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DIPTERA DANICA

PART VI

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DIPTERA DANICA

GENERA AND SPECIES
OF FLIES HITHERTO FOUND IN DENMARK

BY

WILLIAM LUNDBECK

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= vol. 4

PART VI

PIPUNCULIDAE, PHORIDAE

WITH 132 FIGURES

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Pipunculidæ.

Head large, semiglobular, in *Pipunculus* (and *Nephrocerus*) specially large, as long or about as long as broad, puffed out behind the eye-margin and then deeply excavated, in the other genera it is shorter, flat or only slightly concave behind, without any margin

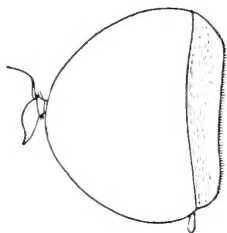


Fig. 1. *Pipunculus zonatus* ♂.

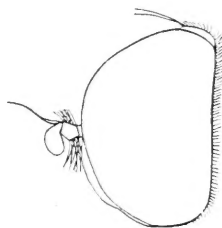


Fig. 2. *Verrallia aucta* ♂.

Head in profile.

behind the eyes (figs. 1 and 2); it is broader than thorax. Eyes generally touching in the male, sometimes quite narrowly separated, in the female separated, but rather narrowly. Vertex with three ocelli; it has in *Nephrocerus* and *Pipunculus* no bristles, but in the other genera there is a pair of long, parallel ocellar bristles, directed forwards. In the males with the eyes touching the vertex and frons are elongately triangular, and when the eyes are only approximate, vertex and frons are narrowly connected; in the females the frons forms a narrow band from the ocelli to the antennæ; vertex, frons and epistoma are not raised above the level of the eyes in *Pipunculus*, but in *Chalarus* and *Verrallia* vertex and epistoma are a little raised and are therefore seen in these two genera, when the head is viewed in profile, but not in *Pipunculus* (figs. 1 and 2). As the family belongs to the *Aschiza* there is no frontal bladder nor bladder-seam, neither is any

lunula present; de Meijere remarks (Bronn: Klass. und Ordn. d. Tier-Reichs V, 3, 1916, 42) that the frons is a little more chitinized just above the antennæ, and this might be interpreted as an indication of a lunula. The eyes are very large, occupying the whole front part of the head, and in *Pipunculus* with the longer head they even are enormous; in *Nephrocerus* they are somewhat reniform behind; they are practically bare, but in reality they have some short, very scarce hairs, only seen under the microscope; in the male the facets are a little enlarged over about the whole eye, decreasing evenly towards the hind margin, in the female the facets are much to very much enlarged in a small space in front around the bases of the antennæ. The antennæ are inserted in the middle of the head, close to each other; they are six-jointed, the basal joint is very small, the second a little larger, somewhat calicular, the third is compressed, oval or irregularly reniform, rarely more roundish, it is dilated downwards so that its long axis is perpendicular to the axis of the antennæ; below it is in *Pipunculus* either more or less pointed or drawn out in a shorter or longer, sometimes rather long rostrum, in the other genera it is rounded below; the three last joints form an arista, which is inserted dorsally on the third joint quite at the base; the basal joints of the arista are quite small, especially the first, and only seen under the microscope; the basal joints, and the base of the third joint form a thickened basal part; the second antennal joint has shorter or longer hairs above and below, sometimes rather long and numerous, especially in *Verrallia*, the third joint is pubescent, generally silvery, the arista is bare with only the basal joints and the thickened basal part of the third joint microscopically hairy, the latter only on the upper side. Epistoma is narrow and forms a band with parallel borders from the antennæ to the oral aperture, in *Chalarus* and *Verrallia* it widens a little downwards. No jowls are developed as the eyes reach quite to the oral aperture. An oral cone is present, but small; clypeus is somewhat horse-shoe-shaped and lies on the front part of the oral cone quite up to the lower end of epistoma, it is, as in other cyclorrhaphous flies, in connection with the pharynx; when in situ its basal part is seen at the end of epistoma as a small knob. The mouth parts are small and as a rule not or slightly seen; labrum and hypopharynx are small, somewhat triangular, of about equal length; the maxillary palpi are rather long, thin, but thickened towards the end and club-shaped; I could not detect any maxillary lacinia. Labium has a chitinized basal part sending out two long processes back-

wards, the labella are relatively very large. Thorax about quadratic, a little arched above; prothorax is small, but it forms a long stalk stretching into the head and carrying it; the stalk is long especially in *Pipunculus* with its hollowed occiput; the propleural parts form above a curious knob at each humerus; postscutellum is relatively large; metathorax is very small and narrow and there is no chitinized metasternum behind the hind coxæ; in *Nephrocerus* humeri and scutellum are somewhat inflated. The thoracic disc is in *Pipunculus* either nearly bare with only short and sparse hairs as dorsocentral rows, or in some species it is more densely haired all over, and there are no bristles; in the other genera it is more pilose, and among the hairs some bristles or longer bristly hairs are discernible, as a rule two posthumeral, a notopleural, a supraalar and two postalar bristles and further a dorsocentral bristle behind, and the scutellum has here at the margin about four to eight stronger hairs or bristles. Propleura have in many species a vertical fan of distinct hairs; otherwise the pleura are bare in *Pipunculus*, in the other genera mesopleura with more or less dense longish hairs behind the suture (on pteropleura Ost. Sack.); metapleura (Ost. Sack.) bare. Abdomen somewhat long and narrow, longest in *Nephrocerus*, it is cylindrical, semicylindrical or more flattened; in the male it consists in *Pipunculus* of five not transformed tergites and four ventrites, the fifth being quite short, in the other genera there are six normal tergites and five ventrites; after these not transformed segments follow the more or less transformed segments, constituting the exterior genitalia. The genitalia are unsymmetrical, curving from left to right and bent in under the venter; according to the above, the transformed segments are in *Pipunculus* five, in the other genera four; in *Pipunculus* the sixth segment is very short and hidden, only visible just at the left side and sometimes a little above, while in the other genera it is visible and normal, but small; the seventh segment is only present on the left side, its tergite bends down on the ventral side, so that it occupies the left half of the breadth of the abdomen both above and below, while its ventrite accordingly gets a vertical position going from the lower side of the tergite to the upper and thereby bordering the left side of the ventral cavity, in which the hypopygium is laid up; the eighth segment lies at the end and generally forms a roundish or irregularly conical knob; it is curved quite over from the left to the right and thus its morphological apical opening points forwards, and lies beside the basal opening; the segment has in *Pipunculus* on its back-

wards turned surface a larger or smaller, curious membranous impression of roundish, oval or elongated shape, often with a longitudinal keel-shaped middle fold; the impression is in some species very small or quite disappearing; in the other genera no such impression is present, the segment here looking as if composed of two pieces, separated by a longitudinal split, but this latter, I think, answers to the impression. *Nephrocerus* I have not seen, but its hypopygium seems to be principally of the same construction; the eighth segment bears to the right, at the end below, the ninth segment, the real hypopygium, which consists of a basal part bearing a pair of more or less elongated triangular, somewhat claw-like appendages, and from the basal part issues below the penis as a thread-like organ, curved or with the end somewhat rolled up; in an excision in the basal part between the bases of the claws is a pair of small, hairy lamellæ, constituting the tenth segment. It will be seen that the genitalia are rather like those in the *Syrphidae*; as there the anterior of the transformed segments are forced to the left, the eighth lying at the end, curving to the right and bearing the ninth below towards the right; also the construction of the ninth segment, the hypopygium itself, is similar to that in the *Syrphidae*. In the female abdomen is in all genera composed of six not transformed segments, next to these follows a curious large hypopygium, consisting of two segments, the first forming an oval or more roundish or cordate, sometimes elongated basal part, ending in a longer or shorter, thin and pointed ovipositor, which is straight or more or less incurved, or on the contrary, recurved. The ovipositor is semitubular with a ventral (upwards turned) canal; on the dorsal side at the base of the ovipositor is an opening, in which two small lamellæ are placed, answering to the last segment; this opening is thus the morphological end of the segment forming the ovipositor, and the ovipositor itself is a ventral prolongation of the segment. The hypopygium is bent in under the venter. According to the above, the female abdomen would consist of only nine segments, but I think a small segment may be present between the sixth and the hypopygium, or else it has quite disappeared. In *Nephrocerus* there are, in addition to the parts mentioned, two semicircular prominent swellings below the sixth abdominal segment. In *Pipunculus* abdomen is generally sparingly and short-haired, in the other genera it has longer hairs especially at the sides; at the sides of the first segment there is always a bunch or fan of longer hairs, but they may be more or less conspicuous and contrasted to the other hairs at the

sides. Legs more or less slender, in some species of *Pipunculus* the femora somewhat thickened; hind tibiæ a little curved in the middle and here a little thickened, and they are somewhat twisted. In *Pipunculus* the legs are mainly short-haired, the femora nearly nude, but in some species the femora have a distinct or even longish ciliation behind, and moreover all femora, or only the posterior, or sometimes only the middle femora have a double row of small spinules below the apical part or half, and in a few species the hind trochanters have small spines below at base and in the female the anterior femora one or two bristles below at base. In the other genera no such spinules or bristles are present, but the femora have long hairs, the anterior femora behind and the hind femora in front. The tibiæ are short-haired and with the hairs partly in rows along the edges; in *Pipunculus* the hind tibiæ may have some longer hairs above on the middle, and in *Verrallia* they have long hairs above in the whole length; the hairs are always shorter in the female than in the male, and in *Verrallia* there are in this sex no long hairs on hind tibiæ; tibial spurs very slight or not developed. Claws and pulvilli generally large and not rarely larger in the female than in the male. Empodium long, bare and bristle-shaped in *Pipunculus*, in the other genera shorter, more spine-like and with hairs below. Wings somewhat to rather long and narrow, especially in *Pipunculus*; costa continued to the end of the discal vein; cubital vein unforked and thus one cubital cell; first posterior cell always open, but narrowly as the last part of the discal vein is bending upwards; the discal vein generally unforked, but in a few species forked at the end, the lower branch not reaching the margin; discal cell long and bordered below by the upper branch of the postical vein, in *Chalarus* the discal cell absent; the medial cross-vein placed at about the first third or fourth of the discal cell, or nearer the middle to beyond it; anal cell long, closed near the margin; axillary vein quite or almost quite absent or in *Verrallia* and in the male of *Chalarus* present only as a weak fold. No real stigma present, but in many species the tip of the mediastinal cell is coloured, in others not; the third costal segment (the segment between the tip of the mediastinal and subcostal veins) varies from much shorter to much longer than the fourth segment. The axillary lobe is not developed in *Pipunculus* and the female of *Chalarus*, but present in the male of *Chalarus* and in *Verrallia*; almost no alula present in *Pipunculus* and *Chalarus*, in *Verrallia* a small one. Squamulæ small, the thoracic almost only consisting of frenulum, the alar squamula a little broader, finely

haired at the margin; the angulus somewhat protruding. In rest the wings lie flat over abdomen.

As seen the venation of the wings is of the Muscid type and it is much like that in *Syrphidae*, but it differs by the invariably open first posterior cell, as well as by the want of vena spuria.

The two sexes in the *Pipunculidae* are, the genital differences not considered, not rarely of a somewhat different aspect, caused by a different pruinosity of thorax and especially of abdomen, this latter being in several species much more shining in the female than in the male or coloured in another way; further the third antennal joint is often more pointed or longer rostrate in the female than in the male, and the wings are relatively shorter and more rounded at apex in the female; this latter fact influences the length of the costal segments, so that especially the third costal segment in comparison with the fourth is as a rule shorter in the female than in the male.

The developmental stages are somewhat known, but only few larvæ have been described and solely of the genus *Pipunculus*, though the habits of *Chalarus* and partly of *Verrallia* are known. The larva is elliptic, a little flattened, whitish and consists of twelve segments, the head included; the surface is transversely corrugated but otherwise smooth, only finely shagreened, rarely (*xanthocerus*) spinose; the transverse furrows divide the segments more or less distinctly into three corrugations, and on the middle or posterior corrugation there seems to be some (8) sensory organs or papillæ looking like circular or oval circlelets (Boheman, de Meijere). The head bears the small, one-jointed antennæ in connection with the maxillary palpi, and the mouth is armed with two hooks; the anterior spiracles lie at the front end of prothorax; the last segment bears at the end above a dark, chitinized, oval, or more transverse plate with the posterior spiracles lying separated, one at each side of the plate; below the plate is the anus. The puparium is reddish or blackish, more or less oval, rounded at the ends; the anterior spiracular tubes are short, a little curved and directed a little forwards, they seem to protrude between the first and second abdominal segments (according to de Meijere's figures in Zool. Jahrb. Syst. 40, 1916, Taf. II, Fig. 143—145); at the posterior end the spiracular plate is present as in the larva; just at the front end the prothoracic larval spiracles are visible. The surface shows as usual the larval organs and corrugations more or less distinctly, it is sometimes almost quite smooth, in other species distinctly corrugate and with rows of depressions along the sides. —

The opening of the puparium by the emerging of the imago is rather interesting, it differs from that in the *Syrphidae*, where two pieces, both dorsal, are detached, as well as from that in the *Muscidae*, where a dorsal and a ventral plate are detached by a rupture near the front margin of the first abdominal segment, so that the spiracular tubes, which protrude through the first abdominal segment more backwards, remain on the puparium. The opening is described by de Meijere l. c. and I can fully confirm his observations. In *Pipunculus* two pieces are detached, a dorsal and a ventral one; the vertical rupture is all round situated in the second abdominal segment near the front margin; the two plates are divided by a horizontal rupture in such a way that the upper plate consists only of the dorsal parts of the first abdominal segment and the narrow margin of the second, the lower plate includes head, all three thoracic segments and the ventral parts of the two abdominal segments; the anterior spiracular tubes evidently protrude between the first and second abdominal segments and are found on the detached dorsal plate near the hind margin. In *Chalarus* and *Verrallia* we now find, that the plates, which are detached off, include the same parts, viz all the anterior segments to just behind the front margin of the second abdominal segment, but the plates are here again subdivided, the upper into three, the lower into two pieces; the lower plate is divided into a lower semi-circular part, including most of prothorax and the ventral parts of the other thoracic and of the abdominal segments to the vertical rupture, and an upper median part, including the rest of prothorax and the dorsal parts of the other two thoracic segments; the upper plate, which consists only of first abdominal segment and the front margin of second, has its lateral parts separated off as two small lateral plates, one to each side of the median plate; there are thus in all five pieces detached, but comprising the same parts as occupied by the two plates detached in *Pipunculus*. The anterior spiracular tubes also here protrude between first and second abdominal segments, and they protrude just in the ruptures between the upper plate and the lateral plates and are therefore not seen on any of the detached pieces, but remain sitting on the delicate pupal skin in the puparium. A comparison with *Pipunculus* shows that the upper plate and the small lateral parts in *Chalarus* answer to the upper plate in *Pipunculus*; this is also seen from the place of the anterior spiracular tubes: the lower plate and the median plate above it likewise answer to the

lower plate in *Pipunculus*¹. As mentioned under *Verrallia* I have examined a pupa of *V. aucta*, which was opened in the same way as in *Chalarus*, only that the upper piece here remained well connected with the puparium (perhaps accidentally, though there was no sign of any rupture), also here the anterior spiracular tubes were found on the pupal skin. The suture dividing the lower and the median plate in *Chalarus* is also indicated in *Pipunculus*, but is not ruptured, and de Meijere thinks it possible that it is not always ruptured in *Chalarus*; this is perhaps also the case, I have seen only two complete puparia of *Chalarus*, and here the median piece remained attached to the lower piece but the suture was distinct, the lateral pieces were separated. On the other hand it is possible that in *Pipunculus* a rupture sometimes may take place in the same way as in *Chalarus*, along the indicated suture between the lower and the median plate, as mentioned by Scott (Ent. Month. Mag. 2, XIX, 1908, 10, fig. 1), though the separation of the two plates here only later on occurred.

The larvæ are well known to be parasitic in *Homoptera*; as mentioned under *Pipunculus* Perkins has bred a large number of Australian and Hawaiian species; of European species only *P. fuscipes* has been bred from *Thamnotettix virescens*, and *Chalarus spurius* from species of *Typhlocyba*; further some larvæ coming from *Homoptera* have been noted but not bred, and some species have been bred from pupæ found on the ground; *Verrallia aucta* has been watched chasing and attacking frog-hoppers. Only as to *Nephrocerus* nothing seems to be known, but no doubt also this genus is parasitic on *Homoptera*, and Verrall remarks, that the English *Nephrocerus* occurs exactly in the same district as the one English, very large *Cicada*. The egg-deposition has not been observed, but after the observation of *Verrallia aucta* made by Jenkinson, there can be little doubt, that the females sting the host with the ovipositor and thus deposite the egg; the larva then lives in the abdomen of the host, when full-grown nearly filling it; at time for pupation it quits the host by rupturing the abdomen from thorax in one side, or rarely through a hole on the dorsal side of abdomen, and then it goes to the ground and hibernates here as pupa beneath the soil or beneath rubbish; rarely the pupa is found fixed on a leaf.

The *Pipunculidae* are a very characteristic family; the species

¹ In de Meijere's figures 141 and 142 the letters D₁ and D₂, indicating the small lateral plates, are wrongly appended to the lower instead of to the upper plate.

are characteristic especially by their large head and large to enormous eyes, also is the head very mobile as it is sitting on a long stalk from thorax; in dried specimens it therefore easily drops off. Characteristic are also the feet with their large pulvilli, sometimes specially enlarged in the female, and the slender and elongate claws, which are yellow with only the apex black, and likewise sometimes longer in the female than in the male. The family is not large, containing only four genera; of these only the three are known from Denmark, but the fourth, *Nephrocerus*, with the largest representatives in the family, reaching to 9,5 mm in length, occurs in North and Middle Europe, one being found in England, though rare; it is thus rather probable that some day it will turn up also here. The family is evidently nearly related to the *Syrphidae* as shown by the wing-venation, the construction of the male genitalia and other characters, but they are always quite distinct. Girschner thinks (Ill. Wochenschr. für Entom. 1897, 587) that they are the most nearly allied to *Baccha*, to which genus they are similar with regard to wings and squamulæ, and he says that *Nephrocerus* forms a transition to *Baccha*, and in this, I think, he may be correct; they also show affinities to the *Platypezidae*. — The species occur in woods and on meadows, hovering on bushes and in low herbage; they are the most exquisite hoverers of all Diptera; they exhibit perhaps less power in the hovering, but more elegance than the Syrphids, of which I think that *Baccha*, *Neoascia* and *Syritta* come next to them in this respect, and the two former genera are perhaps also the Syrphids the most nearly allied to them. The species may be seen hovering on meadows between the grass, no doubt in search for *Homoptera*, and as the females have the facets of the front part of the eyes much to very much enlarged, it may be induced that they observe their victims mainly by sight. Nothing has, I think, been observed with regard to what the species feed upon, and I shall only note, that they do not seem to be attracted by flowers at all.

Of the family about 250 species are known, of which about 85 species are palæartic; there seems to be only one species, *Chalarus spurius*, common to Europe and North America.

The Pipunculids seem to be little attacked by parasitic Hymenoptera; from the literature I know only the one case mentioned by Perkins of the breeding of an Encyrtid from the Australian *P. cinerascens*; Perkins remarks, that just this species has a pupa, which is not subterranean, but fixed on leaves, and that he got no parasites from the numerous species with subterranean pupæ which he has

bred; he therefore thinks these species less exposed to attacks. I have, however, myself bred a Proctotrupid, *Basalys erythropus* Kieff. from a pupa of *P. xanthopus* found in flood refuse; I think the larva is here infested during the short time from its leaving the host until pupation.

Pipunculidae earlier recorded from Denmark: — The only author who has mentioned Pipunculids from Denmark is Zetterstedt, who in 1844 in Dipt. Scand. III enumerates 10 species: *P. pratorum*, *ater*, *fuscipes*, *geniculatus*, *sylvaticus*, *rufipes*, *fulvipes*, *varipes*, *ruralis* and *spurius*, and in 1849 in VIII he further mentions *nigritulus* and *flavipes*. Of these species *geniculatus* (nec Meig.) is by Verrall considered as a new species *incognitus*, this species, however, is not found in our collection, but there is a specimen from Stæger of *nigritulus*, labelled *geniculatus*, and, according to some manuscript notes from Stæger, it also seems to be this species which he called *geniculatus*, and I therefore think that Zetterstedt's record (probably he had seen no Danish specimen but got information from Stæger) refers to this species, which thus is the same as the later on recorded *nigritulus*; I have seen *geniculatus* in Zetterstedt's collection; there are two males, and they fully answer to Becker's description of his *geniculatus* = *incognitus* Verrall; *fulvipes* is = *maculatus*; *ruralis* Zett. has never been interpreted with certainty, the species is not found in our collection, and I think it probable that the species may have been a *fuscipes*; in Zetterstedt's collection the species was not found, there was only a label with the inscription "5, Stæger"; finally *flavipes* is = *Braueri*. Thus Zetterstedt knew in 1849 ten or, if his *ruralis* was distinct, eleven Danish species. In the present work 28 species are enumerated.

Table of Genera.

1. Head about as long as broad and as long or longer than thorax, puffed out behind along the eye-margin and then deeply hollowed; no ocellar bristles; third antennal joint pointed or rostrate below; thorax and abdomen almost bare or only short-haired; no bristles present. 1. *Pipunculus*.
- Head shorter than broad and shorter than thorax, not puffed out behind the eye-margin, and the back flat or slightly concave; ocellar bristles present; antennæ with the third joint rounded below; thorax and abdomen longish pilose and with some bristles. 2.
2. No discal cell present. 2. *Chalarus*.
- A discal cell present 3. *Verrallia*.

1. **Pipunculus** Latr.

Species of rather small to medium size, of dark, generally blackish or brownish, sometimes more greyish colours, rarely with yellow side spots on abdomen in the female. The head (fig. 3) is very large, semiglobular, as long or about as long as broad, it is not only broader but in all respects larger than thorax; behind it is very deeply excavated, but behind the eyes it is puffed out to a somewhat broad margin all round, this margin is finely hairy and along the edge between the puffed out part and the deep excavation there is a row of fine erect hairs. Eyes very large, occupying nearly the whole head, leaving only the margin along the eyes behind; the eyes are generally touching in the male, but in some species scarcely touching or in reality narrowly separated; in the female they are separated, but narrowly. In the male there is thus an elongated vertical and a similar frontal triangle which are narrowly connected in the species with the eyes separated. In the female vertex and frons form a narrow band with parallel borders or slightly widened in the middle and very finely hairy; the vertex bears three ocelli but there are no ocellar bristles. Vertex, frons and epistoma are not raised above the level of the eyes and thus not seen in profile. Eyes practically bare; in the male the facets are very slightly enlarged on the whole front part, decreasing evenly in size towards the posterior margin, in the female the facets just on the front part of the eyes around the antennæ are much to exceedingly enlarged. The antennæ are inserted in the middle of the head quite near to each other, the third joint is oval, elongated oval, or somewhat reniform, more or less pointed below or here with a shorter or longer rostrum, it is generally more pointed or longer rostrate in the female than in the male; the second joint is short-haired or has long hairs above and below, the third joint is pubescent. Epistoma forming a narrow band of about the breadth of the frons, it stretches from the antennæ to the oral aperture, its last part thus becoming horizontal; as the eyes go quite to the oral aperture no jowls are developed. An oral cone is developed, but not large; clypeus is somewhat horse-shoe-shaped, lying on the front side of the oral cone, its basal or median part is seen just below the end of epistoma. The mouth parts are small, generally not

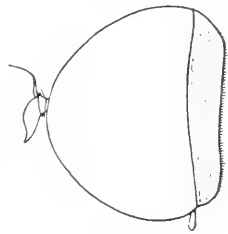


Fig. 3. *Pipunculus*
zonatus ♂.
Head in profile.

stretching beyond the oral aperture; labrum and hypopharynx are small, of about aequal length, somewhat triangular, the maxillary palpi somewhat long, one-jointed and club-shaped; the maxillæ are by Becher described and figured as lancet-like, a little longer than labrum and pointed. I was not able to find them and I doubt their existence as free processes; labium is relatively not small, its chitinized ventral plate sends two long processes backwards, the labella are very large. Thorax is about quadratic, a little arched above, the

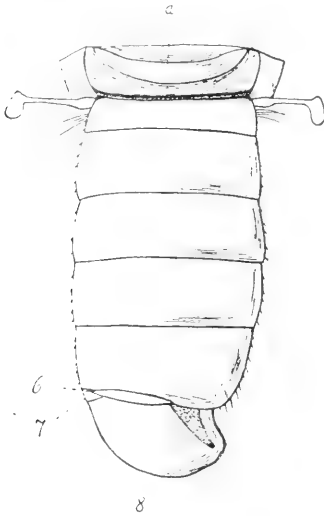


Fig. 4. Abdomen of *P. zonatus* ♂ from above. *a* postscutellum, behind it the narrow metanotum. 6, 7, 8, sixth, seventh and eighth segments. The unsymmetrical hind margin of the fifth segment is seen.

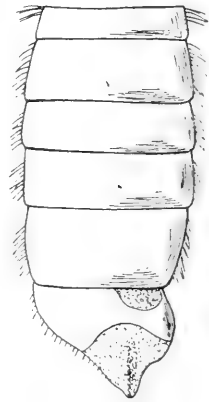


Fig. 5. Abdomen of *P. Thomsoni* ♂ from above; in this species sixth and seventh segments are not visible on the dorsal side; the last segment is the eighth with its apical impression.

prothoracic parts form at the humeri a curious, somewhat elevated knob; the thoracic disc has generally very sparse and fine, sometimes scarcely perceptible hairs, present only as dorsocentral rows and behind the humeri, but in some species the disc is relatively densely clothed all over with more obvious hairs and in this case scutellum bears similar hairs. Thorax has no bristles; the marginal hairs on scutellum are often a little longer than the other hairs, in *furcatus* (non-Danish) somewhat bristly; on propleura there is in many species a fan of distinct hairs. Abdomen elongated, cylindrical

or semicylindrical, sometimes a little more flattened, the tergites form by far the largest part and are arched, while the ventrites are plane and somewhat narrow; in the female abdomen is sometimes a little broader behind than at the base. In the male abdomen has five not transformed dorsal segments of about equal length except the fifth, which is the longest; in some species the fifth segment has the hind margin a little unsymmetrical, the segment being a little longer on the right than on the left side (fig. 4). On the ventral side

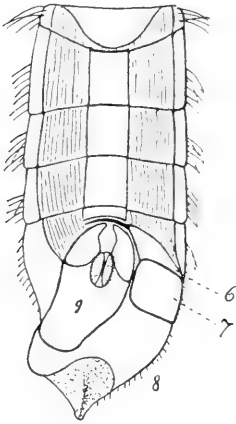


Fig. 6. *P. Thomsoni* ♂; abdomen from below; 6, sixth segment with its ventrite, 7, seventh segment, 8, eighth segment with its apical impression, 9, hypopygium.

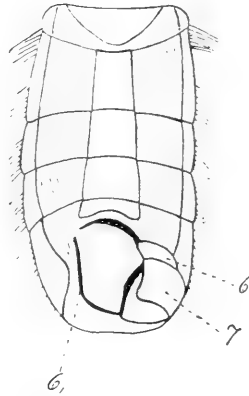


Fig. 7. *P. Thomsoni* ♂; abdomen from below; eighth segment and hypopygium removed; 6, sixth segment with its ventrite, 7, seventh segment with its vertical ventrite, 6₁, the narrow, here quite hidden, dorsal part of the sixth segment.

there are only four not transformed segments, the fifth being quite short and not or slightly chitinized. After the normal segments follow those which are transformed and constitute the exterior genitalia. The genitalia apparently form a large, roundish or conical knob at the end of abdomen with a smaller or larger, sometimes nearly or quite wanting apical membraneous impression (fig. 5). On a closer examination we find on the left side below next to the large fifth dorsal segment a very small sixth segment, it is triangular and lies at the left hing corner of the fifth, (figs. 6, 7) but in reality it is present

in its whole breadth above, but very short and hidden, rarely seen here just behind the fifth segment (fig. 4); this segment sends a narrow ventral chitinization along the hind margin of the small fifth ventral segment, so that it is present all round but very narrow (figs. 6, 7); then follows a similar, but a little larger seventh segment, likewise on the left side, also stretching up dorsally, but here hidden; like the sixth it has a narrow ventral chitinization, but lying on the left side and nearly vertical; this segment is thus wholly confined to the left side (figs. 6 and 7); after the seventh comes the large eighth segment, it occupies the whole end, but its morphological base is on the left side and then it turns quite over to the right, so that its morphological apical aperture points forwards and lies beside the basal aperture; it varies somewhat in shape and size, but is generally roundish or more or less irregularly conical; it bears at the end (the part pointing backwards), generally somewhat to the right, a curious, larger or smaller membranous, impressed area, sometimes with a longitudinal keel-shaped, protruding fold (figs. 5, 6); the impression may be roundish, oval or triangular or sometimes very narrow, slit-like, and it may vary from very large to quite small and be nearly or quite wanting; after this eighth segment follows on the right side below, the ninth segment, the real hypopygium; it consists of a basal part ending with two, somewhat triangular, pointed claws or clasping appendages, and below these latter the penis issues; at the hind margin of the basal part, in an excision between the bases of the claws, there is a pair of small, oval, hairy lamellæ, constituting the tenth segment (fig. 6). As said there are only four not transformed ventral segments, the fifth being quite narrow and slightly chitinized, but as seen there is a narrow ventrite to the sixth segment and a similar, vertically situated one, to the seventh, and these chitinized stripes border as it were a groove, otherwise membranous, in which the hypopygium is laid up (fig. 7); sometimes the fourth ventral segment is excised in the hind margin for the reception of the ends of the claws on hypopygium. The male genitalia are, as already mentioned, very like those in the *Syrphidae*, even the curious membranous impression has its homologon in the Syrphid genus *Sphaerophoria*, where likewise a curious membranous space is present, with a small indication of a raised fold. In the female abdomen consists of six not transformed segments with normal tergites and ventrites, then follows the hypopygium, which consists of a basal part, that is generally oval, sometimes broader and cordate in shape ending in

a long, pointed, straight or sometimes incurved or recurved ovipositor; the basal part sometimes tapers evenly into the ovipositor, or this latter issues more suddenly from the basal part; the basal part and the ovipositor are each formed of a segment, in the present genus the two segments are, however, such connate that a division into two segments cannot be seen, but in *Verrallia* the division is visible; the ovipositor is semitubular with the cavity upwards (when in normal position, the canal is ventral); the morphological apical opening of the segment forming the ovipositor lies on its dorsal base, and in this opening two small hairy lamellæ are seen, constituting the last segment; the ovipositor itself is thus a ventral prolongation of the segment; the whole hypopygium is bent in under the venter. As there are six normal abdominal segments and then two forming the hypopygium and a small last segment with the end lamellæ, we get in all nine segments, but as the real number is no doubt ten, there is, I think, a small segment at the base of the hypopygium, if it has not quite disappeared, in some species it, however, seems to be indicated above, just at the base of the hypopygium. Abdomen is short and very sparingly hairy, sometimes a little more, and the hairs may be longer at the sides or towards the end; at the sides of the first segment there is a bunch or fan of longer hairs, which may be conspicuous or somewhat bristly, or they may be smaller and less conspicuous. — I shall here note, that Perkins (l. c. 127) mentions, that in species of *Pipunculus* the surface of abdomen, especially in the males, often shows a number of depressions, variable and of irregular form; I have also seen such impressions, which are, in the species I have studied, present especially on the last segment, sometimes also more forwards, and I think that they belong to the same category. I have, however, not found them so variable as stated by Perkins; they have already been mentioned by Thomson, who uses them as characters in several species. — Legs somewhat slender, sometimes the femora a little thickened; the hind tibiæ are somewhat curious, they are a little curved and thickened in the middle, and the apical part is somewhat concave on the posterior side below the middle; the femora are either all dull, or the hind femora or all three pairs are more or less shining below and behind, and this gives some distinguishing characters; the legs are upon the whole short-haired, the femora are often nearly bare, but sometimes they have a distinct ciliation behind, which may be rather conspicuous and longish, especially on the middle pair, and then there are also some

other longish hairs on the femora; all femora or only the posterior, or sometimes only middle femora have double rows of small spinules below the apical part or half. In some species the hind trochanters are armed below at the base with small spines in both sexes, and in the female the anterior femora armed with a couple of bristles below at base; the tibiæ are short-haired and with the hairs partly arranged in longitudinal rows along the edges, sometimes the hind tibiæ have some longer hairs, especially about the middle; there are no or only slight apical spurs. Claws and pulvilli are large, and in several species larger in the female than in the male, the claws are yellow with black apex; empodium bristle-shaped, bare. Wings long and narrow, alula so much reduced that it is practically absent, axillary lobe not developed, though the margin here is different in the different species and sometimes tends towards forming an axillary lobe, and then a weak axillary fold also may be indicated; the apical part of the mediastinal cell coloured or not (in the descriptions given as stigma present or absent); medial cross-vein placed at about the first third of the discal cell or nearer the middle to beyond it, discal vein unforked, rarely forked (*furcatus*, non-Danish).

The developmental stages are somewhat known; the species are parasitic on *Homoptera*; Perkins records (Rep. of work of the Exper. Stat. of the Hawaiian Sugar planters Ass. Bull. 1, Part IV, 1905) a large number of bred Australian and Hawaiian species; the author gives a list of the literature, to which I refer. Further Scott (Ent. Month. Mag. 2, XIX, 1908, 9) bred *P. melanostolus* from a pupa, de Meijere (Zool. Jahrb. Syst. 40, 1916, 234) describes two undetermined larvæ, and Haupt (Zeitschr. f. wissensch. Insektenbiol. XII, 1916, 275) records that he has found *Homoptera*, most often species of *Deltocephalus*, from which Pipunculid larvæ evidently had gone out. The larvæ affect both *Cercopidae*, *Jassidae* and *Fulgoridae* and nymphs as well as imagines; whether the same species of *Pipunculus* attacks *Homoptera* of different families is not known, but Perkins thinks it probable, and at all events it is known, that the same species of *Pipunculus* may attack very different species of *Homoptera* within the same family. Of European species *P. fuscipes* was bred by Boheman from *Thamnotettix virescens*, Ott bred *P. xanthocerus* from a pupa sitting on a *Ribes* in spring, and Mik mentions a *Pipunculus* larva in *Grypotes puncticollis*, and finally Scott bred, as mentioned, *P. melanostolus* from a pupa found in rotten wood. I possess myself *P. ater*, *haemorrhoidalis* and *xanthopus* bred from pupæ, and I have also

examined a puparium of *fuscipes* and of *nigritulus*; the pupæ were in all cases found in spring in flood refuse. According to the descriptions the larva is whitish, elliptical, a little flattened, and pointed in front; the dermis is transversely corrugated, so that each segment is subdivided into three corrugations, but otherwise the surface is rather smooth; the head bears small, one-jointed antennæ and connected with these maxillary palpi as usual in cyclorrhaphous larvæ; the mouth has the usual two hooks; the anterior spiracles lie at the front margin of prothorax; at the end of the last segment above is a generally dark plate of various shape which bears the posterior spiracles, these latter lie always more or less separated at each lateral corner of the plate; below the spiracular plate the anal opening is found; the larva consists of twelve segments including the head. The puparium is of a reddish or dark brown colour and of a more or less oval shape, rounded at each end, and sometimes slightly flattened on the ventral side; the anterior spiracular tubes are small and short, generally curved forwards, the posterior spiracular plate is seen as in the larva; in some respects the puparia seem to be different, thus, according to the figures by Perkins, the posterior spiracular area may be more or less deeply impressed with one to three tubercles at each side. In one of Perkins' species (*cinerascens*) the puparium has on the place for the anterior spiracles two large and thick processes belonging to the puparial wall and through the ends of which the small spiracular tubes protrude. The puparium of *xanthocerus* is likewise curious, it is described by Ott as richly covered with hairy spines, so that he compares it with a *Hispa*, and consequently also the larva must be spinose. Also otherwise the puparia may be various as regards the surface, this being either almost quite smooth or somewhat sculptured. Of the puparia I have examined myself that of *fuscipes* quite agrees with the description and figure by Boheman (Öfvers. Kgl. Vet. Akad. Förh. 11, 1854, 305, Taf. V, figs. 6—8), it is reddish, oval with rounded ends and slightly corrugated, the spiracular plate distinctly shows the two small prolongations upwards figured by Boheman, the anterior spiracular tubes are yellow, curved forwards; the puparium of *ater* is reddish, quite oval with rounded ends, the surface is nearly smooth, only very finely shagreened; the posterior spiracular area is not impressed, small, narrowly oval with the spiracles at each side, in the middle are two small, darker spots above and a larger, black spot below (about as in de Meijere l. c. fig. 139); the puparium of *haemorrhoidalis* is more cylindrical, almost black, the surface is finely sha-

greened and covered with a number of impressions, which are transverse on the dorsum and two on each segment, roundish or somewhat funnel-shaped on the sides and here forming about four longitudinal rows, the impressions being more or less connected by oblique impressed lines; the posterior spiracular plate is not impressed, narrowly oval with the spiracles at each side; the puparium of *xanthopus* is quite similar to that of *haemorrhoidalis* and sculptured in the same way, and also the puparium of *nigritulus* is similar, but it is less dark, more finely shagreened and the impressions, both dorsal and lateral, are much less marked, so that the puparium upon the whole is less sculptured; the fourth lateral row has the impressions prolonged ridge-like downwards; the puparium of *melanostolus*, described by Scott, seems to be similar.

The larvæ live in the abdomen of the *Homoptera*, when full grown nearly quite filling it, and with the head turned forwards; when time for pupation comes, the larva splits the base of abdomen from metathorax in one side and quits the host. Perkins mentions one species, where the exit took place through a hole on the dorsum of abdomen; after leaving the host the larva as a rule goes to the ground and pupates here a little below the surface, hibernating as pupa; in two species, *xanthocerus* and the Australian *cinerascens*, the larva does not go to the ground but fixes the puparium on a leaf. The oviposition has not been exactly watched, but Perkins has seen species when hovering dart to the underside of leaves, where *Homoptera* were congregated, and as mentioned under *Verrallia* Jenkinson has seen *V. aucta* pounce upon frog-hoppers and in one case he saw the *Verrallia* sitting on the back of the frog-hopper; thus there can be no doubt I think, that the Pipunculid stings the Homopteron with the ovipositor, the egg passing through the canal on the ventral side of the ovipositor.

The species of *Pipunculus* occur in woods, especially in somewhat humid places, and on meadows, hovering on bushes and in grass, evidently here seeking *Homoptera*, and they are very exquisite hoverers. Most of the species are rather scarce, and I have rarely met with them in larger numbers. The genus is by far the largest in the family, the other three genera together comprising only about a dozen species in all.

Of this genus about 75 palæartic species are known; 25 have hitherto been found in Denmark.

Table of Species.

1. Stigma present (i. e. third costal segment coloured) and about as long or longer than next costal segment.	2.
— Stigma absent and third costal segment from half as long to one quarter of the next costal segment.	26.
2. Abdomen all dull; femora without pubescence behind, even on middle femora.	3.
— Abdomen more or less shining, at least on the hind margins of the segments; femora with pubescence behind, at least on middle femora (except <i>zermatensis</i>)	15.
3. Legs quite black	1. <i>melanostolus</i> .
— Legs not quite black.	4.
4. Abdomen velvet black with pale grey hindmarginal bands	8. <i>sericeus</i> .
— Abdomen brown with greyish hindmarginal spots or bands	5.
5. Males	6.
— Females	10.
6. Hypopygium with a large impression.	7.
— Hypopygium with a small or smallish impression, roundish, oval or somewhat triangular, sometimes nearly or quite disappearing.	8.
7. Larger species, 3,5—4,5 mm.	2. <i>zonatus</i> ♂.
— Small species, 2,4—3,3 mm.	3. <i>fuscipes</i> ♂.
8. Third antennal joint short-pointed, not rostrate; tibiæ mainly dark	4. <i>montium</i> ♂.
— Third antennal joint more or less long-rostrate; tibiæ mainly yellow.	9.
9. Third antennal joint yellowish; stigma shorter than next costal segment; impression on hypopygium not quite small, oval	5. <i>coloratus</i> ♂.
— Third antennal joint dark; stigma as long or fully as long as next costal segment; impression on hypopygium quite small, roundish, sometimes nearly or quite disappearing.	7. <i>terminalis</i> ♂.
10. Hypopygium with a middle furrow.	11.
— Hypopygium without middle furrow.	14.
11. Frons all grey.	7. <i>terminalis</i> ♀.
— Frons black above.	12.
12. Third antennal joint yellow; tibiæ and tarsi mainly yellow.	6. <i>sulcatus</i> ♀.
— Third antennal joint dark; tibiæ and tarsi mainly black or brownish	13.
13. Middle cross-vein near the end of the first third of the discal cell; size 3,5—4,5 mm	2. <i>zonatus</i> ♀.
— Middle cross-vein nearer the middle; size 3—3,5 mm	4. <i>montium</i> ♀.

14. Frons black above; last abdominal segment without middle furrow; humeral knob dark and legs mainly dark..... 3. *fuscipes* ♀.
 — Frons quite grey; last abdominal segment with a middle furrow; humeral knob yellow and legs mainly yellow..... 5. *coloratus* ♀.
15. Thoracic disc distinctly and relatively densely hairy all over; middle femora with obvious ciliation behind; tibiæ not quite yellow or mainly dark..... 16.
 — Thoracic disc nearly bare, with fine hairs only as dorsocentral rows and behind humeri; middle femora with a more faint ciliation behind; tibiæ quite yellow or nearly (in *zermattensis* no ciliation on femora and legs dark, but this species has an incomplete stigma)..... 23.
16. Males..... 17.
 — Females..... 20.
17. Abdomen shining, without velvet bands..... 10. *spinipes* ♂.
 — Abdomen with velvet bands..... 18.
18. Thorax shining; the velvet bands on abdomen narrow 9. *varipes* ♂.
 — Thorax pruinose, more or less dull; the velvet bands on abdomen broader..... 19.
19. Abdomen with the velvet bands of medium breadth and with distinct grey lateral spots; frons brown.. 11. *Thomsoni* ♂.
 — Abdomen with the velvet bands very broad and without or with indistinct brownish lateral spots; frons dark or blackish brown..... 12. *ater* ♂.
20. Thorax rather shining; ovipositor strongly recurved; legs mainly yellow; humeral knob yellow..... 9. *varipes* ♀.
 — Thorax more or less pruinose; ovipositor straight or slightly curved; legs darker; humeral knob dark..... 21.
21. Thorax (generally) somewhat shining behind; ovipositor somewhat longer than the basal part..... 10. *spinipes* ♀.
 — Thorax more dull; ovipositor of about the length of the basal part..... 22.
22. Frons quite grey; ovipositor straight or nearly so.. 11. *Thomsoni* ♀.
 — Frons black above; ovipositor somewhat recurved. 12. *ater* ♀.
23. Stigma incomplete, not reaching the tip of the mediastinal vein; legs nearly all black..... 13. *zermattensis*.
 — Stigma complete; legs mainly yellow..... 24.
24. Legs quite yellow and humeral knob yellow..... 14. *Braueri*.
 — Legs not quite yellow and humeral knob dark..... 25.
25. Third antennal joint not rostrate; only hind femora shining behind..... 15. *semifumosus*.
 — Third antennal joint rostrate; all femora shining behind..... 16. *pulchripes*.
26. Middle cross-vein much before the middle of the discal cell..... 27.

- Middle cross-vein about or beyond the middle of the discal cell. 33.
27. Eyes in male not touching; legs in female not quite yellow (see *semimaculatus*). 28.
- Eyes in male touching; legs in female practically all yellow. 32.
28. Male hypopygium without impression; female hypopygium with the basal part small, the ovipositor considerably longer; size 4,2—4,5 mm. 17. *rufipes*.
- Male hypopygium with impression; female hypopygium with the ovipositor not longer than the basal part; smaller species. 29.
29. Third antennal joint yellow, very long-rostrate. 19. *xanthocerus*.
- Third antennal joint dark or not long-rostrate. 30.
30. Femora mainly black; male hypopygium very large with a large impression; female hypopygium yellow, flat, short and broad. 18. *haemorrhoidalis*.
- Femora mainly yellow; male hypopygium with a small impression; female hypopygium yellow, ellipsoidal. 31.
31. Femora with a distinct black ring at base. 20. *xanthopus*.
- Femora all yellow or practically all yellow. 22. *semimaculatus*.
32. Humeral knob yellow; male hypopygium not large; female hypopygium black. 21. *maculatus*.
- Humeral knob black; male hypopygium large; female hypopygium yellow. 22. *semimaculatus*.
33. Eyes in male touching for only a very short space; thorax greyish or whitish pruinose, when seen from in front; abdominal hairs pale. 23. *littoralis*.
- Eyes in male touching for a longer space; thorax not greyish or whitish; abdominal hairs dark. 34.
34. Abdomen in male with the hairs somewhat long, hypopygium with a long, oblique, narrow furrow; hind trochanters in both sexes armed with small bristles below at base and anterior femora in female with a couple of bristles below at base; tarsi yellow; claws and pulvilli in female larger than in male. 24. *sylvaticus*.
- Abdomen in male with the hairs short, hypopygium with a broad impression; hind trochanters and anterior femora unarmed; tarsi black, claws and pulvilli in female not larger than in male. 25. *nigritulus*.

As seen from the table the species fall into several rather well distinguished groups, five in all, already more or less used by Thomson, Becker and Verrall. First the species are divided into two larger groups, one with a coloured stigma about as long as next costal segment, the other without stigma and the third costal segment much

shorter than the next. The first group again divides into three smaller groups: 1, the species with a quite dull abdomen in both sexes; this group comprises the species 1 to 8; 2, the species with a more or less shining abdomen, with thorax and scutellum relatively densely hairy all over and with femora, especially middle femora, obviously ciliate behind; this group comprises the species 9 to 12; 3, the species with a considerably shining abdomen, thorax and scutellum nearly bare with hairs only as dorsocentral rows and at humeri, and with the femora with only a faint (or no) pubescence behind; this group comprises the species 13 to 16. The second larger group, without stigma, divides into two smaller groups: 4, the species with the middle cross-vein situated much before the middle of the discal cell, comprising the species 17 to 22 and 5, the species with the middle cross-vein at or beyond the middle of the discal cell, comprising the species 23 to 25. It will be seen, that only group 2 has thorax and scutellum hairy all over, all the other groups have hairs only as dorsocentral rows and at the humeri; further only group 2 and 3 have a distinct ciliation behind the femora, especially middle femora, this ciliation is obvious in group 2, faint in group 3 and here it is wanting in *zermattensis*; all the other groups have no such ciliation or pubescence. Perkins remarks that for the Australian and Hawaiian species only the division into the stigmated and non-stigmated groups holds good, while the other groups are not satisfactory for these species; the groups, he uses, with characters from the various pointing or rostration of third antennal joint and from the hairs at the sides of first abdominal segment being bristly or not, would, on the other hand, not be practicable for our species, as these characters are here very graduated.

1. *P. melanostolus* Beck.

1897. Beck. Berl. Ent. Zeitschr. XLII, 40, 5 et 1900, XLV, 220, 5 et 1921. Wien. Ent. Zeitg. XXXVIII, 123. — 1910. Kertész, Cat. Dipt. VII, 377 (*Dorylas*).

Male. Frons and epistoma shining whitish. Occiput greyish, brown above. Antennæ black, third joint oval, pointed but not distinctly rostrate, second joint with conspicuous hairs above and longer below. Thorax brown, dull, with an indication of three less dull stripes; on the sides behind the humeri it is greyish; the disc has very sparse, short brownish hairs, only present as dorsocentral rows,

but on the grey spots behind the humeri are distinct, longer black hairs; scutellum a little shining, the marginal hairs small. Pleura and postscutellum grey. Abdomen black, dull, the hind margins of the segments broadly greyish, on the sides there are large, triangular, whitish grey spots, on the first segment nearly meeting in the middle. Abdomen is sparingly and short-haired, on the sides of first segment an inconspicuous tuft of a little longer hairs. Hypopygium blackish above, whitish grey below, with a nearly horizontal small slit. Legs black, dull, only the hind femora shining on the posterior and postero-ventral side; the legs short-haired, femora nearly bare, and only middle femora with just discernible small spinules below the apical part, hind tibiae with a distinct fringe above. Wings a little brownish tinged, stigma brown, nearly double as long as next costal segment; middle cross-vein at about the first third of the discal cell. Halteres black.

Female. Frons black and somewhat shining above, greyish on the lower half, on the black part an elongated elevation stretching from near the vertical triangle more than half way down. Abdomen with the bands more brownish. Hypopygium large and long, reaching almost to the base of abdomen, the basal part elongated, without furrow, black and shining; it somewhat evenly passes into the thickened basal part of the reddish ovipositor, which tapers into a thin, incurved apical part. Wings with the stigma not much longer than next costal segment.

Length 4,5 mm.

P. melanostolus is a distinct and beautiful species, it is very rare in Denmark, only three specimens, two males and a female have been taken, on Lolland at Maglemer and in Merrits Skov ^{9/7} 1873 (Schlick) and at ^{22/7} 1913 (Sønderup).

Geographical distribution: — Europe down into Italy; it is not known north of Denmark.

2. *P. zonatus* Zett.

1849. Zett. Dipt. Scand. VIII, 3206, 5—6 et 1855. XII, 4683, 5—6. — 1862. Schin. F. A. I, 248. — 1869. Thoms. Opusc. Entom. II, 115, 12. — 1897. Beck. Berl. Ent. Zeitschr. XLII, 52, 18, Taf. II, Fig. 9 et 1900. XLV, 223, 18 et 1921. Wien. Ent. Zeitg. XXXVIII, 126, 127. — 1901. Verr. Brit. Flies. VIII, 86, 2. — 1902. Girsch. Wien. Ent. Zeitg. XXI, 123. — 1910. Kertész, Cat. Dipt. VII, 385 (*Doryglas*). — *Cephalops pratorum* Fall p. p. 1816. Dipt. Suec. Syrph. 15, 1.

Male. Vertex black, frontal triangle and epistoma greyish white; occiput grey, brownish above. Antennæ blackish brown, pale-haired, with a rostrum of medium length. Thorax brown, dull, indistinctly darker at the sides and with a likewise indistinct dark middle line; behind the humeri a grey spot and the disc a little grey in front of scutellum; the disc has sparse, short, dark hairs only as dorsocentral rows and behind the humeri; the hairs at the margin of scutellum a little longer and stronger. Pleura and postscutellum grey. Abdomen brown, dull, with grey hind margins to the segments, broadest at the sides and more or less interrupted in the middle and thus forming grey triangular lateral spots; first segment nearly quite grey except in the middle. Abdomen is sparingly haired with short, blackish hairs, first segment has on each side a bunch of short, black bristles. Hypopygium of medium size, with the apical impression large, oval, broadest above; the claws reddish. Legs black, greyish pruinose, the trochanters obscurely brownish, knees and about the basal half of tibiæ yellowish, tarsi brownish, palest at base; hind femora shining on posterior and ventral side; the legs are all short-haired, femora a little spinulose below the apical half, especially the middle femora with two distinct rows. Wings a little brownish tinged, stigma brown, as long as next costal segment; middle cross-vein a little behind the basal third of the discal cell. Halteres brown, the peduncle paler.



Fig. 8. Antenna of *P. zonatus* ♂. × 90.

Female. Frons and epistoma narrow, the frons black above, white downwards, it has a longitudinal keel from the ocellar tringle ending with a little knob above the antennæ; third antennal joint a little more pruinose than in the male and with a longer rostrum. Abdomen with the grey spots larger; hypopygium pearshaped, greyish black, shining above, with a longitudinal furrow; the ovipositor reddish, as long as the basal part, slightly incurved just at apex. Claws and pulvilli larger than in the male. Wings with the stigma shorter than the fourth costal segment.

Length 3,5—4,5 mm.

P. zonatus is not rare in Denmark, Dyrehaven, Egebæks Vang, Faxe Ladeplads (the author), on Lolland at Maglemer and in Merrits Skov (Schlick), on Funen at Veflinge, in Jutland at Hejls south of

Kolding, Ry and Albøg, and on Bornholm at Rø and Hasle (H. J. Hansen, the author); the dates are $^{11}/_6$ — $^{28}/_7$; I have taken it in copula on $^{19}/_7$. It occurs in humid places in woods hovering at bushes, the copulated pairs were seen beautifully hovering.

Geographical distribution: — Europe down into Italy, towards the north to southern Sweden.

3. *P. fuscipes* Zett.

1844. Zett. Dipt. Scand. III, 953, 5 et 1855. XII, 4682, 5 et 1859. XIII, 6057, 5. — 1862. Schin. F. A. I, 247. — 1869. Thoms. Opusc. Entom. II, 116, 13. — 1897. Beck. Berl. Entom. Zeitschr. XLII, 54, 20 et 1900. XLV, 223, 20 et 1921. Wien. Ent. Zeitg. XXXVIII, 126, 127. — 1901. Verr. Brit. Flies VIII, 89, 5. — 1910. Kertész, Cat. Dipt. 373 (*Dorylas*). — *P. ruralis* Strobl, 1894. Mittheil. Nat. Ver. Steierm. XXX, 5.

Male. Vertex black, shining, frons and epistoma silvery shining seen from above; the frons shorter than in *zonatus*. Occiput grey, dark brown above. Antennæ black or blackish, third joint with a short rostrum. Thorax dark brown, dull, a spot on the anterior surface, inwards to the humeri and a spot behind the humeri grey, the disc is very sparingly short-haired, the hairs only forming dorsocentral rows, they are a little more conspicuous behind the humeri; scutellum with small marginal hairs. Pleura and postscutellum grey. Abdomen brown, dull, with greyish spots on the lateral hind corners of the segments; it is sparingly clothed with short hairs, at the sides of first segment a bunch or fan of longer, black hairs. Hypopygium of medium size, short, blackish, a little shining; its whole apical surface occupied by a large oval impression, the membrane of which sometimes forms a protruding fold. Legs black, a little greyish and dull, hind femora shining on the posterior and posteroventral side; knees, base of tibiæ and also apex yellowish, tarsi brownish, palest at base; the legs sometimes paler, tibiæ with a broad dark ring before apex, and tarsi paler only last joint dark, the legs short-haired, femora almost bare, slightly spinulose below the apical part. Wings long and narrow, a little tinged, stigma brown, a little shorter than next costal segment; medial cross-vein just anterior to the first third of the discal cell, situated below the apex of the mediastinal vein. Halteres blackish.

Female. Frons a little broader than in *zonatus*, black above but silvery shining on the lower part, above the antennæ a short keel or

elongated knob; antennæ with the third joint smaller and paler than in the male, the rostrum longer. Abdomen somewhat broad, the side spots larger, confluent along the sides. Hypopygium not large, greyish, without furrow, at most with a small impression at the base, ovipositor short, straight. Wings with the stigma shorter than the next costal segment. Halteres paler than in the male, brown or brownish yellow.

Length 2,4—3,3 mm.

P. fuscipes is somewhat common in Denmark, Søndermarken (the author), Utterslev Mose (Schlick), Lersø, Charlottenlund (Stæger), Dyrehaven (H. J. Hansen), Geel Skov, Søllerød (the author); the dates are ²⁶/₅ into July; a pupa was taken in Utterslev Mose in flood refuse in spring, the imago came in May (Schlick).

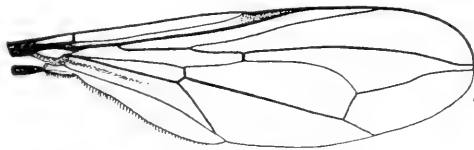


Fig. 9. Wing of *P. fuscipes* ♂.

Geographical distribution: — Europe down into Spain and Italy, towards the north to middle Sweden.

Remarks: Some words about the synonymy are needed, as it would seem from the literature that the two sexes of *fuscipes* Zett. were not one species; Becker says (Wien. Ent. Zeitg. XXI, 1902, 16) that of the types of Meigen to *pratorum* the male is *fuscipes* Zett. (vide Corrigenda p. 74) the female *fuscipes* Zett., but he does not say, whether the male and female belong to one species; Girschner (ibid. XXI, 1902, 123) quotes under *pratorum* Fall. emend. Meig. only *fuscipes* Zett., so that he evidently considered them as different, as also declared by Verrall, but in 1915 and 1921 Becker (ibid. XXXIV, 65 et XXXVIII, 166) cites *fuscipes* Zett. ♀ under *pratorum* Fall. emend. Meig., so that he seems to be of opinion that Meigen's types belonged to one species. Now it is beyond doubt that male and female of *fuscipes* Zett. are one species; as Zetterstedt says "Stæg. in litt." the name is originally due to Stæger, and in our collection there are many specimens from Stæger, also two pairs in copula, which may be considered at all events as co-types, and moreover I have seen Zetterstedt's types which likewise are the present species. Now if it is

correct that Meigen's types to *pratorum* Fall. are a male *fascipes* and a female *fuscipes*, these specimens do not belong to the same species, *fascipes*, which was described by Zetterstedt only on the male, becomes a synonym to *pratorum* Fall. emend. Meig., while *fuscipes* Zett. is a good species. To the above synonymy of *fuscipes* should then be added; *P. pratorum* Meig. 1824. Syst. Besch. IV, 22, 7, p. p. ♀.

4. *P. montium* Beck.

1897. Beck. Berl. Entom. Zeitschr. XLII, 50, 16 et 1900. XLV, 222, 16 et 1921. Wien. Ent. Zeitg. XXXVIII, 125, 127. — 1910. Kertész, Cat. Dipt. VII, 337 (*Dorylas*).

Male. Frons somewhat high, whitish grey, epistoma silvery. Occiput grey, brownish just above. Antennæ blackish, third joint pointed oval but without distinct rostrum. Thorax brown, dull, slightly greyish on the sides behind the humeri; it is short and sparingly haired, the hairs only forming dorsocentral rows, behind the humeri they are a little more conspicuous; scutellum with the marginal hairs longer, but fine. Pleura and postscutellum greyish. Abdomen brown, dull, with somewhat inconspicuous greyish spots on the lateral hind corners of the segments, stretching more or less up on the dorsum, first segment nearly quite greyish. Abdomen is sparingly haired with very short hairs, at the sides of first segment a fan of longer, black hairs. Hypopygium small, blackish, slightly shining, with a small oval or somewhat triangular apical impression; the end claws reddish. Legs black, slightly greyish, dull, hind femora shining on the posterior and posteroventral side; knees and basal part of tibiæ yellow, metatarsi a little brownish; the legs all short-haired, on the elevation on anterior side of hind tibiæ a couple of longer hairs; middle femora a little spinulose with a double row of small spinules below the apical half, but on front and hind femora the spinules very small, especially on front femora, and only forming one row. Wings a little tinged, stigma brown, as long or fully as long as next costal segment; middle cross-vein behind the first third of the discal cell. Halteres black, peduncle paler.

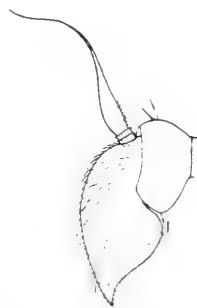


Fig. 10. Antenna of *P. montium* ♂ × 100.

Female. Vertex and frons narrow, frons black and shining above, silvery below, above the antennæ an elongated knob or keel; antennæ with the third joint paler than in the male and with a distinct rostrum. Hypopygium small, pear-shaped, the basal part with a furrow, the ovipositor not longer than the basal part, straight or nearly so. Claws and pulvilli larger than in the male. Wings with the stigma shorter than next costal segment.

Length 3—3,5 mm.

This species is very similar to *fuscipes*, but it is in the male known by the not rostrate antennæ and smaller impression on hypopygium, and in the female by the narrow frons and the smaller hypopygium with a furrow. I have compared my specimens with typical specimens kindly sent me from Mr. Becker.

P. montium is rare in Denmark, only five specimens have been taken, two males and three females, Ruderhegn (H. J. Hansen), on Langeland at Lohals (the author), in Jutland at Albøge (Kryger) and at Ry (the author) and on Bornholm at Hasle (H. J. Hansen); the dates are ²²/₆—²⁷/₇; it was taken for the first time in 1883. One of my females (Albøg) has pale humeral knobs and the middle cross-vein a little more towards the base, it might perhaps be the undescribed female to *Kowarzi*, but it is only 3 mm.

Geographical distribution: — Besides from Denmark known from Germany, Bohemia and Switzerland.

5. *P. coloratus* Beck.

1897. Beck. Berl. Entom. Zeitschr. XLII, 57, 24 et 1900. XLV, 223, 24 et 1921. Wien. Ent. Zeitg. XXXVIII, 127. — 1910 Kertész, Cat. Dipt. VII, 371 (*Dorylas*). — *P. fuscipes* Strobl (nec Zett.) 1904. Mittheil. Nat. Ver. Steierm. XXX, 3.

Male. Frons and epistoma silvery. Occiput grey, brownish just above. Antennæ with the third joint brown or yellowish brown, conspicuously white-haired, rostrum rather long, whitish. Thorax brown, dull, with more or less distinct indications of three stripes; the humeral knob brownish-yellow, and behind it the thorax is grey; the disc has sparse, fine but not quite short hairs, only present as dorsocentral rows and behind the humeri; the hairs are only slightly longer at the margin of scutellum. Pleura and postscutellum grey. Abdomen brown, dull, with rather broad, brownish grey hind margins to the segments, broadest and confluent along the sides, first segment

nearly quite grey. Abdomen is sparingly haired with short hairs, and the bunch of hairs at the sides of first segment is small and inconspicuous. Hypopygium somewhat large, greyish with a medium sized, oval apical impression. Legs yellow, femora with a broad blackish ring, front and middle tibiæ may be a little infuscated on the posterior side, tarsi with the apical joints brownish; the legs are greyish pruinose, dull, hind femora shining on the posterior side; the legs are all short-haired, the femora nearly bare, middle femora spinulose below and hind femora likewise at apex. Wings clear or nearly so, stigma rather pale brown, shorter than next costal segment; middle cross-vein a little behind the first third of the discal cell. Halteres brownish yellow.

Female. Frons narrow, quite grey, only the ocellar triangle black, there is a very slight longitudinal median keel in the whole length; third antennal joint paler than in the male, with the rostrum slightly longer. Thorax more greyish-brown, hence the stripes more visible. Abdomen with the bands more grey and the last segment grey with a longitudinal median furrow. Hypopygium somewhat small, without furrow or only a slight indication at the base; ovipositor quite short and thin, not as long as the basal part, straight. Claws and pulvilli larger than in the male.

Length 3—3,5 mm.

P. coloratus is not exactly rare in Denmark, Dyrehaven (H. J. Hansen), Geel Skov, Tisvilde, Lohals on Langeland (the author), on Funen at Strib (Th. Mortensen), on Lolland at Lysemose (Schlick), in Jutland at Hejls south of Kolding (the author) and on Bornholm at Allinge (H. J. Hansen); the dates are $^{18}/_6$ — $^{12}/_7$; in our old collection is a couple of specimens, probably from Ry in Jutland. At Lohals I took it numerously with the net on a meadow on $^{30}/_6$, of *Homoptera* I found only *Philaenus spumarius* present there. The male was hitherto not described; Mr. Becker has kindly compared specimens from me and confirmed my determination.

Geographical distribution: — Besides from Denmark otherwise known from Silesia and Styria.

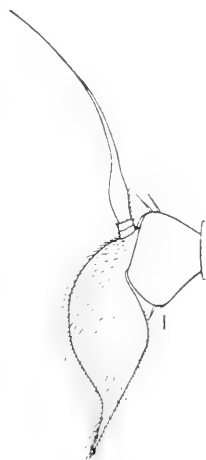


Fig. 11. Antenna of *P. coloratus* ♂ ×115.

6. *P. sulcatus* Beck.

1897. Beck. Berl. Entom. Zeitschr. XLII, 57, 23 et 1900. XLV, 223, 23 et 1921. Wien. Ent. Zeitg. XXXVIII, 127. — 1910. Kertész, Cat. Dipt. VII, 382 (*Dorylas*).

Male. Unknown.

Female. Frons black, grey above the antennæ, with a very slight longitudinal keel ending in a low knob above the antennæ; epistoma whitish grey. Occiput grey, brown above. Antennæ with the third joint yellow, with a long and fine rostrum. Thorax dull

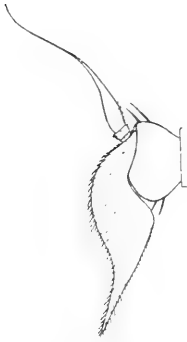


Fig. 12. Antenna of *P. sulcatus* ♀ × 90.

brownish, greyish behind the humeri, humeral knob yellow; the disc sparingly with fine, short hairs only as dorsocentral rows and behind the humeri, the hairs are almost not longer at the margin of scutellum. Pleura and postscutellum greyish. Abdomen brown, dull, with greyish hind margins to the segments, broadest at the sides, sixth segment grey. Abdomen has sparse, short hairs, the longer hairs at the sides of first segment very inconspicuous. Hypopygium somewhat small, the basal part greyish, with a furrow, ovipositor about as long as the basal part, thin and slightly curved. Legs with femora blackish, greyish pruinose, base and apex yellowish, tibiæ and

tarsi yellow, the former a little infuscated about the middle, the last tarsal joint brownish; hind femora shining on posterior and postero-ventral side; the legs all short-haired, femora almost bare, middle femora quite slightly spinulose below. Wings very slightly tinged, stigma pale brown, a little shorter than next costal segment, middle cross-vein about at the first third of the discal cell. Halteres dark yellowish.

Length about 3 mm.

P. sulcatus is rare in Denmark, we have only one specimen, a female, Dyrehaven ¹⁸/₆ 1884 (H. J. Hansen).

Geographical distribution: — Besides from Denmark known only from Dalmatia and the Pyrenees.

Remarks: I am not quite sure with regard to the determination of this species: it has the greyish bands on abdomen rather distinct, it is quite similar to the female of *terminalis* and I should have deter-

mined it so, had it not been for the frons which is black and shining above and the stigma which is a little shorter than next costal segment.

7. *P. terminalis* Thoms.

1869. Thoms. Opusc. Entom. II, 115, 11. — 1897. Beck. Berl. Entom. Zeitschr. XLII, 47, 13 et 1900. XLV, 222, 13 et 1921. Wien. Ent. Zeitg. XXXVIII, 125, 127. — 1901. Verr. Brit. Flies, VIII, 92, 8. — 1910. Kertész, Cat. Dipt. VII, 382 (*Dorylas*). — *P. fuscipes* Strobl, 1894. Mittheil. Ver Steierm. XXX, 4.

Male. Frons and epistoma silvery. Occiput grey, very slightly brownish above. Antennæ with the third joint brownish, distinctly white or silvery pubescent, with a long, fine rostrum. Thorax dull brown, scutellum more greyish, humeral knob yellowish and behind it thorax a little greyish; the disc has sparse, fine, though not short hairs only as dorsocentral rows and behind the humeri, the hairs are not longer at the margin of scutellum. Pleura and postscutellum grey. Abdomen brown, dull, with grey hind margins to the segments, broadest and palest on first segment and broad and confluent at the sides. Abdomen has sparse, short hairs, at the sides of first segment an inconspicuous bunch of longer, black hairs. Hypopygium large, blackish, slightly shining and greyish pruinose; it has a small and low roundish apical impression, sometimes almost or quite disappearing, the end claws reddish. Legs yellow, femora with a broad blackish, greyish pruinose middle ring, or they are more black with only the base indistinctly and the apex yellow, tibiæ a little infuscated about the middle and last tarsal joint dark; hind femora shining on the posterior and posteroventral side; the legs all short-haired, femora nearly nude, only hind femora with a row of longer, fine hairs below; middle femora a little spinulose below the apical half. Wings a little tinged, stigma brown, as long or fully as long as the next costal segment; middle cross-vein anterior to the first third of the discal cell. Halteres brownish.



Fig. 13. Antenna of *P. terminalis* ♂ ×110.

Female. Frons narrow, quite grey, only vertical triangle black; there is a fine longitudinal keel from the vertex ending with a small

knob above the antennæ. Thorax a little more greyish than in the male. Hypopygium not large, pear-shaped, the basal part with a furrow, ovipositor shorter, thin and straight. Claws and pulvilli larger than in the male.

Length 3—3,5 mm.

P. terminalis seems to be somewhat rare in Denmark, Tisvilde, on Langeland at Lohals and in Jutland at Hejls and Skamling south of Kolding (the author); my dates are $30/6$ — $2/8$; at Tisvilde it hovered in some numbers at bushes in the outskirts of the wood from $21/7$ — $2/8$ in 1916. A single male without locality was found in our old collection.

Geographical distribution: — Europe down into Italy, towards the north to southern Sweden.

8. *P. sericeus* Beck.

1897. Beck. Berl. Entom. Zeitschr. XLII, 100, Anmerk. et 1900. XLV, 223, 21 et 22. — 1910. Kertész, Cat. Dipt. VII, 381 (*Dorylas*). — *P. holosericeus* Beck. 1897 l. c. XLII, 55, 21 et 1921. Wien. Ent. Zeitg. XXXVIII, 131, 5. — 1900. Kertész, Wien. Ent. Zeitg. XIX, 245, 4.

Male. Frons grey, with a black shining point in the middle; epistoma whitish grey. Occiput grey, dark brown or blackish brown above. Antennæ with the third joint blackish, pointed oval, only short rostrate. Thorax dull brown, humeral knob a little yellowish, behind it a slight greyish spot; the disc with sparse, short hairs, only present as dorsocentral rows and behind the humeri; along the margin of scutellum a little longer hairs. Pleura and post-scutellum grey. Abdomen velvet black, with large and distinct, grey or whitish grey lateral spots, uniting to narrow bands in the middle, first segment almost quite grey, fifth segment rather long with the whole hinder part grey. Abdomen sparingly with short hairs, at the sides of first segment a couple of longer hairs. Hypopygium small, somewhat shining but a little pruinose,

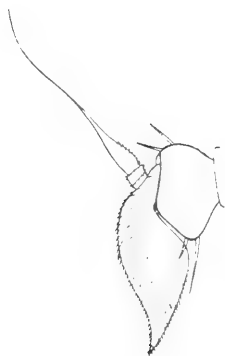


Fig. 14. Antenna of *P. sericeus* ♂ $\times 110$.

with a vertical, high and narrow apical impression. Legs black, a little greyish pruinose, knees and basal part of tibiæ yellow, tarsi brownish, palest at the base; hind femora shining on posterior and posteroventral side; the legs all short-haired, femora nearly nude, middle femora a little spinulose below the apical half. Wings almost

clear, stigma slightly coloured, distinctly longer than next costal segment, middle cross-vein at about the first third of the discal cell or a little beyond. Halteres brownish.

Length 2,7 mm.

Female. I possess only the male, and Becker was not sure with regard to the female; he describes (*P. sp.?* l. c. 1897, 56, 22; *clavatus* 39, Taf. II, Fig. 7; *P. sericeus* ♀ l. c. 1900, 223, 22) a female, which in all respects is similar to the male, but rather larger, 4 mm; it has a hypopygium of the type present in *melanostolus*, the basal part tapering evenly into a somewhat long, curved apical part or ovipositor; the author is inclined to consider it the female of *sericeus*, it was from the same locality as this latter. In 1921 (l. c.) he declares this female to be the female of the present species.

P. sericeus is very rare in Denmark, I have taken only one male at Lohals on Langeland ³⁰/₆ 1909.

Geographical distribution: — The species is otherwise known from Transsylvania and Italia.

Remarks: I consider my determination as sure, only in two points my specimen seems to differ a little from Becker's description, and they are, I think of no consequence; Becker describes the frons as black with a small shining point in the middle, in my specimen the frons is grey, but has the black, shining point; next Becker says that the humeri are brown as the disc, while in my specimen they are a little yellowish; for the rest my specimen is in every point fully agreeing with Becker's description.

9. *P. varipes* Meig.

1824. Meig. Syst. Besch. IV, 21, 6. — 1844. Zett. Dipt. Scand. III, 963, 16 et 1859. XIII, 6059, 16. — 1862. Schin. F. A. I, 247. — 1894. Strobl, Mittheil. Nat. Ver. Steierm. XXX, 6. — 1897. Beck. Berl. Entom. Zeitschr. XLII, 62, 25, Tab. II, Fig. 17 et 1900. XLV, 229, 25 et 1921. Wien. Ent. Zeitg. XXXVIII, 156. — 1901. Verr. Brit. Flies VIII, 96, 11, p. p. var. — 1910. Kertész, Cat. Dipt. VII, 383 (*Dorylas*).

Male. Frons grey, darker upwards, rather high, but narrow above, at least as high as the eye-suture; epistoma white. Occiput whitish grey darker above. Antennæ with the third joint oval, not or very short-pointed, brown or blackish brown, second joint with long hairs above and below. Thorax æneous, shining, the humeral knob dark, only slightly brownish at the upper margin; behind the knob thorax is a little greyish pruinose; the disc is relatively densely

clothed all over with yellow hairs, at the margin of scutellum a little longer hairs. Pleura and postscutellum grey, propleura with distinct hairs. Abdomen black, shining, first segment with the hind margin grey, the other segments with narrow velvet black front margins, broadest on second segment and decreasing in breadth backwards. Abdomen is clothed with yellow hairs, which are somewhat long at the sides, longest forwards and especially on first segment. Hypopygium large, black, a little brownish pruinose, with a vertical, long and narrow impression or split, from which a keel-shaped longitudinal fold protrudes. Legs yellow, femora stout, with a broad black ring in the middle so that only base and apex are yellow, tibiae more or less blackish or brownish on the ventral side below middle, tarsi with the apical joint blackish; all femora shining behind and below; the legs short-haired, middle femora with a longish, pale ciliation behind, and also front and hind femora with a similar, less conspicuous pubescence; the femora distinctly spinulose below the apical part, with two rows of spinules. Wings a little tinged, stigma pale brown, considerably longer than next costal segment, middle cross-vein at about the first third of the discal cell. Halteres yellow.

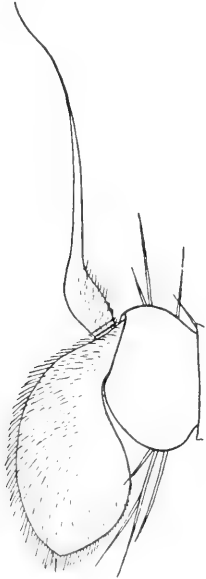


Fig. 15. Antenna of
P. varipes ♂ × 90.

Female. Frons quite whitish with a very slight elevated middle line ending in a small knob above the antennae; third joint of antennae yellow. Thorax with the humeral knob yellow and with a distinct grey spot behind and inwards to the humeri, stretching backwards along the sides and with a fine backwards prolongation on each side of the middle. Abdomen with first segment grey and also the second more or less grey on the front part, and with grey triangular lateral spots on the segments. Hypopygium somewhat large, the basal part oval, black and shining, ovipositor reddish, as long or slightly longer than the basal part, somewhat strongly recurved. Legs generally much paler than in the male, femora often nearly quite yellow only faintly dark obscured on the middle, and they are scarcely so shining. Stigma about equal to the next costal segment.

Length 4,5—5 mm.

P. varipes is rare in Denmark, I know only two males and four females, Bogø south of Sealand (the author), Dødemose near Nysted on Lolland (L. Jørgensen) and in Jutland at Hejls south of Kolding and at Ry (the author), further one specimen in our old collection; the dates are $\frac{2}{7}$ — $\frac{20}{7}$.

Geographical distribution: — Europe down into Italy, towards the north to middle Sweden.

Remarks: Verrall describes a var. which seems to answer to the true *varipes*; the author also mentions (p. 99) that an examination of Meigen's types gave him the same impression; Verrall's description of his main form would seem to answer to *spinipes* Meig. (*campestris* Beck.) as he also suggests himself (p. 98). — After the above was written Becker has published a paper (l. c. 1921) in which he comes to the same conclusion.

10. *P. spinipes* Meig.

1830. Meig. Syst. Besch. VI, 359, 14. — 1915. Beck. Wien. Ent. Zeitg. XXXIV, 65 (*Dorylas*) et 1921. Wien. Ent. Zeitg. XXXVIII, 149, 150. — *Pipunculus campestris* Meig. (nec Latr.) 1824. Syst. Besch. IV, 9. 1. — 1844. Zett. Dipt. Scand. III, 952, 3 et 1855. XII, 4682, 3 et 1859. XIII, 6057, 3. — 1869. Thoms. Opusc. Entom. II, 121, 21. — 1894. Strobl, Mittheil. Nat. Ver. Steierm. XXX, 5. — 1897. Beck. Berl. Entom. Zeitschr. XLII, 69, 31, Taf. II, Fig. 11 et 1900. XLV, 229, 31. — *Dorylas campestris* p. p. 1910. Kertész, Cat. Dipt. VII, 370. — *P. elegans* Egg. 1860. Verhandl. zool. bot. Gesellsch. Wien, X, 347. — 1862. Schin. F. A. I, 246. — *P. varipes* p. p. (excl. var.) Verr. 1901. Brit. Flies VIII, 96, ?

Male. Vertex black, frons and epistoma silvery whitish; eye-suture long, considerably longer than frons. Occiput grey, darker above. Antennæ blackish, third joint pointed, but not rostrate, second joint with long hairs above and below. Thorax black, a little æneous, more or less brownish pruinose on the front half, the humeral knob dark, but grey at the upper margin, and behind it thorax a little greyish on the sides; the disc somewhat densely clothed all over with pale brownish hairs; scutellum shining with a little longish hairs at the margin. Pleura and postscutellum grey, propleura with a fan of yellow hairs. Abdomen relatively flat, black and shining, first segment dull and with a grey hind margin, the other segments with very narrow, almost disappearing velvet black front margins and with triangular grey lateral spots. Abdomen is clothed with short, brownish yellow hairs, not longer at the sides, at the sides of first segment a conspicuous bunch of longer yellow hairs. Hypopygium somewhat

large, black, a little brownish grey pruinose, with a narrow oval apical impression with a protruding longitudinal keel-shaped fold. Legs with the femora somewhat robust, though less than in *varipes*; the legs are black with the knees and the basal part and very apex of tibiæ yellow, tarsi more or less blackish brown and also the trochanters may be brownish; the femora are all shining below, hind femora also on the posterior side; the legs are short-haired, middle femora with a longish pale ciliation behind, and front and hind femora with a similar but less conspicuous pubescence, hind tibiæ with some longish hairs below the middle on the anterodorsal side; the femora have two rows of small spinules below the apical part, on the middle femora stretching over two thirds. Wings a little brownish tinged, stigma brown or pale brown, distinctly longer than next costal segment, middle cross-vein at the first third of the discal cell. Halteres yellowish.

Female. Frons quite grey with a very slight, almost imperceptible median keel and a very small elevation above the antennæ; antennæ with the third joint brown or yellowish, more pointed than in the male or slightly rostrate. Thorax with the front part more dusted than in the male and more greyish, sometimes rather dusted all over, it is conspicuously grey round the humeral knob. Abdomen as in the male but without velvet front margins, and second segment grey on its front part or entirely grey. Hypopygium with an oval, black and shining basal part, the reddish ovipositor is longer than the basal part, straight or very slightly recurved. Legs paler than in the male, trochanters and base of femora yellowish, tibiæ nearly all yellow with only a black patch ventrally below the middle, and tarsi yellowish, a little darkened outwards with the last joint black. Wings with the stigma shorter than the next costal segment.

Length 4 to about 6 mm.

The species shows resemblance to *varipes*, but this species is besides by the much more shining thorax distinguished in the male by the velvet bands on abdomen, and in the female by the distinctly recurved ovipositor, and in both sexes it has much paler legs and, especially in the male, all femora more shining behind.

P. spinipes is not exactly common in Denmark, Ordrup Mose, Ermelund (Stæger, Schlick), Egebæks Vang, Geel Skov, Tisvilde, Melby, Faxe Ladeplads, on Bogo south of Sealand, at Lohals on Langeland (the author), on Lolland at Lysemose (Schlick), on Funen at Hoffmansgave, in Jutland at Laven (H. J. Hansen) and in Egense

Skov at the east end of Limfjorden (the author), and on Bornholm at Hammeren (the author) and at Rønne and Almindingen (H. J. Hansen); my dates are $30/5-16/8$.

Geographical distribution: — Europe down into Italy, towards the north to southern Sweden.

11. *P. Thomsoni* Beck.

1897. Beck. Berl. Entom. Zeitschr. XLII, 67, 29, Taf. II, Fig. 18 et 1900. XLV, 229, 29. — 1902. Girsch. Wien. Ent. Zeitg. XXI, 123. — 1915. Beck. Wien. Ent. Zeitg. XXXIV, 66 (*Dorylas*) et 1921. Wien. Ent. Zeitg. XXXVIII, 150, 151. — *Cephalops pratorum* Fall. p. p. 1816. Dipt. Succ. Syrph. 15, 1. — *P. pratorum* 1838. Zett. Ins. Lapp. 579, 1 et 1844. Dipt. Scand. III, 951, 2 et 1855. XII, 4682, 2 et 1859. XIII, 6057, 2. — 1862. Schin. F. A. I, 247. — 1869. Thoms. Opusc. Entom. II, 120, 20. — 1901. Verr. Brit. Flies VIII, 103, 13, fig. 103. — 1910. Kertész, Cat. Dipt. VII, 379 (*Dorylas*). — *P. campestris* Schin. (nec Latr.) 1862. F. A. I, 247. — *P. ater* Strobl, 1894. Mittheil. Nat. Ver. Steierm. XXX, 8, p. p. et 1899. Wien. Ent. Zeitg. XVIII, 147, 116.

Male. Vertex black, frons brown pruinose, not quite so high as the eye-suture; epistoma whitish grey. Occiput whitish grey, brownish above. Antennæ blackish, third joint ovate, quite short-pointed, second joint with long hairs above and below. Thorax brown, pruinose all over and dull or dullish, scutellum a little shining, humeral knob of the same colour and thorax not grey behind it; the disc is relatively densely clothed all over with brownish hairs, very slightly longer at the margin of scutellum. Pleura and postscutellum grey, propleura with yellow hairs. Abdomen velvet black, first segment with grey hind margin, the following segments with the hind margins black and brilliantly shining and the margins being broader backwards, so that on fourth segment it occupies one half while the fifth segment is almost quite shining with only a narrow velvet front band; at the sides there are grey triangular lateral spots; the fifth segment has above two roundish impressions on the middle, one on each side of the middle line. Abdomen is clothed with short, yellowish hairs, longest at the sides, the longer hairs at the sides of first segment slightly pronounced. Hypopygium somewhat large, shining, slightly brownish pruinose, it has a large, oval apical impression with a rather large longitudinal, keel-shaped fold, the end claws are black. Legs black, somewhat pruinose, with the femora rather stout, trochanters, base of femora and knees yellowish, tibiæ with a broad basal part and apex yellowish, on front tibiæ the blackish ring only present as a patch behind, tarsi brownish yellow, darker outwards with the apical joint black; all

femora shining below, hind femora also on posterior side; the legs short-haired, middle femora with a rather long, pale ciliation behind, front and hind femora with a similar, but much less dense and conspicuous ciliation, and all femora with a double row of small spinules below the apical half or on middle femora two thirds. Wings a little brownish tinged, stigma brown, longer than next costal segment, middle cross-vein at the first third of the discal cell. Halteres brownish yellow.

Female. Frons quite whitish grey, without any keel; antennæ brownish, a little more pointed than in the male. Thorax more greyish pruinose, especially at the sides. Abdomen all shining, with distinct whitish grey triangular lateral spots, with first segment grey, and with second likewise grey, but more brownish on the disc. Hypopygium with an oval, black and shining basal part, the reddish ovipositor straight or almost straight, slightly longer than the basal part. Legs with tibiæ paler than in the male, the blackish ring smaller and much less distinct. Wings with the stigma a little shorter than next costal segment.

Length 4—5 mm.

P. Thomsoni is more common in Denmark than *spinipes*, Dyrehaven (H. J. Hansen), Ruderhegn (Schlick), Ørholm, Bogø south of Sealand, on Langeland at Lohals (the author), on Lolland at Lysemose and in Merrits Skov (Schlick), on Funen at Middelfart and in Jutland at Hejls south of Kolding (the author); the dates are $7/6$ — $28/7$.

Geographical distribution: — Northern and middle Europe down into Bohemia and probably into Spain; towards the north to northern Sweden.

Remarks: Becker (l. c. 1921, 157) thinks that *omissinervis* Beck. and *carinatus* Verr. are no doubt only aberrations or monstrosities of *Thomsoni*, and this opinion may I think, be correct, at all events as regards the former species.

12. *P. ater* Meig.

1824. Meig. Syst. Besch. IV, 23, 9. — 1844. Zett. Dipt. Scand. III, 953, 4 et 1855. XII, 4682, 4 et 1859. XIII, 6057, 4. — 1862. Schin. F. A. I, 247. — 1869. Thoms. Opusc. Entom. II, 119, 19. — 1894. Strobl, Mittheil. Nat. Ver. Steierm. XXX, 5, p. p. — 1897. Beck. Berl. Entom. Zeitschr. XLII, 68, 30, Taf. II, Fig. 20 et 1900. XLV, 229, 30 et 1915. Wien. Ent. Zeitg. XXXIV, 64 (*Dorylas*) et 1921. Wien. Ent. Zeitg. XXXVIII, 150, 151. — *P. campestris* Latr. 1804. Hist. Nat. Crust. et Ins. XIV, 392? — 1901. Verr. Brit. Flies VIII, 99, 12, figs. 94, 99—102. — 1910. Kertész, Cat. Dipt. VII, 370, p. p. (*Dorylas*).

— *P. dispar* Zett. 1838. Ins. Lapp. 579, 3. — *P. Wolffi* Kow. 1887. Wien. Ent. Zeitg. VI, 152, 13.

Male. Vertex black, shining; frons blackish brown or brown, dull, higher than the eye-suture; epistoma grey. Occiput grey, dark brown above. Antennæ blackish, third joint oval, pointed but not rostrate, second joint with long hairs above and below. Thorax brown, pruinose and dull, the humeral knob of the same colour, and thorax not grey behind it; scutellum shining; the thoracic disc has dense brownish hairs all over, and at the margin of scutellum the hairs are not longer. Pleura grey anteriorly, brownish backwards and postscutellum brownish; propleura with yellow hairs. Abdomen velvet black, from the second segment with narrow, brilliantly shining hind margins, being broader backwards and on fifth segment occupying half the length or more; at the side margins indistinct brownish spots are seen; the fifth segment has two impressions above as in *Thomsoni*. Abdomen has short, dark brownish hairs, paler and longer at the sides and the bunch of hairs at the sides of first segment not or slightly longer. Hypopygium somewhat large, black and shining, slightly greyish pruinose, it has an oval apical impression with a longitudinal median keel-shaped fold; the end claws black. Legs black, femora somewhat stout, trochanters and base of femora more or less yellowish, knees, a broad basal part and apex of tibiæ yellow or obscurely yellowish, tarsi brownish, palest at base; sometimes the tibiæ paler, only indistinctly brownish or blackish below the middle; all femora shining below, hind femora also on posterior side and also front femora to some degree shining behind; the legs short-haired, middle femora with a rather long ciliation behind and front and hind femora with a similar, less dense ciliation; all femora with a double row of small spinules below the apical part or half. Wings a little tinged, stigma brown or pale brown, much longer than the next costal segment, middle cross-vein at about the first third of the discal cell. Halteres brown or brownish yellow.

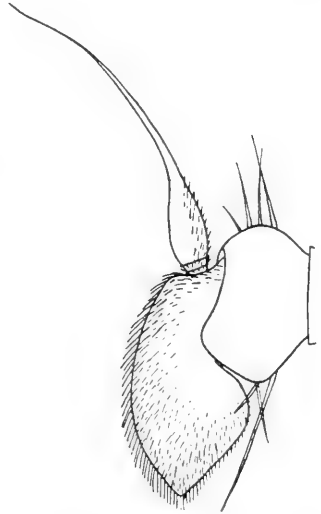


Fig. 16. Antenna of *P. ater* ♂
× 115.

Female. Frons grey, but black above in front of the vertex; third antennal joint more pointed than in the male. Pleura and post-scutellum more grey. Abdomen black, shining, first segment grey, second more or less grey on the front part or quite grey, the segments have grey triangular lateral spots. Hypopygium with an oval, black and shining basal part, the reddish ovipositor is about as long as or slightly shorter than the basal part, and it is somewhat recurved, the basal part passing somewhat evenly into the ovipositor. Legs coloured as in the male, claws and pulvilli a little larger. Wings with the stigma as long as next costal segment.

Length 3—4 or fully 4 mm.

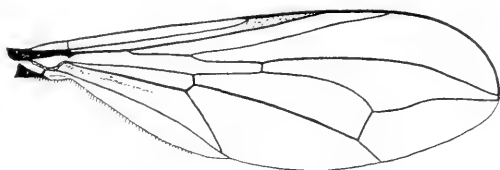


Fig. 17. Wing of *P. ater* ♀.

P. ater is common in Denmark, Ordrup Mose, Ermelund, Dyrehaven, Lyngby Mose, Fure Sø, Søllerød, Ørholm, Geel Skov, Ruderhegn, Alindelille, Vemmetofte, on Langeland at Lohals, on Lolland at Lysemose and in Kæld Skov, in Jutland in Grejsdal at Vejle, at Ry and Horsens and on Bornholm at Allinge; my dates are $7/5$ — $20/8$. Pupæ were taken on $13/3$ at Skovrøddam in Ruderhegn in flood refuse, the imagines emerged in the first days of May (Kryger.)

Geographical distribution: — Europe down into Italy, towards the north to northern Sweden.

Remarks: It seems to me that Becker has confused the females of this and the foregoing species, as he describes *ater* with the frons quite grey and the ovipositor straight, and *Thomsoni* with the frons black above and ovipositor recurved, while I find just the reverse. That my females really belong to *ater* is, I think, beyond doubt, for the first they agree well in size, and they are also agreeing with my males with regard to localities; this is, to be sure, not convincing, but further I have bred both sexes of *ater* from some pupæ found together, and this fact is, I think, of importance.

The four species *varipes*, *spinipes*, *Thomsoni* and *ater* form one group and are related and similar, but surely distinct; the males will

be distinguished without difficulty; with regard to the females *varipes* is known by the shining thorax, pale legs and somewhat strongly recurved ovipositor, *spinipes* has a less shining, sometimes nearly quite dull thorax, dark legs and ovipositor straight or nearly so, and longer than the basal part, *Thomsoni* and *ater* with their dull thorax are besides known from *spinipes* by the ovipositor being shorter and the legs generally darker, and as before said they are distinguished from each other as *Thomsoni* has a quite grey frons and a longer, nearly straight ovipositor, while *ater* has the frons black above and a shorter and a little recurved ovipositor. — For the three last named species I have followed the synonymy given by Becker in 1915, which corrects that in the Cat. Dipt. 1910 and certainly comes as near to the truth as at present possible. Only with regard to Zetterstedt's *pratorum* it seemed to me that we could not be sure; Zetterstedt describes *ater* with an abdomen which is different in the two sexes, shining in the female, but with dull bases of the segments in the male; for the other two species, *pratorum* and *campestris* he on the contrary gives a shining abdomen without sexual difference, and the differences he otherwise mentions are small and of no consequence; further he says under *pratorum* that he had got this species from Stæger under the name of *campestris*, and *campestris* in Stæger's collection is *spinipes*; I therefore think that it might be thought rather probable, that Zetterstedt's *pratorum* was also *spinipes* and not *Thomsoni*. I have, however, had opportunity to see Zetterstedt's specimens of the four species in question; *varipes* and *ater* are identical with our interpretation; *pratorum* is in my opinion our *Thomsoni*, but with regard to *campestris* Zetterstedt has confused this species and *pratorum*; a male and a female are *campestris* (our *spinipes*), but two pairs, each pair pinned on the same pin, are in my opinion *Thomsoni*; Zetterstedt has thus not laid sufficient stress on the male abdomen, whether being shining or with velvet bands. It is curious that Zetterstedt has confused *spinipes* and *Thomsoni*, while we should more probably have waited him to mix the very similar *Thomsoni* (his *pratorum*) and *ater*.

The two impressions on fifth abdominal segment mentioned for *Thomsoni* and *ater* might be thought to be due to exsiccation, but they are always present; they belong, I think, to the same category as the depressions mentioned by Perkins (Rep. of Exper. Stat. of the Hawaiian Sugar Plant. Ass. 1901, Bull. 1 Part. IV, 127).

13. *P. zermattensis* Beck.

1897. Beck. Berl. Entom. Zeitschr. XLII, 77, 38 et 1900. XLV, 229, 38 et 1921. Wien. Ent. Zeitg. XXXVIII, 154. — 1910. Kertész, Cat. Dipt. VII, 384 (*Dorylas*).

Male. Frons and epistoma greyish white or silvery. Occiput greyish, brown above. Antennæ blackish brown, third joint with a distinct, somewhat long rostrum. Thorax blackish brown, dull, humeral knob yellowish and behind it thorax grey; scutellum slightly shining; the thoracic disc with sparse short hairs only as dorsocentral rows and behind humeri, the hairs at the margin of scutellum not longer. Pleura and postscutellum grey. Abdomen black, shining, but somewhat moderately as it is a little pruinose, just at the sides with somewhat inconspicuous greyish spots; first segment greyish brown,

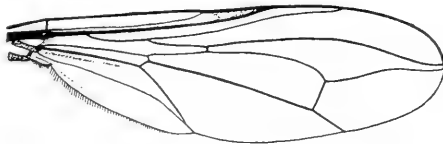


Fig. 18. Wing of *P. zermattensis* ♂.

dull, and second a little dullish. Abdomen very sparingly with short hairs, at the sides of first segment a small bunch of longer hairs. Hypopygium small, black, a little pruinose and moderately shining; apical impression somewhat small, broad, transversely oval, the end claws brownish. Legs black with the knees yellowish, dull, hind femora shining on posterior and posteroventral side; the legs short-haired, femora nearly bare; only middle femora with two rows of small spinules below the apical part. Wings nearly clear, stigma pale brown, incomplete as it does not reach the tip of the mediastinal vein, third costal segment slightly shorter than fourth, middle cross-vein at the first third of the discal cell. Halteres blackish.

Female. Frons relatively broad, black and shining, grey above the antennæ, with a slight middle furrow ending in a low keel above the antennæ. Abdomen fully as shining as in the male and the grey side spots small and very inconspicuous. Hypopygium small, the basal part broad, broader than long, black and somewhat shining, without furrow, ovipositor short, somewhat thick at base. Third costal segment distinctly shorter than fourth.

Length 2,5 to nearly 3 mm.

P. zermattensis is rare in Denmark, I know only three specimens,

a male and two females, taken on Lolland at Faaborg and on Funen at Langensø (Schlick), the latter specimen taken on $25/6$ 1871. The male was hitherto not known.

Geographical distribution: — Besides from Denmark only known from Zermatt and the Pyrenees.

This species stands a little apart in group 3 because of its dark legs with no ciliation behind femora; it seems to be rather like *halteratus*, as described by Verrall.

14. *P. Braueri* Strobl.

1880. Strobl, XIV Programm. Seitenstett. 13 et 1894. Mittheil. Nat. Ver. Steierm. XXX, 7. — 1897. Beck. Berl. Entom. Zeitschr. XLII, 76, 36, Taf. II, Fig. 22 et 1900. XLV, 229, 36 et 1921. Wien. Ent. Zeitg. XXXVIII, 152, 154. — 1902. Girsch. Wien. Ent. Zeitg. XXI, 123. — 1910. Kertész, Cat. Dipt. VII, 369 (*Dorylas*). — *Cephalops pratorum* Fall p. p. 1816. Dipt. Suec. Syrph. 15, 1. — *P. flavipes* Zett. (nec Meig.) 1844. Dipt. Scand. III, 962, 15 var. *a* et *b*. et 1849. VIII, 3207, 15 var. *a*. — 1869. Thoms. Opusc. Entom. II, 118, var. *b*.

Male. Frons and epistoma silvery white. Occiput grey, dark brownish above. Antennæ brownish, third joint oval, very short-pointed, second joint with long hairs above and below. Thorax æneous, somewhat shining, humeral knob yellow and behind it the thorax grey on the sides; the disc very sparingly with shortish hairs, present only as dorsocentral rows and behind the humeri; at the margin of scutellum a little longer hairs. Pleura and postscutellum grey, propleura with a fan of long hairs. Abdomen black and shining, first segment grey, dull, the next two velvet black on the basal half in the middle and the fourth more or less velvet behind the front margin; the segments have just at the lateral hind corners very small greyish spots. Abdomen has sparse, very short hairs, at the sides of first segment a fan of long, black hairs. Hypopygium somewhat large, black, a little brownish pruinose, with a very large, roundish oval apical impression, the end claws reddish yellow. Legs all yellow, tarsi a little infuscated towards the end; hind femora shining behind; the legs short-haired, femora with a faint, pale ciliation behind, on hind femora below, hind tibiæ with a couple of bristly hairs on the elevation on the front side; all femora with a double row of spinules below, on front and hind femora in the apical part, on middle femora in nearly the whole length. Wings long, more than twice as long as abdomen, a little brownish tinged, stigma brown, as long as or longer than the next costal segment, middle cross-vein at about the first fourth of the discal cell. Halteres brownish yellow.

Female. I do not know the female, but according to the descriptions it is similar; abdomen except first segment shining, hypopygium with a short ovipositor.

Length 4,5 mm.

P. Braueri is very rare in Denmark, we have only three males, two taken on Frederiksberg in earlier time (Stæger), and one taken in Geel Skov on $14/6$ 1921 (the author). The species must be very near to *flavipes*, but if the two species are really distinct, our species will, as seen from the description of abdomen, be *Braueri*. I think it is one of our specimens which Zetterstedt mentions l. c. VIII, thus confirming that his *flavipes* var. a is *Braueri*. I have seen the species in Zetterstedt's collection, and the specimens I saw are in my opinion *Braueri*.

Geographical distribution: — Northern and middle Europe down into Styria, towards the north it seems to go to the northern Sweden.

15. *P. semifumosus* Kow.

1887. Kow. Wien. Ent. Zeitg. VI, 149, 7. — 1894. Strobl, Mittheil. Nat. Ver. Steierm. XXX, 6. — 1897. Beck. Berl. Entom. Zeitschr. XLII, 70, 32 et 1900. XLV, 229, 32 et 1921. Wien. Ent. Zeitg. XXXVIII, 152, 153. — 1910. Kertész, Cat. Dipt. VII, 381 (*Dorylas*). — *P. flavipes* Thoms. 1869. Opusc. Entom. II, 117, 17, p. p. (excl. varr.). — 1894. Strobl, l. c. 8.

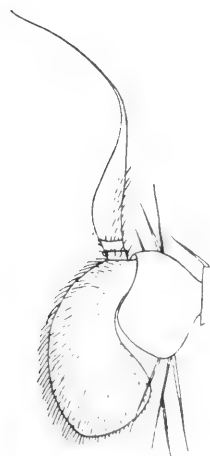


Fig. 19. Antenna of
P. semifumosus ♂
× 115.

Male. Frons and epistoma grey. Occiput grey, brown above. Antennæ brownish, third joint short, almost not pointed, nearly rounded, second joint with long hairs above and below. Thorax brown, dullish, a little shining behind, especially on scutellum, the humeral knob of the same colour and thorax not grey behind it; the disc very sparingly with fine hairs, only forming dorsocentral rows and present behind the humeri; the hairs at the margin of scutellum inconspicuous. Pleura and postscutellum grey. Abdomen black, the first three segments velvet, the third shining at the sides and the rest shining, only the fourth a little dull on the front margin; first segment a little grey at the sides. Abdomen is sparingly clothed with quite short hairs, at the sides of first segment a bunch of small hairs. Hypopygium not large, a little brownish pru-

inose, with a medium sized oval apical impression. Legs yellow, femora with a broad blackish ring, tibiæ a little infuscated before apex and last tarsal joint blackish; hind femora shining below and on the posterior side; the legs short-haired, femora with a very faint pale ciliation behind, best developed on middle femora; all femora with two rows of small spinules below the apical part. Wings slightly tinged, stigma brown or pale brown, about equal to or a little longer than next costal segment, middle cross-vein beyond the first third of the discal cell. Halteres yellowish brown.

Female. Frons somewhat broad, broadest in the middle, grey, but black and shining above. Antennæ with the third joint paler than in the male, a little more pointed. Abdomen somewhat incurved, shining, the three first segments grey pruinose, and the fourth slightly or not strongly shining, this and the following grey at the sides; hypopygium not large, the basal part roundish, shining, the reddish ovipositor short, thin and straight. Legs paler than in the male as the rings on femora are smaller and not complete behind. Wings with the stigma a little shorter than next costal segment.

Length about 3 mm or fully.

P. semifumosus is rather rare in Denmark, Frederiksberg (Stæger), Dyrehaven (Schlick), Ermelund, Lyngby Mose, Geel Skov and in Jutland at Hejls south of Kolding (the author); my dates are $\frac{3}{7}$ — $\frac{19}{10}$, thus it is no early species.

Geographical distribution: — Northern and middle Europe from Scandinavia down into Styria.

Remarks: Becker is (l. c. 1921, 158) of opinion that *Strobl* Verr. and *strigulipes* Verr. are only slight variations of *semifumosus* and in this I agree the more so because Verrall expresses himself the same possibility.

16. *P. pulchripes* Thoms.

1869. Thoms. Opusc. Entom. II, 117, 16. — 1894. Strobl, Mittheil. Nat. Ver. Steierm. XXX, 7. — 1897. Beck. Berl. Entom. Zeitschr. XLII, 72, 33 et 1900. XLV, 229, 33 et 1921. Wien. Ent. Zeitg. XXXVIII, 152, 154. — 1910. Kertész, Cat. Dipt. VII, 380 (*Dorylas*).

Male. Frons and epistoma grey, the former a little broad, with a black point. Occiput grey, brownish above. Antennæ with the third joint brown, distinctly rostrate, second joint with longish hairs above and below. Thorax brown pruinose, dull, humeral knob of the same colour and thorax not grey behind it; the disc very springly

with fine hairs, forming only dorsocentral rows and present behind the humeri; at the margin of scutellum a little longer hairs. Pleura and postscutellum greyish. Abdomen black, shining, the three first segments velvet and a very narrow velvet front margin on fourth and fifth; the segments have brownish grey lateral spots, which are large forwards and on first and second segments stretch upwards on the dorsum. Abdomen has sparse, short, brownish black hairs and on the sides of first segment a little bunch of slightly longer black hairs. Hypopygium not large, brownish pruinose, with a somewhat large, roundish apical impression. Legs yellow, femora with a broad black ring, tibiae a little infuscated about the middle and last tarsal joint brownish; all femora shining below and behind; the legs short-haired, femora with a faint, longish, pale ciliation behind, most developed on middle femora; all femora with a double row of very small spinules below at apex, on middle femora on the two thirds. Wings a little brownish tinged, stigma brown, longer than the next costal segment, middle cross-vein a little before the middle of the discal cell. Halteres brownish yellow.



Fig. 20.
Antenna of
P. pulchripes
♂ × 115.

Female. Frons somewhat broad, broadest in the middle, grey, black above; antennæ with the third joint longer rostrate than in the male; abdomen shining, with grey lateral spots; hypopygium

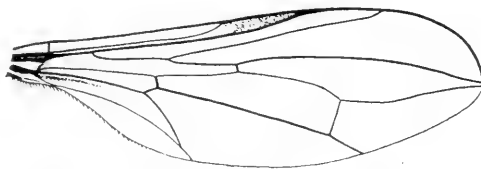


Fig. 21. Wing of *P. pulchripes* ♂.

large, black and shining, the reddish ovipositor short and thin, nearly straight. Legs as in the male, but tibiae not or almost not infuscated. Wings with the stigma shorter than next costal segment. Halteres yellow.

Length 3,2 mm.

P. pulchripes is rare in Denmark, I know only one male from Geel Skov ⁵/₆ 1916 (the author) and a pair taken at Vemmetofte

$\frac{1}{6}$ 1884 (H. J. Hansen). As my female is in a somewhat bad state the description is partly taken from Becker.

Geographical distribution: — Northern and middle Europe down into Styria and on Corsica, towards the north to southern Sweden.

17. *P. rufipes* Meig.

1824. Meig. Syst. Besch. IV, 21, 4. — 1844. Zett. Dipt. Scand. III, 959, 12 et 1849. VIII, 3207, 12 et 1859. XIII, 6059, 12. — 1862. Schin. F. A. I, 247. — 1869. Thoms. Opusc. Entom. II, 110, 3. — 1894. Strobl. Mittheil. Nat. Ver. Steierm. XXX, 9. — 1897. Beck. Berl. Entom. Zeitschr. XLII, 89, 48, Taf. II, Fig. 15 et 1900. XLV, 240, 48 et 1921. Wien. Ent. Zeitg. XXXVIII, 162, 163. — 1901. Verr. Brit. Flies VIII, 115, 21, fig. 112. — 1910. Kertész, Cat. Dipt. VII, 380 (*Dorylas*).

Male. Eyes not touching, vertex and upper part of frons black, shining, silvery below above the antennæ; epistoma silvery. Occiput grey, brownish black above. Antennæ blackish, third joint white pubescent, long rostrate. Thorax blackish brown, a little pruinose, somewhat shining, humeral knob of the same colour; the disc sparingly with fine hairs, only present as dorsocentral rows and behind the humeri; at the margin of scutellum the hairs not longer. Pleura and postscutellum greyish black. Abdomen black, somewhat shining, first segment grey; abdomen has a very short, dense pubescence and sparse longer brownish hairs, somewhat dense on the apical half of fifth segment; at the sides of fifth segment a fan of longer, partly pale hairs. Hypopygium large, slightly pruinose, without apical impression, the end claws reddish. Legs with femora black, a little brownish at trochanters and the apical part yellow, tibiæ yellow, sometimes with a slight infuscation about the middle, or with a large ring, or the apical part black; tarsi yellow, a little darker towards apex and the apical joint black; the femora dull; the legs short-haired, femora practically bare, only middle femora with a double row of very short spinules below the apical half. Wings rather long, more or less brownish tinged, stigma absent, third costal segment about one quarter of the fourth, middle cross-vein near the base of the discal cell. Halteres yellow.

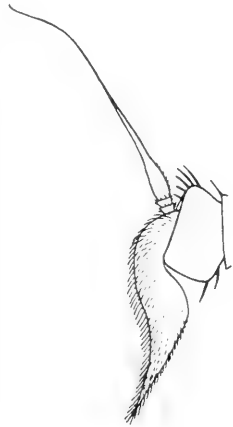


Fig. 22. Antenna of *P. rufipes* ♂ × 90.

Female. Quite similar; frons narrow, black and shining in the upper half; hypopygium not large, the basal part ovate, greyish pruinose, the reddish ovipositor much longer than the basal part, thick in its first part. Claws and pulvilli slightly enlarged.

Length 4,2—4,5 mm.

P. rufipes is not common in Denmark, Copenhagen in a garden, Søndermarken, Ordrup Krat, on Funen at Hvidkilde (Stæger, the author), in Jutland at Funder near Silkeborg (Esben-Petersen); the dates are $^{10}/_5$ — $^{17}/_6$. As seen from the description I possess specimens with rather dark tibiæ, perhaps answering to *confusus* Verr., but I think my specimens belong to one species; Becker declares also (l. c. 1921, 163) that he is of opinion that *confusus* Verr. is only a synonym of *rufipes*. I have seen Zetterstedt's specimens and I found them identical with the present species.

Geographical distribution: — Europe down into Italy, towards the north to middle Sweden.

18. *P. haemorrhoidalis* Zett.

1838. Zett. Ins. Lapp. 580, 6 et 1844. Dipt. Scand. III, 959, 13. — 1869. Thoms. Opusc. Entom. II, 112, 6. — 1894. Strobl, Mittheil. Nat. Ver. Steierm. XXX, 10. — 1897. Beck. Berl. Entom. Zeitschr. XLII, 91, 51, Taf. II, Fig. 13 et 1900. XLV, 240, 51 et 1921. Wien. Ent. Zeitg. XXXVIII, 163. — 1901. Verr. Brit. Flies VIII, 116, 22. — 1910. Kertész, Cat. Dipt. VII, 375 (*Dorylas*). — *P. albitarsis* Zett. 1844. l. c. III, 958, 11.

Male. Eyes not touching, but the frons very narrow, especially above the middle, it is black, silvery above the antennæ; epistoma silvery white. Occiput grey, blackish in the upper half. Antennæ with the third joint brownish, somewhat long rostrate. Thorax black or brownish black, shining, slightly pruinose, humeral knob of the same colour; the disc sparingly with fine hairs, only present as dorso-central rows and behind humeri, the hairs at the margin of scutellum not longer. Pleura blackish, partly shining, postscutellum black and shining. Abdomen somewhat robust, especially thickened behind, it is black and shining, the incisures very narrowly white, first segment grey. Abdomen is slightly pruinose from a very short pubescence and has very sparse, fine, longer hairs, at the sides of first segment a fan of longer, brownish hairs. Hypopygium very large, somewhat swollen, a little pruinose, it has a large, roundish oval apical impression, the end claws are reddish. Legs with femora black with the apical part yellow, tibiæ pale yellow with a slight dark ring below the middle

and tarsi pale yellow with the apical joint black; femora dull; the legs short-haired, femora nearly nude, middle femora with a double row of very small spinules below in about the whole length. Wings slightly tinged, stigma absent, third costal segment about one third of the fourth, middle cross-vein near the end of the first third of the discal cell. Halteres yellow.

Female. Quite similar; frons black and shining, white above the antennæ. Hypopygium curious, it is yellow, the basal part is large and flattened, almost disciform, with a roundish impression in the middle, ovipositor short, thick at the base. Claws and pulvilli somewhat enlarged.

Length about 3,5 mm.

P. haemorrhoidalis is rare in Denmark, Charlottenlund (Stæger), Ørholm (the author), Ruderhegn (Schlick, Kryger); the dates are in the first part of June; pupæ were taken in Ruderhegn in flood refuse on $\frac{9}{2}$ and $\frac{13}{4}$, the imagines emerged on $\frac{10}{5}$ and $\frac{2}{6}$ respectively (Schlick, Kryger). I have studied Zetterstedt's types of *albitarsis* and *haemorrhoidalis* and found them identical with male and female respectively of the present species.

Geographical distribution:— Northern and middle Europe down into Styria, towards the north to northern Sweden.

19. *P. xanthocerus* Kow.

1887. Kow. Wien. Ent. Zeitg. VI, 153, 17. — 1894. Strobl, Mittheil. Nat. Ver. Steierm. XXX, 10. — 1897. Beck. Berl. Entom. Zeitschr. XLII, 89, 47, Taf. II, Fig. 14 et 1900. XLV, 240, 47 et 1921. Wien. Ent. Zeitg. XXXVIII, 162, 163. — 1910. Kertész, Cat. Dipt. VII, 384 (*Dorylas*).

Male. Eyes not touching, frons black and shining above, whitish below like the epistoma. Occiput grey, blackish above. Antennæ with the third joint yellow, whitish pruinose, very long rostrate. Thorax black, shining, very slightly pruinose, humeral knob of the same colour; the disc sparingly with fine hairs only as dorsocentral rows and behind the humeri; at the margin of scutellum the hairs slightly longer. Pleura and postscutellum greyish. Abdomen black, shining, the incisures very narrowly white; it is a little grey pruinose from very short pubescence and with sparse fine, longer hairs, first segment grey; at the sides of first segment a rather conspicuous fan of long yellow hairs. Hypopygium black, of medium size, with a somewhat large, nearly triangular apical impression. Legs yellow, femora with a broad black ring on the middle and generally the last tarsal joint

darkened; femora not shining; the legs haired as usual, hind tibiæ with one or two long yellow hairs in the middle on the posterior side; only middle femora with two rows of quite small spinules below the apical half. Wings somewhat brownish tinged, stigma absent, third costal segment scarcely one quarter of the fourth, middle cross-vein at about the first fourth of the discal cell. Halteres yellow.



Fig. 23. Antenna of *P. xanthocerus* ♀ × 90.

Female. Quite similar; frons narrow, black and shining above, white below above the antennæ; hypopygium somewhat small, the basal part ovate, black and shining, the reddish ovipositor straight, scarcely as long as the basal part.

Length about 4 mm.

P. xanthocerus seems to be very rare in Denmark, only one specimen, a female, has been taken at Lohals ²³/₇ 1913 (the author). As I do not know the male the above description is partly taken from Kowarz.

Geographical distribution: — Europe down into Italy, it does not seem to be known north of Denmark.

20. *P. xanthopus* Thoms.

1869. Thoms. Opusc. Entom. II, 111, 5. — 1897. Beck. Berl. Entom. Zeitschr. XLII, 90, 50 et 1900. XLV, 240, 50 et 1921. Wien. Ent. Zeitg. XXXVIII, 162, 163. — 1901. Verr. Brit. Flies VIII, 117, 23, fig. 113. — 1910. Kertész, Cat. Dipt. VII, 384 (*Dorylas*).

Male. Eyes not touching, frons very narrow above the middle, black and shining, white above the antennæ and epistoma white. Occiput grey, black in the upper half. Antennæ with the third joint brown or yellowish, pointed but not exactly rostrate. Thorax black, slightly brownish pruinose, somewhat shining; humeral knob of the same colour; the disc very sparingly with fine hairs, present only as dorsocentral rows and behind the humeri, at the margin of scutellum the hairs a little longer. Pleura and postscutellum greyish. Abdomen black, shining, the incisures very narrowly white; it has a very short greyish pubescence and very sparse longer fine hairs, first segment grey and with a conspicuous fan of longer yellow hairs at the sides. Hypopygium somewhat large, subconical, a little pruinose, with a small roundish apical impression, it is somewhat hairy at the apex; the end claws reddish. Legs yellow, femora with a small black

ring near the base, broadest above, last tarsal joint more or less darkened; the femora not shining; the legs haired as usual, only middle femora with a double row of small spinules below the apical half. Wings very slightly tinged, stigma absent, third costal segment not much more than one quarter of the fourth, middle cross-vein at about the first fourth of the discal cell. Halteres yellow.

Female. Similar to the male; frons black and shining above, white below above the antennæ; abdomen sometimes quite black, but often more or less yellow at the sides of third and fourth segment, and sometimes these segments yellow with only a black dorsal spot; venter mainly yellow. Hypopygium somewhat large, especially long, all yellow, ovipositor distinctly shorter than the basal part, rather thick at the base. Legs with the black ring on femora very small or nearly wanting. Claws and pulvilli enlarged.

Length 3,2—3,5 mm.

P. xanthopus I have only from two localities, Dyrehaven ¹⁸/₆ 1884 (H. J. Hansen) a single male, and Ruderhegn, and all the specimens from this latter locality are bred; the pupæ were taken some-



Fig. 24. Antenna of *P. xanthopus* ♂ × 115.

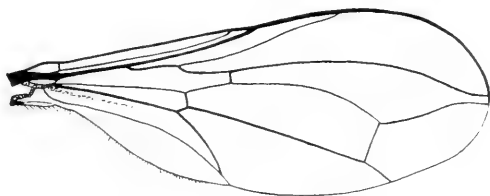


Fig. 25. Wing of *P. xanthopus* ♀.

what numerous in flood refuse at the border of a pond in April 1890 (Schlick) and on ¹³/₃ 1910, ⁹/₂ 1913 and ¹³/₄ 1914 (Kryger), the imagines emerged on ⁵/₅—⁹/₆.

Geographical distribution: — Northern and middle Europe down into Hungaria, towards the north to southern Sweden.

Remarks: There can be no doubt that the species is *xanthopus*, as it in every respect is quite agreeing; the yellow sides of third and

fourth segment in the female, similar to those in *maculatus*, have not hitherto been mentioned, neither they are always present, and only Thomson has known the female, for the female mentioned by Becker certainly does not belong here, as my females have the costal segments as in the male i. e. the fourth three or four times as long as the third and much shorter than the fifth.

21. *P. maculatus* Walk.

1834. Walk. Entom. Mag. II, 264, 1 et 1851. Ins. Brit. Dipt. I, 232, 1. — 1901. Verr. Brit. Flies VIII, 119, 24. — 1910. Kertész, Cat. Dipt. VII, 376 (*Dorylas*). — 1921. Beck. Wien. Ent. Zeitg. XXXVIII, 162, 163. — *P. fulvipes* Macq. 1834. Recueil Soc. Sc. Agr. Lille, 355, 5 et 1834. Suit. à Buff. II, 11, 9, ♂. — 1838. Meig. Syst. Besch. VII, 147, 18. — 1844. Zett. Dipt. Scand. III, 960, 14 et 1859. XIII, 6059, 14. — 1869. Thoms. Opusc. Entom. II, 112, 7. — *P. lateralis* Macq. 1834. l. c. 355, 4 et 1834. l. c. II, 11, 8, ♀. — 1838. Meig. l. c. VII, 147, 17. — 1897. Beck. Berl. Entom. Zeitschr. XLII, 87, 46 et 1900. XLV, 240, 46. — *P. annulipes* Zett. 1838. Ins. Lapp. 580, 7, p. p.

Male. Eyes touching, vertex black, shining, frons and epistoma silvery, the former narrow. Occiput grey, black and shining above. Antennæ with the third joint yellow, white pruinose, somewhat long and pointed but not really rostrate. Thorax black, shining, a little brownish pruinose, humeral knob yellowish; the disc very sparingly with fine hairs, only as dorsocentral rows and behind the humeri, the hairs at the margin of scutellum not longer. Pleura and post-scutellum greyish. Abdomen black and shining, first segment grey; at the sides or lateral hind margins of third and fourth segment there are sometimes indefinite, yellowish spots, often very slight or quite wanting. Abdomen is quite slightly pruinose from a very short greyish pubescence, most distinct on fifth segment, and it has sparse, fine, longer hairs, on the sides of first segment a conspicuous fan of long, yellow hairs. Hypopygium not large, greyish pruinose, with a small oval or roundish oval apical impression; the end claws reddish at apex. Legs all yellow, only coxæ except their apex black, front femora with a small brown spot above at base and tarsi slightly darkened towards the end; the femora dull; the legs haired as usual, hind tibiæ with a longer hair in the middle on the anterior side; only middle femora with a double row of small spinules below the apical half. Wings slightly brownish, stigma absent, but just the apex of the mediastinal cell is obscured, third costal segment one third or one quarter of the fourth, the fourth somewhat shorter than the fifth,

middle cross-vein at about the first fourth of the discal cell. Halteres yellow.

Female. Similar; frons black and shining above, grey on the lower half; abdomen with a large lateral yellow spot on third and fourth segment and venter mainly yellow. Hypopygium small, the basal part ovate, blackish and shining, the short, reddish ovipositor of about the length of the basal part, thick at the base. Front femora without spot. Claws and pulvilli much enlarged.

Length 3,5 mm.

P. maculatus is rather rare in Denmark, Charlottenlund (Stæger), Hald near Viborg and on Bornholm in Almindingen (H. J. Hansen) and at Hammeren (the author); in the latter place it was taken in some numbers in a small wood, swarming low on *Vaccinium myrtillus*; my dates are from the last days of July to ¹⁶/₈. I have seen Zetterstedt's specimens of *fulvipes*, they are identical with *maculatus*.

Geographical distribution: — Europe down into France, towards the north to northern Sweden.

22. *P. semimaculatus* Beck.

1897. Beck. Berl. Entom. Zeitschr. XLII, 91, 52, Taf. II, Fig. 19 et 1900. XLV, 240, 52 et 1921. Wien. Ent. Zeitg. XXXVIII, 162, 163. — 1910. Kertész, Cat. Dipt. VII, 381 (*Dorylas*).

Male. Eyes nearly touching but a very narrow, black frontal stripe visible between them; vertex black, shining, frons and epistoma whitish. Occiput grey below, black and somewhat shining in the upper half. Antennæ with the third joint brownish yellow, it is pointed, but it is not so long as in *maculatus*. Thorax black and shining, almost not pruinose, humeral knob of the same colour; the disc very sparingly with fine hairs, present only as dorsocentral rows and behind the humeri, the hairs at the margin of scutellum not longer. Pleura and postscutellum slightly greyish and somewhat shining. Abdomen black, shining, first segment grey, at the lateral hind corners of third and fourth segment indefinite reddish spots. Abdomen not pruinose, but, however, with a very short greyish pubescence and very sparse longer, fine hairs, at the sides of first segment a conspicuous fan of long, yellow hairs. Hypopygium large, conical, piceous on the right side, it is somewhat pruinose and has a small, round apical impression, the end claws reddish. Legs yellow, anterior femora with a very small, blackish patch at the base above on anterior side, hind femora with a similar, still weaker patch above near the middle, last tarsal joint

a little darkened; the femora are not very dull, especially somewhat shining behind; the legs haired as usual, only middle femora with a double row of very small spinules below the apical half. Wings a little brownish tinged, stigma absent, third costal segment not short, more than one third of the fourth, and this latter considerably shorter than the fifth, medial cross-vein at about the end of the first fourth of the discal cell. Halteres yellow.

Female. I do not know the female; according to Becker the frons is as usual; thorax somewhat pruinose in front; abdomen with reddish yellow spots on the sides of third and fourth segment. Hypopygium yellow, long ellipsoidal, ovipositor as long as the basal part, straight, thick at the base.

Length about 4 mm.

This species is similar to *maculatus*, but distinguished by the much larger male hypopygium and the quite yellow female hypopygium, and in both sexes by the black humeral knob, besides by other characters. I think it is beyond doubt that my specimen belongs to this species, the only difference being, that also the posterior femora have a quite small dark spot like the front femora. It is also similar to *xanthopus*, and it is perhaps not quite impossible, that it might be a variety of this species with the rings on femora reduced to nearly disappearance, but it seems to have a rather larger hypopygium; with *xanthopus* the yellow spots on the female abdomen and the yellow female hypopygium would agree.

P. semimaculatus (if correct) is rare in Denmark, we have only one specimen, a female, taken at Horsens (H. J. Hansen).

Geographical distribution: — Northern and middle Europe down into Germany, towards the north to Lappland.

23. *P. littoralis* Beck.

1897. Beck. Berl. Entom. Zeitschr. XLII, 86, 44. — 1900. Beck. *ibid.* XLV, 239, 44, p. p. ♂. — 1901. Verr. Brit. Flies VIII, 122, 26, fig. 116. — 1920. Collin, Ent. Month. Mag. LVI, 272, 1. — *Dorylas minimus* p. p. 1910. Kertész, Cat. Dipt. VII, 377. — 1921. Beck. Wien. Ent. Zeitg. XXXVIII, 160, ♂.

Male. Eyes touching, but only for a very short space; vertex black, shining, frons and epistoma greyish or silvery white. Occiput grey, a little brownish above. Antennæ with the third joint brownish yellow, whitish pruinose, somewhat long rostrate. Thorax dark greyish

brown or olive, pruinose, dull, but seen from in front greyish white, almost silvery, especially at the humeri and sides; humeral knob yellowish or whitish; the disc very sparingly with fine brownish hairs, forming only dorsocentral rows and present behind the humeri, the hairs at the margin of scutellum not longer. Pleura grey, posteriorly whitish when seen from in front, postscutellum greyish. Abdomen black, almost greenish black, shining, a little pruinose, especially behind, first segment grey, dull. Abdomen is sparingly clothed with short hairs, a little longer on fifth segment, all pale, first segment with a couple of a little longish hairs at the sides. Hypopygium small, black, somewhat pruinose, with an oblique, narrow, split-like apical impression on the right side, the end claws reddish at apex. Legs black, apex of femora, and base of tibiæ a little more broadly, pale yellow, tarsi brownish yellow, the apical joint darker; femora greyish pruinose, but hind femora shining behind; the legs haired as usual, posterior femora with very small spinules in two rows below the apical part, especially fine on hind femora; hind trochanter with about four small bristles below at base. Wings nearly clear, stigma absent and third costal segment about half as long as fourth, middle cross-vein beyond the middle of the discal cell. Halteres yellow.

Female. Similar; frons rather broad, black and shining above, greyish white below above the antennæ. Hypopygium narrowly ovate, somewhat shining, ovipositor about as long as the basal part, thin and straight. Anterior femora armed with a pair of bristles below the base, hind trochanters armed as in the male, but the bristles more hair-like; tarsi more robust than in the male, especially hind metatarsi; claws and pulvilli larger.

Length 3 or fully 3 mm.

P. littoralis seems to be rare in Denmark, at all events only few specimens have been taken hitherto, Vedbæk (Stæger), in Jutland at Agger (Th. Mortensen) and at Skagen; it was taken in June; as the localities show the species is exclusively a shore species.

Geographical distribution: — The species is hitherto known with certainty only from Denmark down to northern Germany (Sylt and Amrum) and from England.

Remarks: Becker united l. c. 1900 his *littoralis* and *minus* as male and female of one species; Collin l. c. shows, that this cannot be so, and under the name of *minus* he describes male and female being very probably Becker's species.

24. *P. sylvaticus* Meig.

1824. Meig. Syst. Besch. IV, 20, 3. — 1838. Zett. Ins. Lapp. 579, 5 et 1844. Dipt. Scand. III, 956, 9 et 1849. VIII, 3206, 9 et 1859. XIII, 6058, 9. — 1862. Schin. F. A. I, 232. — 1869. Thoms. Opusc. Entom. II, 109, 1. — 1894. Strobl, Mittheil. Nat. Ver. Steierm. XXX, 11. — 1897. Beck. Berl. Entom. Zeitschr. XLII, 83, 40, Taf. II, Fig. 16 et 1900. XLV, 236, 40 et 1921. Wien. Ent. Zeitg. XXXVIII, 164. — 1901. Verr. Brit. Flies VIII, 124, 27, fig. 117. — 1910. Kertész, Cat. Dipt. VII, 382 (*Dorylas*). — 1920. Collin, Ent. Month. Mag. LVI, 274, 4. — *P. hirticollis* Beck. Deutsch. Ent. Zeitschr. 1910, 657.

Male. Eyes touching, vertex black, frons whitish yellow, about as high as the eye-suture, epistoma whitish. Occiput grey below, black and shining on the upper half. Antennæ with the third joint yellowish brown, whitish pruinose, somewhat long rostrate. Thorax brownish black, pruinose, more or less shining; humeral knob yellowish; the disc has fine, somewhat long, dark hairs as dorsocentral rows and at the sides, the hairs at the margin of scutellum short. Pleura and post-scutellum blackish, a little pruinose, somewhat shining, the latter grey above and at the sides. Abdomen black or greenish black, a little pruinose, somewhat shining, first segment dull greyish; abdomen is clothed with distinct and not very sparse hairs, longest on fifth segment, the fan of hairs at the sides of first segment rather conspicuous. Hypopygium somewhat large, conical, black and somewhat pruinose, it has a long and narrow, split-like oblique apical impression towards the right, the end claws are yellowish at apex and stretching into a semicircular excision in the fourth ventral segment.



Fig. 26. Antenna of *P. sylvaticus* ♂
× 112.

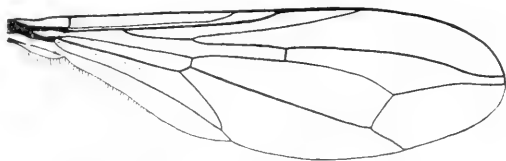


Fig. 27. Wing of *P. sylvaticus* ♂.

Legs black, apex of femora and the basal part of tibiae yellow, tarsi yellow with last joint dark; femora pruinose, hind femora shining behind; the legs haired as usual, middle femora with a double row of small spinules below the apical part and a similar one just per-

ceptible on hind femora; hind trochanters armed with some small bristles at the base below. Wings slightly tinged, stigma absent and third costal segment about half as long as fourth, middle cross-vein at or beyond the middle of the discal cell. Halteres yellow.

Female. Similar; frons black and shining above but greyish on the lower half or two thirds; hypopygium with the basal part ovate, shining, somewhat pruinose, the reddish ovipositor longer than the basal part; anterior femora with a pair of bristles below the base, hind trochanters armed as in the male; claws and pulvilli larger than in the male.

Length 2,8 to fully 3 mm.

P. sylvaticus is not rare in Denmark, Amager, Charlottenlund (Stæger), Dyrehaven, Ruderhegn, Vemmetofte (H. J. Hansen), Nordskoven at Jægerspris (Schlick), Hillerød, Lohals on Langeland (the author), on Lolland at Lysemose (Schlick), on Falster, on Funen at Veflinge, in Jutland in Grejsdal at Vejle, Nebsager near Horsens, Frijsenborg, Laven, Hald and Sæby (H. J. Hansen, the author); the dates are $^{28}/_5$ into August. I have seen the species in Zetterstedt's collection, it is identical with the present.

Geographical distribution: — Northern and middle Europe down into France and on the Canaries, towards the north to northern Sweden.

25. *P. nigritulus* Zett.

1844. Zett. Dipt. Scand. III, 957, 10 et 1849. VIII, 3206, 10 et 1852. XI, 4312, 10 et 1859. XIII, 6059, 10. — 1887. Kow. Wien. Ent. Zeitg. VI, 153, 16. — 1897. Beck. Berl. Entom. Zeitschr. XLII, 84, 41, Taf. II, Fig. 10 et 1900. XLV, 238, 41. — 1920. Collin, Ent. Month. Mag. LVI, 274, 6. — *P. geniculatus* Verr. 1901. Brit. Flies VIII, 120, 25, figs. 114—115, p. p. — 1921. Beck. Wien. Ent. Zeitg. XXXVIII, 160, 162. — *Dorylas geniculatus* 1910. Kertész, Cat. Dipt. VII, 374 p. p.

Male. Eyes touching, vertex black, frons white or whitish yellow, about as high as the eye-suture; epistoma white. Occiput whitish grey below, black and shining in the upper half. Antennæ with the third joint brown or blackish brown, whitish pruinose, moderately rostrate. Thorax brownish black, dull, a little shining behind and scutellum shining; humeral knob pale yellow; the disc with fine dark hairs as dorsocentral rows and about the humeri, and the hairs at the margin of scutellum short and little conspicuous. Pleura black and shining in front, more pruinose behind, postscutellum black and



Fig. 28.
Antenna of
P. nigritu-
lus ♂ $\times 112$.

as long as fourth or scarcely, middle cross-vein well beyond the middle of the discal cell. Halteres yellow.

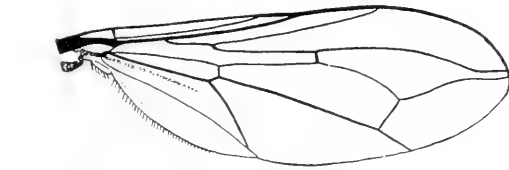


Fig. 29. Wing of *P. nigrutilus* ♂.

Female. Similar, frons black and shining in the upper two thirds, whitish grey above the antennæ. Venter not clothed as in the male; hypopygium elongated ovale, black and shining, pruinose at the base, ovipositor reddish, thin and straight, about as long as the basal part. Hind trochanters as in the male; claws and pulvilli not larger.

Length 3—3,5 mm.

As known Verrall considered his *geniculatus* and *nigrutilus* Zett. as the same species, but Collin, who had studied Zetterstedt's types of *nigrutilus* has l. c. shown, that this is not so and has given characters for *geniculatus*. As mentioned by him it remains at present uncertain which of these species may be the *geniculatus* of Meigen,

but otherwise I think my synonymy correct, while further synonyms are still uncertain. I have also myself studied Zetterstedt's types.

P. nigrutilus is not rare in Denmark, Charlottenlund (Stæger), Ermelund, Ørholm, Geel Skov, Ruderhegn, Nordskoven at Jægerspris (Schlick), Rørvig, Bogø south of Sealand (the author), on Lolland at Faaborg and in Aasø Skov (Schlick), on Funen at Odense and in Jutland in Grejsdal at Vejle and at Frederikshavn, and on Bornholm at Rønne (H. J. Hansen); the dates are $^{26}/_5$ — $^{14}/_8$; a pupa was taken in Ruderhegn in flood refuse in April (Schlick).

Geographical distribution: — Northern and middle Europe at all events down into Bohemia, towards the north to middle Sweden.

2. **Chalarus** Walk.

Small species of velvet black colour in the male, more greyish in the female. Head semiglobular, a little broader than thorax, flat or a little excavated behind just from the eye-margin, and thus without any rim behind the eyes. Eyes separated in both sexes, very narrowly in the male, a little more broadly in the female. Vertex a little elevated, with three ocelli; the vertex has some short hairs and a pair of ocellar bristles, which are parallel and directed forwards, they are longer in the male than in the female; in the latter sex the frons distinctly hairy on the upper half. Eyes occupying the whole front side of the head, they are practically bare; in the male the facets somewhat enlarged, decreasing evenly in size towards the hind margin, in the female very enlarged on the front part around the antennæ. Antennæ (Fig. 30) inserted in the middle of the head, near to each other, third joint short oval, rounded below, more roundish in the female, the second joint with a few long hairs above and below. Epistoma as in *Pipunculus*, but shorter on account of the less long head and a little raised above the level of the eyes. The mouth parts I have not examined, but probably they are as in *Pipunculus*. Thorax quadratic, a little arched above, as in *Pipunculus* with humeral knobs formed of the propleural parts; the thoracic disc and scutellum clothed with longish, or in the female shorter

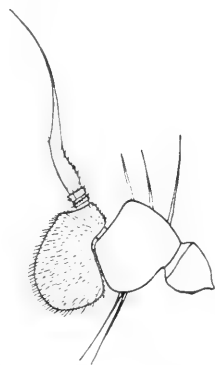


Fig. 30. Antenna of *Ch. spurius* ♂ × 100.

hairs, among these a couple of posthumeral, a notopleural, a supraalar and two postalar bristles can be discerned and also a pair of less conspicuous dorsocentral bristles; scutellum has four distinct marginal bristles. Mesopleura with some longish hairs just behind the suture. Abdomen a little flattened; it has in the male six not transformed dorsal segments, the last being the smallest, and five ventral segments;

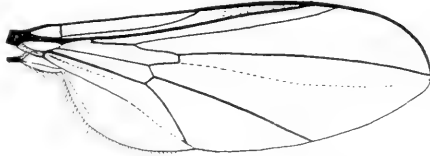


Fig. 31. Wing of *Ch. spurius* ♂.

on the left side the seventh dorsal segment is seen, bending down on the underside. The exterior genitalia are otherwise constructed mainly as in *Pipunculus*, but smaller and there is no large membraneous impression in the eight segment, but it is apparently divided into two pieces by a longitudinal split above on the right side, the left piece being the larger, the right smaller and a little compressed. In the female abdomen has six normally developed segments, the

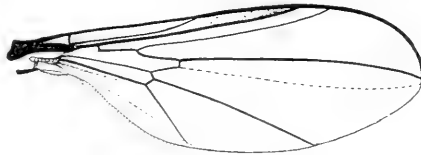


Fig. 32. Wing of *Ch. spurius* ♀.

hypopygium with its ovipositor is similar to that in *Pipunculus*; the hairs on abdomen are long at the sides and especially so on first segment; the male hypopygium has also longish hairs. Legs somewhat slender, hind tibiae formed as in *Pipunculus*; anterior femora with long hairs on the posteroventral side and hind femora likewise on the anteroventral side in the apical half, tibiae short-haired, only hind tibiae with one or a couple of long hairs above on the middle; claws and pulvilli of medium size, empodium short, bristle-shaped, with hairs below. Wings somewhat long, alula very small, practically absent, axillary lobe somewhat developed in the male, wanting in the female; the end of the mediastinal cell coloured, but the colouring not reaching quite to the apex of the mediastinal vein, third costal

segment much longer than fourth, the discal vein abbreviated just after the medial cross-vein, only continued as a slight fold and thus no discal cell present; anal vein very weak; axillary vein present in the male as a weak fold, absent in the female.

The developmental stages have not been described, but the species is parasitic on *Homoptera*; it has been bred from Cicadellines by Tetens (Ent. Nachricht. XV, 1891, 1) and from *Typhlocyba hippocastani* and *Douglasi* by Giard (Compt. rend. Acad. Sc. Paris, CIX, 708); it lives here in the same way as the larva of *Pipunculus*, and Giard mentions the curious alterations and reductions of the exterior genitalia of the Homopteron caused by the presence of the parasitic larva. I have myself bred the species from pupæ found in hollow trees and in flood refuse in spring. The pupa is reddish brown, quite oval and rounded at the ends, the surface apparently smooth, at the posterior end is a small black, roundish triangular spiracular plate with the spiracles lying at each side, the anterior spiracular tubes are yellow, short and curved forwards. The curious way in which the puparium is opened by the emergence of the imago is mentioned under the family. As before said the pupa was found in spring and had no doubt hibernated; Giard declares the species to have two broods in the year, with us it has probably only one.

The species of *Chalarus* occurs in woods, especially in somewhat humid places, and it hovers here on bushes and in low herbage and is sometimes present in great numbers; it is, I think, the most exquisite hoverer of all Diptera; when caught in a deep net it is able to raise vertically quite from the bottom up to the edge and coming here it gives a jerk to the side and is away.

Of the genus only two species exist in all (*holosericeus* taken as a synonym to *spurius*), *spurius* Fall. and *basalis* Löw (if the latter is really distinct); one, the widely distributed *spurius*, is found in Denmark.

1. *Ch. spurius* Fall.

1816. Fall. Dipt. Suec. Syrph. 16, 3 (*Cephalops*). — 1824. Meig. Syst. Besch. IV, 24, 11, Tab. XXXIII, Fig. 24 (*Pipunculus*). — 1838. Zett. Ins. Lapp. 580, 8 et 1844. Dipt. Scand. III, 968, 23 et 1852. XI, 4312, 23 et 1859. XIII, 6060, 23 (*Pipunculus*). — 1862. Schin. F. A. I, 245. — 1869. Thoms. Opusc. Entom. II, 123, 25 (*Pipunculus*). — 1894. Strobl, Mittheil. Nat. Ver. Steierm. XXX, 1. — 1897. Beck. Berl. Entom. Zeitschr. XLII, 96, 56. — 1901. Verr. Brit. Flies VIII, 68, 1, fig. 88. — 1910. Kertész, Cat. Dipt. VII, 385. — *Pipunculus holosericeus* Meig. 1824. l. c. IV, 24, 12. — *Ch. holosericeus* 1862.

Schin. F. A. I, 245. — 1894. Strobl, l. c. 1. — 1897. Beck. l. c. 97, 57. — *Atele-
leneura velutina* Macq. 1835. Suit. à Buff. II, 12, 1. — 1838. Meig. l. c. VII,
148. — *Pipunculus obscurus* Zett. 1838. Ins. Lapp. 580, 9.

Male. Vertex and frons black, but the latter silvery on an about quadratic space above the antennæ; frons very narrow and most narrow in the middle; epistoma silvery when seen from above. Occiput black. Antennæ blackish or brownish, third joint oval, rounded below, second joint with some long hairs above and below. Thorax dull velvet black, clothed above with long black hairs, among which two specially long dorsocentral hairs behind and bristly hairs at the sides; scutellum with four long, bristly marginal hairs. Pleura and postscutellum blackish or greyish black, the latter with a grey triangular spot; on mesopleura behind the suture some long hairs. Abdomen velvet black, clothed with short black hairs above, long at the sides, and at the sides of first segment a fan of still longer hairs. Hypopygium not large, dull black, somewhat shining above and on the left side, it has a longitudinal furrow above, and has long hairs at the end. Legs black, anterior femora with a row of long black hairs on the posteroventral side, especially long on middle femora, and hind femora with a similar row on the anteroventral side in the apical part, middle femora also with longish hairs on the anterior side; tibiæ short-haired but hind tibiæ with some long hairs on the anterior side about the middle. Wings more or less brown, stigma pale brown, not reaching to the end of the mediastinal vein, middle cross-vein situated before or below the end of the mediastinal vein, third costal segment several times longer than the fourth, but the costal segments varying, the second from of about the same length to considerably longer than the third and this latter from about three or four to more than six times as long as fourth. Halteres black.

Female. Frons broader than in the male, but of the same colour, distinctly hairy above; antennæ larger, but the third joint shorter, roundish. Thorax and abdomen not velvet, but dull grey or greyish black, with the hairs on thorax shorter. Hypopygium with a roundish, knob-like, greyish basal part, ovipositor brownish red, longer than the basal part, thick at the base and thus evenly passing into the basal part. Legs black or greyish black, tibiæ and tarsi often paler, the legs haired as in the male, but the hairs pale. Halteres yellow.

The species varies somewhat, besides the variations in the wing veins mentioned above it varies with regard to the colour of the legs and the hairs; the tibiæ and tarsi may be more or less pale, sometimes

the legs all brown, and with the hairs pale; also the hairs on thorax and abdomen vary from black to yellow; especially among the females the paler forms often occur, sometimes with tibiæ and tarsi yellow.

Length 2—2,8 mm.

Ch. spurius is common in Denmark, Frederiksberg Have, Søndermarken, Utterslev Mose, Ordrup Mose, Charlottenlund, Ermelund, Dyrehaven, Lyngby Mose, Egebæks Vang, Ørholm, Geel Skov, Ruderhegn, Bagsvær, Jægerspris, Tisvilde, Bogø south of Sealand, at Lohals on Langeland, on Lolland at Maglemer, on Funen at Hvidkilde, in Jutland at Hejls south of Kolding, in Grejsdal and Højebæk Dal at Vejle; the dates are $^{16}/_5$ — $^{12}/_9$; it occurs in humid places in woods, hovering on bushes and in low herbage. Pupæ were taken in Dyrehaven in a hollow oak on $^{1}/_4$, developing on $^{5}/_5$, at Ørholm in a hollow beech on $^{26}/_4$, developing on $^{18}/_5$, and they were taken in flood refuse in Utterslev Mose in April, developing in May and in Ruderhegn on $^{9}/_2$, developing on $^{10}/_4$ (Kryger, Schlick, the author).

Geographical distribution: — All Europe down into Italy, and on the Canaries, towards the north to northern Sweden, and also occurring in North America.

Remarks: I quite follow Verrall in considering *holosericeus* as a synonym to *spurius*, the characters given by Strobl give no safe distinction, and the variation in the venation and in colours do not follow each others, but in the female with the often pale colours the middle cross-vein is more commonly below the apex of the mediastinal vein than in the male. I think it beyond doubt, that *holosericeus* of Meigen was the female to *spurius*.

3. **Verrallia** Mik.

Species of medium size, in the male of velvet black, in the female of greyish colour, nearly related to *Chalarus*. Head (fig. 33) semiglobular, a little broader than thorax, flat or very slightly concave behind, and without any margin behind the eyes; along the hinder eye-margin a row of dense, short hairs. Eyes large, occupying the whole front part of the head, touching or nearly so in the male, a little more broadly separated in the female; in this latter sex the frons widens a little downwards and epistoma is again broader. Vertex a little raised, with three ocelli, it is covered with short hairs and has a pair of long, parallel, ocellar bristles, directed forwards; in the female the upper part of the frons is hairy and the ocellar

bristles smaller. Eyes practically bare, in the male the facets a little enlarged, decreasing evenly in size towards the hind margin, in the female they are more enlarged just in front, around the antennæ.

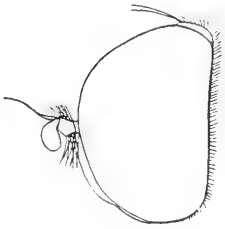


Fig. 33. *Verrallia aucta* ♂.

Head in profile.

Antennæ (fig. 36) inserted in the middle of the head near to each other, the third joint irregularly oval, rounded below, the second with numerous long hairs above and below, longest below. Epistoma as in *Chalarus* but longer, and likewise raised above the level of the eyes. The mouth parts I have not been able to examine, but no doubt they are mainly as in *Pipunculus*. Thorax quadratic, a little arched above, the humeral knob slightly visible as it is lying on the front side; the disc with longish hairs, shorter in the female; among the hairs two posthumeral, a

notopleural, a supraalar and two postalar bristles are visible, as also a pair of dorsocentral bristles behind; at the margin of scutellum four or more bristles or strong hairs; on account of the shorter hairs the bristles are more conspicuous in the female than in the male; propleura with some small hairs and mesopleura with dense, longish hairs behind the suture. Abdomen (fig. 34) somewhat flattened, a little narrowed behind; in the male there are six not transformed dorsal segments, the sixth being small, and there are five not transformed ventral segments, the sixth ventrite being unsymmetrical, only developed on the left side. The genitalia are otherwise constructed mainly as in *Pipunculus* or especially as in *Chalarus*; on the left side the seventh segment is present, but of this only the tergite is seen, bending down on the ventral side and only occupying the left half part of the breadth; the eighth segment, which is formed quite as in *Chalarus*, has no apical impression; it consists, seen from above, of a somewhat triangular piece on the left side and a somewhat elliptical, longitudinally compressed part on the right side, stretching more forwards up along the right side of the seventh segment; the two parts are separated by a longitudinal furrow or split; on the right side below

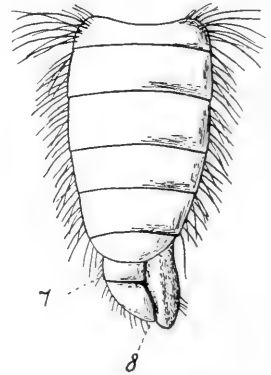


Fig. 34. *W. aucta* ♂; abdomen from above; 7 and 8 seventh and eighth segment.

lies as usual the ninth segment with its end claws and between the bases of these latter the small tenth segment with the hairy lamellæ. While the genitalia thus in the main are like those in *Pipunculus* the eighth segment seems to be more complicate; I think, however, that it is principally of the same construction, and that the split between the two pieces answers to the apical impression in *Pipunculus*, but I have not had material sufficient for dissection. In the female abdomen consists of six normally developed segments, the hypopygium is large, the basal part is roundish or it is elongated and not swollen, the ovipositor long and strong, incurved. Abdomen is clothed with hairs, which are long at the sides, especially on first segment, the male hypopygium has longish hairs at the end and on the right side. Legs slender, hind tibiæ not or almost not twisted; the anterior femora have long hairs behind, the hind femora on the anterior side and on the basal half below, and hind tibiæ with long hairs on the antero-dorsal side; the hairs are shorter in the female, and hind tibiæ without long hairs. Claws and pulvilli somewhat large and sometimes enlarged in the female; the claws are yellow with black apex; empodium small and short, spine-shaped, hairy below. Wings moderately long, a quite small alula present, the axillary lobe somewhat developed in both sexes; the end of the mediastinal cell coloured, third costal segment about of the length of fourth or longer, middle cross-vein near the middle of the discal cell, discal vein forked or unforked.

As shown by the shape of the head, the presence of bristles, the number of normal abdominal segments, and the construction of the male genitalia the genera *Chalarus* and *Verrallia* are very closely allied to each other and more than any of them to *Pipunculus*.

The developmental stages are not known, but as mentioned under *Pipunculus* Jenkinson has (Ent. Month. Mag. XXXIX, 1903, 222) watched *V. aucta* chasing and attacking frog-hoppers, so that the genus thus is known to be parasitic in these insects, like the other Pipunculids. I possess *V. aucta* bred from a pupa found in spring in flood refuse; the puparium is reddish, quite oval, rounded at the ends, the surface is finely shagreened; at the posterior end is a transverse, oval, black spiracular plate with the spiracles lying one at each side. The anterior spiracular tubes are short, curved at the end; to judge from the empty puparium the opening takes place in the same way as in *Chalarus*, but in my sole puparium the upper piece (*B* in de Meijere: Zool. Jahrb. Syst. 40, 1916, Taf. 11, Fig. 144—145) is not separated but remains well connected with the puparium; the way of opening shows the close relationship to *Chalarus*.

The species of *Verrallia* are found in the same places as the species of *Pipunculus*, and they behave in the same way.

The genus is a small one, containing, I think, in all only seven species from Europe, North America and China; of the three palæarctic species two have been found in Denmark.

Table of Species.

1. Wings with the discal vein not forked; anterior femora with a small wart below the middle 1. *pilosa*.
- Wings with the discal vein forked; anterior femora without wart below the middle 2. *aucta*.

1. *V. pilosa* Zett.

1838. Zett. Ins. Lapp. 579, 2 et 1844. Dipt. Scand. III, 967, 22 et 1849. VIII, 3208, 22 et 1859. XIII, 6060, 22 (*Pipunculus*). — 1869. Thoms. Opusc. Entom. II, 123, 24 (*Pipunculus*). — 1894. Strobl, Mittheil. Nat. Ver. Steiern. XXX, 2 (*Pipunculus*). — 1897. Beck. Berl. Entom. Zeitschr. XLII, 94, 54 (*Prothechus*). — 1901. Verr. Brit. Flies VIII, 71, 1, figs. 89—92. — 1910. Kertész, Cat. Dipt. VII, 387. — *Pipunculus modestus* Schin. (nec Hal.). 1862. F. A. I, 246, 3.

Male. Vertex black, frons silvery but black above; eyes quite approximated, but scarcely actually touching, the long frons and vertex connected by a very narrow line; epistoma silvery, broader than the frons. Occiput black. Antennæ black, silvery pruinose, third joint somewhat oval, not pointed, second joint with numerous long hairs above and below. Thorax velvet black, dull, clothed with long, black or brownish black hairs, and at the margin of scutellum about four or more longer and stronger hairs. Pleura and postscutellum dark brownish grey, mesopleura with long hairs behind the suture. Abdomen velvet black with brownish grey, triangular spots at the lateral hind corners of the segments; it is clothed with black hairs, which are long at the hind margins of the segments and at the sides, at the sides of first segment specially dense and long. Hypopygium black, of medium size, with a longitudinal furrow or split above to the right; at the end it has longish hairs. Legs black with the knees yellowish or reddish and tarsi slightly brownish towards the base; anterior femora with a ciliation of long, black hairs on the posterior side and hind femora with a similar one on the anterior side except at base and with finer and shorter hairs on the posteroventral side; anterior tibiæ short-haired, hind tibiæ with an anterodorsal ciliation of long hairs; anterior femora with a small, triangular wart below

near middle. Wings somewhat brownish tinged, stigma brown, not reaching quite to the apex of the mediastinal vein, third costal segment about twice as long as fourth, middle cross-vein at or beyond the middle of the discal cell. Halteres black or blackish.

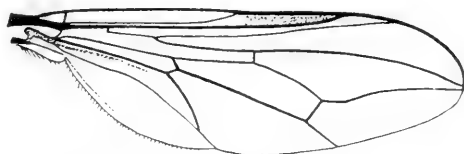


Fig. 35. Wing of *V. pilosa* ♂.

Female. Frons rather narrow, greyish or light brownish grey. Thorax grey, dull, with a brownish median stripe and indications of two abbreviated darker lateral stripes; the hairs shorter than in the male. Abdomen dull brown with grey hind margins to the segments, widened towards the sides and occupying the whole lateral margin, last segment brownish. Hypopygium with a roundish, grey basal knob and a reddish, incurved ovipositor, which is longer than the basal part and thick at the base. Legs about as in the male, but paler, tibiae more brownish and tarsi brown, hind tibiae without a long anterodorsal ciliation; anterior femora likewise with a wart below. Halteres brownish yellow.

Length 3,5—4 mm.

V. pilosa is rare in Denmark, Dyrehaven, Geel Skov (the author), on Funen at Hvidkilde (Miss E. Møller) and a specimen, probably from North Sealand (Schlick), in all two males and two females; the dates are $18/5-3/7$. As seen from the description my specimens belong to a dark form with black halteres and strong, bristly hairs round scutellum, answering to var. *setosa* Verr.

Geographical distribution: — Northern and middle Europe down into Styria, towards the north to northern Sweden.

2. *V. aucta* Fall.

1817. Fall. Dipt. Suec. Syrph. 61, 1—2 (*Cephalops*). — 1824. Meig. Syst. Besch. IV, 23, 10 (*Pipunculus*). — 1844. Zett. Dipt. Scand. III, 950, 1 et 1855. XII, 4682, 1 et 1859. XIII, 6057, 1 (*Pipunculus*). — 1862. Schin. F. A. I, 246 (*Pipunculus*). — 1869. Thoms. Opusc. Entom. II, 122, 23 (*Pipunculus*). — 1894. Strobl, Mittheil. Nat. Ver. Steierm. XXX, 2 (*Pipunculus*). — 1897. Beck. Berl. Entom. Zeitschr. XLII, 94, 53, Taf. II, Fig. 25 (*Prothechus*). — 1901. Verr. Brit. Flies VIII, 74, 3, fig. 93. — 1910. Kertész, Cat. Dipt. VII, 386.

Male. Eyes touching or apparently touching for a long space, but a continuation from the vertex may be traced far down; vertex black, frons silvery, black just at the upper corner; epistoma silvery. Occiput black. Antennæ black, third joint oval, rounded below,

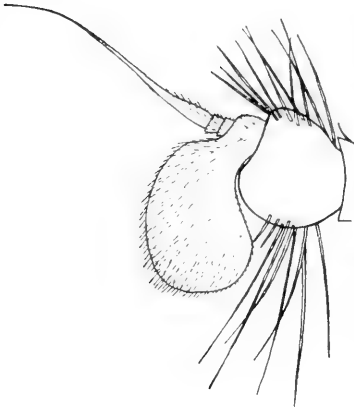


Fig. 36. Antenna of *V. aucta* ♂ $\times 100$.

silvery pruinose, second joint with long hairs above and below. Thorax velvet black, shining a little greyish behind the humeri; it is clothed with longish, black or brownish black hairs, at the margin of scutellum about four bristles. Pleura and postscutellum greyish; mesopleura with longish hairs behind the suture. Abdomen velvet black with rather large, grey triangular spots at the lateral hind corners of the segments. Abdomen is clothed with black hairs, short on the dorsum though longer at the hind margins, but long at the sides and especially at the sides of first segment. Hypopygium of medium size, dull black, with a longitudinal furrow or split above to the right; it has longish hairs at the end and on the left side.

Legs black, a little greyish pruinose, the knees and just apex of tibiæ yellowish; anterior femora with a long black ciliation behind, hind femora with a similar one on the anterior side and with longish hairs on the posteroventral side, hind tibiæ with a long anterodorsal ciliation. Wings slightly tinged, stigma brown, of about the length of next costal segment, middle cross-vein at the middle of the discal cell, the end of the discal vein forked, the lower branch of the fork not reaching the margin. Halteres yellowish brown.

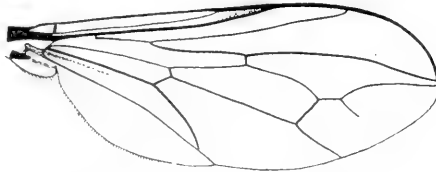


Fig. 37. Wing of *V. aucta* ♀.

Female. Frons whitish grey. Thorax grey, dull, with four weak darker stripes, the two median abbreviated behind, the hairs a little shorter than in the male. Abdomen blackish, with triangular, grey

lateral spots, stretching along the hind margin of the segments as very narrow bands, first segment grey; the hairs at the base of abdomen more or less pale. Hypopygium large, the basal part elongated and narrow, grey pruinose, ovipositor long and incurved, longer than the basal part, black at base, reddish outwards, it is thick at the base the basal part passing evenly into the ovipositor. Legs as in the male but paler on tibiæ, and the tarsi brownish, hind tibiæ without long anterodorsal ciliation; claws and especially pulvilli larger than in the male. Wings with the stigma a little shorter than next costal segment.

Length 4—4,5 mm.

V. aucta is more common in Denmark than the other species; Ordrup Mose, Dyrehaven (Stæger, the author), Lyngby Mose, Ruderhegn, Faxe Ladeplads, in Jutland at Hejls south of Kolding (the author) and at Fussingø (Schlick) and on Bornholm at Almindingen and Rønne (H. J. Hansen); the dates are $18/6$ into July; a pupa was taken in Ruderhegn in flood refuse on $13/3$ it developed on $15/6$ (Kryger).

Geographical distribution: — Europe down into Italy, towards the north to middle Sweden.

HYPOCERA.

Phoridae.

The family *Phoridae* I take here in the same sense as does Schmitz, viz with exclusion of the *Termitoxeniidae*, which latter I consider as a special family. The *Termitoxeniidae* are a family consisting of very peculiar flies, in the fully developed stage with a large and swollen abdomen, and this latter is of a singular construction with the apical segments moved forwards and forming a protruding tube more or less near the ventral base. They have been studied and described especially by Wasmann in a series of papers, and further by Assmuth, Bugnion, Schmitz and Silvestri. They are all termitophilous; five genera are at present known with in all 15 species, belonging to Africa and India. The family is in many respects very nearly related to the *Phoridae*, but the species on the other hand show many special characters. They are all (or are said to be) proterandric hermaphrodites, but this is doubted by Brues (1908),

Bugnion (1913) and Silvestri (1920). The species of *Termitoxenia* lay large eggs, from which the imago emerges, and the genus *Termitomyia* is considered to be imaginipar; in the genus *Ptochomyia* Silvestri (Bull. Lab. zool. gen. et agrar. Portici XIV, 1920, 272) the eggs are smaller, though still large (0,65 mm, the imago 1,56 mm), and Silvestri found a larva in the egg. All the species are recorded to show a curious, so-called imaginal development, being as young small, the stenogastric individuals, but during the imaginal development growing larger and through intermediate forms reaching the physogastric stage; the development concerns both head, thorax and abdomen, or sometimes only abdomen. The species are all wingless, but possess short, curious so-called thoracal appendages which are modified wings, and they possess halteres. It is, I think, correct, at any rate at present, to take the *Termitoxeniidae* as a separate family, but very nearly related to, and in several characters similar to the *Phoridae*.

The *Phoridae* thus limited are at present divided into three subfamilies: *Phorinae*, *Platyphorinae* and *Thaumatoxeninae*. This latter subfamily (Schmitz, Zool. Anz. XLV, 1915, 548) consists at present of one genus, *Thaumatoxena* with two species, occurring in Africa and both termitophilous. They are small, very flat, Blattid-like creatures, which by their first describers (Breddin and Börner 1904) were considered as belonging to the *Rhynchota*. They have in both sexes small wing-rudiments (a male, probably belonging to *T. Wasmanni*, is known, perhaps also the male of the other species) but seem to want halteres, a rather unique case; the abdominal tergites are all, or all except the first united to a single abdominal scutum. In the following description of the family I do not consider this subfamily.

In Europe only the two other subfamilies are represented; in the now following description of the family I mainly consider only the first subfamily, the *Phorinae*, the rather small subfamily *Platyphorinae* with only one Danish species being mentioned thereafter.

The species of Phorids are of small to medium size (0,5 to about 6 mm), they are generally of a dark colour, sometimes more or less to quite yellow, and of a curious, humpbacked appearance; they are also characteristic by their peculiar quick way of running. — Head somewhat semiglobular, generally a little broader than high; it is a little arched behind, sometimes more flat or a little concave. The eyes are broadly separated in both sexes, and sometimes a little more

broadly in the male than in the female; only in *Phora* the eyes are less broadly separated and here more broadly in the female than in the male. The vertex is not separated from the frons and in the descriptions the whole space between the eyes from the vertical margin above down to the antennæ is termed the frons. The frons thus understood is generally broader than high, sometimes quadratic or higher than, to twice as high as broad (the height measured at the side along the eye-margin); the anterior margin is more or less produced in the middle; in many genera the frons has a fine longitudinal median furrow; below the anterior margin the frons curves downwards and inwards and forms a large cavity, somewhat divided into two, in which the antennæ are placed. On the vertex there is a more or less developed ocellar triangle, bearing the three ocelli; in some species (of *Hypocera*) the triangle, or the space on which it is placed, is particularly shaped and raised, and in that case the anterior ocellus may be wanting. On vertex and frons there is a number of generally well developed bristles, thus on vertex two outer vertical bristles near the upper eye-corners and two ocellar bristles in the middle, on the ocellar triangle; below these bristles on the frons there is a number of fronto-orbital and frontal bristles; in the descriptions all these bristles are for simplicity termed frontal bristles, typically they form three transverse rows, each consisting of four bristles, one row at vertex, one about the middle and one near the lower margin; sometimes the bristles form four rows and are more than twelve in number or on the contrary some bristles are wanting; besides these bristles there are one or two pairs of often smaller bristles above the antennæ on the anterior corner of the frons, the supraantennal bristles, they may sometimes be wanting. The frontal and supraantennal bristles are of the utmost importance for characterising genera and species; the bristles may be very variously placed in the rows, so that the two lower rows are more or less straight, or they are convex or concave; the frontal bristles are reclinate, directed more or less backwards, the supraantennal bristles are in a group of genera likewise reclinate and then only two in number, in another group of genera they are on the contrary proclinate, directed forwards and downwards and there are then generally two pairs. The frontal bristles are rarely very weak or almost not developed (*Gymnophora*). Above on the hinder side of vertex there is a postvertical bristle on each side, they are of moderate size, a little converging. On occiput along the posterior margin of the eyes there is a row of well developed postocular bristles;

they are rarely small; the lowermost of them is generally much larger than the others; further there is, as a rule, some smaller or larger bristles at the sides of the oral aperture below the eye, the oral bristles, sometimes there is only one, and further upwards on the cheeks there are generally likewise some bristles, the genal bristles, also here is sometimes only one. The oral and genal bristles are sometimes not distinctly separated, but more or less confluent, and the postocular bristles may sometimes be continued round the lower corner of the eye and upwards, so that no distinction is present between oral and genal bristles as often in *Aphiochaeta*. (The bristle I term the long lower postocular bristle Schmitz takes to be an oral bristle, and when there is one other oral bristle besides it, he says: "Zwei divergierende Backenborsten", but it seems to me that the said bristle both by place and direction proves to belong to the postocular bristles.) Eyes large, occupying the lateral parts of the head, rarely smaller; they are of oval shape and hairy, rarely bare (*Phora* and *Pseudacteon*). The antennæ are placed in the above mentioned cavities about in the middle of the head or more or less below to rather near the lower margin; they are six-jointed, the basal joint is small, somewhat cylindrical, the second joint is narrow at the base but with a ring-like thickening just after the base, its apical part is swollen, more or less globular, but this part is hidden in a large cavity in the third joint, so that the greater part of the second joint is imbedded in the third; the third joint is of various shape, roundish or more elongated and citreiform, or it may be still more elongated, elongately bulb-shaped with a narrow apical part; not rarely the joint is larger in the male than in the female, and the above mentioned special forms are generally present only in the male; the three last joints form a thread-like arista with the two basal joints shorter or longer, generally rather short. The three basal joints, the antenna itself, are short-pubescent, the pubescence on third joint sometimes rather conspicuous; the arista has a shorter or longer pubescence, and sometimes it is longer pubescent in the female than in the male; rarely it is apparently bare. Epistoma is a low part below the antennæ, and it is not separated from the frons as there is no frontal bladder-seam nor lunula.¹ The jowls

¹ Schmitz says in Wien. Ent. Zeitg. XXXVI, 1917, foot-note: »Das einzige, was man in dieser Beziehung bei Phoriden konstatieren kann, ist, dass bei mit KOH mazerierten Köpfen gewisser Arten, z. B. der Gattung *Dohrniphora*, die Chitindecke auf der Grenze zwischen Stirn und Gesicht dünner und darum leichter durchzutrennen ist.«

are narrow or not at all developed, only rarely they are a little broader and a little descending below the eyes. The oral aperture is relatively large, often larger in the female than in the male. There is a well developed, though generally not long oral cone. The mouth and its parts are mainly of the Muscid type; the clypeus lies as usual on the front side of the oral cone; it is arched or somewhat roundly incised in its distal margin, or more or less horse-shoe-shaped; when the oral cone is longer the clypeus is also long and becomes forceps-shaped as in species of *Dohrniphora*; the basal part of clypeus is often specially developed and thickened, and in that case it is seen protruding between the palpi and the antennæ, it is then always more protruding in the female than in the male, and it may be very conspicuous as in the females of *Conicera*. The proboscis is shorter or longer, and in accordance herewith the length of the mouth parts varies. Labrum is strong, more or less pear-shaped, arched and with the sides curved downwards; it is pointed, the apex itself three-pointed; it is of the length of labium or shorter; hypopharynx lies in the bottom of labium, it is shorter or longer and more or less blade-shaped, pointed, sometimes with the apex cleft and two-pointed, and it is hollowed with the cavity upwards. Maxillæ are generally not developed, only in *Dohrniphora* and some or all species of *Hypocera* they are present as a small piece at the base of the palpus, so that it looks as if the palpus was two-jointed; the maxillary palpi are well developed, one-jointed (sometimes recorded as two-jointed, see above); they are as a rule compressed and more or less club-shaped, along the lower margin and at apex they bear a number of generally well developed bristles; the palpi and their bristles may vary sexually, sometimes the palpi are enlarged in the male and this may be to a high degree; the bristles on the other hand are sometimes small to very small in the male while of normal size in the female; when the palpi are larger in the female than in the male this is due to the whole proboscis being larger in the female. Labium consists as usual of the basal part and the labella; these parts may vary considerably as regards their relative lengths; the basal part generally or always shows four bristles below, two on each side, one behind the other; the labella are more or less oval, pseudotracheae are present or wanting, sometimes the labella has some curious chitinous hooks instead (*Dohrniphora transformata*). Often the oral cone and proboscis are larger in the female than in the male, a feature which may be more or less pronounced; sometimes oral cone and proboscis are both very long, as in species of *Dohrni-*

phora, they may form an angle and thus be knee-shaped; also this shape is only found in the female; this difference may influence on the shape of the various parts so that f. inst. labrum may be shorter than labium in the male but of the same length in the female. Thorax is rectangular or sometimes nearly quadratic, rarely it is more elongated; it is rather high and arched above; prothorax is as usual small, but its pleural parts are distinct; behind scutellum a broader or narrower, generally rather broad postscutellum is seen, not unlike an abdominal segment; metathorax is small, metanotum generally not visible above or only towards the sides, but metapleura distinct. The thoracic disc is short-haired and has one or two pairs of dorsocentral bristles behind, most often only one pair; very rarely there are two pairs in the female but only one pair in the male; the hairs between the dorsocentral bristles are sometimes developed to smaller bristles. Scutellum has two or four, in a single case six marginal bristles; when only two bristles present there is always a quite small hair on each side, exterior to the bristles, and it is this hair which may develop to a bristle, so that we get four bristles; the four bristles may be more or less equal, or the outer pair may be smaller, down to diminutive hairs; not rarely the outer bristles are well developed in the female but small in the male. Of bristles I further find, as a rule, the following: a humeral bristle on humerus, a posthumeral bristle behind the humeral just at the side margin, one or more bristles behind the posthumeral, which are placed just at the margin and may, I think, be notopleural bristles, farther behind and more inwards there is one supraalar bristle and on the postalar callus there is a postalar bristle. In a couple of species (of *Aphiochaeta*) there is still a bristle present on the disc, this bristle is placed forwards and inwards to the postalar bristle and may, I think, be termed an intraalar bristle, and it is otherwise not developed in the family. On the propleura are small hairs and a row of bristles below, also further upwards or above there are often one or a couple of bristles; for the rest the pleura are generally bare, but in many species the mesopleura have a group of hairs or small bristles above on the anterior plate in front of the suture, these hairs may either be equal in size or one or a couple of them may be developed to larger bristles, sometimes very large. In most species of *Hypocera* the thorax is somewhat curious, the notopleural suture vanishing anteriorly, and hence the upper part of mesopleura has short hairs like those on the disc. Abdomen varies in shape from short and robust, more or less conical, to somewhat long and more

slender; it consists in both sexes of ten segments; the six first have normal, not transformed tergites, but on the ventral side these six segments have no chitinized ventral plates, the venter being thus membranous, and this is an important family character. The only exceptions from this rule is the occurrence of a ventral plate in the male of *Metopina* and in the females of *Chaetoneurophora thoracica*, *Trupheoneura luteifemorata*, *Aphiochaeta Oldenbergi* and *Chonocephalus*, where a chitinized sixth ventral plate is present. In the male the second and sixth segments are sometimes more or less elongated, or sometimes only the sixth; after the six normal segments follow the hypopygium, but as this answers morphologically to the ninth segment, the seventh and eighth segments thus have disappeared, and the disappearance is total, as no chitinizations are found in the connecting membrane between the sixth segment and the hypopygium. The hypopygium is smaller or larger and somewhat various in shape, but principally of the same construction; it may be described as consisting of a dorsal part or tergite, which bends more or less down on the sides as two large side parts, and a ventrite or ventral plate, more or less covering the opening below between the side parts and of very various shape, smaller or larger; the said side parts may be very various in shape, and the hypopygium may be symmetrical or more or less unsymmetrical; in some species (in *Chaetoneurophora* and *Paraspiniphora*) the left side part is more or less deeply fissured and a special plate moreover may occur here; in other species (*Parastenophora*, *Trupheoneura*) the side parts may be developed as long arms so that a forceps-like organ is formed, the arms may be symmetrical or more or less to very unsymmetrical. In the cavity formed of the described parts a very complex copulatory organ, the subanal body (Wood), consisting of penis and variously formed appendages, is enclosed, and these parts are sometimes more or less exposed. Below the hind margin of the tergite, between the side parts the tenth segment, the anal tube, protrudes, it varies to no small degree, being short, papilliform and not or almost not protruding, or it is long, cylindrical and finger-like (*Dohrniphora*), or shorter, flat and depressed (*Trupheoneura*), or finally compressed and more or less high (*Aphiochaeta*); it generally (or always) consists of a tergite, often divided longitudinally, and a ventrite, which stretches further backwards than the tergite and generally bears at the end two shorter or longer upwards curved hairs. In *Hypocera*, except *citreiformis*, and *Conicera* there is the difference, that the opening for the anal tube

is not between the side parts but goes through the dorsal part; this condition, however, is, I think, of secondary nature, the side parts being connected below the opening. The hypopygium is more or less hairy in various ways, especially on the sides, and not rarely it is here provided with bristles, arranged in certain ways. (The hypopygium of the *Phoridae* has not yet been comparatively morphologically studied; no doubt important results will be gained by such a study, as already proved by Schmitz's examination of the hypopygium in *Phora*). In the female there is as in the male generally six normal, not transformed segments with chitinous tergites, but there are some exceptions, thus in *Dohnniphora* the fifth and sixth or only the sixth is membraneous, without chitinized tergites, and in most species of *Gymnophora* some (the fourth, fourth and fifth or third to fifth) segments are membraneous; the segments following after the sixth are smaller and telescopically retractile, they may all have chitinized dorsal and ventral plates, not rarely longitudinally divided and generally small; the ninth and especially the tenth segment are small, the tenth bears a pair of small end lamellæ, generally directed downwards; these segments are otherwise not transformed, but in some genera (as in *Pseudacteon* among Danish genera) the last segments may form a chitinized, more or less long ovipositor. In some single cases a tergal plate may be very reduced or wanting in the female abdomen as the fifth in *Chaetoneurophora thoracica* (see under this species), and in the genus *Phalacrotophora*, and the fourth in *Aphiochaeta zonata*, or a tergite may be curiously abbreviated as in some species of *Aphiochaeta*; in some other females of *Aphiochaeta* some tergites may be narrowed so that the dorsal side parts of abdomen is more or less membraneous, and sometimes, as in *A. ruficornis*, the narrowing of the tergites is variable individually, what are also the abbreviated tergites mentioned. All these features show that the female abdomen in the *Phoridae* is somewhat inclined towards a diminishing of the tergal plates, and this reaches its climax in foreign forms with the tergites very small or abdomen quite membraneous. In the *Metopina* female we met with a curious formation; at the base of the fifth segment is an opening, covered by a movable, semicircular chitinous plate; this feature is more often met with among foreign genera as mentioned below. Abdomen is generally sparingly or very sparingly and short haired above, sometimes almost imperceptibly, the hairs along the hind margins of the segments are as a rule slightly longer and these hairs increase as a rule a little

in length backwards; this is most pronounced in the male and here the hairs at the hind margin of sixth segment are often more or less elongated, sometimes rather much, so that they form a row of long hairs or bristles; at the sides of second segment there is not rarely longer hairs or bristles. In two species (*Aphiochaeta rufipes* and *hirtiventris*) abdomen is in the male covered above by long, stubby hairs. Also the venter is generally variously haired, often rather sparingly, sometimes to a higher degree. The legs are as a rule rather characteristic both by their shape and the way in which they are haired; they are not rarely somewhat robust, sometimes more slender; the coxæ somewhat long, especially the front coxæ; the femora are generally of a shape characteristic to the family, nearly always compressed, especially the hind femora and these latter are very often more or less dilated, also a very characteristic feature in the family; the tarsi as a rule rather long; sometimes the legs may show special characters, thus the front tarsi may be thickened, either only metatarsus or the whole tarsus, and generally this character is less pronounced or wanting in the female; also hind tibiæ and hind tarsi may be thickened. The coxæ have a number of bristles at the end, the middle coxæ also on the exterior or anterior side, further the hind coxæ have two or more, characteristic, smaller bristles at the apex on the outside, these bristles point outwards. Otherwise the tibiæ have either single, individualised bristles, present in various numbers and arranged in various ways, or they have no single bristles; in the latter case the posterior tibiæ have generally a row of bristles or more or less bristly hairs. The hind tibiæ are sometimes of simple shape, but often they are specially constructed; very often, as in *Aphiochaeta* (with a few exceptions) there is along the dorsal side a somewhat elevated margin with a dense row of palisade-like arranged hairs, on the posterior side of which the above mentioned row of bristles or hairs is placed; in other genera (*Dohrniphora*, *Hypocera*) two or three such rows of palisade-like hairs are present, separated by furrows; in some few species (of *Hypocera* and *Paraspiniphora*) the hind tibiæ are ornamented in another way, the dorsal side being covered by transverse, comb-like rows of short bristly hairs; generally the middle tibiæ show a similar construction as the hind tibiæ, while the front tibiæ are simple. The legs are otherwise clothed with short hairs, the posterior side of posterior femora is partly bare; on the posterior side of hind tibiæ, at the end there are special, short, bristly hairs arranged in transverse comb-like rows and such hairs are also found on the

posterior or posteroventral side of hind metatarsus; a similar arrangement is generally present on the anterior or anterodorsal side of middle tibiæ on a smaller or larger apical area, and is also often more or less discernible at the end on the anterior side of the front tibiæ. These peculiar combs of special, short and, I think, a little flattened bristles are very characteristic to the family. Sometimes (in species of *Aphiochaeta*) the hairs below the basal half of hind femora may be more or less elongated in both sexes, or they may be specially developed, stronger and forming a longer or shorter fringe or forming special bristles only at the base, and when thus developed they are present only in the male. The posterior tibiæ have shorter or longer, often rather long apical spurs, longest on middle tibiæ. Still it is to be mentioned as characteristic that the hairs on the tarsi, especially on the posterior tarsi, form longitudinal hair-seams. Claws and pulvilli small or somewhat small and empodium bristle-shaped; in some species of *Paraspiniphora* these organs show sexual dimorphism, they are normal in the male, but in the female they are enlarged, the empodium is hairy below, and the hair above between the claws is long, flattened and band-shaped; the enlargement is most pronounced on the anterior tarsi. In *Metopina* and in several foreign genera the pulvilli are transformed, narrow, with branches below, in other foreign genera both pulvilli and empodium are wanting. Wings with the axillary angle well developed; the venation is rather unique and consists of two thick veins at the front margin, the second of these veins forked at the apex or not; from this latter vein four thin veins issue, going to the apical and hinder margin, all unbranched; costa is short, at most reaching somewhat beyond the middle, stopping at the end of the third vein; the mediastinal vein issues from the humeral cross-vein, it is short and generally ends in the subcostal vein, but sometimes it does not unite with this, but ends freely, and it may be reduced or almost wanting. In a single case, the male of the American genus *Ecitomyia* Brues, the first or subcostal vein is wanting so that only one thick vein, the cubital or third vein, is present. The venation has been somewhat debated and is not easily understood; all the veins with exception of the mediastinal vein are convex; I think the following interpretation is at least possible: the vein following the subcostal vein is the cubital vein, it is generally furcated at the end, the inner branch of the fork being the radial vein, for the greater part coalesced with the cubital vein, but the radial vein may sometimes be absent, and then there is no fork; the first thin

vein I take to be a branch from the cubital vein, this thus being forked and two cubital cells being present, or when there is no radial vein there is only one cubital cell; the second thin vein I take as the discal vein (Redtenbacher's vein V), the third is the postical vein and the fourth the axillary vein; this latter may be more or less abbreviated or wanting; the anal vein is wanting, sometimes more or less indicated as a concave fold; below the discal vein a concave fold, furcated at the end, is generally seen (representing Redtenbacher's vein VI). As all the thin veins are unbranched there are only two posterior cells, and anal and axillary cells are confluent; there is only one basal cell, the more or less distinct cross-vein closing it apically includes, I think, the middle cross-vein, which should be placed between the in the basal part coalesced cubital and discal veins; otherwise no cross-veins are present. In the descriptions I follow the way used by other authors on the Phorids and designate the veins by their number: the subcostal vein as the first vein, the radial as second, the second thick vein as the third, and the thin veins as fourth, fifth, sixth and seventh. The costa bears two parallel rows of shorter or longer cilia, and just at the base it has one or some longer bristles; in *Chaetoneurophora* and in species of *Hypocera* and *Trupheoneura* the third vein has in the whole length fine bristles or hairs, and it has sometimes a more or less conspicuous bristle at the base. Sometimes the costa is more or less thickened, it may be the case in both sexes, but generally most or only in the female, and the thickening may reach a high degree. In other species the third vein may be specially thickened, and then only in the male or at all events only slightly in the female. Alula is not developed, the margin is here straight and bears a number of stubby bristles; the number of these bristles may be different and is in some genera (*Conicera*) only one. (Also in the species of f. inst. *Aphiochaeta*, the number may be different and perhaps give specific characters, but it is difficult to use, as these bristles are easily lost). In rest the wings lie flat over abdomen. The venation of the wing, especially the length of costa and of its divisions and the length of the costal cilia give important characters for the genera as well as especially for the species. Peculiar wing-pores have been mentioned (Felt, 10th State Entom. N. Y. Report) lying near apex of the third vein or stretching more backwards (Brues); they are, I think, sensory pores belonging to the same category as those described by Mc. Indoo (Journ. of Comp. Neurol. XXIX, 1918). Above, at the base of the wing-root there is a small,

somewhat patagium-like tegula with a fan of bristles. Squamulae slightly developed, the thoracic squamulae not developed, almost only consisting of frenulum, and also the alar squamulae narrow, but these latter have at the end before the junction with the alular margin a roundish extension with bristles or hairs at the margin.

At last still an important character of the family must be mentioned, namely that all bristles in the Phorids are characteristic by being spinulose or short-hairy; so far known similar bristles occur only in the *Mycetophilidae*. Alexander and Brues, however, state (Biol. Bull. V, 1903, 19) that two species of *Puliciphora* have bare bristles.

The above remarks are based mainly on the European species; among these there are no specially aberrant forms, and they are all winged in both sexes. In non-European, especially tropical regions many forms occur which are very aberrant in many ways. The head may be otherwise shaped and the bristles otherwise arranged, reduced or absent, and they may be different in the two sexes; ocelli may be absent in both sexes also in otherwise normal forms (*Melaloncha*); pulvilli and empodium may be reduced or wanting. Many of these genera have the wings wanting or much reduced in the female, while the male, when known, always has wings (of a number of genera only the female is known); only in one case, the genus *Aptinandria* newly published by Schmitz (Entom. Meddel. XIII, 1921, 6), and of which both sexes are known, they are both wingless and without halteres, and also without scutellum and ocelli; the author mentions (for the male) a very small wing-rudiment, which he says is of the same kind as in the female of *Puliciphora*. The reduced wings are often of a peculiar shape, more or less scale-like or narrow with very long and strong bristles. These females are upon the whole much specialised or degenerate and often very curious. Together with the want of wings also the halteres seem always to be wanting, but when rudiments of wings are present halteres are generally also present (in some females of *Puliciphora* and *Wandolleckia* as also in the above mentioned *Aptinandria* very small vestigial wings are mentioned without halteres); only for *Ecitomyia* Brues (Americ. Naturalist XXXV, 1901, 351) expressly mentions that the female has rudimentary wings but no halteres, and states this to be quite unique, though the same case is stated for *Thaumatoxena* as mentioned above. The females without wings or with reduced wings have also the eyes small and generally no ocelli, though sometimes ocelli are present and the scutellum is generally very small or quite undeveloped, and the whole

thorax is somewhat reduced. Also the abdomen is altered, the tergites being small and rudimentary, and in a couple of genera the abdomen is quite membranous; it sometimes bears rows of long bristles. It will be seen that the curious aberrations, with the sole exception of *Aptinandria*, mainly or only concern the females, and the forms in question are in most cases nymecophilous or termitophilous. In many of these genera a curious feature is described, consisting of an opening or excision at the base of the fifth abdominal segment (perhaps sometimes the fourth) in the female, covered by a semi-circular cover, thus a similar feature to that found in *Metopina* among European forms; it is thought to be in connection with a kind of gland; I think the curious small excision at the base of the sixth segment in *Aphiochaeta*, mentioned below under this genus, is something similar, though here occurring on another segment, and so is perhaps also the feature found on the fifth segment in *Phalacrotophora* and in *Chaetoneurophora thoracica*. Schmitz thinks it possible (Tijdschr. voor Entom. 59, 1916, LIX) that this organ is no gland, but may be of use by the opening of the pupa-case; in *thoracica* I think that the formation is in some connection with the copulation (see under this species). Some of the degenerate forms (*Wandolleckia*) are recorded to show the same curious imaginal development with stenogastric and physogastric individuals as mentioned above for *Termitoxenia* (Schmitz, Zool. Mededeel. 's Rijks Mus. Lejden II, 1915, 1).

In the subfamily *Platyphorinae* the species are small, of a broad and flat shape. The head is broader than high, excavated behind and lying close to thorax; frons broad, always broader than the eyes taken together, without bristles or with single bristles at the margins. Eyes of normal size to small or very small, especially in the female, bare or pubescent; ocelli present in the male and in the females with wings, but absent in the unwinged females. Antennæ inserted low down, near the oral margin. The oral aperture relatively small so that broad, horizontal jowls are present; a row of confluent oral and genal bristles stretching from the oral aperture to the lower part of the eye. Thorax broad and flat, especially in the female, without dorso-central bristles; scutellum present in the male and in the females with wings, it is short and broad, with or without marginal bristles; in the wingless females it is absent. Mesopleura wedge-shaped, presenting a dorsal and a ventral surface meeting in a sharp longitudinal lateral margin; the dorsal surface partaking in the formation of the

thoracic disc, the notopleural suture being partly vanished and the prothoracic spiracles placed on the upper side; the dorsal part of mesopleura hairy and with a bristle behind. Abdomen short, broad and flat, especially in the female; the male hypopygium small; in the female abdomen has four to six not transformed segments, the rest retractile, it ends with two small lamellæ which seem sometimes to be wanting. Legs somewhat short and robust in the female with the femora broad or very broad, more slender in the male; posterior coxæ transformed to transverse plates; tibiæ with or without single bristles. Claws small, pulvilli and empodium present or wanting. Wings present in the male, of the Phorid type; third vein furcated or not and bare or with fine bristles; in the female wings may be present, but short though otherwise mainly normal, or they are in this sex wanting, or only a small rudiment is present as in *Conoprosopa* (perhaps a very small hairy process, present in the other genera also represents wing-rudiments); when wings are present halteres are also present, but the females without wings are also without halteres. — It will be seen, that the females have either shortened wings, and then they also possess ocelli, scutellum and halteres, while the wingless females are destitute of ocelli, scutellum and halteres and are less like the males, of broad, flat and oval shape with shorter, more robust legs.

The *Platyphorinae* include in all six genera, of which *Platyphora* is European and also occurs in America, the others are from Africa; in all there are about fifteen species; only of *Platyphora* and *Conoprosopa* the males are known; on account of the different aspect of the sexes it was not until rather late that the sexes were recognised as belonging together; of *Platyphora Lubbocki* the male was described in 1877 and the female as *Aenigmatias* in 1890, and, though suggested by several authors and first by Mik in 1898, it was not until 1914 that it was proved (or practically proved) that they were male and female of one species (Donisthorpe, The Entomologists Record XXVI, 1914, 276 and Schmitz, Berl. Entom. Zeitschr. 1915, 466), and Brues likewise has lately shown (Psyche, XXV, 1919, 41) that also *Conoprosopa*, of which only males were known, belongs to this subfamily, as he got a species of this genus in copula with a typical *Platyphorine* female. — So far known the *Platyphorines* are all myrmecophilous.

The developmental stages of the Phorids cannot be said to be well known and of many genera they are still unknown, even if the

species sometimes have been bred, so that the feeding habits of the larvæ are known. As regards the European genera the larva of *Chaetoneurophora* is unknown, the pupa is described here; the developmental stages of *Paraspiniphora* are well known, of *Parastenophora* they are unknown; larva and pupa of *Trupheoneura* are described here; as regards *Dohrniphora* egg, larva and pupa of the American species *venusta* are described (Jones, Entom. News, XXIX, 1918, 299), and there is a paper of Weiss (Bull. Soc. Hist. Nat. de l'Afrique du Nord. 1911, 34), dealing briefly with the metamorphosis of *D. chlogastra*, but as to description it has only some remarks about the puparium; the pupæ of three species are described here; larva and pupa of *Hypocera* are described and likewise of *Conicera*, but from earlier time and not thoroughly; the stages of *Phora* are not described, of *Beckerina* unknown; of *Aphiochaeta* the stages are rather well known of some few species, of *Phalacrotophora*, though known, they are not described, and of *Pseudacteon* they are not described; of *Gymnophora* the stages are unknown, of *Metopina* not described, and finally of *Platyphora* the pupa is known, but not described. Only of few foreign genera the developmental stages are known. The larvæ may be somewhat different in aspect, but the principal features are the same. The larva is of the type of the Muscid larvæ and like this passes during growth through three stages separated by two moults; the larva is more or less cylindrical or a little flattened, attenuating anteriorly and also posteriorly or here truncate; the colour is whitish or yellowish; the body consists of twelve segments including the head; the dermis is generally more or less covered with nearly microscopical or a little larger spinules; above the mouth opening there are, as in other cyclorrhaphous larvæ, on each side two papillæ, more or less confluent at base, one is broad at the base and corrugated at apex, the other, which is placed more dorsally, is more slender and terminates with three small processes and a larger, refractive body; Keilin follows Wandolleck in interpreting both papillæ as antennæ, while evidently the lower papillæ are no doubt maxillary palpi, the upper antennæ in accordance with the opinion of de Meijere (Zool. Jahrb. Syst. XIV, 1900, 100). The mouth parts consist, as in the other cyclorrhaphous larvæ, of a pharyngeal skeleton with a pair of hooks. Besides the clothing of the dermis with small spinules there are on the body a number of more conspicuous or larger, generally pointed papillæ or warts; these latter are present in a certain number and arrangement, but the surface may besides, as in species of *Paraspiniphora*, be richly

provided with various processes of varied shape so that the larvæ gets a curious aspect, but also here formations are present, even if small, answering in number and arrangement to the said papillæ present in all species. According to the studies made by Keilin these various formations are provided with sensory organs and are in connection with nervs; as before said there is a certain number of formations or papillæ which are always present in a certain arrangement and thus homologous, but rather various in size and shape; of such formations there are four on prothorax, six on meso- and meta-thorax in transverse rows. The abdominal segments are each more or less distinctly divided into three corrugations separated by furrows, and each segment has eight of the formations in question, four on the posterior corrugation, placed two on each side of the middle, and four on the middle corrugation situated two on each side and more or less pleural; the eighth segment has the papillæ placed round the hind margin; this latter segment when attenuated bears the posterior spiracles at the end, when truncate the spiracles lie on the dorsal side; the anterior spiracles are found at the posterior margin of the prothoracal segment. On the ventral side the abdominal segments more or less distinctly show a somewhat bladder-like flat prominence on each side of the middle and to each side of these generally still another slight elevation. — The pupa may be of somewhat various shape; in most species, as in *Aphiochaeta* and in several other genera, it is on the ventral side rather arched transversally, but more flat on the dorsal side; the greatest height lies at about the anterior third and from here the dorsal surface slants abruptly towards the anterior end but evenly towards the posterior end; the outline of the puparium is somewhat elongately rhomboidal; in other species (*Paraspiniphora*) the ventral side is likewise arched but the dorsal flat, or the puparium is upon the whole rather flat, the circumference is oval or elongated oval or sometimes rather broad; the colour of the puparium is lighter or darker brownish, sometimes blackish; the larval papillæ and formations are still more or less visible on the puparium; the anterior spiracles protrude as shorter or longer, generally rather long spiracular tubes through the second abdominal segment, they are generally a little curved, directed forwards and diverging. The opening of the puparium takes place in a curious way which moreover is not quite the same in all species. In *Aphiochaeta* an anterior piece is detached, above going from the front end to the anterior part of the first abdominal segment, but below separating more anteriorly in the anterior

part of metathorax, and then behind it a larger posterior piece stretching from the anterior piece to near the hind margin of third abdominal segment, but only including the dorsal halves of these segments; this latter piece divides into two by a longitudinal median split. In species of *Paraspiniphora* the way of opening is another; here a dorsal plate is detached including metathorax, the two first abdominal segments and the greater part of the third, the dividing line being a little anterior to the hind margin of this segment, this plate is not split in two; no front part is here detached; in *Par. Bohemanni* the opening seems to take place in a way somewhat similar to that found in *Aphiochaeta*, on the ventral side, however, only the head-segment is separated off. — The larvæ mainly live in various decaying matters, both vegetable and animal, and in fresh or decaying fungi; as to animal matters species have been bred from dead insects, caterpillars, beetles etc., from nests of wasps and from putrid snails, and they have also been found on small vertebrates. All these species are not parasitical, but some seem to be so such as *Aphiochaeta juli* on myriapods and the species of *Phalacrotophora* (on Coccinellid pupæ, beetles and spider-eggs, see under the genus), and *Aphiochaeta ferruginea* (= *xanthina* Speiser) is recorded to cause myiasis in man, being able to develop in the intestine; also some species living in nests of wasps and bees seem to be parasitical as *Hypocera incrassata*, and *Aphiochaeta rata* is recorded as bred from larvæ present in a living *Clerus formicarius*. A curious case is recorded by Chappellier (Feuil. des jeunes Naturalistes 43, 1913, 55) who found Phorid larvæ living in bodies of Canary birds prepared with vapours of formaline; the larvæ pupated, but were not bred, the pupæ were determined as belonging to *A. rufipes* and *Par. Bergenstammi* (the latter determination I think dubious). A not small number especially of exotic forms are myrmecophilous, being either parasites or commensalists; to the former belongs f. inst. the American genus *Apocephalus* of which the species *A. Pergandei* "the ant-decapitating fly" lives as larva in the head of *Camponotus pennsylvanicus* causing the head at last to drop off; among the latter is the American species *Metopina pachycondylae* the larva of which lives curled round the neck of the larva of *Pachycondyla harpax* being fed by the workers together with the ant-larva; for many of the myrmecophilous forms it is not known whether they are parasitical or not. Some exotic species are termitophilous. — As regards hibernation this is in our climate generally passed in the pupal or sometimes in the larval stage, but many species have more than one brood

in the year; not few species may hibernate or be able to hibernate as imago.

The family of *Phoridae* is very characteristic; the high thorax gives most of the species a curious, humpbacked appearance, and they are easily known by the peculiar venation of the wings. The place of the family in the system has been much debated; they have been considered as related to the *Mycetophilidae*, partly on account of the wing-venation and partly because of the spinulosity of the bristles, otherwise only found in the said family; the wing-venation is for the rest more like what is found in *Bibionidae* (and for this reason, I think, Fabricius placed *Dohrniphora florea* in that family), it is especially similar to the venation in *Apistes*, but I think this is only a casual similarity. On the other hand, the *Phoridae* have been placed at the end of the *Cyclorrhapha* near the *Borboridae*. Osten Sacken thinks that they are nearly related to the *Lonchopteridae* and thinks they are not *Cyclorrhapha*, and Verrall is of the same opinion. Brues (Biol. Bull. XII, 1907) thinks also that they are related to the *Lonchopteridae*, but with affinities also to *Borboridae* and *Hippoboscidae*. I am not able to express any certain view about the question but shall only say that I think the *Phoridae* are not at all related to the *Mycetophilidae* or *Bibionidae*, as they are no doubt belonging to the *Cyclorrhapha* but rather related, however, to the *Lonchopteridae*. The natural arrangement of the families here might be the *Lonchopteridae* at the end of the *Ortorrhapha* and the *Phoridae* beginning the *Cyclorrhapha*. In a recent paper (Revista di Sc. Nat. Natura VII, 1916, 174) Bezzi includes *Braula* as a subfamily in the *Phoridae*, but as well shown by Schmitz (Wien. Ent. Zeitg. XXXVI, 1917, 179) this is erroneous.

The species of Phorids occur especially on leaves of bushes and in low herbage in woods, generally in damp localities; they are here seen running about in a characteristic jerking or hopping manner which makes them at once recognizable, and they are often present in large numbers; when chased they also fly, but generally only for a short distance; they are also found on the dead leaves on the ground and some species are seen on flowers, especially on umbellifers. Some few species may be seen dancing in the air at trees as the males of *Phora* and the females of *Phalacrotophora*. Under carrion several species are generally found, present here for egg-deposition; some few species occur indoors and are seen in our houses on windows, especially the common *A. rufipes*, but under certain circumstances

many species, otherwise not indoor forms, may occur in this way, thus my friend Dr. Th. Mortensen, who lives in a villa at a wood and to whom I am indebted for very valuable aid in collecting Phorids to me, one summer caught all the specimens occurring on his windows, and in this way he took no less than some sixty species. As mentioned above many foreign forms occur with ants or termites, and to these many aberrant forms, with apterous or semiapterous females and also otherwise curious belong. The species of the African genus *Wandolleckia* occur epizooically on large land-snails (*Achatina*), running about on the snails probably feeding on the slime.

The Phorids have only rather recently been studied more closely. In 1901 Becker published his well known monograph; in this work all the known species were well treated and many synonymical questions were elucidated by the study of types; but the author had no large material. From 1906 to 1912 Wood then published a series of articles on the family in Ent. Month. Mag. and by his work the knowledge, especially of the smaller forms (*Aphiochaeta*) made a large step forwards. For the first time the important character of the mesopleura being bristly or not (detected by Collin) was used here and was of very great consequence; Wood's tables included about 146 species and of these about 100 were new, but of the total number 114 belong to *Aphiochaeta*, 94 of these being new. Malloch much advanced the study by dividing the old genus *Phora* into several good genera, and he and Brues have made a great work with foreign forms, especially in the American fauna. Pater H. Schmitz S. J., the well known specialist in Phorids, has in a series of papers done a most splendid and careful work with foreign forms, especially myrmecophilous and termitophilous species, and since 1918 he is publishing an elaborate work on the European fauna, of this work four parts are published, but it is still unfinished, most species of *Aphiochaeta* remaining. I beg here to offer my thanks to this latter author for the very valuable aid he has yielded me during my work both by sending me rich material and in other ways.

The number of European species is at present about 335; in Brues' catalogue from 1914 (Bull. Wisc. Nat. Hist. Soc. XII) about 530 species from the world are enumerated (besides some fossil and a number under "incertae sedis"), but a large number of both European and non-European species has been described since then which I have loosely estimated to about 160, so that the total number of species from the world is at present about 700. How large the increase

is will be seen from the fact that Brues in 1903 gave the number to about 125.

Of *Hymenoptera* parasitic on Phorids I know the following: In the catalogue of Dalla Torre are mentioned *Aspilota fuscicornis* Hal. bred from *Conicera dauci* (*atra*), this must be the Braconid mentioned by Reinhard from this species; *Orthostigma pumilum* Nees from *Aphiochaeta rufipes*, *Opius leptostigma* Wesm. from *Phora tuberorum* Rond. which is a nomen nudum, and *Eucoela zigzag* Riley from the American *Aphiochaeta aletiae*; from *Paraspiniphora maculata* (*helicivora*) *Aneurhynchus phorivora* Kieff. is bred (André, Spec. Hymm. Eur. X, 1911, 822). Schmitz mentions (Biol. Zentralbl. 37, 1917, 33) a Braconid from species of *Paraspiniphora* in snail-shells and states that the infested pupae are as a rule, but not always, to be known by the fact that the anterior spiracular tubes do not protrude. I have seen *Phygadeuon flavicans* Thoms. bred from a *Chaetoneurophora*-pupa, probably *thoracica*, one in each pupa (Rosenberg) and I have myself bred from *Paraspiniphora notata* *Aneurhynchus lativentris* Kieff., one in each pupa, from *P. Bergenstammi* *Loxotropa* sp., likewise one in each pupa, and from a material of snails containing pupæ of the named two species I bred *Hemiteles* sp., *Pezomachus* sp. and *Pleuropachys costalis* Dalm.; from *Dohrniphora Oldenbergi* I have bred *Loxotropa crassicornis* Kieff., one in each pupa, and from *Aphiochaeta rata* *Aspilota* sp., likewise one in each pupa.

Phoridae earlier recorded from Denmark:— The first Phorid mentioned from Denmark is *Empis minuta* Fabr. which is described in 1787 in Mantiss. Ins. II, 365, 11 and again mentioned in Ent. Syst. and Syst. Antl., and this is, I think, upon the whole the first Phorid described; the species is identical with *Parastenophora pubericornis* Malloch as shown below under this species, and it thus gets the name *Parastenophora minuta* and it is the sole Phorid mentioned by Fabricius from Denmark. Zetterstedt mentions in Dipt. Scand. VIII, 1848 22 species: *Gymnophora arcuata* Meig. and under *Trineura*: *thoracica* Meig., *dimidiata* Meig. = *thoracica* Meig., *notata* Zett., *urbana* Meig. = *caliginosa* Meig., *rufipes* Meig., *pulicaria* Fall., the specimen in our collection labelled "Zett. det." is *A. Woodi* n. sp., *humeralis* Zett., *ruficornis* Meig., there is only one specimen in our collection and it is labelled "Zett. det.", it is *Parastenophora minuta* Fabr., *opaca* Meig., *fuscipes* Macq?, only one specimen is in our collection, the one described by Zetterstedt, it is *Chaetoneurophora curvinervis* Beck., *ciliata* Zett., the specimen in our collection labelled

"Zett. det." is *A. latifemorata* Beck., *pumila* Meig.?, only one specimen is in our collection and is labelled "Zett. det.", it is undeterminable, but is not *A. pulicaria* Meig., *crassicornis* Meig., *flava* Meig., *lutea* Meig. = *A. sulphuripes* Meig., *incrassata* Meig., *mordellaria* Fall., *carinifrons* Zett., as remarked below under the species the male is the type to the species, the female is *H. agilis* Meig., *femorata* Meig. = *H. flavimana* Meig., *aterrima* Fabr., *velutina* Meig., a specimen in our collection labelled "Zett. det." is *Phora artifrons* Schmitz. According to the above the number of Zetterstedt's species is 22 as one species, *dimidiata* is the same as *thoracica*, while *carinifrons* represents two species; as *P. minuta* Fabr. is also included among Zetterstedt's species, the number of Danish species published at that time thus was 22. In 1890 Meinert (Entom. Meddel. II, 212) recorded *Platyphora Lubbocki* (described as a new genus and species *Aenigmatias blattoides*), the number thus being 23. In three recent papers (Vidensk. Meddel. fra Dansk nat. For. 71, 1920 and 72, 1921) I added *Paraspiniphora Bergenstammi*, thus increasing the number to 24, and described 56 new species, but of these three drop into synonymy as *A. fuscipennis* Lundbk. = *fungivora* Wood, *A. perciliata* Lundbk. (1920, 132 = *longiciliata* p. 11, nomen præoccupatum) is identical with *indifferens* Lundbk., and *pallida* Lundbk. = *ustulata* Schmitz; the number is thus 53, and accordingly the number of species known from Denmark was 77. In the present work 210 species are enumerated.

Table of Subfamilies.

1. Species not of specially broad shape; head free, not close to thorax, frons never broader than the eyes together, with transverse rows of bristles (except *Gymnophora*); oral aperture large. Thorax high. Mesopleura of normal shape lying on the sides. Scutellum not specially broad. (Male always winged, in foreign genera the females may have reduced wings or be wingless, and when wingless they have no halteres, scutellum and ocelli generally wanting and the eyes small so that the frons is broad; the European species are all winged and with ocelli and scutellum present in both sexes). . I. *Phorinae*.
- Species of rather broad and more or less flat shape; head fitting close to thorax; frons broad, broader than the eyes together, without bristles or with only few bristles at the margins; eyes not large or small to very small; oral aperture small. Thorax broad. Mesopleura of curious shape with a dorsal and a ventral surface meeting

in a sharp, longitudinal lateral margin, the upper surface partaking in the formation of the disc, hairy and with a long bristle behind, the notopleural suture more or less vanished and the anterior spiracles lying on the dorsal surface. Scutellum short and very broad. Wings present and normal in male, in female wanting or shortened; ocelli, scutellum and halteres only present in winged forms, in the wingless wanting. (The only European genus has wing-less, blattid-like females). Myrmecophilous

II. *Platyphorinae*.

I. Phorinae.

Table of Genera.

- | | |
|---|------------------------------|
| 1. Tibiæ with single bristles, at least middle tibiæ. | 2. |
| — Tibiæ without single bristles, only posterior or hind tibiæ generally with a row of bristles or more or less bristly hairs. | 9. |
| 2. Third vein forked | 3. |
| — Third vein unforked (in <i>Hypocera irregularis</i> and <i>agilis</i> a very weak anterior branch of the fork is present). | 7. |
| 3. Seventh vein wanting or more or less abbreviated, the other veins complete. | 4. <i>Trupheoneura</i> . |
| — Seventh vein present and reaching the margin, or when abbreviated also sixth or all thin veins more or less abbreviated | 4. |
| 4. Scutellum with two bristles; tibial bristles somewhat weak. | 3. <i>Parastenophora</i> . |
| — Scutellum with four bristles; tibial bristles well developed. | 5. |
| 5. Third vein with a row of fine bristles or hairs in the whole length. | 1. <i>Chaetoneurophora</i> . |
| — Third vein without bristles or hairs. | 6. |
| 6. Middle tibiæ besides a proximal pair of bristles with a well developed anterior bristle in some distance from the apex; fourth vein curved at base; abdomen in female with six normal tergites | 2. <i>Paraspiniphora</i> . |
| — Middle tibiæ besides a proximal pair of bristles with a small anterior bristle at apex; fourth vein slightly or not curved at base; abdomen in female without tergal plates on fifth and sixth or only on sixth segment | 5. <i>Dohrniphora</i> . |
| 7. Frons rather narrow, narrowest in the male, with a middle furrow; eyes large, bare; middle tibiæ with several dorsal bristles, at least with two. | 8. <i>Phora</i> . |
| — Frons broad, without middle furrow; eyes of usual | |

- size, hairy; middle tibiae with only one dorsal bristle 8.
8. Arista dorsal..... 6. *Hypocera*.
- Arista apical, third antennal joint in the male long, elongately bulb-shaped with a narrow apical part.. 7. *Conicera*.
9. Third vein forked 10.
- Third vein unforked 13.
10. Frons without middle furrow and only with small bristles on vertex..... 13. *Gymnophora*.
- Frons with a middle furrow and with three transverse rows of bristles 11.
11. Frons with two supraantennal bristles directed upwards and diverging; hind tibiae simple without dorsal hair-seam or row of bristles..... 9. *Beckerina*.
- Frons with four, rarely two, supraantennal bristles which are proclinate; hind tibiae with a dorsal hair-seam and a posterodorsal row of bristles or hairs (except *A. nudipes* and *retroversa*, non Danish). 12.
12. Posterior tibiae with a posterodorsal row of bristles or hairs, sometimes also an anterodorsal row of weaker bristles; frons generally broader than high, sometimes higher to somewhat higher than broad; inner bristle of lower frontal row not much below the outer or if so almost vertically below it; supraantennal bristles generally not very small, four in number (rarely only two); abdomen in female normal 10. *Aphiochaeta*.
- Posterior tibiae always with both a posterodorsal and an anterodorsal row of bristles; frons somewhat higher to twice as high as broad; inner bristle of lower row much below the outer and rather near the middle; supraantennal bristles generally small or very small and most often only one pair; abdomen in female with the fifth segment quite or mainly membraneous, the apical part ovipositor-like with chitinizations at apex..... 11. *Phalacrotophora*.
13. Hind tibiae with a dorsal hair-seam; sixth vein gently curved as usual..... 12. *Pseudacteon*.
- Hind tibiae without dorsal hair-seam; sixth vein strongly and somewhat sharply curved in the middle..... 14. *Metopina*.

II. Platyphorinae.

- Only one Danish genus..... 15. *Platyphora*.

I shall here premise the remarks that in the following descriptions the costal divisions of the wing are named 1, 2 and 3; 1 is the space from the humeral cross-vein to the inner border of the junction of the first vein with costa, 2 the space from here to the inner border of the junction of the second vein with costa, and 3 the space from this point to the end; the length of costa is measured from the longer bristles present on its base.

I. Phorinae.

1. **Chaetoneurophora** Malloch 1912.

(*Chaetoneura* Malloch, Glasgow Naturalist I, 1909, 26).

Species of relatively large size. Frons broader than long, with strong bristles forming three transverse rows with four bristles in each row; at the anterior corner one pair of smaller supraantennal bristles, directed backwards. Eyes hairy. Antennæ inserted near the middle of the head, sometimes somewhat larger in the male than in the female; arista dorsal. Clypeus distinct, a little protruding, especially in the female. Palpi with the bristles sometimes shorter in the male than in the female. Proboscis a little more robust in the female than in the male. At the side margins of the oral aperture a row of oral bristles and on the cheeks a number of two to five genal bristles; one long and conspicuous lower postocular bristle. Thorax with one pair of dorsocentral bristles. Scutellum with four bristles. Mesopleura bare. Abdomen in the male with the sixth and generally also the second segment elongated. Hypopygium of medium to somewhat large size; it is not quite symmetrical as the two side parts of the tergite are of different size and shape and the left fissured; below, generally on the right side, is a narrow, somewhat claw-shaped piece, and in some species (*thoracica*, *caliginosa*) there is on the left side a triangular plate between the side of the hypopygium and the sixth segment; a variously shaped ventral plate is present; the anal tube somewhat or very short, cylindrical or nearly. In the female the sixth abdominal segment is elongated; (about the special construction of abdomen in the female of *thoracica* see under that species). Abdomen is very sparingly haired with quite short hairs and such hairs are present at the hind margins of the segments; at the hind margin of sixth segment they are longer, and at the lateral margin

of second segment are longer hairs. Legs with the front tibiæ with one dorsal bristle, middle tibiæ with a pair of bristles near the base and one near apex and hind tibiæ with from two to seven bristles of which two anterior or anterodorsal and 0—5 dorsal; besides the posterior tibiæ have long, ventral apical spurs; the legs for the rest simply clothed with short hairs, only on the apical part on posterior side of hind tibiæ there are special, short, bristly hairs arranged in comb-like, transverse rows, and likewise on posterior side of metatarsi; also the hairs on the anterodorsal side of the apical half of middle tibiæ specially dense, a little long and arranged somewhat in transverse rows, and the same arrangement of bristly hairs is discernible at the apex of front tibiæ on the anterior side. Claws and pulvilli normally developed; empodium bristle-shaped, small, but distinct. Wings with costa beyond the middle; costal cilia short; third vein forked and with a row of hairs in its whole length; fourth to seventh veins present and reaching the margin or slightly abbreviated.

With regard to the developmental stages the larva is, as far as I see, not known; Bremsi (Isis 1846, 172) mentions the larva of *caliginosa* in larvæ of *Crabro lituratus*, but it is not described; whereas the pupa of *thoracica* and *caliginosa* are known and mentioned by Malloch (Ent. Month. Mag. 2, XIX, 1908, 203) as found in a mole's nest in March and developing in April, and I have also examined the pupæ of these two species. The pupa of *thoracica* was found in mole's nests on $\frac{1}{4}$ and $\frac{12}{4}$, the latter developing on $\frac{29}{4}$, and that of *caliginosa* was likewise taken in a mole's nest on $\frac{12}{4}$ and developing on $\frac{21}{4}$ — $\frac{29}{4}$. The pupæ of the two species are quite similar, of the common type such as occurring in *Aphiochaeta rufipes*; they are of oval circumference, about equally arched on the ventral and dorsal surfaces, with the greatest height in the anterior third and from here slanting gradually towards the posterior end, but more abruptly towards the anterior end; the lateral margin is pronounced though not sharp, and with some small tubercles round the posterior end; otherwise papillæ or processes are not or indistinctly visible so they are at all events very small. The spiracular tubes are somewhat short, a little curved and diverging, they are shorter, thicker, and more pointed in *thoracica* than in *caliginosa*. I measured the pupa of *thoracica* to a length of about 7—8 mm, that of *caliginosa* of about 4—5 mm. The larva, as mentioned below, no doubt feed on carrion or perhaps upon the whole on various decaying matters. The hibernation is, I think,

according to the time at which the pupæ were found, passed in the pupal stage, I also possess an immature specimen of *curvinervis* taken on ¹⁹/₅.

The species of *Chaetoneurophora* seem most often to occur on trunks of trees, in this way I have taken *thoracica* and *caliginosa* in no small number, and it is also recorded for *fennica*; further the species may often be taken under carrion, thus I have taken *fennica* and it is also recorded for the other species; when taken here it is generally only in the female sex, and no doubt they occur here for depositing the eggs; when chased on these places, they generally do not fly, but run quickly; the tracing power of the species must be very great, I once laid a dead sparrow out on the ground in a wood, and when I came back to it half an hour later, *Ch. fennica* was present very numerously on it, but otherwise I did not see the species on the place; the same is mentioned for *curvinervis* by Wood (Ent. Month. Mag. 2, XVII, 1906, 187). As seen above and under the species, and also otherwise known, the species may further be taken in nests of moles and in foxes' dens, certainly also occurring here for depositing the eggs, or they are found here as pupæ. From the mentioned facts it may be induced that the larvæ no doubt feed on carrion, but when the species develop from nests of insectivores etc. this can hardly be the case; the larva may be supposed to have fed here on various refuse or decaying matters present in such places. The communication by Bremi about the larva of *caliginosa* in larvæ of *Crabro lituratus* may, I think, also refer to the larva living in dead larvæ of the *Crabro* or upon the whole in the nest.

Of the genus four species are known from the palæarctic region, all four also occurring in Denmark.

Table of Species.

- | | |
|---|-------------------------|
| 1. Halteres black; hind tibiæ with three bristles..... | 2. <i>curvinervis</i> . |
| — Halteres yellow; hind tibiæ with two or more than three bristles | 2. |
| 2. Hind tibiæ with two bristles | 1. <i>fennica</i> . |
| — Hind tibiæ with more bristles | 3. |
| 3. Hind tibiæ with four bristles; thorax often more or less pale; wings with costa a little thickened in the male, much in the female and in this sex the apex of the wing darkened | 3. <i>thoracica</i> . |
| — Hind tibiæ with 5—7 bristles; thorax black; wings without darkening and costa not thickened..... | 4. <i>caliginosa</i> . |

1. *Ch. fennica* Beck.

1901. Beck. Abhandl. zool. bot. Gesell. Wien I, 22, 8 (*Phora*). — 1906. Wood, Ent. Month. Mag. 2, XVII, 194, 266 (*Phora*). — 1910. Kertész, Cat. Dipt. VII, 392 (*Phora*). — 1912. Malloch, Proc. U. S. Nat. Mus. 43, 424. — 1914. Brues, Bull. Wisc. Nat. Hist. Soc. XII, 87. — 1918. Schmitz, Jaarb. Natuurh. Genootsch. Limburg 1917, 91.

Male. Frons considerably broader than long, black, bristles strong, all three rows placed on nearly straight lines. Antennæ blackish brown, third joint somewhat large and a little elongated, pointed towards the apex; arista short-pubescent. Palpi of ordinary size, deep yellow, with black, not long bristles. Thorax black, slightly shining, with blackish or dark brownish pubescence and with one pair of dorsocentral bristles. Pleura with some indeterminate brownish markings and generally also a brownish point at humeri and postalar calli. Abdomen black, slightly greyish, first segment generally somewhat indistinctly brownish on the disc and the membrane in front of it narrowly white; first, second and sixth segments somewhat elongated; abdomen very sparingly clothed with short, black hairs, forming a distinct row along the hind margin of each segment, sixth segment with somewhat longer hairs and at the hind margin with long hairs; the abdominal hairs are most distinct at the lateral margins, and here somewhat long on second segment. Hypopygium of fair size, greyish black, when fully exposed shining above at base; it has somewhat long hairs posteriorly; it is unsymmetrical, the right side obliquely cut and below it a somewhat narrow piece with long hairs at the margin, the left side larger, but fissured; below, at the base of the hypopygium a pair of curious, yellow, hook-shaped pieces are seen; anal tube of medium length, blackish with paler apex and with longish hairs. Legs brown, hind femora sometimes more blackish brown; front tibiæ with a dorsal bristle near the middle, middle tibiæ with a pair near the base and an anterior near apex, hind tibiæ with two anterior bristles, one about at the end of the first third and one near apex; middle tibiæ with one, hind tibiæ with two apical spurs. Wings clear or a little yellowish; thick veins yellowish brown the others pale; costa reaching considerably beyond the middle, 1 about equal to 2 + 3 or a little longer; fork acute; costal cilia short and fine; fourth vein issuing at the base of the fork, rather strongly s-like curved at the base, the following veins indistinct at their apices. Halteres deep yellow.

Female. Similar to the male, the antennæ a little smaller, bristles

on palpi a little longer and the abdominal segments of about equal length except the longer sixth segment which latter has rather long hindmarginal bristles.

Length 2,3—3,5 mm, the female generally the larger.

Ch. fennica does not seem to be rare in Denmark, Ermelund (the author), Holte, Suserup Skov at Sorø (Th. Mortensen), Vemme-tofte (H. J. Hansen), on Langeland at Lohals (the author), on Lol-land at Ryde (Schlick), in Als Sønderkov (Th. Mortensen) and in Jutland at Hejls south of Kolding and Jelling (the author); the dates are $^{16}/_5$ — $^8/_8$. In Ermelund I took it numerously on a dead sparrow on $^{10}/_6$, at Lohals below a dead mole on $^{14}/_7$, and at Hejls below a newly dead crow on $^{15}/_7$; in the first case both sexes were present and a pair in copula was taken, in the second case only females were present, and in the third all but one were females.

Geographical distribution: — Northern and middle Europe from Finland to Holland, and in England.

2. *Ch. curvinervis* Beck.

1901. Beck. Abhandl. zool. bot. Gesell. Wien I, 33, Taf. II, Fig. 25 (*Phora*). — 1906. Wood, Ent. Month. Mag. 2, XVII, 194 (*Phora*). — 1910. Kertész, Cat. Dipt. VII, 391 (*Phora*). — 1912. Malloch, Proc. U. S. Nat. Mus. 43, 423. — 1914. Brues, Bull. Wisc. Nat. Hist. Soc. XII, 87. — 1918. Schmitz, Jaarb. Natuurh. Genootsch. Limburg, 1917, 91. — *Trineura fuscipes* Zett. 1848. Dipt. Scand. VII, 2871, 21.

Male. Frons twice as broad as high, only very slightly shining; bristles strong, all three rows nearly straight. Antennæ with the third joint of ordinary size, a little pointed, brownish black, palest below; arista short-pubescent. Palpi black, brownish at apex, bristles ordinary. The oral bristles forming a dense bunch and also the genal bristles conspicuous, rather numerous (about five) and nearly confluent with the oral bristles. Thorax black, a little shining, with brownish pubescence and one pair of dorsocentral bristles. Abdomen black, a little greyish, sixth segment the longest; abdomen sparingly haired with short hairs quite as in *fennica* only the marginal hairs on sixth segment less long. Hypopygium black and shining above, as far as I could see constructed mainly as in *fennica*; anal tube blackish, a little pale at apex, with a circle of long hairs round the end. Legs blackish or brownish black, knees, front tibiæ and all tarsi paler; front tibiæ with a strong dorsal bristle in the middle, middle tibiæ with a pair near base and an anterior near apex, hind tibiæ with three bristles, a dorsal in the middle and two anterior, one at

the end of the first third and one at apex; all bristles rather strong. Wings somewhat yellowish tinged, veins brownish; costa reaching considerably beyond the middle, a little stronger than in *fennica*, 1 slightly longer than 2 + 3; fork acute; costal cilia short, but stronger than in *fennica*; fourth vein issuing behind the base of the fork,

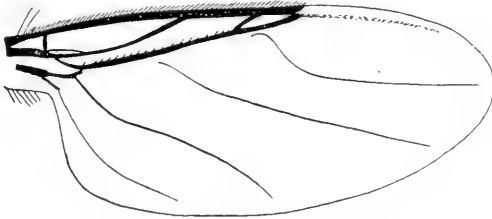


Fig. 38. Wing of *Ch. curvinervis* ♂.

considerably curved in its first part, the following veins a little abbreviated, not quite reaching the margin. Halteres black.

Female. I possess only one immature female; according to Becker this sex is similar to the male, but sometimes paler with palpi and legs reddish yellow to reddish brown.

Length about 3 to about 4 mm.

In Stæger's collection there is an old, very mouldy specimen, labelled "fuscipes Macq? Zett. det.," it is a *curvinervis* and it is evidently the specimen mentioned by Zetterstedt l. c. as taken by Stæger at Copenhagen on $11/5$; Zetterstedt writes "♀?", but the specimen is a male.

Ch. curvinervis seems to be rare in Denmark, I know only five specimens, the above mentioned old male from near Copenhagen on $11/5$ (Stæger), two males taken in Ermelund on $28/4$ 1909 and $20/5$ 1920 (the author), one male from Hillerød $12/4$ 1921 (Th. Mortensen), and one immature female taken at Holte $19/5$ 1916 in a fox's den (Rosenberg).

Geographical distribution: — The species is otherwise known from England, Holland and Germany and, according to Brues (Journ. New York Ent. Soc. 16, 1908, 200), also from North America.

3. *Ch. thoracica* Meig.

1804. Meig. Klass. eur. zweiff. Ins. I, 313, 2 (*Trineura*). — 1823. Fall. Dipt. Suec. Phytom. 6, 3 (*Trineura*). — 1830. Meig. Syst. Besch. VI, 214, 8 (*Phora*). — 1848. Zett. Dipt. Scand. VII, 2852, 1 (*Trineura*). — 1864. Schin.

F. A. II, 342 (*Phora*). — 1901. Beck. Abhandl. zool. bot. Gesell. Wien I, 20, Taf. I, Fig. 8 (*Phora*). — 1906. Wood, Ent. Month. Mag. 2, XVII, 194 (*Phora*). — 1910. Kertész, Cat. Dipt. VII, 396 (*Phora*). — 1912. Malloch, Proc. U. S. Nat. Mus. 43, 423, Pl. 35, fig. 8. — 1914. Brues, Bull. Wisc. Nat. Hist. Soc. XII, 88. — 1918. Schmitz, Jaarb. Natuurh. Genootsch. Limburg, 1917, 91. — *Phora dimidiata* Meig. 1830. l. c. VI, 215. — *Trineura dimidiata* Zett. 1848. l. c. VII, 2853, 2.

Male. Frons black or greyish black, considerably broader than high; bristles strong, the middle row nearly straight, the anterior rather convex. Antennæ not large, brown or reddish brown; arista very short-pubescent. Palpi yellow with short bristles. Genal bristles 2 — 3. Thorax black or paler, varying from red to black, and humeri and postalar calli always more or less reddish; thorax is slightly shining with black pubescence, and one pair of dorsocentral bristles. Pleura black or more or less reddish, pteropleura (Ost. Sack.) with the upper margin always pale, whitish yellow. Abdomen black, a little greyish, first segment sometimes a little brownish on the disc; first, second, and sixth segments elongated and first segment with the hind margin a little incised; abdomen very sparingly with short black hairs, forming a row at the hind margin of each segment and the sixth segment with somewhat long hindmarginal hairs; at the sides of second segment a bunch of somewhat long hairs. Venter yellow. Hypopygium large, knob-like, of greyish colour, the right side square, the narrow, claw-like piece below turned somewhat to the left, the left side fissured above and with a triangular piece between it and the sixth segment; the hypopygium has short hairs on the posterior part; a yellowish ventral plate is visible; anal tube quite short, blackish, with long hairs. Legs including coxæ yellow or light brownish yellow; front tibiæ with a dorsal bristle a little above the middle, middle tibiæ with a pair near the base and an anterior near apex, hind tibiæ with four bristles, two dorsal, one near base and one a little below the middle, and two anterior or anterodorsal, one near base and one near apex. Wings more or less yellowish, an apical browning may be present, but is in this sex very slight and only rarely present; veins brownish, costa a little (more or less) thickened and the thick veins upon the whole strong, especially the first vein thickened towards the apex; costa reaching beyond the middle, 1 about equal to 2 and generally a little shorter than 2 + 3; fork acute; costal cilia short and fine; fourth vein issuing with a peduncle at or generally before the base of the fork and somewhat s-like curved at the base, for the rest nearly straight. Halteres yellow.

Female. In general appearance similar to the male, but often paler; palpi larger with bristles of ordinary length. Abdomen is of a curious construction; the first four segments are of about equal length only the first shorter, the tergite of the fourth segment is narrowed behind, the fifth tergite is a very short and small, more or less hidden plate, often quite hidden so that abdomen has apparently only five tergites, the sixth segment is, as usual, elongated;

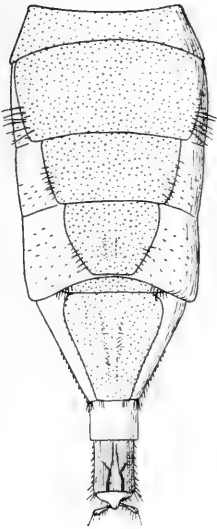


Fig. 39.

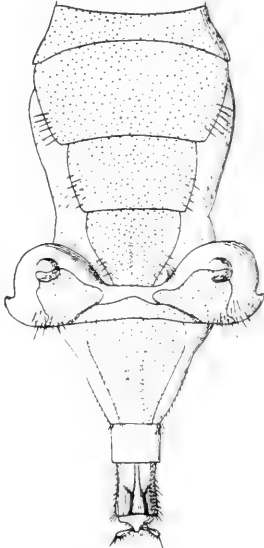


Fig. 40.

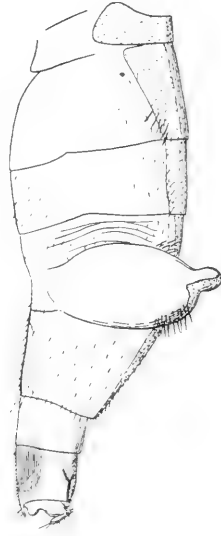


Fig. 41.

Abdomen of *Ch. thoracia* ♀.

Fig. 39 normally distended, from above; Fig. 40 with the sacks pulled out, from above; Fig. 41 the same from the side.

on the ventral side the sixth segment has a large, chitinized ventral plate; as well known the occurrence of such a ventrite is very rare among the Phorids, its occurrence here is, I think, due to the peculiar construction of abdomen. The lateral hairs on abdomen are somewhat conspicuous besides the long hairs on second segment; on the membrane to each side of the fifth tergite a bunch of bristles is seen, when this part is not quite withdrawn. — Such is the construction when abdomen is normally distended (fig. 39), but in certain circumstances the membrane with the bunch of bristles is capable of being pulled out to a high degree, and it forms then on each side a large sack of orange colour, the sacks being connected in the middle at the

base. The sacks are somewhat pear-shaped, broadest below, erect, and attenuated upwards, the upper part is black; on the hinder side each sack bears a patch of bristles and anteriorly, towards the lateral margins of the fourth segment, there are likewise some bristles (figs. 40, 41). The sacks may be seen protruding to a different degree and sometimes unsymmetrically, one protruding the other withdrawn. — Wings with the apical part brown darkened, this browning is sometimes very distinct and rather distinctly bordered inwards, at other times more effaced or nearly wanting; costa considerably thickened in the middle, attenuating towards each end.



Fig. 42. Wing of *Ch. thoracica* ♀.

Length. The species varies much in size, the length varying in all from 2 to 5,5 mm, the female is always the larger; for the male the length is 2—3,5 mm for the female from fully 3—5,5 mm.

Ch. thoracica is rather common in Denmark, Vesterfælled, Ermelund, Dyrehaven, Holte, Bogø south of Sealand, on Langeland at Lohals, on Lolland at Lysemose and in Jutland at Ry, Grejsdal at Vejle and Hejls south of Kolding; the dates are $^{15}/_5$ — $^{22}/_8$, but bred specimens emerged at the end of April. Pupæ were taken on Vesterfælled on $^1/_1$ and in Dyrehaven on $^{12}/_4$, the latter developing on $^{29}/_4$; in both localities they were taken in moles' nests (Rosenberg). The species occurs otherwise in low herbage, and I have also taken a specimen on an umbellifer; but generally the species may be seen in some numbers on tree-stems, as also often recorded; in this way I have taken it at Lohals and Hejls in the middle of July, and it seems that the copulation takes place here, for I have taken it in copula on the stems on $^{12}/_7$; when occurring on the stems the females had very often the above mentioned abdominal sacks more or less extended so that it seems rather probable that these sacks have something to do with the copulation.

Geographical distribution: — Europe down into France, towards the north to Lapland; also in North America.

Remarks: Becker says that he has seen a large number of specimens without darkened apical part of the wing, and he refers such specimens to a var. *claripennis*; he says nothing about the sex of these specimens, but he states that he has seen a copulated pair the male of which had clear wings, but the female had the apical part darkened; in my material the males have always the wings without darkening or rarely with a very slight indication of a darkening, while the females always have the darkening, but sometimes rather faint, and Malloch (*Ent. Month. Mag.* 2, XIX, 12) notes the same. Becker ascribes to the species two long bristles on the jowls, but there is (as in the other species of the genus) only one long lower postocular bristle. — One of my female specimens shows on the left hind tibiæ five bristles of which three dorsal, and on the right six, three anterodorsal and three more dorsal.

4. *Ch. caliginosa* Meig.

1830. Meig. *Syst. Besch.* VI, 214, 6 (*Phora*). — 1910. Kertész, *Cat. Dipt.* VII, 390 (*Phora*). — 1912. Malloch, *Proc. U. S. Nat. Mus.* 43, 424. — 1914. Brues, *Bull. Wisc. Nat. Hist. Soc.* XII, 87. — 1918. Schmitz, *Jaarb. Natuurh. Genootsch. Limburg* 1917, 91. — *Phora urbana* Meig. 1830. l. c. VI, 215, 11. — 1848. *Zett. Dipt. Scand.* VII, 2856, 5 (*Trineura*). — 1864. Schin. *F. A.* II, 342. — 1901. Beck. *Abhandl. zool. bot. Gesell. Wien*, I, 21, 7, *Taf. I*, *Fig. 9*. — 1906. Wood, *Ent. Month. Mag.* 2, XVII, 194. — *Trineura trochanterata* *Zett.* 1855. l. c. XII, 4822, 5–6.

Male. Frons considerably broader than high, black, a little shining; bristles strong, the anterior row more or less convex. Antennæ black, of medium size; arista long, very short-pubescent, apparently nude. Palpi brown or dark yellowish brown, with ordinary bristles. Genal bristles 3–5. Thorax black, shining, with black pubescence and one pair of dorsocentral bristles. Pleura with the upper margin of pteropleura whitish. Abdomen black, somewhat greyish, first segment somewhat pale on the middle, second and sixth segments elongated, the three intermediate short and increasing in length backwards; abdomen sparingly clothed with short, black hairs, forming a row at the hind margin of the segments; second segment with a few longer hairs at the hind corners, and sixth segment with longish hairs at the hind margin. Hypopygium somewhat large, greyish black, with short hairs; it is constructed as in *thoracica*; anal tube quite short, brownish, with longish hairs. Legs brownish, femora more blackish brown, knees yellowish; front tibiæ with a dorsal bristle a little above

the middle, middle tibiae with a pair near the base and an anterior near apex, hind tibiae with two anterior, one near middle or above and one near apex, and with three to four or five dorsal bristles. Wings somewhat yellowish, veins brownish yellow; costa reaching well beyond the middle, 1 about equal to 2; fork acute; costal cilia short. Halteres pale yellow.

Female. Quite similar to the male; the abdominal segments of about equal length with exception of the longer sixth segment, which has long hindmarginal bristles only below; the fifth segment is slightly or not at all chitinized and hence more or less corrugated above and of a more deep black colour than the rest of abdomen.

Length 2.5—4 mm.

Remarks: In my material the hind tibial bristles are present in a number from 5 to 6, but it is recorded that the number may be 7.

Ch. caliginosa does not seem to be common in Denmark, Dyrehaven, Holte (Th. Mortensen, Rosenberg) and at Hejls south of Kolding (the author); the dates are $\frac{4}{5}$ — $\frac{12}{7}$. At Hejls it was taken on stems of trees together with *thoracica*, and at Holte Rosenberg took it in a fox's den. Pupae were taken in Dyrehaven in a mole's nest on $\frac{12}{4}$, they developed on $\frac{21}{4}$ — $\frac{29}{4}$ (Rosenberg).

Geographical distribution: — Europe down to Italy, towards the north to middle Sweden, and in Siberia.

2. **Paraspiniphora** Malloch 1912.

(*Spiniphora* Malloch, Glasgow Naturalist I, 1909, 26).

Species of medium or relatively large size. Frons more or less broader than high, with strong bristles forming three transverse rows with four bristles in each row, the anterior rows often very convex; one pair of strong supraantennal bristles, directed backwards. Eyes hairy. Antennae inserted more or less to much below the middle, third joint of ordinary size, or somewhat large, elongately lemon-shaped, generally smaller in the female; arista dorsal, it is sometimes more pubescent in the female than in the male. Clypeus sometimes a little protruding in the female. Palpi with the bristles sometimes shorter in the male than in the female, in *Bergenstammi* quite short in the male; when examined with a lens the palpi show on the upper or exterior surface more or less distinctly a small excavation, this is due to a special sensory organ as mentioned by Schmitz (Biol. Zentralbl. 37, 1917, 33). At the sides of the oral aperture

some few small oral bristles, and a little higher up some bristles which may perhaps be termed genal bristles. One long and conspicuous lower postocular bristle. Thorax with one or two pairs of dorsocentral bristles or (*domestica*, non-Danish) with one pair in the male, two in the female. Scutellum with four bristles. Mesopleura bare or (*spinosissima*, *Bohemanni* and *erythronota*) hairy and with one very long bristle near the hind margin. Abdomen in the male with second and sixth segment more or less elongated. Hypopygium somewhat small to rather large; it is not symmetrical as the two sides of the tergum are not equally sized; below or at the end of the right side is a narrow piece, and in some species (*Bergenstammi* and *notata*) there is a somewhat triangular piece between the left side and the sixth segment; sometimes a distinct ventral plate is seen; anal tube short, sometimes quite short, almost not protruding. In the female the sixth segment is more or less elongated, and in *Bergenstammi* and *notata* the seventh is deeply incised above. Abdomen is rather sparingly haired with short hairs, generally a little longer at the sides; they are longish at the hind margin of sixth segment and at the hind corners of second segment are longer hairs or the lateral margin of this segment has long, somewhat dense hairs. Legs with strong bristles, front tibiæ with a dorsal bristle, middle tibiæ always with one well developed anterior bristle at about the lower third and with a pair of bristles near the upper fourth, and sometimes (in non-Danish species) with still more bristles, hind tibiæ with two to four bristles or sometimes (in non-Danish species) with more numerous bristles; posterior tibiæ with long apical spurs; legs for the rest simply clothed with short hairs; as usual special, short, bristly hairs arranged in comb-like rows are present on posterior side of the apical part of hind tibiæ and on posterior side of metatarsus, and a similar arrangement is seen just at apex on anterior side of front tibiæ; on the antero-dorsal side of middle tibiæ in the apical part the hairs are longer and also somewhat row-like arranged; in *Bohemanni* and *erythronota* the hind tibiæ have the hairs otherwise arranged than in the other species, the hind tibiæ have here special short bristly hairs arranged in comb-like transverse rows on the dorsal side in the whole length. Claws and pulvilli of common shape in *Bohemanni*, *erythronota* and *spinosissima*, and the empodium small and bristle-shaped, but in *Bergenstammi*, *immaculata* and *notata* (as well as in the non-Danish *domestica* and *maculata*) there is here a curious sexual dimorfism, the claws and pulvilli in the male being of common shape, but in the

female rather enlarged, the claws strongly curved, the hair above between the claws long, flattened and band-shaped and the empodium hairy below the apical part; these features are most developed on the anterior tarsi. (How it is with regard to the non-Danish species *Strobli* in this respect I do not know). Wings with the costal cilia more or less short; third vein forked and with a distinct bristle at the base; fourth to seventh veins present and reaching the margin.

The developmental stages of this genus are to some degree known yet it is most often the pupæ that have been met with, only of *domestica* also the larva is described. Léon Dufour describes (Soc. Sc. Lille 1841, 420, fig. 6—17) the pupa of *maculata* (*helicivora*); it was found on $31/3$ in shells of *Helix aspersa* and emerged in December; Bergenstamm bred *Bergenstammi* from *H. pomatia* (Mik. Verh. zool. bot. Gesell. Wien, XIV, 1864, 794); Keilin describes (Bull. Soc. France Belgique (7), 45, 1911, 29) very thoroughly larva and pupa of *domestica* (as *Bergenstammi*) from various species of *Helix*, and further the pupa of *maculata* (*Phora* No. 1) and of *notata* (*Phora* No. 2), the former from *H. aspersa*, the latter from *H. nemoralis*. Engel mentions (Wien. Ent. Zeitg. XXXV, 1916, 58) *maculata* bred from snails from Cyprus. Finally Schmitz (Tijdschr. v. Entom. 51, 1909; Zeitschr. f. wiss. Insektenbiol. VI, 1910, 109 and especially Biol. Zentralbl. 37, 1917, 32) mentions and describes the pupæ of *maculata*, *domestica* (as *Bergenstammi*) *excisa* (probably = *Bergenstammi*), larva and pupa of *immaculata*, pupa of *Bohemanni*, all bred from shells of *H. pomatia*, *hortensis*, *nemoralis* and *arbustorum*, and finally the pupa of an undetermined species bred from a Pupid snail. As mentioned under the family Chappellier has recorded *Bergenstammi* living as larva in bodies of Canary birds treated with formaline, but this observation requires, I think, confirmation. I have myself mentioned (Vidensk. Medd. fra Dansk Nat. For. 71, 1920, 125) the pupa of *notata* and *Bergenstammi* from shells of *H. pomatia*, *hortensis*, *nemoralis* and *lapicida* taken in winter, the imagines of *notata* emerging in February and March, those of *Bergenstammi* in April and May; *Bergenstammi* I have also bred from putrid *Planorbis corneus* scraped up and lying at the border of a streamlet, they were taken on $30/7$ and the imagines were emerging and continued to emerge in August; they copulated and deposited anew and imagines were again emerging (in a warm room) on $15/12$ to $5/2$ next year; finally I have examined puparia of *Bohemanni* from *H. pomatia*, but they were empty.

As before said, the only larva described is that of *domestica* of

which Keilin has given a very detailed description; according to this author, the larva is remarkable by its rich ornamentation with cuticular processes. The larva is somewhat spindle-shaped, attenuating towards the head and with the last segment attenuated to a process, carrying below, near the base, the anus and at the end the posterior spiracles; the length is about 7 mm. The thoracal segments are rather smooth, but on abdomen there is on the dorsal side of each of the first seven segments three transverse rows of erect bristles, the first abdominal segment, however, shows only the posterior row; further there is on each segment six long cylindrical papillæ, each carrying at the end a bundle of four long, diverging bristles; of these six papillæ four are placed in the middle row of the three transverse rows of bristles in such a way that two stand near the middle and two at the side margin, one on each side, further the last two are placed likewise one at each side margin a little anterior to the former; these latter papillæ are smaller than the other four, and at the side margin of each segment there are consequently two papillæ, one behind the other, the anterior being the smaller; on the ventral side there is a similar, but smaller papilla at the lateral margin of each segment. On each of the seven abdominal segments there are still four small processes with three bristles at the end, they are placed in the posterior row of the three transverse rows of bristles, two near the middle and two near the side margins; the last segment has six long, hairy lateral papillæ, three at each side, one at the base of the segment and two near the apex. Besides these various papillæ which are visible with a lens, there are still other minute formations, both dorsal and ventral, especially some quite small papillæ bearing four cross-like arranged hairs; of such papillæ there are four on the prothoracic and six on the meso- and metathoracic segment as a transverse middle dorsal row, and on the abdominal segments there are four in a transverse dorsal row at the hind margin of each segment and one at each side on the ventral surface, and finally one on the base of the large posterior lateral papilla. All these formations are, or bear, sensory organs in connection with nerves, but for a more detailed study I refer to Keilin's work. As before said only the larva of *domestica* is described, but Schmitz (Biol. Zentralbl. l. c.) remarks that the larva and pupa of *immaculata* are similar, but the large dorsal and lateral papillæ are shorter and with shorter bristles. — Of the other bred species only the puparia are known, but as these latter still to some degree show the larval ornamentation, we thus get some information as to

the external morphology of the larvæ. The puparium of *domestica*, according to Keilin, is reddish brown, the ventral surface much arched, the dorsal flat; the larval head and prothorax are withdrawn; the anterior and especially the posterior end are curved upwards, the latter often even forwards; all the larval papillæ and minute formations are still present; through the second abdominal segment, near the front margin, two long, attenuating and somewhat diverging spiracular tubes protrude; the length of the puparium is 4,7—5 mm.

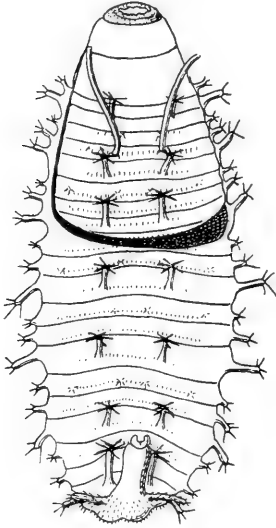


Fig. 43. Puparium of
P. Bergenstammi.

The puparium of *Bergenstammi* (fig. 43) is quite similar to that of *domestica*, but it shows on the abdominal segments three instead of two lateral papillæ, a small, a medium sized, and a large; further the papillæ show generally five to six bristles at the end, and the four small processes in the posterior row of bristles show four bristles at the end; the colour is reddish, the length 3,5—6 mm. The puparium of *immaculata* is, according to Schmitz, likewise similar to that of *domestica* and shows the same papillæ as this, but the papillæ are here much smaller and less conspicuous, they have at the end four, sometimes five bristles; also the other formations and the bristles in the transverse rows are much smaller; the posterior end is curved upwards, but sometimes straight; the colour is yellowish to dark brown, the length to

8 mm. The puparium of *notata* is of the same circumference as the foregoing, and it is likewise arched on the ventral, flat on the dorsal side, but it differs in being smooth, without bristles or papillæ, only on the lateral margin there is on each of the first seven abdominal segments a small papilla or process; (in such puparia without papillæ or processes the mentioned sensory organs connected in the other pupæ with the papillæ and processes are not absent; on the contrary, they are all present, but lying direct on the surface and not visible macroscopically); the anterior and especially the posterior end are curved more or less upwards, sometimes almost not. The spiracular tubes are long. The colour is reddish brown to blackish brown, the length 5—8 mm. The puparium of *maculata* is, according to Keilin

and Schmitz, very similar to that of *notata*, but it differs in being quite smooth, without lateral papillæ; the lateral margin is somewhat swollen, and on the dorsal side there is a median longitudinal furrow. The colour is blackish brown, the length about 7—8 mm. The puparium of *Bohemanni* differs somewhat from the others; it is rather broad, the ventral side is only a little arched from side to side, whereas the dorsal side is somewhat arched in a similar way as that found in *rufipes* and thus with the greatest height about in the anterior third, but the puparium is upon the whole rather flat; the posterior end is curved upwards; the puparium is smooth, without papillæ or bristles; the dorsal side is finely granulated; the spiracular tubes are somewhat short, rather thick at base and attenuating; as to colour the puparium is black above, reddish or dark yellowish below; the length is about 6,5 mm.

As the puparium to the real *Bergenstammi* is now known, and as it is proved that Keilin's *Phora* No. 1 is *maculata* and No. 2 *notata*, I shall here include a table over the puparia, mainly after Schmitz (Biol. Zentralbl. l. c.).

- | | |
|---|-----------------------------|
| 1. Dorsal and lateral papillæ present, bearing bristles at the end..... | 2. |
| — No dorsal papillæ; lateral papillæ, if present, generally short, and with the bristles at end inconspicuous..... | 4. |
| 2. Dorsal and lateral papillæ large, the bristles long; the three transverse rows of bristles on the abdominal segments distinct and somewhat long..... | 3. |
| — Dorsal and lateral papillæ small, with short bristles; the transverse rows of bristles small and inconspicuous.. | <i>P. immaculata.</i> |
| 3. Abdominal segments each with three lateral papillæ . | <i>P. Bergenstammi.</i> |
| — Abdominal segments each with only two lateral papillæ.. | <i>P. domestica.</i> |
| 4. Lateral papillæ present..... | 5. |
| — No lateral papillæ..... | 6. |
| 5. Puparium narrowly elliptical, lateral papillæ small... . | <i>P. notata.</i> |
| — Puparium broadly elliptical, lateral papillæ large.... | <i>P. sp. Schmitz l. c.</i> |
| 6. Dorsal side with a longitudinal median furrow, flat, ventral side arched..... | <i>P. maculata.</i> |
| — No dorsal furrow, dorsal side somewhat arched, black, ventral side rather flat, yellowish brown..... | <i>P. Bohemanni.</i> |

The larvæ live in dead snails and, as seen above, they have been found in various species of *Helix*, in *Planorbis* (and in a Pupid), and the same species may be found on various species of the snails. Schmitz remarks (Biol. Zentralbl. l. c.) that the sense organ on the maxillary

palpi of the imago is no doubt of use in seeking the putrid snails. Keilin has interesting remarks about the movement of the larva of *domestica* (*Bergenstammi*) which in creeping contracts almost only the thoracic segments, and it fixes the anterior end not by the mouth hooks, but by using the mouth as a sucker. The larvæ may be present in the snails in rather great numbers, I have seen pupæ of *notata* in *H. hortensis* and *nemoralis* in a number of up to 24 and in *pomatia* in a number of 65. In the same shell there may be more than one species of Phorid; Keilin remarks that if so one of the species always predominates and, as it seems, prevents the other from developing, so that the latter either quite perishes or only gives some few pupæ; I can in so far confirm this, as I have met with *notata* together with another species, the former by far predominating. The pupation takes place in the shell, the puparium being glued to the inside of the shell by the ventral surface; the puparia may be seen very crowded in the circumvolutions of the shell, generally lying side by side, all with the head-end in the same direction, though this is not invariably so. The hibernation no doubt is passed in the pupal stage, my pupæ were all taken in winter; the pupal stage seems to be of long duration; as said before Léon Dufour found the pupa of *maculata* on $31/3$ and it developed in December. *P. maculata* and *notata* are spring species, but seem to have only one brood in the year. According to Schmitz *domestica* has several broods in the year, and the same is, as seen above, also the case with *Bergenstammi*; for *immaculata* Schmitz records two broods in the year; *Bohemanni* has, I think, only one brood, at all events in our country. — According to Keilin, the eggs are deposited in the putrid snails not in heaps, but each egg singly, direct on the inside of the shell.

The genus *Paraspiniphora* is one of the genera created by Malloch (The Glasgow Nat. 1904) as subgenera, when he divided the old Genus *Phora*; the characters given for it were not very striking, mainly consisting of the position of the bristles on middle tibiæ and the four scutellar bristles, yet the genus seems to be quite valid, and it is very interesting to see that it shows a biological character, as it is known for most of its species that they live as larvæ in putrid, shell-bearing snails, and there is some reason to think that this is the case in all species. While the genus thus seems to be a good one, it is, however, not quite homogenous; two of the species, *Bohemanni* and *erythronota* (and perhaps also *spinosissima*) stand, as seen above in the description of the genus, and as already noted by Schmitz

(Biol. Zentralbl. l. c.), somewhat apart by the hairy mesopleura with a long bristle, and the arrangement of the hairs on hind tibiæ; these species bear by the said characters some resemblance to *Hypocera*; also the hypopygium is a little different, and it was seen that the puparium of *Bohemanni* (for *erythronota* it is not known) is different from that of the other species; moreover there seems also to be anatomical characters separating these species, for while Schmitz (Anat. Anz. 49, 1916, 333 and Biol. Zentralbl. l. c. 32) for *Paraspiniphora* gives three Malpighian tubes, he has later on communicated to me that in *Bohemanni* he finds four vasa Malpighi. At present I shall, however, leave the genus undivided.

Of the genus 9 or 10 species are known from the palæarctic region 5 of which have been found in Denmark.

Table of Species.

- | | |
|--|-------------------------|
| 1. Mesopleura with hairs and a long bristle behind | 2. |
| — Mesopleura bare | 3. |
| 2. Thorax black; legs black, only front tibiæ paler | 1. <i>Bohemanni</i> . |
| — Thorax red or brown, sometimes only with reddish stripes or all black; anterior legs yellowish | 2. <i>erythronota</i> . |
| 3. Hind tibiæ with four bristles; dark species | 4. |
| — Hind tibiæ with only three bristles; yellow species | 4. <i>immaculata</i> . |
| 4. Antennæ and palpi orange; wings without spot; hind tibiæ with one dorsal bristle, two more anterodorsal one of them near apex, and one anteroventral | 3. <i>Bergestammi</i> . |
| — Antennæ and palpi blackish brown; wings with a spot below the fork; hind tibiæ with two dorsal bristles one of them near apex, one anterior near apex, and one anteroventral | 5. <i>notata</i> . |

1. **P. Bohemanni** Beck.

1901. Beck. Abhandl. zool. bot. Gesell. Wien, I, 27, 14, Taf. I, Fig. 18 (*Phora*). — 1910. Kertész, Cat. Dipt. VII, 389 (*Phora*). — 1912. Malloch, Proc. U. S. Nat. Mus. 43, 427. — 1914. Brues, Bull. Wisc. Nat. Hist. Soc. XII, 89. — 1917. Schmitz, Biol. Zentralbl. 37, 38, et 1918. Jaarb. Natuurh. Genootsch. Limburg 1917, 92.

Male. Frons a little broader than high, black, shining; bristles strong, anterior row a little convex; supraantennals rather strong. Antennæ brown or brownish black, third joint a little elongated; arista very short-pubescent. Palpi brownish yellow to black with short bristles below, longer at the apex. Thorax black, rather shining,

with black pubescence; one pair of dorsocentral bristles. Scutellum with four bristles, the anterior one third of the length of the posterior. Mesopleura black, a little shining, hairy and with one very long bristle behind. Abdomen rather short, black, a little greyish, dull; second segment elongated and also sixth somewhat long; abdomen very sparingly clothed with short black hairs, slightly longer at the hind corners of second segment. Hypopygium small, as far as I could see not symmetrical, the left side of the tergum the largest, with long hairs below, the right side smaller, with strong bristles at the margin, and with a small, narrow piece below; anal tube short, not or almost not protruding. Legs black, front tibiæ and tarsi a little paler, just the apex of coxæ and the trochanters generally more or less pale, and the knees narrowly pale; hind femora very broad; front tibiæ with a dorsal bristle a little above the middle, middle tibiæ with a pair at about the upper third and an anterior at the lower third, hind tibiæ with two anterior bristles, one at about the upper third and one near apex; all bristles strong; middle tibiæ with two, hind tibiæ with a number of apical spurs of various length; the hairs below femora a little longish, especially towards apex; hind tibiæ with a furrow from the upper bristle downwards (in which the bristle may be laid down), and with the short hairs on the dorsal and partly the posterior side arranged in dense, comb-like transverse rows; hind metatarsi below besides the small bristles with three or four longer bristles. Wings brownish, veins brown; costa not reaching the middle; 1 considerably longer than 2 + 3; costal cilia somewhat short; third vein with the single bristle at the base distinct. Halteres yellow.

Female. Similar to the male; antennæ a little smaller; bristles on palpi a little longer; wings with the costa longer.

Length. The species may vary rather much in size in both sexes, the length from scarcely 2 to fully 3,5 mm.

P. Bohemanni seems not at all common in, Denmark as I have taken it only in two localities, Ermelund, where I have taken it in some numbers in 1917 to 1921 at the dates from $12/4$ to $22/5$ and at Aalborg, where I took a single female $28/6$ 1921; it is thus a spring-species; it occurred in a humid place in the wood in low herbage, especially consisting of *Aegopodium podagraria*, and I took it in copula on $3/5$, $9/5$ and $15/5$. I have never bred it, though I have collected snail-shells in the said locality; I have only seen three puparia in a *H. pomatia*, taken by Mr. Kryger in Ermelund on $10/1$ but they were empty; in snail-shells from other localities it has not occurred.

Geographical distribution: — Northern and middle Europe down into Bohemia; towards the north to southern Sewden.

2. *P. erythronota* Strobl.

1892. Strobl, Wien. Ent. Zeitg. XI, 195, 6 (*Phora*). — 1901. Beck. Abhandl. zool. bot. Gesell. Wien I, 33, 22, Taf. II, Fig. 24 (*Phora*). — 1906. Wood, Ent. Month. Mag. 2. XVII, 262 (*Phora*). — 1910. Kertész, Cat. Dipt. VII, 392 (*Phora*). — 1912. Malloch, Proc. U. S. Nat. Mus. 43, 428. — 1914. Brues, Bull. Wisc. Nat. Hist. Soc. XII, 89. — 1918. Schmitz, Jaarb. Natuurh. Genootsch. Limburg 1917, 92.

Male. Frons a little broader than high, black or slightly greyish black and slightly shining; bristles strong. Antennæ with the third joint a little elongated, brown or reddish brown; arista short-pubescent, yellow at the base. Palpi yellow with short bristles below, longer at apex. Thorax yellowish red to dark brown, sometimes darker to black with only two faint reddish longitudinal stripes, or all blackish (var. *nigrodorsata* Strobl, Mittheil. Nat. Ver. Steierm. 46, 1910, 120); it is almost not shining and clothed with dark brown pubescence; one pair of dorsocentral bristles. Scutellum with four bristles, the anterior rather small. Pleura reddish to blackish, haired as in *Bohemanni* and likewise with a very long bristle. Abdomen black, a little greyish, with very narrow paler hind margins to the segments, for the rest together with the hypopygium constructed as in *Bohemanni*. Anterior legs yellow, only the middle coxæ black and the middle tarsi a little darkened; hind legs black or brownish black; otherwise the legs as in *Bohemanni*, with the hairs and bristles arranged in the same way, but the middle tibiæ have only one long apical spur and the hind tibiæ three. Wings as in *Bohemanni* and likewise with a distinct bristle at the base of third vein. Halteres yellow.

Female. Similar to the male, but without pale hind margins to the abdominal segments.

Length 2 to about 3 mm.

As seen this species is nearly related and very similar to *Bohemanni*; it is generally smaller, but not absolutely; it may, however, be distinguished with certainty, also in its darkest variety, by the always yellow anterior legs, paler palpi, and the much less shining frons and thorax; also the apical spurs on posterior tibiæ seem to yield a good character.

P. erythronota is not rare in Denmark, Ermelund, Dyrehaven, Holte, Suserup Skov at Sorø, Bogø south of Sealand, on Langeland

at Lohals, and in Jutland at Hejls south of Kolding (Th. Mortensen, the author); the dates are $^{10}/_6$ — $^{29}/_9$; I have taken it with the net in woods in low herbage in damp localities and I have taken it in copula between $^{10}/_7$ and $^{29}/_9$; in recent times we have first taken it in 1913, but in Stæger's collection there stood an old specimen determined as *thoracica*.

Geographical distribution: — Northern and middle Europe from southern Sweden and Norway down into Austria and Styria.

3. *P. Bergenstammi* Mik.

1864. Mik., Verhandl. zool. bot. Gesell. Wien, XIV, 793, 4 (*Phora*). — 1901. Beck. Abhandl. zool. bot. Gesell. Wien, I, 25, 12, Taf. I, Fig. 14—16 (*Phora*). — 1910. Kertész, Cat. Dipt. VII, 389, p. p. (*Phora*). — 1912. Malloch, Proc. U. S. Nat. Mus. 43, 426, Pl. 35, fig. 6. — 1914. Brues, Bull. Wisc. Nat. Hist. Soc. XII, 89, p. p. — 1917. Schmitz, Biol. Zentralbl. 37, 34, p. p. Fig. 2. — 1920. Lundbeck, Vidensk. Medd. Dansk nat. For. 71, 128. — 1920. Schmitz, Jaarb. Natuurh. Genootsch. Limburg 1919, 93. — *Phora sphingicides* Strobl (nec Bouché, teste Beck.) 1892. Wien. Ent. Zeitg. XI, 197. — *Phora comstocki* Brues (Aldrich). 1903. Trans. Amer. Ent. Soc. XXIX, 346, Pl. V, fig. 12.

Male. Frons considerably broader than high, black, dull; bristles strong, the middle and anterior row very convex, and hence the supra-antennal bristles rather near to the middle bristles of the anterior row. Antennæ with the third joint a little elongated and pointed, of medium size, yellow or orange; arista short-pubescent. Palpi somewhat large, orange, with quite short bristles. Thorax black, a little greyish, not or slightly shining, with a point at humeri and at postalar calli reddish; it is clothed with black pubescence and has two pairs of dorsocentral bristles. Scutellum with four about equal bristles. Pleura with indeterminate reddish markings, especially above on pteropleura; mesopleura bare. Abdomen black, a little greyish, second and sixth segments somewhat elongated; first segment generally a little brownish and with a narrow white hind margin; abdomen sparingly clothed with short black hairs, at the lateral margin of second segment somewhat dense, longer hairs, and sixth segment with longish hairs posteriorly. Hypopygium somewhat large, hairy at the sides; it is unsymmetrical, the left side the smaller, with a somewhat triangular piece between it and the sixth segment, the right side has a narrow piece along the hind margin; below there is a long, black or reddish ventral plate, reaching to the end of the hypopygium, with the right posterior corner a little claw-like produced; anal tube short, yellow. Legs yellow, hind femora darkened above; front tibiæ with a dorsal bristle

above the middle, middle tibiæ with a pair near the upper fourth and an anterior at about the lower third, hind tibiæ with four bristles, a dorsal near the middle, two more anterior, one at the upper third and one near apex, and finally one anterodorsal bristle at the middle. Wings yellowish; veins brown; costa reaching beyond the middle, 1 at most double 2; costal cilia rather short; fourth vein somewhat strongly curved at base. Halteres yellow.

Female. Similar; the antennæ smaller with arista much more distinctly pubescent, and palpi with ordinary bristles; further the tarsi show a peculiar sexual difference; on the anterior tarsi the last



Fig. 44. Wing of *P. Bergenstammi* ♀.

joint is relatively a little larger than in the male and more hairy, the claws are long and broad, the empodium long, curved upwards and hairy below the apical part, the hair above, between the claws is long, curved downwards, flattened and band-shaped; also the pulvilli are larger; the same features are present on the hind tarsi, but to a smaller degree. The seventh abdominal segment is deeply excised above and often reddish.

Length. The species may vary very considerably in size, the length from 1,5 to 3,5 mm, the female is generally the larger.

Both Mik and Becker describe the thorax in the female as often brown, in my material it is black in both sexes.

P. Bergenstammi is not rare in Denmark, Ermelund, Holte, Hillerød, Suserup Skov at Soro (Th. Mortensen), Bogo south of Sealand (the author), at Strandby on Lolland (L. Jørgensen); the dates of capture are in July; it was for the first time taken in 1917. I have bred it in some numbers from shells of *H. hortensis*, *nemoralis* and *lapicida* taken by Mr. Jørgensen at Strandby in the first months of the year, the imagines developed in April, but the development was probably accelerated; I have further bred it from *H. pomatia*, taken by Mr. Kryger in Ermelund in the winter, the imagines came in May,

and from *Planorbis corneus*, scraped up and lying at the border of a streamlet, taken by Dr. Mortensen in Hillerød on $^{30}/_7$, the imagines were then emerging and continued so in the following time; I kept the snails after emerging had stopped, and on $^{15}/_{12}$ to $^{5}/_2$ next year some imagines again appeared, the room was heated and in the free these imagines would evidently have come in spring; according to the above, the species has at least two broods in the year with us; Schmitz states (Biol. Zentralbl. 37, 1917) that in Holland the nearly related *domestica* (*bergenstammi* by Schmitz) has several broods in the year.

Geographical distribution: — Europe down into Egypt (Becker), it is not known north of Denmark; it occurs also in North America.

Remarks: This species is very similar to and related to *P. domestica* Wood which species does not occur in Denmark; the two species are, however, easily distinguished, as *domestica* has in the male only two dorsocentral bristles and ordinary bristles on the palpi, and in both sexes the costa does not reach quite to the middle, 1 is more than double 2, and the fourth vein is less curved at base; also is *domestica* often paler and has pale hind margins to the abdominal segments. The two species have been confused since Malloch in 1910 united them; in my paper, cited in the synonymical list, I have made out their distinctions and synonymy and to this I refer.

4. *P. immaculata* Strobl.

1894. Strobl, Mittheil. Nat. Ver. Steierm. XXX, 14 (*Phora thoracica* var. *immaculata*). — 1910. Strobl, ibid. XLVI, 119 (*Phora*). — 1914. Brues, Bull. Wisc. Nat. Hist. Soc. XII, 90. — 1917. Schmitz, Biol. Zentralbl. 37, 36 et 1918. Jaarb. Natuurh. Genootsch. Limburg 1917, 93. — *Phora dorsalis* Beck. 1901. Abhandl. zool. bot. Gesell. Wien, I, 31, 19, Taf. II, Fig. 23. — 1906. Wood, Ent. Month. Mag. 2, XVII, 262, 265. — 1910. Kertész, Cat. Dipt. VII, 391. — 1910. Malloch, Ann. Scot. Nat. Hist. 20 (*Spiniphora*).

Male. Frons low, considerably broader than high, blackish grey, dull; bristles strong, the two anterior rows very convex. Antennæ orange, third joint elongated and enlarged; arista short-pubescent. Palpi yellow, of ordinary size, the bristles not long. Thorax yellow, dull, with short, black pubescence and two pairs of dorsocentral bristles. Scutellum with four about equal bristles. Pleura yellow. Mesopleura bare. Abdomen with second and sixth segments elongated; it is dull yellow, the front part of the segments more or less indeterminate blackish, the most broadly on second and sixth segments, on the middle segments generally to a slight degree and interrupted

in the middle; venter yellow. Abdomen has distinct, short black hairs, at the lateral margin of second segment is a dense row of bristles, and also at the hind corners of third segment the hairs are bristly, and at the hind margin of sixth segment are long hairs, longest at the sides. Hypopygium somewhat large, yellow, hairy at the sides, it is constructed mainly as in *Bergenstammi*; anal tube somewhat long, yellow. Legs yellow, front tibiæ with a dorsal bristle above the middle, middle tibiæ with a pair near the upper fourth and an anterior at the lower third, hind tibiæ with two anterodorsal bristles, one at the upper third and one near apex, and with an anteroventral bristle above the middle. Wings yellowish brown, veins brown; costa well beyond the middle, 1 a little longer than 2 + 3; costal cilia somewhat short; fourth vein strongly curved at the base, for the rest straight. Halteres yellow.

Female. Similar; antennæ smaller, arista much more pubescent; hind tibiæ with three to four smaller dorsal bristles in the upper half besides the ordinary bristles; tarsi with the same sexual difference as in *Bergenstammi*. Abdomen more indeterminately suffused with blackish, seventh segment deeply incised above; there are bristles at the sides of second segment and at hind margin of sixth segment as in the male, and they are fully as strong, and along the sides of abdomen some stronger, bristly hairs are seen.

Length 3—3.7 mm.

P. immaculata seems to be very rare in Denmark, I possess only one pair, a male, taken $1\frac{1}{7}$ 1910, probably at Damhussoen (Larsen), and a female taken in Ermelund $27\frac{1}{6}$ 1920 (the author). The larva is a snail-feeder, but I have never bred the species.

Geographical distribution: — Europe down into Styria, towards the north into Norway.

5. *P. notata* Zett.

1848. Zett. Dipt. Scand. VII, 2855, 4 (*Trineura*). — 1920. Lundbeck, Vidensk. Medd. Dansk nat. For. 71, 125. — 1920. Schmitz, Jaarb. Natuurh. Genootsch. Limburg 1919, 92. — *Trineura maculata* Zett. 1848 l. c. 2854, 3. — *Phora maculata* Wood, 1906. Ent. Month. Mag. 2, XVII, 262. — 1910. Kertész, Cat. Dipt. VII, 393, p. p. — *Paraspiniphora maculata* 1914. Brues, Bull. Wisc. Nat. Hist. Soc. XII, 90, p. p. — ?*Trineura punctipennis* Zett. 1848. l. c. 2856, Obs. — *Phora* No. 2, Keilin, 1911. Bull. Sc. France Belgique (7), 45, 60, Pl. IV, fig. 52.

Male. Frons short, nearly twice as broad as high, dull black; bristles strong, the two anterior rows very concex. Antennæ black

or blackish brown, third joint large, elongated; arista very short-pubescent. Palpi black or brownish, with ordinary bristles. Thorax black, dullish, a little greyish, with black pubescence and two pairs of dorsocentral bristles. Scutellum with four bristles, the anterior a little smaller than the posterior. Pleura black, dull, only a little shining below; they are bare. Abdomen greyish black, in certain lights rather grey, dull, second and sixth segments somewhat elongated; it is clothed with short hairs, forming distinct rows at the hind margins; at the lateral margins the hairs are longer, and the second segment has here somewhat dense and long hairs; the marginal hairs on sixth segment somewhat long. Hypopygium somewhat large, constructed mainly as in *Bergenstammi*; the left side with a triangular plate between it and sixth segment, the right side with a somewhat claw-like piece below the hind margin; below there is a ventral plate similar to that in *Bergenstammi*; anal tube quite short, black. Legs with the femora black or blackish brown, tibiae and tarsi paler, dark or lighter brownish; front tibiae with a dorsal bristle above the middle, middle tibiae with a pair at about the upper fourth and one anterior near the lower third; hind tibiae with four bristles, two dorsal, the one at about the upper third the other near apex, further an anterior near apex and an anteroventral above the middle; middle tibiae with two, hind tibiae with three apical spurs of various length. Wings light brownish, veins brown, below the fork there is a more or less roundish, generally rather distinct, blackish spot; costa reaching beyond the middle, 1 about equal to $2 + 3$; costal cilia short, but not specially short; fourth vein curved at the base. Halteres yellow.

Female. Similar; antennae and palpi paler, reddish to yellowish red, and antennae smaller with the arista longer and more distinctly

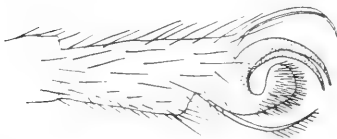


Fig. 45. *P. notata* ♀. Last joint of middle tarsus, showing claws, pulvilli, empodium, and the band-shaped hair above.

pubescent. Seventh abdominal segment deeply incised above, long haired. Tarsi showing a similar sexual difference as in *Bergenstammi*, and to a still higher degree, the tarsi stouter and more haired, especially the last joint, claws, empodium and pulvilli large and the hair above, between the claws very flattened and band-shaped; this development is the most pronounced on the anterior tarsi, but still distinctly present also on the hind tarsi.

Length. Rather varying, from 2,5 to nearly 4 mm; the smallest specimens are of rare occurrence.

P. notata is no doubt common in Denmark, though hitherto not taken on many localities, Ordrup Mose, Ermelund, Hillerød at Køge and at Strandby on Lolland; the dates are in April and the beginning of May. I have bred it numerously from *H. pomatia* taken in Ermelund by Mr. Kryger, the imagines came in February and March, and from shells of *H. hortensis*, *nemoralis* and *lapicida*, taken

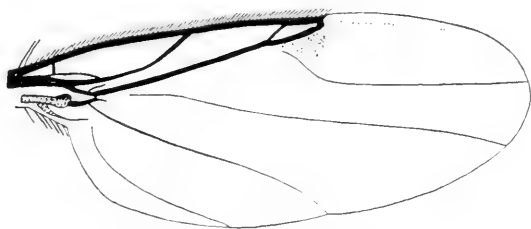


Fig. 46. Wing of *P. notata* ♀.

at Køge by Prof. Ad. Jensen and at Strandby on Lolland by L. Jørgensen, the imagines developed likewise in February and March, but probably the development was more or less accelerated. The few specimens I have netted, were taken in low herbage. The species is at all events an early spring-species and seems to have only one brood in the year, as also suggested by Schmitz (Biol. Zentralbl. 37, 1917, 34) for the nearly related *P. maculata*.

Geographical distribution: — The species is hitherto known from Sweden, Denmark, England and Switzerland, towards the north to southern Sweden; if *P. punctipennis* Zett. is the present species, it goes down to Malta.

Remarks: The species *notata* Zett. has never been accepted, but united with *maculata* Meig. The two species are also very similar and related, and moreover *maculata* Zett. (nec Meig.) is also *notata*, but the species are at once distinguished by the character that *maculata* has only three bristles on hind tibiæ, *notata* four as there is a dorsal bristle near apex not found in *maculata*; it was the differently shaped puparia which led me to detect the difference of the species. and the name I was able to settle with certainty, as I had the opportunity of examining Zetterstedt's type specimens which are in our collection. In my paper cited under the synonymy I have made

out the differences and the synonymy, and to this I refer. As Zetterstedt says "Stæg. in litt." the name *notata* is originally due to Stæger.

3. **Parastenophora** Malloch 1910.

(*Woodia* Malloch, Glasgow Naturalist I, 1909, 28; *Stenophora* Malloch, *ibid.* 27; *Pseudostenophora* Malloch, Proc. U. S. Nat. Mus. 43, 1912, 412).

Species of small to medium size (about 1—4 mm). Frons varying in breadth, from almost quadratic to nearly double as broad as high; there are three rows of bristles, each with four bristles; one pair of smaller supraantennal bristles directed backwards. Eyes hairy. Antennæ inserted low down near the oral margin, third joint generally small, but sometimes more or less to considerably enlarged in the male; arista dorsal, pubescent, often the most in the female. Clypeus often protruding and then especially in the female; proboscis sometimes rather large in the female. Palpi sometimes enlarged in the male and with small bristles, sometimes upon the whole rather small (*minuta*). There are small oral and distinct genal bristles; one longer postocular bristle below. Thorax with one pair of dorsocentral bristles. Scutellum with two bristles. Pleura bare. Abdomen generally with second and sixth segments a little elongated. Hypopygium not large, the tergite short above, on each side prolonged into a more or less hand-shaped prolongation forming a kind of forceps, the prolongations or arms of the forceps may be symmetrical or unsymmetrical; anal tube short, sometimes not or almost not protruding, sometimes flattened; a large, more or less arched ventral plate present. In the female abdomen terminating with two small styliform lamellæ, directed downwards. Abdomen sparingly haired. Legs of normal shape, but sometimes (in non-Danish species) unusually long and slender; front tibiæ generally with one dorsal bristle (in *minuta* with none), middle tibiæ with a pair at about the first third, and a small one on anterior side at apex, sometimes wanting, hind tibiæ with one dorsal bristle at or above the middle, and one, generally small, anterodorsal at apex, sometimes wanting; the legs as usual clothed with short hairs, on the apical part of posterior side of hind tibiæ and on posterior side of hind tarsi arranged in comb-like transverse rows; the middle tibiæ have the hairs on the dorsal side in the apical half dense and a little longer. Claws and pulvilli normal and empodium small and bristle-shaped. Wings with costa shorter or longer and the costal cilia likewise short or somewhat long; third vein forked.

sometimes thickened, especially in female; four thin veins present, all reaching the margin.

The developmental stages do not seem to be known; Bezzi has (Arch. Zool. exper. et gen. 5, VIII, 1912, 57) described and figured larva and pupa of a species determined as *P. aptina*; the stages are described as quite of common shape for Phorid larvæ and pupæ, and with four small tubercles on each segment; the above mentioned author states, however, later on (Atti del. Soc. Ital. di Sc. Nat. LIII, 1914, 215) that the larvæ and pupæ belonged to *A. rufipes*.

The species occur on bushes and in low herbage in more or less humid places in woods, some are especially found in autumn; *P. minuta* has been taken on *Agarici*.

As remarked by Schmitz (Jaarb. Natuurh. Genootsch. Limburg 1917, 194) the genus is very nearly related to the following genus *Trupheoneura*, and in some cases the bordering of the genus may be difficult. I quite follow Schmitz in the sense in which he takes the genus, and consequently I exclude all species in which the seventh vein does not reach the margin distinctly, and all species with more than two bristles on scutellum. The genus was established by Malloch under the name *Stenophora* in 1909, but in 1912 he altered it to *Pseudostenophora* on account of preoccupation; in 1909 he had created the genus *Woodia* for *Phora gracilis* Wood, this name he in 1910 altered to *Parastenophora*, likewise because it was preoccupied; this latter genus was distinguished by having only one bristle at the base of middle tibiæ, or none at all, and no bristle on the middle of hind tibiæ. Now Pater Schmitz has kindly communicated to me that he has seen a specimen of *gracilis* with bristles on the tibiæ quite as in *Pseudostenophora* so that the species is congeneric with this genus, and as *Parastenophora* has priority the genus must bear this name. A paper from Schmitz, dealing with the question, has appeared in Zool. Mededeel. 's Rijks Mus. Leiden, VI, 1921, 56.

Of the genus 14 species are known from the palæarctic region; 3 occur in Denmark.

Table of Species.

1. Front tibiæ without dorsal bristle, upper bristle on hind tibiæ at about the upper fourth; antennæ in male large . . . 1. *minuta*.
- Front tibiæ with a dorsal bristle, upper bristle on hind tibiæ near the middle; antennæ in male not large 2.
2. Halteres with the knob more or less dark; antennæ reddish;

- palpi yellow, of ordinary size; wings with costa beyond the middle. 2. *unispinosa*.
 — Halteres whitish; antennæ and palpi black, the latter in the male large and broad, with one strong bristle at end; wings with costa not beyond middle 3. *nudipalpis*.

1. *P. minuta* Fabr.

1787. Fabr. Mantiss. Ins. II, 365, 11 et 1794. Ent. Syst. IV, 406, 18 et 1805. Syst. Antl. 142, 23 (*Empis*). — 1860. Loew, Zeitschr. f. Entom. Breslau, XIV, 36 (*Empis*). — 1910. Lundbeck, Dipt. Dan. III, 6 et 189 (*Phora*). — *Trineura ruficornis* Zett. 1848. Dipt. Scand. VII, 2863, 12, p. p. specimen danicum. — *Phora pubericornis* Malloch, 1908, Ent. Month. Mag. 2, XVIII, 12. — 1910. Malloch, Ann. Scot. Nat. Hist. 90 (*Stenophora*). — 1914. Brues, Bull. Wisc. Nat. Hist. Soc. XII, 96 (*Dohrniphora*). — 1918. Schmitz, Jaarb. Naturh. Genootsch. Limburg 1917, 96 (*Pseudostenophora*).

Male. Frons black, shining, about one and a half times as broad as high, anterior row of bristles convex. Antennæ with the third joint large and pointed, brownish yellow and with a conspicuous yellow pubescence; arista pubescent. Palpi small, yellow, with small bristles. Thorax black, shining, with blackish pubescence and one pair of dorsocentral bristles. Scutellum with two bristles. Abdomen black, dull. Hypopygium yellow, with the arms of forceps symmetrical. Legs yellow, hind femora and tibiæ a little darkened towards tip, front coxæ yellow, posterior coxæ darker; front tibiæ without bristle, middle tibiæ with a pair at about the upper third and a very small anterior at apex, hind tibiæ with a dorsal bristle at about the upper fourth and a not small dorsal at apex. Wings slightly tinged, veins yellow; costa reaching well beyond the middle, 1 not quite double 2 and slightly longer than 2 + 3; fork longish, its anterior branch a little obliterated at base; costal cilia moderately short; third vein strong, fourth vein issuing from about the middle of the outer branch of the fork, somewhat curved in its first part; mediastinal vein not reaching the first vein. Halteres yellow.

Female. Similar; frons less broad, antennæ not large, but pubescent as in the male; proboscis long and protruding, as long as the head is high, with a large labrum; palpi smaller than in the male.

Length 2—3 mm.

As I have seen only two females of the species, both in a bad state, the description is partly taken from Malloch.

Remarks: The synonymy of this species is rather interesting. As known the *Empis minuta* of Fabricius has never been recognized; Loew gives l. c. a thorough historical account of this question, and says that he is inclined to think that Fabricius' species, especially on account of its habitat "in agaricis", was a *Phora* which was very well possible, as Fabricius in 1794 had at least all Empidids and probably also other Diptera under *Empis*, but the author, however, thinks this interpretation less probable, because Fabricius also in 1805 has the species as an *Empis*, and here this genus only includes *Empis* and *Rhamphomyia* and some nearly related forms. In Diptera Danica l. c. I mentioned that Loew's suggestion of the species being a *Phora* was nevertheless correct; two specimens are present in the collection of Tønder Lund, the one on the label being a *Phora* (the other a *Sciara*); the *Phora* on the label is thus the type, and as I now examined it more closely it proved to be *P. pubericornis* Malloch; this species has thus stood in the said collection for more than a hundred years before it was described again by Malloch. There are some points of interest connected with the story of this species; Fabricius says "Habitat gregatim in Daniæ Agaricis", and Malloch (l. c. 1910) took the species "on the underside of a species of Agaricus on fallen timber", so that all known specimens are taken in this way. It is interesting that Malloch states (l. c. 1908) that the species has a striking resemblance to a species of *Tachydromia*, for this to some degree makes it intelligible that Fabricius took it for an Empid. — In Stæger's collection is an old, bad specimen of the species labelled "*ruficornis* Zett. det.", this is evidently the specimen from Stæger, mentioned by Zetterstedt l. c. the description of which already proved that it could not be *ruficornis*.

Brues in his catalogue from 1914 has made a strange error as regards this species; under Incertae sedis he enumerates *minuta* Fabr., but his quotations from Fabricius, Meigen and Kowarz refer to *Dolichopus minutus* Fabr., only the quotation of Lundbeck is correct.

P. minuta seems to be rare in Denmark, we possess only the two specimens mentioned above, both females in bad condition, and both without particular locality; as before remarked the species is only known as taken on Agarici.

Geographical distribution: — The species is, besides from Denmark, only known from Britain.

2. *P. unispinosa* Zett.

1860. Zett. Dipt. Scand. XIV, 6475, 12—13 (*Trineura*). — 1901. Beck. Abhandl. zool. bot. Gesell. Wien, I, 30, 18, Taf. II, Fig. 21—22 (*Phora*). — 1906. Wood, Ent. Month. Mag. 2, XVII, 193, 265 (*Phora*). — 1910. Kertész, Cat. Dipt. VII, 397 (*Phora*). — 1914. Brues, Bull. Wisc. Nat. Hist. Soc. XII, 97 (*Dohrniphora*). — 1918. Schmitz, Jaarb. Natuurh. Genootsch. Limburg 1917, 96 (*Pseudostenophora*).

Male. Frons considerably broader than high, black, slightly shining; anterior rows of bristles a little convex. Jowls yellow. Antennæ small, reddish, arista distinctly pubescent. Palpi yellow, rather narrow, with bristles of ordinary size, but one at the apex specially long. Thorax black, sometimes somewhat brownish, with dark pube-

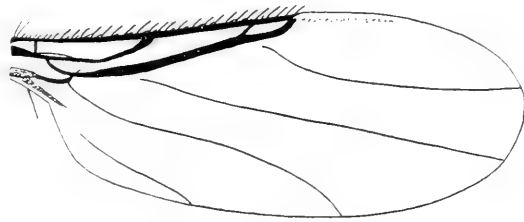


Fig. 47. Wing of *P. unispinosa* ♀.

scence; one pair of dorsocentral bristles. Pleura greyish black or brownish to yellowish brown. Scutellum with two bristles. Abdomen black, not shining, second and sixth segments slightly elongated. Abdomen with very sparse hairs, only at the hind margin of sixth segment a little more conspicuous hairs. Hypopygium greyish or reddish grey, not large, the tergite is short above, the sides prolonged as two hand-shaped or a little spoon-shaped prolongations forming something like a forceps, the right arm is a little longer than the left; anal tube short, somewhat flat, yellow, with longish hairs; there is a large and arched, somewhat triangularly pointed ventral plate of brownish colour. Legs yellow or brownish yellow; front tibiæ with a small dorsal bristle at about the middle; middle tibiæ with a pair at the upper third, a dorsal and an anterodorsal, the former generally the smaller and perhaps sometimes wanting, and with a very small anterior bristle at apex, sometimes wanting; hind tibiæ with a dorsal bristle above the middle and a small anterodorsal at apex, sometimes almost (or quite) wanting. Wings a little brownish tinged, veins brown; costa reaching beyond the middle, 1 about double 2;

angle at fork large; costal cilia rather short; third vein somewhat thickened, fourth slightly and evenly curved in its first part. Halteres with the peduncle reddish, the knob black or blackish.

Female. Frons a little less broad than in the male; antennæ slightly smaller with a more pubescent arista. Wings with costa longer, 1 not much longer than 2; third vein considerably thickened. Halteres with the knob often paler.

Length 1 to about 2 mm.

P. unispinosa is not rare in Denmark, Holte, Geel Skov, Suserup Skov at Sorø, Bogø south of Sealand, at Lohals on Langeland, and in Jutland at Hejls and Skamling south of Kolding, Jelling and in Hals Sønderkov at the east end of Limfjorden (Th. Mortensen, the author). The dates are $^3/7$ — $^7/9$; it was for the first time taken in 1917.

Geographical distribution: — Europe down into Austria and also recorded from Spain; towards the north to middle Sweden.

3. *P. nudipalpis* Beck.

1901. Beck. Abhandl. zool. bot. Gesell. Wien, I, 29, 17, Taf. I, Fig. 20 (*Phora*). — 1906. Wood. Ent. Month. Mag. 2, XVII, 193, 265 (*Phora*). — 1910. Kertész, Cat. Dipt. VII, 394 (*Phora*). — 1914. Brues, Bull. Wisc. Nat. Hist. Soc. XII, 96 (*Dohrniphora*). — 1918. Schmitz, Jaarb. Natuurh. Genootsch. Limburg 1917, 96 (*Pseudostenophora*).

Male. Frons not much broader than high, black, shining; the anterior rows of bristles nearly straight, only the lower a little convex. Antennæ small, blackish or blackish brown; arista pubescent. Palpi black or brown, large, flat and rather broad, they have a long bristle at the end, otherwise they are nearly nude, only with a couple of small bristles. Thorax black, somewhat shining, with brownish pubescence and one pair of dorsocentral bristles. Scutellum with two bristles. Abdomen black, a little greyish, not shining, second and sixth segments a little elongated; abdomen very sparingly with short hairs, not distinctly longer at the hind margin of sixth segment. Hypopygium small, greyish black; it is quite short above, the arms of the forceps elongated, symmetrical; anal tube quite short, black; there is a large yellowish ventral plate, which is arched and rounded or slightly pointed at the end. Legs brown to brownish black, the front legs the palest, and also posterior tibiæ and tarsi paler; front tibiæ with a dorsal bristle above the middle, middle tibiæ with a pair at about the upper fourth and a smaller anterior bristle near

apex; hind tibiae with a dorsal bristle above the middle and a small anterodorsal near apex. Wings clear or nearly so, veins brownish or yellow, thin veins paler; costa reaching to the middle, a little thickened just at the end; 1 more than double 2; costal cilia rather long

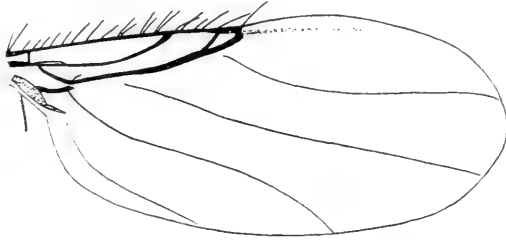


Fig. 48. Wing of *P. nudipalpis* ♂.

and not dense; fourth vein issuing beyond the base of the fork. Halteres whitish.

Female. Similar; palpi narrower with more numerous long bristles; antennal arista more pubescent.

Length 1,6 to fully 2 mm.

P. nudipalpis seems to be rare in Denmark; Ermelund, Ørholm, Holte and Hejls south of Kolding (Th. Mortensen, the author); in all five males and two females; the dates are $7/6$ — $10/10$.

Geographical distribution: — Europe down into Austria; it does not seem to be known north of Denmark.

4. **Trupheoneura** Malloch.

Species of small to medium size. Frons broader than high, not rarely very low and much broader than high; three transverse rows of bristles with four bristles in each; supraantennal bristles smaller, one pair, placed on the anterior corner; they are directed straight upwards and diverging. Eyes hairy. Antennæ with the third joint roundish, sometimes enlarged in the male; arista dorsal, generally pubescent and often most in the female, it is only rarely nude (*sublugubris*). Clypeus generally distinct, in the female protruding. Proboscis generally a little larger in the female than in the male, and sometimes much enlarged in the female. Palpi broader or narrower, sometimes larger or very large in the male, the bristles not rarely

short in the male. Jowls somewhat descending below the eyes; small oral and more distinct genal bristles present; one long lower post-ocular bristle. Thorax with one pair of dorsocentral bristles. Scutellum with two or four bristles, when four the bristles either equal or unequal, the anterior pair the smaller. Mesopleura without hairs or bristles. Abdomen often with the second and sixth segments in the male elongated; in several species there is at the base of second segment a curious, granulated or finely papillate area. Hypopygium generally large to very large, sometimes medium-sized; it is well chitinized and as a rule shining above at the base; the prolongations from the tergite are most often more or less band-shaped; they are rarely symmetrical, generally unsymmetrical and then as a rule the left being the larger; in some species the arms are very unsymmetrical, the left being large, deeply cleft, and thus, as it were, forming a forceps by itself. Anal tube somewhat flattened, from quite short, scarcely protruding, to medium long, with long hairs; there is a large, arched ventral plate. In the female the seventh sternite is generally chitinized and more or less elongated, the apex being of various shape, rounded, excised or more or less pointed, or drawn out in a narrow, curved prolongation, or it may be provided with a median spine. In a single case (*luteifemorata*) also the sixth sternite is chitinized, a case almost unique among European Phorids. The last segment terminates with two styliform lamellæ. Abdomen is sparingly haired with short hairs. Legs sometimes rather slender; front tibiæ with a dorsal bristle above the middle (sometimes wanting), middle tibiæ with a pair at about the upper third or fourth, and one small or very small anterior at apex (the posterior of the upper pair may be absent); hind tibiæ with two anterior or anterodorsal bristles, one above the middle and one small at apex (in *opaca* the upper hindtibial bristle generally is wanting); all the bristles are generally somewhat weak; the legs for the rest with short hairs, on the posterior side of the apical part of hind tibiæ and on posterior side of metatarsi they are comb-like arranged in transverse rows; on the dorsal side of middle tibiæ the hairs are in the apical half a little longer and on the anterodorsal side they are also a little row-like arranged. Claws and pulvilli normal; empodium small, bristle-shaped. Wings with costa generally reaching beyond middle, sometimes shorter; it is sometimes thickened in the outer part; costal cilia generally short; third vein forked, in a couple of species with small bristles; fourth to sixth vein reaching the margin, but seventh

vein abbreviated in a shorter or longer distance from the margin and upon the whole weak and indistinct, in some cases quite undeveloped (in *lugubris* ♀ reaching indistinctly to the margin).

The developmental stages were hitherto not known, but for several species it may be induced what the larva feeds upon. *Tr. opaca* has been found on exhumed human bodies; *perennis* has been found in coffins (Hofmann, Münch. med. Wochenschr. 1886 and Ann. Soc. Ent. de Belg. XXX, 1886, C. R. CXXXI), and Becker mentions (Die Phoriden 77) *opaca* (probably it is *perennis*) as taken in abundance on a churchyard, creeping out from the ground. Wood mentions *perennis* and *vitrea* from carrion and *trinervis* from carrion and rotten fungi. The American species *microcephala* Loew and *fratercula* Brues have been obtained, the former from dead caterpillars, the latter in nest of *Vespa germanica* (Malloch, Proceed. U. S. Nat. Mus. 43, 1912, 412). Finally Schmitz notes (Ent. Ber. Nederl. Ent. Vereen. V, 1918, 76) that *intempesta* was taken on a dead fowl. I have myself examined pupæ of *sublugubris* taken in an old nest of a *Vespa* on $\frac{3}{4}$, they developed on $\frac{15}{9}$ — $\frac{20}{9}$, and further larvæ of the same species taken numerously in the nest of *Vespa media* on $\frac{30}{9}$ and developing on $\frac{20}{6}$ — $\frac{28}{6}$ next year. — The larva is almost cylindrical, a little flattened, it is attenuating anteriorly, but truncate behind; the colour is white or whitish. For the rest it is rather similar to the larva of *A. rufipes* as described by Keilin; the whole dorsal surface is set with chitinous teeth which are curved backwards, on prothorax they are small or nearly wanting; further there is a number of conical, spine-like papillæ in transverse rows on the segments; of such papillæ prothorax shows four, meso- and metathorax six each; each abdominal segment is divided into three distinct corrugations separated by furrows, and each segment bears eight papillæ, four on the posterior corrugation lying two on each side of the middle, and four on the middle corrugation lying towards the sides, the lateral being pleural; on the seventh abdominal segment the row of papillæ is a little convex behind, following the dorsal outline of the segment; the eighth abdominal segment is obliquely truncated above and bears round the margin eight papillæ; the posterior spiracles lie above in the middle; on the ventral surface each abdominal segment shows two large, somewhat bladder-like prominences, one on each side of the middle; each prominence is a little divided longitudinally; outwards to each prominence is a similar, but small and slightly pronounced elevation. At the posterior margin of prothorax lie the anterior

spiracles. The fullgrown larva has a length of about 5 mm. As seen from the above the larva is very similar to Keilins' description of *A. rufipes*, the papillæ being present in the same number and distribution and no doubt also here bearing sensory organs, but it differs by the relatively large teeth which cover the surface, and by the segments being distinctly divided into three corrugations; the ventral prominences are no doubt homologous to those mentioned by Keilin, and likewise they quite answer to the description given by Perris of *A. pusilla* (Ann. Soc. ent. de Fr. 4, X, 354). The pupa is likewise similar to that of *A. rufipes* and of the same typical shape, the ventral surface is arched from side to side, the dorsal more flat, the greatest height lies at the anterior third, from here sloping abruptly towards the head end and more evenly towards the posterior end; the surface is granulated from the larval teeth; the papillæ are only slightly visible, except those round the posterior end. The anterior spiracular tubes are of medium length, pointed, they are rather distant, not directed forwards but to each side. The colour of the pupa is brown; the length fully 3 mm.

As seen from the above the larvæ feed on carrion, for no doubt the imagines are present there for depositing the eggs, but they seem upon the whole to feed on decaying animal and vegetable matters, as species have been got from dead caterpillars, from nests of *Vespa*, and also have been taken on rotten fungi. Not few species seem to occur in autumn or even vinter, but some, as f. inst. *intermedia*, exclusively occur in spring and some may be taken in summer. As regards hibernation those species which occur in spring no doubt hibernate as pupa, but the autumn species perhaps hibernate as larva.

Of the genus about 25 species are known from the palæarctic region; 12 have been found in Denmark.

Table of Species.

1. Scutellum with four bristles, the anterior often smaller than the posterior	2.
— Scutellum with two bristles.	7.
2. Scutellar bristles equal or nearly	3.
— Scutellar bristles unequal.	4.
3. Antennæ with the third joint very large, almost as large as the eye; abdomen in male with second and sixth segments elongated, and hypopygium large, black and shining with arms of forceps very unsym-	

- metrical; female with proboscis very large. Wings with seventh vein very weak and short 1. *opaca*.
- Antennæ with third joint smaller; abdomen in male with only sixth segment a little elongated and hypopygium smaller, greyish, with arms of forceps almost symmetrical; female with proboscis not large. Wings with seventh vein reaching to or almost to the margin 2. *lugubris*.
4. Third vein with small bristles 3. *pauciseta*.
- Third vein without bristles 5.
5. Costa thickened in the outer half 4. *intermedia*.
- Costa not thickened 6.
6. Palpi narrow, only with long bristles at apex; sixth abdominal segment in male with long bristly hairs at hind margin, and hypopygium shining with symmetrical, thin, stiletto-like arms of forceps; female with proboscis large and with long hairs on venter towards apex 5. *trinervis*.
- Palpi of ordinary shape, in male with short bristles; male without bristly hairs on sixth segment, and hypopygium dull, with broad, unsymmetrical arms of forceps; female with proboscis not large, and venter without long hairs 6. *sublugubris*.
7. Halteres whitish or yellow 8.
- Halteres black or blackish 11.
8. Palpi yellow 9.
- Palpi black 10.
9. Arms of male forceps symmetrical; seventh sternite of female ending with a narrow upwards curved prolongation 7. *luteifemorata*.
- Arms of male forceps symmetrical (only male known) 8. *similis*.
10. Legs rather slender; left arm of forceps spoon-shaped, rounded at the end, black; seventh sternite of female rounded at the end 9. *intempesta*.
- Legs less slender; left arm of forceps with a large triangular tooth on the anterior side, yellow; seventh sternite of female excised at the end with the corners drawn out 10. *excisa*.
11. Costa short, not reaching the middle, not thickened 11. *Dudai*.
- Costa longer, reaching to middle or beyond, thickened towards the apex 12. *tumidula*.

1. *T. opaca* Meig.

1830. Meig. Syst. Besch. VI, 216, 12 (*Phora*). — 1848. Zett. Dipt. Scand. VII, 2866, 16 (*Trineura*). — 1864. Schin. F. A. II, 342 (*Phora*). — 1901. Beck. Abhandl. zool. bot. Gesell. Wien, I, 17, 2, p. p. (*Phora*). — 1906. Wood, Ent. Month. Mag. 2, XVII, 192, 264 (*Phora*). — 1906. Collin, ibid. 177 (*Phora*). — 1910. Kertész, Cat. Dipt. VII, 394 (*Phora*). — 1914. Brues, Bull. Wisc. Nat.

Hist. Soc. XII, 98. — 1918. Schmitz, Jaarb. Natuurh. Genootsch. Limburg 1917, 99. — *Phora nigricornis* Egg. 1862. Verh. zool. bot. Gesell. Wien, XII, 1235. — 1864. Schin. F. A. II. 342. — 1901. Beck. l. c. 18, 3, Taf. I Fig. 6—7, Taf. IV, Fig. 62, 66. — 1910. Kertész. l. c. 394.

Male. Frons very low and broad, nearly four times as broad as high, black and shining; bristles not strong, the anterior rows slightly convex. Antennæ with third joint large, about as large as an eye, black, with dense, relatively longish brownish pubescence; arista short-pubescent. Palpi black, somewhat broad, with short bristles along the lower margin. Thorax black, slightly shining, with black pubescence and one pair of dorsocentral bristles. Scutellum with four equal or nearly equal bristles. Abdomen black, dull, slightly greyish, second and sixth segments a little elongated, the second segment finely granulated on its front part; abdomen sparingly clothed with short hairs, slightly longer at the hind margins of the segments and at the sides. Hypopygium very large and long, well chitinized, black and shining (fig. 49); the side prolongations from the tergite very unsymmetrical, on the right side there is at the end a broad, downwards curved, band-shaped prolongation, somewhat serrated at the end, on the left side there issues more forwards a prolongation which is deeply excised and thus forming a forceps-like piece with claw-like arms the anterior of which is a little larger than the posterior, and both are curved backwards; between the two side prolongations the short, somewhat flat, brownish anal tube is seen which has long hairs; on the ventral side of the hypopygium some complicated appendices are seen, and there is an arched ventral plate, ending in a yellowish termination; the hypopygium is hairy above on the apical part. Legs black, front tibiæ and apical part of femora, and also the posterior knees, brownish or yellowish; front tarsi robust; the front tibiæ with a very small dorsal bristle above the middle, middle tibiæ with a pair at the upper third, and a small anterior at apex, and hind tibiæ with an anterior bristle at apex. Wings slightly or somewhat more brownish tinged; veins brown; costa reaching beyond the middle, a little thickened towards the end, 1 about equal to 2 + 3; fork somewhat long; costal cilia quite short; fourth vein distinctly curved in its basal part, the seventh practically

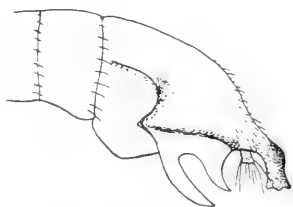


Fig. 49. *T. opaca* ♂.
Hypopygium seen obliquely
from the left $\times 120$.

wanting or only slightly indicated in its first part. Halteres black.

Female. Frons higher than in the male; third joint of antennæ much smaller and less pubescent, arista longer pubescent; clypeus much protruding, shining; palpi narrower, with ordinary bristles; proboscis very large and as long as the head is high, labrum reaching to the end of it, arched and shining. Abdomen more conspicuously hairy, especially the two last segments; first segment a little roundly excised in the hind margin.

Length 2,8 to fully 3 mm.

Remarks: My material consists only of six specimens, four males and two females (two of the specimens are German), none of my specimens have any upper hindtibial bristle, but such a bristle may be present, though rarely (Collin l. c.). Becker, as known, united *opaca* and *perennis*, but his description of *opaca* is mainly based on *perennis*, and the figures Taf. I, 4—5 belong to this species. Collin l. c. doubts that Zetterstedt's *opaca* is the present species, but Zetterstedt mentions a male specimen sent from Stæger, and this specimen, which is in our collection, is *opaca*.

T. opaca seems rather rare in Denmark, only four specimens, three males and a female, are known; two of the males are from earlier time, one from Charlottenlund (Jacobsen), and one from the vicinity of Copenhagen (Stæger), the third is from Vemmetofte (H. J. Hansen); the female is from the little wood Tyvekrog near Hillerød (the author); the dates are $^{16}/_4$ — $^1/_6$.

Geographical distribution: — Europe down into Austria and Styria, towards the north to middle Sweden.

2. *T. lugubris* Meig.

1830. Meig. Syst. Besch. VI, 217, 17 (*Phora*). — 1901. Beck. Abhandl. zool. bot. Gesell. Wien, I, 18, 4, Taf. IV, Fig. 67 (*Phora*). — 1906. Wood, Ent. Month. Mag. 2, XVII, 192 (*Phora*). — 1910. Kertész, Cat. Dipt. VII, 393 (*Phora*). — 1914. Brues, Bull. Wisc. Nat. Hist. Soc. XII, 98. — 1918. Schmitz, Jaarb. Natuurh. Genootsch. Limburg 1917, 99. — *Phora papillata* Winegate, 1906. Ent. Month. Mag. 2, XVII, 111 et 215.

Male. Frons low and broad, about three times as broad as high, black, dullish; anterior rows of bristles straight or nearly. Antennæ with the third joint moderately large, black, brownish pubescent; arista pubescent. Palpi black, large and somewhat broad, the marginal bristles short. Thorax black, slightly shining, with black pubescence

and one pair of dorsocentral bristles. Scutellum with four equal bristles. Abdomen black, distinctly greyish, dull, first segment excised in the hind margin, at the sides much longer than second, sixth a little elongated; second segment granulated or papillate on its front part; abdomen has short hairs almost only at the hind margins of the segments. Hypopygium somewhat large, but much smaller than in *opaca*, greyish, black and shining above at base; the side prolongations or arms of forceps of simple shape, the right a little narrower than the left; anal tube small, flat; below there is a large, arched, black and shining ventral plate; the hypopygium is hairy above on the apical part. Legs black or brownish black, tibiæ and tarsi paler, the front tibiæ the palest; front tibiæ without or with a quite small dorsal bristle, middle tibiæ with a pair at the upper third and a small anterior at apex and hind tibiæ with an anterior bristle at the upper third and a smaller at apex. Wings somewhat yellowish tinged, veins brown; costa reaching beyond the middle, somewhat thickened from the apex of the subcostal vein outwards, 1 slightly longer than 2 + 3; fork longish; costal cilia quite short; fourth vein well curved in its basal part, the seventh vein weak but reaching the margin almost or quite. Halteres black.

Female. Third joint of antennæ smaller than in the male; palpi narrower with ordinary bristles; clypeus only slightly protruding and proboscis not large. Wings with the seventh vein as in the male.

Length 2,5—3,5 mm.

T. lugubris seems to be very rare in Denmark, I only know two specimens, both females and both from North Sealand (Schlick), one of them taken at Damhusmosen ²⁶/₃ 1878; as we have only the female the above description of the male is drawn from a German specimen, kindly sent me from Pater Schmitz.

Geographical distribution: — Europe down into Styria, towards the north into Norway.

3. *T. pauciseta* Schmitz.

1918. Schmitz, Ent. Ber. Nederl. Ent. Ver. V, 28 et 1918. Jaarb. Natuurh. Genootsch. Limburg 1917, 100.

Male. Unknown.

Female. Frons somewhat broader than high, black, practically not shining; bristles not weak, the anterior rows convex. Antennæ small, brown, arista pubescent. Palpi dark yellow, somewhat narrow,

with ordinary bristles. Clypeus protruding, black and shining. Thorax black, slightly shining, a little reddish about the humeri, with blackish pubescence and one pair of dorsocentral bristles. Scutellum with four bristles, the anterior small. Pleura blackish, downwards brownish. Abdomen blackish, dull, slightly hairy, the hairs best observable at the sides; at the lateral margin of second segment there are about three long hairs and below the sixth segment there is on each side a long hair. The seventh sternite a little prolonged in the middle. Legs not slender, hind tibiae a little thickened towards the end; the legs are yellowish or brownish yellow, the femora, especially posterior

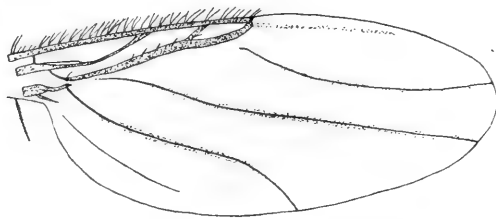


Fig. 50. Wing of *T. pauciseta* ♀.

femora more brownish; front tibiae with a dorsal bristle above the middle, middle tibiae with a pair at about the upper third and a very small anterior bristle at apex, hind tibiae with an anterodorsal bristle above the middle and a quite small anterior bristle at apex. Wings a little brownish tinged, veins brown; costa reaching well to the middle; 1 about equal to $2 + 3$; fork unusually long and the angle very acute; costal cilia somewhat short; third vein thickened in its whole length and bearing an open row of fine bristles stretching to the base of the fork, the last bristle placed on the base of the anterior branch of the fork; fourth vein issuing far beyond the base of the fork, near the end of third vein, it is evenly curved in its whole length; seventh vein long, interrupted just before the margin. Halteres blackish.

Length fully 2 mm.

T. pauciseta is rare, only two females have been taken; Bogo south of Sealand ⁸/₇ 1917 and at Lohals on Langeland ¹⁹/₇ 1920 (the author).

Geographical distribution: — Besides the Danish specimens only one other specimen, likewise a female, is known, taken by Schmitz in Dutch Limburg, while the male still remains unknown.

4. *T. intermedia* Malloch.

1908. Malloch, Ent. Month. Mag. 2, XIX, 204. — 1914. Brues, Bull. Wisc. Nat. Hist. Soc. XII, 98. — 1918. Schmitz, Jaarb. Natuurh. Genootsch. Limburg 1917, 100.

Male. Frons low, about three times as broad as high, somewhat shining; bristles not weak, the anterior row slightly convex. Antennæ black, third joint large; arista short-pubescent. Palpi black, large and broad, with very short bristles along the lower margin. Thorax black, somewhat shining, with black pubescence and one pair of dorsocentral bristles. Scutellum with four bristles, the anterior about



Fig. 51. Wing of *T. intermedia* ♂.

half as large as the posterior. Pleura black, somewhat rugose. Abdomen black, a little greyish, dull; first segment a little and sixth distinctly elongated, the first triangularly excised in the hind margin; second segment with a granulated or papillate patch on its base; abdomen sparingly with short hairs, best visible at the hind margins of the segments and the sides. Hypopygium large, but smaller than in *opaca*, well chitinised; it is greyish, but black and shining above at the base; with regard to the side prolongations from the tergite it is similar to that in *opaca*, on the right side there is at the end a somewhat broad, band-shaped prolongation which is curved downwards and rounded at the end, on the left side there is more forwards a prolongation which is deeply cleft and thus divided forceps-like into two hook-like arms, both curved backwards, but much more unequal than in *opaca*, the anterior is large and shining, the posterior small, greyish and dull; anal tube small, not protruding; there is a large, arched, black and shining ventral plate, triangularly pointed; the hypopygium is a little hairy above on the apical part. Legs black or blackish, the knees yellowish and also often the front tibiæ paler; the legs are somewhat slender, the front tarsi a little robust; front tibiæ with a small dorsal bristle above the middle, middle tibiæ with a

pair at about the upper third and a very small anterior bristle at apex, hind tibiæ with two anterodorsal bristles, one above the middle and one small at apex. Wings slightly tinged; veins brown; costa reaching beyond the middle, from the uniting with the first vein it is thickened, increasing in thickness towards the end; 1 about equal to or a little longer than $2 + 3$; fork somewhat acute; costal cilia quite short; fourth vein issuing beyond the base of the fork, curved in its first part, for the rest straight; seventh vein weak, ending somewhat before the margin. Halteres black.

Female. Frons a little higher than in the male; antennæ smaller, of medium size, arista more pubescent. Palpi narrow, with short bristles at the lower margin, longer at the end. Clypeus much protruding; proboscis rather large, as long as the head is high, with the labrum large, arched and shining. Wings considerably brownish tinged, 1 longer than $2 + 3$, costa thickened as in the male.

Length 2—2,5 mm.

T. intermedia is perhaps not rare in Denmark, but I know it only from two localities, Ordrup Mose and Vesterfælled; in Ordrup Mose I can take it in great numbers every year in April and especially in May, I have taken it between $^{12}/_4$ and $^{15}/_5$; it occurs always only in grass on the field, but never in other low herbage; the female seems to be of rare occurrence for although I have swept the male in abundance I have got only one female; I took it for the first time in 1917, but two specimens have been taken on Vesterfælled on $^3/_5$ 1908 and $^{13}/_4$ 1914 (C. Larsen).

Geographical distribution: — The species is known from Denmark, Germany and England.

5. *T. trinervis* Beck.

1901. Beck. Abhandl. zool. bot. Gesell. Wien, I, 19, 5 (*Phora*). — 1906. Wood. Ent. Month. Mag. 2, XVII, 191 (*Phora*). — 1910. Kertész, Cat. Dipt. VII, 397 (*Phora*). — 1914. Brues, Bull. Wisc. Nat. Hist. Soc. XII, 99. — 1918. Schmitz, Jaarb. Natuurh. Genootsch. Limburg 1917, 101.

Male. Frons not twice as broad as high, greyish black, dull, the rows of bristles straight or nearly. Antennæ with the third joint brownish black, not large, arista rather distinctly pubescent. Proboscis rather large, brown. Palpi black, narrow, with long bristles at apex, the other bristles short. Thorax black, a little shining, with black pubescence and one pair of dorsocentral bristles. Scutellum with four bristles, the anterior small. Abdomen black, somewhat

greyish, dull, second and sixth segments elongated; abdomen is distinctly short-haired, the hairs a little longer at the hind margins of the segments and on sixth segment and here long and bristly and forming a circlet at the hind margin. Hypopygium of medium size, brown, shining, the arms of the forceps are symmetrical, forming two long, straight and narrow, stiletto-like appendages; the anal tube is not quite short, flat, thickened towards the end and here with long hairs; the ventral plate is large, ending in a long, brown prolongation. Legs with the femora blackish, the anterior brown towards the end, tibiæ and tarsi brown, the anterior palest; front tarsi robust; front tibiæ (in my specimens) without dorsal bristle, middle tibiæ with a pair rather near the base, the posterior sometimes wanting, and a smaller anterior bristle at apex, hind tibiæ with an anterior bristle above the middle and a smaller at apex. Wings yellowish tinged; veins brown; costa reaching fully to the middle, 1 about equal to 2 + 3; fork longish; costal cilia short; fourth vein somewhat curved at base, seventh very weak and only present with a short basal part. Halteres black.

Female. I do not know the female, according to the descriptions, it has proboscis large, larger than in the male; abdomen with long hairs towards the end of the venter.

Length 2.5—3 mm.

T. trinervis is very rare in Denmark, I only know two specimens, both males, from the vicinity of Copenhagen (Schlick).

Geographical distribution: — Middle Europe down into Styria, it is not known north of Denmark.

6. *T. sublugubris* Wood.

1906. Wood. Ent. Month. Mag. 2, XVII, 192, 265 (*Phora*). — 1910. Ker-tész, Cat. Dipt. VII, 396 (*Phora*). — 1914. Brues, Bull. Wisc. Nat. Hist. Soc. XII, 99. — 1918. Schmitz, Jaarb. Natuurh. Genootsch. Limburg 1917, 101.

Male. Frons nearly twice as broad as high, black, dull; bristles somewhat strong, the anterior row convex. Antennæ black, of medium size, arista nude. Palpi black, of ordinary size, with short bristles. Thorax black, not shining, with fine and dense black pubescence and one pair of dorsocentral bristles. Scutellum with four bristles, the anterior much smaller than the posterior. Pleura greyish black. Abdomen black, a little greyish, dull, second and sixth segments a little elongated; second segment with a very finely granulated, impressed, somewhat semicircular area at the front margin; abdomen is sparingly

haired with short hairs forming rows at the hind margins of the segments, and with a little longer hairs at the sides and at the hind margin of sixth segment. Hypopygium of medium size, greyish, dull, but when fully exposed shining above just at the base; the side prolongations of the tergite forming a forceps with unsymmetrical arms, the left about double the size of the right; anal tube relatively long, greyish, with longish hairs; below there is a large, arched ventral plate; the hypopygium is a little hairy on the apical part. Legs black or blackish brown, tibiae and tarsi paler to brownish, front tibiae to brownish yellow; front tibiae with a dorsal bristle above the middle, middle tibiae with a pair at about the upper third and a smaller anterior bristle at apex, hind tibiae with two anterior bristles, one near the upper third and one at apex. Wings nearly clear; veins black or blackish brown; costa well beyond the middle of the wing, 1 longer than $2 + 3$; costal cilia short; fourth vein rather strongly curved in its first part, for the rest straight, seventh vein very weak, ending about one fourth before the margin. Halteres black.

Female. Frons a little higher than in the male; antennae small, arista likewise nude. Palpi with the bristles longer; clypeus protruding, shining; proboscis a little larger. Seventh abdominal sternite ending in a long, narrow, hairy prolongation.

Length 1,8—2,5 mm.

T. sublugubris does not seem to be common in Denmark; Copenhagen on a window (the author), Holte (Th. Mortensen), Hareskov, Ruderhegn (Kryger) and in Jutland at Hejls south of Kolding (the author); the dates are $^{14}/_7$ — $^{26}/_9$. In Hareskov Mr. Kryger took pupae in an old nest of a *Vespa* on $^3/_4$, the imagines came on $^{15}/_9$ — $^{20}/_9$, and in Ruderhegn he took larvæ in a nest of *Vespa media* on $^{30}/_9$, they developed next year on $^{20}/_6$ — $^{28}/_6$; it seems to be mainly an autumnal species. The species was for the first time taken in 1910.

Geographical distribution: — The species is known from Denmark, England, Holland and Germany.

7. *T. luteifemorata* Wood.

1906. Wood, Ent. Month. Mag. 2, XVII, 191, 265 (*Phora*). — 1910. Ker-tész, Cat. Dipt. VII, 393 (*Phora*). — 1914. Wood, l. c. 2, XXV, 153 (*Phora*). — 1914. Brues, Bull. Wis. Nat. Hist. Soc. XII, 98. — 1918. Schmitz, Jaarb. Natuurh. Genootsch. Limburg 1917, 101. — 1919. Schmitz, Ent. Ber. Nederl. Ent. Ver. V, 186.

Female. Frons somewhat broader than high, black, a little shining; bristles somewhat strong, the middle row slightly, the anterior distinctly convex. Antennæ black or brownish black, third joint small; arista pubescent. Palpi yellow, of ordinary size and armature; clypeus somewhat protruding, shining. Thorax black, sometimes with a slight reddish hue and the humeri reddish; it is a little shining, with black pubescence, rather conspicuous behind, and with one pair of dorsocentral bristles. Scutellum with two bristles. Pleura blackish, brownish behind and below. Abdomen blackish, a little greyish, dull; it is sparingly hairy, the hairs best visible at the

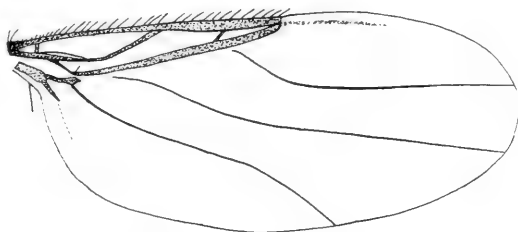


Fig. 52. Wing of *T. luteifemorata* ♀.

sides; the sixth segment has a chitinised, semicircular, densely hairy sternite, the seventh sternite is triangularly pointed and drawn out into a narrow, upwards curved process, hairy below. Legs yellowish or brownish yellow, the hind legs the darkest; front tibiæ with a dorsal bristle above the middle, middle tibiæ with a pair at the upper third and a small anterior bristle at apex, hind tibiæ with two anterodorsal bristles, one above the middle and one smaller at apex; the upper bristles on middle and hind tibiæ not weak. Wings rather brownish tinged; veins brown; costa reaching well beyond the middle, thickened from the uniting with the first vein to the end; 1 about equal to $2 + 3$; fork rather long, the angle somewhat acute; costal cilia moderately short; fourth vein issuing a little beyond the base of the fork, rather curved in its first part, for the rest nearly straight; seventh vein weak and short, ending abruptly about half way to the margin. Halteres yellow or dirty yellow.

Length 2 mm.

The male of this species has never been described; when Wood described the species he had only the female, but he must later on have got the male for in 1914 (l. c.) he gives, when describing *T. connexa*, some remarks about the male of *luteifemorata* and says here

about it: "hypopygium smaller, its flaps symmetrical, very long, slender and of a yellow colour, and bent at the base".

T. luteifemorata is rare in Denmark, I have only taken it once, Geel Skov ¹⁴/₉ 1918, three females; they were taken on bushes.

Geographical distribution: — The species is known from Denmark, England and Germany.

8. *T. similis* Lundbk.

1921. Lundbk. Vidensk. Medd. Dansk nat. Foren. 72, 129.

Male. Frons somewhat broader than high, black, not shining; bristles somewhat strong, the rows straight or the anterior slightly convex. Antennæ not large, brownish black; arista short-pubescent. Palpi yellow or dirty yellowish, of ordinary size and armature. Thorax black, a little reddish at the humeri; it is not or slightly shining, with blackish or blackish brown pubescence and one pair of dorso-central bristles. Scutellum with two bristles. Pleura brownish black. Abdomen black, dull, second and sixth segments a little elongated; abdomen is sparingly haired with short hairs, slightly longer at the hind margin of sixth segment. Hypopygium relatively not large, it is reddish or blackish, the arms of the forceps unsymmetrical, the left long, somewhat narrow and curved, the right a little broader, but much shorter; anal tube short, with long hairs; below a large, arched ventral plate is seen, and on the left side a special, triangular prolongation. Legs yellow or brownish yellow, the hind legs being the darkest; front tibiæ with a dorsal bristle above the middle, middle tibiæ with a pair at the upper third and a small anterior bristle at apex, hind tibiæ with two anterodorsal bristles, one at the upper third and one small at apex; the upper bristles on middle and hind tibiæ not weak. Wings a little yellowish or brownish yellow tinged, veins brown or blackish brown; costa reaching well beyond the middle, thickened from the uniting with the first vein to the end and increasing in thickness outwards; 1 about equal to 2 + 3 or a little longer; fork longish, the angle somewhat acute; costal cilia moderately short, nearly midway between short and long; fourth vein issuing at or near the base of the fork, moderately curved in its first part and for the rest straight; seventh vein weak, ending about half way to the margin. Halteres yellow.

Female. Unknown.

Length 1,7 to about 2 mm.

As seen from the description this species is very similar to *luteifemorata*, also I should not have hesitated in considering it the male to this species were it not that Wood, as remarked above, says that in *luteifemorata* the arms (flaps) of the hypopygial forceps are symmetrical.

T. similis is a rare species, it has been taken in Geel Skov on $14/9$ and $4/10$ 1918 (the author), two males; they occurred on bushes.

Geographical distribution: — Besides in Denmark the species has also been found in Holland, according to a specimen kindly sent to me from Pater Schmitz, but it is hitherto not known from Germany as erroneously recorded by me l. c.

9. *T. intempesta* Schmitz.

1918. Schmitz, Entom. Ber. Nederl. Ent. Vereen. V, 1918, 74. — 1920. Schmitz, Jaarb. Natuurh. Genootsch. Limburg 1919, 96.

Male. Frons broader than high (7—4), black, dull; of the rows of bristles the anterior somewhat, the intermediate slightly convex; the outer bristle of both rows in the same distance from the eye-margin. Antennæ black, third joint slightly large, but smaller than the eye; arista finely pubescent. Palpi black, not narrow, with moderately short bristles on the outer half. Thorax black, dull, with a little brownish or greyish hue, and with blackish brown pubescence and one pair of dorsocentral bristles. Scutellum with two bristles. Abdomen black, dull, sparingly clothed with short hairs, slightly longer at the hind margins of the segments, especially on sixth segment; the segments nearly of the same length, at most the second a little longer. Hypopygium somewhat large, mainly black, when fully exposed brown and shining above at base; the forceps very unsymmetrical, the left arm more than three times as long as the right and rather broad, broadly rounded at the end, seen from below it is spoon-like hollowed and followingly arched above; the right arm not longer than broad at the base and somewhat shorter than the brown anal tube which is seen between the two arms and has long hairs; below there is a large, arched ventral plate. Legs a little less slender than in *perennis*, but, however, rather slender, brown or dark brown; front tibiæ with a weak dorsal bristle at the upper third, middle tibiæ with a pair of well developed bristles at the upper fourth and one small anterior at apex, hind tibiæ with two anterior bristles, one moderately long at the first third and one

very small at apex. Wings brownish tinged, veins brown; costa reaching somewhat beyond the middle, from the uniting with the first vein gradually a little swollen outwards, but not exactly thickened, the divisions proportionally as 19—17—8; third vein a little thick, the fork rather acute; costal cilia moderately short; fourth vein issuing a little beyond the base of the fork, somewhat strongly curved in its first part; seventh vein weak, only reaching half way to the margin. Halteres whitish.

Female. Quite similar to the male; antennæ a little smaller; palpi narrower and narrowed at the base, bristles ordinary, especially one long at apex; clypeus somewhat protruding, shining. On the venter the fifth segment is bare with a transverse row of bristles at the hind margin, the sixth is densely hairy, the seventh ventral sternite is elongated, broadly rounded at the end. Legs more dark brown with the femora blackish or blackish brown. Wings with 1 about equal to 2, veins blackish brown.

Length 1,7—2,5 mm.

T. intempesta is rare in Denmark, I have only taken it once, Geel Skov ²³/₁₀ 1919, two females; they were taken on bushes. Schmitz' specimens, one male and one female, were taken on a dead fowl on ²⁶/₁—²⁷/₃. The above description of the male is taken from a German specimen which Pater Schmitz has taken later on at Bonn and kindly sent to me.

Geographical distribution: — The species is known from Denmark and Germany (Kiel and Bonn).

10 *T. excisa* Lundbk.

1921. Lundbk. Vidensk. Meddel. Dansk nat. For. 72, 130.

Male. Frons low and broad, more than twice as broad as high, black, not shining; bristles well developed, the middle row a little, the anterior distinctly convex. Antennæ black or brownish black, third joint somewhat large and conspicuously pubescent; arista pubescent. Palpi black, rather narrow, with the bristles short. Thorax black, a little greyish, very slightly shining or nearly dull; it has black pubescence and one pair of dorsocentral bristles. Scutellum with two bristles. Abdomen black or greyish black, dull, sparingly clothed with short hairs, a little more distinct at the hind margins of the segments. Hypopygium somewhat large, reddish grey, the left arm of forceps yellowish; it is unsymmetrical, the tergite has above

on the left side a small triangular prolongation, the left arm of forceps is long, somewhat curved, with a large triangular tooth on the anterior margin, the right arm is short, broad, pointed and with a small tooth on the posterior margin; below there is a large, yellowish, somewhat furcated ventral plate; anal tube short with longish hairs. Legs somewhat long and slender, but less than in *intempesta*, brown, tibiae and tarsi more brownish yellow; front tibiae with a dorsal bristle above the middle, middle tibiae with a pair at about the upper third and a small anterior at apex, hind tibiae with two anterior bristles, one above the middle and one smaller at apex; the bristles are rather small, only the upper anterior on middle tibiae longer. Wings somewhat large, brown or yellowish brown tinged; veins blackish brown; costa reaching beyond the middle (0.57), thickened from the uniting with the first vein and increasing in thickness outwards; costal divisions proportionally about as 20—13—9 (the wing was not plane so the measurements are partly estimated); fork rather long and somewhat acute; costal cilia short; third vein a little strong; fourth vein issuing behind the base of the fork, distinctly S-like at base and with the curve in its first part somewhat strong; seventh vein reaching a little more than half way to the wing margin. Halteres yellow.

Female. Similar to the male; frons a little higher; antennae smaller; palpi more greyish and with longer bristles, especially one long at the end; clypeus protruding, shining. Abdomen has

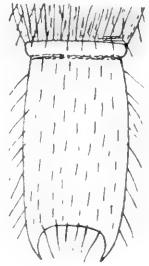


Fig. 53.
T. excisa ♀,
seventh
sternite
× 120.

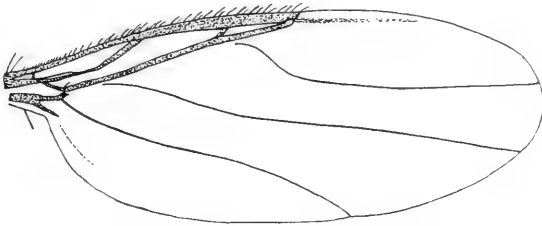


Fig. 54. Wing of *T. excisa* ♀.

the fourth ventral segment hairy, the fifth seems to have hairs only towards the hind margin, the sixth is hairy; the seventh sternite is elongated, of the same breadth in the whole length and excised in the hind margin, the corners being drawn out a little hook-like (fig. 53);

it is hairy below. The wings have 1 relatively shorter than in the male, the divisions about as 6—5—4 or 3.

Length 2—3 mm, the female the larger.

This species is similar to *intempesta*, but at once distinguished by the shape of the forceps and of the seventh sternite in the female; also the legs are less slender and paler. I possess only the female, the above description of the male is drawn from a German specimen kindly sent me from Pater Schmitz.

T. excisa is rare in Denmark and only taken in Geel Skov $4/_{10}$ — $23/_{10}$ in 1918 and 1919 (the author), three females; it occurred on bushes.

Geographical distribution: — Besides in Denmark the species also occurs in Holland and Germany according to specimens kindly sent me from Pater Schmitz.

11. *T. Dudai* Schmitz.

1918. Schmitz, Entom. Ber. Nederl. Ent. Vereen. V, 32. — 1918. Schmitz, Jaarb. Natuurh. Genootsch. Limburg 1917, 103.

Male. Frons nearly twice as broad as high, black, dull; bristles well developed, the middle and anterior rows convex, the outer bristles of middle row at the eye margin, those of the lower row more inwards. Antennæ black or brownish black, third joint of normal size; arista pubescent. Palpi not large, a little narrow, yellow or brownish yellow, bristles ordinary or smallish. Thorax black, dull, a little reddish at the humeri, with brown pubescence and one pair of dorso-central bristles. Scutellum with two bristles. Pleura brownish black. Abdomen black, dull, second and sixth segments elongated and the latter with a paler membraneous seam at the hind margin; abdomen with very short hairs, almost only visible at the hind margins of the segments and at the sides, second segment with two or three a little longer hairs at the hind corners. Hypopygium not large, black or brownish black, shining above at the base, the arms of the forceps curved downwards, a little unsymmetrical the left a little broader than the right, of the same length or perhaps a little longer; they have both bristles at the end; anal tube quite short; below there is a large, arched ventral plate, triangular pointed and yellowish at the end. Legs somewhat short and strong, brown, the front legs the palest; front tibiæ with a dorsal bristle above the middle, middle tibiæ with a pair at about the upper third and one minute anterior at apex, hind tibiæ with two anterodorsal bristles one at the upper

third and one small at apex. Wings slightly brownish tinged; veins brown; costa short, not reaching the middle, 1 nearly double 2 + 3;

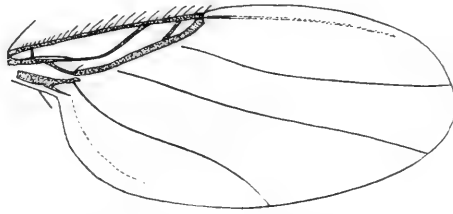


Fig. 55. Wing of *T. Dudai* ♂.

fork short; costal cilia short; fourth vein slightly and evenly curved in its whole length, seventh vein long, ending a little before the margin. Halteres black.

Female. Unknown.

Length 1,5 mm.

T. Dudai is rare in Denmark, only three specimens, all males, are known; Ermelund ²/₉ 1919, Bogø south of Sealand ⁸/₇ 1917 and at Lohals on Langeland ⁷/₇ 1920 (the author).

Geographical distribution: — Besides from Denmark the species is known from Holland and Germany.

12. *T. tumidula* Schmitz.

1918. Schmitz, Entom. Ber. Nederl. Ent. Vereen. V, 33. — 1918. Schmitz, Jaarb. Natuurh. Genootsch. Limburg 1917, 104.

Male. Frons low, twice as broad as high, black and dull; the middle row of bristles straight, the anterior slightly convex; outer bristles of both rows placed at the eye-margin. Antennæ of medium size, third joint about half as large as the eye, brownish black; arista pubescent. Palpi black, rather small, with ordinary bristles. Thorax black or slightly greyish black, dull, with blackish pubescence and one pair of dorsocentral bristles. Scutellum with two bristles. Pleura dull. Abdomen black, a little greyish, dull; second and sixth segments somewhat elongated, and also first segment not short; abdomen sparingly clothed with short hairs, almost only visible at the hind margins of the segments and at the sides. Hypopygium not large, greyish black, dull, a little shining above just at base; the arms of the forceps narrow, band-shaped, a little unsymmetrical, the left

a little longer than the right; they are a little hairy; anal tube of some length, brownish black, with long hairs; an arched ventral plate is present. Legs not strong, all blackish brown; front tibiæ with a dorsal bristle above the middle, middle tibiæ with a pair at the upper third and one small anterior bristle at apex, hind tibiæ with two anterodorsal bristles, one above the middle and one smaller at apex; the bristles not long, the anterior upper bristle on middle tibiæ the longest. Wings a little brownish tinged; veins brown; costa reaching a little beyond the middle (0,52), thickened from the uniting with the first vein; 1 about equal to 2 + 3 or slightly longer, and 2 somewhat longer than 3 (16—8—7) (the slight difference between these measurements and those given by Schmitz are certainly individual and of no consequence); costal cilia short, especially being very short towards the base; fourth vein a little S-like at the base and distinctly curved in its first part, for the rest straight; seventh vein ending about half way to the margin. Halteres black, the peduncle a little paler.

Female. Unknown.

T. tumidula is like most other *Trupheoneura*-species rare, only one specimen, a male, has been caught, Ermelund $\frac{7}{5}$ 1918 (the author).

Geographical distribution: — Besides in Denmark the species occurs in Holland and Germany.

5. **Dohrniphora** Dahl.

Species of medium to relatively large size. Frons not specially broad, from somewhat higher than broad to somewhat broader than high; three transverse rows of strong bristles, the rows straight or more or less to considerably curved; supraantennal bristles directed backwards, one pair, relatively strong. Eyes hairy. Antennæ inserted below the middle of the head, of ordinary size, or in the male the third joint enlarged, lemon-shaped; arista dorsal, pubescent. Palpi of ordinary size and armature or sometimes somewhat large in the female or in both sexes, the bristles sometimes relatively short in the male. Clypeus somewhat protruding, most in the female and here often to a high degree. Proboscis as a rule larger in the female than in the male, often rather thick, with a large, arched labrum, sometimes long, rather slender and very protruding, and then also the oral cone with the clypeus long; in accordance with the length of the proboscis and oral cone the clypeus is either horse-shoe-shaped

or longer and forceps-shaped. According to Schmitz the maxillæ are a little more developed than usual, a small palpiger being present, looking as a basal joint of the palpi. There are narrow jowls present, sometimes descending a little below the eyes; one long lower post-ocular bristle and at the oral margin one long oral bristle so that two diverging bristles are seen (the bristles which Schmitz terms "2 divergierende Backenborsten auf der Grenze von Wangen und Backen"); one rather conspicuous genal bristle (Schmitz says one or more, in the Danish species I found always only one). Thorax with one pair of dorsocentral bristles. Scutellum with four strong, equal or practically equal bristles. Mesopleura bare. (In exotic species the scutellar bristles may be unequal and mesopleura hairy). Abdomen in the male rather flat above, in dried condition always even concave; second and sixth segments elongated. Hypopygium not large, at all events when seen from above, and the tergite quite short above; the two side-parts plate-shaped, but unsymmetrical, that on the right side a simple plate, the left likewise plate-shaped, but it is deeply fissured quite to the base, the fissure lies near the dorsal side; the anal tube is long, cylindrical, finger-like; below there is a broad ventral plate; the hypopygium has in some species long hairs below, there is especially one or a couple of specially long hairs at the lower corner behind the fissure on the left side; in other species the hypopygium is bare or nearly so. In the female abdomen is characteristic by the want of tergites on the fifth and sixth segments, or only on the sixth (*crassicornis* and *Dudai*, the latter non-Danish), and the fourth tergite is generally more or less narrowed; the eighth is long and narrow, with long hairs, especially at the end; at the end of abdomen there are two quite small and short, hairy lamellæ. Abdomen is very sparingly and short, almost invisibly haired, or apparently quite nude, except on sixth segment. Legs with the front tibiæ with a dorsal or anterodorsal bristle above the middle, sometimes (in non-Danish species) with more bristles, middle tibiæ with a pair at about the upper third, and one, often weak, anterior near apex, hind tibiæ in a single case without bristles, and when bristles are present they are often small; there may then be a various number (1—5) of anterodorsal and likewise of anteroventral bristles, or there is only one kind, anterodorsal or anteroventral bristles present; only in one species (*Dudai*, non-Danish) there is moreover a single posterodorsal bristle. (Of the Danish species anterodorsal bristles are present in all species except *concinna*; anteroventral bristles are

present in *concinna* and *crassicornis*, these bristles are generally small and individually variable in number; *crassicornis* has thus both anterodorsal and anteroventral bristles, *concinna* only anteroventral and the other species only anterodorsal bristles). The bristles on the legs are upon the whole not strong, of medium size or smallish. The posterior tibiæ have apical spurs. The hind tibiæ have a dorsal furrow, bordered on each side by a row of dense, palisade-like arranged hairs (in *chlorogastra*, non-Danish and in most non-European species there is only one row), *abbreviata* shows three rows as the posterior is double; in the bottom of the furrow there is a row of hairs; on the posterior side of the posterior row there is further a row of fine, shorter or a little longer hairs or bristles, answering to the similar row of hairs or bristles in *Aphiochaeta*; on the dorsal side of middle tibiæ there is a similar arrangement of palisade-like hairs, but the anterior row does not reach here to the end, but stops before, where the comb-like rows of hairs begin. For the rest the legs have short hairs; on the anterodorsal side of middle tibiæ at apex there is a smaller or larger, somewhat flattened area with the hairs comb-like arranged in transverse rows, and a similar arrangement is present on the posterior side of hind tibiæ just at apex, and on the posterior side of metatarsi the hairs likewise in comb-like transverse rows, also just at apex on anterior side of front tibiæ such an arrangement is discernible. Claws and pulvilli normal; empodium short, spine-shaped. (Becker says with regard to the species *Dohrni* that pulvilli and empodium are reduced or wanting). Wings with costa to about the middle, the mediastinal vein quite small, indistinct or wanting; costal cilia short; third vein forked, the fork generally small or very small with the angle acute; fourth vein issuing anterior to the base of the fork and ending before the apex of the wing, it is almost straight or more or less S-like curved; fourth to seventh vein all present and reaching the margin or sometimes more or less abbreviated.

The developmental stages are not well known, so far I know of only one species the larva is described; something is, however, known about the feeding habits of the larvæ. *D. concinna* (*cimbicis* Aldr.) has been bred from cocoons of *Cimbex americana*, the imagines emerging $^{24}/_5$ — $^{27}/_5$ (Brues, Trans. Amer. Ent. Soc. XXIX, 1903, 348); *abdominalis* (or a species determined so) has been taken on carrion in April and May (Malloch, Ent. Month. Mag. 2, XIX, 1908, 13), one specimen being taken with undeveloped wings the larva may be supposed to have fed on the carrion. I have myself taken *floreæ* below

a dead crow on $^{16}/_7$, probably present there for depositing eggs. Weiss has (Bull. Soc. Hist. Nat. de l'Afrique du Nord, 1911, 34) written on the metamorphosis of *D. chlorogastra* (perhaps = *venusta*, see Schmitz, Jaarb. Natuurh. Genootsch. Limburg 1919, 101); the larva lived on carrion of small mammals, especially of mice; the females lay 30—40 eggs, the larval stage lasts 15—21 days, the pupal stage 25—40 days. The American species *D. venusta* has been bred from cow-peas (probably decaying) (Malloch, Proc. U. S. Nat. Mus. 43, 1912, 432), and Jones describes (Entom. News, XXIX, 1918, 299, Pl. XVII) egg, larva and pupa of this species; they were found in late summer in the pitchers of *Sarracenia flava*, these pitchers being at that time filled with accumulated insect remains in which the Phorid larvæ lived; he found that the larva hatched after three days, the duration of the larval stage was about 16 days and of the pupal stage the same. The African species *Bequaerti* was bred from putrid snails (Schmitz, Jaarb. Natuurh. Genootsch. Limburg, 1914, 105). I have myself bred *floreæ* and *Oldenbergi* from pupæ taken in flood refuse, *floreæ* was taken on $^{15}/_4$, the imago come on $^{1}/_5$, *Oldenbergi* was taken in April and May and developed soon after. Further I possess two pupæ of *concinna* taken on a dead *Lacerta* on $^{7}/_8$ and developing on $^{13}/_8$. — As before said only of one species the larva is described, viz that of *D. venusta*, described by Jones l. c. According to this author, the larva is flattened dorsally, brownish white; the surface roughened with fine, sparse, microscopical hairs, a little larger on the processes; meso- and metathorax and the abdominal segments bear each a transverse row of six fleshy, pointed processes, the lateral ones being the largest, and round the hind margin of the last segment there are six similar processes. On the ventral side there are six longitudinal rows of smaller processes, those of the outer row on each side papillate, the other low and inconspicuous. The posterior spiracles lie above on the middle of the last segment. Length 4 mm. The puparium is elliptical, dull mahogany brown; the larval processes visible, but almost obsolete except the lateral. The anterior spiracular tubes are rather large, flat and straight, and they are distant and diverging; they seem to be rather peculiar as they are described and figured as wand-like, their edges fringed with rigid, cleft filaments; (the author says that they protrude from the fourth segment, no doubt their place is on the second abdominal segment). The eggs are described as elongated oval, not quite symmetrical, white, pearly, slightly polished and minutely but not closely punctate; 0,65 mm long and 0,27 mm broad.

They were scattered singly. The puparium of *chlorogastra* seems likewise to have the anterior spiracular tubes of a peculiar shape as Weiss l. c. describes them as "velus et démesurément longs"; these two species thus seem to agree herein, in contradistinction to the following species and this is in favour of their being specifically identical. The puparium of *florea* is mainly of the same shape and circumference as that of *rufipes*; it is thus somewhat elliptical, arched

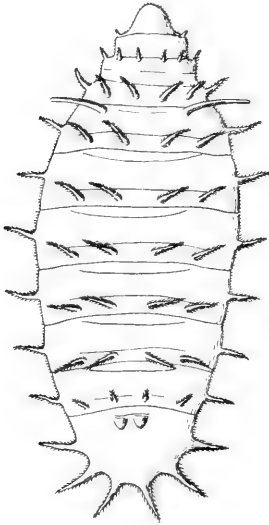


Fig. 56.
Puparium of *D. Oldenbergi*.

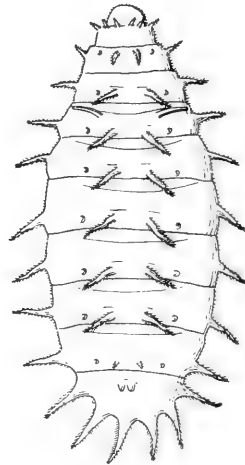


Fig. 57.
Puparium of *D. concinna*.

transversally on the ventral surface, more flat on the dorsal surface; the greatest height lies in about the anterior third from here falling off somewhat abruptly towards the head-end, more evenly towards the posterior end; the surface is finely shagreened. On pro- and mesothorax I could see no processes, but on metathorax there is a transverse row of six small, conical processes at the front margin. The abdominal segments are indistinctly divided into three corrugations, and each segment bears a transverse row of six long, conical processes set with hairs; the processes have an average length of 0,5 mm; they are placed at about equal distance from each other, the lateral process stand quite at the margin; the four median processes are placed on the posterior corrugation at the hind margin, the lateral processes a little more forwards, on the middle corrugation. The row

on seventh abdominal segment is straight, not curved backwards; along the margin of the eighth segment are six processes, and above on this segment lie the larval posterior spiracles on two short processes. On the ventral surface there are indications of four slight elevations or warts lying two side by side on each side of the segments. The anterior larval spiracles are distinctly seen at the hind margin of prothorax. The anterior spiracular tubes are of medium length, curved, somewhat distant and directed towards each side. The colour is brownish red, the length 4,5 mm. The puparium of *Oldenbergi* (fig. 56) is quite like that of *florea*. The puparium of *concinna* (fig. 57) is of the same shape and outline as the foregoing, but otherwise somewhat different; there are likewise long, conical and haired processes, and here six somewhat small processes are seen on mesothorax, and likewise on metathorax, that between the middle and side process on each side being short; on each abdominal segment there are only four processes, two at the middle and one at each side margin, but between each middle and side process there is a quite small, dot-shaped wart; the processes are all at the posterior margin and give the impression of being placed on the posterior corrugation; the last segment has six long process round the margin; on the seventh segment the middle processes are short. The colour is brown or reddish brown, the length 3—3,5 mm. If we take the papillæ or processes present in these four species to be homologous with the papillæ in *rufipes* ("a" by Keilin), what they no doubt are, then there consequently is the difference that while *rufipes* has eight papillæ on each abdominal segment, we find here only six (but it is of course not impossible, that a detailed examination of the larva would show small sensory organs representing the fourth pair of papillæ). — The facts recorded above about the breeding of several species seem to show, that the larvæ live in decaying matters of various kind, both animal and vegetable; but it is interesting to see, that the larvæ of some species in so far live in another way, as it is known for several African and Indian species, that they are termitophilous (Schmitz, Wien. Ent. Zeitg. XXXIV, 1915, 312). The hibernation (of the European species) seems, according to the dates for the emerging of the imagines, to be passed in the pupal stage, but *concinna*, the pupa of which was found and developed in August, has perhaps more than one brood in the year.

The way in which the genus *Dohrniphora* has been formed needs some words; when Malloch in 1908 (The Glasgow Naturalist I, 24)

subdivided the old genus *Phora*, he correctly reserved this name for the oldest species, *abdominalis* and its allies; as it later on was shown that *Trineura* Meig. was a synonym of *Phora* Latr., the genus *Trineura* with *aterrima* Fabr. as type thus got the name *Phora*, and so the group of species left in *Phora* by Malloch was without name, and there was no old name to be used for it after priority. In 1898 Dahl (Sitzungsber. Gesell. naturf. Freunde, Berlin 1898, 188) had created the genus *Dohrniphora* for the species *Dohrni* from Bismarck Archipelago. It now proved that this species was congeneric with the group of species in question, and Malloch, therefore, in 1912 (Proc. U. S. Nat. Mus. 43, 430) correctly united them in the genus *Dohrniphora* with *Dohrni* as type. That *D. Dohrni* is congeneric with the other species is evident; Dahl laid specially stress on the long proboscis in the female, but this is a character present in several other species, among others in *abbreviata*, the proboscis of which is long and knee-shaped, at least even as long as in *Dohrni* (to judge from Dahl's figure). Brues (Bull. Wisc. Nat. Hist. Soc. XII, 1914, 86) says that *Dohrniphora* is heterogeneous, and he includes in it, besides a number of not well recognized species, also *Pseudostenophora* Malloch, but I quite follow Schmitz in the opinion that *Dohrniphora* is a good and naturally circumscribed genus, showing, however, some affinities to *Hypocera*; it shows not few special characters as the construction of the middle and hind tibiae, the long oral bristle together with the long lower postocular bristle, the single conspicuous genal bristle, and the indistinct mediastinal vein. The genus has, as said above, affinities to *Hypocera*, thus in the small to very small fork, the construction of the hind tibiae and several other characters; Assmuth has (Tijdschr. v. Entom. LXII, 1919, 196) described a *Hypocera dohrniphoridaea* from the Bismarck Archipelago, this species has the third vein unforked, but at the same time no tergite on sixth abdominal segment (only the female is known), and shows some other characters belonging to *Dohrniphora*; Schmitz, who has studied the species, says in a letter to me that he considers the species as a *Dohrniphora*.

Of the genus 9 palæarctic species are known, 6 have hitherto been found in Denmark.

Table of Species.

1. Hind tibiae with anteroventral bristles and with or without anterodorsal bristles; all hind tibial bristles small. 2.
- Hind tibiae without anteroventral bristles, but with only anterodorsal bristles, and the hind tibial bristles larger. 3.

2. Hind tibiæ with both anterodorsal and anteroventral bristles; male with third antennal joint somewhat large, lemon-shaped; female with tergal plate on fifth abdominal segment; halteres black 1. *crassicornis*.
 — Hind tibiæ with only anteroventral bristles; third antennal joint in male not large; female without tergal plate on fifth abdominal segment; halteres yellow to black 2. *concinna*.
 3. Fourth to seventh vein not reaching the margin; fourth vein straight; halteres yellow 3. *abbreviata*.
 — Fourth to seventh vein reaching the margin; fourth vein not straight; halteres dark 4.
 4. Palpi and antenna brown or blackish; fourth vein slightly and simply curved 4. *Oldenbergi*.
 — Palpi orange, antennæ partly reddish; fourth vein somewhat S-like and more curved 5.
 5. Fourth vein moderately curved; antennæ in male somewhat large; abdomen in female red except first segment 5. *abdominalis*.
 — Fourth vein more strongly curved; antennæ in male not enlarged; abdomen in female black or red with black tergites 6. *florea*.

1. *D. crassicornis* Meig.

1830. Meig. Syst. Besch. VI, 220, 26 (*Phora*). — 1848. Zett. Dipt. Scand. VII, 2874, 24 (*Trineura*). — 1864. Schin. F. A. II, 344 (*Phora*). — 1901. Beck. Abhandl. zool. bot. Gesell. Wien, I, 23, 10, Taf. I, Fig. 12, Taf. IV, Fig. 60—61 (*Phora*). — 1906. Wood, Ent. Month. Mag. 2, XVII, 195 (*Phora*). — 1910. Kertész, Cat. Dipt. VII, 391 (*Phora*). — 1914. Brues, Bull. Wisc. Nat. Hist. Soc. XII, 95. — 1918. Schmitz, Jaarb. Natuurh. Genootsch. Limburg 1917, 110 et 1920 *ibid.* 1919, 100.

Male. Frons slightly broader than high, black, somewhat shining, coarsely punctate; the bristles in nearly straight rows or the anterior rows slightly convex. Antennæ black or brownish black, third joint rather large, lemon-shaped and a little pointed; arista very short-pubescent. Palpi black, of ordinary size, with the bristles well developed. Thorax black, nearly dull, with black pubescence and one pair of dorsocentral bristles. Scutellum with four strong, practically equal bristles. Pleura black, a little rugose below and behind. Abdomen black, a little greyish, dull; first segment narrowed in the middle and with the hind margin pale and also the membrane in front of it pale; second and sixth segments elongated; no hairs visible on abdomen except on the apical part of sixth segment. Hypopygium small when seen from above, and often rather retracted; the tergite

is quite short, the side parts hairy, and especially there are long hairs at the lower margin on the right side, and on the left side one or two specially conspicuous hairs at the lower corner behind the fissure, while the plate anterior to the fissure is bare; anal tube long, cylindrical, with long hairs, it is black or with the apex reddish; ventral plate short. Legs with the hind femora well dilated; the legs are black, front tibiae and tarsi brownish yellow, and posterior knees reddish; front tibiae with a dorsal bristle at about the upper third and with a row of short dorsal bristles on the lower half, middle tibiae with a pair of bristles at the upper third and a small anterior at apex, hind tibiae with a various number of small anterodorsal and anteroventral bristles (about 2—5 in each row), and with a dorsal furrow enclosed by two palisade-like rows of hairs. Wings brown with brown veins; costa blackish, reaching about to the middle; 1 more than double $2 + 3$; fork small, to very small, angle acute; costal cilia short and fine; fourth vein issuing before the base of the fork, straight in its first part, then curved slightly upwards and again downwards towards the end. Halteres black.

Female. Antennae smaller than in the male, third joint more roundish; clypeus a little more protruding. Abdomen with five tergal plates, the fifth narrowed.

Length 3—3,5 mm.

D. crassicornis is rather common in Denmark; Ordrup Mose, Ermelund, Hareskov, Geel Skov, Ruderhegn, Gurre, and in Jutland at Hejls south of Kolding, Grejsdal and Frijsenborg; the dates are $15/6$ — $29/9$; I generally took it with the net on bushes, and it is especially an autumnal species; the male seems to be much more often met with than the female, I have several times taken the male in some numbers, but in all only one female; Zetterstedt on the other hand records the female as the more common. I possess a specimen in which the third vein has no fork at all.

Geographical distribution: — Europe down into Italy; towards the north to middle Sweden; it is also recorded from North America.

2. *D. concinna* Meig.

1830. Meig. Syst. Besch. VI, 221, 28 (*Phora*). — 1848. Zett. Dipt. Scand. VII, 2875. Obs. (*Phora*). — 1864. Schin. F. A. II, 345 (*Phora*). — 1901. Beck. Abhandl. zool. bot. Gesell. Wien, I, 24, 11, Taf. I, Fig. 13 (*Phora*). — 1906. Wood. Ent. Month. Mag. 2, XVII, 195 (*Phora*). — 1910. Kertész, Cat. Dipt. VII, 390 (*Phora*). — 1914. Brues, Bull. Wisc. Nat. Hist. Soc. XII, 94. — 1918.

Schmitz, Jaarb. Natuurh. Genootsch. Limburg 1917, 110 et 1920. *ibid.* 1919, 100. — *Phora Junebris* Meig. 1830. l. c. 221, 30. — 1864. Schin. l. c. 338. — *Phora luctuosa* Meig. 1838. l. c. VII, 412, 43. — *Trineura gymnophorina* Zett. 1848. l. c. VII, 2864, 14 et 1860 XIV, 6476, 14. — *Phora distincta* Egg. 1862. Verh. zool. bot. Gesell. Wien, XII, 1233. — 1864. Schin. l. c. 338.

Male. Frons from slightly broader to about one and a half times as broad as high, black, shining; the bristles in straight or nearly straight rows or the middle row a little concave in front; the supra-antennal bristles relatively smaller than in *crassicornis*. Antennæ brown to blackish, third joint not large, but varying in size, roundish, a little pointed. Palpi brown to black, of ordinary size and armature. Thorax black, slightly shining, with black pubescence and one pair of dorsocentral bristles. Scutellum with four practically equal bristles. Abdomen greyish black, dull, second and sixth segments elongated; it is very sparingly, almost invisibly haired with only some few more conspicuous hairs on the apical part of sixth segment. Hypopygium constructed as in *crassicornis*, but smaller and shining above, it is hairy in the same way, but on the lower left corner, behind the fissure there is always only one hair, but this is strong; anal tube long, greyish black, or reddish towards the apex or quite reddish. Legs black, the apex of anterior femora and the anterior tibiæ and tarsi more or less brownish or yellowish brown, the hind knees reddish and hind tarsi brown; front tibiæ with an anterodorsal bristle at the upper fourth, middle tibiæ with a pair rather near the base and a smaller anterior bristle near apex; sometimes one of the bristles in the pair may be wanting; hind tibiæ with a various number of small antero-ventral bristles, generally three to four, sometimes only one or quite wanting, but generally only on one leg, and the hind tibiæ with a dorsal furrow enclosed by two palisade-like rows of hairs. Wings more or less brownish, sometimes quite or nearly quite colourless; thick veins blackish brown, the others brown or paler; costa reaching about to the middle, distinctly thickened from the uniting with the first vein; 1 about double 2 + 3, but sometimes longer; costal cilia short, but perhaps a little longer than in *crassicornis*; fourth vein a little more curved and sixth and seventh veins generally not, or not distinctly reaching the margin. Halteres yellow to black.

Female. Antennæ a little smaller than in the male; clypeus protruding and proboscis much larger. Fourth abdominal tergite narrowed, fifth and sixth wanting.

Length 1,5 to about 3,5 mm.

This species varies, as seen, to a very high degree; it varies especially in size, in the colour of antennæ, palpi, anal tube and especially halteres, in the dimensions of the frons, in the size of the antennæ in the male, in the number and development of the bristles on middle and hind tibiæ, in the colour of the wings, and in the dimensions of costa and its divisions. Schmitz mentions that specimens of all reddish brown colour may occur, but I have never seen such. The species is similar to *crassicornis*, but besides by other characters it will always be distinguished by the want of anterodorsal hind tibial bristles, and the female by having no tergal plate on fifth abdominal segment. Strobl described (Wien. Ent. Zeitg. XI, 1892, 199) a species *pseudoconcinna* which is evidently only a small form with clear wings, costa considerably thickened in second and third divisions, and with fourth vein issuing at the base of the fork, characters which may occur in *concinna*. Schmitz (l. c. 1918) says, that Strobl described *pseudoconcinna* with bare hind tibiæ, but this is not correct; Strobl says, that there are three anteroventral bristles, but as he erroneously considered *concinna* as possessing also anterodorsal bristles, this was for him a distinguishing character. Schmitz describes l. c. a var. *pachycera*, which he in 1920 l. c. considers as a separate species, with large antennæ, very small hind tibial bristles, clear wings and other small characters; only the male is known. Further he describes (l. c. 1918) a var. *rostralis*, especially characterized by a long, slender proboscis, the labrum being twice as long as broad, and with some other minor characters, f. inst. relatively smaller wings. I possess three males (two from Hejls ²⁷/₇ and ²⁸/₇ 1919 and one from Fanø ¹⁰/₇ 1921) which in the shape of proboscis and in most other characters agree with the description by Schmitz, at the same time my specimens have the sixth abdominal segment unusually densely and long haired.

Whether the species *Trineura concinna* Zett, quoted in the synonymy, and which was based on a communication from Stæger in which *concinna* was enumerated as Danish, really was this species, I cannot say; the specimens are not found in Stæger's collection, and there is the curious fact, that this common species is not at all represented in Stæger's collection. I have seen Zetterstedt's types of *gymnophorina* and can confirm Becker's statement that they are identical with *concinna*.

D. concinna is very common in Denmark all over the country, and found in very various localities; it may also be taken indoors

on windows. It occurs during the whole summer, my dates are $\frac{3}{5}$ — $\frac{18}{10}$. I have taken it in copula between $\frac{4}{6}$ and $\frac{18}{10}$. Pupæ were taken in Dyrehaven on a dead *Lacerta* on $\frac{7}{8}$ and developed on $\frac{13}{8}$ (Kryger).

Geographical distribution: — Cosmopolitan or almost so; Europe down into Spain, towards the north to middle Sweden; it is very common with us, but seems to be more rare farther towards the north. It is also recorded from the Canarian Islands, and it occurs likewise in North America.

3. *D. abbreviata* v. Ros.

1840. v. Ros. Württemb. Correspondenzbl. I, 64 (*Phora*). — 1901. Beck. Abhandl. zool. bot. Gesell. Wien, I, 22, 9, Taf. I, Fig. 10—11 (*Phora*). — 1906. Wood, Ent. Month. Mag. 2, XVII, 195, 265 (*Phora*). — 1910. Kertész, Cat. Dipt. VII, 388 (*Phora*). — 1914. Brues, Bull. Wisc. Nat. Hist. Soc. XII, 92. — 1918. Schmitz, Jaarb. Natuurh. Genootsch. Limburg 1917, 109 et 1920. *ibid.* 1919, 103. — *Phora sordidipennis* Léon Duf. 1841. Mem. Soc. Sc. Lille, 422, fig. 21. — 1864. Schin. F. A. II, 344. — 1892. Strobl, Wien. Ent. Zeitg. XI, 197, 14.

Male. Frons considerably higher than broad, black, shining; bristles strong, the middle row very concave in front, the anterior row a little convex; the supraantennal bristles only a little smaller than the others. Antennæ of ordinary size, reddish brown, third joint a little elongated and pointed; arista very short-pubescent. Palpi well developed, yellow or orange, with well developed bristles. Proboscis yellow. Thorax black, almost dull, with black pubescence and one pair of dorsocentral bristles, but besides there is a transverse row of smaller bristles at the hind margin of the disc. Scutellum with four equal and strong bristles. Abdomen black, a little greyish, dull, first segment yellow; second and sixth segments elongated. Hypopygium with the anal tube yellow on the apical half. Legs yellow, also the coxæ, hind tibiæ darker and hind femora blackish on the apical part; the posterior, especially the hind femora rather dilated; front tibiæ with a dorsal bristle at the upper third, middle tibiæ with a pair at the upper fourth and one small anterior bristle at apex, hind tibiæ with three anterodorsal bristles in the upper two thirds and one smaller at apex; further both middle and hind tibiæ have some bristles round the end besides the apical spurs; middle tibiæ with an anterior row of fine bristles in the apical half, and hind tibiæ with a similar posterodorsal row in the whole length and with three rows of palisade-like hairs as the posterodorsal row is doubled. Wings

considerably brown; veins brown; costa not reaching quite to the middle; second and third vein parallel and hence 1 about four times longer than $2 + 3$; angle at fork very acute; costal cilia short and fine; fourth vein issues anterior to the base of the fork and is rather straight and also fifth and sixth veins nearly straight; fourth to sixth veins evanescent before the margin, but the seventh vein reaching it. Halteres whitish yellow.

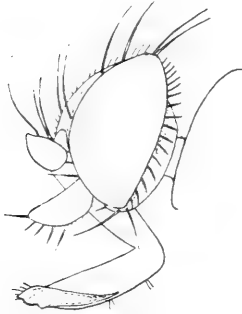


Fig. 58. Head of
D. abbreviata ♀.

Female. Clypeus protruding, long and narrow, forceps-shaped; oral cone and proboscis long, together forming a knee. Abdomen with the fourth tergite narrow, fifth and sixth segments without tergites; the last narrow segment yellow.

Length 3—3,5 mm.

As I have seen only the female of this species, the description of the male is partly taken from Becker.

D. abbreviata is very rare in Denmark, only one specimen, a female, has been caught; Bogø south of Sealand ⁸/₇ 1917 (the author).

Geographical distribution: — Europe down into Italy; it seems to have its northern limit on Denmark.

4. *D. Oldenbergi* Schmitz.

1920. Jaarb. Natuurh. Genootsch. Limburg 1919, 104.

Male. Frons about quadratic, black, somewhat shining; it is very coarsely punctate, the rows of bristles nearly straight, only the front row a little convex; supraantennal bristles strong. Antennæ of ordinary size, third joint blackish, brown on the lower side, arista distinctly pubescent. Palpi of ordinary size, a little broad, black or blackish, the bristles not long. Thorax black, somewhat shining, with brownish black pubescence and one pair of dorsocentral bristles. Scutellum with four about equal bristles. Abdomen black, dull, a little shining at apex, second and sixth segments elongated; hairs only visible on fifth and sixth segments. Hypopygium rather small, the dorsal part quite short; it is somewhat hairy, especially on the right side, and below there are some longer hairs; anal tube finger-like, reddish, with long hairs, longest at the end. Legs brown or dark brown to blackish, anterior tibiæ and tarsi paler,

brownish or brownish yellow; hind femora dilated; front tibiæ with a dorsal bristle above the middle, middle tibiæ with a pair at about the upper fourth and a small anterior bristle at apex, hind tibiæ with two anterodorsal bristles at about the upper fourth and the lower third and with a dorsal furrow enclosed by two palisade-like rows of hairs. Wings yellowish or yellowish brown, veins yellowish brown, or the thick veins darker; costa reaching to the middle or about; 1 about double $2 + 3$; fork very acute and relatively long; costal cilia short; fourth vein issuing before the base of the fork, quite



Fig. 59. Wing of *D. Oldenbergi* ♂.

slightly curved and curved very little downwards towards apex. Halteres black or blackish brown.

Female. Similar; frons a little broader, distinctly broader than high; antennæ smaller and paler below third joint; palpi larger, brownish, with long bristles. Abdomen with first segment roundly excised in the hind margin and thus short in the middle, second segment elongated, fourth a little narrowed but more than twice as broad as long, fifth and sixth without tergal plates; the last narrow segment reddish.

Length 2,8—3,5 mm.

D. Oldenbergi is somewhat rare in Denmark, and all specimens have been bred from pupæ; Upperslev Mose in May (Schlick), Damhusmosen in April and May (Schlick, Larsen, the author); the pupæ were found in flood refuse, the imagines were bred in May. The male was hitherto not known.

Geographical distribution: — Besides from Denmark only known from Germany.

5. *D. abdominalis* Fall.

1823. Fall. Dipt. Suec. Phytom. 5, 2, ♀ (*Trineura*). — 1830. Meig. Syst. Beschr. VI, 225, 40, ♀ (*Phora*). — 1848. Zett. Dipt. Scand. VII, 2867, 17, ♀ (*Trineura*). — 1864. Schin. F. A. II, 336 (*Phora*). — 1901. Beck. Abhandl.

zool. bot. Gesell. Wien, I, 35, 25, Taf. II, Fig. 27—29 (*Phora*). — 1910. Kertész, Cat. Dipt. VII, 388 p. p. (*Phora*). — 1914. Brues, Bull. Wisc. Nat. Hist. Soc. XII, 92 p. p. — 1918. Schmitz, Jaarb. Natuurh. Genootsch. Limburg 1917, 110 p. p. et 1920. *ibid.* 1919, 104. — *Trineura fulviventris* Bohem. 1852. Kgl. Vet. Akad. Handl. 208, ♀. — 1855. Zett. Dipt. Scand. XII, 4824, 17—18 ♀. — *Phora sororecula* V. d. Wulp, 1871. Tijdschr. v. Entom. 2, VI, 209, ♂. — 1910. Kertész. l. c. 396. — 1914. Brues, l. c. 96 (*Dohrniphora*). — 1916. de Meijere, Tijdschr. v. Entom. 59, 312.

Male. Frons a little broader than high, black, somewhat shining; it is coarsely punctate, especially towards the sides; the anterior row of bristles a little convex, the others straight; supraantennal bristles strong. Antennæ somewhat large, third joint somewhat elongated and distinctly pointed, it is blackish or brownish, reddish brown below; arista short-pubescent. Palpi large and broad, orange, bristles somewhat short, the hindmost longer. Thorax black, somewhat shining, with short, blackish pubescence and one pair of dorso-central bristles; scutellum with four nearly equal bristles. Abdomen black, rather shining, especially behind, second and sixth segments elongated; it is almost bare, only at apex some hairs visible. Hypopygium not large, the dorsal part quite short; it has no hairs or bristles; anal tube long, cylindrical, reddish, with long hairs, longest at apex. Legs black, knees, front tibiæ and tarsi brownish and also posterior tarsi a little brownish; hind femora dilated; front tibiæ with a dorsal bristle on about the middle, middle tibiæ with a pair at about the upper fifth, and a small anterior bristle at apex, hind tibiæ with two anterodorsal bristles at about the upper fourth and the lower third, and with a dorsal furrow enclosed by two palisade-like rows of hairs. Wings brown; veins dark brown; costa reaching beyond the middle; 1 about double $2 + 3$; the fork very small; costal cilia moderately short; fourth vein issuing long before the base of the fork, it is considerably curved nearest the basal end, curved distinctly down towards the apex and also curved a little downwards at the base. Halteres black or blackish.

Female. Similar; antennæ smaller, reddish brown; palpi with the bristles of ordinary length. Abdomen red, only first segment black, this segment is broadly excised in the hind margin, the lateral corners prolonged backwards and reddish, fifth and sixth segments without tergal plates; the four tergal plates decrease in breadth backwards, and each is trapezoidal, being less broad behind than in front, the fourth at the hind margin not twice as broad as long.

Length 4—4,5 mm.

D. abdominalis is rare in Denmark, I possess only one specimen, a female, Ermelund ¹⁴/₅ 1910 (the author); the above description of the male is drawn from a German specimen, kindly sent me from



Fig. 60. Wing of *D. abdominalis* ♀.

Pater Schmitz. I have seen Zetterstedt's specimens, two females labelled "Lund", and found them identical with the present species.

Geographical distribution: — The species seems to occur in most Europe, towards the north to middle Sweden.

6. *D. florea* Fabr.

1794. Fabr. Entom. Syst. IV, 255, 8 (*Bibio*). — 1804. Meig. Klass. eur. zweifl. Ins., I, 217, g. (*Bibio*). — 1805. Fabr. Syst. Antl. 68, 9 (*Bibio*). — 1830. Meig. Syst. Besch. VI, 221, 31. Tab. LXIII, Fig. 8 (*Phora*). — ?1864. Schin. F. A. II, 337 (*Phora*). — 1920. Schmitz. Jaarb. Natuurh. Genootsch. Limburg 1919, 105. — *Trineura palpina* Zett. 1848. Dipt. Scand. VII, 2868, 18. — *Phora flexuosa* Egg. 1862. Verhandl. zool. bot. Gesell. Wien, XII, 1233. — 1864. Schin. F. A. II, 338. — *Phora abdominalis* Wood, 1906. Ent. Month. Mag. 2, XVII, 195, 265. — 1918. Schmitz l. c. 1917, 110 p. p.

Male. This species is very similar to *abdominalis*. The antennæ are of ordinary size, not enlarged, they are paler, the third joint orange below, arista more distinctly pubescent. Abdomen dull, only sixth segment a little shining. Hypopygium as in *abdominalis*, but more or less reddish. Legs paler than in *abdominalis*, brown or dark brown, front legs including the coxæ yellowish and also the posterior tarsi pale; hind tibiæ with two or three anterodorsal bristles. Wings paler than in *abdominalis*, more or less yellowish, veins yellow, costa brown; fourth vein more strongly curved and curved distinctly downwards at both ends.

Female. Abdomen red with the tergal plates black, fifth and sixth segments without tergal plates; second segment with the hind margin broadly and roundly excised, third tergite much narrower

than second, rounded at the hind margin, fourth tergite again much narrower, quite small, about quadratic. The female may also have a quite black abdomen, the form with only the tergal plates black, the rest red Schmitz describes (l. c. 1920) as var. *versicolor*.



Fig. 61. Wing of *D. florea* ♀.

Length 2,8—3,7 mm.

Also *D. florea* is rare in Denmark, we have only four specimens, two males and two females; Frederiksborg, an old male specimen (Fr. Jacobsen), Sorø Sø, a male, and at Hejls south of Kolding on $^{16}/_7$ and $^{23}/_7$ 1919 (the author), two females, one of them from under a dead crow; the specimen from Sorø Sø was bred, I took the pupa in flood refuse on $^{15}/_4$ 1907 and the imago emerged on $^1/_5$. Both my females belong to the var. *versicolor*, they have only two bristles on hind tibiae, while both my males have three. I have seen Zetterstedt's types to *Trineura palpina*; I saw four females labelled "Esperød"; they are identical with *florea*.

Geographical distribution: — Probably all Europe and known from North Africa; towards the north to southern Sweden.

Remarks: The two species *abdominalis* and *florea* since Becker's monograph have been considered as only one species with the specimens with three hind tibial bristles as a var. *flexuosa*, but in 1920 Schmitz proved with certainty that they are two well distinguished species. The male of *abdominalis* has been thought to have sometimes a red abdomen like the female and is mentioned thus both by Becker, Wood and Schmitz in 1918; this is evidently caused by Schiner who stated that he had seen the male, and it had a red abdomen, but as Schmitz in 1920 says this is no doubt erroneous, Schiner had certainly only the female. Schmitz l. c. refers *sororcula* v. d. Wulp as a synonym to *florea*, but he has later on communicated to me that this, according to a letter from de Meijere, is an error, *sororcula* being identical with *abdominalis*.

6. **Hypocera** Lioy.

Species of medium to relatively large size. Frons generally not broad, about as broad as high, rarely broader to being of considerable breadth; in several species it has at vertex an elevated knob of various shape, bearing the ocelli of which there are in this case only two, at all events in *incrassata* and *carinifrons*, the only Danish species with a frontal knob;¹ in *coronata* and *ocellata* (non-Danish) the vertex is behind the ocellar triangle produced vertically upwards in the male, but only slightly in the female; the bristles are somewhat various in arrangement, but in the European species there are almost always three rows with four bristles in each; the rows may be straight and a pair of supraantennal bristles present, but often the rows are very convex, and there are generally no supraantennal bristles; in a single case (*vitripennis*) there are two pairs of supraantennal bristles and at the same time the middle bristles of the anterior row are wanting; the supraantennal bristles, when present, directed backwards. Eyes hairy. Antennæ as a rule inserted much below the middle, near the oral margin, they are generally small, but sometimes the third joint in the male enlarged, more or less lemon-shaped; arista dorsal, in *vitripennis* rather subapical, pubescent or nearly nude. Palpi larger or smaller, bristles ordinary or small, and sometimes longer in the female than in the male. Clypeus somewhat protruding, more in the female than in the male, and sometimes very large in the female; proboscis sometimes larger in the female than in the male. The maxillæ are, according to Schmitz (Zool. Mededeel. 's Rijks Mus. Leiden, II, 1915, 8 and Tijdschr. v. Entom. 59, 1916, LVIII), as in *Dohniphora* more developed than usual, a palpiger and a rudimentary lacinia being developed. Schmitz has also in an African species, taken on a putrid *Unio*, found a similar sense-organ on the palpus as mentioned above under *Paraspiniphora*, likewise in species seeking putrid snails. Jowls very small and generally not descending below the eyes; one long lower postocular bristle; *mordellaria* has some small oral

¹ Schmitz says (Entom. Ber. Nederl. Ent. Ver. VI, 1922, 37) about the new species *H. cephalotes*, which has a frontal knob, that it wants the anterior ocellus in contradistinction to the other species of *Hypocera*; in *carinifrons*, however, it is beyond doubt that only two ocelli are present; in *incrassata*, on the other hand, the anterior vertical wall of the frontal knob is pale coloured and may perhaps be interpreted as the transformed anterior ocellus, and Pater Schmitz has kindly communicated to me that the case is the same in *Bernuthi*.

bristles nearly confluent with a row of a little longer genal bristles; the other species have small oral bristles or hairs, but no genal bristles, only in *citreiformis* and *vitripennis* there is one oral bristle and in the former two in the latter one genal bristle, all somewhat conspicuous; in these two species the jowls are also a little descending. Thorax with one pair of dorsocentral bristles; scutellum with two or four bristles, in the latter case the anterior always much smaller than the posterior. The dorsopleural suture is generally somewhat effaced anteriorly and, therefore, the upper part of mesopleura shows a pubescence similar to that on the disc; in one species, *mordellaria*, the mesopleura have a long and strong bristle behind; only in two species, *citreiformis* and *vitripennis*, the dorsopleural suture is present in its whole length and mesopleura not hairy above. Abdomen somewhat robust, second segment more or less elongated, and sometimes also sixth. Hypopygium small and of a construction characteristic of the genus; it is always symmetrical, the difference in construction from the other genera consists therein that the opening for the anal tube is not between the side-prolongations from the tergite, but this opening pierces the tergite itself; I think, however, that the difference is not a principal one, but caused by a secondary uniting of the side-prolongations below the opening for the anal tube; all the hypopygia I have studied have given me this impression, and the junction is often very short as in *incrassata*, or somewhat fissured in the middle as in *mordellaria*; in *citreiformis* the hypopygium is of the common construction, with free side-prolongations; the anal tube is short, papilliform, or, what is most often the case, it does not protrude; there is a large, more or less deeply cleft or excised ventral plate; the parts of a complicated subanal body always protrude more or less. In the female abdomen in some species (*incrassata*, *carinifrons*) ends with a shorter or longer, tubiform segment with small lamellæ at the end, but generally it only bears at apex two small lamellæ. Abdomen is very short-haired, only at the sides of first and second segments there may be longer hairs, and often also on sixth segment. Legs in many species rather robust with the femora, especially hind femora, broad, the tibiæ strong and sometimes the front tarsi in the male broad or with the last joint broad; in other species the legs more slender; otherwise the legs are somewhat various in the various species; front tibiæ with one, sometimes very weak dorsal bristle, but in some species with more, middle tibiæ with a pair of bristles at about the upper third and one, sometimes weak, anterior at apex

or somewhat above apex; hind tibiæ generally with two anterior bristles, one above the middle and one, sometimes spur-like or very weak, at apex, but sometimes with only the latter bristle or, on the other hand, with more (2–3) bristles. In foreign (African) species the hind tibiæ may be more richly provided with bristles; the hind tibiæ are in most species of a similar shape as in *Dohrniphora*, they have dorsally two palisade-like rows of hairs, enclosing a furrow with a row of hairs in the bottom, sometimes this latter row is also palisade-like, so that there are three such rows, separated by two furrows; as in *Dohrniphora* the middle tibiæ show a similar arrangement in the basal half. From this shape of the hind tibiæ three species differ; in *mordellaria* the hind tibiæ has on the dorsal side the hairs or small bristles arranged in dense transverse combs as in *Paraspiniphora Bohemanni* and *erythronota*, and also on the middle tibiæ there are no palisade-like rows of hairs; in *citreifformis* and *vitripennis* the tibiæ are simple, without furrow or hair-rows. In all species there is on the anterodorsal side of middle tibiæ in the apical half an area with the hairs more or less distinctly arranged in transverse rows, and such an arrangement is also present on the posterior side of hind tibiæ at apex and to some degree on the posterior side of the hind metatarsi. According to Schmitz, the species *ocellata* (non-Danish) as regards the hind tibiæ shows a transition to *mordellaria*, as the palisade-like hair rows here show a tendency to dissolve into oblique combs. Claws and pulvilli normal, empodium small, bristle-shaped. Wings with the costa generally not reaching beyond the middle; the mediastinal vein indistinct or nearly quite wanting, in *citreifformis* present, but not reaching the first vein, and in *vitripennis* quite developed; costal cilia short or moderately short; third vein unforked, only in *agilis* and *irregularis* a fork present, but the anterior branch very thin or indistinct; the vein bears in most species fine hairs in the whole length, but is sometimes bare, in *mordellaria* it has a short row of bristles at the base; when the vein is haired it has generally no stronger bristle at the base, but when bare it shows such a bristle; the seventh vein is often rather weak, and in foreign species it may be more or less obliterated to quite disappearing.

The larvæ of some species live in nests of wasps and bees. According to Assmuss (Die Parasit. d. Honningbiene, Berlin 1865, 26), *H. incrassata* deposits its eggs in the larvæ of the honey-bee; the female enters the hive and seeks larvæ in still uncovered cells; it deposits with the ovipositor an egg in the larva by piercing it between

the segments; the *Hypocera*-larva lives parasitically in the bee-larva and goes for pupation out of it, bores through the covering of the cell and falls to the ground where it pupates; the bee-larvæ perishes and putrefies, and the *Hypocera* was formerly thought to be the cause of the foul brood. *H. vitripennis* has been bred from the nest of a *Bombus* (Wood), and from nests of *Vespa* (Schmitz, Jaarb. Natuurh. Genootsch. Limburg 1917, 118), and I possess myself a specimen bred from *Vespa vulgaris*, the imago developed in May; Malloch mentions (Ent. Month. Mag. 2, XIX, 1908, 205) that he took a number of this species on $\frac{11}{6}$ in moss, several specimens had the wings still undeveloped, and he saw one specimen emerge; this observation would speak against the species living as larva in wasps nests unless the pupæ had come from a nest in the neighbourhood, which I think probable. Schmitz (l. c.) mentions, but as uncertain, *mordellaria* as bred from snails. An African species *H. vectabilis* has been bred from dried *Coleoptera* (Brues, Ann. Mus. Nat. Hung. XI, 1913, 1) and another, *H. mollusvicora* from a putrid *Unio* (Schmitz, Zool. Mededeel. 's Rijks Mus. Leiden, II, 1915, 7). — According to the above, it seems that *H. incrassata* is a real parasite, *vitripennis* perhaps also, or it feeds on decaying matters in the nests, as the other recorded facts point towards the larvæ feeding on various decaying matters. One African species is thought to be myrmecophilous (Schmitz, Deutsch. Ent. Zeitschr. 1915, 498). — The only description of larva and pupa is, so far I see, that given by Assmuss l. c., and for the larva it seems to be rather incorrect, but the larva is stated to be white, finely shagreened, and about 3 mm long; the pupa (Tab. II, fig. 15) seems to be of the typical shape found in *rufipes* and others; it is described as dirty yellow and has two curved and diverging anterior spiracular tubes; the length is 3 mm; the eggs are described as longish oval, broader at one end, yellowish white and of a length of about 0,4 mm.

The genus *Hypocera* is, as also remarked by Schmitz, evidently not quite homogeneous; *mordellaria* with the mesopleura haired quite to the suture, a strong pleural bristle and transverse combs on hind tibiæ, is in these points very similar to the two species of *Paraspini-phora*, *Bohemanni* and *erythronota*, which also stand apart in their genus, and I think the three species are rather related; *citreiiformis* and *vitripennis* with no hairs on mesopleura, simple hind tibiæ and no hairs on third vein are also deviating, and by their in the male enlarged antennæ and the development of clypeus in the female, as well as by the curved first vein and only one bristle on alula they approach the

following genus *Conicera*, especially *vitripennis* with the subapical arista is related to *Conicera* and should perhaps be placed in this genus; I leave it, however, at present here on account of its shorter third antennal joint, not quite apical arista and otherwise arranged hind tibial bristles; the other species show, as remarked under *Dohrniphora*, affinities to this genus; in the future the genus will certainly be divided.

Of the genus 14 palæarctic (European) species are known; 8 occur in Denmark.

Table of Species.

- | | |
|--|--------------------------|
| 1. Mesopleura with a long bristle; third vein with a short row of bristles at base..... | 1. <i>mordellaria</i> . |
| — Mesopleura without bristle; third vein with hairs in about the whole length or bare..... | 2. |
| 2. Frons with a large, elevated knob at vertex, bearing the hinder ocelli, anterior ocellus wanting..... | 3. |
| — Frons without such a knob; three ocelli present..... | 4. |
| 3. Frontal knob more than half as broad as the frons; front tibiæ with two or more bristles..... | 2. <i>incrassata</i> . |
| — Frontal knob not more than one third of the breadth of the frons; front tibiæ with only one bristle..... | 3. <i>carinifrons</i> . |
| 4. Fourth vein strongly curved at its origin and fourth and fifth veins strongly diverging..... | 5. |
| — Fourth vein moderately or slightly curved at its origin and fourth and fifth veins less diverging..... | 6. |
| 5. Third vein unforked; middle tibiæ with the apical bristle well developed and a little above apex..... | 4. <i>flavimana</i> . |
| — Third vein forked; middle tibiæ with the apical bristle very minute and placed at apex..... | 5. <i>irregularis</i> . |
| 6. Mesopleura hairy above; hind tibiæ with a dorsal furrow; third vein with hairs..... | 6. <i>agilis</i> . |
| — Mesopleura bare; hind tibiæ simple without dorsal furrow; third vein without hairs..... | 7. |
| 7. Hind tibiæ without bristles except a minute apical one.. | 7. <i>citreiformis</i> . |
| — Hind tibiæ besides the apical bristle with two or three bristles..... | 8. <i>vitripennis</i> . |

1. **H. mordellaria** Fall.

1823. Fall. Dipt. Suec. Phytom. 6, 4 (*Trineura*). — 1830. Meig. Syst. Besch. VI, 212, 2 (*Phora*). — 1848. Zett. Dipt. Scand. VII, 2883, 31 (*Trineura*). — 1864. Schin. F. A. II, 339 (*Phora*). — 1901. Beck. Abhandl. zool. bot. Gesell. Wien, I, 40, 30, Taf. II, Fig. 34 (*Phora*). — 1906. Wood, Ent. Month. Mag. 2, XVII, 263 (*Phora*). — 1910. Kertész, Cat. Dipt. VII, 400. — 1914. Brues,

Bull. Wisc. Nat. Hist. Soc. XII, 102. — 1918. Schmitz, Jaarb. Natuurh. Genootsch. Limburg 1917, 114.

Male. Frons nearly quadratic, a little broader than high, black and shining, coarsely punctate; three rows of strong bristles, the anterior row a little convex and more distant from the middle row than this latter from the posterior; supraantennal bristles present, about half the size of the others. Antennæ reddish brown to blackish, third joint somewhat large; arista short-pubescent. Palpi not large, yellow, bristles not long; proboscis yellowish. Thorax black, nearly dull, with black or blackish pubescence and with one pair of dorsocentral bristles, but between these a pair of smaller bristles. Scutellum with two strong bristles. Mesopleura hairy on the upper part and with a long and strong bristle before the suture. Abdomen greyish black, dull; first segment membraneous and pale at the hind border in the middle, second segment somewhat elongated. Abdomen with short hairs, almost only forming a row at the hind margin of each segment, sixth segment with a little longer hairs; at the lateral margins the hairs are a little longer, and they are longest and dense at the sides of first and second segments. Hypopygium relatively not small, dull; it is hairy and with long hairs below; anal tube short, but distinctly protruding, yellow, with longish hairs. Legs somewhat robust, hind femora much dilated; the legs are black, front tibiæ and tarsi yellow or brownish yellow, and likewise the coxal joints and the knees, but the latter very narrowly; front tibiæ with a dorsal bristle at the upper third, middle tibiæ with a pair at the upper third and an anterior bristle in some distance from the apex, hind tibiæ with two anterior bristles, one at the upper third and one at apex; all bristles strong; the hind tibiæ have the hairs on the dorsal side in the whole length arranged in dense, comb-like, transverse rows. Wings brown, costa black the other veins brown; costa reaching about to the middle, 1 nearly equal to 2 or a little longer; costal cilia moderately short; fourth vein strongly curved at base and curved slightly and evenly downwards towards apex; the third vein has a row of distinct bristles on its basal part. Halteres black with a brown peduncle.

Female. Antennæ smaller than in the male; clypeus narrow and protruding; proboscis larger than in the male, rather long and protruding and of a brown or blackish colour; palpi larger and with much longer bristles.

Length 3 to about 4 mm.

H. mordellaria is not rare in Denmark, though generally only

taken in single specimens. Ordrup Mose (Stæger), Ermelund, Skodsborg, Egebæks Vang, (the author), Vemmetofte (H. J. Hansen), on Langeland at Lohals, on Funen at Hvidkilde (the author) and on Bornholm at Rø (H. J. Hansen); my dates are $^{22}/_5$ — $^{28}/_7$; I have taken it on bushes in woods.

Geographical distribution: — All Europe, towards the north to middle Sweden and northern Norway; whether it occurs in North America is uncertain, according to Malloch (Proc. U. S. Nat. Mus. 43, 1912, 434) it does not seem to be the case.

2. *H. incrassata* Meig.

1830. Meig. Syst. Besch. VI, 212, 1, Tab. 63, Fig. 5 (*Phora*). — 1848. Zett. Dipt. Scand. VII, 2882, 30 (*Trineura*). — 1864. Schin. F. A. II, 339 (*Phora*). — 1901. Beck. Abhandl. zool. bot. Gesell. Wien, I, 37, 27, Taf. II, Fig. 31—32 (*Phora*). — 1906. Wood, Ent. Month. Mag. 2, XVII, 263 (*Phora*). — 1910; Kertész, Cat. Dipt. VII, 400. — 1914. Brues, Bull. Wisc. Nat. Hist. Soc. XII, 102. — 1918. Schmitz, Jaarb. Natuurh. Genootsch. Limburg 1917, 114.

Male. Frons nearly quadratic, black, dull; instead of the ocellar triangle there is an almost quadratic, somewhat saddle-shaped elevation, which bears the two, rather distant hinder ocelli, one at each side, while there is no anterior ocellus; the elevation is more than half as broad as the vertex and bordered on each side by a furrow; its anterior margin is more or less distinctly reddish, and it is hairy behind; the frons is punctate and distinctly hairy on its anterior part; there are three rows of strong bristles but no supraantennal bristles; the middle row is very, the anterior row somewhat convex. Antennæ quite small, black or brownish black; arista nearly nude. Palpi not large, black or blackish, the bristles somewhat short, except one long at apex. Thorax black, shining, with dense, but very short blackish pubescence and with one pair of dorsocentral bristles. Scutellum flat above, with four bristles, the posterior strong, the anterior very much smaller. Mesopleura hairy above on the anterior part. Abdomen black, a little greyish, dull, second and sixth segments a little elongated; the first segment with a pale hind margin and the others sometimes reddish at the hind margins; abdomen has very short hairs, longer only at the sides of first and second segments. Hypopygium small, black, polished and shining above, the protruding parts of the subanal body reddish; it has longish hairs below at apex; anal tube short, but protruding, reddish, with short hairs; ventral plate roundly excised, horse-shoe-shaped. Legs robust, all femora,

but especially the hind pair, much dilated; front tarsi somewhat broad; the legs are black or blackish, trochanters and the front legs yellowish except the basal half of femora, the middle metatarsi and the posterior knees reddish; front tibiae with two dorsal bristles (sometimes three or four), middle tibiae with a pair at the upper third and one anterodorsal bristle near apex, hind tibiae with two anterior bristles, one above the middle and one at apex; all bristles rather strong; besides all legs have a number of apical spurs, on the front legs they are short; the hind tibiae have three dorsal rows of dense, palisade-like arranged hairs, separated by two furrows. Wings somewhat yellowish, rather strongly at base; vein brownish, but yellow at the base, and costa blackish towards apex; costa not reaching the middle, the second division a little thickened, 1 somewhat longer than 2; costal cilia fine and short; third vein with fine hairs in the whole length; fourth vein strongly curved at the base and curved very slightly downwards towards the apex. Halteres black.

Female. Quite similar to the male, only clypeus a little more protruding; the last exposed abdominal segment (8) red.

Length 2,8—4 mm.

H. incrassata is not rare in Denmark, though like the preceding not taken in great numbers; Charlottenlund, Ordrup Mose (Stæger, Schlick), Holte (Th. Mortensen), Geel Skov (the author), at Gurre (Kryger) and on Falster (Schjødte); the dates are $^{11}/_8$ — $^{22}/_9$, thus it seems to be autumnal. It is recorded to be parasitical on the honey-bee.

Geographical distribution: — All Europe, towards the north to southern Sweden.

3. *H. carinifrons* Zett.

1848. Zett. Dipt. Scand. VII, 2885, 33, ♂ (nec ♀) (*Trineura*). — 1901. Beck. Abhandl. zool. bot. Gesell. Wien, I, 38, 29, Taf. II, Fig. 33 (*Phora*). — 1906. Wood, Ent. Month. Mag. 2, XVII, 263 (*Phora*). — 1910. Kertész, Cat. Dipt. VII, 399. — 1914. Brues, Bull. Wisc. Nat. Hist. Soc. XII, 101. — 1918. Schmitz, Jaarb. Natuurh. Genootsch. Limburg 1917, 114.

Male. Frons nearly quadratic or a little higher than broad, black and dull; the ocellar triangle formed as an elongated, somewhat saddle-shaped and slightly carinate elevation which bears the posterior ocelli behind; no anterior ocellus present; the elevation is bordered on each side by a broad furrow, and it is not more than one third of the breadth of the vertex; the frons is distinctly haired

on its anterior part; there are three rows of strong bristles, the two anterior rows very convex; no supraantennal bristles. Antennæ black, quite small, arista nearly nude. Palpi black or brownish black, rather small, the bristles of medium length and one longer apical bristle. Thorax black, shining, with black or blackish pubescence and one pair of dorsocentral bristles. Scutellum flat, with four bristles, the anterior much smaller than the posterior. Mesopleura hairy above on the anterior part. Abdomen black, dull, somewhat greyish; second segment much, sixth a little elongated; the hairs on abdomen very short and fine, nearly invisible except at the lateral margins and on

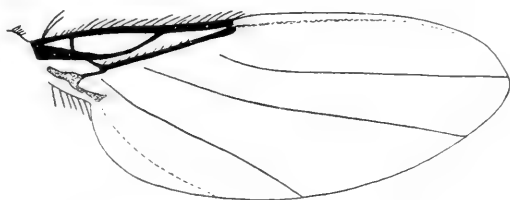


Fig. 62. Wing of *H. carinifrons* ♂.

sixth segment; first and second segments with longer hairs at the sides. Hypopygium small, black and polished, the side parts somewhat claw-shaped, the complicated subanal body partly reddish; the aperture for the anal tube lies rather dorsally, the tube is quite short, not protruding; above, at the opening for the anal tube the hypopygium has long hairs; the ventral plate horse-shoe-shaped. Legs robust, the femora dilated, especially hind femora very broad; all tibiæ rather strong and hind tibiæ thickened outwards; front tarsi broad, especially the last joint dilated, with long hairs and the pulvilli enlarged, hind tarsi somewhat thickened; the legs are black, apex of front femora and front tibiæ and tarsi yellowish, middle tarsi brownish towards apex; the trochanters and the posterior knees reddish or yellowish; front tibiæ with one anterodorsal bristle above the middle; middle tibiæ with a pair at about the upper third and one anteroventral bristle at apex; hind tibiæ with two anterior bristles one above the middle and one at apex; the posterior tibiæ have a number of strong apical spurs among which on the hind tibiæ one dorsal; the hind tibiæ have on the dorsal side two palisade-like rows of hairs enclosing a furrow. Wings yellowish, most strongly towards the base and anterior margin; costa blackish, the other veins brownish; costa not reaching the middle; 1 somewhat longer than 2; costal

cilia relatively not short; third vein with fine hairs in the whole length; fourth vein not much curved at base, for the rest nearly straight, and fifth vein rather parallel to the fourth. Halteres black.

Female. Quite similar to the male; arista a little more pubescent; the last exposed abdominal segment (8) long, narrow and reddish; last joint of front tarsi not enlarged and hind tarsi not thickened.

Length 2,5—3 mm.

H. carinifrons is not rare in Denmark and often taken in great numbers; Ermelund (the author), Holte (Th. Mortensen), Geel Skov, Bogø south of Sealand, on Langeland at Lohals (the author), on Funen at Odense (H. J. Hansen), in Jutland at Hejls south of Kolding, Himmelbjerget (the author), Fusingø (Schlick), Jelling and at Nørresundby (the author); the dates are $^{29}/_6$ — $^{10}/_9$. It occurs on bushes in woods and along roads; at Hejls I took it on $^{30}/_7$ in great number, it swarmed there numerously on Corylus.

Geographical distribution: — Northern Europe, Russia and down to Silesia; towards the north to southern Sweden and in Norway and Finland; it seems thus to be a somewhat northern species.

Remarks: The types of *carinifrons* Zett. are in our collection, and I have examined them; they are the male and female mentioned by Zetterstedt l. c. as sent him from Stæger. As already stated by Becker l. c. 39 and 74 the male is the type, as it is a good species, while the female is *agilis* Meig. Becker had not seen these types, but he must have found both sexes in Zetterstedt's collection, though Zetterstedt says that he had taken it only once "semel etiam a me inventa"; he must then have taken, as he thought, both sexes, and it is curious that in both cases, both as regards the Danish specimens and his own specimens, he made the same error in giving the *carinifrons* male an *agilis* as female, probably he was misled by receiving the specimens from Stæger as male and female of one species; it is also strange that, in spite of the name, he has not one word about the shape of the frons; as Zetterstedt says: "Stæg. in litt." the name is due to Stæger. — Both Becker and Wood say that the third vein (second vein) is bare, but this is not correct, as it is quite distinctly hairy.

4. *H. flavimana* Meig.

1830. Meig. Syst. Besch. VI, 213, 4 (*Phora*). — 1910 Kertész, Cat. Dipt. VII, 400. — 1914. Brues, Bull. Wisc. Nat. Hist. Soc. XII, 102. — 1918. Schmitz, Jaarb. Natuurh. Genootsch. Limburg 1917, 115. — *Phora femorata* Meig. 1830.

l. c. VI, 213, 5. — 1848. Zett. Dipt. Scand. VII, 2886, 34 (*Trineura*). — 1864. Schin. F. A. II, 339. — 1901. Beck. Abhandl. zool. bot. Gesell. Wien I, 41, 31, Taf. II, Fig. 35. — 1906. Wood, Ent. Month. Mag. 2, XVII, 264, 266.

Male. Frons quadratic, black and shining, somewhat punctate; the middle row of bristles straight or a little concave, the anterior row a little convex; the middle row placed high upwards, much nearer the upper than the lower row; no supraantennal bristles. Antennæ of medium size or somewhat small, black, third joint a little elongated and pointed; arista short-pubescent. Palpi not small, black, with well developed bristles. Thorax black, a little shining, with blackish or dark brownish pubescence and one pair of dorsocentral bristles.

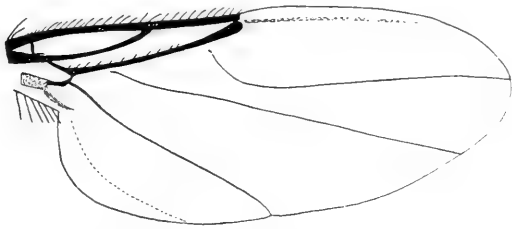


Fig. 63. Wing of *H. flavimana* ♂.

Scutellum with four bristles, the anterior varying in size, but never half as large as the posterior. Mesopleura hairy above anteriorly. Abdomen black, very slightly greyish, slightly shining, a little more towards apex; second segment elongated; abdomen has very short hairs, best visible at the hind margins of the segments and at the sides; at the hind corners of first segment are longer hairs. Hypopygium small, grey or brownish grey, shining above just at the base, with shortish hairs; the protruding subanal body reddish; anal tube reddish, but not protruding; ventral plate triangularly cleft. Legs robust, femora, especially the hind pair much dilated, hind tibiæ somewhat thickened outwards and hind metatarsi a little dilated; the legs are black, the apical part of front femora, front tibiæ and tarsi brown or yellowish red, the tarsi darkened towards the end; all trochanters and the posterior knees yellowish or reddish; front tibiæ with a dorsal bristle above the middle, middle tibiæ with a pair at the upper fourth and one anterior bristle at a little distance from the apex, hind tibiæ with two anterior bristles one at the upper third and one at apex; posterior tibiæ with strong apical spurs among which on the hind tibiæ one dorsal may be present or wanting, also on front tibiæ

a dorsal apical spur present; hind tibiæ with two dorsal palisade-like rows of hairs enclosing a furrow. Wings a little yellowish or greyish yellow; veins brown or the thin veins yellow; costa reaching to the middle or nearly, 1 a little longer than 2; costal cilia short, third vein with a little elongated swelling at apex, finely haired in its whole length; fourth vein strongly curved in its first part, for the rest nearly straight, that and the fifth vein very diverging. Halteres black.

Female. Antennæ smaller than in the male; palpi a little broader and sometimes more brownish; clypeus a little more protruding; the apical swelling on third vein larger.

Length 2,5—3,2 mm.

H. flavimana is not common in Denmark; Ermelund, Dyrehaven, Holte, Geel Skov (Th. Mortensen, the author), Ruderhegn (H. J. Hansen), Klosterishegn (C. Larsen), on Langeland at Lohals (the author), in Jutland at Laven, and on Bornholm in Almindingen (H. J. Hansen); besides a specimen from earlier time; the dates are $28/3$ — $10/11$. I have generally taken it on bushes.

Geographical distribution: — Europe and down into Algeria, towards the north to northern Sweden; it also occurs in North America.

5. *H. irregularis* Wood.

1912. Wood. Ent. Month. Mag. 2, XXIII, 95, fig. 1, and *ibid.* 1914, XXV, 154. — 1914. Brues, Bull. Wisc. Nat. Hist. Soc. XII, 103. — 1918. Schmitz, Jaarb. Natuurh. Genootsch. Limburg 1917, 115.

Male. Frons broader than high, black and dull or nearly, somewhat punctate; the anterior row of bristles convex, the middle row much nearer the upper than the lower row; no supraantennal bristles. Antennæ rather small, black, third joint distinctly pale pubescent; arista short-pubescent. Palpi somewhat large, black, with well developed bristles. Thorax black, very slightly shining, blackish or dark brownish pubescent, with one pair of dorsocentral bristles. Scutellum with four bristles, the anterior about half as large as the posterior. Mesopleura a little hairy above just on the anterior part. Abdomen black, a little greyish, dull, second segment elongated; it has quite short hairs, but is a little more distinctly haired than in *flavimana*; at the hind corners of first segment are long hairs, and also at the hind corners of second segment the hairs a little long. Hypopygium small, greyish, shining above at base and quite resembling that in *flavimana*. Legs as in *flavimana* and coloured mainly in the same way, but middle tibiæ reddish at the end and posterior tarsi brownish red; the tibiæ

with bristles as in *flavimana*, but the lower anterior bristle on middle tibiæ quite minute and placed at the apex, and hind tibiæ with fewer (only two) apical spurs and further front tibiæ with no dorsal apical spur; hind tibiæ shaped as in *flavimana*. Wings only slightly greyish yellow, veins brown; costa reaching to the middle, 1 about equal to 2 (2 + 3); costal cilia a little longer than in *flavimana*; third vein forked, but the anterior branch very thin, the fork longish; the third vein has at apex a little elongated swelling, and it has fine hairs in

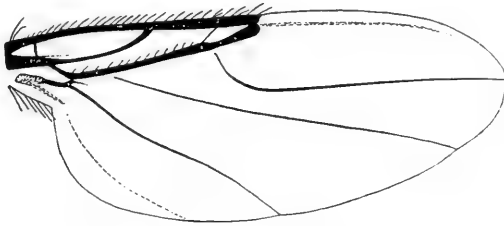


Fig. 64. Wing of *H. irregularis* ♂.

the whole length; fourth vein strongly curved in its first part, for the rest straight, that and the fifth vein rather diverging. Halteres black.

Female. Quite similar, only clypeus slightly more distinct, and the apical swelling of third vein a little more pronounced.

Length 2,7—3,5 mm.

As seen this species is nearly related to and very similar to *flavimana*, but it is distinguished with certainty especially by the forked third vein, the broader and duller frons, the quite dull and more hairy abdomen, the shorter first costal division, and the lower bristle on middle tibiæ being minute and placed at the apex, and finally also by the want of a dorsal apical spur on front tibiæ. Wood says that there is no lower bristle on middle tibiæ, he has, I think, not reckoned this very small one. At present there are known in all seven specimens of the species, including three females which sex was not known hitherto; all seven specimens show the thin, but distinct anterior branch of the fork.

H. irregularis is rare in Denmark, I have taken in all five specimens, two males and three females, in Geel Skov on $\frac{6}{9}$ — $\frac{23}{10}$ in 1918 to 1921; they were taken on leaves in a plantation of young sycamores; on $\frac{7}{10}$ a pair was taken in copula.

Geographical distribution: — Besides from Denmark the species is only known from England, where two males have been taken by Wood.

6. *H. agilis* Meig.

1830. Meig. Syst. Besch. VI, 213, 3 (*Phora*). — 1864. Schin. F. A. II, 339 (*Phora*). — 1901. Beck. Abhandl. zool. bot. Gesell. Wien, I, 42, 33, Taf. II, Fig. 39, Taf. III, Fig. 40 (*Phora*). — 1910. Kertész, Cat. Dipt. VII, 399. — 1914. Brues, Bull. Wisc. Nat. Hist. Soc. XII, 100. — 1918. Schmitz, Jaarb. Natuurh. Genootsch. Limburg 1917, 117. — *Trineura carinifrons* 1848. Zett. Dipt. Scand. VII, 2885, 33, p. p. ♀ (nec ♂).

Male. Frons nearly quadratic, black, dull; the anterior row of bristles convex; no supraantennal bristles. Antennæ of medium size, black, arista short-pubescent. Palpi not large, black, with ordinary bristles. Thorax black, dull or nearly so, with dark brownish pubescence and one pair of dorsocentral bristles. Scutellum with four bristles,

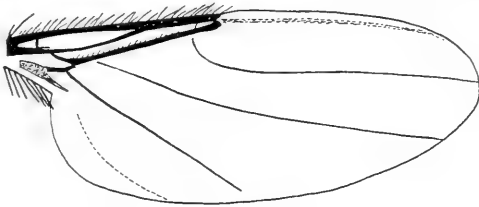


Fig. 65. Wing of *H. agilis* ♀.

the anterior much smaller than the posterior. Mesopleura hairy above anteriorly. Abdomen black, slightly greyish, dull, second segment elongated; abdomen has short hairs, longer at the side margins of first segment. Hypopygium small, black and shining, the protruding parts of the subanal body partly reddish; anal tube not protruding. Legs robust and the femora, especially the hind pair rather dilated, hind tibiæ thickened outwards; the legs are black, trochanters and knees somewhat indistinctly reddish, front tibiæ and tarsi yellowish brown and middle tarsi brownish; front tibiæ with one dorsal bristle above the middle, middle tibiæ with a pair at the upper third and one anterior bristle a little before the apex, hind tibiæ with only one bristle on the anterior side at apex; the hind tibiæ have two dorsal rows of palisade-like arranged hairs enclosing a furrow. Wings nearly clear, only slightly yellowish in the region with the thick veins; veins brown, costa not reaching to the middle, with the second division a little thickened; 1 about one and a half times longer than 2 (2 + 3); costal cilia short; third vein with a small fork, but the anterior branch very thin and indistinct, the vein with very fine hairs; fourth vein somewhat moderately curved in its origin and curved slightly downwards towards the apex. Halteres black.

Female. Antennæ a little smaller than in the male, and clypeus more distinctly protruding; wings with first costal division relatively shorter.

Length 2,4 to nearly 3 mm.

H. agilis is rare in Denmark, I have only taken it at Lohals on Langeland and at Hejls south of Kolding on $15/7$ — $30/7$ in 1919 and 1920, further one specimen from Bornholm at Ronne in July 1883 (H. J. Hansen); at Hejls it occurred on bushes of *Corylus* along a road together with *H. carinifrons*; as mentioned, we have moreover an old female specimen from Stæger, placed as female to *carinifrons* and probably from the vicinity of Copenhagen.

Geographical distribution: — All Europe, towards the north it seems to occur to the southern Sweden.

7. *H. citreiformis* Beck.

1901. Beck. Abhandl. zool. bot. Gesell. Wien, I, 43, 34, Taf. III, Fig. 42 (*Phora*). — 1906. Wood, Ent. Month. Mag. 2, XVII, 264, 266 (*Phora*). — 1910. Kertész, Cat. Dipt. VII, 399. — 1914. Brues, Bull. Wisc. Nat. Hist. Soc. XII, 101. — 1918. Schmitz, Jaarb. Natuurh. Genootsch. Limburg 1917, 117.

Male. Frons much broader than high, black, a little shining; bristles not strong, the anterior rows slightly convex; a pair of small supraantennal bristles present. Antennæ black, third joint large, elongated and lemon-shaped, pointed, arista distinctly pubescent. Palpi brownish or blackish brown, not large, the bristles weak. Thorax black, somewhat shining, with blackish brown pubescence and one pair of dorsocentral bristles. Scutellum with four bristles, the anterior quite small. Mesopleura not hairy above. Abdomen black, dull, second and sixth segments a little elongated; the abdomen is distinctly haired with short hairs, a little longer at the sides and on sixth segment. Hypopygium relatively large, greyish, but black and shining on the front part above; from the tergite a short prolongation stretches down on each side and between these the anal tube is seen, the opening for the tube thus does not pierce the tergite as in the other species, but the construction is as in most of the other genera; the anal tube is blackish, but quite short, not protruding; there is a large, cleft ventral plate. Legs not robust, hind tarsi long, $1\frac{3}{4}$ times longer than the tibiæ or more; the legs are brownish black, the hind legs the darkest, the apical half of front femora and front tibiæ and tarsi dirty yellowish, middle tibiæ and posterior tarsi brownish; further the trochanters and knees are reddish or yellowish; front tibiæ with

a very weak dorsal bristle above the middle, middle tibiae with a pair at the upper third and a small anterior bristle at apex, hind tibiae with only a small anterodorsal bristle at apex (they are recorded to have sometimes an abnormal bristle near the middle); the hind tibiae are simple, without dorsal furrow; hind femora with short, dense hairs below at base. Wings clear and colourless, thick veins brown, the others fine and white; costa reaching to the middle or fully so, 1 somewhat longer than 2; costal cilia short; third vein somewhat

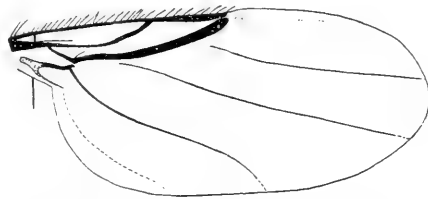


Fig. 66. Wing of *H. citreiformis* ♂.

thickened, without hairs, only with a little bristle at base, that and the first vein rather curved; fourth vein very slightly curved at its origin; only one bristle on alula. Halteres black.

Female. I do not know the female, it is recorded to have the third antennal joint smaller, shorter and brown, the palpi narrow, and the third vein thicker.

Length 1,8 mm.

H. citreiformis is rare in Denmark, I have taken only two specimens, both males, in Geel Skov on $\frac{7}{9}$ 1918, on bushes; the species is recorded to frequent the umbels of *Heracleum sphondylium* and *Angelica silvestris*.

Geographical distribution: — Besides from Denmark the species is known from Finland and Britain.

8. *H. vitripennis* Meig.

1830. Meig. Syst. Besch. VI, 223, 36 (*Phora*). — 1848. Zett. Dipt. Scand. VII, 2889 (*Trineura*). — 1901. Beck. Abhandl. zool. bot. Gesell. Wien, I, 44, 35, Taf. III, Fig. 43 (*Phora*). — 1906. Wood. Ent. Month. Mag. 2, XVII, 264, 266 (*Phora*). — 1910. Kertész, Cat. Dipt. VII, 401. — 1914. Brues, Bull. Wisc. Nat. Hist. Soc. XII, 103. — 1918. Schmitz, Jaarb. Natuurh. Genootsch. Limburg 1917, 118.

Male. Frons low and broad, more than twice as broad as high, but somewhat produced anteriorly in the middle; it is black and

dull; the bristles curiously placed, the middle row very convex, its middle bristles placed on a line with the outer bristles of the front row, this latter row wants the middle bristles; there are two pairs of supraantennal bristles, the anterior pair small, the posterior somewhat larger. Antennæ black, third joint large, conically pointed; arista nearly nude, placed near the apex of the joint and thus subapical. Palpi of moderate size, black, with short bristles. One distinct genal and one distinct oral bristle. Thorax black, dull, with brownish black, somewhat longish pubescence and one pair of dorsocentral bristles. Scutellum with two bristles, the anterior pair only represented by

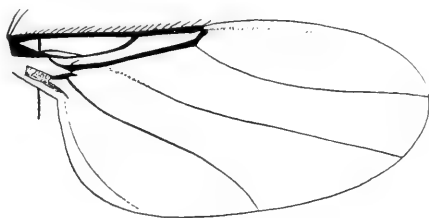


Fig. 67. Wing of *H. vitripennis* ♂.

small hairs. Mesopleura not hairy above. Abdomen black, dull, second and sixth segments elongated, the very short hairs almost only visible at the sides. Hypopygium quite small, greyish black, of the construction typical for *Hypocera*; it has somewhat bristly hairs below; anal tube not protruding. Legs not robust, hind tarsi somewhat long; the legs are brownish black, the front legs, especially tibiæ, paler and all tarsi brownish or brownish yellow; front tibiæ with a dorsal bristle at the upper third, middle tibiæ with a pair at the upper third and an anterior bristle at apex, hind tibiæ with two anterodorsal bristles, one at the upper third and one at or below the middle (they are recorded to have sometimes a third bristle below the others) and with a quite small, spur-like bristle at apex; the hind tibiæ are simple, without dorsal furrow. Wings clear and colourless, thick veins brown or blackish brown, the others nearly colourless; costa scarcely reaching to the middle, 1 somewhat longer than 2; costal cilia short; first vein curved and the mediastinal vein developed; third vein bent angularly upwards at apex, without hairs, but with a distinct bristle at base; fourth vein not evenly and much curved; only one bristle on alula. Halteres black.

Female. Antennæ with the third joint smaller and more roundish; frons more produced anteriorly in the middle, the posterior pair of supraantennal bristles larger; palpi a little paler, with ordinary bristles. Clypeus very large and strongly protruding. Legs a little paler. Wings

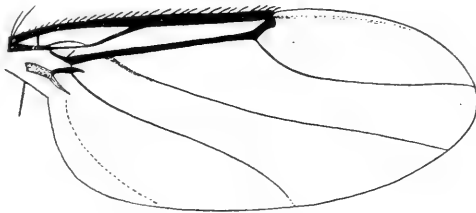


Fig. 68. Wing of *H. vitripennis* ♀.

with the costa thickened and much longer than in the male, reaching considerably beyond the middle, and 1 shorter than 2.

Length 1,3—1,6 mm.

Remarks: Strobl describes (Wien. Ent. Zeitg. XI, 1892, 193) a var. *albidohalterata* with whitish yellow halteres.

H. vitripennis is rare in Denmark, I possess only a few males and two females; Holte (Rosenberg), on Bogø south of Sealand and in Jutland at Hejls south of Kolding and at Jelling (the author); my dates of capture are ¹⁵/₇—²⁴/₇ in 1917 to 1921. Rosenberg bred it from a nest of *Vespa vulgaris* in May 1910. It is known to develop in nests of *Vespa* and *Bombus*, and the imagines are recorded to frequent *Heracleum sphondylium* and *Angelica silvestris*.

Geographical distribution: — Europe, towards the north to Jämtland in Sweden,

7. **Conicera** Meig.

Small species of black colour. Frons broad, generally about twice as broad as high; there are three rows of frontal bristles, the two upper rows show four bristles each, the lower row may also have four bristles, but the outer bristle is quite small and placed near to the outer bristle of the middle row, and it may in some species be quite wanting; also the inner bristle of the lower row may be rather small in the male; one pair of small, upwards directed and diverging supraantennal bristles present, only in the male of *dauci* wanting. Eyes hairy. Antennæ in the male of characteristic shape, the third

joint is elongated, globose at base, but drawn out into a long apex; in the female the third joint short, roundish; arista apical, shorter or longer, and very short or more distinctly pubescent. Clypeus somewhat large, largest in the female and in this sex very large and protruding. Jowls present and a little descending below the eyes; one long lower postocular bristle and, at all events generally, one oral and one genal bristle, both a little smaller; Becker (1901) says: "Backen- und Wangenborsten fehlen", he must have overlooked these bristles. Thorax with one pair of dorsocentral bristles. Scutellum with two bristles. Mesopleura bare. Abdomen is not long, conical, second and sixth segments somewhat elongated (sixth segment shows generally a transverse furrow so that it looks as if there were seven abdominal segments). Hypopygium somewhat large, higher than long, bent in under abdomen; it is of a similar construction as in *Hypocera*, it is symmetrical, the opening for the anal tube does not lie between the side prolongations from the tergite, but pierces the tergite; here as in *Hypocera* I think, however, that the uniting below the opening is a secondary one; below the opening the hypopygium is on each side prolonged into a pointed or rounded arm, so that a kind of forceps is formed; the anal tube is small and not protruding. Abdomen in the female has also second and sixth segments somewhat elongated, and it bears at the end two small lamellæ. Abdomen has so short hairs that it appears nearly nude. Legs not robust; in the American species *Kerteszi* the second and third joints on front tarsi are dilated; front tibiæ with a small dorsal bristle near the base, middle tibiæ with a dorsal and an anterior bristle forming a pair near the base and an anterior bristle above the apex (foreign species may have four bristles on middle tibiæ (*Aldrichi* Brues), hind tibiæ likewise with a pair of bristles near the base, a dorsal bristle at about the lower third and a small anterior bristle at apex; middle tibiæ with one, hind tibiæ with two apical spurs; for the rest the legs are clothed with short hairs, a little longer on the dorsal side of middle tibiæ below the middle; in *dauci* the dorsal hairs on front tibiæ form a row of small, but distinct bristles; as usual the hairs on the apical part of the posterior side of hind tibiæ are arranged in comb-like transverse rows, and likewise on the posteroventral side of hind metatarsi, and a similar arrangement is present on the anterodorsal side of the apical part of middle tibiæ as in *Hypocera*, but less distinct. Claws and pulvilli normal, empodium bristle-shaped. Wings with costa short and the costal cilia short; first vein rather curved, mediastinal vein incomplete, not

reaching the first vein; third vein not furcated; only one, rather feathery, bristle on alula.

The developmental stages are somewhat known; Bouché (Naturgesch. d. Ins. 1834, 101) found the larva of *dauci* in decaying radishes in August, and gives the duration of the larval stage as fourteen days and of the pupal stage as two to three weeks; he describes and figures the larva as flattened cylindrical, narrowed in front, of white colour and spinulose, on the ventral side with four longitudinal rows of small, conical, fleshy papillæ; the posterior end is obliquely cut, with eight fleshy teeth at the margin; the length is 1 mm. The pupa is described as elliptical, flattened at each end, with a marked lateral margin, and of greyish yellow colour; the spiracular tubes are long, directed forwards and outwards; round the posterior end are strong teeth. According to Brauer (Denkschr. kais. Akad. d. Wissensch. Wien, math. nat. Cl. XLVII, 1883) Hartig mentions *dauci* from *Arctia caja*, and Letzner bred the same species (*atra*) from an *Agaricus*. Reinhard (Verh. k. k. zool. bot. Gesell. Wien, XXXI, 1881, 207) records several cases in which the species (*atra*) was found numerously, larvæ, pupæ and imagines, in coffins on the remains of human bodies until five years after burial; Hofmann (Ann. Soc. Ent. de Belg., XXX, 1886, C. R. CXXXI and Münch. med. Wochenschr. 1886) mentions it (*albipennis*) found in one case, also in all three stages, in a deterred coffin on a body eleven months after burial, and Webster mentions *Conicera* sp. (Ins. Life II, 1890, 356) found similarly, likewise all three stages, two years after burial; in all these cases the puparia were present in very large numbers. Schmitz (Jaarb. Natuurh. Genootsch. Limburg 1919, 109) mentions females of *C. similis* taken on dead moles and one specimen on a human corpse. I have myself, as said below, bred *C. pauxilla* from a nest of *Vespa vulgaris*?, taken on $\frac{26}{9}$, the imagines emerging from $\frac{10}{5}$ to $\frac{20}{5}$ next year. According to the above, the larva evidently lives similarly to other *Phoridae* in decaying vegetable and animal matters; it is curious that they have so often been found in coffins on human corpses; the question here arises in which way they have come there; Hofmann thinks it possible that the imagines are able to reach their way to the bodies, but mentions also the possibility of the eggs having been laid on the body before burial, and Riley and Howard (Ins. Life l. c. 371) are inclined to think this latter the most probable; this latter way is, I think, the only possible, as the imagines could scarcely penetrate through the ground and into the coffin. It was, I think, more possible that the

eggs were laid on the ground, and the larvæ then went down, but I do not think it very probable. The large number of puparia found in the coffins shows that many generations must have followed each other in the coffin, but this is not difficult to understand, for when the imagines emerge, they certainly soon copulate and deposite the eggs, and even if the coffin is now a bad place for the otherwise flower-seeking imagines, and these soon will perish, the new generation will develop and again proceed with a new brood, so that a number of broods will follow each other, the imagines of which never reach to the day-light.

The species of *Conicera* are attracted by flowers and especially found on flowers of umbellifers in sunny places, but they occur also in low herbage in woods.

This genus is somewhat nearly related to *Hypocera*, as shown by its hypopygium, and especially to *citreiiformis* and *vitripennis* with which it had the bare pleura, one oral and one genal bristle and only one bristle on alula in common, as also the antennæ show similarity; it comes especially near to *vitripennis* with its strongly developed clypeus and subapical arista, and it is just possible that *vitripennis* should be placed in *Conicera*, as mentioned under *Hypocera*.

Of the genus four European species are known three of which occur in Denmark.

Table of Species.

- | | |
|--|---------------------|
| 1. Wings quite colourless with the thin veins white, fourth vein distinctly curved at base; lower dorsal bristle on hind tibiæ longer than the upper, front tibiæ with a dorsal row of small bristles; male with third antennal joint much elongated, and without supraantennal bristles; hypopygium with the arms of forceps pointed at the end..... | 1. <i>dauci</i> . |
| — Wings a little tinged, not quite colourless, thin veins darker, fourth vein not specially curved at base, but slightly and evenly curved in the whole length; lower dorsal bristle on hind tibiæ shorter than or, at most, as long as the upper, front tibiæ without a dorsal row of distinct small bristles; male with the third antennal joint less elongated; supraantennal bristles present; hypopygium with the arms of forceps rounded at the end..... | 2. |
| 2. Sixth and seventh veins not or not distinctly abbreviated; a small outer bristle of lower frontal row generally present; arms of hypopygial forceps with a long, pointed process on the upper or inner margin near base; costa in female 0,41, not reaching much beyond the end of seventh vein | 2. <i>similis</i> . |

- Sixth and seventh veins in male abbreviated; no outer bristle in lower frontal row; arms of hypopygial forceps with the mentioned process short and blunt; costa in female 0,44, stretching far beyond the end of seventh vein 3. *pauvilla*.

1. *C. dauci* Meig.

1830. Meig. Syst. Besch. VI, 223, 34, ♀ (*Phora*). — 1914. Brues, Bull. Wisc. Nat. Hist. Soc. XII, 106. — 1918. Schmitz, Jaarb. Natuurh. Genootsch. Limburg 1917, 119 et 1920. *ibid.* 1919, 107. — *Conicera atra* Meig. 1830 l. c. VI, 226, 1, Tab. LXIII, Fig. 12—13, ♂ et 1838, l. c. VII, 411. — 1864. Schin. F. A. II, 335. — 1901. Beck. Abhandl. zool. bot. Gesell. Wien, I, 81, 69, Taf. III, Fig. 59. — 1910. Kertész, Cat. Dipt. VII, 401. — *Phora albipennis* Meig. 1830. l. c. VI, 223, 35.

Male. Frons low, about twice as broad as high, black, dull; inner bristles of lower frontal row approximate and small, outer bristles wanting; supraantennals wanting. Antennæ black, large and much elongated; arista somewhat short, not longer than third joint, very short-pubescent. Palpi black, somewhat small, narrow, with short bristles. Thorax black, dull, with blackish pubescence. Abdomen black, dull, with very short hairs, almost only visible at the hind margins of the segments. Hypopygium large, black or greyish black, the arms of the forceps with a pointed end and distinctly haired. Legs blackish or blackish brown, front legs, especially tibiæ, and all tarsi paler; front tibiæ with a small dorsal bristle near the base and below it a row of small bristles, generally smaller than the upper bristle; the dorsal bristle on hind tibiæ at the beginning of the lower third

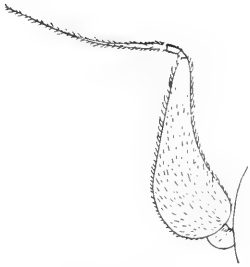


Fig. 69. Antenna of *C. dauci* ♂ ×85.

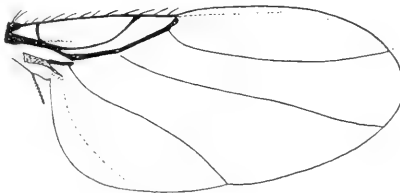


Fig. 70. Wing of *C. dauci* ♂.

longer than the upper bristles. Wings clear and quite colourless; thick veins dark brown, the others colourless; costa about 0,43 of the wing-length; costal cilia short and not dense; fourth vein

distinctly curved at its origin and curved upwards towards apex. Halteres black.

Female. Similar to the male in appearance; antennæ short; inner bristles of lower row less approximate and larger; small supra-antennals present; wings a little longer but costa relatively not longer.

Length 1,5 to nearly 2 mm.

C. dauci is common in Denmark; Ermelund, Holte, Geel, Skov, Suserup Skov at Sorø, Bogø south of Sealand and in Jutland at Hejls south of Kolding and at Jelling (Th. Mortensen, the author); my dates are $\frac{9}{5}$ — $\frac{16}{10}$ in 1917 to 1921; I have taken it in copula on $\frac{12}{7}$. The species may be taken with the net in low herbage, but it is often seen outside of woods, f. inst. along roads on the umbels of various umbellifers.

Geographical distribution: — Europe, towards the north to Lapland; also occurring in North America.

2. *C. similis* Halid.

1833. Halid. Entom. Mag. I, 179 (*Phora*). — 1901. Beck. Abhandl. zool. bot. Gesell. Wien, I, 81, 70, Taf. III, Fig. 59. — 1910. Kertész, Cat. Dipt. VII, 402. — 1914. Brues, Bull. Wisc. Nat. Hist. Soc. XII, 107. — 1918. Schmitz, Jaarb. Natuurh. Genootsch. Limburg 1917, 119, and 1920, *ibid.* 1919, 108, Fig. 12.

Male. Frons as in *dauci*, but the inner bristles of the lower row not approximate and as large as the other bristles, outer bristles generally present, but small and near to the outer bristles of the middle row; supraantennals present. Antennæ shorter than in *dauci*, with a longer arista, longer than third joint and more distinctly pubescent. Palpi somewhat small and narrow, varying from blackish to brownish yellow, with short bristles. Thorax black, less dull than in *dauci*, with brownish black pubescence. Abdomen dull black, with short hairs, visible only at the hind margins of the segments. Hypopygium large, greyish or brownish black, the arms of the forceps rounded at the end, at the upper or inner margin they have near the base a rather long, pointed process; they are distinctly hairy. Legs paler than in *dauci*, brown or dark brown, front legs yellowish; front tibiæ without any row of bristles, only with the usual hairs below the upper dorsal bristle, the lower bristle on hind tibiæ shorter than or generally as long as the upper, but not longer. Wings relatively longer than in *dauci* and the axillary angle more rounded; they are a little tinged, thick veins brown, the others brown or pale brown, sixth and seventh

veins reaching the margin, at most a little indistinct just at apex; costa shorter than in *dauci*, about 0,39 of the wing-length, a vertical line from the apex of costa meets the seventh vein at apex or a little before; costal cilia short; fourth vein not curved at the base, but evenly and slightly curved in the whole length. Halteres black.



Fig. 71. Wing of *C. similis* ♀.

Female. Similar; antennæ short; wings relatively longer and also costa a little longer, 0,41 of the wing-length.

Length 1,2—1,7 mm.

C. similis is as common in Denmark as *dauci*; Ermelund, Holte, Geel Skov, Hillerød, Suserup Skov at Sorø, on Bogø south of Sealand, on Langeland at Lohals and in Jutland at Hejls south Kolding, Jelling, Ry and in Egense Skov at the east end of Limfjorden (Th. Mortensen, the author); the dates are $^{16}/_5$ — $^8/_8$ in 1917 to 1921; I have taken it in copula on $^{15}/_7$. The species occurs in a similar way as *dauci*, but the female seems to be met with less often than the male, I possess many males, but only five females; the same is mentioned by Schmitz.

Geographical distribution: — Besides from Denmark known from England, Holland and Germany.

3. *C. pauxilla* Schmitz.

1920. Schmitz, Jaarb. Natuurh. Genootsch. Limburg 1919, 109, Fig. 13.

Male. Frons as in the other species; inner bristles of lower row not approximate and as large as the other bristles, outer bristles of lower row not present; supraantennals present. Antennæ with the third joint about as in *dauci*, arista shorter than in *similis*, of about the length of third joint, distinctly pubescent. Palpi small and narrow, black, with short bristles. Thorax black, dull, with brownish pubescence. Abdomen black and dull, apparently almost nude. Hypopygium greyish black or greyish brown, as in *similis* with the arms of

the forceps rounded at the end, but at the upper or inner margin near the base with a small, blunt process; the arms are distinctly hairy. Legs blackish to brownish, front legs not or slightly paler; front tibiæ without a row of bristles below the upper dorsal bristle, though an indication of a bristly row is seen; the lower bristle on hind tibiæ not longer and generally shorter than the upper. Wings quite slightly coloured; thick veins brown, the thin veins pale brown; costa about 0,40 of the wing-length, a vertical line from the apex of costa reaches the hind margin at or a little beyond the apex of seventh vein; costal cilia short, I think shorter than in the other species and somewhat fine; sixth and seventh veins distinctly abbreviated, not reaching the margin; fourth vein slightly and evenly curved in the whole length. Halteres black.

Female. Similar to the male; antennæ short; palpi often paler, brownish; wings longer, and also costa relatively longer, 0,44 of the

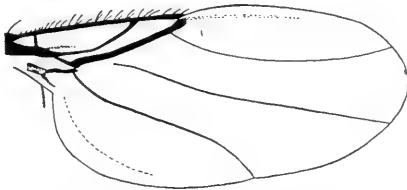


Fig. 72. Wing of *C. pauxilla* ♀.

wing-length, so that a vertical line from apex of costa always reaches the margin at a point nearer to the end of sixth than to the end of seventh vein or in the middle between them, and a vertical line from the end of first vein meets the margin about at the apex of seventh vein; sixth and seventh veins not abbreviated.

Length 0,8—1,3 mm.

C. pauxilla is as common in Denmark as the other two; Gentofte, Ermelund, Geel Skov, Lillerød, Suserup Skov at Soro, Bogø south of Sealand, Lohals, and in Jutland at Hejls south of Kolding, Ry and Nørresundby (Th. Mortensen, Kryger, the author); the dates are $^{16}/_5$ — $^6/_9$ in 1915 to 1921; I have taken it in copula on $^{27}/_6$. Mr. Kryger took a nest of *Vespa vulgaris*? at Lillerød on $^{26}/_9$ 1915 and from this I bred a great number of the species which emerged from $^{10}/_5$ — $^{20}/_5$ 1916 together with *Volucella pellucens*, *Ophyra leucostoma*, *Fannia scalaris*, an *Eccoptomera* and a *Sciara*.

Geographical distribution: — Hitherto known from Holland

and Denmark, and also occurring in Germany (Schmitz, Tijdschr. v. Entom. LXIV, 1921, 9).

Remarks: *C. pauxilla* is in several respects intermediate between *dauci* and *similis*; the three species are nearly related, but they are, as seen from the descriptions, distinguished by a number of characters. Schmitz knew only the male of *pauxilla*, and this is easily known by the abbreviated veins, the female does not possess this character, but is nevertheless easily distinguished from *similis* by the absence of the outer bristle of lower frontal row and the length of costa. Still a distinguishing character seems to be present, as *similis* has a bristle at the base of third vein, while I could trace no such in *dauci* and *pauxilla*.

8. **Phora** Latr.

(*Trineura* Meig.).

Entirely black species (only one single, American species is blue-green) of medium size. Head semiglobular; frons narrow, in the male generally about twice as high as broad, in the female broader, in the male it is sometimes narrowed upwards; it has a middle furrow. There are four rows of frontal bristles, the two upper rows each consisting of four bristle, the two lower rows with only two bristles each, placed at the margin; the third row (from below) is convex, and when the frons is narrowed upwards the inner bristles in this row may be placed nearly vertically below the outer; these inner bristles in third row are as a rule somewhat smaller than the others; one pair of rather small supraantennal bristles which are reclinate and diverging. The frons is coarsely hairy, the hairs especially present on the anterior half or two thirds; these hairs vary in length, being in some species rather long, nearly reaching the bristles in length, especially the inner bristles of third row. Eyes large, bare. Antennæ inserted a little or somewhat below the middle, they are small, third joint about globular, distinctly pubescent, with a long, thin, nearly bare dorsal arista. Palpi small and rather narrow, they have long bristles only at the end, the bristles at the lower margin being quite short. The antennal cavities are not large and the epistoma more visible than in other genera; clypeus not protruding. The lower post-ocular bristles increase somewhat in length so that they are longer than the others, but there is no single, specially long bristle, and no oral or genal bristles are seen. Thorax with one pair of large dorso-

central bristles. Scutellum with two bristles, likewise large. Pleura bare. Abdomen robust. Hypopygium somewhat large, bent more or less in under abdomen; the hypopygium has newly been thoroughly studied by Schmitz (1920, Jaarb. Natuurh. Genootsch. Limburg 1919, 112, Fig. 1—7), and it yields the best characters for recognizing the species; it is unsymmetrical; on the right side the tergite bends down and passes into the lower part (ventral plate), whereas on the left side the upper and lower part are completely separated from each other; the lower part (or ventral plate) does not reach quite to the end of the hypopygium; the upper part forms behind on each side a prolongation, between which the opening for the anal tube is, these prolongations form together a kind of forceps, but the arms are quite unsymmetrical; on the left side the upper part passes evenly out into the arm and this is in most species divided into an upper and a lower lobe by a long fissure which from the upper margin goes downwards and then curves forwards towards the base; in some species the arm is undivided; the right arm is generally smaller and in contradistinction to the left it is articulated to the basal part; the lower part or ventral plate has on each side behind a lobe or process which is, as a rule, long and slender on the left side, broad and lobe-shaped on the right; the arms of the forceps are more or less hairy, especially the lower lobe of the left arm, further there is at the inner end of the fissure a group of more or fewer hairs, and on the right side there is a row of hairs along the hind margin of the downwards bending side part. The anal tube is quite short and hardly stretching beyond the opening between the arms, it consists as usual of a longitudinally divided tergite and an undivided ventral part, and it is hairy at the end. When the hypopygium is in situ the whole anterior part, which is smooth and shining, is retracted into the sixth segment, so that almost only the arms of the forceps are seen, but the shape and sculpture of these, especially of the upper lobe of the left arm, is of great value for the specific distinction. Abdomen in the female has the sixth segment a little elongated and shows at the end the usual two small lamellæ. Abdomen is very sparingly and short haired. Legs somewhat robust, in nearly all species the front tarsi are dilated in both sexes, especially the four last joints, only in the male of *heterocerca* they are not or slightly dilated; the hind femora have in the male on the ventral side at the base a curious elevation or process, sometimes accompanied by a group of hairs; the process differs a little in shape in the various species; the coxal bristles are strong

and numerous, those on the outside at apex of hind coxæ form a curious fan, and below the middle trochanters is a long, outwards pointing bristle; the front tibiæ have no bristles, the middle tibiæ have one or two anterior bristles above the middle and one at apex, and the hind tibiæ have likewise one or two bristles on the anterior side above the middle and one at apex; these bristles are present in both sexes and constant (single individual aberrations not considered), but further the middle tibiæ have dorsal bristles, characteristic of the genus; these bristles may, all species taken in consideration, be present in a number from one to nine, but the number varies both for the various species and individually, and is always larger in the male than in the female; in the males the number may in the various species be in all from three to nine and in the females from one to four, but in the single species the number varies less, generally from one to three; the number is often different on right and left tibia. The bristles are long and strong; the posterior tibiæ have longer and shorter apical spurs. For the rest the legs are clothed with short hairs, as usual a little longer on the dorsal side of middle tibiæ in the apical part, and arranged in comb-like transverse rows on the posterior side of hind tibiæ in the apical part and on posteroventral side of hind metatarsi. Claws and pulvilli small; empodium bristle-shaped. Wings with the thick veins rather strong and costa reaching near to, or more or less to considerably beyond the middle; costal cilia long or moderate; the first vein runs parallel with the costa and suddenly curves up at the end, the mediastinal vein is distinct and well developed, stretching near to the curve of the first vein; third vein not forked; the seventh vein is very weak or only visible as a fold, it goes generally to the margin, but is sometimes a little abbreviated; also the anal vein is indicated as a concave fold and more or less visible, either only in the basal part or stretching to the middle, the extreme base of it is fully developed; at the base of third vein there is a strong bristle.

The developmental stages are, so far as I am aware, not described; the pupa of a species, considered as *aterrima*, is mentioned by Mégnin (Compt. rend. de l'Acad. des Sc. 105, 1887, 948, and La faune des cadavres, Paris 1894); the author found the pupæ and puparia in great numbers on exhumed human bodies which had been buried two to three years ago; he thinks that the eggs are deposited on the ground so that the young larva penetrates down to the body; this is possible, but I should be inclined to think that the eggs have been

present on the body before burial, such as is probably the case also in *Conicera*, though the question is in both cases not yet settled; the great numbers in which the puparia were found shows that several generations must have followed each other in the coffins. Brauer (1883) mentions for *Trineura* the larvæ found in dead *Lepidoptera* and decaying matters, and quotes Zetterstedt, but this is an error as Zetterstedt's remarks belong partly to *Gymnophora*, partly to other genera.

The species occur on leaves of bushes in woods, the males may often be seen hovering in small swarms in sunshine, generally near trees at the end of some branch. — The genus was hitherto considered to include only three European species; Becker mentioned, however, on account of differences in the hypopygium, that a fourth species existed, but he could find no other characters for it, and did not describe it. Schmitz followed in 1918 the same way, but in 1920 he published a very thorough new study of the genus in which especially the hypopygia were used for discrimination of the species, and here he enumerates no less than 13 European species, and he thinks it probable that still more species exist. My studies have convinced me that Schmitz's species are well founded; as regards the difficult synonymical questions which have arisen I quite follow Schmitz to whose remarks I refer. Of the 13 European species 7 have hitherto been found in Denmark.

The colour of all species is quite the same; the males are of a deep velvety black, the females dull black, and antennæ, palpi and halteres are black, these colours are, therefore, not mentioned in the descriptions of the species.

Table of Species.

Males.

- | | |
|--|-----------------------|
| 1. Hind and middle tibiæ with two anterior bristles. | 1. <i>Schineri</i> . |
| — Hind tibiæ with only one anterior bristle. | 2. |
| 2. Middle tibiæ with two anterior bristles; frons narrowed upwards | 2. <i>artifrons</i> . |
| — Middle tibiæ with only one anterior bristle; frons of equal breadth in the whole length. | 3. |
| 3. Wings clear and colourless, at most with an indication of being tinged | 4. |
| — Wings distinctly tinged, seventh vein reaching the margin | 6. |
| 4. Front tarsi not or practically not dilated; hypopygium | |

- with left arm of forceps not fissured; seventh vein reaching the margin..... 3. *heterocerca*.
- Front tarsi dilated; hypopygium with left arm of forceps by a fissure divided into an upper and a lower lobe; seventh vein not quite reaching to the margin..... 5.
5. Upper lobe of left arm of forceps with the hind margin concave, not crenelated; the indicated anal vein reaching to the middle..... 4. *aterrima*.
- Upper lobe of left arm of forceps with the hind margin convex, finely crenelated; the indicated anal vein short, not reaching the middle..... 5. *holosericea*.
6. Apically to the basal process below hind femora a group of bristly hairs..... 6. *pubipes*.
- No group of hairs at the basal process below hind femora 7. *tincta*.

The above table is based only on the males; Schmitz has not been able to find out the females, and though I possess several species taken in copula I am not able to discriminate with certainty the females of several species. As regards the females of the species treated here the following may be noted: *Schineri* and *artifrons* (the female of the latter unknown) will be recognized in the same way as the males by the tibial bristles; *heterocerca*, which in contradistinction to the male has the front tarsi dilated, is known by 1 being longer than 2 and the inner bristles of third frontal row relatively small; of the other three, which have 1 at most about equal to 2 and the said bristles relatively larger, *tincta* has the wings generally a little tinged and fourth vein not much curved at the base, while *holosericea* and *aterrima* have clear wings and fourth vein more curved; of these two species *holosericea* seems to have the costal cilia shorter than *aterrima* and seventh vein not quite reaching the margin, while in the *aterrima* female it reaches the margin; the female of *pubipes* is unknown, I possess two doubtful females which seem like the male to have the front legs rather pale.

1. Ph. Schineri Beck.

1901. Beck. Abhandl. zool. bot. Gesell. Wien, I, 80, 68, Taf. V, Fig. 72 (*Trineura*). — 1910. Kertész, Cat. Dipt. VII, 403 (*Trineura*). — 1914. Brues, Bull. Wisc. Nat. Hist. Soc. XII, 109. — 1918. Schmitz, Jaarb. Natuurh. Genootsch. Limburg 1917, 120 et 1920. *ibid.* 1919, 115, Fig. 1—2. — *Trineura stictica* Schin (nec Meig.) 1864. F. A. II, 347.

Male. Frons so imperceptibly narrowing upwards that it is practically of equal breadth in the whole length, the hairs long, about half as long as the bristles. Thorax with the hairs somewhat strong

and not short. Abdomen with the hairs on sixth segment distinct. Hypopygium with the left arm of forceps shining and by a long fissure divided into an upper and a lower lobe, the latter somewhat hairy. Legs black, front tibiæ brownish yellow; the four last joints of front tarsi dilated, but not much, the fourth joint longer than broad; base of hind femora with the basal process somewhat low, apically to it a row of longish hairs being shorter outwards; middle tibiæ with two anterior bristles and generally six, sometimes more, dorsal bristles, hind tibiæ with two anterodorsal bristles, one about in the middle and one above. Wings strongly brownish; veins dark brown, costa black, long, about 0,53 of the wing-length, 1 somewhat shorter than 2; costal cilia somewhat long.

Female. Middle tibiæ with only two to four dorsal bristles; wings much less brown.

Length 2—3,7 mm.

The above description of the male is drawn from a German specimen kindly sent me from Pater Schmitz.

Ph. Schineri is rare in Denmark, only one specimen, a female, has been taken at Silkeborg $\frac{5}{5}$ 1910 (Esben-Petersen).

Geographical Distribution: — Northern and middle Europe down into Austria.

2. *Ph. artifrons* Schmitz.

1920. Schmitz, Jaarb. Natuurh. Genootsch. Limburg 1919, 118.

Male. Frons narrowing upwards, above about one fifth of the breadth of the head, below towards twice as broad as above; the hairs long, not quite half as long as the bristles, the third row of bristles strongly convex and its inner bristles nearly vertically below the outer; the second row apparently consisting of four bristles as there below the normal bristles is a pair of almost equally strong bristles (no doubt strongly developed hairs). Palpi somewhat small. The hairs on thorax somewhat long and strong, not dense. Hypopygium with the left arm of forceps shining, divided by a fissure in an upper and a lower lobe, the upper lobe relatively small and with the hind margin strongly convex. Legs black, front tibiæ paler brownish, shorter than the tarsi; front tarsi moderately dilated, scarcely as broad as the end of tibiæ, with the fourth joint longer than broad; the basal process on hind femora not small, but low, with five to six long hairs on the anterior side; middle tibiæ with two anterior bristles in the upper

half (one of them not rarely wanting, generally, however, only on one leg), and with five to seven dorsal bristles; hind tibiae with one anterior bristle below the base. Wings somewhat strongly brown, veins dark brown, costa black, reaching about to the middle, 0,48—0,49 of the wing-length, 1 a little shorter than 2 (about 17—20); costal cilia long; fourth vein evenly curved, only slightly more in the first part; seventh vein relatively distinct, reaching the margin.

Female. Unknown.

Length 2,4—2,7 mm.

Ph. artifrons is rare in Denmark, we have only three specimens, all males, two taken by Stæger, they are without particular locality, but are probably from the vicinity of Copenhagen, and one from Teglstrup Hegn (Schlick); the latter is taken on $20/8$; the two specimens from Stæger stood determined as *velutina* and one of the specimens is labelled "Zett. det.", and is mentioned by Zetterstedt Dipt. Scand. VII, 2893, so that *artifrons* is identical with Zetterstedt's *velutina* or included in it. I have compared my specimens with a typical specimen from Pater Schmitz.

Geographical distribution: — Besides from Denmark known from various places in Germany.

3. *Ph. heterocerca* Schmitz.

1920. Schmitz, Jaarb. Natuurh. Genootsch. Limburg 1919, 118, Fig. 6.

Male. Frons rather narrow, of equal breadth in the whole length; the hairs short, few in number and only present just on the front part, the third row of bristles convex, the inner bristles only half as large as the outer. Thorax with the hairs somewhat long and dense. Hypopygium with the left arm of forceps without fissure and thus not divided into two lobes, it is shining and distinctly hairy on the lower part; the right arm is somewhat large with the hinder corners drawn out and somewhat incised in the hind margin; the process on the left side of the ventral part of the hypopygium is furcated (according to Schmitz, it was not to be seen on my specimens). Legs black, front legs with knees and tibiae yellowish, and also front tarsi and to a less degree middle tarsi paler; front tarsi very slightly or almost not dilated, fourth joint considerably longer than broad and as long or fully as long as the fifth; the basal process on hind femora somewhat high and triangular, with short hairs; the hairs below the hind femora a little longish; middle tibiae with one anterior

bristle below the base and five to eight dorsal bristles, hind tibiae with one anterior bristle at the upper third. Wings clear and colourless, thick veins brownish the other veins very pale; costa about to the middle (about 0,48 of the wing-length), 1 longer than 2 (about 17—14); costal cilia long; fourth vein slightly curved in its first part, for the

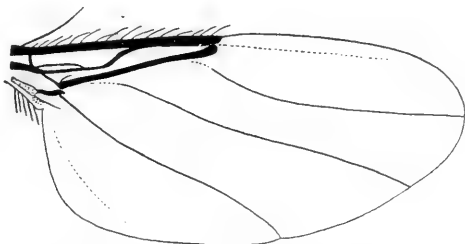


Fig. 73. Wing of *Ph. heterocerca* ♂.

rest almost straight; the anal vein very slightly indicated, seventh vein also weak, but reaching the margin.

Female. Similar to the male with the usual differences; front tarsi distinctly dilated; middle tibiae with three to four dorsal bristles; the hind femora show a quite small process below the base. As in the male the inner bristles of third row are only about half the length of the other bristles.

Length 2—2,5 mm.

Remarks: It is curious that most of my male specimens show a different number of the dorsal bristles on the middle tibiae as there is one more bristle on one tibia than on the other, thus five and six, six and seven, and seven and eight; also a female shows the same, viz three and four bristles. Schmitz describes l. c. a variety with the wings a little tinged, this variety seems to have the front tarsi as a rule slightly more dilated and fewer bristles on middle tibiae viz four to five, and there seems also to be a little difference in the wing as the costa is a little longer and division 1 relatively shorter; this variety I have not seen from Denmark. My male specimens are determined by Pater Schmitz.

Ph. heterocerca is rare in Denmark, I possess about twenty specimens, males and females, all taken in one locality, in Ermelund in low herbage on $\frac{14}{5}$ to $\frac{31}{5}$ in 1917 to 1921 (the author); for the genuine form Schmitz also records May so that the species seems to occur in spring. I have taken it in copula on $\frac{26}{5}$ and $\frac{31}{5}$. Only two of my

females are taken in copula, but I feel sure that also the others belong to this species as the costal divisions sufficiently distinguish this female.

Geographical distribution: — Hitherto only known from Denmark and Silesia.

4. *Ph. aterrima* Fabr.

1794. Fabr. Ent. Syst. IV, 334, 93 (*Musca*) et 1805. Syst. Antl. 323, 35 (*Tephritis*). — 1830. Meig. Syst. Besch. VI, 224, 37. — 1838. Zett. Ins. Lapp. 796, 8 et 1848. Dipt. Scand. VII, 2890, 35 (*Trineura*). — 1864. Schin. F. A. II, 347 (*Trineura*). — 1901. Beck. Abhandl. zool. bot. Gesell. Wien, I, 80, 66, Taf. V, Fig. 74 (75?) (*Trineura*). — 1910. Kertész, Cat. Dipt. VII, 402 (*Trineura*). — 1914. Brues, Bull. Wisc. Nat. Hist. Soc. XII, 107. — 1918. Schmitz, Jaarb. Natuurh. Genootsch. Limburg 1917, 170 et 1920. *ibid.* 1919, 120, Fig. 3. — *Trineura atra* Meig. 1804. Klass. Eur. Zweifl. I, 313, Taf. XV, Fig. 22. — 1823. Fall. Dipt. Suec. Phytom. 7, 7 p. p. — *Trineura obscura* Zett. 1848. l. c. VII, 2884, 32.

Male. Frons somewhat broad, about twice as high as broad or a little broader, of equal breadth, the hairs short; the third row of bristles somewhat convex, the inner bristles somewhat smaller than the others. Thorax with the hairs somewhat short and dense. Hypopygium with the left arm of forceps with a fissure dividing it into two lobes, the upper lobe somewhat large with the apical margin concave; the lobe is rugose, but the rugosity does not reach the actual hind margin so that this is not crenelated. Legs black, front tibiae somewhat paler, yellowish brown on the dorsal and anterior side; they are shorter than the tarsi; front tarsi with the four last joints dilated, but not broader than the end of tibia, fourth joint slightly longer than broad; hind femora with the hairs below short, the basal process rounded, with short hairs on the anterior side; middle tibiae with one anterior bristle below the base and generally five to six, but also four, dorsal bristles, hind tibiae with one anterior bristle at the upper third. Wings clear and colourless, at most with a slight indication of yellowish, and just at the base they are yellow; costa black, the other veins blackish brown, thin veins brownish; costa reaching beyond the middle, about 0,53 of the wing-length, but a little varying, 1 shorter than 2 (about 17—23); costal cilia moderately long; fourth vein rather curved in the first part, for the rest straight; anal vein visible as a fold to the middle, seventh vein weak, but reaching quite near to the margin.

Female. Similar except the usual differences; middle tibiae with one to three dorsal bristles (in my copulated females with

three); wings not or slightly yellow at base, the indication of the anal vein less distinct, and seventh vein reaching the margin.

Length 2,2—3 mm.

Ph. aterritima is common in Denmark; Damhusso, Hellerup, Holte, Birkerød, Hillerød, on Langeland at Lohals, on Ærø, on Funen at Odense, in Jutland at Hejls south of Kolding, Jelling, on Fanø and at Løkken; my dates are $^{30}/_5$ — $^{1}/_9$. I have taken it in copula on $^4/_6$ and $^{20}/_7$. My male specimens have been examined by Pater Schmitz.

Geographical distribution: — Europe, towards the north to Lapland; further it goes down into North Africa and it occurs also in North America.

5. *Ph. holosericea* Schmitz.

1920. Schmitz, Jaarb. Natuurh. Genootsch. Limburg 1919, 121, Fig. 4.

Male. Frons twice as high as broad, of equal breadth, the hairs short; third row of bristles rather convex, the inner bristles somewhat shorter than the others. Thorax with the hairs somewhat short and dense. Hypopygium with the left arm of forceps with a fissure dividing it into an upper and a lower lobe, both lobes are shagreened and rugose, the upper lobe has a convex hind margin, and as the rugosity is produced to the very margin, this is slightly crenelated; the lower lobe distinctly hairy. Legs black, front tibiæ paler, brownish yellow on the dorsal and anterior side, they are shorter than the tarsi; the four last joints of front tarsi dilated, about as broad as the end of tibia, the fourth joint very slightly longer than broad; the hairs below hind femora short, the basal process not small, somewhat rounded, with some hairs on the anterior side; middle tibiæ with one anterior bristle below the base and with four to five dorsal bristles, hind tibiæ with one anterior bristle at the upper third. Wings clear and colourless, at most very slightly yellowish at base, thick veins brown, costa black, thin veins pale brownish; costa reaching beyond the middle, about 0,52—0,53 of the wing-length; 1 shorter than 2, about as 8—11; costal cilia somewhat short, generally shorter than in *aterrima*; fourth vein as in *aterrima*; the indication of anal vein short, not reaching to the middle, seventh vein weak, nearly straight and abbreviated at the end.

Female. Similar to the male with the usual differences; middle tibiæ (in my mated female) with three dorsal bristles; wings with 1 about equal to 2.

Length 2,3—2,5 mm.

Ph. holosericea is not common in Denmark, I possess seven specimens, six males and a female and I have seen five males more; Damhusmosen, Hellerup, Ermelund (the author), Charlottenlund (Schlick), Lyngby Mose, Holte (the author), Bagsvær (Larsen), Lolland at Maribo (Schlick), and in Jutland at Hejls south of Kolding (the author); my dates are $^{24}/_5$ — $^3/_9$; I have taken it in copula on $^{25}/_5$. My male specimens have been determined by Pater Schmitz.

Geographical distribution: — Hitherto known from Denmark, Holland, Germany and Hungaria.

6. *Ph. pubipes* Schmitz.

1920. Schmitz, Jaarb. Natuurh. Genootsch. Limburg 1919, 124.

Male. Frons fully twice as high as broad, of equal breadth, the hairs short; the third row of bristles rather convex, the inner bristles a little shorter than the others.

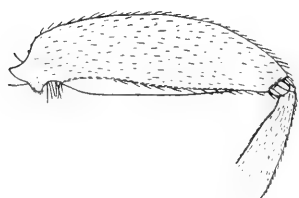


Fig. 74. *Ph. pubipes* ♂, hind femur from the outside $\times 35$.

Thorax with the hairs dense, not quite short. Hypopygium withdrawn, the left arm of forceps somewhat rugose. Legs black, apical part of front femora and front tibiae and tarsi yellowish, middle tibiae and tarsi brownish; front tibiae shorter than the tarsi, the four last joints of the tarsi only moderately dilated, not as broad as the end of tibia, the fourth joint considerably longer than broad; hind femora not broad, with short hairs below, the basal process forming a small tooth at the very base and distally to it an excision with a conspicuous group of longish, bristly hairs (fig. 74); middle tibiae with an anterior bristle at about the upper third, and with four (according to Schmitz also three) dorsal bristles; hind tibiae with an anterior bristle at the upper third. Wings slightly yellowish tinged, at the basal anterior part somewhat more; veins brown; costa reaching to or about to the middle; 1 equal to 2; costal cilia long; fourth vein somewhat curved in its first part for the rest straight; seventh vein weak, but reaching the margin.

Female. Unknown (see below).

Length 2,7 mm.

Ch. pubipes is rare in Denmark, I know only two specimens, both males; Charlottenlund $^{18}/_9$ 1877 (Schlick) and on Langeland at

Lohals ²⁹/₇ 1913 (the author); my specimens are identified by Pater Schmitz. Schmitz says about the inner bristles of third row "fast auf dem gleichen Niveau wie die äussern", in my specimens the third row is rather convex.

I possess two doubtful females, one from Holte and one from Lohals; they agree with the male in the colour of the front legs.

Geographical distribution: — Hitherto only known from Denmark and Silesia; in all only four males are known.

7. *Ph. tincta* Schmitz.

1920. Schmitz, Jaarb. Natuurh. Genootsch. Limburg 1919, 124, Fig. 5. — ? *Phora stictica* Meig. 1830. Syst. Besch. VI, 225, 39. — ? *Trineura aterrima* Beck. 1901. Abhandl. zool. bot. Gesell. Wien, I, p. p. Taf. V, Fig. 73.

Male. Frons about twice as high as broad, of equal breadth, the hairs short; third row of bristles not strongly convex, the inner bristles somewhat smaller than the others. Thorax with the hairs dense, not long. Hypopygium with the left arm of forceps by a fissure divided into an upper and a lower lobe, the upper lobe somewhat large, with the hind margin convex, slightly or almost not rugose and thus more or less shining. Legs black, front tibiae yellowish brown on anterior and dorsal side and the base of front tarsi a little pale; front tibiae shorter than tarsi; the four last joints of the front tarsi somewhat dilated, almost as broad as the end of tibia, the fourth joint longer than broad; the hairs below hind femora short, the basal process somewhat triangular, elongated; middle tibiae with an anterior bristle at about the upper third, and four to five dorsal bristles; hind tibiae with one anterior bristle at the upper third. Wings distinctly tinged, somewhat yellowish to slightly brownish; veins brown, costa black; the costa reaching to the middle or a little beyond, 1 shorter than 2, about as 7—9; costal cilia long; fourth vein somewhat curved in its first part, for the rest straight; seventh vein reaching to the margin.

Female. Similar to the male with the usual differences; the wings quite slightly tinged; middle tibiae with two to three dorsal bristles (in my specimens).

Length 2—2,5 mm.

Ph. tincta is common in Denmark; Dyrehaven, Lyngby Mose, Holte, on Langeland at Lohals, on Funen at Veflinge, in Jutland at Hejls south of Kolding, Jelling, Ry and at Løkken, and on Bornholm in Almindingen; the dates are ²⁴/₅—²⁴/₇; I have taken it in copula

between $\frac{2}{7}$ and $\frac{22}{7}$. My male specimens have been examined by Pater Schmitz.

Geographical distribution: — Hitherto known from Denmark, Holland, Belgium and Germany; the species is about as common as *aterrima* and will no doubt be found to be widely distributed.

9. **Beckerina** Malloch.

Species of medium size. Frons rather broad, with a middle furrow; three nearly straight rows of strong bristles with four bristles in each row; one pair of smaller supraantennal bristles which are directed upwards and diverging. Eyes hairy. Antennæ inserted rather low down, of medium size in the male, smaller in the female, arista dorsal, pubescent. Palpi not small, with dense, but somewhat short bristles. One long lower postocular bristle; two strong oral bristles directed forwards and a couple of quite small genal bristles or hairs. Thorax with one pair of dorsocentral bristles. Scutellum with four strong and equal bristles. Mesopleura bare. Abdomen with the segments of equal length. Hypopygium of medium size or somewhat small; it is unsymmetrical, of the side prolongations from the tergite the left is quite short and rounded, the right long and broad; the anal tube papilliform, quite small, almost not protruding; a somewhat cleft ventral plate is present. In the female abdomen terminates with two small lamellæ, which are directed downwards. Abdomen is very short-haired, only at the hind margin of the segments and especially at the hind corners the hairs are a little longer. Legs without tibial bristles, only a small apical and spur-like anterior bristle on hind tibiæ and a similar, still smaller on middle tibiæ; besides the middle tibiæ have one long apical spur and hind tibiæ a similar and a couple of small spurs; the legs are short-haired, hind tibiæ simple, without furrow or palisade-like rows of hairs, they have special, short, comb-like arranged hairs on the apical part of the posterior side and on posteroventral side of hind tarsi; on middle tibiæ no such arrangement is present, at all events not distinctly, but the hairs on the dorsal side are a little longer than the other clothing. Claws and pulvilli normal, but small, empodium quite small, bristle-shaped. Wings with the costa reaching fully to the middle, thickened outwards; costal cilia long; mediastinal vein present; third vein forked, the fourth vein issuing beyond the base of the fork, somewhat short, curved upwards

towards the end and ending long before the apex of the wing; all thin veins reaching to the margin.

This genus is evidently related to *Aphiochaeta*, from which it was separated in 1910; the specially distinguishing characters are the erect supraantennal bristles and the simple hind tibiæ. The genus comprises only one European species, and in all only two species, viz besides *umbrimargo* the American species *orphnephiloides* Malloch; this latter species Malloch evidently placed correctly in this genus in spite of some deviations, it has thus four supraantennal bristles, the frontal suture slightly marked, the rows of frontal bristles much curved, second abdominal segment elongated and a short costal fringe.

The developmental stages of the genus are not known.

As remarked only one palæarctic species of the genus is known, also occurring in Denmark.

1. *B. umbrimargo* Beck.

1901. Beck. Abhandl. zool. bot. Gesell. Wien, I, 65, 61, Taf. III, Fig. 45 (*Phora*). — 1908. Wood, Ent. Month. Mag. 2, XIX, 168 (*Phora*). — 1910. Kertész, Cat. Dipt. VII, 415 (*Aphiochaeta*). — 1914. Brues, Bull. Wisc. Nat. Hist. Soc. XII, 111. — 1918. Schmitz, Jaarb. Natuurh. Genootsch. Limburg 1917, 121.

Male. Frons nearly twice as broad as high, black, somewhat greyish and dull; the anterior row of bristles a little convex; one pair of supraantennal bristles, considerably smaller than the others. Antennæ of medium size, black, the third joint roundish; arista pubescent. Palpi not small, black or brownish black, with dense and strong, but shortish bristles. Thorax black, a little shining, with brownish black pubescence, rather distinct behind, and with one pair of dorsocentral bristles. Scutellum with four equal bristles. Abdomen black, in certain lights a little greyish, dull, the segments of equal length; abdomen is sparingly haired with short hairs, a little longer at the hind margins, especially at the hind corners of the segments. Hypopygium of medium size, greyish; it is unsymmetrical, the right side prolongation long, the left quite short and rounded; the prolongations bear longish hairs at apex; anal tube quite short, almost not protruding, brownish and hairy; the ventral plate somewhat cleft in the hind margin. Legs brownish black, anterior femora more brownish and tibiæ and tarsi brownish to brownish yellow. Wings rather brownish, almost blackish at the anterior margin in continuation of costa; veins brown or blackish brown, thin veins strong; costa reaching fully to the middle, increasing in thickness outwards; 1 slightly longer than 2 + 3;

costal cilia long; fork longish, angle somewhat acute; fourth vein issuing considerably behind the base of the fork, somewhat curved at its origin, curved upwards at the end and ending considerably before the apex of the wing. Halteres black.



Fig. 75. Wing of *B. umbrimargo* ♂.

Female. Antennæ with the third joint smaller; palpi of the same size and armature, and the female for the rest similar to the male. Length 1,8—2,6 mm.

B. umbrimargo I have taken only in one locality, Ermelund, but here it is rather common, occurring on leaves of bushes and low herbage in a low, damp place; my dates are $\frac{5}{5}$ — $\frac{30}{6}$ so that it seems to be an early occurring species. I have taken it in copula on $\frac{19}{5}$. I took it for the first time in 1914.

Geographical distribution: — Europe with Britain and down into Austria; it does not seem to be known north of Denmark.

10. **Aphiochaeta** Brues.

Species of small to medium size (about 0,5 to fully 3 mm). Frons generally broader than high, sometimes quadratic or higher than broad; it has an impressed longitudinal middle line; there are three transverse rows of bristles with four bristles in each row; the two posterior rows are generally more or less straight, or the middle row may be somewhat convex; the anterior row varies from straight to very convex, with the inner bristles much below the outer, in extreme cases nearly or quite vertically below the outer. There are two pairs of stronger or weaker supraantennal bristles, one below the other, which are proclinate, directed forwards and downwards; these two pairs of bristles are either equal in size or the bristles of the lower pair are smaller and weaker than those of the upper, in various degrees, down to a quite minute size, and in rare cases the lower

bristles are so small that only one pair of distinct bristles is seen; the upper supraantennal bristles may be either approximate or more distant so that they are either more approximate than the inner bristles of the middle row or placed in the same distance from each other as these latter, and these are the two alternatives usually occurring, but sometimes, however more rarely, they are placed more widely apart so that they are more distant than the inner bristles of the middle row; the supraantennal bristles of the lower pair are generally more approximate than the upper, rarely placed in the same distance. Eyes hairy. Antennæ with the third joint generally round, rarely more elongated, oval; it may vary a little in the relative size in the various species, and sometimes it may be somewhat too much enlarged in the male sex, but not or less in the female; arista dorsal, shorter or longer, from distinctly pubescent to almost bare. Clypeus generally or always a little more protruding in the female than in the male, but not conspicuously. Palpi smaller or larger with generally well developed bristles, sometimes the bristles more or less short; in some few species the palpi are enlarged in the male and with the bristles weak and short. Below the lower corner of the eye there is a long lower postocular bristle, and then, stretching upwards along the lower anterior eye-margin, a number of generally well developed bristles representing the oral and genal bristles, but these bristles form together with the postocular bristles an uninterrupted series curving round the lower eye-margin, only the lower postocular bristle being somewhat individualised by its size or its direction, and this is sometimes also not the case either; not rarely this lower postocular bristle is, however, distinct, and of the anterior row one or a couple below are stronger, oral bristles, and by an interval divided from the smaller genal bristles. Thorax with one pair of dorsocentral bristles; in a couple of species (*latifemorata*, *ruficornis*, *errata*) there is, besides, a bristle forwards and outwards to the dorsocentral bristles which may be termed an intraalar bristle; this bristle is otherwise not individualised. Scutellum with two or four, in a single case (*flavicoxa*) with six bristles; when there are two bristles there are always two quite small hairs present, one on each side anterior to the bristle, and it is these hairs which in the four-bristled species have been developed to bristles; when four bristles are present they may either be equal in size or the anterior pair is smaller, and not rarely they are equal in the female, unequal in the male; in some cases the female shows four, but the male only two scutellar bristles,

the anterior pair being reduced to the small hairs mentioned above, always representing the anterior pair when only two bristles are present, and in a few cases the anterior pair in the male may vary in the same species, being sometimes mere hairs, sometimes more developed. Mesopleura either bare or bristly, when bristly the bristles may all be small and of uniform or nearly uniform size, or among the bristles there may be one or a couple larger; these larger bristles may be stronger or weaker and thus more or less conspicuous. Abdomen in the male with the segments more or less equal in length or sometimes the sixth, or the second and sixth somewhat elongated. The hypopygium is smaller or larger; it may be somewhat unsymmetrical with the side prolongations unequal, but most often it is symmetrical; it may otherwise vary somewhat in shape, being higher than long or on the contrary longer than high and somewhat cylindrical, and the side prolongations may be drawn a little out below in various ways; it is generally more or less hairy on the sides downwards, and it is often provided with weaker or stronger bristles in various arrangement and number. The ventral plate may vary from quite small to a large, flap-like plate, it is in more rare cases of a special shape, narrow and spatula-shaped, forked or unsymmetrical. The anal tube varies from quite small to a considerable size; it is as a rule compressed, highest about the middle, slanting towards base and apex, rarely it is depressed; at the apex there is a pair of larger or smaller, upwards curved hairs, very rarely wanting. In the female abdomen consists of six normally developed segments with normal tergites, the following segments are narrow and more or less retracted telescopically, they consist of a small seventh and eighth segment and finally at the end a small segment and apically a pair of small lamellæ, generally or always directed downwards, together these formations represent the ninth and tenth segments; the connecting membrane between the sixth and seventh and between the seventh and eighth segments is long so that these segments are able to be stretched out to a high degree; the tergites of the segments after the sixth are very small, they may be of different shape and sometimes longitudinally divided; these last segments after the sixth, in contradistinction to the anterior segments, also have chitinized ventral plates, but they are small and may likewise be of various shape and often divided; only in one species (*Oldenbergi* Schmitz) there is a chitinized ventral plate on the sixth segment. The tergite of the sixth segment in the female seems always to have a more or less pronounced emargination

in the middle of the front margin so that an unchitinized part is seen here, and I think this may be in connection with some special organ present in this place; this feature is sometimes rather conspicuous f. inst. in *pygmaea*, but is also seen in the other species, when the segments are fully stretched out. In some few species (*ruficornis*, *pygmaea* and to a less degree *errata* and *tarsalis*) the abdominal tergites in the female are on some segments narrowed in a curious way, and in other species (*ciliata*, *coaequalis*) the fourth or (*tergata*, *breviterga*) the third tergite is abbreviated, or the fourth tergite is not at all developed (*zonata*). Abdomen is sparingly haired with very short hairs, generally only quite slightly longer at the hind margins of the segments; these hindmarginal hairs as a rule increase a little in length backwards, but they may be more or less elongated or sometimes developed as bristles at the hind margin of the sixth segment in the male; in some species the hairs at the sides of second abdominal segment are developed as more or less strong bristles; two species (*rufipes* and *hirtiventris*) have in the male abdomen clothed with curious, long hairs. Legs sometimes with the front tarsi thickened, either the whole tarsus or only metatarsus, and generally the thickening is most pronounced in the male. In single cases the hind tibiae and metatarsi may be thickened. Hind femora more or less broad. The legs have no single special bristles; the posterior tibiae have an apical spur; the hind tibiae have a dorsal hair-seam consisting of dense, palisade-like arranged hairs and generally standing on a slight longitudinal keel; the hair-seam may be straight or more or less deflected; on the posterior side of the hair-seam there is a row of bristles which may vary from rather strong to quite delicate, but always distinctly discernible from the other hairs present; the various development of these bristles form a very important specific character; on the middle tibiae a similar arrangement is present, only the hair-seam stops here a little before the apex and the bristles are smaller; in a few species there is on the posterior tibiae a row of bristles also on the anterior side of the hair-seam, but these bristles are smaller than the posterior and generally not going to the apex, or only developed above and few in number. Only two species (*nudipes* and *retroversa*, non-Danish) show simple posterior tibiae without hair-seam or bristles, and these two species are thus rather aberrant. The legs are for the rest clothed with short hairs; on the anterodorsal side of middle tibiae towards the end the hairs are a little longer, but not, or not distinctly arranged in rows; on the posterior side of hind tibiae at apex the short hairs are arranged

in comb-like transverse rows on a smaller or larger, but generally rather small area, and they are also similarly arranged on the posterior side of hind metatarsus. From the common clothing with short hairs the hairs below the hind femora still must be excepted; while the posterior side of hind femora is for the greater part nude there is below a ventral row of hairs, from the base to about the middle or somewhat beyond; these hairs may be rather short and little marked against the common clothing, but often they are longer to rather long and also more or less strong, and when such developed they are rather sparse. Hairs of the mentioned kind, whether shorter or longer, are equally developed in both sexes or, at all events, only slightly less pronounced in the female, but sometimes these hairs are more specially developed, as a short, very dense fringe, or as a dense fringe of longer and stronger, more bristly, often curved hairs which may be denser or specially developed at the base, or on the contrary at the middle, and sometimes specially developed hairs are present only at the base. When the femora are armed in this way, these hairs or bristles are present only in the male, and the female then has only short hairs. The hairs below the hind femora no doubt give important specific characters, but when they are simply more or less elongated they are often difficult to see, as they may frequently be adpressed towards the lower side of the femora. Besides the mentioned hairs the lowermost of the hairs clothing the anterior side are in the apical part longer and stronger, so that a short anteroventral row of stronger hairs is present here; these latter hairs may also be of various development in the various species. Claws and pulvilli normal, generally small; empodium small and bristle-shaped. Wings with the costa much varying in length, from about 0,30 of the wing-length to well beyond the middle and sometimes still longer; the mediastinal vein ending in the subcostal vein, sometimes somewhat indistinctly, the vein appearing a little abbreviated; the costal cilia varying from very short to rather long; third vein forked; fourth to seventh veins present and reaching the margin. In some cases one of the wing-veins may be specially developed, more or less broadened; in a single case (*humeralis*) it is the third which is considerably broad in the male, but only slightly strong in the female; in another group of species it is costa which is more or less thickened in the female, sometimes much thickened and then also a little thickened in the male, at other times less thickened and then simple in the male.

The developmental stages of this large genus so rich in species

are only very scantily known, a number of species have, however, been bred, so that some facts are known about their feeding habits, but only relatively few larvæ are described. Bouché (Naturgesch. d. Ins. 1834, 102) seems to be the first author who has mentioned the larva (*Phora heracleellae* which is considered to be identical with *sordida* Zett., though I am inclined to think it is *rufipes*, the author having confused the two sexes). I shall not here enumerate the cases in which species have been bred, mentioned in the literature, but refer to Brauer (Denkschr. d. kais. Akad. d. Wissensch. Wien, math. nat. Cl. 1883, 66) and Keilin (Bull. Sc. France Belgique (7) 45, 61 et 79), and in 1912 Malloch (Proc. U. S. Nat. Mus. 43, 412) has given a list with brief notations of the habits of the most species of which they are known; also Grandi (Boll. Lab. Zool. Gen. et Agrar. Portici, VIII, 1914, 242) gives an enumeration of the known habits. The larvæ have been found feeding on decaying animal and vegetable substances of many various kinds; species have been bred from decaying leaves (Malloch, Ent. Month. Mag. 2, XX, 1909, 36, mentions that he has found *rufipes* mining in leaves of turnips, but the larva no doubt fed on the decaying leaves, as suggested by Wood, *ibid.* 2, XXII, 1911, 69), from decaying potatoes, from various species of fungi, fresh or most often decaying, from onions and also from dung; further they have been bred from dead insects of many various kinds, from nests of wasps and bees, and from various dead snails; *rufipes*, which is so common in our houses, has been bred from old cheese, from a concentrated solution of soap and from old human excrements, besides that it has in the free been found in decomposing animal and vegetable matters. The following list of recorded habits for species of the genus can be given: *A. Giraudii* Egg. from cocoon of *Cimex variabilis*; *A. ruficornis* Meig. from dead snails; *A. rata* Wood from nests of *Bombus* and *Vespa*, from decaying vegetable matters with *Nepticula* and from a larva of *Clerus formicarius*; *A. sordida* Zett.? (*heracleella* Bouché) from larvæ of *Tinea heracleella*; *A. minor* Zett. from cocoon of *Cimex americana*; *A. flava* Fall. from an *Agaricus*; *A. sulphuripes* Meig. (*lutea*) from an *Agaricus*, from pupa of *Sphinx pinastri* (*semi-flava* Hartig) and from dunged humus with larvæ of *Bibio pomonæ* (Engel: Wien. Ent. Zeitg. XXXV, 1916, 57); *A. rufipes* Meig. from old cheese, concentrated dilution of soap, old human excrements, humus impregnated with manure, decaying leaves, decaying potatoes, various fresh or decaying fungi, and from *Lactaria deliciosa* and *Psalliota campestris* in which lived *Limonia xanthoptera* (= *Limnobia*

bifasciata) and *Mycetophila punctata* and *blanda* (Engel l. c.), from dead *Oryctes nasicormis*, pupa of *Sphinx atropos*, decaying Lepidopterous larvæ among others *Ocneria dispar*, pupa of *Vanessa antiopa*, from bee-hives (here it is often common and has, therefore, been miscredited as the cause of foul brood, though evidently only present as a scavenger), from nests of *Vespa germanica*, larva of *Nematus salicis*, and from dead snails; Schnabl (see Mik. Wien. Ent. Zeitg. II, 1883, 46) mentions the larva vomitted numerously by a patient who had lived on somewhat putrid potatoes, but as the author, as seen below, had earlier mistaken a Muscid larva for that of *rufipes*, the observation is perhaps not correct; the larva of this species is also mentioned by Chapellier (Feuille des jeun. Naturalistes, 43, 1913, 55) as living in bodies of Canary birds prepared with vapours of formaline; *A. pulicaria* Fall. from cow-dung, from nest of *Vespa germanica*, and from an Agaricus; *A. pusilla* Meig. from an Agaricus, from *Bombyx pini*, and from under the bark of a pine-tree in excrements and detrite from bark-beetles and remains of an *Astynomus aedilis*; *A. pygmaea* Zett. from a mushroom (Engel l. c.). Malloch l. c. mentions the following American species: *A. fungicola* Coqu. from the fungus *Trametes pecki*; *A. agarici* Lintn. on decaying mushrooms; *A. scalaris* Loew from onions and decaying insects; *A. conica* Mall. from abdomen of *Camponotus pennsylvanicus*; *A. aletiae* Com. from pupa of *Aletia*; *A. atlantica?* Brues on rotten *Aletia* pupa; *A. evarthæ* Mall. from dead beetles and from fungi; *A. setacea* Aldr. from cocoon of *Cimbex americana*. Still a couple of unidentified species have been noted: *A. tuberculata* Schin. from truffles and *A. bovistae* Gimmerth. in a fresh Lycoperdon. The exotic species *A. xanthina* Speis. = *ferruginea* Brunetti (and perhaps = *scalaris* Loew) (Schmitz, Wien. Ent. Zeitg. XXXV, 1916, 228) has been bred from dead insects and from a Lacertid (*Calotes versicolor*), and this species is interesting as it is said to cause myiasis in man, infesting the intestine and being able to complete its life cycle as an internal human parasite (Austen, Trans. Soc. Trop. Medic. et Hyg. III, 1910, 229). — I have myself bred *ruficornis* from a pupa found in flood refuse at the border of a pond, and I have seen *errata* with its pupa found in a similar place, further I have *rata* bred from a pupa in flood refuse, from larvæ in dead Lepidopterous larvæ, from larvæ in a dead *Orgyia antiqua*, from larvæ in a dead *Prionus coriarius*, from pupæ found in the nest of a chaffinch, and from nest of *Vespa vulgaris*; *rufipes* I possess bred from decaying seed of lupines, from fungi, from nests of wasps, from bee-hives,

and from sick and dead larvæ of *Stilpnotia salicis*, and finally I possess *pulicaria* bred from *Vespa media*, from a dead *Carabus hortensis* and from decaying larvæ and pupæ of *Depressaria nervosa*.

From the above it is evident that the larvæ feed on decomposing animal and vegetable matters, and the species seem to be rather polyphagous as the same species has often been bred from various substances, both vegetable and animal. On account of cases where the species have been bred from insects, it has been suggested that they were parasites, but in all or most cases it seems probable that the insects have been sick or dead before the attack; in one case, however, true parasitism seems to be beyond doubt, viz as regards the American species *A. juli* Brues parasiting on myriapods (Knab, Insect. Insc. Menstr. I, 1913, 24), and *A. rata* once has been recorded as bred from a living larva of *Clerus formicarius* (se Schmitz, Zool. Jahrb. Syst. 37, 1914, 553), but, according to the above, this species is, at all events generally, not parasitic, perhaps the *Clerus*-larva has been sick. — As remarked only few larvæ have been described; Bouché (Naturgesch. d. Ins. 1834, 102) extremely briefly describes the larva and pupa of *A. sordida* Zett.? (*heracleellae*); Léon Dufour (Ann. d. sc. nat. Zool. 2, XII, 1839, 54) describes and figures larva and pupa of *A. rufipes* (*pallipes*) and 1840 (Mém. Soc. Roy. des sc. de l'agr. et des arts de Lille, 416) he describes and figures larva and pupa of *A. pusilla* (*nigra*); Bouché (Stett. Ent. Zeitg. VIII, 1847, 146) gives a very short description of the larva of *rufipes*; Gimmerthal (Arbeit. naturf. Ver. Riga I, 1848, 324) mentions and figures larva and pupa of *rufipes* (*annulata*); Heeger (Sitzungsber. kais. Akad. d. Wissensch. math. nat. Cl. Wien, X, 1853, 170) describes and figures the developmental stages of the same species; Keilin thinks that the author has mistaken the larva, and that the pupa may belong to another species; Perris (Ann. Soc. Ent. de Fr. 4, X, 1870, 354) describes and figures the stages of *A. pusilla*; Schnabl (Deutsch. Entom. Zeitschr. XX, 1876, 217) describes and figures larva and pupa of *A. rufipes*, the pupa is no doubt correct, but a sole glance at the figures of the larva shows that it is the larva of a Muscid, as already stated by Keilin; Hubbard describes (Amer. Ent. III, 1880, 34) a larva, which, according to Brues, (Bull. Wisc. Nat. Hist. Soc. IV, 1906, 101) is probably *A. cavernicola* Brues; Kiefer (Ill. Zeitschr. für Entom. V, 1900, 241) describes the larva of *rufipes*, Keilin is inclined to think that this larva may belong to another species; Keilin (Bull. Soc. France Belgique (7), 45, 1911) very thoroughly describes and figures larvæ and

pupæ of *A. rufipes* and *ruficornis*, and finally Grandi (Boll. Lab. Zool. Gen. et Agrar. Portici, VIII, 1914, 243) likewise thoroughly describes and figures the developmental stages of the exotic species *A. xanthima* Speis. — I have myself examined a pupa of *ruficornis* and of *errata*, and larvæ and pupæ of *rata*, *rufipes* and *pulicaria*. The larva of *rufipes* is whitish, almost cylindrical, attenuating anteriorly, but truncate behind; the surface is covered with dense, nearly microscopical spinules, less developed on the ventral side; on the dorsal surface there are small, conically pointed or hair-like papillæ in transverse rows on the segments; on prothorax there are four such papillæ, on meso- and metathorax six; at the base of prothorax the anterior spiracles are found, one on each side; each abdominal segment is somewhat indistinctly divided into three corrugations which are separated by furrows; each of these segments has eight papillæ of which four are present on the posterior corrugation, placed two to each side of the middle; and four are found on the middle corrugation, placed towards the sides and thus more or less pleural. The papillæ on the seventh segment form a posteriorly convex row, following the dorsal outline of the segment which stretches backwards in the middle; the eighth segment is obliquely truncated above and has the posterior spiracles lying on the middle; round its hind margin are six papillæ forming distinct teeth, the fourth pair of papillæ placed more anteriorly near the sides. On the ventral surface each abdominal segment shows a pair of somewhat large and somewhat bladder-like, flat prominences, one on each side of the middle, each showing an indication of being longitudinally divided; outwards to each prominence a slight elevation is seen. The length of the larva is 4—5 mm. The pupa is pale brown, it is arched from side to side on the ventral surface, more flat on the dorsal; the greatest height is near the anterior end, the dorsal surface from here slanting abruptly of towards the anterior end, but evenly towards the posterior end; the lateral margin is somewhat sharply marked and the outline of the pupa is elongately rhomboidal; the larval papillæ are only slightly marked, but however, discernible as small brown points; of the lateral papillæ the inner is placed on the margin, the outer below it on the ventral side; the papillæ round the hind margin are more distinct. The spiracular tubes are not long, somewhat distinct, directed outwards, but almost not forwards; the length of the pupa is 3 to about 4 mm. As seen from the above this description is quite agreeing with that given by Keilin; this author has studied the finer structure of the formations which is in connection with their sensory functions; I only find the

apical part of the pupa (Pl. IV, fig. 44) erroneously drawn, the border between the seventh and eighth abdominal segments being drawn as a transverse line, while it is in reality convex behind as in the larva, and consequently the eight teeth round the margin of the last segment reach further forwards on the sides. — The larva of *pulicaria* is quite similar to that of *rufipes*, only the microscopical spinules being still smaller, so that under a lens the surface is apparently nude; it is smaller, the length of the larva is 3,5 mm, of the pupa 2,5 mm. — Again the larva of *rata* is similar to the preceding, it is likewise apparently nearly nude, but the papillæ are relatively fully as large as in *rufipes*; it has a length of 4 mm; the pupa, which, in accordance with the larva, shows the larval papillæ rather distinct, is 2—3 mm. — Of *ruficornis* I have only seen a pupa, it has, as described by Keilin, the posterior end narrow and the posterior spiracles not lying above on eighth segment, but at the end of it and somewhat protruding; the larval papillæ are, in accordance with their smallness in the larva, almost not to be seen, even round the hind margin of last segment; the length is 3 mm; the pupa of *errata* is quite similar to that of *ruficornis*. — *A. pusilla*, as described by Perris, is similar to the others, but seems to have the papillæ somewhat large.

Most species of *Aphiochaeta* seem to have more than one brood in the year as they may occur during the whole season, or sometimes especially in spring or early summer and then again towards autumn; some few species, which occur at more fixed times, have perhaps only one brood, as f. inst. *A. Woodi* n. sp., which, at all events with us, is exclusively autumnal. The hibernation generally takes place in the pupal stage, I think, but probably also in certain cases in the younger or older larval stage; I possess several breedings of *A. rata* where the larvæ were taken in September to November, the imagines emerging from April to June. As to species such as the above mentioned *Woodi* it is certainly the larva which hibernates. Some species are evidently able to hibernate also as imagines, besides *rufipes*, which may be met with indoors in every month, I possess f. inst. also *pygmaea* from all months in the year; once by removing some fire-wood in the free on ¹⁴/₁₁ *ciliata* and *lata* were found, of the former both sexes, of the latter only males, and on ²⁵/₁₂ *ciliata*, *maura*, *pygmaea* and *pygmaeoides* were taken on windows in a villa near a wood, evidently coming from the wood with a Christmas-tree which had been brought in the day before; of *ciliata*, *maura* and *pygmaeoides* only females were present, of *pygmaea* both sexes.

The species of *Aphiochaeta* occur especially on leaves of bushes and low herbage, generally in woods in more or less humid and shaded places; they run quickly around on the leaves, and when disturbed they fly only for a short distance; some species are also seen on flowers, especially of umbellifers, and here often in sunshine. Like the other Phorids they have a curious way of running, which makes them easily recognizable; when they are taken by sweeping with the net in herbage, and the net then is filled with small flies, the species of *Aphiochaeta* are at once recognized in the net only by their movements, and this is fortunate for else they would be much more difficult to collect; I have been deceived only by certain small Borborids and by the species of *Drapetis*. It is rare that a single species predominates in a locality, though this may happen, f. inst. *Woodi*, *atripes*, *tumida*, *latifrons* and perhaps a few others I have found so, otherwise by sweeping in a locality a relatively large number of species in proportion to the number of specimens is generally to be had; as an example I shall note that from a short collecting in a small locality I once brought home 40 specimens including no less than 27 species, and of such instances I could enumerate many; the given example is from the summer 1921, which was very dry, and Phorids in no way common. The species are most numerous in autumn. Some few species may sometimes be seen swarming, I have f. inst. taken *latifrons* occurring in small swarms around the leaves of a *Corylus*, the swarms consisted only of males, and I have seen *tumida* swarming round the end of branches of *Acer*, and here both sexes were present.

Of the genus about 230 species are hitherto known from Europe, but no doubt a number of species will be detected hereafter; of the about 230 European species 154 are at present known from Denmark two of which are here described as new.

As regards the following table I must premise some remarks. As most of the European species may be expected to occur in Denmark I have endeavoured to include all these species in the table, but numbering only the species hitherto found here;¹ some species,

¹ Since my manuscript was finished Schmitz has (Entom. Ber. Nederl. Ent. Ver. VI, 1921, 1) described three new species: *styloprocta*, *irregularifrons* and *offuscata*; the first, only known in the female sex, has four scutellar bristles, mesopleura bristly, and abdomen ends with an ovipositor; the other two, of which only the male is known, have bare mesopleura, but are difficult to locate, as they have both costa and costal cilia rather midway between short and long; *irregularifrons* has the frons about as high as broad, shining, halteres

especially of those of Strobl, I have not been able to include, as they are not sufficiently characterized. Wood, as well known, divided *Aphiochaeta* (his Group II) into sections *A*, *B*, *C* and *D*; the first section does not come in question here as it only includes *Pseudacteon formicarum*; section *B* was characterized by four or more scutellar bristles; section *C* and *D* with two scutellar bristles were separated by *C* having a long costa, *D* a short one. For further grouping he divided *C* into a group with short costal cilia and into one with long costal cilia; section *D* with the short costa he likewise divided into two groups, but not using here the costal cilia, but the relative length of the costal divisions, the first group having 1 at least $1\frac{1}{2}$ times as long as $2 + 3$, the second group having 1 shorter. Later on, in "Supplementary notes" (Ent. Month. Mag. 2, XXII, 1912, 173) he gave a table with another grouping, dividing primarily after the costal cilia, so that here a section *C* is characterized by short costal cilia, and a section *D* by long costal cilia. I am of the same opinion as Schmitz that this latter table is less good than his former. The characters taken from the length of costa and of costal cilia are of course not absolute, as species occur which stand intermediate in these characters or vary with regard to them individually or sexually, but it is not possible to look away from these characters, they are quite necessary and also upon the whole rather useful. I have, however, preferred another way of grouping; after separating the group with more than two scutellar bristles I characterize my other primary divisions by the mesopleura being bristly or bare, and if bristly by the bristles being uniform or being unequal with one or more longer bristles in connection with the short; for the further grouping I then make use first of the length of costa and next of the costal cilia. It is not so that I think the grouping according to the bristles on pleura to be more natural, but it has the advantage, that these characters are rather absolute and prevent mistakes as to the primary divisions¹, what is, I think

black, and costa 0,45; it will thus (costal cilia taken as short) in my group VI come under No. 10; *offuscata* has the frons slightly broader than high, dull, costa 0,45—0,46, cilia between short and long and halteres dark yellow to brownish. — Otherwise my tables include, I think, the species published to the end of 1921.

¹ As to one species with bristly pleura, *A. conformis*, it is, to be sure, recorded that individuals occur with bare pleura; I have examined many specimens of this species, and they had always bristles on pleura; supposed that individuals without bristles really belong to this species I should be inclined to consider them as quite abnormal aberrations.

of great importance and facilitates the determination. In measuring the length of the costa and of the whole wing I follow Schmitz (Jaarb. Nat. Genootsch. Limburg, 1917, 134) and measure from the long bristle or hair at the base of the costa (it seems that Wood, judging from his descriptions, has measured in a similar way, perhaps simply from the base of the wing); the costal divisions on the other hand are measured from the humeral cross-vein and in the following way: division 1 stretches from the humeral cross-vein to the point where the inner contour of the first vein joints the costa, division 2 stretches from this point to the point where the inner contour of second vein, the anterior branch of the fork, joints costa, and division 3 from this latter point to the end of costa. The relative lengths of the divisions may, to be sure, vary a little (and sometimes more considerably), but when microscopical measurements upon the whole are used, we may necessarily use quite fixed points. As to the terms long and short regarding the costa I likewise follow Schmitz and take the border between long and short as lying at 0,44 so that a costa reaching 0,44 of the wing-length or beyond is long, a costa not reaching 0,44 is short; it might seem that this border is rather arbitrary, but experience has shown that there really is something like a dividing line here. The length of the costal cilia, whether short or long, is generally rather easily determined, though also here intermediates and variation may occur.

Table of Groups.

1. Scutellum with four or six bristles.....	Group I.
— Scutellum with two bristles.....	2.
2. Mesopleura bristly.....	3.
— Mesopleura bare.....	6.
3. Mesopleura besides the small bristles with one or more longer bristles.....	4.
— Mesopleura with only small, uniform bristles.....	5.
4. Costa long.....	Group II.
— Costa short.....	Group III.
5. Costa long.....	Group IV.
— Costa short.....	Group V.
6. Costa long.....	Group VI.
— Costa short.....	Group VII.

Table of Species.

Group I.

Scutellum with four or six bristles.

- | | |
|---|----|
| 1. Hind tibiæ simple, without dorsal hair-seam or bristles..... | 2. |
| — Hind tibiæ with a dorsal hair-seam and bristles..... | 3. |

2. Frons higher than broad, shining; angle at fork acute . . . *nudipes* Beck.
 — Frons broader than high, dull; angle at fork rectangular, outer branch steep *retroversa* Wood.
3. Scutellum with six bristles 1. *flavicoxa* Zett.
 — Scutellum with four bristles (abnormally five or six) 4.
4. Inner bristle of lower row nearly vertically below the outer; posterior tibiæ, besides posterodorsal bristles, with a row of smaller anterodorsal bristles 5.
 — Inner bristle of lower row not vertically below the outer; posterior tibiæ with only posterodorsal bristles 7.
5. 1 only slightly longer than 2; abdomen yellow with black transverse bands, more or less interrupted in the middle 2. *picta* Lehm.
 — 1 considerably longer than 2 and generally longer than 2 + 3; abdomen mainly black 6.
6. 1 equal to or a little longer than 2 + 3; hairs below hind femora strong, few in number and not reaching the middle; anal tube in male with two forwards curved spine-like bristles below near apex *Meigeni* Beck.
 — 1 distinctly or considerably longer than 2 + 3; hairs below hind femora less strong, generally more numerous and reaching beyond the middle; anal tube in male without spines below 3. *Giraudii* Egg.
7. Mesopleura bristly 8.
 — Mesopleura bare 24.
8. Mesopleura with one or more longer bristles besides the small 9.
 — Mesopleural bristles uniform in size, all small 14.
9. Mesopleura with two or three long bristles; arista short, not longer than the frons *spinigera* Wood.
 — Mesopleura with only one long bristle (in *Palmeni* rarely two); arista longer (except in *brunnea*) 10.
10. Front tarsi short and conspicuously thickened; third antennal joint in male very large *Palmeni* Beck.
 — Front tarsi simple or slightly thickened (*paludosa*); third antennal joint in male, even if somewhat large, not so large 11.
11. Antennæ red; halteres yellow; thorax more or less brown, the longer bristle on mesopleura small (only female known) *brunnea* Schmitz.
 — Antennæ black; halteres black or brown; thorax black, the longer bristle on mesopleura large 12.
12. Legs pale; size 1,25 mm *paludosa* Wood.
 — Legs dark; size 2—2,7 mm 13.
13. Costa to middle of wing or beyond; halteres black . . . 4. *campestris* Wood.
 — Costa 0,44 of the wing-length; halteres brown; male with only two scutellar bristles *cuspidata* Schmitz.
14. Halteres dark to black 15.

- Halteres yellow (in *posticata* a little darkened)..... 19.
15. Front tarsi with second to fifth joints dilated
in both sexes; size 2,25—2,75 mm. *fumata* Malloch.
- Front tarsi simple; size not above 2 mm. 16;
16. Sixth abdominal segment in female elong-
ated, ovipositor-like (only female known) . 5. *elongata* Wood.
- Sixth abdominal segment in female of normal
shape..... 17.
17. Costa not reaching the middle, 1 at least
double 2. 18.
- Costa reaching the middle, 1 slightly longer
than 2 and nearly equal to 2 + 3; palpi
brown, short and rather broad..... 6. *communiformis* Schmitz.
18. Palpi black; wings colourless *atrimana* Wood.
- Palpi yellowish brown; wings strongly tinged... *aristica* Schmitz.
19. Costa not reaching the middle; male with
only two scutellar bristles..... 7. *rufa* Wood.
- Costa at least reaching the middle; four
scutellar bristles in both sexes (except in
luteipes)..... 20.
20. Front metatarsi a little thickened in both
sexes 21.
- Front metatarsi simple..... 22.
21. Palpi in the male large, projecting, with one
longer bristle at apex, the others very short;
thorax black or dark 8. *projecta* Beck.
- Palpi in the male normal; thorax reddish or
yellow..... 9. *simulans* Wood.
22. Antennæ red; legs yellow; male with only
two scutellar bristles; female pale..... *luteipes* Schmitz.
- Antennæ black; legs dark; four scutellar
bristles in both sexes 23.
23. 1 nearly 1½ times as long as 2 and almost
longer than 2 + 3; costal cilia very long. *dubitalis* Wood.
- 1 scarcely longer than 2, shorter than 2 + 3;
costal cilia at most moderately long; apex
of abdomen in female orange..... *posticata* Strobl.
24. Halteres black..... 25.
- Halteres yellow or dark yellow 26.
25. Frons much broader than high, supraanten-
nal bristles equal; costa reaching beyond the
middle..... 10. *fuscinervis* Wood.
- Frons not much broader than high, supra-
antennal bristles unequal; costa short not
nearly reaching the middle (only male known) 11. *prodroma* Lundbk.
26. Third antennal joint oval in female; a
chitinized ovipositor present (only female
known) *Oldenbergi* Schmitz.

- Third antennal joint not oval; no chitinized ovipositor..... 27.
- 27. Second abdominal segment with a number of long bristles at the sides..... 28.
- Second abdominal segment without long bristles at the sides..... 32.
- 28. Third vein very dilated in the male and also rather thickened in the female; antennæ yellow with a brownish apical spot, which is small in male, large in female 12. *humeralis* Zett.
- Third vein simple 29.
- 29. No distinct intraalar bristle present; arista not longer than the frons; frons about quadratic (only female known)..... 13. *rubicornis* Schmitz.
- A distinct intraalar bristle present inwards to the posthumeral bristle; arista longer; frons broader than high..... 30.
- 30. Legs dark brown; hind femora broad to near apex 14. *latifemorata* Beck.
- Legs yellowish; hind femora less broad, the dorsal margin curving evenly down towards apex..... 31.
- 31. 1 generally shorter or at most slightly longer than 2; four scutellar bristles in both sexes; abdominal tergites in female after the second more or less constricted 15. *ruficornis* Meig.
- 1 longer than 2; male with only two scutellar bristles; abdominal tergites in female not or slightly constricted..... 16. *errata* Wood.
- 32. Thorax red or brown 33.
- Thorax black..... 36.
- 33. Antennæ brownish black to red or reddish yellow, small or of normal size, arista of usual length..... 34.
- Antennæ yellowish red, above usual size, arista short 17. *rubida* Schmitz.
- 34. Supraantennal and scutellar bristles unequal; abdomen black..... 18. *quadriseta* Schmitz.
- Supraantennal and scutellar bristles equal; abdomen with yellow hind margins to the segments, or otherwise marked with yellow..... 35.
- 35. Fourth vein somewhat S-like curved; hairs below hind femora not long *pseudogiraudii* Schmitz.
- Fourth vein not S-like curved; hairs below hind femora long and somewhat strong..... 19. *pseudopicta* n. sp.
- 36. Halteres dark yellow or light brownish; antennæ of male very large..... 20. *emarginata* Wood.
- Halteres yellow; antennæ of male small or medium sized 37.
- 37. Abdomen black, only very slightly greyish; scutellar bristles equal or nearly so 38.

- Abdomen more greyish to rather strongly or whitish grey; scutellar bristles unequal the anterior in male often only small hairs..... 40.
- 38. Frons considerably broader than high..... 39.
- Frons scarcely broader than high (only male known)..... *correlata* Schmitz.
- 39. Supraantennal bristles of normal size; arista of usual length (only female known)..... *septentrionalis* Schmitz.
- Supraantennal bristles small, the lower weak; arista short..... 21. *breviseta* Wood.
- 40. Antennæ somewhat large; frons broad; costa reaching to the middle or beyond; abdomen strongly whitish grey..... *albicans* Wood.
- Antennæ of ordinary size; frons more narrow; costa generally not reaching the middle; abdomen less whitish grey..... 22. *rata* Wood.

Of the above species three, *spinigera*, *albicans* and *rata* have in the male the anterior scutellar bristles much smaller than the posterior and often quite small, only in the shape of a small hair; *spinigera* will be recognized by the two or three long bristles on mesopleura; *albicans* and *rata* will be known by the short bristles on the palpi and the small supraantennals; four other species, *cuspidata*, *rufa*, *luteipes* and *errata* show in the male only two scutellar bristles; of these species *cuspidata* and *rufa* have a short costa, the former 0,44, the latter 0,41, and short costal cilia, *rufa* will moreover be known by the red thorax, the arrangement of the frontal bristles and the minute or almost wanting lower supraantennals; *errata* at once will be recognized on the intraalar bristle, and finally *luteipes* may be known by the yellow pleura and red antennæ from the species, with which it would have to be arranged in the group with two scutellar bristles; it is for the rest not quite certain that the male and female of *luteipes* belong together (see Schmitz, Ent. Ber. Nederl. Ent. Ver. V, 1918, 61, and Jaarb. Nat. Genootsch. Limburg 1917, 137). In *fumata* the male has the anterior bristles much smaller than the posterior, and in the female they are only hairs, but this species is easily known by the thickened four last joints on front tarsi.

Group II.

Scutellum with two bristles.

Mesopleura bristly, with one or more longer besides the small bristles.

Costa long.

- 1. Costal cilia short..... 2.
- Costal cilia long..... 12.

2. Halteres black or brown 3.
 — Halteres yellow 9.
 3. Bristles on hind tibiæ more or less delicate 4.
 — Bristles on hind tibiæ strong 8.
 4. Inner bristle of lower frontal row below the
 outer 5.
 — Inner bristle of lower frontal row in or nearly
 in the same height as the outer 7.
 5. Frons broader than long (about $1\frac{1}{3}$ —1); supra-
 antennal bristles equal or nearly so, the upper
 more distant than the inner bristles of the
 middle row; antennæ in male large; bristles
 on palpi long 6.
 — Frons less broad; supraantennal bristles un-
 equal, the upper less distant; antennæ in male
 not large; bristles on palpi more or less short 25. *limburgensis* Schmitz.
 6. Legs more or less yellow; 1 about double 2 and
 2 considerably longer than 3 23. *rudis* Wood.
 — Legs mainly blackish; 1 more than double 2 and
 2 slightly longer than 3 (only male known) *indigesta* Schmitz.
 7. Hind femora with long hairs below the basal
 half *pseudociliata* Strobl.
 — Hind femora with only short hairs below 24. *depilata* Lundbk.
 8. Front legs, especially coxæ, yellow; female with
 fourth abdominal tergite abbreviated 26. *ciliata* Zett.
 — Front legs dark; female with fourth abdominal
 tergite not abbreviated *major* Wood.
 9. Costa not reaching the middle 10.
 — Costa reaching to or beyond the middle 11.
 10. 1 about equal to or very slightly longer than
 2 + 3; posterior legs dark to black; female
 with fourth abdominal tergite not abbreviated 27. *aequalis* Wood.
 — 1 distinctly longer than 2 + 3; posterior legs
 yellowish brown; female with fourth abdominal
 tergite abbreviated 28. *coaequalis* Schmitz.
 11. Antennæ yellowish red; large bristle on meso-
 pleura long and strong; costa reaching beyond
 the middle 29. *flavescens* Wood.
 — Antennæ black or blackish brown; large bristle
 on mesopleura much smaller; costa only reach-
 ing to the middle 25. *limburgensis* Schmitz.
 12. Halteres black 30. *fungivora* Wood.
 — Halteres yellow or dusky yellow 13.
 13. Costa reaching to or beyond the middle 31. *pleuralis* Wood.
 — Costa not reaching to the middle 14.
 14. Wings brownish tinged 32. *stichata* Lundbk.
 — Wings colourless or nearly 15.

15. 1 not or slightly longer than 2 + 3, fourth vein somewhat curved at base; legs rather dark *albipennis* Wood.
 — 1 distinctly longer than 2 + 3, fourth vein more evenly curved; legs paler 16.
16. 1 not double 2; male with a short row of stubby bristles below base of hind femora (only male known) 33. *basispinata* Lundbk.
 — 1 double 2; male without special armature below hind femora (only male known) 34. *insons* Lundbk.

Of the above species two, included under the species with short costal cilia, viz *rudis* and *depilata*, have the cilia nearly midway between short and long, and in two others, *basispinata* and *insons* the larger bristle on mesopleura is rather small, especially in *basispinata* it is small, so that this species perhaps might be sought in the group with the bristles uniform.

Group III.

Scutellum with two bristles.

Mesopleura bristly, with one or more longer besides the small bristles.

Costa short.

(All species have black halteres).

1. Costal cilia short 2.
 — Costal cilia long 5.
2. 1 more than double 2 + 3 (only female known) . . . *aculeata* Schmitz.
 — 1 not double 2 + 3 3.
3. Front tarsi in male thickened (only male known) . . 35. *manualis* Schmitz.
 — Front tarsi in male simple 4.
4. Supraantennal bristles nearly equal, upper pair wide apart; palpi yellow (only male known) *spinata* Wood.
 — Supraantennal bristles unequal, the lower quite small, the upper approximate; palpi brown (only male known) 36. *pungens* Lundbk.
5. Front metatarsi in male thickened; dorsal hair-seam on hind tibiæ suddenly deflected in the middle in both sexes 37. *manicata* Wood.
 — Front tarsi simple; dorsal hair-seam on hind tibiæ not deflected (*hirsuta* I have not seen) 6.
6. Front legs black and yellow annulated (only male known) *annulipes* Schmitz.
 — Front legs not annulated 7.
7. 1 one and a half times longer than 2 + 3 38. *pectoralis* Wood.
 — 1 not one and a half times longer than 2 + 3 . . . *hirsuta* Wood.

Group IV.

Scutellum with two bristles.

Mesopleura bristly with the bristles uniform, all small.

Costa long.

1. Costal cilia short 2.
- Costal cilia long..... 6.
2. Halteres black..... 3.
- Halteres yellow..... 5.
3. Front metatarsi thickened in both sexes..... *crassipes* Wood.
- Front metatarsi not thickened..... 4.
4. Supraantennal bristles unequal; wings tinged, angle at fork not large; size 1,5 mm *armata* Wood.
- Supraantennal bristles equal; wings clear, angle at fork nearly rectangular; size 0,5—0,75 mm *affinis* Wood.
5. Frons nearly quadratic, strongly shining; 1 distinctly more than double 2 39. *lucifrons* Schmitz.
- Frons a little broader, less shining; 1 not distinctly more than double 2 40. *subnitida* Lundbk.
6. Halteres black or at all events dark 7.
- Halteres yellow..... 34.
7. Front tarsi in both sexes more or less dilated, at all events metatarsus..... 8.
- Front tarsi not dilated (in *trichorrhoea* slightly)..... 22.
8. Front tarsi with only metatarsus distinctly dilated; rather small species, 1,3—1,8 mm (except *obscuripennis*)..... 9.
- Whole front tarsus thickened in male, in female only metatarsus distinctly thickened; larger species 1,5—2 mm 15.
9. Palpi black or brownish..... 10.
- Palpi yellow 11.
10. Larger species, 1,8—2,5 mm; male palpi large . 41. *obscuripennis* Wood.
- Smaller species, 1,3—1,5 mm; male palpi ordinary 42. *conformis* Wood.
11. Costa 0,45—0,47 of the wing-length; legs brownish or darker, last joint of front tarsi not dilated; anal tube in male dark 12.
- Costa reaching to or near to the middle; legs yellow, front tarsi with also last joint a little dilated; anal tube in male yellow..... 46. *dactylata* Lundbk.
12. Wings colourless or nearly..... 13.
- Wings a little yellowish to brownish, veins brown..... 14.
13. Frons pitch-coloured; front metatarsus not broad, but dilated ventrally; hypopygium richly bristly (only male known) *cothurnata* Schmitz.
- Frons black; front metatarsus dilated in the usual way; hypopygium with only small bristles. . 43. *subcarpalis* Lundbk.
14. Costal cilia moderately long; hind femora in male

- with rather strong, dense hairs below the middle
(only male known)..... 44. *pili femur* Lundbk.
- Costal cilia long; hind femora in male without
such hairs 45. *subconvexa* Lundbk.
15. Legs blackish to brown 16.
- Legs more or less yellow..... 21.
16. Palpi black (only male known) 52. *nigripalpis* Lundbk.
- Palpi yellow 17.
17. Costa reaching beyond the middle; hind femora
in male densely fringed; hypopygium strongly
bristly; front tarsi in female a little dusky.... 47. *Dahli* Beck.
- Costa at most reaching to the middle; hind
femora in male not densely fringed; front tarsi
in female yellow or blackish; hypopygium less
bristly..... 18.
18. Front tarsi black or blackish 48. *hyalipennis* Wood.
- Front tarsi yellow 19.
19. Costa 0,45 of the wing-length, 1 nearly three
times as long as 2 and much longer than 2 + 3. . 51. *intercostata* Lundbk.
- Costa reaching to or near to the middle, 1 not
double 2 and about equal to 2 + 3..... 20.
20. Wings a little tinged; sixth segment in male
with long hairs at the hind margin 49. *alticolella* Wood.
- Wings clear or nearly; hairs on sixth segment
in male not or slightly elongated 50. *unicolor* Schmitz.
21. Supraantennal bristles unequal; costa reaching
to the middle 53. *hortensis* Wood.
- Supraantennal bristles equal; costa not reaching
the middle, 0,47 of the wing-length 54. *exclusa* Lundbk.
22. Costa not reaching to the middle 23.
- Costa reaching fully to or beyond the middle..... 31.
23. Wings clear; palpi dusky yellow or darker..... 24.
- Wings generally more or less tinged (in *proxima*
and *dubiosa* very slightly); palpi yellow (in
trichorrhoea darker) 26.
24. Bristles on hind tibiæ small, hairs below hind
femora in male short, and dense at base 25.
- Bristles on hind tibiæ of fair size, hairs below
hind femora ordinary, longish; hypopygium
with a claw-like organ below 59. *ungicularis* Wood.
25. Front legs only slightly paler than the others,
hairs below hind femora in male very short;
hypopygium with one conspicuous bristle; length
1,2—1,5 mm..... 55. *atripes* Brues.
- Front legs relatively paler; hairs below hind
femora in male longer and forming a conspicuous
brush at base; hypopygium with some hairs on
the sides; length 1,5—2 mm..... 56. *hirticus* Schmitz.

26. Costal cilia unusually long. 27.
 — Costal cilia of ordinary length or shorter 28.
27. Larger species, 1,6—2 mm; fork long with the angle acute 57. *indifferens* Lundbk.
 — Small species, 1—1,2 mm; fork ordinary, angle somewhat large. 58. *consimilis* Lundbk.
28. Hind femora in male with dense, somewhat long hairs below the basal part; costa reaching near to the middle (only male known) 60. *modesta* n. sp.
 — Hind femora in male with short or with sparse longish hairs below; costa generally shorter. 29.
29. Hypopygium with numerous, at the apex curved hairs along the lower margin (only male known) . . . *trichorrhoea* Schmitz.
 — Hypopygium not such haired. 30.
30. Frons nearly quadratic; costal cilia rather short; hypopygium large, rather hairy. 61. *proxima* Lundbk.
 — Frons somewhat broader than long; costal cilia of ordinary length; hypopygium small, less hairy. 62. *dubiosa* Lundbk.
31. Palpi black 32.
 — Palpi yellow 33.
32. Wings brownish tinged, proportions of 2 and 3 as 5—2; hind femora in male below basal half with a fringe of somewhat short, but dense and strong bristles. 63. *sepulchralis* Lundbk.
 — Wings not tinged, proportions of 2 and 3 as 3—2; hind femora in male with a dense brush of hairs below at the very base (only male known). *clara* Schmitz.
33. 1 about double 2; hind tibial bristles small, hind femora in male without fringe at base below, but with the hairs at apex long (only male known) *barbulata* Wood.
 — 1 about equal to 2; hind tibial bristles large, hind femora in male with a fringe of dense hairs at base below. 64. *Beckeri* Wood.
34. Costa not reaching to the middle, but distinctly shorter 35.
 — Costa reaching near to or generally beyond the middle. 42.
35. Frons about as high as broad 65. *altifrons* Wood.
 — Frons broader than high 36.
36. 1 not twice as long as 2 and not or almost not longer than 2 + 3 37.
 — 1 twice as long as 2 or more and longer than 2 + 3 41.
37. Palpi blackish or brown; hypopygium higher than long with one strong bristle on each side below; front tarsi in male with second to

- fifth joints increasing in breadth outwards, the fifth dilated. *sordida* Zett.
 (= *scaura* Schmitz, see remarks under *Woodi*).
 — Palpi yellow 38.
 38. Sixth segment in male not with specially long hairs at hind margin; hypopygium higher than long, or if not, yellow at the sides. 39.
 — Sixth segment in male with very long bristles at the hind margin; hypopygium longer than high, black; hind femora in male with a fringe below the basal two thirds (only male known). 66. *chaetopyga* Lundbk.
 39. Hypopygium yellow at the sides below, about as high as long; hind femora in male with a couple of short, strong bristles below base (only male known). 67. *hypopygialis* Lundbk.
 — Hypopygium not yellow at the sides, higher than long; hind femora in male with bristles below the basal half. 40.
 40. Hind femora somewhat short, with a fringe of short, strong, a little curved hairs below the basal half, front tarsi simple (only male known). 68. *setigera* Lundbk.
 — Hind femora not short, with a fringe of bristly hairs below the basal half, front tarsi with second to fifth joints increasing in breadth outwards (only male known) *producta* Schmitz¹.
 41. Bristles on hind tibiae somewhat large, the dorsal hair-seam somewhat suddenly deflected below the middle; costa rather short; hypopygium with bristly hairs; size 1,5—2 mm 69. *subpleuralis* Wood.
 — Bristles on hind tibiae small, dorsal hair-seam not deflected; costa longer; hypopygium without visible hairs; size fully 1 mm 70. *angustipennis* Lundbk.
 42. Colour yellow, abdomen with black bands. 77. *magnifica* Lundbk.
 — Colour black, at most thorax reddish (*variabilis*) 43.
 43. Palpi yellow 44.
 — Palpi brown or blackish brown, or they are dusky yellow and large 47.
 44. Wings clear or nearly. 45.
 — Wings more or less strongly brownish tinged. 46.
 45. Costa reaching considerably beyond the middle; hind femora in male with a fringe of somewhat long, strong hairs below the basal half and last joint of front tarsi dilated. 71. *Woodi* n. sp.
 — Costa reaching about to or at most to the

¹ see Addenda.

- middle; hind femora in male fringed with short hairs and last joint of front tarsi simple 72. *diversa* Wood.
46. Bristles on hind tibiæ large; third abdominal tergite in female not abbreviated. 73. *variabilis* Wood.
- Bristles on hind tibiæ small; third abdominal tergite in female abbreviated (only female known) 74. *tergata* Lundbk.
47. Palpi brown or blackish brown; 1 not much longer than 2; hypopygium with bristles (only male known) 75. *fuscipalpis* Lundbk.
- Palpi dusky yellow, large, somewhat curved; 1 much longer than, nearly twice as long as 2; hypopygium without bristles. 76. *subpalpalis* Lundbk.

A. luteipes, belonging to the group with four scutellar bristles, but the male of which has only two, will be known from the species in question of this group, viz *lucifrons* and *subnitida*, by the brownish red antennæ, more or less yellow pleura, and yellow venter.

Group V.

Scutellum with two bristles.

Mesopleura bristly with the bristles uniform, all small.

Costa short.

1. Costal cilia short; halteres black. 2.
- Costal cilia long. 5.
2. 1 double 2 + 3 or more. 3.
- 1 not double 2 + 3. 4.
3. Abdomen banded, with whitish hind margins to the segments. *Verralli* Wood.
- Abdomen black, not banded. *fenestralis* Schmitz.
4. Supraantennal bristles unequal, the lower quite minute; last joint of front tarsi dilated; hind femora serrated with about four blunt teeth below near base (only male known) *serrata* Wood.
- Supraantennal bristles equal; front tarsi a little thickened, but last joint not dilated and hind femora simple. 78. *latifrons* Wood.
5. Halteres dark or black (in *involuta* sometimes yellow, the species then may be known by the thickened front tarsi in connection with the proportions of the costal divisions) 6.
- Halteres yellow. 11.
6. 1 about double 2 + 3 or longer. 7.
- 1 not double 2 + 3, but distinctly shorter. 8.
7. Palpi black (rarely yellowish); front tarsi simple, but hind tibiæ in the distal part and hind metatarsi thickened 79. *pusilla* Meig.

- Palpi yellow; hind tibiæ and tarsi simple, but front tarsi a little thickened..... 80. *involuta* Wood.
- 8. Palpi black; wings somewhat tinged; size 1,5—2 mm (only female described) *vestita* Wood.
- Palpi yellow; wings colourless or nearly; size 0,9—1,5 mm..... 9.
- 9. Front tarsi somewhat thickened; hind femora with long hairs below..... 81. *manicatella* Lundbk.
- Front tarsi simple; hind femora without long hairs below 10.
- 10. Legs mainly black; size 0,9 mm (only male known)... *ignobilis* Schmitz.
- Legs brownish, size 1,2—1,5 mm (only female known) 82. *pauper* Lundbk.
- 11. 1 about double 2 + 3..... 83. *simplex* Wood.
- 1 not double 2 + 3, but distinctly shorter..... 12.
- 12. Legs ordinary; costal cilia very long 84. *superciliata* Wood.
- Legs short and robust; costal cilia of ordinary length 85. *brevipes* Lundbk.

Group VI.

Scutellum with two bristles.

Mesopleura bare.

Costa long.

- 1. Costal cilia short 2.
- Costal cilia long..... 24.
- 2. Halteres black..... 3.
- Halteres yellow..... 15.
- 3. Frons dull or dullish..... 4.
- Frons strongly or more moderately shining 10.
- 4. All legs black or dark 5.
- Not all legs dark, at least front legs more or less yellow..... 6.
- 5. Costal cilia very short; size about 1 mm..... *rivalis* Wood.
- Costal cilia moderately short; hind femora in male with bristles below; size about 2 mm; (only male known)..... 86. *merochaeta* Lundbk.
- 6. Only front legs more or less pale; costa reaching beyond the middle; arista rather long; ventral plate in male long and furcated 7.
- All legs yellow or yellowish; costa shorter than or at most reaching to the middle; arista not specially long; ventral plate in male not furcated..... 8.
- 7. Antennæ black; middle and hind tibiæ with only the usual posterodorsal row of bristles..... 87. *longiseta* Wood.
- Antennæ reddish brown; middle and hind tibiæ with both a posterodorsal and an anterodorsal row of bristles *brunneicornis* Schmitz.

8. Supraantennal bristles equal or about; front tarsi simple 9.
- Supraantennal bristles unequal; front tarsi with the three first joints a little stout (only male known) 88. *griseifrons* Lundbk.
9. Larger species, 1,5 mm; hypopygium small (only male known) 89. *funicolor* Lundbk.
- Small species, 0,5—0,75 mm; hypopygium large . . . *surdifrons* Wood.
10. Costa with a distinct incrassation at the humeral cross-vein 90. *parva* Wood.
- Costa without isolated incrassation at the humeral cross-vein, when incrassated it is in the whole first part 11.
11. 1 nearly thrice as long as 2, and 2 scarcely longer than 3; frons moderately shining *Mallochii* Wood.
- 1 at most half as long again as 2 or a little more, and 2 much longer than 3; frons somewhat more to strongly shining 12.
12. Frons broader than high 13.
- Frons as high as broad or thereabout 14.
13. Wings strongly brown, often with a cloud, fourth vein evenly curved, strongest on the middle, pedunculated at the base in male 91. *glabrifrons* Wood.
- Wings slightly tinged, almost clear, costa thickened in first division the thickening evenly decreasing outwards, fourth vein much curved in its first part, not pedunculated *incrassata* Schmitz.
14. Palpi yellow or a little dusky; halteres with the peduncle yellow 92. *propinqua* Wood.
- Palpi black; halteres quite black *ebenina* Schmitz.
15. Frons higher than or at least as high as broad 16.
- Frons broader than high 18.
16. Colour yellow (only male known) 95. *ustulata* Schmitz.
- Colour black 17.
17. Frons more or less shining; supraantennal bristles equal, the upper widely distant; antennæ black . . 93. *minor* Zett.
- Frons dull; supraantennal bristles very unequal, the upper not widely distant; antennæ brown . 94. *angustifrons* Wood.
18. Bristles on hind tibiæ rather strong, not numerous . 96. *uliginosa* Wood.
- Bristles on hind tibiæ less strong, more numerous 19.
19. 1 not longer than 2, and thus distinctly shorter than 2 + 3 20.
- 1 longer than 2, and not or slightly shorter than 2 + 3 21.
20. Antennæ yellow or red; costal cilia very short . . 97. *flava* Fall.
- Antennæ blackish brown; costal cilia moderately short 98. *mixta* Schmitz.
21. Three first joints on front tarsi simple 22.

- Three first joints on front tarsi a little dilated. . . 100. *anisodactyla* Schmitz.
22. Lower supraantennal bristles at least half the size of the upper; antennæ brown to red. 23.
- Lower supraantennal bristles minute; antennæ brown to black. *Collini* Wood.
23. Hypopygium conspicuously haired; hind tibiæ with quite small bristles but with conspicuous hairs anterodorsally (only male known). *aperta* Schmitz.
- Hypopygium slightly haired; hind tibiæ with more conspicuous bristles, but not unusually haired anterodorsally. 99. *rubella* Schmitz.
24. Bristles on hind tibiæ strong, or at all events distinct. 25.
- Bristles on hind tibiæ very weak and numerous. 33.
25. Halteres black. 26.
- Halteres yellow. 27.
26. Supraantennal bristles equal, the upper more distant than the inner bristles of the middle row; palpi yellow; bristles on hind tibiæ strong; 1 not double 2. 101. *frontalis* Wood.
- Supraantennal bristles unequal, the upper more approximate than the inner bristles of the middle row; palpi blackish; bristles on hind tibiæ not strong; 1 double 2 (only male known) 102. *melaena* Lundbk.
27. Hind tibiæ besides the posterodorsal row of large bristles with an anterodorsal bristle at base and middle tibiæ with an anterodorsal row in the upper half and about two posterodorsal bristles near the base. *melanocephala* v. Ros.
- Middle and hind tibiæ with the bristles normal. 28.
28. Inner bristle of lower frontal row nearly vertically below the outer. 103. *infraposita* Wood.
- Inner bristle of lower frontal row in usual position. 29.
29. Supraantennal bristles equal or nearly so . . . 104. *vernalis* Wood.
- Supraantennal bristles unequal. 30.
30. Thorax and antennæ yellow 105. *sulphuripes* Meig.
- Thorax black or dark reddish; antennæ red or darker 31.
31. Front tarsi simple; size 1,4—2,5 mm 32.
- Front tarsi stout; size 1,2—1,7 mm 108. *tarsella* Lundbk.
32. Antennæ red or brownish red; wings distinctly tinged; last joint on posterior, especially middle tarsi in male longer than the fourth 106. *scutellaris* Wood.
- Antennæ blackish brown or blackish; wings almost colourless; posterior tarsi in male simple. . 107. *impolluta* Schmitz.
33. Costa in female more or less thickened; hypopygium without bristles. 34.

- Costa not thickened; hypopygium with or without bristles..... 39.
34. Halteres dark or black..... 35.
- Halteres yellow..... 37.
35. Costa in female much thickened, broader than the subcostal cell, and also a little thickened in male 109. *crassicosta* Strobl.
- Costa in female moderately thickened, not as broad as the subcostal cell, in male not thickened..... 36.
36. Costa in female conspicuously swollen, costal cilia moderately long, costa not beyond middle, 1 equal to 2 *denotata* Wood.
- Costa in female less swollen, costal cilia very long, costa reaching beyond middle, 1 longer than 2..... 110. *tumida* Wood.
37. Costa in female much thickened, broader than the subcostal cell; yellowish species 38.
- Costa in female moderately thickened, not as broad as the subcostal cell; black or blackish species..... 111. *subtumida* Wood.
38. Thickening of costa stops before the inner branch of the fork..... *costalis* v. Ros.
- Thickening of costa reaching to the end (only female known) 112. *brunneipennis* Costa.
39. Halteres black or dark (in *discreta* female often dusky yellow) 40.
- Halteres yellow..... 44.
40. Costa not reaching to the middle; antennæ brown 41.
- Costa reaching to the middle or beyond; antennæ black..... 42.
41. Costal cilia moderately long; angle at fork somewhat large; hypopygium with bristles.. 113. *discreta* Wood.
- Costal cilia long; angle at fork acute; hypopygium without bristles..... 117. *analis* Lundbk.
42. 1 about equal to 2, shorter than 2 + 3; hypopygium long and cylindrical, longer than sixth segment (only male known) 114. *setifera* Lundbk.
- 1 longer than 2 + 3 or at least as long; hypopygium shorter than sixth segment 43.
43. 1 double 2 or about..... 115. *fusca* Wood.
- 1 not double 2..... 116. *angusta* Wood.
44. Hypopygium with bristles; 1 distinctly longer than 2 + 3, or if not costal cilia more or less moderately long 45.
- Hypopygium without bristles; 1 generally not longer than 2 + 3, costal cilia long (only in

- rubicunda* moderately long, but this species is easily known by the thickened costa) 49.
45. Male abdomen with long, stubby hairs 46.
- Male abdomen without such hairs 47.
46. Hind tibiæ in male simple; supraantennal bristles quite equal 118. *rufipes* Meig.
- Hind tibiæ in male curious, with the lower dorsal third apparently cut away; supraantennal bristles unequal 119. *hirtiventris* Wood.
47. Hind tibiæ in male as in *hirtiventris*, costa not reaching to the middle, 1 about thrice as long as 2; femora with long hairs below the basal half 120. *albidohalteris* Felt.
- Hind tibiæ in male simple; costa reaching to the middle or beyond, 1 at most double 2; hairs below hind femora shorter 48.
48. Thorax reddish (only male known) 121. *rubescens* Wood.
- Thorax black 123. *nudiventris* Wood.
49. Costa a little thickened; reddish species (only male known) 122. *rubicunda* Lundbk.
- Costa not thickened; black species (only *pulicaria* sometimes with a paler thorax) 50.
50. Hypopygium large, as large as sixth segment (only male known) 124. *similata* Lundbk.
- Hypopygium smaller 51.
51. Fork very long, angle acute (only female known). 126. *longifurca* Lundbk.
- Fork not extremely long 52.
52. Costa generally not much beyond the middle; abdominal tergites in female normal. 125. *pulicaria* Fall.
- Costa long, reaching much beyond the middle or one of the abdominal tergites in female abbreviated or unchitinized 53.
53. Costa long, reaching much beyond the middle; abdominal tergites in female normal. 54.
- Costa generally shorter; one of the abdominal tergites in female abbreviated or unchitinized. 55.
54. Wings of normal length, costa 0,55—0,60 of the wing-length 127. *longicostalis* Wood.
- Wings somewhat small, costa 0,66 of the wing-length (only female known). 128. *brevipennis* Lundbk.
55. Third abdominal tergite abbreviated (only female known) 129. *breviterga* Lundbk.
- Fourth abdominal tergite quite unchitinized *zonata* Zett.

Group VII.

Scutellum with two bristles.

Mesopleura bare.

Costa short.

1. Costal cilia short 2.
- Costal cilia long 20.

2. Halteres black..... 3.
 — Halteres yellow..... 8.
 3. 1 double 2 + 3 or longer..... 4.
 — 1 not double 2 + 3..... 5.
 4. Upper supraantennal bristles more distant than inner bristles of the middle row; antennæ, frons and thorax reddish; hind tibiæ simple (only female known) *ruffrons* Wood.
 — Upper supraantennal bristles nearer together than inner bristles of the middle row; antennæ, frons and thorax black; hind tibiæ narrowed in the apical part (only male known) *praeacuta* Schmitz.
 5. Male palpi very large and with few bristles (only male known)..... *longipalpis* Wood.
 — Male palpi normal..... 6.
 6. Frons broader than high, inner bristle of lower row not much lower than the outer; upper supraantennal bristles more approximate than inner bristles of the middle row; wings a little milky (only male known). . . . 130. *lactipennis* Lundbk.
 — Frons only slightly broader than long or about quadratic; inner bristle of the lower row much lower than the outer, upper supraantennal bristles more distant than inner bristles of the middle row; wings not milky..... 7.
 7. Costal cilia moderately short 131. *gregaria* Wood.
 — Costal cilia very short and fine..... 132. *subnudipennis* Schmitz.
 8. 1 double 2 + 3 or, at all events, nearly so..... 9.
 — 1 not double 2 + 3, but distinctly shorter..... 13.
 9. Costa 0,33 of the wing-length or less; male hypopygium without bristles..... 10.
 — Costa about 0,42 of the wing-length; male hypopygium with bristles..... *virilis* Schmitz.
 10. Costa 0,30 of the wing-length, costal cilia very short 135. *Berndseni* Schmitz.
 — Costa longer, cilia moderately short 11.
 11. Black or dark species..... 12.
 — Yellowish species *brachyneura* Egg.
 12. Third abdominal tergite in female narrowed 133. *pygmaea* Zett.
 — Third abdominal tergite in female normal (only female known)..... 134. *pygmaeoides* Lundbk.
 13. Frons more or less shining 14.
 — Frons dull 17.
 14. Only one pair of distinct, strongly approximate supraantennal bristles, inner bristle of lower frontal row nearer the middle than the eye-margin 136. *angelicae* Wood.

- Two pairs of supraantennal bristles, inner bristle of lower frontal row nearer the eye-margin than the middle..... 15.
15. Front tarsi thickened, legs yellowish 137. *tarsalis* Wood.
- Front tarsi simple, legs blackish or brown..... 16.
16. Hypopygium without bristles; palpi dusky; hind tibial bristles strong; abdominal stigmata normal 138. *brevicostalis* Wood.
- Hypopygium with bristles; palpi yellow; hind tibial bristles fine; abdominal stigmata very large (only male known) *stigmatica* Schmitz.
17. Reddish or yellowish species..... *lutescens* Wood.
- Black species..... 18.
18. Male palpi large, almost nude; hind tibiae at the end with a small, not hairy longitudinal keel dorsally to the hair-seam (only male known) *latipalpis* Schmitz.
- Male palpi and hind tibiae ordinary 19.
19. Hind tibial bristles not large; costal cilia moderately short 139. *lata* Wood.
- Hind tibial bristles rather large; costal cilia short *nigrescens* Wood.
20. Halteres black..... 21.
- Halteres yellow or pale brown..... 26.
21. 1 double 2 + 3 or nearly 22.
- 1 not double 2 + 3, but distinctly shorter..... 24.
22. Frons nearly quadratic, upper supraantennal bristles more distant than inner bristles of the middle row; bristles on hind tibiae strong; hypopygium without bristles..... 140. *maura* Wood.
- Frons distinctly broader than high, upper supraantennal bristles not more distant than inner bristles of the middle row; hypopygium with bristles 23.
23. Palpi black or dusky; legs blackish; supraantennal bristles nearly equal; 1 more than double 2 + 3..... 141. *Mortenseni* Lundbk.
- Palpi yellow; legs yellowish; supraantennal bristles very unequal; 1 slightly less than double 2 + 3..... 142. *coacta* Lundbk.
24. Palpi dusky yellow or yellow; hypopygium without bristles; size 1 mm or above..... 25.
- Palpi black; hypopygium with bristles; size scarcely 1 mm..... 145. *hirticaudata* Wood.
25. Legs brown; 1 about double 2; hind tibiae thickened in both sexes, in male with bristles on the ventral side 143. *erecta* Wood.
- Legs blackish; 1 about three times 2; hind

- tibiæ in male thickened, contracted at the base, without bristles on the ventral side. 144. *tibiella* Lundbk.
26. 1 double 2 + 3 or nearly so. 27.
 — 1 not double 2 + 3, but distinctly shorter. 32.
27. Legs blackish; palpi dusky; hypopygium without bristles (only male known). 146. *cinerella* Lundbk.
 — Legs yellow or when darker palpi yellow. 28.
28. Costa about 0,33 of the wing-length; hypopygium without bristles. 29.
 — Costa longer; hypopygium with bristles. 31.
29. Black or dark species. 30.
 — Yellowish species. *brachyneura* Egg.
30. Third abdominal tergite in female narrowed. 133. *pygmaea* Zett.
 — Third abdominal tergite in female normal. 134. *pygmaeoides* Lundbk.
31. Hypopygium with two bristles; thorax sometimes reddish. 147. *halterata* Wood.
 — Hypopygium with four bristles (only male known) 148. *plurispinosa* Lundbk.
32. Male palpi large, almost nude; hind tibiæ at the end with a small, not hairy longitudinal keel dorsally to the hair-seam (only male known) *latipalpis* Schmitz.
 — Male palpi and hind tibiæ ordinary 33.
33. Hypopygium with bristles; thorax sometimes reddish 34.
 — Hypopygium without bristles 36.
34. Hypopygium with more than one bristle. 149. *fuscotalterata* Schmitz.
 — Hypopygium with only one bristle. 35.
35. Size 1,2 mm or above. 150. *pallidizona* Lundbk.
 — Size below 1 mm *ledburiensis* Brues.
36. Supraantennal bristles large and equal; hypopygium white 151. *albicaudata* Wood.
 — Supraantennal bristles unequal; hypopygium not white. 37.
37. Sixth abdominal segment in male with long bristles (only male known) 152. *spinicincta* Wood.
 — Sixth abdominal segment in male without long bristles 38.
38. Wings somewhat dark 153. *sylvatica* Wood.
 — Wings nearly clear. 39.
39. Costal cilia long; hypopygium large, somewhat cylindrical (only male known) 154. *laeta* Lundbk.
 — Costal cilia moderately long; hypopygium small. *exigua* Wood.

Group I.

Scutellum with four or six bristles.

1. *A. flavicoxa* Zett.

1848. Zett. Dipt. Scand. VII, 2869, 19 et 1852. XI, 4340, 19 et 1860. XIV, 6476, 19 (*Trineura*). — 1901. Beck. Abhandl. zool. bot. Gesell. Wien I, 49 (*Phora*). — 1918. Schmitz, Jaarb. Natuurh. Genootsch. Limburg 1917, 135. — *Phora sexspinosa* Wood, 1908. Ent. Month. Mag. 2, XIX, 169, 216, 254. — *A. sexspinosa* 1914. Brues, Bull. Wisc. Nat. Hist. Soc. XII, 132.

Male. Frons rather broader than high, black, dull; inner bristle of lower row below the outer and nearer to it than to the upper supraantennal; supraantennals equal, the upper distant, more distant than the inner bristles of the middle row, the lower nearer together. Antennæ somewhat large, black, arista short-pubescent. Palpi dusky yellow, of ordinary size and armature. Thorax black, a little shining, with dark brownish pubescence. Scutellum with six equal bristles (sometimes abnormally seven). Mesopleura bristly with one (or more) long bristles. Abdomen black, dull, slightly greyish, the short hairs distinctly longer at the hind margins of the segments. Hypopygium of medium size, with a group of conspicuous, longish hairs below on each side; subanal body very large, consisting of a black, shining, complicated and somewhat hook-like appendage, the ventral plate likewise large and of complicated shape; anal tube long and somewhat high near the apex, deep yellow, darkened at the base. Legs brown, the front legs paler, brownish yellow; front tarsi somewhat thickened; hind femora somewhat broad, with long hairs below the basal half, longest towards the middle; bristles on hind tibiæ somewhat large and numerous; also the posterodorsal bristles on middle tibiæ rather distinct. Wings yellowish brown, veins brown; costa reaching to the middle; 1 double or more than double 2 and longer than 2 + 3; costal cilia short; fourth vein slightly curved, a little recurved at apex. Halteres black.

Female. Similar; antennæ smaller, brownish; the hairs below hind femora as in the male.

Length 2,5—3 mm.

Remarks: It is curious that Becker in his table has the species as independent, but in the descriptive part as a synonym under *ruficornis*, and on pag. 74 he says in the mention of Zetterstedt's collection that *flavicoxa* is a variety of *ruficornis*; Collin has later on

studied Zetterstedt's types and found *flavicoxa* identical with *sexspinosa* Wood (Wood l. c. 254). I have also studied Zetterstedt's types myself and can fully confirm Collin's statement. In Brues' catalogue there is an error as he gives *flavicoxa* Zett. = *ruficornis* Meig., but puts *sexspinosa* = *flavicoxa* without any reference to *ruficornis*.

A. flavicoxa is very rare in Denmark, only one specimen, a male, has been caught, Ermelund ¹⁷/₅ 1920 (the author); it was taken in low herbage in a damp place.

Geographical distribution: — Northern and middle Europe down into Bohemia; towards the north to middle Sweden. Wood remarks that the species seems to be double brooded, as, besides in early summer, it again occurs in August to October.

2. *A. picta* Lehm.

1822. Lehm. Indic. schol. Hamburg, 43, Tab. I, Fig. 6 et 1824. Acta Acad. Leop. Carol. XII, 245 (*Phora*). — 1896. Mik, Wien. Ent. Zeitg. XV, 112 (*Phora*). — 1901. Beck. Abhandl. zool. bot. Gesell. Wien. I, 52, 42, Taf. III, Fig. 50 (*Phora*). — 1908. Wood, Ent. Month. Mag. 2, XIX, 169, 216 (*Phora*). — 1910. Kertész, Cat. Dipt. VII, 410. — 1914. Brues, Bull. Wisc. Nat. Hist. Soc. XII, 126. — 1918. Schmitz, Jaarb. Natuurh. Genootsch. Limburg 1917, 136. — *Trineura interrupta* Zett. 1838. Ins. Lapp. 797, 12 et 1848. Dipt. Scand. VII, 2878, 27. — 1864. Schin. F. A. II, 337, 343 (*Phora*).

Male. Frons fully as high as broad, yellow, sometimes greyish; bristles strong, the inner bristles of lower row nearly vertically below the outer (fig. 76); supraantennals large, equal, the upper rather distant, placed nearly in the middle between the median furrow and the eye-margin, the lower more approximate. Antennæ of medium size, orange, arista distinctly pubescent. Palpi pale yellow, of ordinary size and armature. Thorax yellow with black or brownish pubescence, between the dorso-central bristles some bristly hairs. Scutellum with four equal bristles (abnormally five to six). Pleura yellow, below the squamula a somewhat hammer-shaped black spot. Mesopleura bare. Abdomen of conical shape, tapering behind; it is yellow with broad, black, transverse bands on the front part of the segments, but the bands nearly always interrupted

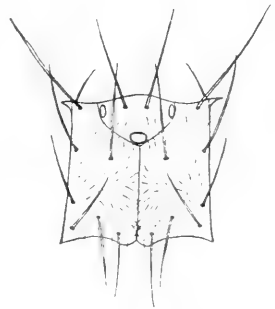


Fig. 76. Frons of
A. picta ♂.

in the middle, only on second segment often uninterrupted; abdomen may thus also be termed black with yellow hind margins and triangular middle spots; first segment nearly quite yellow, only brownish on the disc. Venter yellow. Abdomen is very sparingly haired with short hairs, almost only visible at the hind margins of the segments; along the sides they are a little longer and on the protruding sides of second segment there are bristly hairs. Hypopygium small or medium sized, generally withdrawn; it is yellow or greyish yellow, symmetrical, the side prolongations broadly rounded, hairy; anal tube compressed, somewhat large, yellow, with some longish hairs above and below;

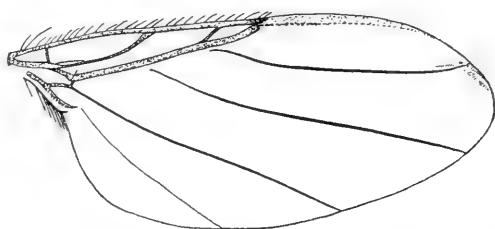


Fig. 77. Wing of *A. picta* ♂.

ventral plate yellow. Legs yellow, hind femora well dilated, blackened just at the tip, middle coxæ with a black spot on the posterior side; the hind femora have long hairs below on the basal half; bristles on hind tibiæ somewhat strong and there is besides an anterodorsal row of small bristles, not reaching quite to the end; middle tibiæ likewise with a posterodorsal row of bristles and an anterodorsal row of smaller bristles on the basal half; on front tibiæ an anterodorsal row of small bristles. Wings yellow or light brownish, veins brownish, thin veins strong; costa reaching to or beyond the middle, 1 a little longer than 2, but generally not as long as 2 + 3; costal cilia short; angle at fork acute; fourth vein a little S-like at the base, for the rest slightly and evenly curved. Halteres yellow.

Female. Antennæ a little smaller than in the male; the anterodorsal bristles on middle and hind tibiæ more distinct; for the rest similar to the male, the hind femora likewise with long hairs below (Becker says that these hairs are absent, but this is incorrect).

Length 1,5 to fully 3 mm, the small individuals are rare.

A. picta is rather common in Denmark, Ordrup (Stæger), Dyrehaven, Egebæks Vang (the author), Holte (Th. Mortensen), Bogø south of Sealand, Lohals on Langeland, and in Jutland at Skamling

and Hejls south of Kolding, Jelling, Ry and Silkeborg (the author); my dates are $^{17}/_6$ — $^{12}/_8$, I have taken it in copula on $^{27}/_7$. I possess a specimen, a male, with six well developed scutellar bristles.

Geographical distribution: — Northern and middle Europe down into Styria; towards the north to middle Sweden and in Finland; it occurs also in North America down into the West Indies. — I have seen Zetterstedt's type to *interrupta* and can confirm Becker's statement that it is identical with *picta* Lehm.

3. *A. Giraudii* Egg.

1862. Egg. Verhandl. zool. bot. Gesell. Wien, XII, 1235 (*Phora*). — 1864. Schin. F. A. II, 341 (*Phora*). — 1901. Beck. Abhandl. zool. bot. Gesell. Wien, I, 58, 50 (*Phora*). — 1908. Wood, Ent. Month. Mag. 2, XIX, 170, 216 (*Phora*). — 1910. Kertész, Cat. Dipt. VII, 407. — 1914. Brues, Bull. Wisc. Nat. Hist. Soc. XII, 120. — 1918. Schmitz, Jaarb. Natuurh. Genootsch. Limburg 1917, 137. — *Trineura bicolor* p. p. Zett. (nec Meig.) 1848. Dipt. Scand. VII, 2880, 29.

Male. Frons a little broader than high, nearly quadratic, grey, indefinitely reddish at the anterior margin; the inner bristle of the lower row less vertically below the outer than in the preceding species, considerably more inwards; upper supraantennals less distant, rather nearer the middle furrow than the eye-margin, lower supraantennals a little more approximate. Antennæ scarcely as large as in *picta*, brown or dark brown, arista very short-pubescent, nearly nude. Palpi yellow, with ordinary armature. Thorax yellow to blackish brown or quite black, pleura yellow or reddish brown, often darkest posteriorly or all blackish brown. Mesopleura bare. Scutellum with four equal bristles. Abdomen black, dull, with narrow pale hind margins to the segments, first segment generally also more or less pale on the front part; abdomen otherwise shaped and haired as in *picta*, the venter often darker. Hypopygium small, more or less pale grey, the side prolongations small, triangularly pointed, hairy at apex: anal tube yellowish grey, palest towards apex, with some longish hairs above and below. Legs yellow, posterior tarsi a little darker, hind femora black at apex and middle coxæ with a black spot behind: hairs and bristles on the legs as in *picta*, the anterodorsal bristles on hind tibiæ few and very small; hind femora with long hairs below on the basal half, but they are less strong and more numerous than in *picta*. Wings slightly yellowish tinged, veins brown or yellowish brown; costa not reaching quite to the middle, 1 double 2 or almost so and longer than 2 + 3; costal cilia short; angle at fork more acute

than in *picta*, fourth vein slightly S-like at base, recurved at apex. Halteres yellow.

Female. Similar; antennæ slightly smaller than in the male; abdomen black with narrow pale hind margins to the segments, first segment black or more or less yellow; hind femora with long

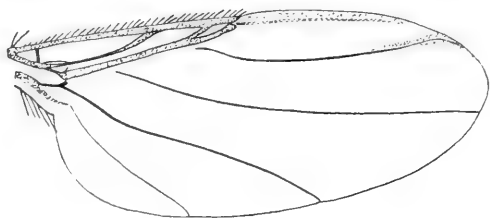


Fig. 78. Wing of *A. Giraudii* ♀.

hairs below the basal half as in the male; as in *picta* the anterodorsal bristles on posterior tibiae are much more distinct and proceed longer downwards than in the male.

Length 2 to about 3 mm.

Remarks: Becker declares that Zetterstedt's *bicolor* is = *Meigeni* Beck., but this is not so; I have studied Zetterstedt's types, there are four specimens, one is *Giraudii*, the three others, a male and two females, are *simulans* Wood. — Strobl describes (Wien. Ent. Zeitg. XVIII, 1899, 148) a var. *breviciliata* and a var. *longiciliata*; the former is typical, but whether the latter belongs to this species is, I think, doubtful. — Wood says l. c. that the hind femora have only ordinary hairs, in the Danish and Dutch specimens I have seen the hind femora have long hairs on the basal half below. — As seen from my description of the male, the anterodorsal bristles on posterior tibiae may be very small; in this connection I shall call attention to the fact that Wood describes (Ent. Month. Mag. 2, XXV, 1914, 153) a species *A. submeigeni* which differs from *Meigeni* only in wanting the small anterodorsal bristles on posterior tibiae; it is no doubt only a small specimen of *Meigeni* (see Schmitz l. c. 136).

A. Giraudii is rare in Denmark, only four specimens, a male and three females, have been taken; Ermelund ¹¹/₆ 1919 (the author) and Holte ¹²/₇—¹⁵/₇ in 1917 to 1919 (Th. Mortensen).

Geographical distribution: — Europe down into Spain, towards the north to southern Sweden; it is also recorded from North America,

but its occurrence there seems to be doubtful (Malloch, Proc. U. S. Nat. Mus. 43, 1912, 451).

4. *A. campestris* Wood.

1908. Wood, Ent. Month. Mag. 2, XIX, 174, 216 (*Phora*). — 1914. Brues, Bull. Wisc. Nat. Hist. Soc. XII, 114. — 1918. Schmitz, Jaarb. Natuurh. Genootsch. Limburg 1917, 149.

Male. Frons somewhat broader than high, black, dull, a little greyish; it is distinctly produced forwards in the middle; inner bristle of lower row a little below the outer, placed in about the middle between it and the upper supraantennal; supraantennal bristles equal, the upper distant, the lower approximate. Antennæ black, of medium size, arista pubescent. Palpi brown or brownish, not large, with ordinary bristles. Thorax black, somewhat shining, with dark brown pubescence; at the hind margin of the disc the hairs are somewhat bristly. Scutellum with four equal or nearly equal bristles. Mesopleura bristly above, with one long bristle behind in front of the suture. Abdomen somewhat slender, black, dull, a little greyish; it has short hairs, most distinct at the hind margins of the segments and especially at the sides. Hypopygium of medium size, greyish black, nearly symmetrical; it has longish hairs below on the sides among which one, somewhat curved, on the left side, is specially conspicuous; anal tube somewhat long, grey, yellowish towards apex; below a black, shining, hook-shaped organ is more or less protruding. Legs light brown to blackish brown, anterior tibiæ and tarsi, especially the front ones, paler, the latter yellowish; hind femora with long hairs below on the basal half; hind tibial bristles well developed, but not large. Wings very slightly or a little more yellowish tinged, veins yellowish brown; costa reaching to the middle, costal divisions about as 4—2—1, but somewhat varying; costal cilia short; fourth vein slightly and evenly curved in the whole length. Halteres black.

Female. Quite similar to the male; frons generally less broad; hind femora likewise with long hairs below the basal half.

Length 2—2,7 mm.

A. campestris is rather rare in Denmark, Ermelund (the author), Bagsvær (Larsen), Holte, Geel Skov (Th. Mortensen), on Langeland at Lohals (the author), at Odense (H. J. Hansen), in Jutland at Hejls south of Kolding, Jelling (the author), Hald (H. J. Hansen) and Løkken (Th. Mortensen); it has been taken from $\frac{5}{6}$ to August; in Stæger's collection an old specimen is determined as *pulicaria*

var. s. n. sp. It occurs in low herbage, I have taken it among others with the net on *Vaccinium myrtillus*.

Geographical distribution: — The species is at present besides from Denmark known from England and Holland.

5. *A. elongata* Wood.

1914. Wood, Ent. Month. Mag. 2, XXV, 153. — 1918. Schmitz, Jaarb. Natuurh. Genootsch. Limburg 1917, 148.

Male. Unknown.

Female. Frons a little broader than high, greyish black, a little shining; the middle row of bristles nearer the upper than the lower row, the inner bristle of lower row somewhat below the outer, nearly in the same distance from it as from the upper supraantennal; supraantennal bristles small, the lower half as large as the upper, the latter approximate, the lower rather close to the upper and only slightly more approximate. Antennæ small, brown, arista short-pubescent. Palpi dirty yellow, with ordinary bristles. Thorax black with dark brownish pubescence. Scutellum with four almost equal bristles. Mesopleura bristly, the bristles uniform. Abdomen somewhat long, broadest at second segment, tapering behind, sixth segment elongated, cylindrical, at the end of it the small and thin last segment is seen; abdomen is black and dull, it is sparingly haired, but at the sides of second segment there are a little longer hairs; the sixth segment is more distinctly hairy behind, and at the hind margin it has longish bristly hairs. Legs yellowish brown, the front legs paler, pale yellowish; below the basal part of hind femora some longish hairs, hind tibial bristles distinct, but small. Wings a little yellowish, veins yellow or brownish yellow; costa not reaching the middle, costal divisions about as 11—5—3; costal cilia short; angle at fork rather acute; fourth vein issuing beyond the base of the fork, curved at both ends, especially at apex and ending long before the apex of the wing. Halteres blackish.

Length 1,5 mm.

This interesting species is very rare in Denmark, I have taken only one specimen, a female, at Ry in Jutland on ¹⁵/₇ 1918; it was taken with the net in the grass on a field.

Geographical distribution: — Besides from Denmark the species is only known from England, where three females have been taken, while the male remains unknown.

6. *A. communiformis* Schmitz.

1918. Schmitz, Jaarb. Natuurh. Genootsch. Limburg 1917, 139, 149.

Male. Frons slightly broader than high, nearly quadratic, greyish black, slightly shining; inner bristle of lower row a little below the outer and a little nearer to it than to the upper supraantennal; lower supraantennals slightly smaller than the upper, these latter about in alignment with the inner bristles of middle row, the lower supraantennals more approximate. Antennæ somewhat small, brownish black, arista short-pubescent. Palpi brown, not long, but broad, the lower margin strongly curved or the palpi almost triangular; on the apical half of the lower margin five long bristles, behind these two short. Thorax black, very slightly shining, with brownish black pubescence. Scutellum with four bristles, the anterior a little smaller than the posterior. Mesopleura bristly, bristles uniform. Abdomen black, a little greyish, dull, with short hairs. Hypopygium small and withdrawn; anal tube of medium length, greyish brown, palest towards the end, the two hairs at apex small. Legs blackish brown, trochanters and knees yellowish, posterior tibiæ and tarsi brownish, front tibiæ and tarsi yellowish; hind femora with short hairs below, which are dense on the basal part; hind tibial bristles distinct, those on the middle the longest. Wings a little yellowish, sometimes more, veins yellow or brownish yellow; costa reaching to the middle, costal divisions about as 13—10—4; costal cilia moderately short, nearly midway between short and long, angle at fork somewhat acute; fourth vein slightly curved in its first part, for the rest nearly straight. Halteres black.

Female. In all respects similar to the male, also the halteres blackish; only the anterior scutellar bristles a little smaller.

Length 1.6—2 mm.

This species will, I think, best be distinguished by its broad palpi; my determination is certain as Schmitz has examined both sexes of my species.

A. communiformis is not common in Denmark; in a churchyard at Copenhagen, Ermelund (the author), Holte (Th. Mortensen), in all two males and five females; the dates are $9/5$ — $30/6$ in 1918—1920; it was taken in copula on $30/6$.

Geographical distribution: — Besides in Denmark the species occurs in Holland.

7. *A. rufa* Wood.

1908. Wood, Ent. Month. Mag. 2, XIX, 170, ♀ and 1912. 2, XXIII, 97, ♀ (*Phora*). — 1909. Malloch, Ent. Month. Mag. 2, XX, 35 (*Phora*). — 1914. Brues, Bull. Wisc. Nat. Hist. Soc. XII, 130. — 1918. Schmitz, Jaarb. Natuurh. Genootsch. 1917, 137. — *Phora pallens* Wood, 1910, Ent. Month. Mag. 2, XXI, 150, 198, ♂. — *Aphiochaeta pallens* 1914. Brues l. c. 126. — *Aphiochaeta rubra* Schmitz 1918. Ent. Ber. Nederl. Entom. Ver. V, 59, ♂. — 1920. Schmitz, Jaarb. Natuurh. Genootsch. Limburg 1919, 135.

Male. Frons grey, dull, as high or little higher than broad; bristles strong, inner bristle of lower row somewhat below the outer, in about the middle between it and the upper supraantennal and in the same height as this latter; upper supraantennals somewhat small, very approximate, the lower very minute. Antennæ small, yellow, arista short, very short-pubescent, apparently almost nude. Palpi yellow, somewhat broad at the end, with the bristles somewhat short. Thorax reddish yellow, with yellowish pubescence. Scutellum with two bristles. Mesopleura bristly, the bristles uniform, few and small. Abdomen black, dull, a little greyish; it is very short and sparingly, almost invisibly haired, only at the sides a few hairs are more distinctly seen; venter yellow. Hypopygium small, but the sides produced somewhat downwards; anal tube yellow, rather large. Legs yellow, hind femora somewhat broad, black at tip; the hind femora have long hairs below on the basal half, hind tibial bristles somewhat large, few in number, and on the upper fourth only small hairs. Wings somewhat yellowish, veins yellow; costa about 0,41 of the wing-length, costal divisions about as 22—13—6, thus 1 a little longer than 2 + 3; costal cilia short; angle at fork acute; fourth vein slightly and evenly curved in about its whole length. Halteres yellow.

Female. Similar to the male; frons slightly broader, indefinitely reddish above the antennæ; lower supraantennals practically wanting; palpi as in the male. Scutellum with four bristles, the anterior half the size of the posterior; hind femora as in the male with long hairs below the basal part; the eighth abdominal segment in my specimen long and exerted.

Length 1,5—1,8 mm.

Remarks: Of this species I have a copulated pair; when I was determining them I came with the male to *pallens* and with the female to *rufa* in Wood's tables; by comparing the two descriptions they are also seen to be very similar except as regards the scutellar bristles, so that I think it beyond doubt that *pallens* and *rufa* are male and

female of the same species. Malloch has l. c. already stated that the male to *rufa* has only two scutellar bristles. I have compared my specimen with a male of *rubra* Schmitz, kindly sent me from the author, and I have no doubt that also this species is identical with *rufa*.

A. rufa is rare in Denmark, I possess only one male and one female, taken in copula, Holte ²¹/₆ 1917 (Th. Mortensen), but in Stæger's collection there are an old male and female, determined as *flava*.

Geographical distribution: — Besides in Denmark the species occurs in Britain and middle Europe going down into Styria (*pallens*, Schmitz, Ent. Ber. Nederl. Ent. Ver. V, 1919, 187).

8. *A. projecta* Beck.

1901. Beck. Anhandl. zool. bot. Gesell. Wien, I, 56, 48, Taf. III, Fig. 53 (*Phora*). — 1908. Wood, Ent. Month. Mag. 2, XIX, 170 (*Phora*) et 1912. l. c. XIII, 97, Fig. 2. — 1910. Kertész, Cat. Dipt. VII, 411. — 1914. Brues, Bull. Wisc. Nat. Hist. Soc. XII, 127. — 1918. Schmitz, Jaarb. Natuurh. Genootsch. Limburg 1917, 138.

Male. Frons slightly broader than high, greyish black, dull; bristles strong, inner bristle of lower row somewhat below the outer and in about the middle between it and the upper supraantennal; supraantennal bristles unequal, the lower scarcely half the size of the upper; the upper supraantennals slightly more approximate than the inner bristles of the middle row, the lower more approximate. Antennæ somewhat small, black, arista distinctly pubescent. Palpi yellow to black, somewhat curved, large and projecting, the bristles quite short, only at the apex one somewhat longer bristle. Thorax black, often with the margins reddish, sometimes all red, it is somewhat shining; pubescence dark or blackish brown, black behind. Scutellum with four bristles of equal or nearly equal size. Pleura black, brownish anteriorly. Mesopleura bristly, bristles uniform. Abdomen black, somewhat greyish, dull, with pale hind margins to the segments: venter dirty yellowish; abdomen is distinctly hairy with quite short hairs, slightly longer at the hind margins of the segments and at the sides, especially on second segment. Hypopygium somewhat small, symmetrical, the sides produced slightly backwards, rounded; it is grey, hairy at the sides; anal tube of medium size, yellow, grey at base; there is a yellowish, somewhat semicircular ventral plate. Legs yellow or dark yellow, hind femora a little blackish at tip and middle coxæ with a black spot behind; front metatarsi a little thickened, hind femora broad with long hairs below the basal half; hind

tibial bristles somewhat strong. Wings tinged with yellowish brown, veins brownish; costa reaching beyond the middle, 1 about equal to 2 + 3; costal cilia moderately long; fourth vein somewhat curved at the base, for the rest almost straight. Halteres yellow or reddish yellow.

Female. Similar to the male; palpi yellow, of ordinary shape but somewhat large, with ordinary bristles; hind femora likewise with long hairs below and front metatarsi a little thickened, but less than in the male.

Length 1,7—2,7 mm.

A. projecta is common in Denmark; Ermelund, Dyrehaven, Lyngby Mose, Holte, Geel Skov, Hillerød, on Langeland at Lohals, on Funen at Veflinge, and in Jutland at Hejls south of Kolding, Nebsager, Ry, Nørre Sundby and Løkken; my dates are $^{24}/_5$ — $^{23}/_{10}$; it was for the first time taken in 1883.

Geographical distribution: — Northern and middle Europe down into Hungaria; towards the north to southern Sweden.

9. *A. simulans* Wood.

1912. Wood, Ent. Month. Mag. 2, XXIII, 97, Fig. 3. — 1914. Brues, Bull. Wisc. Nat. Hist. Soc. XII, 132. — 1918. Schmitz, Jaarb. Natuurh. Genootsch. Limburg 1917, 138. — *Trineura bicolor* p. p. Zett. (nec Meig.) 1848. Dipt. Scand. VII, 2880, 29.

Male. This species is very similar to *projecta*, but it is paler and shows some special characters. Frons slightly broader than high, blackish grey, reddish above the antennæ; bristles as in *projecta*, but the upper supraantennals not nearer together than the inner bristles of middle row, and the lower relatively larger and not or almost not more approximate. Antennæ brown. Palpi yellow, of good size, but not large as in *projecta*, the bristles short, but much longer than in *projecta*. Thorax yellow, the hairs at its hind margin rather bristly; pleura with a blackish spot below the wing-root. Abdomen yellow or reddish, blackish grey at the sides; the hairs fully as distinct as in *projecta*, especially those on the sides of the second segment. Hypopygium grey, the sides prolonged more backwards below and a little pointed. Legs as in *projecta* and likewise with front metatarsi thickened. Wings and halteres as in *projecta*.

Female. Similar; antennæ a little paler; abdomen more reddish with the first, second and sixth segments more or less brownish grey; front metatarsi a little thickened.

Length 2,5—3 mm.

In spite of its similarity to *projecta* the species will be known by the colour, the supraantennal bristles, the palpi and the hypopygium; the description of the colour of abdomen by Schmitz shows that the reddish abdomen may be darkened in various ways. — As mentioned under *Giraudii* I have studied the types to Zetterstedt's *bicolor* and found that of the four specimens one was *Giraudii*, the others *simulans*.

A. simulans is rare in Denmark as elsewhere, only two specimens, a male and a female, have been taken, Holte $\frac{6}{8}$ 1918 (Th. Mortensen) and at Hejls south of Kolding $\frac{6}{7}$ 1919 (the author).

Geographical distribution: — Besides in Denmark the species occurs in England, Holland and Germany and towards the north to middle Sweden.

10. *A. fuscinervis* Wood.

1908. Wood, Ent. Month. Mag. 2, XIX, 173, 217 (*Phora*). — 1914. Brues, Bull. Wisc. Nat. Hist. Soc. XII, 120. — 1918. Schmitz, Jaarb. Natuurh. Genootsch. Limburg 1917, 147.

Male. Frons very low and broad, twice as broad as high, and somewhat furrowed, black, dull; inner bristle of lower row a little below the outer and much nearer to it than to the upper supraantennal; supraantennal bristles equal, the upper distant, about equally distant as the inner bristles of the middle row and the lower slightly more approximate. Antennæ large, reaching above the middle of the eye, black, arista short-pubescent. Palpi not large, yellow, with ordinary armature. Thorax black, very slightly shining, with blackish brown, in certain light often whitish shining pubescence. Scutellum with four equal bristles. Mesopleura bare. Abdomen black, dull, with short hairs at the hind margins of the segments and at the sides, and here a little longer at the hind corners and especially at the hind corners of sixth segment; the second segment with somewhat long, bristly hairs at the sides. Hypopygium small, symmetrical, with a bunch or oblique row of bristles on each side near the base; anal tube small, yellow or brownish yellow; there is a black, arched ventral plate. Legs brown or yellowish brown, the anterior palest and front legs yellowish; hind femora not broad, with some longish hairs below the basal half; hind tibial bristles distinct, numerous but rather small, a little longer in the apical half. Wings with the front margin somewhat convex near the base, brownish, veins lighter or darker brown,

thin veins strong and rather dark; costa reaching beyond the middle, 1 longer than $2 + 3$; costal cilia short; fork longish and the angle very acute; fourth vein slightly curved in the whole length. Halteres black.

Female. Similar, but the antennæ much smaller; hind femora as in the male with a few longish hairs below the basal part.

Length 1,8—2,5 mm.

A. fuscinervis is common in Denmark; Ermelund, Dyrehaven, Egebæks Vang, Holte, Suserup Skov at Sorø, Bogø south of Sealand, at Lohals on Langeland and in Jutland at Hejls south of Kolding, Jelling, Ry, Egense Skov and Hals at Limfjorden and at Sæby; my dates are $^{20}/_6$ — $^{12}/_8$; I have taken it in copula on $^{21}/_7$; it was for the first time taken in 1881.

Geographical distribution: — Besides in Denmark known from England and Holland.

11. *A. prodroma* Lundbk.

1921. Lundbk. Vidensk. Medd. Dansk naturh. Foren. 72, 131, 1.

Male. Frons somewhat, but not much broader than high, black, dull; inner bristle of lower row a little below the outer and nearer to it than to the upper supraantennal; supraantennals unequal, the lower about half the size of the upper; the upper supraantennals approximate, nearer together than the inner bristles of middle row, the lower close to the upper and direct below them, not nearer together. Antennæ somewhat large, but not as large as in *fuscinervis*, black, arista quite short-pubescent. Palpi brownish, of ordinary size and armature. Thorax black, a little shining, with blackish pubescence. Mesopleura bare. Scutellum with four nearly equal bristles. Abdomen black, dull, the hairs very minute and almost only present at the hind margins of the segments, only at the hind corners of second segment a little more conspicuous; at the hind margin of sixth segment they are a little longer. Hypopygium somewhat small, greyish black, with numerous, conspicuous hairs on the sides below; anal tube of medium length, but high, blackish; there is a rounded, blackish ventral plate with the margin paler. Legs black, front legs and middle tibiæ more brownish black; hind femora a little dilated, with long, somewhat strong hairs below the basal half; bristles on hind tibiæ of medium size. Wings somewhat brownish or greyish brown tinged, veins brown and the thin veins rather strong; costa short, about

0.44 of the wing-length, costal divisions about as 13—6—4; angle at fork somewhat acute; costal cilia moderately long; fourth vein evenly curved in the whole length. Halteres black.

Female. Unknown.

Length 2 mm.

The bare pleura and black halteres place the species near *fuscinervis* to which species it also shows some general resemblance, but as seen in the description it differs in many points.

Of the species only one specimen, a male, has been taken, Holte on a fresh stub of a tree $\frac{1}{4}$ 1920 (Th. Mortensen).

Geographical distribution: — Only known from Denmark.

12. *A. humeralis* Zett.

1838. Zett. Ins. Lapp. 796, 7 et 1848. Dipt. Scand. VII, 2862, 11, ♀ et 1860. *ibid.* XIV, 6474, 11, ♂ ♀ (*Trineura*). — 1901. Beck. Abhandl. zool. bot. Gesell. Wien, I, 61, 54, ♀ (*Phora*). — 1910. Kertész, Cat. Dipt. VII, 408. — 1914. Brues, Bull. Wisc. Nat. Hist. Soc. XII, 121. — 1918. Schmitz, Jaarb. Natuurh. Genootsch. Limburg 1917, 140. — *Phora cubitalis* Beck. 1901. l. c. I, 56, 47, ♂. — 1908. Wood, Ent. Month. Mag. 2, XIX, 171, 254 et 1912. 2, XXIII, 98. — *Aphiochaeta cubitalis* 1910. Kertész, l. c. 406.

Male. Frons considerably broader than high, grey, dull; bristles strong, forming three nearly straight rows; inner bristle of lower row in about the middle between the outer and the upper supra-antennal; supraantennal bristles about equal or the lower somewhat smaller, the upper a little more approximate than the inner bristles of middle row, the lower rather close to the upper and very slightly more approximate. Epistoma, genæ and lower part of occiput yellow, the upper part grey. Antennæ of medium size, clear yellow, just the apex of third joint brown, arista not long, distinctly pubescent. Palpi pale yellow, of ordinary size and armature. Thorax blackish or brownish black, somewhat greyish, nearly dull, it is reddish or yellowish at the margin, especially at humeri and postalar calli; the black pubescence somewhat bristly at the hind margin. Scutellum with four strong and equal bristles. Pleura yellowish brown, darker to blackish behind. Mesopleura bare. Abdomen somewhat robust, greyish black, dull; it is distinctly hairy with short hairs, slightly longer at the hind margins and especially at the sides; at the sides of second segment there are longer, bristly hairs, and round the hind margin of sixth segment are relatively long bristles; also the venter is distinctly haired with rather long hairs. Hypopygium small, symme-

trical, greyish, the sides produced a little backwards below and with short, fine hairs; anal tube small, brownish yellow. Legs yellow, hind femora a little darkened at tip and likewise hind tibiae; hind femora somewhat broad, with only short hairs below the basal half, but with the hairs on the anterior side of the ventral margin in the apical half long and bristly; hind tibial bristles large, few in number. Wings somewhat yellowish, veins brown or pale brown; costa reaching to the middle, 1 about equal to $2 + 3$; costal cilia long; angle at fork acute, third vein dilated from the base to the fork and very broad, also the outer branch of the fork thick; fourth vein a little S-like at the base, for the rest nearly straight. Halteres pale yellow.

Female. Similar to the male; antennae a little smaller and the brown spot at the tip much larger; bristles round hind margin of

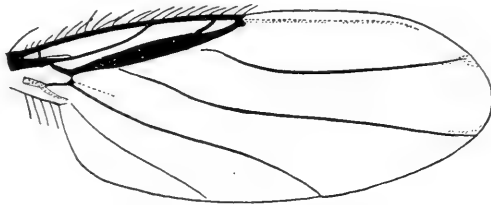


Fig. 79. Wing of *A. humeralis* ♂.

sixth segment much smaller; hind femora likewise with bristly hairs below the apical part; costa beyond the middle; third vein normal though strong and a little thickened.

Length 2—2,5 mm.

A. humeralis is rare in Denmark; Lersø (Stæger), Bogø south of Sealand and in Jutland at Skamling south of Kolding (the author), in all four males and one female; the dates are in July.

Geographical distribution: — Northern and middle Europe into Holland and Germany; towards the north to northernmost Scandinavia.

Remarks: As Collin has shown (Wood l. c. 2, XIX, 254) *humeralis* Zett. is identical with *cubitalis* Beek., the former being the female, the latter the male; I have myself seen Zetterstedt's type and can confirm Collin's statement. In Stæger's collection there are two males and a female; Zetterstedt notes l. c. VII that he had got the species from Stæger, but as Zetterstedt at that time only knew the female, he had thus got only this sex; also Becker had only seen the

female in Zetterstedt's collection so that he established the new species *cubitalis* for the male; of this species he mentions a specimen in Boheman's collection, probably the specimen mentioned by Zetterstedt l. c. XIV.

13. *A. rubricornis* Schmitz.

1919. Schmitz, Entom. Ber. Nederl. Ent. Ver. V, 193 et 1920. Jaarb. Natuurh. Genootsch. Limburg 1919, 137.

Male. Unknown.

Female. Frons about quadratic, black, somewhat greyish, dull; bristles strong, inner bristle of middle row a little below the outer, in about the middle between it and the upper supraantennal; supraantennal bristles unequal, the lower scarcely half as large as the upper; the upper supraantennals approximate, nearer together than the inner bristles of the middle row, the lower slightly more approximate. Antennæ smallish, brown, arista short, not longer than the middle line of frons, short-pubescent. Palpi yellow, bristles not long. Thorax black, a little greyish and somewhat shining, slightly reddish about the postalar calli; it has blackish pubescence, somewhat bristly behind, but there is no individualised intraalar bristle as in the three following species. Scutellum with four equal bristles. Mesopleura bare. Abdomen black, dull, a little greyish, with very short hairs, the second segment has on its protruding sides a series of bristles. Legs brownish, front legs including coxæ yellowish, the base of coxæ and femora more brownish, the posterior coxæ blackish grey and the femora dark brown; hind femora dilated, the upper margin forming an even curve; they have long hairs below the basal half, and the hairs at the anterior ventral margin in the apical part conspicuous and a little bristly; hind tibial bristles somewhat numerous (12—14), strong and rather equal. Wings yellowish or light brownish tinged, veins brown, thick veins paler; costa reaching beyond the middle, 1 distinctly longer than 2 and about as long as 2 + 3 or fully; costal cilia long; fork longish, acute; fourth vein evenly curved in the whole length, only slightly more in the basal part. Halteres light yellow.

Length about 3 mm.

A. rubricornis is rare in Denmark, we have only one specimen, a female, Holte ²⁵/₆ 1917 (Th. Mortensen).

Geographical distribution: — Denmark and Germany.

14. *A. latifemorata* Beck.

1901. Beck. Abhandl. zool. bot. Gesell. Wien, I, 67, 64, Taf. III, Fig. 58 (*Phora*). — 1910. Kertész, Cat. Dipt. VII, 408. — 1914. Brues, Bull. Wisc. Nat. Hist. Soc. XII, 122. — 1918. Schmitz, Jaarb. Natuurh. Genootsch. Limburg 1917, 140.

Male. Frons considerably broader than high, black, a little greyish, dull; bristles strong, the inner bristle of lower row a little below the outer, in about the middle between it and the upper supraantennal; the supraantennal bristles not large, unequal, the lower about half the size of the upper or smaller; the upper supraantennals more approximate than the inner bristles of middle row, the lower slightly more approximate. Antennæ blackish or blackish brown, somewhat large, reaching to about the middle of the eye, arista not long, short-pubescent. Palpi dark yellow to brown, of ordinary size and armature. Thorax black, very slightly shining, with blackish pubescence; there is one pair of dorsocentral bristles, but besides there is a bristle more forwards and outwards, placed forwards and inwards to the postalar bristle; it may, I think, be termed an intraalar bristle. Scutellum with four equal bristles. Mesopleura bare. Abdomen black, a little greyish, dull; it has short hairs, a little longer at the hind margins of the segments and at the sides; at the sides of second segment a row of bristles and sixth segment with bristly hairs at the hind margin. Venter distinctly haired. Hypopygium rather small, greyish, shining below at the sides and with some hairs; anal tube large, high and compressed, but narrow at base, it is yellow, more or less darkened at the base; sometimes a broadly rounded yellowish ventral plate is seen. Legs blackish brown, the front legs paler to yellowish brown; hind femora rather dilated and the dilatation continued towards the apex so that the dorsal margin here curves abruptly down; they have long hairs below on the basal half and the hairs on the anterior ventral margin towards apex are somewhat long and bristly; hind tibial bristles strong, 10—12 in number, on the basal half they increase in size downwards to below the middle, then they are generally smaller and the apical one is again larger, but often they are more equal in size. Wings strongly brownish, veins brown; costa reaching beyond the middle, 1 about equal to 2, shorter than 2 + 3; costal cilia moderately short or a little longer; fourth vein rather curved in its first part, for the rest nearly straight. Halteres yellow or dark yellow.

Female. Similar to the male; antennæ smaller; on the ventral

side abdomen has longish hairs at the hind margins of third, fourth and fifth segments; the hairs below the basal half of hind femora shorter than in the male; the arrangement of the hind tibial bristles described above is generally well pronounced in the female.

Length. About 2 to fully 3 mm.

A. latifemorata I have only taken in Ermelund and Dyrehaven, but here it is common; my dates are $^{23}/_4$ — $^{26}/_6$ it is thus an early species; I have taken it in copula on $^{15}/_5$, $^{23}/_5$ and $^{20}/_6$. My specimens are taken from 1918 to 1921, but, as mentioned above under the genus, a specimen stands in Stæger's collection under *ciliata*, labelled "Zett. det."

Geographical distribution: — Northern and middle Europe down into Hungary; towards the north into Sweden (Becker).

15. *A. ruficornis* Meig.

1830. Meig. Syst. Besch. VI, 218, 21 (*Phora*). — 1848. Zett. Dipt. Scand. VII, 2863, 12, p. p. specimen danicum exclusum (*Trineura*). — 1901. Beck. Abhandl. zool. bot. Gesell. Wien, I, 57, 49 (*Phora*). — 1908. Wood, Ent. Month. Mag. 2, XIX, 171 et 1912. 2, XXIII, 98 (*Phora*). — 1910. Kertész, Cat. Dipt. VII, 413. — 1914. Brues, Bull. Wisc. Nat. Hist. Soc. XII, 130. — 1918. Schmitz, Jaarb. Natuurh. Genootsch. Limburg 1917, 141.

Male. This species is very like *latifemorata*, but paler and distinguished by some other characters. Frons as in *latifemorata*, but generally more grey, sometimes reddish anteriorly; supraantennal bristles

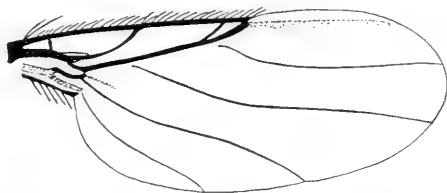


Fig. 80. Wing of *A. ruficornis* ♂.

very approximate. Antennæ yellow to brown, arista fully as long as in *latifemorata*. Palpi yellow or pale yellow. Thorax variable, reddish yellow to brown or blackish with reddish margins, or almost quite blackish; as in *latifemorata* there is, besides the dorsocentral bristles, an intraalar bristle inwards to the postalar bristle. Scutellum with four equal bristles. Pleura more or less yellowish or brownish to darker. Abdomen black, a little greyish, haired as in *latifemorata* and likewise

with bristles on the sides of second segment. Venter with distinct hairs. Hypopygium mainly as in *latifemorata*, perhaps a little larger, not shining below; anal tube as in *latifemorata*. Legs yellow, hind tibiæ and tarsi slightly darker, middle coxæ with a black spot behind, and hind femora blackish at apex; the hind femora less dilated than in *latifemorata* and not broad towards apex, the dorsal margin therefore evenly curved from the middle towards both ends; hind femora haired as in *latifemorata* and hind tibial bristles similar, the arrangement mentioned under *latifemorata* generally well marked. Wings brownish, but less strongly than in *latifemorata*; costa reaching beyond the middle, 1 generally shorter than 2, but variable and sometimes a little longer; costal cilia moderately short to moderately long; fourth vein a little less curved than in *latifemorata*. Halteres yellow.

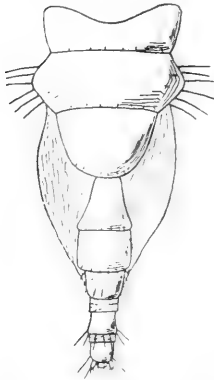


Fig. 81. *A. ruficornis* ♀
typical abdomen.

Female. Similar to the male, but often paler; antennæ smaller; the abdominal tergites of a special shape (fig. 81), the second tergite has the sides with the bristles somewhat protruding, but is narrowed behind, the third tergite is semi-circular or trapezoidal, the fourth is narrow, trapezoidal, most narrow in front, sometimes pointed so that the incision here reaches to the middle line, the fifth tergite is a little broader, the sixth again somewhat narrower so that these three tergites form together an elliptical plate; such is the shape in extreme cases, but often the tergites are broader so that the constriction is less marked, only resulting in the tergites after the second being somewhat narrowed; on the ventral side abdomen has bristly hairs at the hind margins of third to sixth segments; hind femora haired as in the male and the hairs below the basal half as long as in this sex.

Length 1,7—2,8 mm.

A. ruficornis is common in Denmark; Ermelund, Dyrehaven, Lyngby Mose, Holte, Ruderhegn, Suserup Skov at Sorø, Bogø south of Sealand, on Langeland at Lohals and in Jutland at Hejls south of Kolding, Ry, and on Bornholm at Rø. My dates are $^{15}/_5$ — $^{16}/_8$; I have taken it in copula on $^{26}/_6$. It was for the first time taken in 1883. A pupa was taken at a pond in Ruderhegn in flood refuse on $^3/_3$, it developed on $^{20}/_4$ (Kryger). On $^6/_6$ the species was taken at Holte very numerously on a putrid *Anodonta* (Th. Mortensen), all the specimens

were females, evidently present for depositing eggs. Schmitz (Biol. Zentralbl. 37, 1917, 31) thinks that the species may deposit exclusively on snails, but it evidently uses also other putrid animal matter.

Geographical distribution: — Europe and down into the Canadian Islands and Madeira, towards the north to northern Sweden; it also occurs in North America.

Remarks: The Danish specimen mentioned by Zetterstedt l. c. is *Parastenophora minuta* Fabr. as stated above under that species. — *Trineura carbonaria* Zett. is not, as said by Becker, *ruficornis*, but is = *sordida* Zett. and = *scaura* Schmitz (see remarks below under *Woodi*).

16. *A. errata* Wood.

1912. Wood. Ent. Month. Mag. 2, XXIII, 98. — 1914. Brues, Bull. Wisc. Nat. Hist. Soc. XII, 117. — 1918. Schmitz, Jaarb. Natuurh. Genootsch. Limburg 1917, 142. — *Phora cilipes* Wood (nec Brues) 1909. l. c. 2, XX, 120, 148, ♂ nec ♀. — *Aphiochaeta decipiens* Wood (nec de Meijere) 1912. l. c. 2, XXIII, 169.

Male. Again this species is very similar to the two preceding, especially to *ruficornis*. Frons as in the others, grey; supraantennal bristles not strongly approximate, the lower much smaller than the

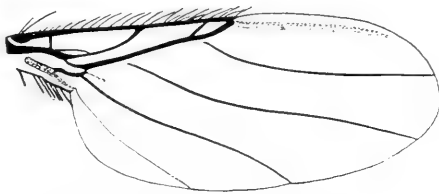


Fig. 82. Wing of *A. errata* ♂.

upper or nearly minute. Antennæ somewhat large, reddish to black. Palpi yellow, ordinary. Thorax reddish to black, an intraalar bristle present as in the other two. Scutellum with only two bristles, the anterior bristles only present as small hairs. Pleura reddish or more or less blackish. Abdomen black, somewhat greyish, haired as in the other two, but the bristles on the sides of second segment smaller and fewer, generally not above five in number. Venter with no hairs visible. Hypopygium small, shining at the sides below and here with a small hair; anal tube large as in the others, yellow or dusky yellow; there is a triangularly pointed, yellowish ventral plate. Legs coloured

as in *ruficornis* and hind femora haired in the same way; bristles on hind tibiæ less strong than in *ruficornis*, generally the middle bristle the longest, or larger and smaller bristles interchange. Wings brownish; costa reaching beyond the middle, 1 longer than 2, but not as long as $2 + 3$; costal cilia longer than in *ruficornis*; fourth vein as in *ruficornis*. Halteres yellow.

Female. Similar; antennæ a little smaller; scutellum with four equal or nearly equal bristles; abdominal tergites not shaped as in *ruficornis*, at most somewhat narrowed; abdomen has no bristly hairs at the hind margins of the segments on the ventral side, but only small hairs distributed more evenly on the segments; hind femora with the hairs below the basal part shorter than in the male, and first costal division generally relatively longer.

Length 1.5 to fully 2 mm.

A. errata is not rare in Denmark; Damhusmosen, Ermelund, Holte, Ørholm, Suserup Skov at Sorø, on Langeland at Lohals and in Jutland at Hejls and Skamling south of Kolding, Nebsager and Ry (H. J. Hansen, Th. Mortensen, the author); my dates are $5/5$ — $12/8$; a pupa was taken at Damhusmosen in flood refuse in May 1879, it developed soon after (Schlick), and this is the first known Danish specimen.

Geographical distribution: — Besides from Denmark the species is known from England and Holland.

17. *A. rubida* Schmitz.

1918. Schmitz, Jaarb. Natuürh. Genootsch. Limburg 1917, 144.

Male. Frons low and broad, nearly twice as broad as high, dark grey; inner bristle of lower row below the outer, about in the middle between it and the upper supraantennal; supraantennal bristles not large, unequal, the lower rather small; the upper supraantennals approximate, nearer together than the inner bristles of the middle row, the lower direct below the upper, not more approximate. Antennæ very large, reddish yellow, arista distinctly though somewhat short-pubescent. Palpi pale yellow, of ordinary size, but somewhat broad at the middle, the bristles ordinary, not long. Thorax reddish yellow, a little shining, with brown pubescence. Scutellum with four equal bristles, the bristles on each side about as distant as the middle bristles. Pleura yellow. Mesopleura bare. Abdomen somewhat rapidly tapering behind; it is black, dull, the hairs very short, almost only

visible at the hind margins. Venter brownish. Hypopygium small and withdrawn, with hairs below on the sides; ventral plate large, rounded at the end, yellow; anal tube large and somewhat high, strongly compressed, yellow. Legs yellow, hind femora darkened just at apex, with long hairs below the basal half to beyond the middle; bristles on hind tibiæ distinct, but not large, the upper small, below them about six stronger, the dorsal hair-seam curved in the whole length so that both ends are somewhat anterodorsal. Wings yellowish brown, veins brown, thick veins more yellow; costa reaching to the middle, 1 about equal to 2 + 3; angle at fork somewhat acute, outer branch of the fork distinctly curved; costal cilia short or moderately short; fourth vein issuing behind the base of the fork, evenly and not much curved. Halteres yellow.

Female. I do not know the female, but, according to Schmitz's description, it is quite similar, only is the frons a little less broad, the antennæ smaller though still above ordinary size, and 1 seems to be relatively longer.

Length 2—2,4 mm.

A. rubida is very rare in Denmark, only one specimen, a male, has been taken, Lohals on Langeland ¹⁷/₇ 1920 (the author); this sex was hitherto not known. The species is evidently nearly related to *emarginata*.

Geographical distribution: — Hitherto known only from Denmark and Silesia; in all only one male and one female are known.

18. *A. quadriseta* Schmitz.

1918. Schmitz, Jaarb. natuurh. Genootsch. Limburg 1917, 143 (*lutea* var. *quadriseta*) and 1919. Entom. Ber. Nederl. Ent. Ver. V, 186.

Male. Unknown.

Female. Frons somewhat broader than high, grey, dull; inner bristle of lower row in about the same height as the outer; supra-antennal bristles a little unequal, the upper a little nearer together than the inner bristles of the middle row, the lower slightly more approximate. Antennæ small, brownish black, arista distinctly pubescent. Thorax dark brown above, paler towards the margin, slightly shining, with black pubescence. Pleura brown, darker above. Mesopleura bare. Scutellum with four bristles, the anterior a little weaker than the posterior. Abdomen black or blackish, dull, sparingly short-haired. Legs yellow, hind femora brown just at apex, below the basal

half with sparse longish hairs; bristles on hind tibiæ distinct, but somewhat small. Wings yellowish, veins yellow or brownish yellow; costa reaching to the middle or about, 1 longer than 2 + 3 the divisions about as 15—8—4; costal cilia moderately long; fourth vein evenly curved. Halteres yellow.

Length 2 mm.

I possess only one female, it belongs to the darker form; according to Schmitz the thorax may be red and antennæ brownish red, but the colour varying, being often darker. My specimen has been determined by Schmitz.

A. quadriseta is rare in Denmark, only the one female mentioned has been taken, Bornholm at Rønne in July 1882 (H. J. Hansen).

Geographical distribution: — Besides from Denmark known from Holland, Germany and Austria.

19. *A. pseudopicta* n. sp.

Male. Frons somewhat broader than high, grey, more or less reddish, dull or dullish; bristles strong, inner bristle of lower row a little below the outer and about in the middle between it and the upper supraantennal (I take this from a specimen with normal bristles, all my other specimens have the bristles curiously abnormal with super-numerary bristles); supraantennal bristles large, equal, the upper as distant as the inner bristles of the middle row, the lower only slightly more approximate. Oral and genal bristles strong and conspicuous. Antennæ yellow or orange, of normal size, arista very indistinctly pubescent. Palpi yellow, somewhat broad, with well developed bristles. Thorax yellow or brownish yellow, dull, with black pubescence. Scutellum with four equal bristles. Pleura yellow with a blackish spot below the halteres. Mesopleura bare. Abdomen yellow, with black, transverse front bands on the segments, broadest at the sides and interrupted or brownish in the middle, and abdomen thus coloured as in *picta*; first segment yellow; abdomen is dull, with short hairs, almost only present at the hind margins of the segments. Hypopygium rather small, grey, with fine hairs on the sides; anal tube yellow, not small. Legs yellow, hind femora a little darkened just at apex and the hind tibiæ at apex on posterior side; the hairs below the basal half of hind femora somewhat long and relatively strong; bristles on hind tibiæ strong. Wings somewhat yellowish, veins yellowish brown; costa reaching to the middle, costal divisions

as 7—3—2, thus 1 longer than 2 + 3; third vein somewhat thick, fork long and rather acute; costal cilia short; fourth vein evenly curved. Halteres yellow.

Female. Similar; abdomen with the bands broader and more brownish, so that it is blackish brown with yellow hind margins to the segments.

Length 2,5—3,5 mm.

This species is, as seen from my description, very similar to *picta*, but the frontal bristles are otherwise arranged and there are no anterodorsal bristles on posterior tibiæ; also other characters are found, thus there are no long hairs at the sides of second abdominal segment, and the long hairs below hind femora do not reach the middle.

A. pseudopicta is rare in Denmark, we have five specimens, a male and four females, labelled "from beech, Sælsølund, Koch leg." (Schlick); perhaps the species was bred from a beech-tree.

Geographical distribution: — Only known from Denmark.

Remarks: This species, which is *picta* so similar in colour, is absolutely distinct from that species, both by the frontal bristles, the bristles on tibiæ and also by the costal divisions; from *Giraudii* it is distinct alone by the colour and also by other characters, and *Meigeni* is different alone by the hypopygium, so there can, I think, be no doubt that the species is new; I state this because I am not quite sure with regard to the group characters taken from the frontal bristles and the tibial bristles; the latter, as said under *Giraudii*, may be few and small and no doubt sometimes totally disappearing (*submeigeni* Wood), and also the frontal bristles may vary in arrangement and are f. inst. in *Giraudii* more approaching the usual arrangement than in *picta*. It is also seen that while describing *pseudogiraudii* Schmitz (Entom. Ber. Nederl. Ent. Ver. V, 1920, 252) had in mind the possibility that it might be a var. of *Giraudii*.

20. *A. emarginata* Wood.

1908. Wood, Ent. Month. Mag. 2, XIX, 172 et 1912. 2, XXIII, 98 (*Phora*).
— 1914. Brues, Bull. Wisc. Nat. Hist. Soc. XII, 117. — 1918. Schmitz, Jaarb. Natuurh. Genootsch. Limburg 1917, 145.

Male. Frons low and broad, nearly twice as broad as high, greyish black, dull; bristles strong, the inner bristle of lower row about in the same height as the outer and nearer to it than to the upper supra-

antennal; supraantennal bristles unequal, the lower less than half the size of the upper or smaller; the upper supraantennals approximate, nearer together than the inner bristles of the middle row, the lower still more approximate. Antennæ blackish brown, third joint large and oval, reaching beyond the middle of the eye; arista short and straight, very short-pubescent. Palpi yellow, with ordinary, not long bristles. Thorax black, a little shining, with pale brownish pubescence. Scutellum with four equal bristles. Mesopleura bare. Abdomen black, rather slightly greyish, dull; it is exceedingly short and sparingly haired, only at the hind corners of second segment some small hairs more visible. Hypopygium small, symmetrical, greyish; anal

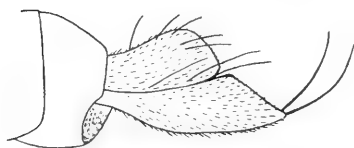


Fig. 83. *A. emarginata* ♂,
anal tube $\times 135$.

tube compressed, narrow at the base, increasing in height outwards and very high at the middle, but then emarginate to the apex (fig. 83), it is yellow, more or less brownish at the base. Legs brownish yellow or brownish, hind femora somewhat dilated, with long hairs below on the basal half; hind tibial bristles of medium size, the dorsal hair-seam is strongly deflected towards the anterior in the apical third and hence the dorsal margin seen in profile is much arched. Wings slightly yellowish tinged, veins brown or dark brown; costa not reaching the middle, 1 nearly double 2 and longer than $2 + 3$; costal cilia long; the outer branch of the fork slightly angulated and from here issues the fourth vein which is evenly curved in the whole length. Halteres dark or dusky yellow to light brownish.

Female. I have not seen the female; according to the descriptions, it has the frons a little less broad, the antennæ of ordinary size with the third joint roundish and arista a little longer; the ovipositor long and exerted (Wood).

Length fully 1 to 1,6 mm.

A. emarginata is a rare species in Denmark; Holte (Th. Mortensen), Geel Skov and in Jutland at Hejls south of Kolding and Ry (the author); in all six specimens, all males; my dates are $\frac{5}{6}$ — $\frac{18}{8}$. It was taken for the first time in 1917.

Geographical distribution: — Besides from Denmark the species is known from England and Holland.

21. *A. breviseta* Wood.

1912. Wood. Ent. Month. Mag. 2, XXIII, 99. — 1914. Brues, Bull. Wisc. Nat. Hist. Soc. XII, 114. — 1918. Schmitz, Jaarb. Natuurh. Genootsch. Limburg 1917, 145.

Male. Frons broader than high, black, a little greyish, dull; inner bristle of lower row slightly below the outer and placed in the middle between it and the upper supraantennal; supraantennal bristles unequal, the lower scarcely half the size of the upper; the upper supraantennals approximate, a little nearer together than the inner bristles of middle row, the lower a little more approximate. Antennæ somewhat large, black, arista short, about as long as the frons, distinctly pubescent. Palpi yellow, of ordinary size, the bristles not long. Thorax black, slightly shining, with dark brown pubescence. Scutellum with four equal and about equally distant bristles. Mesopleura bare. Abdomen black, dull, a little greyish; the short hairs almost not longer at the hind margins of the segments, but on sixth segment somewhat long. Hypopygium small, greyish black, with some hairs below on the sides; there is a large, brownish yellow ventral plate, rounded at the end; anal tube short, yellowish, blackish at the base. Legs brown or dark brown, the front legs slightly paler; hind femora somewhat broad, with long hairs below the basal half; the hairs on the anteroventral side at apex somewhat strong; bristles on hind tibiæ rather large, especially about the middle, the upper smaller. Wings nearly clear, veins brown; costa not reaching quite to the middle, 1 a little longer than 2 + 3 (equal to 2 + 3 after Wood and Schmitz); costal cilia long, but not specially long; fourth vein somewhat curved in its first part, for the rest slightly curved. Halteres yellow.

Female. Wood knew only the male, but Schmitz also mentions the female; according to his description, it agrees with the male, but the frons is less broad, the antennæ smaller, costa a little longer, and 1 relatively longer.

Length 1,7—2 mm.

A. breviseta is very rare in Denmark, only one specimen, a male, has been taken, Lohals on Langeland ²⁴/₇ 1920 (the author).

Geographical distribution: — Besides from Denmark known from England and Holland, but rare.

22. *A. rata* Wood.

1908. Wood, Ent. Month. Mag. 2, XIX, 172 et 1912. 2, XXIII, 98 (Phora). — 1914. Brues, Bull. Wisc. Nat. Hist. Soc. XII, 129. — 1918. Schmitz, Jaarb. Natuurh. Genootsch. Limburg 1917, 146.

Male. Frons generally quadratic, but varying and sometimes broader; it is grey, dull; bristles strong, inner bristle of lower row below the outer and generally nearer the upper supraantennal than the outer bristle; supraantennal bristles small and unequal, the lower quite small, they are approximate, the lower the most. Antennæ brownish black or brown, of usual size, arista of medium length but a little variable, very short-pubescent. Palpi yellow, small and with quite short bristles. Thorax greyish black, very slightly shining, with greyish brown to dark brown pubescence. Scutellum with four unequal bristles, the anterior much smaller than the posterior and most often only present as small hairs. Mesopleura bare. Abdomen black, distinctly greyish, dull; it has very short hairs, most visible at the sides, and at the side margins of second segment they are a little longer, sometimes rather conspicuous; at the hind margin of sixth segment the hairs are also a little longer. Hypopygium of medium size or a little over, somewhat knob-like, it is greyish, hairy below on the sides; it is not quite symmetrical, the side prolongation reaching further down on the right than on the left side; anal tube somewhat large, yellow, brownish at the base; there is a flap-like, dusky yellowish ventral plate, unsymmetrically placed and reaching to or beyond the end of hypopygium. Legs yellowish to dark brown, the posterior legs the darker; hind femora somewhat dilated, with long hairs below the basal half; hind tibiæ above the middle with hairs or very small bristles, below with six to seven bristles which may be more or less strong; the dorsal hair-seam curved somewhat anteriorly in the lower half. Wings a little yellowish tinged, veins brown; costa generally not quite to the middle, but sometimes reaching it, 1 somewhat longer than $2 + 3$; costal cilia long, but varying in length; fourth vein curved in the basal part, for the rest slightly curved or nearly straight. Halteres yellow.

Female. Similar to the male; palpi of normal size and armature; scutellar bristles unequal, but the anterior always present as bristles; abdomen sometimes with pale hind margins to the segments, and sometimes the hairs on the sides of second segment more developed than in the male; hind femora as in the male with long hairs below the basal half.

Length 1,3 to fully 2 mm.

As seen this species varies to no small degree and especially as regards the breadth of the frons, the size of the hind tibial bristles, the length of costa and of costal cilia and also as regards the size of the hairs on the sides of second abdominal segment. In its typical forms the species will, however, be known by the relatively narrow frons, the small supraantennals and the bristles on hind tibiæ, and the male by the small, short-bristled palpi. I possess some specimens with large and nearly equal supraantennal bristles and in the male with palpi of ordinary size and armature which, however, I cannot satisfactorily distinguish from *rata*, and one or more related species perhaps still exist here.

A. rata is one of the most common species in Denmark and occurring all over the country; it occurs during the whole season, my dates are $\frac{8}{5}$ — $\frac{14}{9}$; I have taken it in copula on $\frac{9}{5}$ and $\frac{15}{7}$. I possess specimens bred from larvæ in dead Lepidopterous larvæ from North Sealand, from larvæ taken in a dead *Orgyia antiqua* at Bernstorff on $\frac{6}{11}$ and developing on $\frac{22}{5}$ next year, from larvæ taken in a dead *Prionus coriarius* in Hareskov in October, developing on $\frac{11}{4}$ — $\frac{14}{4}$ next year, and from pupæ taken in the nest of a chaffinck at Strandby on Lolland on $\frac{8}{7}$ and developing on $\frac{29}{7}$, and finally bred from a nest of *Vespa vulgaris* taken at Hillerød on $\frac{26}{9}$, the imagines developing on $\frac{6}{6}$ next year (Kryger). I have also seen a specimen bred from a pupa found at Damhusmosen in flood refuse in April 1878 and developing soon after (Schlick), and this is, as far as I know, the first time the species has been found in Denmark. Schmitz l. c. mentions it from nests of *Bombus* and says it is parasitical, and it is once recorded as bred from a living larvæ of *Clerus formicarius* (Schmitz, Zool. Jahrb. Syst. 37, 1914, 553), but I believe it is more probably a scavenger.

Geographical distribution: — This common species is at present, besides from Denmark, only recorded from England and Holland, but no doubt it has a much wider geographical range.

Remarks: Wood described l. c. a species *albicans* which should be nearly related to *rata*, the separating characters are for a great deal such towards which the varying characters of *rata* tends; Schmitz has l. c. noted this, and I quite agree with him when he says that specimens of *rata* often show one or other of the characters given for *albicans*; I therefore think it doubtful whether *albicans* is more than a variety of *rata*.

Group II.

Scutellum with two bristles.

Mesopleura bristly, with one or more longer besides the small bristles.

Costa long.

23. A. rudis Wood.

1909. Wood, Ent. Month. Mag. 2, XX, 25, 60 (*Phora*). — 1914. Brues, Bull. Wisc. Nat. Hist. Soc. XII, 130. — 1919. Schmitz, Jaarb. Natuurh. Ge-nootsch. Limburg 1918, 150.

Male. Frons somewhat broader than high (about $1\frac{1}{3}$ —1), greyish, dull; inner bristle of lower row below the outer, rather near to it and to the eye-margin; supraantennal bristles equal or nearly



Fig. 84. Wing of *A. rudis* ♂.

equal, the upper distant, distinctly more distant than the inner bristles of the middle row, the lower approximate and placed far down at the anterior point of the frons. Antennæ somewhat large, blackish, arista short-pubescent. Palpi yellow or dusky yellow, narrow and somewhat small, but with the bristles long. Thorax black, very slightly shining, pubescence brown or pale brownish. Pleura somewhat shining below. Mesopleura bristly with one long bristle. Abdomen black, dull, very short hairs visible only at the hind margins and hind corners of the segments, and at the hind margin of sixth segment they are slightly longer. Hypopygium somewhat large, knob-like, blackish grey or sometimes reddish grey; it has a series of hairs on the sides, the hindmost of which is the strongest or forming a real bristle, a little curved; anal tube somewhat large, yellow (rarely black, Wood); subanal body generally exposed and presenting a large, black polished, hook-like piece with a broader one at its base. Legs yellow, the posterior may be slightly darker, especially the apical part of hind femora; front tarsi a little stout; hind femora with long hairs below the basal half; hind tibial bristles distinct and not short, but fine. Wings yellow-

ish, veins brownish; costa reaching to or about to the middle, 1 about double 2 and about equal to or longer than $2 + 3$, but somewhat varying, 2 considerably longer than 3; costal cilia moderately short to almost midway between short and long; angle at fork somewhat large; fourth vein evenly curved in the whole length, a little recurved just at apex, it is obliterated just at the base. Halteres black.

Female. Similar; antennæ small; hind femora likewise with long hairs below the basal half.

Length 1,4—1,8 mm.

I have compared my specimens with typical specimens from Wood, kindly sent me from Mr. Collin.

A. rudis is rare in Denmark; Holte (Th. Mortensen), and in Jutland at Skamling south of Kolding, Jelling, Ry and Egense Skov at the east end of Limfjorden (the author); the dates are $\frac{5}{7}$ — $\frac{29}{7}$ in 1917 to 1921.

Geographical distribution: — Besides from Denmark the species is at present with certainty only recorded from England, but, according to a communication from Pater Schmitz, it seems to be distributed also in middle Europe.

24. *A. depilata* Lundbk.

1921. Lundbk. Vidensk. Medd. fra Dansk naturh. Foren. 72, 132, 2.

Male. Frons low, twice as broad as high at the sides, greyish black, dull; bristles as in *rudis*, the bristles of the lower row likewise near to each other, but the outer placed lower, in nearly the same height as the inner, and this latter thus less near the margin; upper supraantennals still more distant. Antennæ blackish, large, third joint oval, reaching above the centre of the eye, arista short-pubescent. Palpi yellow, somewhat small as in *rudis*, the bristles scarcely so long. Thorax black, a little shining, with brownish pubescence. Mesopleura bristly, with one long bristle, but not so long as in *rudis*. Abdomen dull black and haired as in *rudis*. Hypopygium likewise large, knob-shaped; it is black and has hairs below which seem to be placed more densely and bunch-like than in *rudis*, one of them is a little longer and curved inwards; anal tube yellow, of medium size; when the subanal body is exposed, a very large, black polished, hook-like piece is seen, tapering into a long, band-shaped, pointed end, it has also at the base another, broader piece. Legs yellowish, the posterior slightly darker, the apical half of hind femora brownish; front tarsi

not stouter than usual; hind femora with only short hairs below the basal half, but the hairs on the anteroventral margin of the apical part somewhat long and bristly; hind tibial bristles distinct, but weaker than in *rudis*. Wings as in *rudis*, but more colourless, and thin veins rather fine; 1 distinctly longer than 2 + 3; costal cilia rather midway between short and long; angle at fork likewise large. Halteres black.

Female. Similar to the male; antennæ small and the hairs on the apical part of hind femora much smaller.

Length 1,3—1,7 mm.

This species is, as seen, very similar to *rudis*, but besides by some small characters, as the frontal bristles and the breadth of frons, it will be known by the want of the long hairs below the basal half of hind femora and by the bristly hairs below the apical part; the female may, I think, likewise be recognized by the frontal bristles and short hairs below basal half of hind femora; from *pseudociliata* it is likewise distinguished by the want of long hairs below hind femora, and *pseudociliata* is a larger species with still larger antennæ and the mesopleural bristle longer.

A. depilata is rare, I possess eight males and one female; Holte, Geel Skov, Suserup Skov at Sorø and in Jutland in Egense Skov at the east end of Limfjorden (Th. Mortensen, the author); the dates are $7/7$ — $23/8$ in 1917 to 1921.

Geographical distribution: — Only known from Denmark.

25. *A. limburgensis* Schmitz.

1918. Schmitz, Entom. Ber. Nederl. Ent. Ver. V, 57. — 1919. Schmitz, Jaarb. Natuurh. Genootsch. Limburg 1918, 155.

Male. Frons slightly broader than high, black, a little greyish, dull; inner bristle of lower row well below the outer and in about the same distance from it and from the upper supraantennal, but a little varying in position sometimes rather low and somewhat nearer the eye-margin; supraantennal bristles unequal, the lower scarcely half the size of the upper or smaller; the upper supraantennals about in the same distance from each other as the inner bristles of middle row, the lower more approximate. Antennæ of ordinary size, black or blackish brown, arista not long, short-pubescent. Palpi dusky yellow, rather small and with rather short, sometimes a little longer bristles. Thorax black, a little shining, with brown pubescence.

Mesopleura bristly, with one bristle longer than the others, but not specially strong. Abdomen black, dull, with very short hairs, slightly longer at the hind corners of the segments; at the hind margin of sixth segment the hairs are a little longer or sometimes rather long. Hypopygium of medium size, symmetrical, with some small bristles on each side at the base and hairy above on the hind part; anal tube of medium size, brownish with yellow apex; there is a yellow or dusky ventral plate, rounded at the end, flap-like. Legs yellowish brown to dark brown, the front legs yellowish; hind femora a little broad, with the hairs below the basal half short or a little longish; hind tibial bristles distinct, but delicate, sometimes somewhat stronger. Wings greyish or greyish brown tinged, veins brown; thin veins somewhat strong, only the seventh weaker and more colourless; costa reaching to the middle, 1 about double 2 and longer than $2 + 3$; costal cilia short; fork longish and somewhat acute; fourth vein evenly curved in the whole length, only slightly more at the base. Halteres black, sometimes yellow.

Female. Similar, antennæ very slightly smaller.

Length 1.5—2 mm.

As seen this species varies with black and yellow halteres, and this is followed by variation in some other characters, for the specimens with yellow halteres have the bristles at the hind margin of sixth segment, on the hypopygium, the hind tibial bristles and sometimes also the bristles on the palpi stronger than the specimens with black halteres; I follow, however, Schmitz (l. c. 1919) in regarding them as one species as they in other respects are quite agreeing and as f. inst. the bristles on the palpi may be short in specimens with yellow halteres and longer in such with black halteres. — I have compared my specimens with Schmitz' types, both specimens with yellow and with black halteres.

A. limburgensis does not seem to be common in Denmark; Holte, Suserup Skov at Sorø, Bogø south of Sealand, Marienlyst on Falster and in Jutland at Ry (Th. Mortensen, the author) and at Frederikshavn (H. J. Hansen); the dates are $1/7$ — $31/7$ in 1917 to 1921, but the specimens from Frederikshavn was taken in 1881, the first time the species was taken in Denmark. We have in all thirteen specimens of which only two, both males from Suserup Skov, have yellow halteres.

Geographical distribution: — Besides in Denmark the species occurs in Holland and Germany.

26. *A. ciliata* Zett.

1848. Zett. Dipt. Scand. VII, 2872, 22 (*Trineura*). — 1864. Schin. F. A. II, 341 (*Phora*). — 1901. Beck. Abhandl. zool. bot. Gesell. Wien, I, 64, 58 (*Phora*). — 1909. Wood, Ent. Month. Mag. 2, XX, 25, 61 (*Phora*). — 1910. Kertész, Cat. Dipt. VII, 405. — 1914. Brues, Bull. Wisc. Nat. Aist. Soc. XII, 114. — 1919. Schmitz, Jaarb. Natuurh. Genootsch. Limburg 1918, 151.

Male. Frons narrow, as high as broad, sometimes somewhat higher or on the contrary a little broader, black, somewhat shining; inner bristle of lower row a little below the outer and in about the middle between it and the upper supraantennal; supraantennal bristles unequal, the lower about half the size of the upper or somewhat larger, the upper in nearly the same distance as the inner bristles of middle row, the lower more approximate. Antennæ small, black, arista short-pubescent. Palpi yellow or dark yellow, with well developed bristles. Thorax black, somewhat shining, with blackish or brownish pubescence. Mesopleura bristly and with one long and strong bristle. Abdomen somewhat oval, black, a little greyish, dull; sixth segment a little elongated, the third and fourth the shortest; there are very short hairs visible at the hind margins of the segments, at the hind corners of second segment they are a little longer. Hypopygium quite small and withdrawn, with small hairs at the lower corners; anal tube small, blackish or dark brownish, the apical hairs quite small. Legs black, the front legs brown or yellowish brown and also the knees on the middle legs brownish, front coxæ yellow; hind femora dilated and with a somewhat fatty gloss, the hairs below the basal part shortish; hind tibial bristles very strong, 7—11 in number, also middle tibiæ with distinct bristles. Wings brownish or yellowish brown, veins yellowish or pale brown, costa varying in length, generally reaching to the middle or thereabout, 1 equal to or a little longer than 2 + 3; costal cilia short; angle at fork somewhat acute; fourth vein distinctly curved in its basal part, for the rest almost straight. Halteres black or dark brown.

Female. Similar, but abdomen with the fourth tergite curiously abbreviated, generally at most half as long as the third, the white membrane between the two segments generally seen; abdomen generally a little shining behind, the seventh segment surrounded by longish, fine hairs; costa as a rule a little longer than in the male.

Length 1,4—2,4 mm.

A. ciliata is common in Denmark; Copenhagen, Ermelund, Dyrehaven, Lyngby Mose, Orholm, Holte, Geel Skov, Hillerød,

Krogerup Hegn, Bogø south of Sealand, on Langeland at Lohals and in Jutland at Hejls south of Kolding, Jelling and Ry; it is found nearly during the whole year, my dates are $^{22}/_2$ — $^{25}/_{12}$; I have specimens taken in a birds nest on $^{19}/_9$ (Ad. Jensen); in the cold time it may be taken in shelters f. inst. in hollow trees; on $^{14}/_{11}$ Dr. Th. Mortensen found both sexes by removing some fire-wood, and on $^{25}/_{12}$ he took it on windows together with a couple of other species evidently coming from a spruce, a Christmas-tree brought in from the wood the day before; Malloch (Proc. U. S. Nat. Mus. 43, 1912, 481) mentions it also from under bark on dead trees, especially where *Rhagium bifasciatum* was burrowing. I have taken it in copula on $^{23}/_8$.

Geographical distribution: — A common and widely distributed species; all Europe down into Spain; towards the north to middle Sweden. It is also recorded from North America (one single specimen).

Remarks: I have seen Zetterstedt's types and can confirm Becker's statement; specimens from Smolandia, Paradislyckan and Abusa are agreeing with the present species; a specimen labelled "Sueciæ" is another species and as far as I could see *fungivora*; Zetterstedt mentions the species from Denmark sent by Stæger, a specimen in Stæger's collection under *ciliata*, labelled "Zett. det." is *latifemorata*, as mentioned above under that species; thus Zetterstedt seems to have had no quite clear idea of the species.

27. *A. aequalis* Wood.

1909. Wood, Ent. Month. Mag. 2, XX, 25, 61 (*Phora*). — 1914. Brues, Bull. Wisc. Nat. Hist. Soc. XII, 111. — 1919. Schmitz, Jaarb. Natuurh. Genootsch. Limburg 1918, 153.

Male. Frons narrow as in *ciliata*, generally as high as broad, black and somewhat shining; frontal and supraantennal bristles as in *ciliata*. Antennæ small, black or brownish black, arista short-pubescent. Palpi yellow, of ordinary size and armature. Thorax black, somewhat shining, with brownish pubescence. Mesopleura bristly with one long and strong bristle as in *ciliata*. Abdomen oval, with sixth segment a little elongated, it is black, somewhat greyish and dullish or a little shining; it has short hairs, the most visible at the hind margins of the segments, at the sides they are longer, especially at the hind corners of second segment. Hypopygium quite small and withdrawn, with small hairs below; anal tube small, dusky yellow or brown, the apical hairs quite small. Legs as in *ciliata*, the posterior black or brownish black, the front legs yellow; hind femora

with the hairs below the basal part short; hind tibial bristles long and strong, and also middle tibiæ with distinct bristles. Wings brownish, veins brown or yellowish brown; costa not or not quite reaching to the middle, 1 about equal to $2 + 3$ or very slightly longer; costal cilia short; fourth vein curved in the basal part, for the rest almost straight. Halteres yellow.

Female. Similar; abdomen is somewhat shining behind, the fourth abdominal tergite not abbreviated; the hairs at the end of abdomen quite short, not longish as in *ciliata*.

Length 1,3 to fully 2 mm.

A. aequalis is less common in Denmark than *ciliata*, but in no way rare; Ermelund, Dyrehaven, Holte, Geel Skov, on Langeland at Lohals, on Ærø, and in Jutland at Ry (Th. Mortensen, the author); the dates are $^{10}/_4$ — $^{12}/_9$; I have taken it in copula on $^{31}/_5$. It was for the first time taken in 1917.

Geographical distribution: — Besides from Denmark the species is at present recorded from England and Holland, and from Prussia (Schmitz, Tijdschr. v. Entom. LXIV, 1921, 2.).

28. *A. coequalis* Schmitz.

1919. Schmitz, Jaarb. Natuurh. Genootsch. Limburg 1918, 153.

Male. Similar to the two preceding. Frons narrow, a little higher than broad, black and somewhat shining; outer bristle of lower row somewhat to considerably above the inner and thus placed higher than in *aequalis*; supraantennal bristles somewhat unequal as in the other two. Antennæ small, brownish black, arista very short-pubescent. Palpi yellow, of ordinary size and armature. Thorax black, a little shining, with dark brownish pubescence. Mesopleura bristly with one long and strong bristle. Abdomen oval, black, a little greyish, dull; sixth segment a little elongated; abdomen is haired as in the other two. Hypopygium likewise quite small and withdrawn, anal tube a little longer, dusky yellow. Legs yellowish brown, front legs yellowish; the hind legs may be darkened, but are never black; the hairs below hind femora longish, longer than in *aequalis*; hind tibial bristles long and strong. Wings yellowish brown, veins yellowish or the thin veins more brownish; costa not reaching the middle, 0,44—0,45, 1 distinctly longer to $1\frac{1}{2}$ times longer than $2 + 3$; costal cilia short, but a little longer than in *aequalis*; fourth vein as in *aequalis*. Halteres yellow.

Female. Similar; abdomen with the fourth tergite abbreviated as in *ciliata*, but generally a little less, about half as long as the third; abdomen a little shining behind; hind femora as in the male with longish hairs below the basal half.

Length 1,5 to about 2 mm, after Schmitz to 2,88 mm.

This interesting species stands between *ciliata* and *aequalis*, from the former it is distinguished by the yellow halteres and the female is at once distinguished from the *aequalis* female by the abbreviated fourth abdominal tergite; also the male is easily distinguished from *aequalis* by the colour of the hind legs, the length of costa and its divisions, and the hairs below the hind femora. — I have compared my species with typical specimens from Pater Schmitz.

A. coaequalis seems to be rare in Denmark, I possess only seven specimens, five males and two females; Ørholm (the author), Holte (Th. Mortensen) and on Langeland at Lohals (the author); they were taken from $7/6$ — $19/10$ in 1917 to 1920.

Geographical distribution: — Besides in Denmark the species occurs in Holland and also in Prussia (Schmitz, Tijdschr. v. Entom. LXIV, 1921, 4).

29. *A. flavescens* Wood.

1908. Wood, Ent. Month. Mag. 2, XX, 26, 61 (*Phora*). — 1914. Brues, Bull. Wisc. Nat. Hist. Soc. XII, 119. — 1919. Schmitz, Jaarb. Natuurh. Genootsch. Limburg 1918, 154.

Male. Frons nearly quadratic, greyish black, dull; inner bristle of lower row below the outer and about equally distant from it and from the upper supraantennal; supraantennal bristles unequal, the upper not large, the lower quite small and minute; the upper supraantennals about equally distant as the inner bristles of middle row or a little more approximate, the small lower still more approximate. Antennæ of medium size, yellow, third joint brownish at the apex above, arista quite short-pubescent. Palpi yellow, of ordinary size and armature. Thorax blackish, dull or nearly so, humeri and postalar calli reddish, the pubescence brownish. Pleura brownish black, reddish anteriorly. Mesopleura bristly, with one long and strong bristle. Abdomen black, dull, the short hairs almost only visible at the sides; at the sides of second segment there is a number of long bristles. Hypopygium small; anal tube large and rather long, yellow. Legs yellow, hind tibiæ and tarsi slightly darker; hind femora dilated, the hairs below the basal half long, and the hairs on the anterior side of

the ventral margin at apex rather bristly; hind tibial bristles few in number, very long and strong, also on middle tibiæ small bristles present. Wings brownish, veins brown; costa reaching considerably beyond the middle, 1 about equal to 2, but not longer; costal cilia short, but moderately so; fourth vein somewhat curved in the basal part, for the rest very slightly curved. Halteres yellow.

Female. Similar; abdomen with the fourth tergite abbreviated, about half as long as third, the latter somewhat excised in the hind margin; hind femora as in the male with long hairs below the basal half.

Length 1.7—2 mm.

A. flavescens is rare in Denmark, only three specimens, all females, have been taken; on Langeland at Lohals ²²/₇ 1920 (the author), on Falster at Resle ²⁸/₅ 1882 (H. J. Hansen), and in Jutland at Hejls south of Kolding ¹⁶/₇ 1919 (the author), the latter specimen was taken on the flower of an Umbellifer. The above description of the male is drawn from a Dutch specimen kindly sent to me from Pater Schmitz.

Geographical distribution: — Besides from Denmark known from England and Holland.

30. *A. fungivora* Wood.

1909. Wood, Ent. Month. Mag. 2, XX, 116, 145 (*Phora*). — 1914. Brues, Bull. Wisc. Nat. Hist. Soc. XII, 119. — *A. fuscipennis* Lundbk. 1920. Vidensk. Meddel. fra Dansk nat. Foren. 71, 2.

Male. Frons somewhat broader than high, black, a little greyish, dull; inner bristle of lower row somewhat below the outer and in about the middle between it and the upper supraantennal or a little nearer to the latter; supraantennal bristles unequal, the lower about half as large as the upper or smaller; the upper supraantennals almost as distant as the inner bristles of middle row or a little more approximate, the lower almost not more approximate. Antennæ of ordinary size, black, arista not long, short-pubescent. Palpi not large, yellow or dusky yellow, with ordinary, not long bristles. Thorax black, nearly dull, with brownish pubescence. The pleura may be a little brownish, especially anteriorly. Mesopleura conspicuously bristly, with one or two longer, but not specially long bristles. Abdomen black, very slightly greyish, dull; it has short hairs, most distinct at the hind margins of the segments and especially at the hind corners; the hairs at the hind margin of sixth segment longish, especially

at the sides. Hypopygium of medium size, produced a little downwards and higher than long; it is greyish black, but downwards more brownish or blackish red, when fully exposed it is narrowly glossy above just at base; on each side it has about three bristly hairs, one above the other, the lowermost the strongest and sometimes only the latter distinct; ventral plate dusky yellow or brown, broadest at the end and here broadly rounded; anal tube longish, brownish or dusky yellow, palest at apex. Legs yellow or light brownish yellow, hind legs darkest; hind femora below the basal half with a row of short, dense and somewhat strong hairs, densest towards the base; bristles on hind tibiæ of medium size or nearly, about 14—16 in number. Wings nearly always rather strongly brownish or greyish brown infuscated, veins strong, brown, also the seventh; costa reaching to the middle or generally beyond, costal divisions about as 14—8—5; costal cilia moderately long, almost approaching the border between short and long; fork longish, but the angle not large; fourth vein distinctly curved in its basal part and a little S-like at origin. Halteres black.

Female. Similar; hind femora with usual, short, but somewhat dense hairs below.

Length 1,5—2,2 mm.

I described l. c. this species under the name of *fuscipennis*, because it did not seem to me to agree with *fungivora*; later on I saw specimens of *fungivora* from Wood and I have no doubt that my species is identical with *fungivora*; the specimens of *fungivora* from Wood which I have seen have three bristly hairs on the sides of hypopygium, Wood has only reckoned the largest of them, the specimens have a yellow ventral plate, not black, the anal tube is not specially large and not yellow, but as in my specimens brownish; but Wood's specimens have the wings rather less tinged than mine, and especially in the female, while my females generally have the wings even as brownish as the males, only a couple of females have them less tinged, this is, however, no doubt only due to variation; Wood says that in the female the first costal division is only $1\frac{1}{2}$ times longer than the second, but this also is subject to variation and generally the relative lengths are the same as in the male. Finally I shall remark that Wood says "lower side of ♂ hind femora projecting in the middle as in *humilis*"; under *humilis* he describes this in the following way "— — about the middle where there is a sort of projecting or shoulder breaking the outline of the under-side"; such

a shape is also often seen, but it is here and in other instances always artificial and only due to exsiccation.

A. fungivora is not rare in Denmark; Ermelund, Lyngby, Holte, Geel Skov, Bogø south of Sealand and in Jutland at Hejls south of Kolding and Ry (Th. Mortensen, the author); my dates are $\frac{8}{6}$ — $\frac{15}{10}$ in 1917 to 1919.

Geographical distribution: — Besides from Denmark the species is at present only recorded from England; probably it also occurs in Sweden (see Remarks under *ciliata*).

Remarks: Wood says l. c. 145 that the species is similar to *rudis*; from this it will, however, be known by the not large antennæ in the male, the otherwise arranged supraantennal bristles, the shorter bristles on palpi and the short hairs below hind femora. It is, on the other hand, rather similar to *limburgensis*, so similar that specimens may turn up, which are difficult to place; besides by the longer costal cilia it will generally be recognized by the longer costa, by the fourth vein being more curved at the base, by the hairs below hind femora, and finally the wings are, as a rule, more brown.

31. *A. pleuralis* Wood.

1909. Wood, Entom. Month. Mag. 2, XX, 117, 146 (*Phora*). — 1914. Brues, Bull. Wisc. Nat. Hist. Soc. XII, 127.

Male. Frons somewhat broader than high, greyish black, dull; inner bristle of lower row a little below the outer and nearer to it than to the upper supraantennal; supraantennal bristles large and equal, the upper a little more approximate than the inner bristles of middle row, the lower slightly more approximate than the upper. Antennæ a little beyond medium size, black, arista short-pubescent. Palpi of fair size, yellow or dusky yellow, the



Fig. 85. *A. pleuralis* ♂, hypopygium $\times 75$.

bristles well developed or somewhat long. Thorax black, very slightly shining, with brownish pubescence. Mesopleura bristly with one or two bristles longer than the others. Abdomen black, somewhat greyish, dull; it has moderately short hairs, a little longer at the hind margins of the segments and at the sides, increasing a little in length

backwards, on the sixth segment they are somewhat long at the hind margin and also longish at the sides; venter with distinct hairs at the hind margins of the segments. Hypopygium somewhat large, greyish black, on each side there are about six bristles in a nearly vertical, but above backwards curved row, they are directed downwards (fig. 85); anal tube dusky yellow to blackish with the apex yellow; ventral plate generally protruding downwards, it is narrow, broadened towards the end and somewhat spoon-shaped, dusky yellow; a complicated, black subanal body as a rule protruding. Legs yellowish brown to brownish black, front tibiae and tarsi a

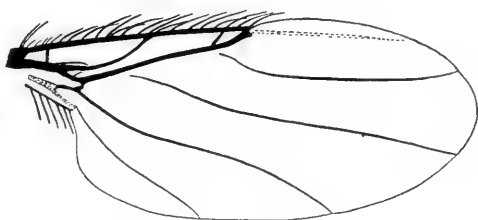


Fig. 86. Wing of *A. pleuralis* ♂.

little paler; hind femora with short hairs below; hind tibial bristles of medium size, the dorsal hair-seam deflected anteriorly from the middle downwards. Wings a little yellowish brown tinged, veins brown or pale brown; costa reaching to or beyond the middle, 1 slightly or somewhat longer than 2 and from a little shorter than to about equal to $2 + 3$; costal cilia full long; fourth vein a little curved in the basal part, for the rest very slightly curved. Halteres yellow.

Female. Similar; antennae a little smaller; the first costal division may be relatively longer; fourth vein generally a little more strongly curved in the basal part.

Length 1,4—2,5 mm.

Wood says that the fore tarsi are somewhat stout in the female and stouter than in the male; this I am not able to see. — Specimens of the smallest size are of rather rare occurrence, such small specimens may have the mesopleural bristles weaker and the longer bristle rather small.

This well characterised species is common in Denmark all over the country; my dates are $^{30}/_1$ — $^{10}/_{11}$ in 1916 to 1921; I have taken it in copula on $^{11}/_8$ and $^{20}/_9$.

Geographical distribution: — This common species besides in Denmark is at present known from England, where it is likewise common, and, according to specimens sent to me from Pater Schmitz, from Holland; it also occurs in Germany.

32. *A. stichata* Lundbk.

1920. Lundbk. Vidensk. Meddel. fra Dansk naturh. Foren. 71, 3.

Male. Frons somewhat broader than high ($1\frac{1}{2}$ —1), greyish black, dull; inner bristle of lower row a little below the outer and nearer to it than to the upper supraantennal; supraantennal bristles nearly equal, the lower, however, the weaker; upper supraantennals in about the same distance from each other as the inner bristles of middle row, the lower a little more approximate. Antennæ black, of ordinary size, arista distinctly pubescent.

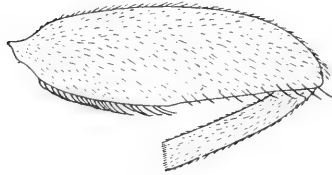


Fig. 87. *A. stichata* ♂, hind femur from the outside $\times 55$.

Palpi yellow, of fair size, with well developed bristles. Thorax black, very slightly shining, with brownish pubescence. Mesopleura bristly, with one bristle longer than the others. Abdomen black, a little greyish, dull, generally with more or less distinct, very narrow, paler hind margins to the segments; abdomen has short hairs, a little longer at the hind margins of the segments and at the sides; on sixth segment the hairs at the hind margin are longish; on the venter there are hairs at the hind margins of the segments. Hypopygium of medium size, knob-like, greyish, sometimes reddish grey; on each side there are about three bristly hairs near the lower margin, directed more or less downwards, and at the hinder dorsal margin there are some small hairs directed backwards; anal tube not large, yellow; there is a broad and rounded, yellowish or dusky ventral plate. Legs yellowish brown hind femora somewhat blackish brown, front legs paler to yellowish; hind femora with a dense row of somewhat short hairs below the basal half, these hairs have the apices curved backwards and touching each others, thus forming a characteristic fringe (fig. 87); hind tibial bristles distinct, though not strong, about of medium size, the dorsal hair-seam deflected towards the anterior from the middle downwards. Wings rather dark tinged, veins brown, thin veins blackish brown; costa reaching nearly half the wing-length (0,46—0,47), the divisions

about as 4—2—1; costal cilia rather long; angle at fork not large, but varying; fourth vein evenly curved. Halteres yellow.

Female. Similar to the male; hind femora without fringe.

Length 1,7—2 mm.

When I described this species I was well aware that it is nearly related to *albipennis* Wood, which species has also a fringe below hind femora; I have later on examined specimens of *albipennis* from Wood, and I think it beyond doubt that *stichata* is different; *albipennis* has almost quite colourless wings with pale veins, a shorter costa, the fourth vein more curved at base, but the hypopygium is rather similar, though *albipennis* seems to have more bristly hairs and these more vertically arranged; the legs in *stichata* are also paler, especially the front legs including the coxæ.

A. stichata does not seem to be rare in Denmark; Ermelund, Bogø south of Sealand, on Langeland at Lohals, and in Jutland at Hejls south of Kolding, Jelling, Ry and Hals; the dates are $\frac{1}{7}$ — $\frac{2}{9}$ in 1917 to 1921 (the author).

Geographical distribution: — Hitherto only known from Denmark.

33. *A. basispinata* Lundbk.

1920. Lundbk. Vidensk. Medd. fra Dansk naturh. Foren. 71, 4.

Male. Frons not much broader than high, grey, dull; inner bristle of lower row a little below the outer and nearer to it than to the upper supraantennal; supraantennal bristles equal or practically so, the upper a little less distant than the inner bristles of middle row, the lower only slightly more approximate than the upper. Antennæ black, of ordinary size or a little beyond, arista distinctly pubescent. Palpi well developed, yellow, with ordinary bristles. Thorax black or greyish black, very slightly shining, with brownish pubescence. Mesopleura bristly, one or two of the lowermost bristles a little longer than the others. Abdomen black, distinctly greyish, dull; generally very narrow, a little lighter hind margins to the segments are visible; abdomen has short hairs, slightly longer at the hind margins of the segments and at the sides; sixth segment a little elongated, with longish hairs at the hind margin and also at the sides; venter with long hairs at the hind margins of the segments. Hypopygium not small, on each side with an almost vertical row of six or seven bristles, directed more or less downwards; ventral plate yellowish, large.

nearly reaching beyond the hypopygium, broadest at the end and here broadly rounded; anal tube of medium size, yellow. Legs brownish yellow or a little darker; hind femora below the base with two

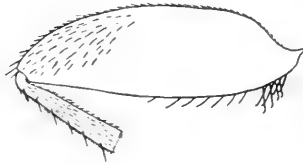


Fig. 88. *A. basispinata* ♂, hind femur from the inside $\times 55$.

short rows alongside of somewhat stubby bristles, the bristles of the anterior row directed downwards, those of the posterior row directed more obliquely towards the apex (fig. 88); hind tibial bristles distinct, but rather small, the dorsal hair-seam deflecting anteriorly in the lower half. Wings clear or nearly so, veins brown or yellowish brown; costa reaching to near the middle (0,47), costal divisions about as 11—7—3 (not 2 as in my first description); costal cilia long; angle at fork of medium size; fourth vein evenly curved. Halteres yellow, (in one specimen halteres darkened and at the same time the anal tube being brown with only apex yellow).

Female. Unknown.

Length. About 1,7 mm.

The armature of the hind femora is somewhat similar to that in *Beckeri*, but this species has the mesopleural bristles quite uniform and black halteres.

A. basispinata does not seem to be common; Copenhagen, on a window, Holte, Hillerød, and in Jutland at Esbjerg, Ry and Løkken (Th. Mortensen, the author); the dates are $^{10}/_6$ — $^{15}/_7$ in 1917 to 1921.

Geographical distribution: — Hitherto only known from Denmark.

34. *A. insons* Lundbk.

1920. Lundbk. Vidensk. Meddel. fra Dansk naturh. Foren. 71, 5.

Male. Frons about $1\frac{1}{2}$ times broader than high, grey, dull; inner bristle of lower row somewhat below the outer and in nearly the same distance from it as from the upper supraantennal; supraantennal bristles not large, approximate, the lower rather close to the upper and a little smaller. Antennæ black, of ordinary size, arista distinctly pubescent. Palpi yellow, ordinary. Thorax black, very slightly or almost not shining, with brownish pubescence. Mesopleura bristly, with two (in the single specimen) a little larger bristles below. Abdomen black, dull, the very short hairs almost only visible

at the hind margins of the segments and at the sides. Hypopygium not large, partly withdrawn, but with some bristles on each side in an ascending line, and with a large, yellowish ventral plate, broadly rounded at the end; anal tube thin, but of medium length, brownish with the apex yellow. Legs brownish, front legs more yellowish; hind femora without any special hairiness below, though with the short hairs more dense towards base than usual; bristles on hind tibiæ small and delicate. Wings clear or nearly so, veins brownish; costa 0,46 of the wing-length, costal divisions about as 4—2—1; costal cilia long; fourth vein evenly curved. Halteres yellowish, somewhat dusky.

Length 1,2 mm.

Female. I possess a female which may belong here; it seems to agree rather well, but the halteres are rather darkened, blackish; it has only one longer mesopleural bristle.

Of this species only one male specimen has been taken, Holte ^{20/6} 1917 (Th. Mortensen). The possible female was taken at Jelling in Jutland ^{18/7} 1921 (the author).

Geographical distribution: — Hitherto only known from Denmark.

Group III.

Scutellum with two bristles.

Mesopleura bristly, with one or more longer besides the small bristles.

Costa short.

35. *A. manualis* Schmitz.

1919. Schmitz, Entom. Ber. Nederl. Ent. Ver. V, 113, 141.

Male. Frons broad, about $1\frac{1}{2}$ times broader than high, greyish black, dull; inner bristle of lower row slightly below the outer and near to it, much nearer than to the upper supraantennal; it is placed near the eye-margin or more inwards; the supraantennal bristles unequal, the lower somewhat smaller than the upper, the upper in about the same distance from each other as the inner bristles of middle row, the lower approximate. Antennæ large (larger than in *pectoralis*), brown or dark brown, arista short-pubescent. Palpi yellow, of ordinary size and armature. Thorax black or more brownish black, dull or nearly so, with brownish pubescence. Mesopleura bristly, with one long bristle. Abdomen black, dull, with narrow, more or less distinct pale hind margins to the segments; the very short hairs visible at the

hind margins. Hypopygium of medium size, black or reddish black, at the lower anterior corners it has a bunch of hairs, directed downwards, much as in *pectoralis*, and at the lower posterior corners are some hairs; anal tube of medium size, somewhat high, dark brownish. Legs yellowish or the posterior more yellowish brown to brownish; front tarsi somewhat, but not much broadened; hind femora somewhat broad, with a few long hairs below the basal part; bristles on hind tibiæ distinct, but fine. Wings slightly yellowish, veins brown; costa about 0,43 of the wing-length, costal divisions about as 3—1—1; costal cilia moderately short; first vein rather curved and thus the costal cell somewhat deep; angle at fork of medium size; fourth vein evenly curved in the whole length, a little obliterated at the base. Halteres black.

Female. Unknown.

Length 1,5 mm.

I have compared my specimens with Schmitz' type, and I think the determination beyond doubt; in one character my specimens deviate, viz as regards the brown antennæ, this is, however, I think, of no consequence; the hairs below hind femora and those on hypopygium, both not mentioned by Schmitz, are present in the type. — If the front tarsi and shorter costal cilia are not noted the species is rather like *pectoralis*, but the pale palpi and legs and the less distant supraantennals distinguish it.

A. manualis is rare in Denmark, I have taken two specimens, both males, in Ry Nørreskov on $16/7$ 1918; they were taken in grass together with *pectoralis*.

Geographical distribution: — Hitherto known from Denmark and Holland.

36. *A. pungens* Lundbk.

1920. Lundbk. Vidensk. Meddel. fra Dansk naturh. Foren. 71, 6.

Male. Frons nearly $1\frac{1}{2}$ times broader than high, black, slightly greyish and quite slightly shining; inner bristle of lower row a little below the outer and very distant from it, nearer the middle line than the margin; upper supraantennals not large, approximate, lower supraantennals very small. Antennæ rather small, brown, arista not long, slightly pubescent. Palpi brown, of ordinary size, the bristles not long. Thorax black, a little shining, with brownish pubescence. Meso-

pleura bristly and with a long bristle which is not of the lowermost, but placed about in the middle among the small bristles. Abdomen black, dull, it is somewhat robust, but tapering towards the end; second segment elongated; the hairs very short, almost only visible at the sides, especially at the hind corners of second segment and also at the hind margin of sixth segment. Hypopygium small, greyish, for the most part withdrawn; it has a broad ventral plate, shorter than the hypopygium and of yellowish colour; anal tube yellow, not long, but rather high, the apical hairs somewhat large. Legs brownish or yellowish brown, the front legs more yellowish, hind femora a little more darkened towards the apex, on the basal part below with some long, sparse hairs; hind tibial bristles (about 14) distinct, but not large, in the upper third quite small. Wings slightly yellowish tinged, veins brown; costa short, 0,42 of the wing-length, costal divisions about as 5—2—1; costal cilia short, but only moderately, about midway between short and long; fourth vein evenly curved. Halteres black.

Female. Unknown.

Length 1,4 mm.

A. pungens is rare, only one specimen, a male, has been taken, Suserup Skov at Sorø ³¹/₇ 1918 (Th. Mortensen).

Geographical distribution: — Only known from Denmark.

Remarks: The species of the present group seem to be of rare occurrence, of the three of these four species, *aculeata*, *spinata* and *pungens* only one specimen of each is known, and of the fourth, *manualis* only three, of *aculeata* only a female is known, of the other three only the male, so that of none of them both sexes are known.

37. *A. manicata* Wood.

1910. Wood, Ent. Month. Mag. 2, XXI, 246, 248 (*Phora*). — 1914. Brues, Bull. Wisc. Nat. Hist. Soc. XII, 123. — 1919. Schmitz, Entom. Ber. Nederl. Ent. Ver. V, 141.

Male. Frons slightly broader than high or quadratic, black, slightly shining; inner bristle of lower row a little below the outer and nearer to it than to the upper supraantennal; supraantennal bristles a little unequal, the upper about as distant as the inner bristles of middle row, the lower considerably more approximate and a little smaller. Antennæ somewhat small, black, arista short-pubescent. Palpi yellowish to blackish, of ordinary size, but not broad, the bristles somewhat long. Thorax black, nearly dull, with

brownish pubescence. Mesopleura bristly, with one somewhat longer bristle. Abdomen somewhat robust, black, dull, with just a suspicion of a gloss at apex, the very short hairs almost only visible at the hind margins of the segments and slightly longer at the hind margin and the sides of sixth segment. Hypopygium small and in my specimens withdrawn, according to Wood it has a small, weak bristle on each side beneath and a dusky ventral plate, which is broad and rounded at the end; anal tube black, short and somewhat thick. Legs black or brownish black, the front legs not or slightly paler; front metatarsi conspicuously swollen, a little oval in shape; hind femora broad, the hairs below not long; hind tibial bristles distinct, but somewhat small and delicate, the dorsal hair-seam suddenly deflected anteriorly in the middle. Wings clear or nearly so, veins brown or blackish, thin veins paler; costa about 0,40 of the wing-length, costal divisions about as 8—4—3 or sometimes 8—3—3; costal cilia moderately long; angle at fork somewhat large; fourth vein evenly curved. Halteres black.

Female. Similar, only the front tarsi simple.

Length 1,1 to about 1,5 mm.

A. manicata is rare in Denmark; Holte, Hillerød (Th. Mortensen), Bogø south of Sealand and in Jutland at Hejls south of Kolding and Jelling (the author); in all six males and two females; my dates are $27/6$ — $19/10$ in 1917 to 1921. All my specimens have dark palpi in both sexes.

Geographical distribution: — Besides from Denmark known from England, and, according to specimens from Pater Schmitz, from Holland.

38. *A. pectoralis* Wood.

1910. Wood, Ent. Month. Mag. 2, XXI, 153, 200 (*Phora*). — 1914. Brues, Bull. Wisc. Nat. Hist. Soc. XII, 126. — 1919. Schmitz, Entom. Ber. Nederl. Ent. Ver. V, 141.

Male. Frons somewhat broader than high, greyish black, very slightly shining, nearly dull; inner bristle of lower row a little below the outer and near to it, much nearer than to the upper supraantennal; supraantennal bristles a little unequal, the lower somewhat smaller than the upper, the upper more distant than the inner bristles of middle row, the lower approximate and considerably below the upper. Antennæ somewhat large, black, arista short-pubescent. Palpi black, of ordinary size, with well developed bristles. Thorax black, a little

shining, with blackish brown pubescence. Mesopleura bristly, with one conspicuous longer bristle. Abdomen black, dull, the very short hairs almost only visible at the hind margins of the segments and a little more distinct at the sides and hind margin of the sixth segment. Hypopygium somewhat large, greyish black, at the lower anterior corners there is a series of hairs, directed downwards; a complicated, black subanal body with a hook-shaped, at the end furcated process is generally exposed, and a small, narrow, yellowish ventral plate is sometimes seen; anal tube of medium size, black, paler at apex. Legs black or brownish black, the front legs, especially tibiæ and tarsi, paler; hind femora broad, below the basal half with longish hairs; hind tibial bristles distinct, but somewhat small. Wings nearly clear, yet slightly yellowish, veins brown, the thick veins blackish brown; costa 0,40 of the wing-length, costal divisions about as 3—1—1; costal cilia long, but moderately; fourth vein evenly and slightly curved in its whole length. Halteres black.

Female. Similar to the male, only the antennæ smaller and the hairs below hind femora shorter.

Length. About 1 to nearly 1,5 mm.

Wood says that the lower supraantennals are quite small, but this is not correct, they are only somewhat smaller than the upper, but they are often difficult to see.

A. pectoralis is rather common in Denmark; Ørholm, Holte, Geel Skov, on Langeland at Lohals and in Jutland at Jelling, Ry and in Egense Skov at the east end of Limfjorden (the author) and at Agger on the west coast (Th. Mortensen); the dates are $\frac{4}{6}$ — $\frac{15}{10}$ in 1918 to 1921. I generally took it with the net in low herbage and especially in grass in woods; the female has appeared much rarer to me than the male.

Geographical distribution: — Besides in Denmark occurring in England and there common, and, according to a specimen sent from Pater Schmitz, in Holland, but it is no doubt more widely distributed.

Group IV.

Scutellum with two bristles.

Mesopleura bristly with the bristles uniform, all small.

Costa long.

39. *A. lucifrons* Schmitz.

1918. Schmitz, Entom. Ber. Nederl. Ent. Ver. V, 58. — 1919. Schmitz, Jaarb. Natuurh. Genootsch. Limburg 1918, 157.

Male. Frons a little broader than high, nearly quadratic, black and strongly shining; inner bristle of lower row slightly below the outer and a little nearer to it than to the upper supraantennal; supraantennal bristles unequal, the lower somewhat smaller than the upper; the upper supraantennals approximate, not as distant as the inner bristles of middle row, the lower a little more approximate. Antennæ of ordinary size, black or dark brown, arista somewhat long, distinctly pubescent. Palpi yellow, of ordinary size and armature, the bristles, however, not long. Thorax black, shining, with brown pubescence. Pleura a little brownish anteriorly. Mesopleura bristly, the bristles uniform. Abdomen black, dull, sixth segment a little elongated, the very short hairs almost only visible at the hind margins of the segments and slightly longer at the hind margin and the sides of sixth segment. Hypopygium small, grey, finely haired at the sides below; a broad, rounded, yellowish to blackish ventral plate is often seen; anal tube short, but somewhat high, yellow, dusky at the base. Legs yellowish brown, the hind legs paler or darker brown and hind femora often blackish brown; hind femora somewhat broad, with a fatty gloss, and also the hind tibiæ somewhat stout; the hairs below hind femora not long; bristles on hind tibiæ rather dense and numerous, distinct, but fine. Wings brownish tinged, veins brown and thin veins rather strong; costa relatively short, 0,44—0,46 of the wing-length, costal divisions about as 10—4—3; costal cilia short; angle at fork of medium size; fourth vein evenly curved in its whole length. Halteres yellow.

Female. Quite similar to the male; costa generally of the greatest length given above.

Length 1—1,5 mm.

I have compared my specimens with typical specimens from Pater Schmitz.

A. lucifrons is common in Denmark; Ermelund, Ørholm, Holte, Hillerød, Suserup Skov at Sorø, on Langeland at Lohals, on Ærø, and in Jutland at Hejls south of Kolding and at Ry (Th. Mortensen, the author); the dates are $24/5$ — $26/9$ in 1917 to 1921.

Geographical distribution: — Besides in Denmark known from Holland and Germany.

40. *A. subnitida* Lundbk.

1920. Lundbk. Vidensk. Meddel. fra Dansk naturh. Foren. 71, 6. — 1920. Schmitz, Jaarb. Naturh. Genootsch. Limburg 1919, 144.

Male. Frons a little broader than high (about $1-1\frac{1}{4}$), black, distinctly but not strongly shining; inner bristle of lower row a little below the outer and about equally distant from it and from the upper supraantennal; the upper supraantennals a little more approximate than the inner bristles of middle row, the lower supraantennals about half as strong as the upper and slightly more approximate. Antennæ of ordinary size, black or blackish, arista distinctly pubescent. Palpi yellow, well developed, with ordinary bristles. Thorax black, somewhat shining, with brownish pubescence. Mesopleura bristly, the bristles uniform. Abdomen black, very slightly greyish, dull; sixth segment a little elongated; the very short hairs visible at the hind margins of the segments and at the sides; on the sixth segment they are more distinct and this segment has somewhat long hairs at the hind margin, especially at the sides. Hypopygium not large, greyish, higher than long, without bristles, but with short hairs along the sides below, ventral plate yellowish, evenly rounded at the end; anal tube short, but somewhat high at the base, yellowish, dusky at the base. Legs yellowish or the posterior more brownish yellow, hind femora a little darkened at apex; hind femora somewhat broad and hind tibiæ somewhat stout as in *lucifrons*; the hairs below the basal half of hind femora a little longish, the bristles on hind tibiæ somewhat delicate, rather dense (about 16). Wings somewhat yellowish or light brownish tinged, especially along the veins, veins brown, thin veins rather strong; costa 0,46 to about 0,50 of the wing-length, costal divisions about as 4—2—1; costal cilia moderately short; angle at fork not large; fourth vein a little S-like at origin, slightly curved in the basal part and for the rest nearly straight, but curved slightly downwards at the end. Halteres deep yellow.

Female. Similar; abdomen slightly shining towards the end and here rather hairy.

Length. About 1,8 mm.

This species is, as seen from the description, highly similar to *lucifrons*; the characters which distinguish it are the a little broader and less shining frons, the lower inner frontal bristle placed in the middle between the outer and the upper supraantennal, the arista being more pubescent, the longer hairs on sixth abdominal segment, the costa upon the whole being longer with longer cilia, and the first division not distinctly more than double the second, also the fourth vein has another curve, and finally the species is larger.

A. subnitida is not common, eight specimens have been taken,

seven males and a female; Holte, Suserup Skov at Sorø (Th. Mortensen), and in Jutland at Ry (the author); the dates are $8/7$ — $6/8$ 1918.

Geographical distribution: — Hitherto only known from Denmark.

41. *A. obscuripennis* Wood.

1909. Wood. Ent. Month. Mag. 2, XX, 113, 143 (*Phora*). — 1914. Brues, Bull. Wisc. Nat. Hist. Soc. XII, 125.

Male. Frons a little broader than high, black, dull; inner bristle of lower row below the outer and in about the middle between it and the upper supraantennal; supraantennal bristles unequal, the lower about half the size of the upper or smaller; the upper supraantennals scarcely as distant as the inner bristles of middle row, the lower not or slightly more approximate. Antennæ black, of ordinary size or a little beyond, arista short-pubescent. Palpi black, large, broad and prominent, with somewhat short bristles, only present on the apical part. Thorax black, dull, with brownish pubescence. Pleura often somewhat brownish. Mesopleura bristly, the bristles uniform. Abdomen tapering backwards, black, dull, the very short hairs visible at the hind margins of the segments and at the sides; at the hind margin of sixth segment only slightly longer. Hypopygium somewhat large, greyish; it is not quite symmetrical, the left side is larger than the right, but both sides are prolonged backwards below into a little protruding corner, often yellowish on the left side, both sides are somewhat densely hairy downwards, on the smaller right side the hairs are crowded so that a small tuft is formed; there is a yellow or dusky yellow, not broad ventral plate, rounded at the end; anal tube of medium size, yellow, blackish at base. Legs yellowish brown, the front legs yellowish; front metatarsi thickened, as thick as tibiæ; the hairs below hind femora short; bristles on hind tibiæ distinct, but small, fine and numerous. Wings somewhat darkened, brownish tinged, veins brown, thin veins a little strong, the seventh weaker; costa about reaching to the middle, costal divisions about as 6—3—2; costal cilia medium long; angle at fork somewhat acute; fourth vein a little curved in the basal part, for the rest nearly straight. Halteres black or brownish black.

Female. Similar; the palpi smaller and paler, brownish, yellow at apex, with ordinary bristles; front metatarsi slightly less thickened.

Length 1,8—2,5 mm.

This species shows a curious resemblance to a species in the group with four scutellar bristles, viz *projecta*; both species show in the male dark, large, slightly bristled palpi, in the female they are smaller, yellow and normally bristled; both have front metatarsi dilated, and the wings are very similar; of course the species cannot be confused, as one has four the other two scutellar bristles.

A. obscuripennis does not seem to be rare in Denmark; Copenhagen, Holte, Geel Skov, Bogø south of Sealand, and in Jutland at Hejls south of Kolding (Th. Mortensen, the author); the dates are $13/6$ — $15/10$ in 1917 to 1920; I have taken it in copula on $2/8$.

Geographical distribution: — Besides in Denmark known from England, and, according to a specimen sent from Pater Schmitz, in Holland.

42. *A. conformis* Wood.

1909. Wood, Ent. Month. Mag. 2, XX, 113, 143 (*Phora*). — 1914. Brues, Bull. Wisc. Nat. Hist. Soc. XII, 115. — *A. carpalis* Schmitz, 1919. Entom. Ber. Nederl. Ent. Ver. V, 112.

Male. Frons considerably broader than high, black, a little greyish, dull; inner bristle of lower row nearly in the same height as the outer and in the middle between it and the upper supraantennal; supraantennal bristles a little unequal, the upper about as distant as the inner bristles of middle row, the lower only slightly more approximate. Antennæ black, a little above ordinary size, arista short-pubescent. Palpi black, of ordinary size and armature. Thorax black, somewhat shining, with brownish pubescence. Mesopleura bristly, the bristles uniform, weak, almost only forming a single row along the hind margin. Abdomen black, dull, short hairs are visible at the hind margins of the segments, a little longer at the hind corners, on sixth segment they are slightly longer. Hypopygium somewhat small; on the sides there are four or five bristles in an obliquely vertical row; a short ventral plate is sometimes seen; anal tube not large, dark brownish with paler apex. Legs black or brownish black, the front legs, especially the tibiæ sometimes paler, but the front tarsi blackish; front metatarsi conspicuously thickened somewhat oval, at the middle broader than the end of tibiæ (fig. 89); hind femora with the hairs below the basal half of some length;



Fig. 59.
A. conformis
♂, front
tarsus $\times 65$.

bristles on hind tibiæ (12—13) distinct, but small. Wings more or less yellowish or brownish tinged, veins brown; costa reaching nearly to the middle (0,48), costal divisions about as 4—2—1; costal cilia long; angle at fork not acute; fourth vein evenly curved in the whole length, only slightly more in its first part. Halteres black.

Female. Similar; antennæ a little smaller; front metatarsi nearly as in the male, a little less oval, hind femora likewise with somewhat long hairs below.

Length 1,3—1,5 mm.

Remarks: I have compared my specimens with specimens from Wood, and I have also seen typical specimens of *carpalis* from Pater Schmitz; in Wood's description there are some errors, especially the colour of the wings and of the front tarsi and also the size are not correct; this was the cause why Schmitz failed to recognize the species; in a letter to me from ²/₁₀ 1919, Schmitz when he had seen Wood's specimens, has already declared the two species to be identical. — Both Wood and Schmitz mention that the species sometimes has no bristles on mesopleura; such specimens I have never seen.

A. conformis is somewhat common in Denmark; at Copenhagen in Sondermarken, in Ermelund, Dyrehaven, Ørholm, Holte (the author), Geel Skov (Th. Mortensen) and in Jutland at Jelling (the author) and at Sæby (H. J. Hansen); my dates are ²/₅—²⁵/₇, it is most common on the earlier dates and is thus a somewhat early species; it was taken for the first time in 1881. I have especially taken it with the net in grass on the ground in woods, it was also several times taken on leaves of *Salix*.

Geographical distribution: — Besides in Denmark occurring in England, Holland and Germany.

43. *A. subcarpalis* Lundbk.

1920. Lundbk. Vidensk. Meddel. fra Dansk naturh. Foren. 71, 8.

Male. Frons somewhat broader than high, black, dull; inner bristle of lower row below the outer and nearer to it than to the upper supraantennal; the upper supraantennals about as distant as the inner bristles of middle row, the lower somewhat weaker and only slightly more approximate. Antennæ black, of ordinary size, with ordinary or fair-sized bristles. Thorax black, dull or nearly so, with brown pubescence. Mesopleura with delicate, uniform bristles. Abdomen black, dull, the very short hairs visible at the hind margins

of the segments and at the sides, on sixth segment very slightly longer. Hypopygium small, black or greyish black, with some small bristles on the sides about as in *conformis*, but situated further downwards; ventral plate in accordance with the hypopygium rather small, yellowish with the end broadly rounded; anal tube small and dark. Legs brown to blackish brown, the front legs paler, yellow or brownish yellow; the front metatarsus dilated, but not fully as wide as the end of tibiæ and thus less dilated than in *conformis*, the other tarsal joints slightly stout; the whole tarsus yellowish, last joint darkened; hind femora with sparse longish hairs below the basal half; bristles on hind tibiæ small, about 11 in number; the hind tibiæ rather short, only as long as the two first tarsal joints or not much longer. Wings clear and colourless, thick veins brown, the others pale; costa 0,45 of the wing-length, costal divisions about as 9—4—2; costal cilia long; fourth vein evenly curved. Halteres black.

Length 1,3 mm.

Female. I possess a female which I think belongs here; it agrees with the male, but the front tarsi are simple, at all events the metatarsus not thickened; the wings are perhaps scarcely so clear as in the male.

This species is similar to *conformis*, but the yellow palpi, the less dilated front metatarsi, the yellow colour of the front tarsi, and the short hind tibiæ together with other characters distinguish it.

Of this species I have five specimens, all males; Holte (Th. Mortensen), Bogø south of Sealand and in Jutland at Hejls south of Kolding (the author); the dates are $^{30}/_6$ — $^{3}/_8$ in 1917 to 1920. The possible female was taken in Ermelund $^{31}/_5$ 1918 (the author).

Geographical distribution: — Hitherto only known from Denmark.

44. *A. pilifemur* Lundbk.

1921. Vidensk. Meddel. fra Dansk naturh. Foren. 72, 133.

Male. Frons broader than high, black, dull; inner bristle of lower row somewhat below the outer and nearer to it than to the upper supraantennal; supraantennal bristles unequal, the lower somewhat smaller than the upper; the upper supraantennals approximate, a little nearer together than the inner bristles of middle row, the lower a little more approximate. Antennæ black, of ordinary size or smallish, arista distinctly pubescent. Palpi yellow, of ordinary size

and armature. Thorax black, a little shining, with blackish brown pubescence. Mesopleura with uniform bristles. Abdomen black, dull, the short hairs almost only visible at the hind margins of the segments and a little longer at the sides; at the sides of sixth segment they are a little elongated. Hypopygium not large, greyish black, it is produced a little downwards, higher than long; on each side there is a nearly vertical row of about four or five weak bristles or bristly hairs, the lowermost a little curved; below there is a small yellowish ventral plate; anal tube of medium size, blackish. Legs black, the front legs more brownish; front metatarsi thickened, as thick as the end of tibiae; hind femora with somewhat long and rather strong hairs below the middle, but at the base the hairs only short and fine; bristles on hind tibiae distinct, but not large. Wings somewhat brownish tinged, veins brown; costa rather short, about 0,46—0,47 of the wing-length, costal divisions about as 11—6—4; costal cilia moderately long; third vein a little strong, fourth vein distinctly curved in its first part, for the rest nearly straight. Halteres black.

Female. Unknown.

Length 1,5 mm.

This species is related to the following species, *subconvexa*, but in the male, the only sex known, it will be distinguished alone by the hairs below hind femora.

A. pilifemur is rare, only two specimens, both males, have been taken, at Lohals on Langeland $\frac{5}{7}$ and $\frac{8}{7}$ 1920 (the author).

Geographical distribution: — Only known from Denmark.

45. *A. subconvexa* Lundbk.

1920. Lundbk. Vidensk. Meddel. fra Dansk naturh. Foren. 71, 8.

Male. Frons somewhat broader than high, greyish black, dull; inner bristle of lower row slightly below the outer, near to it, much nearer than to the upper supraantennal; supraantennal bristles large, a little unequal, the lower slightly weaker than the upper; the upper supraantennals as distant or nearly as distant as the inner bristles of the middle row, the lower a little more approximate. Antennæ of ordinary size, black, arista distinctly pubescent. Palpi dark yellow, with somewhat long bristles. Thorax black, slightly shining, with brownish pubescence. Mesopleura with small, uniform bristles. Abdomen black, dull, with very short hairs, a little more visible at the hind margins of the segments and at the sides; on sixth segment

almost not longer. Hypopygium small, greyish black, produced a little downwards and thus higher than long, with three to five (perhaps always five) small bristles or bristly hairs on each side, placed in a vertical or oblique line, and also with some hairs above on the hind part; anal tube of some length, black or blackish, the apical hairs not small. Legs brownish to blackish brown, the front legs paler to yellowish; front metatarsi dilated, about as wide as the end of tibiæ, the anterior margin straight, the posterior a little convex; metatarsus and last joint somewhat dusky; the hairs below the basal half of hind femora slightly longish; the bristles on hind tibiæ small, but distinct, more numerous than in *subcarpalis*, about 14 in number, the dorsal hair-seam curved distinctly towards the anterior from the middle downwards; hind tibiæ as long as the three first tarsal joints. Wings a little or somewhat yellowish or light brownish tinged, though rather clear, veins brown; thin veins distinct, though not exactly strong, seventh vein distinctly finer and paler; costa 0,45—0,46 of the wing-length, costal divisions about as 13—6—3 or 4—2—1; costal cilia long; fourth vein evenly curved. Halteres black.

Female. Similar; costa a little longer; front metatarsi less, but still perceptibly thickened.

Length 1,6—1,8 mm.

A. subconvexa seems to be rare; Ermelund, Lyngby (the author), Holte (Th. Mortensen), in all four males and two females; the dates are $\frac{9}{6}$ — $\frac{7}{9}$ in 1917 and 1919.

Geographical distribution: — Hitherto only known from Denmark.

46. *A. dactylata* Lundbk.

1920. Lundbk. Vidensk. Meddel. fra Dansk naturh. Foren. 71, 9.

Male. Frons somewhat broader than high, greyish black, dull; inner bristle of lower row a little or somewhat below the outer and nearly in the middle between it and the upper supraantennal; supraantennal bristles equal or nearly so, the upper about as distant as the inner bristles of middle row, the lower a little more approximate. Antennæ somewhat small, blackish brown, arista distinctly pubescent. Palpi yellow, of ordinary size and armature. Thorax black, slightly shining, with brownish pubescence. Pleura a little brownish, especially anteriorly. Mesopleura bristly, the bristles uniform. Abdomen black, dull, venter yellowish or brownish; abdomen has short hairs, best visible

at the hind margins of the segments and only slightly longer on sixth segment. Hypopygium of medium size, as long as high, with two or three small bristly hairs on each side below, one above the other; ventral plate yellowish, rather short; anal tube somewhat large, clear yellow. Legs yellow, hind femora very slightly darkened at apex; front metatarsus dilated, as wide as the end of tibia, the following joints slightly stout, but the last distinctly more dilated and also longer than the fourth joint; the hairs below hind femora short, a little dense at base; bristles on hind tibiæ fine and delicate. Wings slightly brownish tinged, veins brown; costa reaching to or near to the middle, costal divisions nearly as 4—2—1; costal cilia moderately long; angle at fork ordinary; fourth vein evenly curved, slightly recurved at apex. Halteres black, the peduncle yellowish.

Female. Similar; the front tarsi shaped in the same way, the middle joints fully as stout; wings with the fork a little longer, but the angle the same.

Length 1,5—1,7 mm.

This species will be known from the preceding by the shape of the front tarsi; the dilated fifth joint is, however, no very striking character, but it is besides distinguished by the longer costa, and in the male by the yellow, anal tube.

A. dactylata is rare in Denmark; Ermelund, Dyrehaven, Lyngby Mose and in Jutland at Ry (the author), in all five males and four females; my dates are $^{27}/_5$ — $^2/_9$ in 1918 to 1920.

Geographical distribution: — Besides in Denmark the species also occurs in Holland, as Pater Schmitz has communicated to me that Professor de Meijere has taken it there.

47. *A. Dahli* Beck.

1901. Beck. Abhandl. zool. bot. Gesell. Wien, I 67, 63, Taf. III, Fig. 57 (*Phora*). — 1910. Kertész, Cat. Dipt. VII, 406. — 1914. Brues, Bull. Wisc. Nat. Hist. Soc. XII, 116. — *Phora humilis* Wood, 1909. Ent. Month. Mag. 2, XX, 114, 143. — *A. humilis* 1914. Brues, l. c. 121.

Male. Frons a little broader than high, black, dull; inner bristle of lower row not or slightly below the outer and nearer to it than to the upper supraantennal; supraantennal bristles unequal, the upper strong, the lower smaller to about half the size of the upper; the upper more approximate than the inner bristles of the middle row, the lower a little more approximate. Antennæ somewhat large, black, arista short-pubescent. Palpi yellow or dirty yellowish, with well developed

bristles. Thorax black, a little shining, with blackish brown to blackish pubescence. Pleura slightly shining downwards. Mesopleura with well developed, uniform bristles. Abdomen black, a little greyish, dull; it has short hairs on the hind parts of the segments, longer at the hind margins; on the last three segments the hairs are rather conspicuous at the hind margins and at the sides and they are especially long here on the sixth segment. Hypopygium somewhat large, knob-like; it has on each side a number (about 8) of strong bristles, placed partly below and partly in an ascending line; ventral plate small, black and shining; anal tube not large, at most medium-sized,

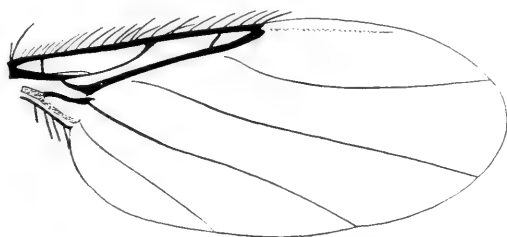


Fig. 90. Wing of *A. Dahli* ♂.

blackish with a yellow apical part. Legs brownish or brownish black, the front legs, especially the tibiae, paler to yellowish; front tarsi dilated, metatarsus the most, as wide as tibia; last joint blackish, metatarsus a little dusky; hind femora with somewhat strong hairs below in about the basal two thirds, strongest and densest at the middle and here forming a conspicuous fringe; hind tibiae rather strong in the apical half, the bristles distinct, but not large. Wings a little yellow or greyish yellow tinged, veins brown, thin veins somewhat strong, the seventh weaker; costa reaching beyond the middle of the wing, 1 not double 2 and nearly equal to 2 + 3 or generally a little shorter; costal cilia long; fork longish, fourth vein evenly curved, a little more in the basal part. Halteres black.

Female. Similar; antennae a little smaller; front tarsi with the four last joints not dilated, though somewhat stout, the whole tarsus a little dusky; hind femora without special fringe below, but with some longish hairs at the middle; wings generally clearer than in the male.

Length 1,8—2,2 mm.

Remarks: I have seen a specimen of *Dahli* from the Museum in Berlin, no doubt specifically identical with Becker's type; the spec-

imen was kindly sent to me from Pater Schmitz who at the same time told me that Becker's type was not to be found; I have also seen specimens from Wood, so that I feel sure in uniting *Dahli* and *humilis*; when Becker gives the colour of legs and halteres paler, it is, I think, because the specimens were preserved in alcohol; when Wood says that the front tarsi in the male are not longer than tibiæ, this is erroneous, as his specimens prove; the tibiæ are not much longer than the three first tarsal joints; the "sort of projection or shoulder breaking the outline of the under-side", which Wood mentions for the hind femora, is, as mentioned above under *fungivora*, only due to exsiccation. — The hairs below hind femora in the male seem to be liable to some variation, some of my specimens showing them less dense than others.

A. Dahli is not just rare in Denmark; at Copenhagen in Frederiksberg Have, in Ermelund, Geel Skov, and in Jutland at Hejls south of Kolding and at Jelling (the author); the dates are $10/6$ — $2/9$; at Hejls it was taken somewhat numerously, especially on flowers of umbellifers. I took it for the first time in 1913, but in Stæger's collection there is an old specimen, placed under *rufipes*.

Geographical distribution: — Denmark, England, Holland and Germany.

48. *A. hyalipennis* Wood.

1912. Wood. Ent. Month. Mag. 2, XXIII, 168. — 1914. Brues, Bull. Wisc. Nat. Hist. Soc. XII, 121.

Male. Frons somewhat broader than high, black, dull; inner bristle of lower row slightly below the outer and nearer to it than to the upper supraantennal; supraantennal bristles unequal, the lower about half the size of the upper; the upper supraantennals about as distant as the inner bristles of middle row, the lower more approximate. Antennæ black, of ordinary size, arista distinctly pubescent. Palpi yellow, of ordinary size, with well developed bristles. Thorax black, very slightly shining, with blackish or dark brownish pubescence. Mesopleura with uniform bristles. Abdomen black, a little greyish, dull; it has short hairs on the hind parts of the segments, a little more conspicuous at the hind margins and a little longer at the sides; at the hind margin of sixth segment the hairs are somewhat long, especially at the sides. Hypopygium small, greyish black, on each side with a number (about 5) of bristles or bristly hairs, placed mainly below,

though somewhat ascending; anal tube somewhat small, blackish, a little pale at apex. Legs blackish brown, the hind legs generally blackish, the front legs paler with yellowish tibiæ, but front tarsi black or blackish; the front tarsi thickened, but less than in *humilis*, especially the four last joints; hind femora with short hairs below; bristles on hind tibiæ distinct, not specially short, but fine, and not numerous. Wings colourless, veins brown, the thin veins pale; costa not quite reaching to the middle of the wing, 1 not double 2, about equal to $2 + 3$ or a little longer; costal cilia long; fork not long, angle medium sized; fourth vein somewhat curved in its basal part, for the rest very slightly curved, nearly straight. Halteres black.

Female. Quite similar to the male; the four last joints on front tarsi scarcely thinner.

Length 1,5—1,8 mm.

This species has only been taken in few localities; Bogo south of Sealand, Lohals on Langeland, and in Jutland at Hejls and Skamling south of Kolding and at Jelling (the author); the dates are $\frac{1}{7}$ — $\frac{25}{7}$ in 1917 to 1921; at Hejls I took it somewhat numerous, one specimen was taken on an umbellifer.

Geographical distribution: — Occurring in Denmark, England and, according to a specimen from Pater Schmitz, in Holland.

49. *A. alticolella* Wood.

1909. Wood, Ent. Mont. Mag. 2, XX, 117, 146 (*Phora*). — 1914. Brues, Bull. Wisc. Nat. Hist. Soc. XII, 112.

Male. Frons somewhat broader than high, black, a little greyish, dull; inner bristle of lower row slightly below the outer and nearer to it than to the upper supraantennal; supraantennal bristles nearly equal, the upper less distant than the inner bristles of middle row, the lower a little more approximate. Antennæ of ordinary size, black, arista distinctly pubescent. Palpi yellow, of ordinary size, with well developed bristles. Thorax black, a little shining, with brownish pubescence. Mesopleura with uniform bristles. Abdomen black, a little greyish, dull; it has short hairs on the hind parts of the segments, a little longer at the hind margins and at the sides; at the hind margin of sixth segment the hairs are rather long and conspicuous, especially at the sides. Hypopygium of medium size, greyish black, it has some (4—6) small bristly hairs below on each side, the hindmost of which is the longest and a little curved at apex, but often the number of

hairs is not to be seen; anal tube small, dusky yellow or blackish with the apex more or less yellow. Legs from pale brownish to brownish black, front legs paler, brownish yellow to yellow; front tarsi thickened, the last joint darkened to black; hind femora with short hairs below; bristles on hind tibiae distinct, of a size as in *Dahli*. Wings yellowish tinged, sometimes only slightly, veins brown; costa reaching to the middle of the wing or as a rule a little shorter, 1 not double 2, about equal to 2 + 3 or a little longer; costal cilia long; fourth vein a little curved in the basal part, for the rest slightly curved. Halteres black.

Female. Similar to the male; the four last joints on front tarsi slightly less dilated.

Length 1,8—2,2 mm.

A. alticolella is a common species in Denmark, and often taken numerously; at Copenhagen in Frederiksberg Have, in Ermelund, Holte, Geel Skov, Suserup Skov at Sorø, Bogø south of Sealand, on Langeland at Lohals, and in Jutland at Hejls south of Kolding (Th. Mortensen, the author); the dates are $^{15}/_6$ — $^{21}/_9$ in 1913 to 1921; I have taken it in copula on $^{21}/_7$, $^{29}/_8$, $^6/_9$ and $^{20}/_9$.

Geographical distribution: — Besides in Denmark occurring in England and, according to specimens sent from Pater Schmitz, in Holland.

50. *A. unicolor* Schmitz.

1919. Schmitz, Entom. Ber. Nederl. Ent. Ver. V, 113.

Male. Frons somewhat broader than high, greyish black, dull; inner bristle of lower row slightly below the outer and nearer to it than to the upper supraantennal; supraantennal bristles nearly equal, the upper at about the same distance from each other as the inner bristles of middle row, the lower very slightly more approximate. Antennae of ordinary size, black, arista distinctly pubescent. Palpi yellow, of ordinary size, with well developed bristles. Thorax black, very slightly shining, with blackish brown pubescence. Mesopleura with uniform bristles. Abdomen black, slightly greyish, dull; it has very short hairs as in the preceding species, very slightly longer at the hind margins; at the hind margin of sixth segment the hairs are not elongated, only at the sides slightly longer. Hypopygium not large, with about four small bristly hairs on each side a little upwards; there is a small, rounded, yellowish ventral plate; anal tube not large,

dark yellowish. Legs brown or dark brown, front legs paler, especially tibiae and tarsi yellowish; the front tarsi thickened as in the preceding species; hind femora with short hairs below; bristles on hind tibiae distinct, not short, but fine. Wings clear and colourless or nearly so, veins brown; costa reaching to the middle of the wing or about, 1 not fully double 2, about equal to $2 + 3$; costal cilia long; fourth vein a little curved in the basal part, for the rest very slightly curved. Halteres black.

Female. Similar to the male; the four last joints on front tarsi perhaps a little less dilated.

Length. Nearly 2 mm.

Of this species I possess only two males and a female; Holte ^{19/6} 1919 (Th. Mortensen), and in Jutland at Hejls south of Kolding ^{27/7} 1919 and at Jelling ^{17/7} 1921 (the author).

Geographical distribution: — Denmark and Holland.

I think my determination of this species is correct; I have seen a type from Pater Schmitz, and I find that I have noted it to be identical with my species, but I must confess that at that time I had not sufficiently studied these difficult species.

Remarks: The four species *Dahli*, *hyalipennis*, *alticolella* and *unicolor* are rather similar; the male of *Dahli* is at once recognized by the fringe below hind femora and the strongly bristled hypopygium, and both sexes are characterised by the long costa and the female also has some longish hairs below the middle of hind femora (often difficult to detect), and front tarsi somewhat dusky; *hyalipennis* is characterised by the black or blackish front tarsi; *alticolella* and *unicolor* are the two most similar, but may be distinguished from each other by the more tinged wings in *alticolella* and the males by the long hairs on sixth segment in *alticolella* and the different hypopygium.

51. *A. intercostata* Lundbk.

1921. Lundbk. Vidensk. Meddel. fra Dansk naturh. Foren. 72, 133, 4.

Male. Frons broader than high, black and dull, very slightly greyish; inner bristle of lower row below the outer and nearer to it than to the upper supraantennal, supraantennal bristles not quite equal, the lower a little weaker than the upper; the upper supraantennals approximate, nearer together than the inner bristles of middle row and the lower slightly more approximate. Antennae small,

brownish black, arista somewhat short-pubescent. Palpi yellow, not broad, with well developed bristles. Thorax black, a little shining, with brownish pubescence. Mesopleura with uniform bristles. Abdomen black, dull, slightly greyish, the short hairs a little more visible at the hind margins of the segments. Hypopygium small, with numerous hairs, especially below on the sides; anal tube yellowish, of medium size, somewhat high. Legs brownish, front legs more yellow; front tarsi thickened, especially metatarsus which is as thick as the end of tibia, the other tarsal joints less thickened, but the whole tarsus

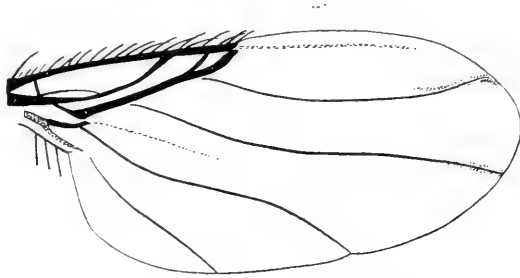


Fig. 91. Wing of *A. intercostata* ♂.

tapering evenly without any marked contrast between metatarsus and second joint; hind femora somewhat broad, with sparse, long hairs below the basal half; bristles on hind tibiae somewhat numerous, but distinct and not just small, longest about the middle. Wings brownish, veins brown, thin veins a little strong; costa rather short, about 0,45 of the wing-length, costal divisions about as 14—5—4; costal cilia moderately long; fourth vein evenly curved in the whole length. Halteres brownish black.

Female. Unknown.

Length 1,7 mm.

This species will easily be distinguished in the group where it must be placed, by the short costa and the proportions of the costal divisions, and the same characters, I think, will serve to distinguish the female.

A. intercostata is rare, only one specimen, a male, has been taken, Hejls south of Kolding ²/₇ 1919 (the author).

Geographical distribution: — Hitherto only known from Denmark.

52. *A. nigripalpis* Lundbk.

1920. Lundbk. Vidensk. Meddel. fra Dansk naturh. Foren. 71, 10, 11.

Male. Frons considerably broader than high, greyish black, dull; inner bristle of lower row somewhat below the outer and nearer to it than to the upper supraantennal; supraantennal bristles unequal, the lower somewhat weaker than the upper; the upper supraantennals approximate, nearer together than the inner bristles of middle row, the lower still a little more approximate. Antennæ black, slightly above ordinary size, third joint rather distinctly pubescent at apex, arista distinctly pubescent. Palpi of fair size, black, the bristles rather strong. Thorax black, nearly dull, with dark brownish pubescence. Mesopleura with uniform bristles. Abdomen black, dull, very slightly greyish; there are short hairs on the hind parts of the segments, a little more visible at the hind margins and only slightly longer at the hind margin of sixth segment. Hypopygium somewhat small, on each side with three or four bristles below in a somewhat oblique row, continued upwards in three vertically placed bristles; anal tube of medium size or somewhat small, black. Legs black, the front legs a little paler, last joint of front tarsi deep black; front tarsi dilated, but not much, metatarsus nearly as broad as tibia; the hairs below the basal part of femora short and not dense; bristles on hind tibiæ small and not numerous, about 12 in number. Wings clear, thick veins blackish, the others almost colourless; costa reaching to the middle, costal divisions about as 13—7—4; costal cilia long; fourth vein evenly curved. Halteres black.

Female. Unknown.

Length 1,8 mm.

A. nigripalpis is rare, only one specimen, a male, has been taken, Ermelund ¹¹/₆ 1919 (the author).

Geographical distribution: — Hitherto only known from Denmark.

53. *A. hortensis* Wood.

1909. Wood, Ent. Month. Mag. 2, XX, 114, 143 (*Phora*). — Brues, Bull. Wisc. Nat. Hist. Soc. XII, 121.

Male. Frons somewhat broader than high, greyish black, dull; inner bristle of lower row a little below the outer and nearer to it than to the upper supraantennal; supraantennal bristles unequal, the lower somewhat smaller than the upper; the upper supraantennals

approximate, less distant than the inner bristles of middle row, the lower more approximate. Antennæ not small, brownish or blackish brown, arista long, distinctly pubescent. Palpi yellow, of ordinary size, with well developed bristles. Thorax black or brownish black, somewhat shining, with brownish pubescence. Pleura somewhat brownish anteriorly. Mesopleura with uniform bristles. Abdomen black, a little greyish, dull; short hairs present on the hind parts of the segments, longest at the hind margins; at the hind margin of sixth segment only a little longer. Hypopygium greyish black, of medium size, somewhat knob-shaped; there are three or four hairs

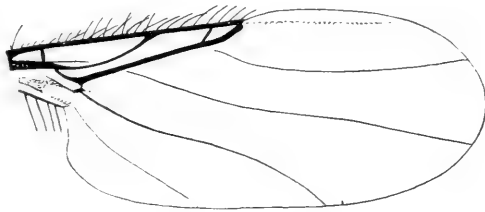


Fig. 92. Wing of *A. hortensis* ♂.

below on each side, and at the apical corners are short hairs; below there is a large, broadly rounded dusky, ventral plate; anal tube yellow, somewhat large, especially high. Legs yellow, the hind legs may be slightly darker and the apical part of hind femora a little darkened, the front legs the palest, whitish yellow, last tarsal joint darkened; front tarsi dilated, but metatarsus scarcely quite as wide as the end of tibiæ; hind femora with short or shortish hairs below; bristles on hind tibiæ distinct and not exactly small. Wings more or less yellowish, veins pale brown or brownish yellow; the wings are somewhat long and characteristic in shape, the axillary angle is rectangular (but the angle itself rounded), the hind margin is straight and the front and hind margins of the wing are parallel; costa reaching to the middle, 1 not double 2 and about equal to $2 + 3$; costal cilia long, but somewhat moderately so; fourth vein a little curved in the basal part, for the rest very slightly curved. Halteres black, but pale on the lower side.

Female. Similar; antennæ slightly smaller; front tarsi a little less thickened, and with also the four last joints a little dilated.

Length 1,6 to fully 2 mm; a specimen of about 2 mm's length has the wing 2,37 mm long.

Remarks: This is a rather characteristic species, easily known by the yellow legs, the characteristic shape of the wing, and also by the high, nearly rhomboidal anal tube in the male. I think the determination is beyond doubt, and I have also got the species as *hortensis* from Pater Schmitz, but Wood's description of the hypopygium as absolutely bare (l. c. 144) does not agree, as the hairs are, to be sure somewhat small, but quite distinct. Wood says (l. c. 113) that the four species *obscuripennis*, *conformis*, *humilis* (= *Dahli*) and *alticollis* have the front tibiæ in the males ciliated with small and fine black bristles, but *hortensis* not; I am unable to see any difference here, and I cannot see that these species at all have bristles on front tibiæ otherwise than most other species of *Aphiochaeta*, nor can I see any difference herein between males and females; if a difference is present it is at any rate very slight.

A. hortensis is common in Denmark, and has often been taken numerously; Copenhagen, Holte, Hillerød, Suserup Skov at Sorø, Bogø south of Sealand, in Jutland at Hejls south of Kolding, Jelling and on Læsø (Th. Mortensen, the author); my dates are $17/6$ — $27/8$ in 1916 to 1921. I have taken it in copula on $21/7$. I have generally taken the species with the net on bushes and in low herbage, a few specimens are taken on windows in Copenhagen.

Geographical distribution: — Besides in Denmark occurring in England and, according to specimens from Pater Schmitz, in Holland.

54. *A. exclusiva* Lundbk.

1921. Lundbk. Vidensk. Meddel. fra Dansk naturh. Foren. 72, 134, 5.

Male. Frons broader than high, black, a little greyish and dull; inner bristle of lower row somewhat below the outer and a little nearer to it than to the upper supraantennal; supraantennal bristles somewhat large, equal, the upper in about the same distance from each other as the inner bristles of middle row, the lower well below the upper and slightly more approximate. Antennæ small, brownish black, arista distinctly pubescent. Palpi yellow, of ordinary size and armature. Thorax black, slightly shining, with brownish pubescence. Pleura a little brownish anteriorly. Mesopleura with uniform bristles. Abdomen black, dull, the short hairs slightly longer at the hind margins of the segments. Venter brownish. Hypopygium small, in my specimen partly withdrawn, but without bristles; anal tube short, but high, yellow. Legs yellow, hind femora slightly darkened at apex;

front tarsi distinctly though not much thickened; the hairs below basal half of hind femora distinct, but not long, at most slightly longish; bristles on hind tibiæ small and fine. Wings brownish tinged, veins brown; costa 0,47 of the wing-length, costal divisions about as 5—3—2; costal cilia moderately long; fourth vein evenly and not much curved. Halteres black.

Female. Unknown.

Length. About 1,5 mm.

This species, on account of its thickened front tarsi, black halteres, and yellow legs is easily placed, and I think that the female therefore, when it turns up, will be identified without difficulty.

A. exclusa is very rare, only one specimen, a male, has been taken, at Ørholm $\frac{5}{6}$ 1918 (the author).

Geographical distribution: — Hitherto only known from Denmark.

55. *A. atripes* Brues.

1914. Brues, Bull. Wisc. Nat. Hist. Soc. XII, 113. — *Phora nigripes* Wood (nec Strobl, Wien. Ent. Zeitg. 1892) 1909. Ent. Month. Mag. 2. XX, 115, 144.

Male. Frons considerably broader than high, greyish black, dull; inner bristle of lower row slightly below the outer and nearer to it than to the upper supraantennal; supraantennal bristles unequal, the lower smaller to half the size of the upper; upper supraantennals approximate, nearer together than the inner bristles of middle row, the lower a little more approximate and somewhat below the upper. Antennæ black, of ordinary size, arista short-pubescent. Palpi dusky yellowish to dark brownish, of ordinary size and armature. Thorax black, slightly shining, with dark brownish pubescence. Mesopleura with uniform bristles. Abdomen black, slightly greyish, dull; it has very short hairs, almost not longer at the hind margins of the segments, but a little longer at the sides, especially behind; on sixth segment they are longer at the sides of the hind margin. Hypopygium somewhat small, greyish black; it has a single, conspicuous, downwards projecting bristle on each side besides small hairs on the hind part; below there is a blackish or at the apex yellow, somewhat large ventral plate (Wood says small); anal tube short, black. Legs black or blackish, the front legs only slightly paler; the hind femora have quite short, but dense hairs below the basal half, being densest towards

the base, but stopping a little before the base, the hairs form a characteristic, but quite short fringe (fig. 93); bristles on hind tibiæ small. Wings clear or a little tinged, veins brown; the thin veins nearly colourless to pale brownish; costa not reaching to the middle, but somewhat variable in length down to 0,44, 1 about equal to $2 + 3$; costal cilia long; fourth vein a little curved in its basal part, for the rest slightly curved, nearly straight. Halteres black.

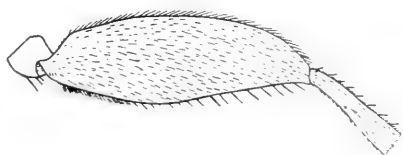


Fig. 93. *A. atripes* ♂, hind femur from the outside $\times 55$.

Female. Similar; costa generally a little longer; hind femora with shorter hairs below which are specially short and dense at the base, but not forming a distinct fringe as in the male.

Length 1,2 to fully 1,5 mm.

A. atripes is common in Denmark; Ermelund, Dyrehaven, Ørholm, Holte, Geel Skov, Suserup Skov at Sorø, on Langeland at Lohals, in Jutland at Hejls and Skamling south of Kolding, on Fanø, at Jelling, Ry, Hald and Frederikshavn, on Læsø and on Bornholm at Hasle (Th. Mortensen, H. J. Hansen, the author); the dates are $28/3$ — $10/10$. At Ry I took it with the net in grass, and at Holte it was present numerously in a spruce forest on the ground on $26/9$. It was for the first time taken in 1882.

Geographical distribution: — Denmark, England and, according to specimens sent from Pater Schmitz, Holland and Germany; it further occurs in Sweden, for a specimen was found in Zetterstedt's collection under *pumila* (see below under *pulicaria*).

56. *A. hirticrus* Schmitz.

1918. Schmitz, Entom. Ber. Nederl. Ent. Ver. V, 62.

Male. Frons considerably broader than high, greyish black, dull: inner bristle of lower row not or almost not below the outer and much nearer to it than to the upper supraantennal; supraantennal bristles unequal, the lower about half the size of the upper; upper supraantennals approximate, nearer together than the inner bristles of middle row, the lower still more approximate. Antennæ black, of ordinary size, arista distinctly pubescent. Palpi dirty yellowish to blackish brown, of ordinary size and armature. Thorax black, almost not

shining, with brownish pubescence. Mesopleura with uniform rather distinct bristles which are (at all events generally) placed nearly in a single row. Abdomen black, very slightly greyish, dull; it has short hairs, slightly longer at the hind margins of the segments, at the sides they are a little longer, especially behind and on sixth segment they are somewhat long at the sides. Hypopygium small, black, it has no strong bristle as in *atripes*, but has, however, small hairs on each side among which one more conspicuous; below there is a large and broad, triangularly pointed, yellowish, ventral plate with a curious, protruding point on the left side; anal tube short, yellow with the base blackish or almost quite yellow. Legs blackish or blackish brown, the front legs paler; the hind femora have below the basal half a

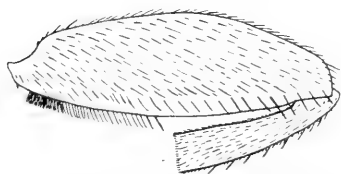


Fig. 94. *A. hirticus* ♂, hind femur from the outside $\times 55$.

dense row of short hairs which at the base are very dense, thus here forming a distinct brush (fig. 94); this fringe is longer and more conspicuous than in *atripes* and much more dense at the base; bristles on hind tibiae small, but a little larger than in *atripes*. Wings clear or nearly so, veins brown, thin veins paler; costa not reaching to the

middle, 1 about equal to $2 + 3$ or a little longer; costal cilia long; fourth vein somewhat evenly curved in the whole length, only a little more in its first part. Halteres black.

Female. Quite similar; costa sometimes a little longer; hind femora with short, at the base a little denser hairs below.

Length. 1.5 to about 2 mm.

This species is, as also remarked by Schmitz, very nearly related to *atripes*, and still more similar to it than seen in Schmitz' description, for *atripes* has similar hairs below hind femora, only shorter and not forming a distinct brush at the base, and *hirticus* has also a hair on the sides of hypopygium, but much less strong than in *atripes*; the males of the two species are, however, rather easily distinguished by the two mentioned characters, and also the ventral plate is different and the anal tube paler in *hirticus*. The females are very difficult to distinguish, *hirticus* has generally clearer wings and paler front legs and *atripes* seems to have the hairs below hind femora more dense than *hirticus*; I also find that in both sexes of *hirticus* the arista is a little longer pubescent than in *atripes*, and finally *hirticus* is larger; but all these characters are not always sufficient so that females

occur which I do not dare to determine with certainty. — I have compared my specimens with types kindly sent me from Pater Schmitz.

A. hirticrus is rather common in Denmark; Ermelund, Dyrehaven, Holte, Geel Skov, Hillerød, Bogø south of Sealand, Lohals on Langeland, and in Jutland at Hejls south of Kolding, Ry, Egense Skov at the east end of Limfjorden and Frederikshavn (Th. Mortensen, H. J. Hansen, the author); the dates are $^{21}/_5$ — $^7/_10$. I have generally taken it in woods in low herbage in humid localities and also on the leaves of bushes, especially on young *Acer*. It was for the first time taken in 1881.

Geographical distribution: — Denmark, Holland and Germany.

57. *A. indifferens* Lundbk.

1920. Lundbk. Vidensk. Meddel. fra Dansk naturh. Foren. 71, 14, 16. — *A. longiciliata* Lundbk. (nec Strobl, Wien, Ent. Zeitg. 1899) l. c. 11, 12. — *A. perciliata* Lundbk. l. c. 132.

Male. Frons somewhat broader than high, greyish black, dull; inner bristle of lower row somewhat below the outer and nearer to it than to the upper supraantennal; supraantennal bristles unequal, the lower about half as strong as the upper; the upper supraantennals

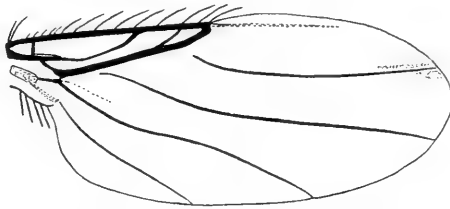


Fig. 95. Wing of *A. indifferens* ♂.

more approximate than the inner bristles of middle row, the lower direct beneath the upper, not more approximate. Antennæ of ordinary size, black or blackish, arista distinctly pubescent. Palpi yellow or a little dusky, well developed, with ordinary bristles. Thorax black or greyish black, nearly dull, with brown pubescence. Mesopleura with uniform bristles. Abdomen somewhat robust, black, slightly greyish, dull; it has short hairs on the hind parts of the segments, more distinct at the hind margins and at the sides, especially at the hind corners of second segment; at the hind margin of sixth segment they are a little longer. Hypopygium not small, greyish, produced downwards and thus higher than long; it has only quite small, in-

distinct hairs at the sides; ventral plate yellowish, rounded at the end, reaching about to the end of the hypopygium; anal tube somewhat small, brownish, a little paler at apex, the apical hairs small. Legs brown or light brownish, front legs a little paler; hind tibiae only slightly longer than the two first tarsal joints; the hairs below the basal part of hind femora distinct, but not long; bristles on hind tibiae small and numerous. Wings brownish tinged, veins brown, thin veins somewhat strong, but seventh vein somewhat finer, the third vein rather strong; costa not reaching to the middle, 0,47 of the wing length, costal divisions about as 11—5—3; costal cilia long, longer than usual; fork longish and the angle acute; fourth vein evenly curved, only slightly more in the basal part. Halteres black or brown to yellowish brown.

Female. Quite similar to the male; costa a little longer, reaching nearly to the middle.

Length. 1,6—2 mm.

This species cannot be confused with *superciliata* Wood which may sometimes have the costa midway between short and long; besides the longer costa and dark halteres also the unequal supra-antennals, the long fork with the acute angle and the larger size distinguish it; especially the fork is characteristic, almost reminding of *fuscinervis*.

Remarks: As I first described the species, I had got it divided into two on account of the halteres, taking a specimen with rather pale halteres for a separate species, and I failed to be aware of the identity; since then I have got more material which proves that the halteres vary from blackish to yellowish brown; in all other respects the species are, as also seen from the descriptions, quite agreeing, and the species is for the rest rather characteristic. The new material included also females which sex was not known hitherto. The name *longiciliata* under which I first described the species, l. c. p. 11, I later, l. c. p. 132 altered to *perciliata* on account of preoccupation, but I had then already described the species, l. c. p. 14 as *indifferens* which name it thus must keep.

A. indifferens is somewhat rare, but has been taken in several localities; Holte (Th. Mortensen, the author), Bogø south of Sealand, Lohals on Langeland and in Jutland at Hejls and Skamling south of Kolding and at Ry (the author); the dates are $\frac{1}{7}$ — $\frac{7}{10}$ in 1917 to 1920.

Geographical distribution: — Hitherto only known from Denmark.

58. *A. consimilis* Lundbk.

1920. Lundbk. Vidensk. Meddel. fra Dansk naturh. Foren. 71, 11, 13.

Male. Frons somewhat broader than high, greyish black; inner bristle of lower row in or nearly in the same height as the outer, and nearer to it than to the upper supraantennal, and thus the bristles of the lower row and the upper supraantennals placed in a nearly straight transverse line; the upper supraantennals about in the same distance from each other as the inner bristles of middle row, the lower a little more approximate and somewhat weaker than the upper. Antennæ of ordinary size or perhaps somewhat small, black, arista distinctly, however, somewhat short-pubescent. Palpi yellow, of ordinary size and armature. Thorax black, very slightly shining, with brown pubescence. Mesopleura with small uniform bristles. Abdomen rather tapering, greyish black, dull; the very short hairs visible at the hind margins of the segments, increasing behind, but only slightly longer on sixth segment. Hypopygium dark brownish or greyish brown, small or of medium size, a little higher than long, without bristles, but with small, though distinct hairs on the sides; ventral plate (as far as I could see) blackish; anal tube small, brown. Legs brown or yellowish brown, hind tibiæ as long as the three first tarsal joints; the hairs below hind femora distinct, but not long; bristles on hind tibiæ small and delicate. Wings yellowish or greyish tinged, veins yellow to pale brownish; costa not quite reaching to the middle, about 0,48 of the wing-length, costal divisions about as 4—2—1; costal cilia unusually long; angle at fork somewhat large; fourth vein a little curved at the origin, for the rest evenly curved, somewhat indistinct at the base. Halteres dark, brownish.

Female. Similar to the male; angle at fork more acute; the halteres a little paler to yellowish.

Length. 1—1,2 mm.

From *superciliata* the present species should be distinguished by the longer costa, the hairs on hypopygium and the darker halteres; I must confess, however, that by reexamining and comparing my material I do not feel sure that the species is distinct; according to Schmitz *superciliata* may sometimes have darkened halteres, and also the costa seems to be rather liable to varying; at present I keep the species, the study of more material will in the future solve the question.

A. consimilis is rare; Ermelund, Geel Skov, on Langeland at Lo-

hals and in Jutland at Ry (Th. Mortensen, the author); the dates are $^{16}/_5$ — $^{19}/_9$ in 1918 to 1920, in all three males and four females. I took it in copula on $^4/7$.

Geographical distribution: — Hitherto only known from Denmark.

59. *A. unguicularis* Wood.

1909. Wood, Ent. Month. Mag. 2, XX, 115, 144 (*Phora*) et 1912. *ibid.* XXIII, 168, — 1914. Brues, Bull. Wisc. Nat. Hist. Soc. XII, 135.

Male. Frons considerably broader than high, greyish black, dull; inner bristle of lower row below the outer and a little nearer to it than to the upper supraantennal; supraantennal bristles equal or nearly, the upper about as distant as the inner bristles of middle row, the lower more approximate. Antennæ black, of ordinary size, arista short-pubescent. Palpi dark yellow or a little dusky, of ordinary size and armature. Thorax black, slightly shining, with brown pubescence. Mesopleura with uniform bristles. Abdomen black, somewhat greyish, dull; the short hairs are almost not longer at the hind margins of the segments, but on the sides of the sixth segment they are distinct. Hypopygium of medium size or somewhat large, knob-like; it is greyish and has on each side a dense bunch of conspicuous, somewhat bristly hairs; below a claw-like, yellowish organ is seen with the point directed forwards; ventral plate yellowish, broadly rounded, but short; anal tube small, dusky yellow. Legs yellowish to brownish, the front legs the palest; the hairs below the basal part of hind femora only a little longish; bristles on hind tibiæ distinct and somewhat large. Wings a little brownish tinged, veins brown and thin veins somewhat strong; costa not reaching to the middle, 1 nearly double 2 and longer than 2 + 3; costal cilia long; fourth vein slightly and evenly curved, only slightly more in the basal part. Halteres black.

Female. I have not seen the female; according to Wood it has blacker legs than the male, costa reaching about to the middle and 1 not more than half again as long as 2.

Length 1,7 mm.

The above description has been drawn from a Dutch specimen, kindly sent me from Pater Schmitz; from Denmark I possess only one rather bad specimen, and I do not feel quite sure as to its identity; my specimen has the claw-like organ below the hypopygium black, what is probably of no consequence for the specific identity, but it

has rather clear wings and the proportions of the costal divisions are 10—6—3 (in the Dutch specimen 12—6—4); for the rest my specimen agrees well and especially so as regards the construction of the hypopygium.

The species is rare in Denmark, as said above I possess only one specimen, a male, Holte ¹⁸/₈ 1917 (Th. Mortensen).

Geographical distribution: — Denmark (if correctly determined), England and, according to the above, Holland.

60. *A. modesta* n. sp.

Male. Frons broader than high, greyish black, dullish; inner bristle of lower row well below the outer and nearer to it than to the upper supraantennal; supraantennal bristles only a little unequal, the lower a little smaller than the upper; the upper supraantennals at about the same distance from each other as the inner bristles of middle row, the lower slightly more approximate. Antennæ black, of ordinary size or smallish, arista distinctly pubescent. Palpi yellow, well developed, with ordinary bristles. Thorax black, somewhat shining, with blackish pubescence. Mesopleura with uniform bristles. Abdomen black, dull, somewhat tapering behind; it has short, sparse hairs, almost only seen at the hind margins of the segments, at the hind margin of sixth segment they are longer, especially downwards on the sides. Hypopygium of medium size, with a number of distinct, nearly bristly hairs down the sides; anal tube of medium length, dirty yellowish. Legs dark brown; hind femora with dense, somewhat long hairs below the basal half, they are longest and densest somewhat after the base; bristles on hind tibiæ small and rather numerous. Wings yellowish, veins brown; costa not reaching quite to the middle, the divisions about as 10—5—4; costal cilia of ordinary length; fourth vein only a little curved at the base, for the rest straight. Halteres black.

Female. Unknown.

Length 1,5 mm.

A. modesta is very rare, only one specimen, a male, is known, taken at Frederikshavn in July 1881 (H. J. Hansen).

Geographical distribution: — Only known from Denmark.

61. *A. proxima* Lundbk.

1920. Lundbk. Vidensk. Meddel. fra Dansk naturh. Foren. 71, 1, 1. —
1920. Schmitz, Jaarb. Natuurh. Genootsch. Limburg, 1919, 143.

Male. Frons slightly broader than high, nearly quadratic; it is greyish black, dull; inner bristle of lower row below the outer and sometimes rather near the eye-margin, but at other times more inwards; supraantennal bristles large and equal, the upper not fully as distant as the inner bristles of middle row and their distance from the eye-margin nearly twice the distance from the middle line, the lower supraantennals considerably longer downwards and somewhat more approximate. Antennæ not large, black or brownish black, arista distinctly pubescent. Palpi yellow, with well developed bristles. Thorax black, nearly dull, with brownish pubescence. Mesopleura bristly, the bristles few and uniform, but sometimes one or two of the lowermost quite slightly longer. Abdomen black, dull; the very short hairs only visible at the hind margins of the segments. Hypopygium greyish, somewhat large and knob-shaped, as broad as the sixth segment; at the lower corners a bunch of erect, small, somewhat bristly hairs and the sides upon the whole rather hairy, behind the hairs stretching upwards towards the dorsum, anal tube small, blackish with a paler end. Legs yellowish, the posterior more brownish yellow, front tarsi slightly stronger than the others; hind femora only with some sparse, slightly longish hairs below on the basal half; hind tibial bristles delicate, the dorsal hair-seam deflected anteriorly in the lower third. Wings clear or nearly so, veins blackish brown; costa 0,46—0,47 of the wing-length, costal divisions proportionately as 10—5—3; angle at fork somewhat large; costal cilia moderately long, nearly midway between short and long; fourth vein slightly and evenly curved in the whole length. Halteres black.

Female. Similar to the male in all respects.

Length. About 1,4 mm.

A. proxima seems to be rare, I possess seven specimens, six males and one female; Bogø south of Sealand and Stensby Skov in south Sealand ^{10/7}—^{27/7} 1917 (the author).

Geographical distribution: — Hitherto only known from Denmark.

Remarks: When I described this species I had only four males; these all had the lowermost bristles on mesopleura slightly longer than the others, the difference was small, and I was already then somewhat in doubt, whether the species should belong to the group with unequal bristles; later on I found another couple of specimens, and in these the difference in the size of the bristles was practically none, the species thus has to be placed among the species with uniform

mesopleural bristles; the new material has necessitated a few alterations in my first description.

62. *A. dubiosa* Lundbk.

1921. Lundbk. Vidensk. Meddel. fra Dansk naturh. Foren. 72, 135, 6.

Male. Frons somewhat broader than high, greyish black, dull; inner bristle of lower row a little below the outer and much nearer to it than to the upper supraantennal; supraantennal bristles nearly equal, the upper about as distant as the inner bristles of middle row, the lower a little weaker and nearer together. Antennæ black, of ordinary size, arista short-pubescent. Palpi yellow, of ordinary size, with well developed bristles. Thorax black, a little shining, with brownish pubescence. Mesopleura with small, uniform bristles. Abdomen black, dull, with short hairs as usual, slightly longer at the hind margins of the segments and on the sixth segment they are only quite slightly longer. Hypopygium small, greyish black, on each side below there are about three small, vertically placed hairs, and more above on the hind part still a couple of hairs; anal tube medium-sized or small, blackish. Legs brownish or darker to blackish brown, the front legs only slightly paler; hind femora with sparse, long or longish hairs below the basal half; bristles on hind tibiæ distinct, but small. Wings clear or very slightly tinged, veins brownish, thin veins paler; costa not reaching to the middle, rather short, about 0,45 of the wing-length, costal divisions about as 11—6—4, thus 1 about equal to 2 + 3; costal cilia of ordinary length; angle at fork somewhat small; fourth vein slightly and evenly curved in the whole length. Halteres black.

Female. I possess a female which may belong here; it seems to agree well with the male, but I am, however, not sure that it is really the female of this species.

Length 1,5 mm.

A. dubiosa seems to be rare; Holte, Hillerød (Th. Mortensen) and Ry in Jutland (the author); the dates are $^{15}/_7$ — $^{19}/_8$ in 1917 and 1918; the possible female I took in Ermelund $^{15}/_5$ 1919.

Geographical distribution: — Only known from Denmark.

Remarks: This species is not very characteristic; it is one of the rather numerous species belonging to the group with costa longer than 0,44, long costal cilia, uniform mesopleural bristles, simple front tarsi and black halteres. In Wood's table it will run down to

nigripes (= *atripes*), but it is distinct from this species among others by the hypopygium and the hairs below hind femora. The species in this group are difficult and I still possess a couple of specimens belonging here which may be different, but which I cannot at present characterize.

63. *A. sepulchralis* Lundbk.

1920. Lundbk. Vidensk. Meddel. fra Dansk naturh. Foren. 71, 12, 14.

Male. Frons low, about twice as broad as high, black, dull; inner bristle of lower row in the same height as the outer and the bristles of the lower row and the upper supraantennals placed in a straight transverse line; the inner lower bristle placed a little nearer

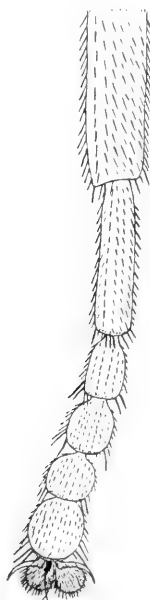


Fig. 96.
A. sepulchralis ♂,
front tarsus from
below $\times 80$.

to the outer than to the upper supraantennal; supra-antennal bristles equal or nearly so, the upper in the same distance from each other as the inner bristles of middle row or slightly more approximate, the lower almost not more approximate than the upper. Antennæ black, rather large, in profile reaching to the middle of the eye, arista very short-pubescent. Palpi black, somewhat large, with long bristles. Thorax black, a little shining, with blackish pubescence. Mesopleura with uniform bristles. Abdomen black, slightly greyish, dull, it has short hairs on the hind parts of the segments, slightly longer at the hind margins; at the hind margin of sixth segment they are distinct, but not long, only longer at the sides. Hypopygium small, black, shining above at the very base; there are no bristles, but downwards on the sides there are short and small, somewhat dense hairs and at the basal corners are longer hairs in a vertical row, the lowermost the longest; ventral plate dusky yellow, short, triangularly rounded; anal tube of medium size, deep black, somewhat hairy, but without apical hairs. Legs quite black or blackish, only front tibiæ and tarsi a little paler;

front tarsi not really thickened, but distinctly stout, the three last joints as broad as long and the pulvilli somewhat large (fig. 96); hind femora below on the basal half with a fringe of somewhat short, but rather dense and strong bristles, shortest, but strongest towards the

base; bristles on hind tibiæ distinct, but relatively small. Wings more or less brownish tinged, veins dark brown to black, thick veins rather strong and also the thin veins somewhat strong, seventh vein nearly as strong as the others; costa reaching well beyond the middle, costal



Fig. 97. Wing of *A. sepulchralis* ♂.

divisions about 15—10—4; costal cilia long; angle at fork not small; fourth vein slightly and evenly curved at the base, for the rest nearly straight. Halteres black.

Female. Similar to the male; antennæ smaller; front tarsi a little less stout; hind femora with quite short, somewhat dense hairs below the basal half.

Length 1,8 to fully 2 mm.

A. sepulchralis seems to be rare, it has only been taken in Ermelund and Geel Skov between $\frac{4}{4}$ and $\frac{4}{5}$ in 1919 (not 1915 as stated by an error in the above quotation) to 1921; it was exclusively taken on tree-stubs, especially on fresh, somewhat exsuding stubs of *Acer*, and in this way Dr. Mortensen took both sexes numerously on $\frac{10}{4}$ 1921; it seems to be exclusively a spring species.

Geographical distribution: — Hitherto only known from Denmark.

Remarks: This species is evidently related to the later described *A. clara* Schmitz (Entom. Ber. Nederl. Ent. Ver. V, 1921, 320) from Abisko; the front tarsi seem to be of quite the same shape, but the two species are distinctly different by the characters given in the table.

64. *A. Beckeri* Wood.

1909. Wood, Ent. Month. Mag. 2, XX, 115, 144 (*Phora*). — 1914. Brues, Bull. Wisc. Nat. Hist. Soc. XII, 113.

Male. Frons broad, almost twice as broad as high, greyish black, dull; inner bristle of lower row nearly in the same height as the outer

and much nearer to it than to the upper supraantennal; supraantennal bristles nearly equal, the upper as distant as the inner bristles of middle row or nearly so, the lower a little more approximate. Antennæ somewhat large, black, arista distinctly pubescent. Palpi yellow, well developed, with somewhat long bristles. Thorax black, somewhat greyish and nearly dull, with blackish brown pubescence. Mesopleura with distinct and uniform bristles. Abdomen black, somewhat greyish, dull; there are short and sparse, but distinct hairs on the hind parts of the segments, a little longer at the hind margins, increasing in length behind; at the hind margin of sixth segment the hairs are long and conspicuous. Hypopygium somewhat large, higher than long, greyish black, and shining at base above; there is a vertical series of bristly hairs on each side below at the base and two more above and backwards; below there is a short, dusky ventral plate; anal tube short, but rather high, dusky yellowish. Legs pale brown to blackish brown, the front legs paler to yellowish; hind femora somewhat broad, the hairs below the basal part not long, but strong, very dense at the base and here forming a distinct brush; about the middle there are some longish hairs; bristles on hind tibiæ strong and not numerous. Wings brownish tinged, veins brown; costa reaching beyond the middle, 1 about equal to 2 and shorter than $2 + 3$; costal cilia rather long; fork longish and angle acute; fourth vein a little s-like at base, with a distinct, but not large curve in its first part, for the rest nearly straight. Halteres black.

Female. Similar to the male; antennæ smaller; hairs below hind femora short, but distinct, shortest and a little dense at base.

Length 2—2,5 mm (according to Wood 2,5—3 mm).

A. Beckeri is very rare in Denmark, only two specimens have been taken, a male at Nebsager south of Horsens in July 1883 (H. J. Hansen) and a female at Hejls south of Kolding ¹⁴/7 1919 (the author).

Geographical distribution: — Denmark, England, and, according to a specimen from Pater Schmitz, Holland.

65. *A. altifrons* Wood.

1909. Wood, Ent. Month. Mag. 2, XX, 117, 146 (*Phora*). — 1914. Brues, Bull. Wis. Nat. Hist. Soc. XII, 112.

Male. Frons high, about quadratic, but a little varying, black and a little shining; inner bristle of lower row a little below the outer and about equally distant from it and from the upper supraantennal;

supraantennal bristles equal, the upper as distant as the inner bristles of middle row, the lower well below the upper and more approximate. Antennæ small, blackish or blackish brown, arista long, distinctly pubescent. Palpi yellow, somewhat large and with the bristles somewhat long. Thorax black, somewhat shining, with quite short and dense, blackish or blackish brown pubescence. Mesopleura with uniform bristles. Abdomen black, somewhat strongly greyish, dull; it has relatively dense, short hairs, almost not longer at the hind margins, and also on sixth segment only very slightly longer. Hypopygium quite small, grey, only with fine, short hairs on the sides; ventral plate yellow, rounded; anal tube short, but stout, yellowish. Legs yellowish or light brownish yellow, the hind legs darker, especially the apical part of femora and the tibiæ; hind femora with long hairs below the basal half; bristles on hind tibiæ relatively large. Wings yellowish tinged, veins brown or pale brown; costa not quite reaching to the middle, about 0,46—0,47, 1 about equal to $2 + 3$; costal cilia long, but not specially long; fourth vein evenly curved in the whole length, only slightly more at the origin. Halteres yellow.

Female. Similar; hind femora likewise with long hairs below the basal half; first costal division in my specimens not relatively longer than in the male as stated by Wood.

Length 1,7—2,2 mm.

I have compared my specimens with typical specimens from Wood.

A. altifrons is rather rare in Denmark; Ermelund, Dyrehaven, Lohals on Langeland and in Jutland in Egense Skov at the east end of Limfjorden (the author); my dates are $18/5$ — $5/9$ in 1917 to 1921.

Geographical distribution: — Besides from Denmark only known from England.

66. *A. chaetopyga* Lundbk.

1921. Lundbk. Vidensk. Meddel. fra Dansk naturh. Foren. 72, 136, 7.

Male. Frons slightly broader than high, black, a little greyish, dull; inner bristle of lower row in the same or nearly the same height as the outer and about in the middle between it and the upper supraantennal; supraantennal bristles unequal, the lower considerably smaller than the upper; the upper supraantennals as distant as the inner bristles of middle row, the lower more approximate. Antennæ somewhat small, black, arista distinctly pubescent. Palpi not large, yellow, a little dusky, with ordinary, not long bristles. Thorax black,

somewhat shining, with brownish pubescence. Mesopleura with uniform bristles. Abdomen black, dull; the short hairs a little longer at the hind margins of the segments and here increasing in length behind, on fifth segment they are already a little longish, and at the hind margin of sixth segment they are very long all round, as long as the segment itself and bristly; also along the sides of fifth and sixth segments the hairs are somewhat long. Hypopygium not small, especially somewhat long and the side parts prolonged backwards below in a little projection; on each side there is an a little oblique or nearly vertical row of about five bristles and still two bristles longer upwards; there is a small, somewhat spatula-shaped, yellowish ventral plate, broadest at the end; anal tube not large, brownish. Legs brown, front legs only slightly paler; the hind femora have below in the proximal two thirds a fringe of distinct, but not long hairs, which are shortest at the base, longish towards the end; bristles on hind tibiæ of about medium size, not numerous. Wings somewhat yellowish brown, veins brown or pale brown; costa not quite reaching to the middle, about 0,48 of the wing-length, costal divisions about as 3—2—1; costal cilia long; fourth vein curved at the origin, for the rest nearly straight; seventh vein quite straight. Halteres yellow.

Female. I possess a female quite agreeing with the male, but with the costa longer, quite to the middle, and of course without special hairs on abdomen; I think it very probable that it belongs here, but cannot be quite sure.

Length 1,6 mm.

A. chaetopyga is very rare, one specimen, a male, was taken in Ermelund ²⁰/₅ 1920, and the mentioned female was taken in the same locality ¹⁴/₅ 1921 (the author).

Geographical distribution: — Hitherto only known from Denmark.

67. *A. hypopygialis* Lundbk.

1920. Lundbk. Vidensk. Meddel. fra Dansk naturh. Foren. 71, 13, 15.

Male. Frons rather broad, but not twice as broad as high, greyish black, dull; inner bristle of lower row about in the same height as the outer and nearer to it than to the upper supraantennal, these six bristles forming a nearly straight, transverse row; supraantennal bristles unequal, the lower not more than half as strong as the upper; the upper supraantennals as distant as the inner bristles of middle row, the lower slightly more approximate. Antennæ black, of ordinary size,

arista distinctly pubescent. Palpi dark yellow, of ordinary size and armature. Thorax black, very slightly shining, with dark or blackish brown pubescence. Mesopleura with uniform bristles. Abdomen somewhat robust, black, somewhat greyish above, dull; the short hairs sparse, but distinct, slightly more conspicuous at the hind margins of the segments; the hairs at the sides of the sixth segment longish, especially at the hind margin. Hypopygium somewhat large and knob-like, about as high as long, it is shining above at the base, greyish, but on the sides the lower half is pale yellow; as far as I have been able to see there is, on each side, a row of about six not strong bristles or bristly hairs, stretching in an oblique or arched line from near the lower anterior corner upwards and backwards, and some hairs more anteriorly towards above; the bristles in the row increase in size downwards, the lowermost being the strongest; further there is on the right side below (or perhaps on both sides) just at the margin of the apical aperture a bunch or series of erect hairs; ventral plate yellow, large and square; anal tube of medium size, blackish or brownish, with some hairs above, but without apical hairs. Legs dark brown, the front legs paler and also posterior tibiae and tarsi somewhat paler, the last joint on all tarsi black; the hairs below hind femora a little longish towards the middle, at the base there is a comb-like row of short, strong bristles; bristles on hind tibiae somewhat large, few in number, about 10 or 11. Wings clear, thick veins blackish brown, thin veins paler; costa not reaching to the middle, about 0,46 of the wing-length, costal divisions about as 11—8—3; costal cilia full long; fourth vein rather curved at the origin and then almost straight. Halteres yellow.

Female. Unknown.

Length 1,7 mm.

A. hypopygialis is a rare species, three specimens, all males, have been taken; Suserup Skov at Sorø ³¹/₇ 1918 (Th. Mortensen) and at Lohals on Langeland ²⁴/₇ 1920 (the author).

Geographical distribution: — Besides in Denmark the species also occurs in Holland, according to specimens I have seen from Pater Schmitz.

68. *A. setigera* Lundbk.

1921. Lundbk. Vidensk. Meddel. fra Dansk naturh. Foren. 72, 136, 8.

Male. Frons broader than high, greyish black, dull; inner bristle of lower row slightly below the outer or nearly in the same height and

nearer to it than to the upper supraantennal, supraantennal bristles equal or nearly, the upper as distant as the inner bristles of middle row, the lower direct below the upper, not or at least very slightly nearer together. Antennæ of ordinary size, black, arista distinctly pubescent. Palpi yellow, well developed, with ordinary bristles. Thorax black, a little greyish and slightly shining, with blackish brown pubescence. Mesopleura with uniform bristles. Abdomen somewhat robust, rather grey, dull; the short hairs conspicuous, slightly longer at the hind margins of the segments, especially on fifth and sixth segments, on the latter a little longish. Hypopygium somewhat small, higher than long, greyish; it is shining at the base above,

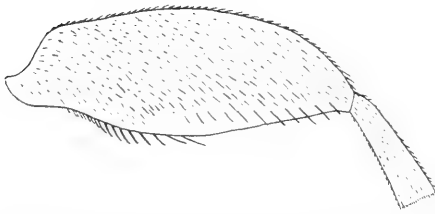


Fig. 98. *A. setigera* ♂, hind femur from the outside $\times 55$.

the lower hinder corners drawn a little out; on each side there are some small bristly hairs; ventral plate elongated and narrow, yellowish; anal tube short, yellow, darker at the base. Legs yellowish or light brownish yellow, hind femora with the apical part darkened and hind tibiæ likewise; hind

femora somewhat short and broad, only reaching slightly beyond the end of abdomen, below the basal half there is a conspicuous fringe of somewhat short, but strong, a little curved hairs, they are quite short at the base, longer outwards and the fringe ends with a couple of finer hairs (fig. 98); bristles on hind tibiæ somewhat large and not numerous (about 10). Wings somewhat brownish tinged, veins dark brown and thin veins somewhat strong; costa not quite reaching to the middle, about 0,48 of the wing-length, costal divisions about as 5—4—2; costal cilia full long; fourth vein evenly curved in the whole length, only slightly more at the origin. Halteres yellow.

Female. Unknown,

Length 1,8 mm.

A. setigera seems to be very rare, only one specimen, a male, has been taken, Lohals on Langeland ⁷/₇ 1920 (the author). The species is somewhat similar to *variabilis*, but is distinguished at once by the fringe below hind femora.

Geographical distribution: — Only known from Denmark.

69. *A. subpleuralis* Wood.

1909. Wood, Ent. Month. Mag. 2, XX, 118, 146 (*Phora*). — 1914. Brues, Bull. Wisc. Nat. Hist. Soc. XII, 133. — ? *Phora pulicaria* Meig. 1830. Syst. Besch. VI, 217, 16.

Male. Frons considerably broader than high, greyish black, dull; inner bristle of lower row slightly or almost not below the outer and a little nearer to it than to the upper supraantennal; supraantennal bristles not large, equal or nearly so, the upper as distant as the inner bristles of middle row, the lower a little more approximate. Antennæ of ordinary size, black, arista short-pubescent. Palpi yellow, not large, with ordinary bristles. Thorax black, slightly shining, with brownish pubescence. Mesopleura with uniform bristles. Abdomen black, distinctly greyish; it has short hairs, slightly longer at the hind margins of the segments and increasing in length backwards; on the sides behind the hairs are longish, and the hindmarginal hairs on sixth segment somewhat long, especially at the sides. Hypopygium somewhat small, grey; on each side it has some small bristly hairs, arranged vertically near the base from below upwards and above continued in a couple of smaller hairs stretching backwards; there is a large, yellowish ventral plate, rounded at the end; anal tube short, but somewhat high, yellow. Legs yellowish brown to brown, the front legs the palest; hind femora with the hairs below the basal half not long, but distinct and fringe-like; bristles on hind tibiæ not large, the dorsal hair-seam deflected anteriorly somewhat suddenly below the middle. Wings more or less brownish tinged, veins brown; costa not reaching to the middle, but rather short, about 0,44—0,45, the divisions may vary a little, but can, I think, as an average be given as 12—5—3; costal cilia full long; angle at fork acute; fourth vein evenly curved in the whole length, a little more in the basal part. Halteres yellow.

Female. Similar to the male; the dorsal hair-seam on hind tibiæ deflected in the same way.

Length 1,5—2 mm.

The costa is, as seen, much shorter than given by Wood, and neither do I find it longer in the female, and by no means to the middle as Wood says; I have seen typical specimens from Wood.

A. subpleuralis is in no way common in Denmark; Holte, Hillerød, Bogø south of Sealand, Lohals on Langeland, on Falster at Marienlyst and in Jutland at Ry (Th. Mortensen, the author); the dates are $\frac{5}{6}$ — $\frac{18}{8}$ in 1917 to 1921; in all about a dozen specimens have been taken.

Geographical distribution: — Besides in Denmark occurring in England and, according to specimens received from Pater Schmitz, in Holland.

Remarks: As stated by Wood l. c. 146 Collin has examined *pulicaria* in Meigen's collection and found that it is a species with bristles on mesopleura and probably the present species; Becker mentions (Abhandl. zool. bot. Gesell. Wien, I, 1901, 70) that he had seen Meigen's *pulicaria*, and he thinks it identical with Fallén's species; as, according to Collin, it is a species with bristly mesopleura, while *pulicaria* Fall. has bare pleura (see below under *pulicaria*) it cannot be that species and so probably may be the present species, though Collin states that the costa reaches beyond the middle of the wing, which is not the case in *subpleuralis*; for the rest Meigen states that the costa does not reach beyond the middle. Whether Becker's species is the present one or *pulicaria* Fall. cannot be decided without examining his specimens.

70. *A. angustipennis* Lundbk.

1920. Lundbk. Vidensk. Meddel. fra Dansk naturh. Foren. 71, 15, 17.

Male. Frons broader than high, greyish black, dull; inner bristle of lower row in nearly the same height as the outer and a little nearer to it than to the upper supraantennal, these six bristles placed in a nearly straight transverse line; supraantennal bristles unequal, the lower about as long as the upper, but weaker; the upper supraantennals, though not near together, yet a little more approximate than the inner bristles of middle row, the lower more approximate and placed somewhat low down. Antennæ somewhat small, black, arista distinctly pubescent. Palpi yellow or dark yellow, of ordinary size, with long bristles. Thorax black, almost not shining, with brownish pubescence. Mesopleura with uniform bristles. Abdomen black, dull, somewhat slender and tapering; it has sparse, very short hairs, not longer at the hind margins of the segments, but at the hind margin of sixth segment the hairs are somewhat long, especially at the sides. Hypopygium small, greyish, higher than long, without bristles or visible hairs; ventral plate broad, dusky yellow; anal tube small, brown or blackish. Legs yellowish brown; bristles on hind tibiæ distinct, but fine, small and numerous. Wings a little brownish or greyish tinged; they are a little narrow with somewhat parallel anterior and posterior margins, veins brown or dark brown; costa not reaching to the middle,

about 0,47 of the wing-length, costal divisions about as 4—2—1; costal cilia long, almost very long; fourth vein a little curved at the origin, for the rest very slightly curved. Halteres yellow.

Female. Quite similar to the male.

Length. Fully 1 mm.

A. angustipennis is rather rare, in all eight specimens, five males and three females, have been taken; Holte (Th. Mortensen), on Langeland at Lohals and in Jutland at Hejls south of Kolding and Ry (the author); the dates are $^{28}/_6$ — $^{29}/_9$ in 1918 to 1920; one specimen was taken in grass with the net. — I possess further some specimens which are a little larger and the wings seem to be broader, but at present I dare not decide whether they constitute a separate species.

Remarks: This species is near *subpleuralis*, but it is smaller, with smaller bristles on hind tibiæ and no sudden deflection of the dorsal hair-seam; it is also and to a high degree, similar to *consimilis* from which I find it distinguished only by the yellow halteres and the want of distinctly visible hairs on hypopygium; from *superciliata* it should be distinguished by the longer costa and the perhaps more distinct hind tibial bristles. Under *consimilis* I expressed some doubts with regard to this species being different from *superciliata* and I cannot but say the same here; it is perhaps possible that *consimilis*, *angustipennis* and *superciliata* might be one species, varying with regard to the colour of the halteres and the length of the costa.

Geographical distribution:— Only known from Denmark (if distinct).

71. *A. Woodi* n. sp.

Phora sordida Beck. (nec Zett.) 1901. Abhandl. zool. bot. Gesell. Wien, I, 60, 53, Taf. III, Fig. 56. — 1906. Malloch, Ent. Month. Mag. 2, XVII, 276. — 1909. Wood. Ent. Month. Mag. 2, XX, 117, 145.

Male. Frons broad, nearly twice as broad as high, greyish black, dull; inner bristle of lower row slightly below the outer and much nearer to it than to the upper supraantennal; supraantennal bristles unequal, the upper large, the lower somewhat smaller; the upper supraantennals less distant than the inner bristles of middle row, the lower slightly more approximate. Antennæ somewhat large, black, arista short-pubescent. Palpi yellow or somewhat dusky, well developed, with ordinary bristles. Thorax black, somewhat greyish and slightly shining, with blackish brown pubescence. Mesopleura with equal bristles. Abdomen black, distinctly greyish, dull; it has

short, but distinct hairs, a little longer at the hind margins of the segments; at the hind margin of sixth segment the hairs are long. Hypopygium of a curious shape, it is not small, but quite short, black or brownish black and shining; it is quite open behind so that the aperture for the anal tube is large; at the hind margin it has long and dense, overhanging hairs all round, and below on the sides there is a couple of bristly hairs among which one bristle; there is a yellowish, triangularly pointed ventral plate below; anal organ relatively small, yellowish or somewhat dusky, and it is hairy, but without the usual two apical hairs; not rarely the hypopygium is more or less withdrawn. Legs brownish or yellowish brown, the hind legs the darkest; the four last joints on front tarsi are relatively broad and the last dilated and blackish; hind femora rather broad, especially about the middle, the ventral margin in the basal half a little concave;

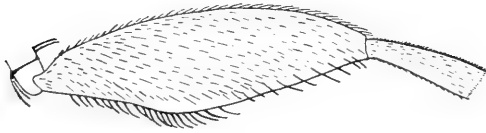


Fig. 99. *A. Woodi* ♂, hind femur from the outside $\times 45$.

below the basal half there is a fringe of somewhat long and strong hairs with the apices curved backwards, they are shortest at the base, longest below the middle (fig. 99); bristles on hind tibiae somewhat

large. Wings nearly clear or slightly tinged, veins brown or dark brown; costa reaching well beyond the middle, 1 generally a little longer than 2, but shorter than $2 + 3$; costal cilia very long; angle at fork not large; fourth vein with a distinct curve in its basal part, for the rest nearly straight. Halteres yellow.

Female. Similar to the male; frons less broad; antennae a little smaller; front tarsi simple with the last joint not dilated and the hairs below hind femora short, but forming a somewhat distinct fringe; first costal division relatively longer, generally equal to $2 + 3$.

Length 2 to fully 2.5 mm.

A. Woodi I have taken almost only in one single locality, Geel Skov, but here it is rather numerous, only one pair has been taken at Hillerød (Th. Mortensen); the dates are $6/9$ — $23/10$ in 1918 to 1921; it is thus late occurring and is evidently an exclusively autumnal species; it was taken on leaves of *Acer*, and many of my specimens I have taken on a single bush in the outskirt of the wood at a road. I have taken it in copula on $7/10$. As seen above the species has only been taken in recent time, but, as mentioned under the family,

there is an old specimen in Stæger's collection, determined as *pulicaria* and labelled "Zett. det."

Geographical distribution: — Denmark, England and down into Germany (Becker).

Remarks: The present species is evidently the *sordida* of Wood and no doubt also of Becker, as seen from his figure of the hind femora of the male and as he gives the palpi as yellow, but it is not *sordida* Zett., I have therefore chosen the new name *Woodi* for it. I have examined Zetterstedt's types of *sordida*; in the collection to Ins. Lapp. there is a male labelled "Lycksele" and a female labelled "Karesuando", and in the collection to Dipt. Scand. there is a pair on one pin labelled "Karesuando"; the study of these types proved that it is another species than the present, though related to it, and they proved to be identical with the newly described *A. scaura* Schmitz (Entom. Ber. Nederl. Ent. Ver. V, 1921, 322, 4), which I was able to decide with certainty, as I possess a type of *scaura*, kindly given to me by Pater Schmitz; this species is thus the real *sordida* Zett. Becker, who had seen Zetterstedt's types, must have made a mistake, which is easily understood, as the species are rather related; it is also seen that he describes the palpi as yellow, while Zetterstedt describes them as black or, in the female, as "lividi". The fringe below the hind femora in the male is very different in the two species. *Trineura carbonaria* Zett. Becker declares to be a variety of *ruficornis*, but a study of the type (there is only the one male specimen mentioned by Zetterstedt) showed that it is identical with *sordida* Zett. Finally I shall remark that besides the mentioned types of *sordida* there was still a male in the collection to Dipt. Scand. labelled "Lycksele" which is not this species, but which seemed to me to be *fuscipalpis* Lundbk.

Phora Heracleellae Bouché (1834. Naturges. d. Ins. I, 102, 95 and Schin. 1864 F. A. II, 34), which Becker considers the same as his *sordida*, is no doubt more probably *A. rufipes*; Bouché seems to have confused the sexes, and Schiner has perhaps done the same.

72. *A. diversa* Wood.

1909. Wood, Ent. Month. Mag. 2, XX, 118, 146 (*Phora*). — 1914. Brues, Bull. Wisc. Nat. Hist. Soc. XII, 117.

Male. Frons broader than high, greyish black, dull; inner bristle of lower row slightly or almost not below the outer and a little nearer to it than to the upper uspraantennal; supraantennal bristles slightly

unequal, the upper about as distant as the inner bristles of middle row, the lower a little more approximate. Antennæ a little above ordinary size, black, arista short-pubescent. Palpi yellow or dark yellow, well developed and with well developed bristles. Thorax black, very slightly shining, with short, dark brownish pubescence. Mesopleura with distinct bristles of uniform size. Abdomen black, distinctly greyish; it has short, sparse hairs, especially on the hind parts of the segments, slightly longer at the hind margins and the sides, and increasing a little in length behind; on the sixth segment the hindmarginal hairs are long and conspicuous. Hypopygium of medium size or smallish, globular or knob-shaped, black and shining above, with small and short hairs on the sides; below there is a broad, somewhat roundish, triangularly pointed yellowish ventral plate, reaching to about the end of the hypopygium; anal tube of medium length, somewhat high, yellow or somewhat dusky at base, without apical hairs. Legs brown, the posterior the darkest; hind femora with a dense fringe of moderately long, somewhat strong hairs below the basal half; bristles on hind tibiæ rather large, few in number. Wings clear or nearly, veins brownish; costa reaching to the middle or about, 1 about equal to 2 + 3, the divisions about as 13—10—4, but the relative lengths a little varying; costal cilia full long; angle at fork ordinary, not large; fourth vein a little curved in the origin, for the rest slightly and evenly curved. Halteres yellow.

Female. Similar; lower supraantennal bristles often smaller; the hairs below hind femora not strong, though distinct; first costal division sometimes relatively longer.

Length 1,8 to fully 2 mm.

Remarks: Wood's statement for the group with this species, that the first costal division is not longer than the second, is, as seen, not correct.

A. diversa is not rare in Denmark; Ermelund, Ørholm, Geel Skov (the author), Holte, Suserup Skov at Sorø (Th. Mortensen), Stensby Skov in South-Sealand, Bogø south of Sealand, Lohals on Langeland and in Jutland at Hejls south of Kolding, Jelling (the author) and Randers (H. J. Hansen); the dates are $\frac{5}{6}$ — $\frac{4}{10}$; it was taken for the first time in 1882. I have taken it in copula on $\frac{20}{9}$.

Geographical distribution: — Denmark, England and, according to specimens sent me from Pater Schmitz, Holland.

73. *A. variabilis* Wood.

1909. Wood, Ent. Month. Mag. 2, XX, 118, 146 (*Phora*). — 1914. Brues, Bull. Wisc. Nat. Hist. Soc. XII, 135.

Male. Frons broader than high, greyish black, dull; inner bristle of lower row a little below the outer and a little nearer to it than to the upper supraantennal; supraantennal bristles strong, equal or practically so, the upper about as distant as the inner bristles of middle row or a little nearer together, the lower slightly more approximate. Antennæ small, brown or blackish brown, third joint visibly pubescent at apex, arista long, distinctly pubescent. Palpi somewhat large, yellow or orange, with rather strong bristles. Thorax black, a little shining; it is often more or less reddish at the postalar calli or at the sides and sometimes quite brownish or reddish; the pubescence brown. Pleura black or more or less to quite reddish. Mesopleura with uniform bristles. Abdomen somewhat robust, black, somewhat greyish, dull; it has distinct, short hairs almost not longer at the hind margins of the segments, but somewhat longer at the hind margin of sixth segment, especially at the sides; at the hind corners of second segment the hairs are somewhat conspicuous. Hypopygium relatively small, grey; it has quite small hairs on the sides and behind and, when in good condition, a longer bristly hair is seen below on each side; ventral plate yellow, square, but with the end rounded, somewhat short; anal tube yellow, of medium length, but high. Legs yellow with the apex of hind femora blackened, sometimes they are darker, the posterior legs being brownish; front tarsi a little stoutish, hind femora rather broad, the hairs below not long, though rather distinct, beginning at the base with shorter, somewhat denser hairs; bristles on hind tibiæ strong, the dorsal hair-seam distinctly deflected anteriorly in or above the middle. Wings somewhat strongly brownish or yellowish brown, veins brown; costa reaching to or beyond the middle, sometimes a little shorter, 1 generally a little shorter than 2 + 3, but often nearly or quite equal to them or even a little longer, but the relative lengths somewhat varying; costal cilia full long; angle at fork generally somewhat acute, but also varying; fourth vein distinctly curved in its first part, for the rest slightly curved. Halteres yellow.

Female. In all respects similar to the male; front tarsi likewise a little strong.

Length 1,5 to fully 2,5 mm, the smallest sizes rarely met with.

Remarks: As seen Wood's statement that 1 is shorter than 2 + 3 is not always correct, and I do not find it specially so in the female;

in this sex the divisions are upon the whole as in the male, and also here 1 may be longer; I possess females with the proportions of 1 to 2 + 3 as 19 to 16; Wood says that abdomen has no trace of any greyish gleam, I find it distinctly greyish. The stoutness of the front tarsi is sometimes very slight.

A. variabilis is very common in Denmark all over the country including Bornholm; my dates of capture are $^{23}/_4$ — $^{10}/_{11}$ in 1917 to 1921, but there are besides some old specimens in Stæger's collection, placed under *rufipes*. As seen above the species occurs during the whole season; it is taken in woods on leaves of bushes and in low herbage.

Geographical distribution: — Besides in Denmark occurring and common in England and, according to specimens from Pater Schmitz, in Holland; perhaps also occurring in Germany (Schmitz, Tijdschr. v. Entom. LXIV, 1921, 8).

74. *A. tergata* Lundbk.

1920. Lundbk. Vidensk. Meddel. fra Dansk naturh. Foren. 71, 16, 18.

Male. Unknown.

Female. Frons nearly $1\frac{1}{2}$ times as broad as high, greyish black, dull; inner bristle of lower row very slightly below the outer and almost in the middle between it and the upper supraantennal, these six bristles placed on a straight or slightly convex transverse line; supraantennal bristles unequal, the upper large, the lower somewhat smaller; the upper supraantennals more approximate than the inner bristles of the middle row, the lower still more approximate. Antennæ somewhat small, blackish brown, arista somewhat long, distinctly pubescent. Palpi yellow, with long bristles. Thorax brownish black above, slightly shining, with brownish pubescence; the lateral margins, humeri, scutellum and pleura more or less brownish or reddish brown. Mesopleura with uniform bristles. Abdomen black or greyish black, venter a little paler; third tergite abbreviated, being shortest in the middle, longer towards the sides and thus with the hind margin excised; the hairs at the sides of abdomen are rather distinct on second segment. Legs yellow, hind femora very slightly darkened just at apex; bristles on hind tibiæ small and numerous. Wings strongly brown, veins strong, brown to blackish; costa well beyond the middle, costal divisions about as 10—6—3; costal cilia full long; fork longish and the angle somewhat acute; fourth vein s-like curved at the base and thence evenly curved. Halteres yellow.

Length 1,8—2,2 mm.

This interesting species is very similar to *variabilis*, but at once distinguished by the third abdominal tergite and the small hind tibial bristles; by this latter character the male, when it turns up, will be known from *variabilis*.

A. tergata is rare, only four specimens have been taken; Ermelund, Lohals on Langeland and in Jutland at Ry (the author); the dates are $15/5$ — $11/7$ in 1918 to 1920.

Geographical distribution: — Hitherto only known from Denmark.

75. *A. fuscipalpis* Lundbk.

1920. Lundbk. Vidensk. Meddel. fra Dansk naturh. Foren. 71, 17, 19.

Male. Frons broader than high, black, slightly greyish, dull; inner bristle of lower row placed in the same height as the outer and both together with the upper supraantennals placed on a straight transverse line; the inner bristle of lower row in about the middle between the outer and the upper supraantennal, though a little nearer the former; supraantennal bristles equal, the upper more approximate than the inner bristles of middle row, the lower direct below the upper, almost not more approximate. Antennæ of ordinary size, black, arista very distinctly pubescent. Palpi somewhat large, brown or blackish brown, palest towards the apex, the bristles strong. Thorax black, a little shining, with blackish pubescence. Mesopleura with uniform bristles. Abdomen black, somewhat greyish, dull; it has short hairs, slightly longer at the hind margins of the segments and at the sides; at the hind margin of sixth segment the hairs are distinct, somewhat long at the sides. Hypopygium of medium size or above, higher than long, greyish, at the base above black and shining; on the sides there are about six not strong bristles in an a little obliquely vertical line and a couple of bristles more anteriorly; ventral plate brown or dusky yellow, large but short, broadly rounded at the end; anal tube short, black. Legs black, tibiæ, especially the anterior, and tarsi a little paler; hind femora broad, the hairs below the basal half distinct and forming a fringe, but neither specially long nor strong, longest at the middle; the hairs on the anteroventral margin towards apex a little strong; bristles on hind tibiæ somewhat strong. Wings brownish, veins brown; costa reaching well to the middle. costal divisions about as 13—11—4; costal cilia long; fourth vein

a little s-like curved at base and thence nearly straight. Halteres yellow.

Female. Unknown.

Length 2,3 mm.

A. fuscipalpis is very rare, only two specimens, both males, have been taken, Ruderhegn ²⁹/₆ 1884 (H. J. Hansen) and in Jutland at Ry ⁴/₇ 1918 (the author).

Geographical distribution: — Hitherto only known from Denmark with certainty, but, as mentioned in the remarks under *Woodi*, a male, labelled "Lycksele" which I think belongs to *fuscipalpis*, was found in Zetterstedt's collection under *sordida*; if my determination of this specimen is correct the species thus occurs in Lapland.

76. *A. subpalpis* Lundbk.

1920. Lundbk. Vidensk. Meddel. fra Dansk naturh. Foren. 71, 18, 20.

Male. Frons about $1\frac{1}{3}$ as broad as high, black with a slight indication of a gloss; inner bristle of lower row in the same height as the outer and in the middle between it and the upper supraantennal, these six bristles placed on a nearly straight transverse line; supraantennal bristles large and equal, the upper pair more approximate than the inner bristles of middle row, the lower not more approximate. Antennæ not large, black, arista long, very distinctly pubescent. Palpi dusky yellow, large, especially long and prominent, somewhat curved, with strong bristles. Thorax black, very slightly shining, with dark brownish pubescence. Mesopleura with uniform bristles. Abdomen robust, black, somewhat greyish above, dull, the hind margins of the segments indistinctly brownish; abdomen has very short hairs, almost not longer at the hind margins of the segments and also on sixth segment only slightly longer. Hypopygium somewhat small (partly withdrawn), greyish, without bristles only with small hairs on the hinder part; ventral plate yellowish, somewhat large and square; anal tube short, dusky at the base with a yellow apex. Legs blackish brown, the anterior legs paler, the front ones yellow, only the femora more or less brownish at base, the hind legs the darkest; front tarsi a little stout; hind femora somewhat dilated, the hairs below the basal half longish and well developed; hind tibiæ with not short, but fine bristles. Wings somewhat greyish brown tinged, veins strong, brown, seventh vein somewhat finer; costa reaching beyond the middle, costal divisions about as 17—10—7; costal cilia long,

but not specially long; fork somewhat longish; fourth vein a little s-like curved at base, thence nearly straight. Halteres yellow.

Female. Quite similar to the male; the palpi of the same size and shape and the hairs below hind femora similar.

Length 2,5 to nearly 3 mm, the female the larger.

A. subpalpalis is very rare; Holte ⁹/₅ 1920 (Th. Mortensen) and in Jutland at Ry ²⁶/₇ and ²⁸/₇ 1918 (the author), one male and three females.

Geographical distribution: — Hitherto only known from Denmark.

77. *A. magnifica* Lundbk.

1920. Lundbk. Vidensk. Meddel. fra Dansk naturh. Foren. 71, 18, 21.

Male. Frons somewhat broader than high, grey, dull, the anterior border indeterminately reddish to a higher or lower degree; inner bristle of lower row a little below the outer and about in the middle between it and the upper supraantennal; supraantennal bristles equal and strong, placed high on the frons, the upper pair a little higher than the inner bristles of lower row, and they are a little more distant than the inner bristles of middle row, the lower supraantennals more approximate than the upper and well below them. Antennæ of ordinary size, yellow, a little brownish at the end, arista distinctly pubescent. Palpi yellow, of ordinary size and armature. Occiput grey above, yellow below. Thorax yellow, slightly shining, with blackish pubescence. Pleura yellow, below the wing-root a black spot. Mesopleura with uniform, black bristles. Abdomen yellow, the posterior margins of the segments broadly black, on third to sixth segments also the lateral margins black, so that these segments may be termed black with a broad, triangular or more semicircular, yellow, basal spot; venter yellow; abdomen is dull, it is distinctly haired, the hairs at the hind margins of the segments and at the sides a little longer, and at the hind margin of sixth segment the hairs somewhat longish all round. Hypopygium of medium size, higher than long, black or greyish black, without bristles or hairs; ventral plate large, nearly square, but rounded at the end, yellow; anal tube of medium size, clear yellow, the apical hairs small. Legs pale yellow, tarsi slightly darkened, hind femora with a black spot at apex, hind tibiæ darkened towards apex and here with a black spot on the inside; front tarsi robust, metatarsus not much thinner than tibia; hind femora with

longish hairs below on the basal half; bristles on hind tibiæ strong, also on middle tibiæ the posterodorsal bristles somewhat strong and here besides a row of distinct, though fine anterodorsal bristles present, going as usual over in the dense hairs below. Wings strongly brownish tinged, especially the anterior margin from the end of costa outwards darkened, veins brown and strong; costa reaching well to the middle, costal divisions about as 8—6—3; costal cilia full long; angle at fork acute; fourth vein evenly curved, only slightly more in the basal part. Halteres yellow.

Female. In all respects agreeing with the male, only hind femora with shorter hairs below and the black abdominal bands narrower, especially towards the sides; front tarsi a little less robust.

Length 1,8—2,4 mm.

This beautiful and interesting species will be known at once as it is the sole yellow species in the group.

A. magnifica does not seem to be specially rare in Denmark; on Langeland at Lohals, and in Jutland at Hejls and Skamling south of Kolding, at Jelling and in Hals Sønderkov at the east end of Limfjorden; the dates are $6/7$ — $29/7$ in 1919 to 1921 (the author). I took it on leaves of shrubs and with the net in low herbage in woods and also running among the dead leaves on the ground.

Geographical distribution: — Besides in Denmark the species also occurs in Prussia as Schmitz has found it in Winnertz' collection (Tijdschr. v. Entom. LXIV, 1921, 4), and it is not uninteresting that this remarkable species, which I described in 1920, was already captured in Prussia more than fifty years ago.

Group V.

Scutellum with two bristles.

Mesopleura bristly with the bristles uniform, all small.

Costa short.

78. *A. latifrons* Wood.

1910. Wood, Ent. Month. Mag. 2, XXI, 151, 198 (*Phora*). — 1914. Brues, Bull. Wisc. Nat. Hist. Soc. XII, 122. — 1919. Schmitz, Entom. Ber. Nederl. Ent. Ver. V, 141.

Male. Frons not much broader than high, greyish black, dull; bristles not strong; inner bristle of lower row near the outer and in or almost in the same height; supraantennal bristles nearly equal,

the upper not approximate, at or at about the same distance from each other as the inner bristles of middle row, but sometimes more distant, the lower supraantennals well below the upper and approximate. Antennæ a little large, black or brownish black, arista not long, distinctly but short-pubescent. Palpi somewhat small, yellow, with ordinary bristles. Thorax black, a little shining, with dark brownish pubescence. Mesopleura with small, uniform bristles. Abdomen black, dull, generally with narrow, more or less distinct paler hind margins to the segments; hairs almost not visible, only a little longer on sixth segment. Hypopygium black, when fully exposed rather long or more correctly high as the side parts are produced downwards, ending in a point; at the lower margin there is a row of strong hairs ending at each lower corner with a bunch of smaller hairs; when the hypopygium is not quite exposed only the bunches at the corners are seen, which is generally the case; ventral plate small, yellowish; anal tube somewhat long, thin at the base, black. Legs brownish yellow to dark brown; front tarsi a little thickened, metatarsus not longer than the two following joints; the hairs below hind femora short; hind tibial bristles quite small and numerous. Wings nearly clear, slightly yellowish, veins dark brown; costa about 0,39 of the wing-length, costal divisions about as 7—3—2; costal cilia short; fourth vein slightly and evenly curved, indistinct or interrupted at the base. Halteres black or blackish.

Female. Quite similar to the male; front tarsi likewise a little strong.

Length 1—1,2 mm.

Remarks: The variety mentioned by Wood l. c. 198 with the hypopygium of another shape I have never seen, all my numerous specimens are quite typical; I think it doubtful that the variety really belongs to this species; on the other hand, I possess a female with rather pale halteres. — The upper supraantennals, as seen in my description, are in no way always wider apart than the inner bristles of middle row, as stated by Wood.

A. latifrons is common in Denmark; Ermelund, Holte, Hillerød, Suserup Skov at Sorø, Stensby Skov in South Sealand, Bogø south of Sealand, Lohals on Langeland and in Jutland at Hejls south of Kolding, Jelling, Ry and in Egense Skov at the east end of Limfjorden (Th. Mortensen, the author); the dates are $27/6$ — $8/8$ in 1917 to 1921. I have taken it, and often numerously, with the net in low herbage in woods, not rarely in localities with spruce and fir; at Hejls

I saw it on $15/7$ swarming in small swarms around the leaves of *Corylus* and resting on the leaves; it was only males which swarmed.

Geographical distribution: — Hitherto known from Denmark, England and Holland.

79. *A. pusilla* Meig.

1830. Meig. Syst. Besch. VI, 218, 19, p. p. (*Phora*). — 1864. Schin. F. A. II, 345 (*Phora*). — 1901. Beck. Abhandl. zool. bot. Gesell. Wien, I, 63, 56, Taf. IV, Fig. 65 (*Phora*). — 1910. Kertész, Cat. Dipt. VII, 412. — 1914. Brues, Bull. Wisc. Nat. Hist. Soc. XII, 128. — 1921. Schmitz, Tijdschr. v. Entom. LXIV, 8. — *Phora nigra* Meig. 1830. l. c. VI, 218, 18. — 1864. Schin. l. c. 345. — ? *Phora pumila* Meig. 1830. l. c. 218, 20. — 1864. Schin. l. c. 345. — *Phora clavipes* Wood, 1910. Ent. Month. Mag. 2, XXI, 195, 201. — *Aphiochaeta clavipes*, 1914. Brues, l. c. XII, 115. — 1919. Schmitz, Entom. Ber. Nederl. Ent. Ver. V, 141.

Male. Frons broader than high, black, slightly greyish, dull; inner bristle of lower row slightly below the outer and much nearer to it than to the upper supraantennal; supraantennal bristles equal, the upper a little nearer together than the inner bristles of middle row, the lower approximate. Antennæ somewhat small, black, arista short-pubescent. Palpi black, of ordinary size and armature. Thorax



Fig. 100. *A. pusilla* ♂, hypopygium $\times 130$.

black, very slightly shining, with blackish pubescence. Mesopleura with uniform bristles which are few and somewhat strong. Abdomen black, dull, the short hairs almost only visible at the hind margins of the segments and at the sides behind; at the hind margin of sixth segment almost not longer. Hypopygium not large, black, glossy above at the base; the sides are produced somewhat downwards ending in a point; there is a series of hairs at the lower margin, ending at the point with a longer, backwards curved hair; the ventral plate is narrow, broadest at the end, yellowish, it is microscopically hairy; anal tube small, black to dusky yellow, with longish hairs, but the apical hairs small (fig. 100). Legs black or blackish brown, front legs not or almost not paler; front tarsi a little stoutish, hind tibiae stout and somewhat thickened outwards and hind metatarsi somewhat dilated; hind femora with quite short hairs below, bristles on hind tibiae very small and numerous. Wings colourless or a little whitish, axillary lobe rather large, approaching a rectangular shape,

thick veins brown or blackish, the thin veins fine and pale; subcostal vein rather curved and hence the costal cell somewhat deep; costa short, about 0,38 of the wing-length, costal divisions a little varying, but generally about as 4—1—1, but the first division may be relatively a little shorter; costal cilia long; the anterior branch of the fork



Fig. 101. Wing of *A. pusilla* ♂.

somewhat thin, but the posterior thick; fourth vein slightly curved at its origin, for the rest nearly straight. Halteres black.

Female. Similar to the male, only the hind tibiae and metatarsi a little less dilated.

Length 1—1,4 mm.

This species will generally be known without difficulty, but it varies to some degree; the variation concerns the length of the costa and of the costal divisions, also the costal cilia vary a little in length; further the degree of thickening of hind metatarsus is various and the front tarsi are generally slightly thickened, but sometimes appear more conspicuously thickened; the hypopygium on the other hand is always of the same construction.

A. pusilla is common in Denmark; Copenhagen, Ermelund, Lyngby, Holte, Geel Skov, Hillerød, Alindelille and Suserup Skov at Sorø, Bogø south of Sealand, Lohals on Langeland and in Jutland at Hejls south of Kolding, Ry and Jelling (Th. Mortensen, the author); the dates are $\frac{9}{5}$ — $\frac{10}{11}$ in 1916 to 1921. I have taken it in copula on $\frac{3}{6}$. Four of my specimens, two males and two females (from Bogø) have yellow or dusky yellow palpi and also paler legs, but otherwise agree in all respects; they answer perhaps to the var. mentioned by Wood (l. c. 201), but, as far as I see, the hypopygium shows no difference.

Geographical distribution: — The species is common and widely distributed; Europe and down into North Africa; it does not seem to occur north of Denmark, or is at all events not recorded from the north; it is also recorded to occur in Australia, but with some doubt.

Remarks: Schmitz has (l. c. 1921) drawn attention to the fact that Becker's *pusilla* is no doubt = *clavipes* Wood, and this is evidently correct; as Becker thus has fixed the name *pusilla* for a species included in Meigen's collective species, Schmitz declares that the name *pusilla* must now be used for the species hitherto known as *clavipes* Wood, and in this I quite follow Schmitz.

80. *A. involuta* Wood.

1910. Wood., Ent. Month. Mag. 2, XXI, 153, 200 (*Phora*). — 1914. Brues, Bull. Wisc. Nat. Hist. Soc. XII, 122. — 1919. Schmitz, Entom. Ber. Nederl. Ent. Ver. V, 141.

Male. Frons somewhat broader than high, black, slightly shining; inner bristle of lower row a little below the outer and about at the same distance from it as from the upper supraantennal; supraantennal bristles about equal, the lower a little weaker than the upper; the upper supraantennals a little nearer together than the inner bristles of middle row, the lower more approximate. Antennæ of ordinary size, black or brownish black, arista short-pubescent. Palpi yellow, of ordinary size and armature. Thorax black, very slightly shining, nearly dull, with blackish brown pubescence. Mesopleura with uniform bristles. Abdomen only slightly tapering, black, slightly greyish, dull; the very short hairs almost not longer at the hind margins of the segments, but on the last segments the hairs at the sides are conspicuous and somewhat dense, and at the hind margin of sixth segment they are longish, longest at the sides; also at the end of the venter there are distinct hairs. Hypopygium small, glossy above at the base, with some not strong bristles on the sides; anal tube small and short, dusky. Legs blackish brown or brownish, the front legs paler; front tarsi distinctly thickened, metatarsus not longer than the two following joints; the hairs below hind femora short; bristles on hind tibiæ distinct, but somewhat small. Wings nearly clear, veins dark brown; costa about 0,38 of the wing-length, costal divisions about as 4—1—1; costal cilia long; angle at fork not small; fourth vein slightly and rather evenly curved. Halteres dark brown, according to Wood varying from yellow to black, independent of sex.

Female. Similar to the male and front tarsi of the same shape, but the end of abdomen without conspicuous hairs; halteres in my specimen yellow.

Length. About 1,5 mm.

As my male specimen is in no good condition the above description is partly drawn from a Dutch specimen, kindly sent me from Pater Schmitz.

A. involuta seems to be very rare in Denmark, I possess only one pair, a female taken at Ry ¹⁵/₇ 1918 (the author) and a male taken at Hulsig ²⁴/₇ 1921 (Th. Mortensen); further I possess a female, which I have taken on Bogø ⁶/₇ 1917, but it is less typical and has yellow legs, so that perhaps it does not belong here.

Geographical distribution: — Besides in Denmark occurring in England and, according to the above, in Holland.

81. *A. manicatella* Lundbk.

1920. Lundbk. Vidensk. Meddel. fra Dansk naturh. Foren. 71, 132. — *A. submanicata* Lundbk. (nec Malloch, Ent. News 1914) l. c. 71, 20, 23.

Male. Frons considerably broader than high, greyish, dull; inner bristle of lower row a little below the outer and slightly nearer to it than to the upper supraantennal; supraantennal bristles nearly equal, the upper in the same distance from each other as the inner bristles of middle row and the lower direct below the upper, not more approximate (in one female specimen the upper supraantennals are a little more distant than the lower). Antennæ small, black or brownish black, arista distinctly pubescent. Thorax black, very slightly shining, with brownish pubescence. Mesopleura with uniform bristles. Abdomen black, dull, the short hairs almost only visible at the hind margins of the segments and very slightly longer on sixth segment. Hypopygium small and withdrawn, there is a couple of small bristles downwards on the sides; ventral plate yellowish, flap-like, rounded at the end; anal tube small, dirty yellowish. Legs brownish, front legs paler; the front tarsi somewhat stout, metatarsus only a little narrower than tibiæ, the other joints more slender; hind femora with long hairs below the basal part; bristles on hind tibiæ distinct though not large, about 12 in number. Wing white, a little milky, thick veins brown the others colourless; costa 0,40 of the wing-length, costal divisions about as 9—4—3; costal cilia long; fourth vein evenly curved. Halteres black.

Female. Similar; front tarsi of the same shape and the hairs below hind femora likewise long.

Length 1,2 to nearly 1,5 mm.

The stout front tarsi remind one of *involuta*, but this species has other costal divisions.

A. manicatella is rare; Bogø south of Sealand and in Jutland at Jelling (the author); the dates are $^{10}/_7$ — $^{30}/_7$ in 1917 to 1921; in all two males and three females.

Geographical distribution: — Hitherto only known from Denmark.

82. *A. pauper* Lundbk.

1920. Lundbk. Vidensk. Meddel. fra Dansk naturh. Foren. 71, 20, 22. (*paupera*).

Male. Unknown.

Female. Frons broader than high, greyish black; inner bristle of lower row in nearly the same height as the outer and nearer to it than to the upper supraantennal; supraantennal bristles unequal, the lower a little more than half as strong as the upper; the upper supraantennals almost as distant as the inner bristles of middle row, the lower very slightly more approximate. Antennæ of ordinary size, black, arista distinctly though short-pubescent. Palpi yellow, of ordinary size and armature. Thorax black, slightly shining, with brown pubescence. Mesopleura with distinct, uniform bristles. Abdomen black, slightly greyish above, with very short and sparse hairs. Legs brown or dark brown, the front legs paler; bristles on hind tibiæ distinctly bristly, but small, 12—14 in number. Wings clear or nearly so, yet slightly yellowish, veins yellowish, thin veins fine; costa 0,39 of the wing-length, costal divisions about as 9—4—2; costal cilia full long; fourth vein distinctly curved at the origin, for the rest slightly and evenly curved. Halteres black.

Length 1,2—1,5 mm.

This species is distinguished from *pusilla* by the yellow palpi, shorter first costal division and simple hind tibiæ and tarsi, besides by some other characters; from *ignobilis* it is distinguished by paler legs, stronger bristles on hind tibiæ, longer costal cilia, and larger size; I think the male will be known by the same characters.

A. pauper is rare, Ermelund and Dyrehaven $^{7}/_5$ — $^{20}/_6$ in 1918 to 1920 (the author); in all six females.

Geographical distribution: — Hitherto only known from Denmark.

83. *A. simplex* Wood.

1910. Wood, Ent. Month. Mag. 2, XXI, 154, 201 (*Phora*). — 1914. Brues, Bull. Wisc. Nat. Hist. Soc. XII, 132.

Male. Frons only slightly broader than high, blackish, slightly shining; inner bristle of lower row a little below the outer and placed in the middle between it and the upper supraantennal; supraantennal bristles about equal, the upper about as distant as the inner bristles of middle row, the lower more approximate. Antennæ small, black, arista short-pubescent. Palpi dark yellow, of ordinary size and armature. Thorax black, slightly shining, with blackish brown pubescence. Mesopleura with distinct, uniform bristles. Abdomen robust, black, a little greyish, dull, it has short hairs, almost not longer at the hind margins of the segments, only at the hind margin of sixth segment a little longer. Hypopygium small and withdrawn, greyish black, only with some small, inconspicuous hairs on the sides; below there is a large, flap-like, dusky yellowish ventral plate, reaching to the end of the hypopygium; anal tube short, but stout, dusky yellowish or darker. Legs blackish brown, front legs, especially tibiæ and tarsi paler; hind femora and tibiæ a little strong, the hairs below hind femora short; bristles on hind tibiæ small, but fully distinct, rather numerous. Wings nearly clear, but, however, a little yellowish, veins pale brown or yellowish; costa about 0,37 of the wing-length, costal divisions about as 22—7—5; costal cilia very long; angle at fork not small; fourth vein evenly and slightly curved. Halteres deep yellow.

Female. I have not seen the female; according to Wood, it seems to be similar to the male.

Length 1,5 mm or nearly, after Wood 1,25—1,75 mm.

Wood says that 1 is double $2 + 3$, as seen above 1 is not quite so long in my specimens, I nevertheless think that my determination is correct as the specimens are otherwise well agreeing.

A. simplex is rare in Denmark, only two specimens, both males, have been taken on Bogø south of Sealand ¹⁸/₇ 1917 (the author).

Geographical distribution: — The species is otherwise only known from England.

84. *A. superciliata* Wood.

1910. Wood, Ent. Month. Mag. 2, XXI, 244, 247 (*Phora*). — 1914. Brues, Bull. Wisc. Nat. Hist. Soc. XII, 134.

Male. Frons considerably broader than high, greyish black, dull; inner bristle of lower row very slightly below the outer and nearer to it than to the upper supraantennal; supraantennal bristles somewhat large, equal, the upper as distant as the inner bristles of middle

row, the lower a little more approximate. Antennæ of about ordinary size, black, arista short-pubescent. Palpi yellow, of ordinary size, with well developed bristles. Thorax black, a little shining, with brownish pubescence. Mesopleura with uniform bristles. Abdomen black, a little greyish, dull; sixth segment a little elongated; the very short hairs are not longer at the hind margins of the segments and only slightly longer at the hind margin of sixth segment. Hypopygium somewhat small, but produced downwards and thus higher than long; there are only quite small hairs on the sides; below there is a large and flap-like yellowish ventral plate; anal tube small,

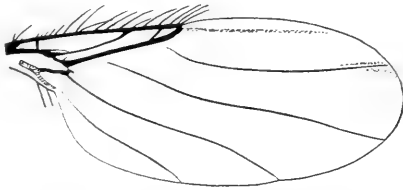


Fig. 102. Wing of *A. superciliata* ♂.

blackish, generally with the apex pale. Legs blackish brown or brown, the front legs paler, hind femora the darkest; the hind femora have short hairs below; bristles on hind tibiæ small, hair-like and numerous. Wings brownish tinged, veins brown; costa about 0,43—0,44 of the wing-length, costal divisions about as 9—4—3; costal cilia very long; angle at fork not large or generally a little acute; fourth vein curved in its first part and then evenly curved. Halteres yellow.

Female. Quite similar to the male.

Length 1—1,3 mm.

A. superciliata seems to be rare in Denmark; Geel Skov, Bogø south of Sealand, on Langeland at Lohals and in Jutland at Ry (the author); the dates are $\frac{9}{7}$ — $\frac{19}{9}$ in 1917 to 1920; in all six males and seven females have been taken; on one occasion I took it in grass with the net.

Geographical distribution: — Besides in Denmark occurring in England and, according to specimens from Pater Schmitz, in Holland.

85. *A. brevipes* Lundbk.

1920. Lundbk. Vidensk. Meddel. fra Dansk naturh. Foren. 71, 21, 24.

Male. Frons somewhat broader than high, greyish black, dull; inner bristle of lower row below the outer and a little nearer to it

than to the upper supraantennal; supraantennal bristles unequal, the lower somewhat smaller than the upper; the upper supraantennals about in the same distance from each other as the inner bristles of middle row, the lower more approximate and near up to the upper. Antennæ of ordinary size, brownish black, arista short-pubescent. Palpi yellow, of ordinary size and armature. Thorax black, almost not shining, with brownish pubescence. Mesopleura with uniform bristles. Abdomen a little robust, black, greyish above and dull; it is distinctly hairy, the hairs a little longer at the hind margins of the segments and at the sides; at the hind margin of sixth segment the hairs longish. Hypopygium small, greyish, with a nearly vertical row of small bristly hairs on each side; ventral plate dusky yellowish, small, nearly square; anal tube short, but high, yellow. Legs yellow or brownish yellow; they are rather short and robust, the femora somewhat thick, front tibiæ not much more than half as long as femora, also middle tibiæ short and a little arched, hind tibiæ likewise short and distinctly arched; all tibiæ somewhat thick; the hairs below the basal part of hind femora not long; bristles on hind tibiæ distinct and not short, but fine, the dorsal hair-seam deflected anteriorly in the distal half. Wings brownish, veins brown and somewhat strong, especially costa and third vein a little thick; costa about 0,41 of the wing-length, costal divisions about as 10—5—3; costal cilia long; angle at fork somewhat acute; fourth vein slightly and evenly curved. Halteres yellow.

Female. Unknown.

Length 1,7 mm.

A. brevipes is very rare, only one specimen, a male, has been taken, Jutland at Ry ¹⁹/₇ 1918 (the author).

Geographical distribution: — Hitherto only known from Denmark.

Group VI.

Scutellum with two bristles.

Mesopleura bare.

Costa long.

86. *A. merochaeta* Lundbk.

1921. Lundbk. Vidensk. Meddel. fra Dansk naturh. Foren. 72, 137, 9.

Male. Frons somewhat broader than high, black, slightly greyish, dull or nearly; inner bristle of lower row below the outer and

only slightly nearer to it than to the upper supraantennal; supraantennal bristles unequal, the lower about half the size of the upper; the upper supraantennals nearer together than the inner bristles of middle row, the lower only very slightly more approximate. Antennæ somewhat large, black, arista short-pubescent. Palpi black, of ordinary size and armature. Thorax black, somewhat shining, with dark brownish pubescence. Mesopleura bare. Abdomen robust, black, somewhat greyish and dull; it has sparse, short hairs, almost not longer at the hind margins of the segments, but more distinct at the sides; at the hind margin of sixth segment they are a little longer and on the ventral hind margin of sixth segment there are strong, bristly hairs. Hypopygium of medium size, black; it is somewhat curious, but on my specimens I cannot study it quite satisfactorily; it is dull from a dense, nearly microscopical punctuation; along the whole hinder or lower margin somewhat dense, longish hairs are hanging downwards, they seem to be best developed on the left side; there is a small black ventral plate; anal tube somewhat short, but stout, black or with a paler apex. Legs dark brown or blackish brown, the front legs only slightly paler; hind femora rather broad, below the basal two thirds there are unusually long and strong bristles, specially long below the middle; under the microscope the bristles are distinctly spinulose which is otherwise not the case; bristles on hind tibiæ of good size in the lower two thirds, above they are fine. Wings somewhat brownish tinged, veins brown; costa somewhat short, about 0,46 of the wing-length, costal divisions about as 13—7—5; costal cilia short, but moderately, rather midway between short and long, they are relatively few in number, strong and distinctly spinulose; angle at fork not large; fourth vein evenly curved, only slightly more at the base. Halteres black.

Female. Unknown.

Length. Nearly 2 mm.

A. merochaeta is rare, only two specimens, both males have been taken, Ermelund ²³/₅ 1919 (the author) and Geel Skov ¹⁹/₄ 1921 (Th. Mortensen); the latter specimen was taken on a fresh stub of Acer.

Geographical distribution: — Hitherto only known from Denmark.

87. *A. longiseta* Wood.

1909. Wood, Ent. Month. Mag. 2, XX, 26, 61 (*Phora*). — 1914. Brues, Bull. Wisc. Nat. Hist. Soc. XII, 123. — 1919. Schmitz, Jaarb. Natuurh. Genootsch. Limburg 1918, 160.

Male. Frons a little broader than high, black, with an indication of a gloss; inner bristle of lower row nearly in the same height as the outer and nearer to it than to the upper supraantennal; supraantennal bristles nearly equal and somewhat high on the frons, the upper as distant as the inner bristle of middle row, the lower more approximate. Antennæ small, black, arista long, longer than usual, short-pubescent. Palpi yellow, of ordinary size, with well developed bristles. Thorax black, somewhat shining, with dark brownish pubescence. Mesopleura bare. Abdomen black, dull; the very sparse hairs almost not visible, only at the sides and at the hind margin of sixth segment slightly longer. Hypopygium somewhat large and of a curious shape; it is greyish, black and shining above just at base; it is unsymmetrical, the left side large and of common shape, but the right side quite short, and between it and the sixth segment there is an almost semi-circular plate (perhaps the right side in reality is deeply fissured); on the left side there are some small hairs below at the base, the lower margin of the short right side (or of the fissure) has a row of hairs; the ventral plate is long and furcated, with the arms a little spread; anal tube somewhat large, yellow, more or less darkened at the base, and hanging curiously downwards ("just as cattle carry their tails in repose" Wood). Legs brown or blackish brown, front legs including coxæ yellow; front tarsi somewhat stout; hind femora rather broad, the hairs below short, just below the base there are some strong, curved hairs, forming a little comb; bristles on hind tibiæ somewhat strong, those on the middle the longest. Wings brownish or greyish brown, veins brown, thin veins somewhat strong; costa reaching considerably beyond the middle, 1 about equal to 2 + 3, or generally a little shorter; costal cilia short; angle at fork not large; fourth vein somewhat strongly curved in its basal part. Halteres black.

Female. Similar; front tarsi likewise stout, but hind femora without special hairs below the base.

Length. The species varies somewhat in size, the length from scarcely 1 to 1,7 mm.

A. longiseta is not rare in Denmark; Ermelund, Dyrehaven, Lyngby Mose, Geel Skov and in Jutland at Ry (the author); the dates are $18\frac{1}{5}$ — $8\frac{1}{8}$ in 1918 and 1920. It frequents humid and boggy places in woods.

Geographical distribution: — Besides in Denmark known from England and Holland.

88. **A. griseifrons** Lundbk.

1920. Lundbk. Vidensk. Meddel. fra Dansk naturh. Foren. 71, 22, 25. — 1920. Schmitz, Jaarb. Natuurh. Genootsch. Limburg 1919, 147.

Male. Frons considerably broader than high, grey; inner bristle of lower row below the outer, rather close to it and somewhat near to the margin; supraantennal bristles unequal, the lower less than half as large as the upper; the upper supraantennals fully as distant as the inner bristles of middle row, the lower a little more approximate. Antennæ not small, brownish black, arista somewhat short, distinctly pubescent. Palpi yellow, not large and with the bristles somewhat short. Thorax black, very slightly shining, almost dull, with brown pubescence. Mesopleura bare. Abdomen deep black, dull; hairs almost invisible, only longer and more distinct on sixth segment, especially at the hind margin. Hypopygium quite small and retracted, though a subanal body is exposed in the shape of a downwards protruding process; ventral plate broad, but short, yellow; anal tube somewhat small, but of medium length, yellow. Legs yellow, hind femora slightly brownish yellow, the hairs below the basal half long; front tarsi with the three first joints a little stout; bristles on hind tibiæ distinct, but somewhat small. Wings a little yellowish, veins brown; costa reaching nearly or quite to the middle, costal divisions about as 10—6—3; costal cilia short or moderately short; fourth vein evenly curved. Halteres black.

Female. Unknown.

Length. About 1,3 mm.

A. griseifrons seems to be rare; Holte ^{28/6} 1919 (Th. Mortensen) and Ry in Jutland ^{20/7} 1918 (the author), two males.

Geographical distribution:— Hitherto only known from Denmark.

Remarks: On account of the shape of the front tarsi this species must be similar to *anisodactyla* Schmitz with which it also in other respects seems to be conform, but *anisodactyla* has yellow halteres.

89. **A. fumicolor** Lundbk.

1920. Lundbk. Vidensk. Meddel. fra Dansk naturh. Foren. 71, 132. — 1920. Schmitz, Jaarb. Natuurh. Genootsch. Limburg 1919, 147. — *A. fumipennis* Lundbk. (nec Brues 1907, Ann. Mus. Nat. Hung. V, nec Enderlein 1912, Stett. Ent. Zeitg.) 1920. l. c. 23, 26.

Male. Frons not broad, scarcely $1\frac{1}{3}$ as broad as high, greyish black, with a slight indication of a gloss; inner bristle of lower row slightly below the outer and about in the middle between it and the upper supraantennal; supraantennal bristles equal, the upper distant, in about the same distance from each other as the inner bristles of middle row or perhaps a little more distant, but as the inner bristles of middle row are rather distant, the same is the case with the upper supraantennals; the lower supraantennals considerably more approximate. Antennæ of ordinary size, black, arista distinctly pubescent. Palpi not small, yellow, slightly dusky, with ordinary bristles. Thorax black, a little shining, with dark brownish pubescence. Mesopleura bare. Abdomen somewhat robust, deep black, dull; the short hairs only visible on the two last segments. Hypopygium small, a little greyish, only with hairs on the sides; anal tube small and short, yellowish, somewhat dusky. Legs pale brownish or brownish yellow, the front legs the palest; the hairs below the basal half of hind femora longish; bristles on hind tibiæ somewhat small, but distinct. Wings somewhat brownish or greyish fumigated, veins dark brown, nearly blackish; costa reaching near to the middle of the wing, 0,48 of the wing-length, costal divisions about as 11—6—4; costal cilia short, but not specially short; fork longish, the angle not small; fourth vein evenly curved. Halteres black.

Female. Unknown.

Length. About 1,5 mm.

A. fumicolor seems to be very rare, Ermelund $1\frac{1}{6}$ 1919 (the author), one male.

Geographical distribution: — Hitherto only known from Denmark.

90. *A. parva* Wood.

1909. Wood, Ent. Month. Mag. 2, XX, 27, 62 (*Phora*). — 1914. Brues, Bull. Wisc. Nat. Hist. Soc. XII, 126. — 1919. Schmitz, Jaarb. Natuurh. Genootsch. Limburg 1918, 159.

Male. Frons broader than high, black, highly shining; inner bristle of lower row below the outer and nearer to it than to the upper supraantennal; supraantennal bristles unequal, the lower about half as large as the upper, or sometimes a little larger; the upper supraantennals less distant than the inner bristles of middle row, the lower quite approximate. Antennæ somewhat small, black, arista distinctly

pubescent. Palpi dusky yellow, of ordinary size, with well developed bristles. Thorax black, shining, with not quite short, dark brownish pubescence. Pleura shining. Mesopleura bare. Abdomen black, dull, the hairs somewhat distinct at the sides and at the hind margin of sixth segment. Hypopygium of medium size, somewhat glossy, with hairs along the lower margins; anal tube yellow, directed downwards. Legs brown or dark brown, front legs paler; the hairs below hind femora distinct, but not long; bristles on hind tibiæ well developed, but not large. Wings nearly colourless or slightly tinged, the microscopical hairiness more visible than usual; thick veins blackish brown, costa almost black, thin veins pale; costa reaching beyond the middle, rather strong, at the humeral cross-vein with a distinct incrassation; 1 about equal to 2 + 3 or a little shorter; costal cilia short and fine; fourth vein rather curved in its first part, for the rest nearly straight, but directed upwards and much diverging from the fifth vein, just at the base it is a little obliterated. Halteres black.

Female. Similar; costa fully as strong as in the male, likewise with a thickening at the humeral cross-vein.

Length 1—1,3 mm.

There can be no doubt about the determination of this characteristic little species, but Wood's description is not fully agreeing; he says that there is only one pair of supraantennal bristles, but there are two pairs, and the lower are not specially small, about half the size of the upper or even larger; I also find the hypopygium not large, at most medium-sized.

A. parva is rare in Denmark; Ermelund (the author), Holte, Hillerød (Th. Mortensen) and in Jutland at Jelling and Ry (the author); the dates are $21\frac{1}{5}$ — $26\frac{1}{9}$ in 1917 to 1921; in all four males and three females. I have taken it in grass with the net.

Geographical distribution: — Besides in Denmark occurring and common in England, Holland and Germany.

91. *A. glabrifrons* Wood.

1909. Wood, Ent. Month. Mag. 2, XX, 27, 62 (*Phora*). — 1914. Brues, Bull. Wisc. Nat. Hist. Soc. XII, 120. — 1919. Schmitz, Jaarb. Natuurh. Genootsch. Limbuig 1918, 159.

Male. Frons broader than high, black, strongly shining; inner bristle of lower row nearly in the same height as the outer and nearer to it than to the upper supraantennal; supraantennal bristles nearly

equal, the upper less distant than the inner bristles of middle row, the lower a little more approximate. Antennæ small, black, arista somewhat long, distinctly pubescent. Palpi black or dark brown, not small and with the bristles well developed. Thorax black, somewhat shining, with brown pubescence. Mesopleura bare. Abdomen robust, black and dull, the hairs very inconspicuous, only visible at the sides and at apex. Hypopygium quite small and withdrawn, but it has small hairs below; anal tube very short, almost not protruding, yellowish. Legs black, the front legs more brown with the coxæ yellow; hind femora somewhat dilated, the hairs below short;

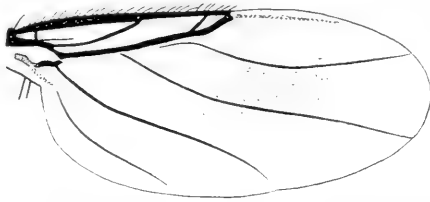


Fig. 103. Wing of *A. glabrifrons* ♂.

hind tibial bristles distinct and not small, that is to say only the four or five on the middle part, towards both ends they are small; the dorsal hair-seam somewhat suddenly deflected anteriorly from the middle. Wings very strongly brown and often with a cloud behind the middle, veins brown and strong; costa reaching to the middle or beyond, it is a little thickened in the first division, though this thickening is not much pronounced, 1 slightly longer than 2 and about equal to 2 + 3; costal cilia short; fourth vein issues anterior to the fork with a sort of peduncle, for the rest it is evenly curved, the curve strongest on the middle. Halteres black.

Female. Similar to the male; palpi sometimes paler to yellowish; the costa not thickened and the basal stalk of fourth vein less or sometimes almost not at all pronounced.

Length 1,5—1,7 mm.

Wood terms the hind tibial bristles weak and he even speaks (l. c. 62) of practically bare hind tibiæ; in my specimens the bristles on the middle part of hind tibiæ are fairly developed.

A. glabrifrons is not common in Denmark; Ermelund, Geel Skov, Lohals on Langeland and in Jutland at Ry (the author); the dates are $31/5$ — $29/9$ in 1918 to 1921; at Lohals I took it in some

number on leaves of shrubs between $1/7$ and $25/7$ in 1920. I have taken it in copula on $31/5$.

Geographical distribution: — Besides in Denmark occurring in England, Holland and Germany.

92. *A. propinqua* Wood.

1909. Wood, Ent. Month. Mag. 2, XX, 27, 62 (*Phora*). — 1914. Brues, Bull. Wisc. Nat. Hist. Soc. XII, 127. — 1919. Schmitz, Jaarb. Natuurh. Genootsch. Limburg 1918, 160.

Male. Frons high, as high or higher than broad, black, strongly shining; inner bristle of lower row well below the outer, nearer to the eye-margin than to the upper supraantennal; supraantennal bristles equal, the upper about in the same distance from each other as the inner bristles of middle row, the lower a little more approximate. Antennæ small, black or blackish brown, arista distinctly pubescent. Palpi yellow or somewhat dusky, of ordinary size, with well developed bristles. Thorax black, shining, with brown pubescence. Mesopleura bare. Abdomen black, very slightly greyish, a little shining; the short hairs are scarcely visible, only at the hind margin of sixth segment they are distinct and longer. Hypopygium quite small, greyish, with very small hairs on the sides; below there is a square, yellow or dusky ventral plate; anal tube quite short, yellowish. Legs brown or dark brown, hind femora the darkest, front legs paler, yellow; hind femora somewhat broad, the hairs below short; bristles on hind tibiæ well developed, but not strong, the dorsal hair-seam deflected anteriorly in about the middle. Wings a little brownish tinged, veins brown; costa generally not reaching to the middle, 1 distinctly longer than 2 and as long as 2 + 3 or a little longer; costal cilia short; angle at fork not small; fourth vein evenly, but distinctly curved. Halteres black, the peduncle distinctly yellow.

Female. Quite similar to the male.

Length 0,9 to nearly 1,5 mm.

As already remarked by Schmitz l. c. the hind tibial bristles are not, as Wood says, very small, but rather well developed.

A. propinqua is more common in Denmark than *glabrifrons*; Ermelund, Ørholm (the author), Holte, Suserup Skov at Sorø (Th. Mortensen), Stensby Skov and Sortsø Skov in South Sealand, Bogø south of Sealand, at Lohals on Langeland and in Jutland in Hals Sønderkov at the east end of Limfjorden (the author); my dates are $20/5$ — $4/10$ in 1917 to 1921.

Geographical distribution: — Besides in Denmark occurring and common in England and Holland.

93. *A. minor* Zett.

1848. Zett. Dipt. Scand. VII, 2864, 13 et 1855. XII, 4824, 13 (*Trineura*). — 1901. Beck. Abhandl. zool. bot. Gesell. Wien, I, 63, 57 (*Phora*). — 1909. Wood, Ent. Month. Mag. 2, XX, 28, 62 et 1912, 2, XXIII, 167 (*Phora*). — 1910. Kertész, Cat. Dipt. VII, 409. — 1914. Brues, Bull. Wisc. Nat. Hist. Soc. XII, 124. — 1919. Schmitz, Jaarb. Natuurh. Genootsch. Limburg 1918, 158. — ? *Phora nitidifrons* Strobl, 1892. Wien. Ent. Zeitg. IX, 200 et 1894. Mittheil. Ver. Steierm. XXX, 16 et 1899. Wien. Ent. Zeitg. XVIII, 148 et 1910. Mittheil. Ver. Steierm. XLVI, 122.

Male. Frons high, higher than broad, or sometimes lower, about quadratic, black and more or less shining; bristles not strong, inner bristle of lower row considerably below the outer and somewhat near the eye-margin, but the position of these bristles somewhat varying; supraantennal bristles equal, the upper very distant, much more distant than the inner bristles of middle row, the lower more approximate, but still rather distant. Antennæ somewhat small, black, arista quite short-pubescent. Palpi variable in colour, blackish to yellow, somewhat prominent and with rather long bristles. Thorax black, shining, with blackish or brownish pubescence. Mesopleura bare. Abdomen black, very slightly greyish, fifth and sixth segments generally more or less shining; the hairs very short, only a little longer towards the end and at the sides and longest at the hind margin of sixth segment; at the sides of second segment they are rather conspicuous. Hypopygium somewhat small, greyish; it has short hairs at the lower corners and a longer hair below at the base; anal tube short, but somewhat high, yellow, dusky at the base. Legs somewhat varying in colour from black or blackish to yellowish, the front legs generally paler and the front coxæ always yellow; hind femora rather dilated, the hairs below the basal half distinct and somewhat long; bristles on hind tibiæ strong and also on middle tibiæ the postero-dorsal bristles on the upper half distinct. Wings greyish yellow to strongly brownish, veins brown; costa not quite reaching to the middle, 1 nearly equal to 2 + 3, but it varies and may be both shorter or longer; costal cilia short and fine; fourth vein somewhat curved in its first part. Halteres whitish yellow.

Female. Similar to the male, only the costa longer.

Length 1.3—2 mm.

A. minor is somewhat rare in Denmark; Geel Skov, Hillerød,

Bogø south of Sealand, Ærø (Th. Mortensen, the author), on Lolland at Strandby and in Kældskov (L. Jørgensen) and on Læsø (Th. Mortensen); the dates of capture are $^{22}/_4$ — $^{30}/_7$ in 1917 to 1921. The specimens from Lolland came on $^{17}/_3$ and $^{19}/_3$ from a material of shells of *Helix* taken by Mr. Jørgensen on $^7/_3$ and $^{12}/_3$ and probably bred from the snails, and Dr. Mortensen took it in some numbers at Hille-rod on putrid *Planorbis corneus* on $^{30}/_5$; it seems thus to choose, or at all events to prefer snails for depositing the eggs.

Geographical distribution: — Northern and middle Europe, towards the north to middle Sweden and Finland, and it is recorded down into Tunis; it is also recorded from North America.

Remarks: As seen from the description the species varies to some degree; the frons is sometimes strongly, sometimes much less shining, and it may be rather high, but going down to being about quadratic; the inner bristles of lower row may be not little varying in position, being placed more or less low down, and also being near to the eye-margin or more remote from it, placed in the middle between the eye-margin and the upper supraantennal; finally the colour of legs and palpi and the length of costa vary. Four of my specimens, a male and three females (from Ærø, Strandby and Læsø) belong to the darkest form, with the posterior legs black and dark palpi, at the same time they have a high and strongly shining frons and the bristles on hind tibiæ moderate. All my other specimens have brown or yellowish brown posterior legs, yellow palpi, a not much shining frons which is often relatively broad, and strong hind tibial bristles; they cannot belong to the following species as they have equal supraantennals with the upper pair widely distant and long bristles on the palpi. As Wood doubted the specific identity of the male and female which he first described, thus I think it just possible that these specimens might belong to a separate species, intermediate between *minor* and *angustifrons*, but at present I cannot decide it.

I have seen Zetterstedt's types, there are two specimens, one, labelled "Ostrogh.", is headless, the other, labelled "Lund" has a moderately shining frons and thus seems to belong to the mentioned variety which has the frons less shining.

94. *A. angustifrons* Wood.

1912. Wood. Ent. Month. Mag. 2, XXIII, 167 (*Phora*). — 1914. Brues, Bull. Wisc. Nat. Hist. Soc. XII, 112. — 1919. Schmitz, Jaarb. Natuurh. Geneetsch. Limburg 1918, 159.

Male. Frons higher than broad, grey, not shining; bristles stronger than in *minor*, inner bristle of lower row much below the outer and rather near the eye-margin; supraantennal bristles not large, unequal, the lower small, the upper somewhat distant, but not or only a little more distant than the inner bristles of middle row, the lower supraantennals a little more approximate. Antennæ small, brown, arista short-pubescent. Palpi yellow, of ordinary size, with somewhat short bristles. Proboscis somewhat well developed. Thorax black, only slightly shining, with darker or paler brownish pubescence. Mesopleura bare. Abdomen black, somewhat greyish, dull, the short hairs very slightly longer at the hind margins of the segments and almost not longer on sixth segment. Hypopygium small, greyish, the lower hinder corner drawn a little out and with a small hair, and forwards and upwards there are smaller hairs; below there is a medium-sized, rounded, dark or dusky ventral plate; anal tube of some size, yellow. Legs yellowish or yellowish brown, the front legs the palest, the hind legs the darkest; hind femora rather dilated, with the hairs below the basal half long; bristles on hind tibiæ strong and the postero-dorsal bristles on middle tibiæ also somewhat developed. Wings yellowish or yellowish brown, veins brown or pale brown; costa reaching to or generally beyond the middle, 1 about equal to $2 + 3$, but it may be shorter or longer; costal cilia short, somewhat dense and distinctly stronger than in *minor*; fork generally rather longish and the angle somewhat large, but both length and angle varying and in accordance herewith also the relative lengths of division 2 and 3; fourth vein well curved in its basal part, for the rest slightly curved or nearly straight. Halteres yellow.

Female. Similar; hind femora likewise with long hairs below; abdomen often shining above.

Length 1,3—2,4 mm, the smallest sizes rarely met with.

As already mentioned by Schmitz l. c. the frons in this species may vary in breadth, especially in the female; it is sometimes nearly quadratic. In the position of the inner bristles of lower row I find no principal difference from *minor*. According to Schmitz, the halteres sometimes may be dark.

A. angustifrons is not rare in Denmark; Utterslev Mose, Damhussø (Larsen), Ermelund, Geel Skov, Bogø south of Sealand, Lohals on Langeland and in Jutland at Hejls south of Kolding and Jelling (the author); my dates are $\frac{5}{6}$ — $\frac{28}{9}$ in 1907 to 1921; I have taken it in copula on $\frac{10}{9}$; a pupa was taken in May in Utterslev Mose in flood refuse and it developed soon after (Larsen).

Geographical distribution: — Besides in Denmark occurring in England, Holland and also in Prussia (Schmitz, Tijdschr. v. Entom. LXIV, 1921, 4).

95. *A. ustulata* Schmitz.

1920. Schmitz, Jaarb. Natuurh. Genootsch. Limburg 1919, 150. — *A. palida* Lundbk. 1921. Vidensk. Meddel. fra Dansk naturh. Foren. 72, 138, 10.

Male. Frons high, about quadratic, yellow; inner bristle of lower row well below the outer, in about the middle between it and the upper supraantennal; supraantennal bristles very unequal, the upper not large, the lower present only as very small, nearly microscopical hairs; the upper supraantennals approximate, nearer together than the inner bristles of middle row, the small lower hairs more approximate. Antennæ of ordinary size, yellow, arista not long, distinctly pubescent. Palpi yellow, not large, with ordinary bristles. Thorax yellow, dullish, with pale brown pubescence. Pleura yellow. Mesopleura bare. Abdomen yellowish, the segments blackish at the sides and hind margins in such a way that abdomen may be termed blackish with a series of semicircular, yellow middle spots; the very short hairs only visible at the hind margins of the segments, at the hind margin of sixth segment they are distinct. Venter yellow. Hypopygium large, yellowish grey, with small, but distinct and bristly hairs at the lower margin, the hindmost being the longest; anal tube large, whitish yellow, it is low at the base, but increases in height outwards and has a somewhat rhomboidal shape. Legs yellow, hind femora brown just at apex, with sparse, long hairs below the basal half; bristles on hind tibiæ quite small and fine, but distinct on the lower half. Wings a little yellowish, veins brownish yellow; costa reaching to the middle, costal divisions about as 7—5—2, thus 1 about equal to 2 + 3; costal cilia short, but somewhat moderately; angle at fork large; fourth vein slightly and evenly curved, but a little recurved at apex. Halteres yellow.

Female. Unknown.

Length 1,2 mm.

A. ustulata is very rare, only one specimen, a male, has been taken, Holte ²⁰/₆ 1917 (Th. Mortensen).

Geographical distribution: — Besides from Denmark known from Holland in one specimen.

Remarks: This species will at once be known in the group by

its pale colour, but perhaps the female will show four scutellar bristles. — I described it l. c. as a new species, but since then I have seen the type of *ustulata* Schmitz and find my species quite identical with it. The chief difference in the description is in the hypopygium, which Schmitz describes without bristles; on the type, however, one long, bristly hair is distinct, it is the hindmost, those anterior to it seem to be smaller than in my specimen; the colour of the frons and the position of the bristles in the lower row in Schmitz's specimen is no doubt due to exsiccation. In my description of *pallida* the anal tube by a misprint has been called reddish yellow instead of whitish yellow; the brownish patch in the fork-cell, mentioned by Schmitz, is less distinct in my specimen.

96. **A. uliginosa** Wood.

1909. Wood, Ent. Month. Mag. 2, XX, 28, 63 (*Phora*). — 1914. Brues, Bull. Wisc. Nat. Hist. Soc. XII, 135. — 1919. Schmitz, Jaarb. Natuurh. Genootsch. Limburg 1918, 161.

Male. Frons considerably broader than high, greyish black, dull; inner bristle of lower row in about the same height as the outer and nearer to it than to the upper supraantennal; supraantennal bristles unequal, the lower about half as large as the upper; the upper supraantennals as distant as the inner bristles of middle row, or a little more distant, the lower slightly more approximate. Antennæ above ordinary size, black or brownish, arista short-pubescent. Palpi yellow, ordinary, with ordinary bristles. Thorax black, slightly shining, with brownish pubescence. Mesopleura bare. Abdomen black, a little greyish, dull, the short hairs a little more visible at the hind margins of the segments and at the sides, at the hind margin of sixth segment a little longer. Hypopygium of medium size, greyish, with short hairs below on the sides, among which one a little longer near the base; there is a dark, flap-like and rounded ventral plate below; anal tube short, yellow. Legs yellowish brown, the front legs a little paler and the hind legs a little darker; hind femora somewhat dilated, with long hairs below the basal half; bristles on hind tibiæ few in number, about 10, somewhat strong. Wings almost colourless, veins brownish yellow, thin veins fine; costa reaching to or nearly to the middle, 1 about equal to 2 + 3 and 2 nearly thrice as long as 3; costal cilia moderately short; fork generally small with the angle somewhat large, but varying; fourth vein curved at its base, for the rest nearly straight. Halteres yellow.

Female. Similar; antennæ a little smaller; frons scarcely as broad as in the male; hind femora as in the male with long hairs below.

Length 1,5 to about 2 mm.

A. uliginosa seems to be rare in Denmark, I possess only one male and one female, Geel Skov ¹⁴/₉ 1918 and at Hejls south of Kolding ³/₇ 1919 (the author).

Geographical distribution: — Besides in Denmark occurring in England and Holland, and probably also in Germany (Schmitz, Tijdschr. v. Entom. LXIV, 1921, 8).

97. *A. flava* Fall.

1823. Fall. Dipt. Suec. Phytom. 7, 8 (*Trineura*). — 1838. Zett. Ins. Lapp. 797, 10 et 1848. Dipt. Scand. VII, 2876, 25 (*Trineura*). — 1864. Schin. F. A. II, 343 (*Phora*). — 1901. Beck. Abhandl. zool. bot. Gesell. Wien, I, 54, 44, Taf. III, Fig. 52 (*Phora*). — 1909. Wood, Ent. Month. Mag. 2, XX, 28, 63 (*Phora*). — 1914. Brues, Bull. Wisc. Nat. Hist. Soc. XII, 119. — 1919. Schmitz, Jaarb. Natuurh. Genootsch. Limburg 1918, 61.

Male. Frons broader than high, grey, dull, sometimes the anterior margin indistinctly reddish; inner bristle of lower row in the same height as the outer and a little nearer to it than to the upper supra-antennal; supraantennal bristles unequal, the lower about half the size of the upper; the upper supraantennals about as distant as the inner bristles of middle row, the lower a little more approximate. Antennæ of ordinary size, yellow or pale yellow, sometimes red, arista distinctly pubescent. Palpi yellow, of ordinary size and armature. Thorax from pale yellow or reddish yellow to dark brown, dull or dullish, with dark brown pubescence. Pleura yellow to brownish, when yellow with a dark spot below the wing-root. Mesopleura bare. Abdomen varying from almost quite yellow to quite black, when yellow the middle segments are more or less dark, and often it is black with first, second and sixth segments yellow, or with only the latter yellow, and also the hind margins are often pale; it is dull; the short hairs are a little longer at the hind margins of the segments, especially at the sides, and they increase in length towards the end; at the sides of second segment they are specially distinct; venter yellow. Hypopygium rather large and knob-like, greyish or brownish black; it is hairy on the sides with short hairs; below there is a somewhat large, greyish ventral plate, which is deeply cleft and furcated, but not always in view; anal tube of medium size, yellow, with very

small apical hairs. Legs yellow, hind femora blackish just at apex and with sparse, long hairs below the basal half; bristles on hind tibiae somewhat numerous (about 16); they are quite small and fine in the upper third, but somewhat well developed in the lower two thirds. Wings more or less yellowish, sometimes brownish, veins yellow to brown; costa reaching well beyond the middle, 1 shorter than 2,

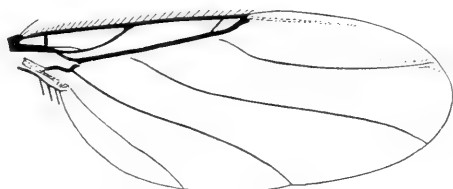


Fig. 104. Wing of *A. flava* ♂.

rarely of the same length; costal cilia very short; angle at fork not large; fourth vein issuing slightly S-like, curved in its first part, then nearly straight, but again curved upwards at apex. Halteres yellow.

Female. Similar to the male; abdomen similarly varying in colour; hind femora likewise with long hairs below.

Length 1,4—2,2 mm.

Wood says about the ventral plate (ventral processes) that the left is broader than the right; so far as I could see they are alike, perhaps a little unsymmetrical. — I have seen Zetterstedt's specimens, and I can confirm Becker's statement that they are identical with our species.

A. flava is common in Denmark and present in all suitable localities all over the country and during the whole season; my dates are $19/4-3/11$.

Geographical distribution: — Common and widely distributed over all Europe down into Spain and Italy, towards the north to middle Sweden and Finland; it is further recorded from Formosa, and it occurs in North America, the East Indies, and is also recorded from New Guinea.

98. *A. mixta* Schmitz.

1918. Schmitz, Entom. Ber. Nederl. Ent. Ver. V, 61 et 1919. Jaarb. Natuurh. Genootsch. Limburg 1918, 162.

Male. Frons broader than high, greyish black, dull; inner bristle of lower row in about the same height as the outer and nearer to it

than to the upper supraantennal; supraantennal bristles unequal, the lower at most half the size of the upper; the upper supraantennals as distant as the inner bristles of middle row, the lower slightly more approximate. Antennæ of ordinary size, blackish brown, arista distinctly pubescent. Palpi a little smallish, with ordinary bristles, yellow. Thorax black, slightly shining, with brownish pubescence; the humeri may be indistinctly reddish. Pleura more or less brownish, especially anteriorly. Mesopleura bare. Abdomen black, dull; the short hairs a little longer at the hind margins of the segments and at the sides and increasing in length towards the end, so that they are a little longish at the hind margin of sixth segment. Hypopygium somewhat small, black or brownish, with small hairs on the sides; below there is a not large, triangularly pointed, dusky yellowish ventral plate; anal tube of medium size, yellow or dark yellow, with small apical hairs. Legs yellow, hind femora somewhat darkened at apex with long hairs below the basal half; bristles on hind tibiæ numerous, small and fine, and they are equal or nearly so in the whole series; they are thus much smaller than those on the lower two thirds in *flava*. Wings somewhat brownish tinged, veins dark brown; costa reaching beyond the middle, 1 shorter than, rarely as long as 2; costal cilia short, but somewhat moderately, longer than in *flava*; fourth vein somewhat s-like at base, curved in its first part and again at the end and here slightly recurved. Halteres yellow.

Female. Similar; hind femora likewise with long hairs below which seem, however, to be a little shorter than in the male.

Length 1.3—2 mm.

A. mixta is somewhat common in Denmark; Egebæks Vang, Holte, Bogø south of Sealand, on Langeland at Lohals and in Jutland at Hejls and Skamling south of Kolding, Jelling and Ry (the author); my dates are $13/6$ — $2/8$ in 1917 to 1921; it was taken with the net on bushes and in low herbage in woods. — I have compared my specimens with a type specimen from Pater Schmitz.

Geographical distribution: — Besides from Denmark hitherto only known from Holland.

99. *A. rubella* Schmitz.

1920. Schmitz, Jaarb. Natuurh. Genootsch. Limburg 1919, 148.

Male. Frons broader than high, greyish, sometimes a little brownish anteriorly, dull; inner bristle of lower row in the same

height as the outer and nearer to it than to the upper supraantennal; supraantennal bristles unequal, the lower half the size of the upper or somewhat over; the upper supraantennals a little more approximate than the inner bristles of middle row, the lower still more approximate. Antennæ brown or reddish brown, arista distinctly, but short-pubescent. Palpi yellow, of ordinary size and armature. Thorax reddish yellow to brownish, dull or dullish, with brown pubescence. Pleura coloured as the disc. Mesopleura bare. Abdomen brown to blackish, dull, there is often on the second segment a more or less distinct reddish spot at each lateral front corner, and the front margin may



Fig. 105. Wing of *A. rubella* ♂.

be reddish; the hind margins of the segments somewhat pale; the short hairs are distinctly a little longer at the hind margins of the segments and at the sides, but not more elongated at the hind margin of sixth segment; at the hind corners of second segment the hairs are somewhat distinct. Venter yellow. Hypopygium of medium size, brown or greyish brown, with small hairs below on the sides; the lower hinder corners are distinctly drawn out into a little point; below there is a short, flap-like, yellowish ventral plate; anal tube short, but high, yellow. Legs yellow, hind femora slightly or a little more darkened at apex, the hairs below the basal half long; bristles on hind tibiæ somewhat fine, smaller than in *flava* and of more equal size. Wings yellowish, veins brown; costa reaching to the middle, 1 longer than 2 and about equal to 2 + 3, or slightly shorter; costal cilia moderately short; fourth vein issuing a little behind the base of the fork, a little curved at the base, then nearly straight and again a little curved at the end. Halteres yellow.

Female. Similar; antennæ paler, red or yellowish red; hind femora likewise with long hairs below.

Length 1.5—2 mm.

A. rubella is common in Denmark; Ermelund (the author), Holte, Hillerød, Suserup Skov at Sorø (Th. Mortensen), Stensby Skov in South Sealand, Bogø south of Sealand, Lohals on Langeland (the author), on Funen at Odense (H. J. Hansen), in Jutland at Hejls south of Kolding, Jelling and Ry (the author); the dates are $12/4$ — $21/8$ in 1917 to 1921. It was generally taken with the net on bushes and in low herbage in humid places in woods.

Geographical distribution: — Besides in Denmark occurring in Germany and down into Hungaria.

Remarks: The above species is evidently *rubella* Schmitz, and I have compared it with a type specimen from the author. I thought at a time that it was *Collini* Wood, but in that species the wings are less tinged, the veins finer, the lower supraantennals minute and the antennæ darker; for the rest I do not know with certainty what *Collini* is, I have seen English specimens from Mr. Collin, but these specimens had long costal cilia and were not well answering to Wood's description; on the other hand I have seen a specimen determined by Schmitz and well agreeing with Wood's description, and this latter is, I think, correct. The three species *flava*, *mixta* and *rubella* are rather similar, but distinguished with certainty, *flava* has always quite short costal cilia and pale antennæ, *mixta* has longer costal cilia and dark antennæ and is a darker species, *rubella*, which is more similar to *flava* in colour, has likewise longer costal cilia, a shorter costa and 1 longer than 2; finally the hypopygium in *flava* with its ventral plate is quite unlike the other two.

100. *A. anisodactyla* Schmitz.

1919. Schmitz, Entom. Ber. Nederl. Ent. Ver. V, 110 et 1919. Jaarb. Natuurh. Genootsch. Limburg 1918, 162.

Male. Frons broader than high, greyish, dull; inner bristle of lower row a little below the outer and nearer to it than to the upper supraantennal; supraantennal bristles unequal, the lower small; the upper supraantennals about as distant as the inner bristles of middle row, the lower a little more approximate. Antennæ of ordinary size, brownish black, arista short-pubescent. Palpi yellow, somewhat small, with the bristles somewhat short. Thorax black, very slightly shining, with dark brown pubescence. Pleura a little brownish anteriorly. Mesopleura bare. Abdomen black, dull, somewhat tapering; the hairs almost only visible at the hind margins of the segments

and a little longer at the hind margin of sixth segment. Hypopygium of medium size, greyish black, with short hairs below on the sides; there is a flap-like, dusky ventral plate; anal tube of medium size, yellowish, a little dusky. Legs yellow or yellowish, the three first joints of front tarsi a little broad; hind femora with long, sparse hairs below the basal half; bristles on hind tibiæ fine. Wings very slightly yellowish, veins brownish; costa reaching about to the middle, 1 a little longer than 2 + 3 (perhaps about as 7—4—2); costal cilia moderately short; fourth vein somewhat curved in its first part, for the rest nearly straight. Halteres yellow.

Length 1,2—1,4 mm.

Female. The female is not known, but I possess a specimen which may possibly belong here; it agrees well, but has the front tarsi simple and first costal division relatively a little longer. The length is 1,6 mm.

A. anisodactyla is rare in Denmark, I possess only two males, Holte and Suserup Skov at Sorø (Th. Mortensen), they were taken on $\frac{31}{7}$ and $\frac{6}{8}$ 1918; the possible female is taken at Ry in Jutland $\frac{20}{7}$ 1918 (the auhtor).

Geographical distribution: — Besides from Denmark only known from Holland.

101. *A. frontalis* Wood.

1909. Wood, Ent. Month. Mag. 2, XX, 119, 147 (*Phora*). — 1914. Brues, Bull. Wisc. Nat. Hist. Soc. XII, 119.

Male. Frons slightly broader than high, almost quadratic, black, slightly shining and rather hairy; inner bristle of lower row below the outer, about in the middle between the eye-margin and the upper supraantennal; supraantennal bristles large and equal, the upper more distant than the inner bristles of middle row, the lower more approximate. Antennæ somewhat large, brownish black, arista short-pubescent. Palpi somewhat large and prominent, deep yellow, with ordinary or a little shortish bristles. Thorax black, a little shining, with blackish brown pubescence. Mesopleura bare. Abdomen black, dull, the short hairs slightly longer at the hind margins of the segments, longest on sixth segment. Hypopygium not small, greyish black; it has distinct and somewhat dense hairs below on the sides, and there is a somewhat small, dusky yellow ventral plate; anal tube not long, but somewhat high, greyish brown, the apical hairs

very small. Legs somewhat robust, brownish or dark brown, the front legs paler, yellowish; hind femora somewhat dilated, with long hairs below the basal half; bristles on hind tibiæ strong and also the postero-dorsal bristles on middle tibiæ rather large. Wings yellowish, veins brown; costa reaching a little beyond the middle, 1 longer than 2, a little shorter than 2 + 3, the divisions about as 7—5—3; costal cilia long, but not specially long; fourth vein slightly curved in the whole length and a little recurved at apex. Halteres black.

Female. Similar; antennæ a little smaller; hind femora likewise with long hairs below.

Length 2—2.3 mm.

A. frontalis is rare in Denmark; Holte (Th. Mortensen), on Langeland at Lohals and in Jutland at Hejls south of Kolding (the author); the dates are $30/6$ — $11/8$ in 1917 to 1920, in all four males and three females. One of my females wants the anterior branch of the fork on both wings, so that the third vein is unforked.

Geographical distribution: — Besides from Denmark hitherto only known from England.

102. *A. melaena* Lundbk.

1921. Lundbk. Vidensk. Meddel. fra Dansk naturh. Foren. 72, 139, 12.

Male. Frons not much broader than high, black, dull; inner bristle of lower row slightly below the outer and slightly nearer to it than to the upper supraantennal; supraantennal bristles unequal, the lower about half the size of the upper; the upper supraantennals approximate, nearer together than the inner bristles of middle row, the lower a little more approximate. Antennæ a little large, black, arista short-pubescent. Palpi brownish black, of ordinary size and armature. Thorax black, slightly shining, with blackish brown pubescence. Mesopleura bare. Abdomen black, dull, slightly greyish; the hairs very short and sparse, and almost not longer at the hind margins of the segments, only on sixth segment a little longer. Hypopygium of medium size, greyish, on the sides at the lower margin there are numerous hairs among which a couple of longer and a little bristly hairs, and above on the hind part there are some shorter hairs; the ventral plate is elongated, rounded at the end, black; anal tube short, but high, blackish grey. Legs black, front legs only slightly paler; hind femora with long hairs below the basal half; bristles on hind tibiæ distinct and not numerous, but somewhat short. Wings somewhat

strongly brownish tinged, veins brown, thin veins somewhat strong; costa reaching nearly to the middle, costal divisions about as 14—7—4; angle at fork somewhat acute; costal cilia moderately long; fourth vein evenly curved. Halteres black.

Female. Unknown.

Length 2 to fully 2 mm.

This species locates itself together with *frontalis* in one group, and therefore the female will, I think, not be difficult to identify.

A. melaena is rare, only two specimens, both males, have been taken, Geel Skov ¹⁹/₄ and ²²/₄ 1919 (Th. Mortensen, the author); one of the specimens was taken on a fresh stub of *Acer*.

Geographical distribution: — Hitherto only known from Denmark.

103. *A. infraposita* Wood.

1909. Wood, Ent. Month. Mag. 2, XX, 119, 147, ♂ et 1912. l. c. 2, XXIII, 169, ♀ (*Phora*). — 1914. Brues, Bull. Wisc. Nat. Hist. Soc. XII, 121.

Male. Frons not broader than high, greyish black, dullish; inner bristle of lower row much below the outer, quite or nearly vertically below it and placed near the eye-margin; supraantennal bristles large and equal, the upper widely distant, more distant than the inner bristles of middle row, the lower rather more approximate. Antennæ not large, brownish black, arista short-pubescent. Palpi pale yellow, of ordinary size and armature. Thorax black or brownish, very slightly shining, humeri and the side margin more or less reddish; it has pale brown or yellowish pubescence. Pleura more or less brownish, especially anteriorly and below. Mesopleura bare. Abdomen black, a little greyish, dull, the very short hairs a little more visible at the hind margins of the segments and at the sides and increasing a little in length behind. Hypopygium somewhat small, greyish, with short hairs below on the sides; there is a yellowish ventral plate; anal tube not large, but stout, yellow, with well developed apical hairs. Legs yellowish, hind femora slightly darkened at apex, they are somewhat dilated, with sparse, longish hairs below the basal half; bristles on hind tibiæ strong and also the posterodorsal bristles on middle tibiæ somewhat large. Wings yellowish to brownish tinged, veins brown, thin veins somewhat strong; costa reaching to the middle, the costal divisions about as 12—8—5, thus 1 about equal to 2 + 3; costal cilia long, but not specially long; fourth vein slightly curved in the basal part, for the rest straight, but a little recurved at apex. Halteres yellow.

Female. Similar; hind femora with similar, a little longish hairs, but they seem to be shorter than in the male.

Length 1,4—1,8 mm.

A. infraposita is not rare in Denmark; Geel Skov (the author), Holte, Hillerød (Th. Mortensen), Bogø south of Sealand, on Langeland at Lohals (the author), on Funen at Odense (H. J. Hansen), and in Jutland at Jelling, Ry and Laven (the author); the dates are $28/6$ — $15/10$ in 1917 to 1921. I have taken it in woods on bushes and in low herbage in more or less humid places; the female is rarely met with, while I have many males I have got only six females.

Geographical distribution: — Besides from Denmark only known from England, where it is rare.

104. *A. vernalis* Wood.

1909. Wood, Ent. Month. Mag. 2, XX, 119, 147 (*Phora*). — 1914. Brues, Bull. Wisc. Nat. Hist. Soc. XII, 135.

Male. Frons broader than high, greyish black, dull; inner bristle of lower row nearly in the same height as the outer and in about the middle between it and the upper supraantennal; supraantennal bristles equal or nearly, the upper slightly more approximate than the inner bristles of middle row, the lower a little nearer together. Antennæ of ordinary size and armature. Thorax black, a little shining, with brown pubescence. Mesopleura bare. Abdomen somewhat robust, black, dull, the short hairs the most visible at the hind margins of the segments and at the sides, on sixth segment a little elongated. Hypopygium greyish black or greyish brown; it has distinct and longish hairs on the sides and a longer, bristly hair below at the base; there seems to be a small, triangularly pointed, yellowish ventral plate; anal tube short, but high, yellow. Legs light brown to more blackish brown, the front legs paler, yellowish; hind femora a little dilated, the hairs below the basal half somewhat long; bristles on hind tibiæ not strong, but distinct and of some size; the dorsal hair-seam with a somewhat sudden deflection towards the anterior in about the middle or above it. Wings somewhat strongly brownish, veins brown, thin veins somewhat strong; costa short, not reaching to the middle (in most of my specimens only 0,44 of the wing-length), 1 equal to or longer than 2 + 3; costal cilia long; fourth vein only a little curved in the basal part, for the rest very slightly and evenly curved. Halteres yellow.

Female. Similar, only the costa longer.

Length 1,8 to fully 2 mm.

Remarks: I am not quite sure that the determination of this species is correct, yet it agrees rather well with Wood's description especially as regards the hypopygium, but the costa is in the male rather short and the hind tibial bristles rather stout. The species belongs to a group of difficult and nearly related forms; I also possess a number of specimens which I cannot determine as *vernalis*, nor can I at present characterize them sufficiently, but I suspect a couple of undescribed species among them. It is also seen that Wood described his *vernalis* as rather varying, so f. inst. as regards the costal divisions and the size. No doubt some species still will have to be made out in this group.

A. vernalis, as I understand it here, is rare in Denmark, I possess only five males and four females; Ermelund, Geel Skov (the author), Holte (Th. Mortensen), on Langeland at Lohals and in Jutland at Ry and in Hals Sønderkov at the east end of Limfjorden (the author); the dates are $^{22}/_5$ — $^7/_9$ in 1918 to 1921.

Geographical distribution: — *A. vernalis* is otherwise known from England and, according to a specimen sent to me from Pater Schmitz (and which I believe identical with my species), from Holland.

105. *A. sulphuripes* Meig.

1830. Meig. Syst. Besch. VI, 219, 22 (*Phora*). — 1914. Brues, Bull. Wisc. Nat. Hist. Soc. XII, 134. — *Trineura flava* Fall. p. p. var. 1823. Dipt. Suec. Phytom. 7, 8. — *Phora bicolor* Meig. 1830. l. c. VI, 219, 23. — *Phora flava* Meig. (nec Fall.) 1830. l. c. VI 219, 24, Tab. LXIII, Fig. 12. — *Phora lutea* Meig. 1830. l. c. VI, 220, 25. — 1838. Zett. Ins. Lapp. 797, 11 et 1848. Dipt. Scand. VII, 2877, 26 (*Trineura*). — 1901. Beck. Abhandl. zool. bot. Gesell. Wien, I, 54, 45, Taf. III, Fig. 53 (*Phora*). — 1909. Wood, Ent. Month. Mag. 2, XX, 120, 148, fig. 5 (*Phora*). — 1910. Kertész, Cat. Dipt. VII, 408. — 1916. Engel, Wien. Ent. Zeitg. XXXV, 57. — *Phora semiflava* Hartig 1837. Jahresber. üb. d. Fortschr. d. Forstwes. I, 305.

Male. Frons broader than high, grey, often more or less reddish at the front margin, or quite reddish grey or reddish, dull; inner bristle of lower row not quite in the same height as the outer and in the middle between it and the upper supraantennal; supraantennal bristles unequal, the lower scarcely half the size of the upper; the upper supraantennals about in the same distance from each other as the inner bristles of middle row, the lower only slightly more approximate. Antennæ somewhat smallish, pale yellow, arista dist-

inctly though somewhat short-pubescent. Palpi yellow, of ordinary size, the bristles not long. Thorax yellow, nearly dull, with brownish pubescence. Pleura yellow, below the squamulæ a brown or blackish spot. Mesopleura bare. Abdomen yellow, generally with second, third and fourth or only third and fourth segments black, but yellow on the middle; this is the typical colour of abdomen, but sometimes it is quite yellow, or on the contrary it is darker, being nearly quite brownish or blackish; there are very short and sparse hairs on the hind part of the segments, a little longer at the hind margins and increasing in length backwards; at the hind corners of second segment the hairs are rather distinct. Venter yellow. Hypopygium somewhat large, greyish black, with distinct hairs behind and on the sides; there is a somewhat large and broad black or somewhat paler ventral plate; anal tube of good size, yellow. Legs yellow or pale yellow, hind femora with a dark spot at apex or this latter wanting, posterior tarsi darkened towards the end; the last joint on middle tarsi nearly twice as long as the fourth and also slightly dilated, and also the last joint on hind tarsi longer than the fourth; hind femora with long hairs below the basal half; bristles on hind tibiæ not strong, but distinct and somewhat long in the lower half, the dorsal hair-seam deflected towards the anterior from the middle downwards; the postero-dorsal bristles on middle tibiæ somewhat distinct. Wings yellowish, veins yellow or brownish yellow; costa reaching to the middle or beyond, 1 much longer than 2 and longer than $2 + 3$; costal cilia long, though not specially long; angle at fork not large; fourth vein a little s-like at base and curving downwards behind the base of the fork, for the rest it is a little curved at each end, nearly straight on the middle. Halteres yellow.

Female similar to the male; frons generally yellow; abdomen quite yellow, sometimes more brownish to blackish; seventh segment black; the end-lamellæ small, roundish, ninth sternite with two upwards curved apical hairs; the hairs on the sides of abdomen rather distinct, especially on second segment; hind femora with long hairs below as in the male; posterior tarsi simple.

Length 1,7—2,3 mm.

Wood says that in the female the lower supraantennals are minute, I find them of the same or about the same size in male and female.

A. sulphuripes is common in Denmark; Ermelund, Lyngby Mose, Holte, Geel Skov, Suserup Skov at Soro, Bogo south of Sealand, on Langeland at Lohals, on Falster at Marienlyst, in Jutland at Hejls

and Skamling south of Kolding, Jelling, Ry and in Egense Skov at the east end of Limfjorden, and finally on Bornholm at Rø; my dates are $\frac{10}{6}$ — $\frac{6}{9}$; it is generally taken on bushes and in low herbage in woods in humid places. I have taken it in copula on $\frac{6}{9}$.

Geographical distribution: — A common and widely distributed species; all Europe, towards the north to northern Scandinavia; further recorded from Formosa and from North- and South America.

Remarks: I have seen Zetterstedt's specimens of *lutea* and I found Becker's statement, that they are identical with our species, correct.

The described sexual character in the shape of the last joint of the posterior tarsi in the male is rather interesting, and it is always well developed and not varying; I possess, however, one male specimen (from Marienlyst, Falster) in which the posterior tarsi are simple as in the female; I do not think it possible that it is a new species, as in all other respects it is quite typical, and it has the above described typical male colour; it was taken together with other specimens of *sulphuripes*; it is unmistakably a male (which I state expressly, as the female in this species may be rather similar to the male as regards the end of abdomen); I think it therefore most probable that we have here to do with a semihermaphroditic specimen; such specimens have not hitherto been described among the Phorids.

106. *A. scutellaris* Wood.

1909. Wood, Ent. Month. Mag. 2, XX, 120, 148, fig. 4 (*Phora*). — 1914. Brues, Bull. Wisc. Nat. Hist. Soc. XII, 132.

Male. Frons broader than high, blackish grey, dull; bristles strong, inner bristle of lower row slightly below the outer and in about the middle between it and the upper supraantennal; supraantennal bristles unequal, the lower about half as large as the upper; the upper supraantennals nearer together than the inner bristles of middle row, the lower a little more approximate. Antennæ of ordinary size, red or brownish red, arista short-pubescent. Palpi yellow, of ordinary size and armature. Thorax black, slightly shining, the humeri, the postalar calli and the scutellum or its margin generally more or less reddish, and so also often the whole side margin of thorax, and sometimes the whole disc reddish or yellowish red; the pubescence blackish brown. Pleura more or less brownish, especially anteriorly

and downwards, and when thorax is paler the pleura are reddish. Mesopleura bare. Abdomen black, a little greyish, dull; in the paler specimens abdomen may be brownish; there are short hairs on the hind part of the segments, a little longer at the hind margins and at the sides and increasing in length backwards. Venter yellow or yellowish. Hypopygium of medium size, greyish black, with distinct hairs behind and on the sides; there is a large rounded ventral plate which is yellow; anal tube short, but high, yellow. Legs yellow, darker than in *sulphuripes*, posterior legs sometimes slightly brownish; hind femora darkened at apex or not; the last joint on the posterior tarsi darkened and shaped as in *sulphuripes* (fig. 106); hind femora with long hairs below the basal half; bristles on hind tibiae distinct, but somewhat small, smaller than in *sulphuripes*; the dorsal hair-seam deflected anteriorly below the middle. Wings rather brownish tinged, veins strong, brown; costa reaching to or near to the middle, 1 longer than, or sometimes equal to 2 + 3; costal cilia long and longer than in *sulphuripes*; fourth vein issuing at the base of the fork, a little s-like at base and a little curved in its first part, for the rest slightly and evenly curved. Halteres yellow.



Fig. 106.

A. scutellaris ♂,
middle tarsus,
× 55.

Female. Similar to the male and with the same colour varieties; hind femora likewise with long hairs below; posterior tarsi simple.

Length 1,4 to nearly 2,5 mm.

A. scutellaris is common in Denmark; Ermelund, Dyrehaven, Geel Skov (the author), Holte, Suserup Skov at Sorø (Th. Mortensen), Bogø south of Sealand, on Langeland at Lohals (the author), on Falster at Marienlyst (Th. Mortensen) and in Jutland at Hejls south of Kolding and Ry (the author); the dates are $\frac{5}{5}$ — $\frac{23}{10}$ in 1917 to 1921. It occurs in the same way as *sulphuripes*; nearly all my specimens belong to the darker forms.

Geographical distribution: — Besides in Denmark occurring in England, and, according to specimens sent me from Pater Schmitz, in Holland.

107. **A. impolluta** Schmitz.

1920. Schmitz, Entom. Meddel. XIII, 116, 2.

Male. This species is very similar to *scutellaris*. Frons and its bristles as in *scutellaris*, the lower supraantennals very small. Antennæ blackish brown or blackish, arista more distinctly pubescent. Palpi yellow, ordinary. Thorax and abdomen mainly coloured as in *scutellaris*, though thorax may be without any reddish colouring. Venter yellowish. Hypopygium constructed as in *scutellaris*. Legs yellow, hind femora dark at apex, with long hairs below the basal half; posterior tarsi simple with last joint shorter than the fourth; bristles on hind tibiæ rather large, larger than in *scutellaris*, the dorsal hair-seam deflected in the same way. Wings slightly tinged, almost colourless, veins pale brown, somewhat fine; costa not reaching to the middle, 0.46—0.47 of the wing-length, 1 longer than 2 + 3; costal cilia perhaps a trifle shorter than in *scutellaris*; fourth vein indistinct or obliterated at the base, distinctly curved in its first part, for the rest very slightly curved or nearly straight until it curves a little upwards at the end. Halteres yellow.

Female. Similar; hind femora likewise with long or longish hairs below; costa longer, reaching to near the middle.

Length 1.4—2 mm.

As I have only the female, the above description of the male is mainly taken from Schmitz, and I have seen a typical female specimen from him; the species will in the male easily be known from *scutellaris* by the simple posterior tarsi; in both sexes it will be distinguished by the dark antennæ, clearer wings and larger hind tibial bristles.

A. impolluta is rare in Denmark, I possess only two females, Ermelund ⁴/₁₀ 1919 and Tisvilde ⁴/₇ 1918 (the author).

Geographical distribution: — Besides from Denmark hitherto only known from Holland.

108. **A. tarsella** Lundbk.

1921. Lundbk. Vidensk. Meddel. fra Dansk naturh. Foren. 72, 139, 11.

Male. Frons considerably broader than high, blackish grey, dull; inner bristle of lower row slightly below the outer and a little nearer to it than to the upper supraantennal; supraantennal bristles unequal, the lower about half the size of the upper; the upper supraantennals a little less distant than the inner bristles of middle row,

the lower a little more approximate. Antennæ smallish, blackish brown, arista long, distinctly pubescent. Palpi yellow, of ordinary size and armature. Thorax black, slightly shining, with brownish pubescence. Pleura brownish anteriorly. Mesopleura bare. Abdomen black, slightly greyish, dull, the short hairs slightly longer at the hind margins of the segments, longest on sixth segment. Hypopygium of medium size, brownish grey, with distinct hairs behind and on the sides; there is a broad, yellow ventral plate, rounded at the end; anal tube short, but high, yellow. Legs yellowish, the posterior legs more brownish yellow, hind femora darkest towards the end, with long hairs below the basal half; front tarsi somewhat stout, especially the three first joints; britsles on hind tibiæ distinct, but rather small and numerous; the dorsal hair-seam curving evenly towards the anterior from above the middle. Wings a little yellowish tinged, veins brown or pale brown; costa reaching to the middle, costal divisions about as 11—6—3, thus 1 a little longer than 2 + 3; costal cilia full long; angle at fork somewhat acute; fourth vein evenly curved in the whole length, only slightly more in its basal part and slightly s-like at the base. Halteres yellow.

Female. Similar; front tarsi likewise stoutish and hind femora with long hairs below.

Length 1,2—1,7 mm.

This species will be known in the group especially by the stout front tarsi and the small size.

A. tarsella is rare; Ermelund ¹²/₄ 1921 and in Jutland at Ry on ⁸/₇—²⁸/₇ 1918; in all three males and four females.

Geographical distribution: — Hitherto only known from Denmark.

109. *A. crassicosta* Strobl.

1892. Strobl, Wien. Ent. Zeitg. XI, 194 et 1894. Mittheil. Verein. Steierm. 1893, XXX, 14 (*Phora*). — *Phora costalis* Strobl, 1910. Mittheil. Verein. Steierm. XLVI, 121 p. p. var. *crassicosta*.

Male. Frons broader than high, black, slightly greyish, dull; inner bristle of lower row in the same height as the outer or a little lower and nearer to it than to the upper supraantennal; supraantennal bristles unequal, the lower half the size of the upper or more; the upper supraantennals not as distant as the inner bristles of middle row, the lower a little more approximate. Antennæ small, blackish, arista distinctly pubescent. Palpi of ordinary size and armature,

dark yellowish or yellowish brown. Thorax black, slightly shining, with dark brown pubescence. Mesopleura bare. Abdomen black, dull, the very short hairs almost only visible at the hind margins of the segments and a little longer at the hind margin of sixth segment. Hypopygium small, greyish black, with small hairs on the sides;

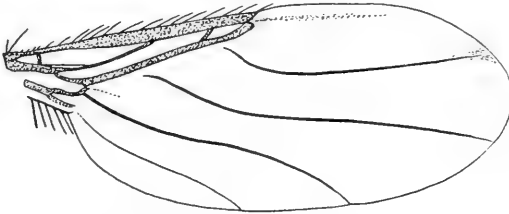


Fig. 107. Wing of *A. crassicosta* ♂.

there is a flap-like, rounded, yellow ventral plate, reaching to the end of the hypopygium; anal tube quite short, brownish or yellowish brown. Legs yellow, the posterior legs, especially the hind femora, darker to brownish; the hairs below the basal part of hind femora medium long; bristles on hind tibiae numerous, small and hair-like. Wings strongly brown, veins brown, thin veins somewhat strong; costa reaching fully to the middle, it is distinctly thickened from a little after the humeral cross-vein to the end, the thickening being similar to that in the female of *tumida*; 1 about equal to $2 + 3$; costal cilia long, but shorter than in *tumida*; fourth vein fairly curved in its first part, for the rest very slightly curved, nearly straight. Halteres dark, dark brown to blackish.

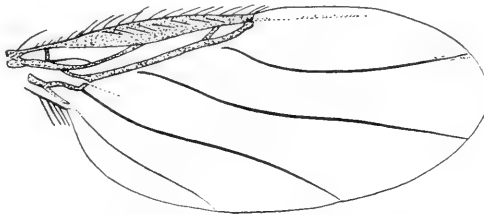


Fig. 108. Wing of *A. crassicosta* ♀.

Female. Similar to the male; the hairs on the sides of second and third abdominal segments somewhat distinct; hind femora with longish hairs below as in the male; wings with the costa much broader,

broader than the subcostal cell, and the thickening as in the male stretching to the end of costa.

Length 1.4 to nearly 2 mm.

A. crassicosta is somewhat rare in Denmark, I have taken it in only two localities, Ermelund from $^{11}/_6$ — $^{27}/_6$ in 1918 to 1920 and on Langeland at Lohals from $^6/_7$ — $^{24}/_7$ in 1920, and a single specimen was taken on Bornholm at Rø in July 1883 (H. J. Hansen); in Ermelund I took it in some numbers on bushes and in low herbage, chiefly consisting of *Aegopodium podagraria*, in a humid, shaded place in the wood.

Geographical distribution: — Besides from Denmark it is known from Styria.

Remarks: The male was hitherto not described; it is interesting to see that in this species also the male has a thickened costa, only to a less degree than the female, while in the species with the costa moderately swollen in the female, the male shows no thickening; this does, however, not seem to be the rule, for Wood describes the male of *costalis* without mentioning any thickening of the costa. I have no doubt that my species is correctly determined as it agrees very well with Strobl's description; Strobl's species is thus a good species and not synonymous with *costalis* as it was hitherto considered.

110. *A. tumida* Wood.

1909. Wood, Entom. Month. Mag. 2, XX, 192, 242 (*Phora*). — 1914. Brues, Bull. Wisc. Nat. Hist. Soc. XII, 135.

Male. Frons considerably broader than high, black, slightly greyish, dull; inner bristle of lower row slightly or almost not below the gutter and a little nearer to it than to the upper supraantennal; supraantennal bristles unequal, the lower about half the size of the upper or less; the upper supraantennals nearer together than the inner bristles of middle row, the lower very slightly more approximate. Antennæ of ordinary size, black, arista somewhat long, distinctly pubescent. Palpi yellowish brown to blackish brown, not broad, with ordinary bristles. Thorax black, a little shining, with dark brownish pubescence. Mesopleura bare. Abdomen black dull; the short hairs a little more visible at the hind margins of the segments and a little elongated at the sides of sixth segment. Hypopygium of medium size, greyish black or brownish black, with small hairs on the sides; below there is a somewhat large, flap-like, yellow or dusky

yellow ventral plate, reaching to the end of the hypopygium; anal tube small, but high, dusky yellow or brown. Legs brown or blackish brown, the front legs slightly paler; hind femora with medium long hairs below the basal half; bristles on hind tibiae small, hair-like and numerous. Wings brown tinged, veins brown or dark brown, thin veins somewhat strong; costa reaching beyond the middle, 1 longer than 2, but shorter than $2 + 3$; costal cilia long, almost very long; fourth vein well curved in its first part, for the rest slightly curved or nearly straight; it issues more or less behind the base of the fork. Halteres dark brown to black.

Female. Similar to the male; the lower supraantennals relatively smaller; the hairs below hind femora as in the male; wings with the

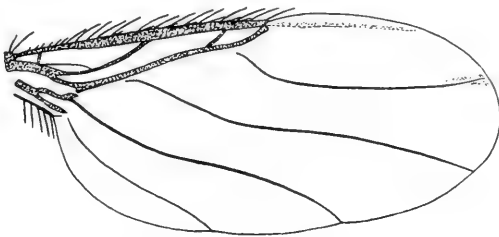


Fig. 109. Wing of *A. tumida* ♀.

costa thickened, but moderately, from a little behind the humeral cross-vein to the end; the fourth vein still more curved in its basal part.

Length 1,3—2,3 mm.

Remarks: This species is in the female easily distinguished, and I have compared it with specimens from Wood, but the male will be difficult to distinguish from a couple of the following species. The male I have described is sure, as I have taken it in copula with the female, and it is the Phorid I have taken most often in copula. I am not sure that my male is identical with Wood's, as in his species 1 is equal to $2 + 3$ as he says in the description, or even longer, as in his specimens I have seen. Wood's remarks about the unusually blunt or truncated appearance of abdomen in the male I am not able to understand, my males, as well as the males from Wood show the end of abdomen and the hypopygium of rather common shape.

A. tumida is very common in Denmark in suitable localities which are shaded and humid places in woods where it occurs on leaves of bushes and in low herbage; I have sometimes seen it swarming

round the ends of branches, both sexes present; my dates are $24/5$ — $10/11$, but it is by far most common in autumn. I have taken it in copula between $4/7$ and $18/10$, and as said it is often seen in copula. My material has been collected in the later years, in 1913 to 1921, but in Stæger's collection there is an old pair, placed under *pulicaria*.

Geographical distribution: — Besides in Denmark occurring and common in England and, according to specimens sent from Pater Schmitz, in Holland; no doubt it will prove to have a much wider range.

111. *A. subtumida* Wood.

1909. Wood, Entom. Month. Mag. 2, XX, 195, 244 (*Phora*). — 1914. Brues, Bull. Wisc. Nat. Hist. Soc. XII, 134.

Male. Frons broader than high, greyish black, dull; inner bristle of lower row in about the same height as the outer, and nearer to it than to the upper supraantennal; supraantennal bristles unequal, the lower much smaller than the upper, but varying and reaching to about half the size of the upper; the upper supraantennals nearer together than the inner bristles of middle row and the lower more approximate. Antennæ of ordinary size, black, arista distinctly pubescent. Palpi yellow or dark yellowish, of ordinary size, with somewhat long bristles. Thorax black, almost not shining, with brownish pubescence; sometimes thorax may be a little paler, brownish. Mesopleura bare. Abdomen black, slightly greyish, dull, the short hairs a little more visible at the hind margins of the segments, longest on sixth segment, but not long. Hypopygium small, greyish or brownish grey, with quite small hairs on the sides; below there is a whitish yellow, flap-like ventral plate; anal tube quite short, but high, yellowish or dusky yellow. Legs yellowish, the posterior or the hind legs may be slightly brownish; the hairs below the basal half of hind femora only slightly longish; bristles on hind tibiæ numerous and hair-like. Wings somewhat yellowish, veins brown; costa reaching to the middle or beyond, 1 about equal to 2 + 3 or shorter; costal cilia full long; fork somewhat longish; fourth vein somewhat curved in its basal part, for the rest nearly straight, it curves downwards behind the base of the fork. Halteres yellow.

Female. Similar to the male; wings generally more yellowish and the costa thickened; the thickening begins at the humeral cross-vein and stretches to the end, but is strongest on the middle part;

abdomen has the venter yellowish and the tergal plates are often distinctly separated, with yellowish insciures between them.

Length. From fully 1 towards 2 mm.

Remarks: This species is in the female easily distinguished, but the male I cannot with certainty distinguish from *pulicaria*; I have seen specimens of both sexes from Wood, and I think my males agree with those of Wood; the characters given by Wood as distinctive from *pulicaria*, smaller size and smaller supraantennals, especially the lower ones, are in no way sufficient, and specimens of *pulicaria*, sent from Mr. Collin, are in these respects similar to *subtumida* from Wood.

A. subtumida is common in Denmark, but less common, however, than *tumida*; Ermelund, Dyrehaven, Ørholm (the author), Holte (Th. Mortensen), Geel Skov and in Jutland at Hejls south of Kolding and Ry (the author); my dates are $^{11}/_4$ — $^{29}/_{10}$ in 1917 to 1921, but besides there are two specimens, females, in Stæger's collection, placed under *pulicaria*. The species is most common in autumn.

Geographical distribution: — Besides in Denmark occurring in England and, according to specimens from Pater Schmitz, in Holland, and it occurs also in Prussia (Schmitz, Tijdschr. v. Entom. LXIV, 1921, 3).

112. *A. brunneipennis* Costa.

1857. Costa, Il giamb. Vico, Napoli, II, 450 (*Megaselia*). — 1909. Wood, Ent. Month. Mag. 2, XX, 241 (*Phora*). — 1914. Brues, Bull. Wisc. Nat. Hist. Soc. XII, 114. — *Trineura costata* Zett. 1860. Dipt. Scand. XIV, 6474, 11—12. — *Phora costalis* 1901. Beck. Abhandl. zool. bot. Gesell. Wien, I, 51, 41, Taf. III, Fig. 48 (♂ nec ♀). — *A. costalis* 1910. Kertész, Cat. Dipt. VII, 405, p. p.

Male. Unknown (see under *rubicunda*).

Female. Frons broader than high, dark brown or greyish brown; bristles strong; inner bristle of lower row in the same height as the outer and nearer to it than to the upper supraantennal; supraantennal bristles placed somewhat high on the frons, unequal, the lower half the size of the upper or fully; the upper supraantennals rather approximate, nearer together than the inner bristles of middle row, the lower direct below the upper, not more approximate. Antennæ small, brownish, arista distinctly pubescent. Palpi yellow, not broad, but otherwise of ordinary size and armature. Thorax brownish red, nearly dull, with brownish pubescence. Pleura yellowish, posteriorly

more brownish. Mesopleura bare. Abdomen yellowish, with sparse, short hairs. Legs yellow; bristles on hind tibiæ numerous and hair-like. Wings yellow, veins brownish yellow or pale brown; costa reaching beyond the middle, it is suddenly thickened a little after the humeral cross-vein, the thickening becomes soon very broad, broader than the subcostal cell, it then decreases evenly outwards, but reaches the end of costa; 1 about equal to $2 + 3$; costal cilia long; fourth

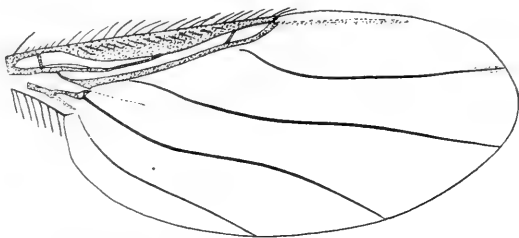


Fig. 110. Wing of *A. brunneipennis* ♀.

vein curves downwards after the base of the fork, it is somewhat curved in its first part, for the rest very slightly curved. Halteres yellow.

Length. About 2,5 mm.

A. brunneipennis is very rare in Denmark, only one specimen has been taken many years ago in Ruderhegn by F. Jacobsen; it stood in our old collection under *lutea*.

Geographical distribution: — Europe down into Italy, towards the north to southern Sweden.

Remarks: As shown by Wood this species, which is known only in the female sex, was by Becker considered to be the male of *costalis* v. Ros. There is an error in Brues's catalogue, as he cites the female of *costalis* Beck. under *brunneipennis* and the male under *costalis*, while it should be the reverse.

113. *A. discreta* Wood.

1909. Wood. Ent. Month. Mag. 2, XX, 193, 242 (*Phora*). — 1914. Brues, Bull. Wisc. Nat. Hist. Soc. XII, 116. — *Phora denotata* Wood, p. p. ♂, 1909. l. c. 192 et 1912. l. c. 2, XXIII, 170.

Male. Frons somewhat broader than high, greyish black, dull; inner bristle of lower row slightly below the outer and nearer to it than to the upper supraantennal; supraantennal bristles unequal,

the lower small or minute; the upper supraantennals nearly as distant as the inner bristles of middle row, the lower a little more approximate. Antennæ small, brown, arista distinctly pubescent. Palpi smallish, yellow or a little dusky, with ordinary bristles. Thorax blackish brown to reddish brown, very slightly shining, with brownish pubescence. Pleura more or less brownish. Mesopleura bare. Abdomen black, dull, with short hairs visible almost only at the hind margins of the segments. Hypopygium large, somewhat knob-like, longer than the sixth segment; it is dark greyish brown; near each lower corner there are two rather strong bristles and behind there are small hairs; the ventral plate is yellow, somewhat broad, but short; anal tube quite short, yellow or yellowish. Legs yellowish, the hind legs may be slightly brownish, especially the apical part of hind femora; the hairs below the basal part of hind femora not long; bristles on hind tibiæ numerous and hair-like. Wings somewhat brownish tinged, veins brown and somewhat strong; costa shorter than to the middle of the wing, but sometimes nearly reaching the middle; 1 equal to 2 + 3 or longer; costal cilia long, but somewhat moderately; angle at fork somewhat large; fourth vein a little curved in the basal part, for the rest slightly and evenly curved. Halteres blackish to brown.

Female. Similar to the male; antennæ brown to reddish; halteres paler than in the male, brownish to dusky yellow, but never pure yellow; venter yellowish or brownish to dark brown.

Length 1—1,5 mm.

The female of this species was hitherto not known; I have not taken the species in copula, but I have no doubt that the female belongs here, first it agrees in all respects with the male, and next I have often taken it in company with the male. On account of the somewhat pale halteres it might perhaps be confused with *pulicaria*, but it will be known by the shorter costa and shorter costal cilia, the relatively longer first costal division, the smaller curve of fourth vein and generally by the small lower supraantennals and the reddish antennæ; it is also generally a smaller species.

A. discreta is not rare in Denmark; Dyrehaven, Geel Skov (the author), Holte (Th. Mortensen), on Bogø south of Sealand, on Langeland at Lohals and in Jutland at Hejls and Skamling south of Kolding, Jelling and Ry (the author); my dates are $\frac{5}{6}$ — $\frac{29}{8}$ in 1917 to 1921. I have taken it with the net in low herbage in humid places in woods, it generally occurs rather low down, near the ground, and also running among the dead leaves on the ground.

Geographical distribution: — Besides from Denmark hitherto only known from England.

114. **A. setifera** Lundbk.

1920. Vidensk. Meddel. fra Dansk naturh. Foren. 71, 31, 36 (*setifer*).

Male. Frons considerably broader than high, greyish black, dull; inner bristle of lower row a little below the outer and about equally distant from it and from the upper supraantennal; supraantennal bristles unequal, the lower pair quite small; the upper supraantennals as distant as the inner bristles of middle row, the lower only slightly more approximate. Antennæ somewhat large, black, arista distinctly pubescent. Palpi well developed, a little above ordinary size, brownish; they have a long bristle at the end, the others seem to be weaker. Thorax black, slightly shining, with brownish pubescence. Mesopleura bare. Abdomen black, dull; it is long, slender and tapering; the short, sparse hairs slightly longer at the hind margins of the segments, longest on sixth segment. Hypopygium large, longer than sixth segment, somewhat cylindrical; it is dark brown, somewhat greyish, with numerous short hairs on the hinder part downwards on the sides, but no bristles; ventral plate large, brownish, rounded at the end; anal tube short, brownish. Legs yellowish brown, hind femora slightly darker above and towards apex; front tibiæ with a postero-dorsal row of rather long, but fine, erect bristles; hind femora with somewhat dense, longish hairs below the basal half; bristles on hind tibiæ numerous, small and hair-like. Wings somewhat brownish tinged; veins strong, dark brown; costa reaching well beyond the middle, costal divisions about as 11—10—5, thus 1 and 2 nearly equal and each double 3; costal cilia long; fork longish, angle somewhat large; fourth vein considerably curved in its basal part. Halteres black.

Female. Unknown.

Length 1,7 mm.

This species is evidently related to *discreta* and especially to *nudiventris*, but it is at once distinguished by the row of bristles on front tibiæ and the hypopygium.

A. setifera is very rare, only one specimen has been taken, Holte ²⁵/₆ 1917 (Th. Mortensen).

Geographical distribution: — Hitherto only known from Denmark.

115. **A. fusca** Wood.

1909. Wood, Ent. Month. Mag. 2, XX, 193, 242 (*Phora*). — 1914. Brues, Bull. Wisc. Nat. Hist. Soc. XII, 120.

Male. Frons considerably broader than high, black, slightly greyish, dull; bristles strong, inner bristle of lower row slightly or almost not below the outer and nearer to it than to the upper supra-antennal; supraantennal bristles nearly equal or the lower a little weaker; the upper supraantennals nearer together than the inner bristles of middle row, the lower very slightly more approximate. Antennæ black of ordinary size or a little above, arista distinctly pubescent. Palpi brownish yellow to blackish, of ordinary size and armature. Thorax black, a little shining, with blackish brown pubescence. Mesopleura bare. Abdomen somewhat robust, black, a little greyish, dull; the short hairs rather distinct and longer at the sides, on sixth segment they are longish and at the hind margin elongated. Hypopygium not small, shorter but higher than the sixth segment and when fully exposed somewhat globular; it is greyish black and has numerous short hairs on the sides; below there is a somewhat large, rounded, yellow or dusky yellow ventral plate, not quite reaching to the end of the hypopygium; anal tube short, but high, dusky yellow or brownish. Legs brownish to brownish black, the front legs slightly paler; hind femora with a row of not long, but distinct and somewhat strong hairs below the basal half, they are densest at the base; also the anteroventral hairs on the apical part somewhat strong; bristles on hind tibiæ well visible, but hair-like and numerous. Wings brownish, veins brown or pale brown and strong; costa reaching to the middle, 1 about double 2 and longer than $2 + 3$; costal cilia long; angle at fork not large; fourth vein well curved in its basal part, for the rest slightly and evenly curved. Halteres black or blackish.

Female. Similar to the male; the lower supraantennals smaller, generally half as large as the upper; the hairs below hind femora less pronounced, and the angle at fork generally more acute.

Length 1,5 to nearly 2,5 mm.

As *fusca* I have determined a species which is somewhat robust, with equal or nearly equal supraantennals in the male, and with the lower supraantennals about half the size of the upper in the female, with costal division 1 about double 2, and with the fork more or less acute, especially in the female; the not small hypopygium does not agree with Wood's description, and he does not mention long hairs

at the hind margin of sixth segment. I have seen some English specimens from Mr. Collin, but only one of them, a female type-specimen from Wood, agrees with my specimens, the others I would consider as *angusta* or *tumida*. — Only few of my females show the costal divisions as described above, a number have 1 relatively shorter, and also often the fork less acute, and as regards these specimens I am not sure as mentioned below under *angusta*.

A. fusca, as I understand it here, is not rare in Denmark; Ermelund, Holte, Geel Skov, Suserup Skov at Sorø, on Langeland at Lohals, on Falster at Marienlyst, and in Jutland at Ry (Th. Mortensen, the author); the dates are $^{28}/_5$ — $^{27}/_{10}$ in 1917 to 1921.

Geographical distribution: — Besides from Denmark known from England and, according to a specimen from Pater Schmitz, from Holland.

116. *A. angusta* Wood.

1909. Wood. Ent. Month. Mag. 2, XX, 193, 243 (*Phora*). — 1914. Brues, Bull. Wisc. Nat. Hist. Soc. XII, 112.

Male. Frons considerably broader than high, black, a little greyish, dull; inner bristle of lower row about in the same height as the outer and a little nearer to it than to the upper supraantennal; supraantennal bristles unequal, the lower half as large as the upper or thereabout; the upper suparantennals a little less distant than the inner bristles of middle row, the lower almost not more approximate. Antennæ black, a little above ordinary size, in profile reaching to or about to the middle of the eye; arista somewhat long, distinctly pubescent, but less than in *tumida*. Palpi dusky yellow to blackish, of ordinary size and armature. Thorax black, slightly shining, with brown pubescence. Mesopleura bare. Abdomen black or slightly greyish, dull; the short hairs a little longer at the hind margins of the segments and slightly elongated at the hind margin of sixth segment. Hypopygium small, higher than long, blackish or blackish brown, with short and small hairs on the sides; below there is a somewhat large, flap-like, dusky yellow or darker ventral plate, reaching to the end of the hypopygium; anal tube short, but high, brownish. Legs brown or dark brown to blackish, front and middle tibiæ and tarsi paler; the hairs below the basal half of hind femora longish; bristles on hind tibiæ hair-like and numerous. Wings slightly brownish, veins brown or pale brown; costa reaching to the middle or fully,

costal divisions about as 13—8—4 and 1 thus longer than 2 + 3; costal cilia long; angle at fork not small; fourth vein curved in its first part, for the rest very slightly curved. Halteres brown to black.

Female. Similar to the male; the antennæ, though not small, scarcely so large; the lower supraantennals smaller; the hairs below hind femora about as in the male.

Length 1.5 to nearly 2 mm.

The above description is mainly drawn from a copulated pair (Geel Skov ²³/₈ 1918); I have compared it with typical specimens from Wood and I find it agreeing, but the male of the species will be very difficult to distinguish safely from *tumida*, for, as already remarked, I cannot confirm the statement about the hypopygium given by Wood for *tumida*; as far as I can see the hypopygium is of the same shape in the two species. Characters which should serve to distinguish it are the larger antennæ, the not fully as long costal cilia, and the first costal division being longer than 2 + 3, but this latter character loses a good deal of its value as the costal divisions may vary somewhat. From typical *fusca* the male *angusta* may be known by the costal divisions, the hypopygium, and the generally smaller size, whereas, on the other hand, the *angusta* female will be difficult to distinguish from the *fusca* female, for, as said above under *fusca*, females, probably belonging to this species, occur which have the costal divisions approaching to what is found in *angusta*. From all this it is seen, that I cannot at present distinguish with certainty the males of *tumida* and *angusta*, nor the females of *fusca* and *angusta*. I possess a very large material of *angusta*, and I find it somewhat varying, not only, as already mentioned by Wood, in the relative size of the pairs of supraantennal bristles, but also as regards the costal divisions and the size of the fork, and perhaps more than one species is hidden in my material, but the described copulated pair represents, I think, Wood's *angusta*. The size of the species, when I take my whole material, is 1—2 mm.

A. angusta is very common in Denmark all over the country in woods in humid places, running on leaves of bushes and in low herbage from early spring to late autumn; I have also taken it on fresh stubs of *Acer*. The dates are ⁴/₄—²⁷/₁₀ in 1917 to 1921.

Geographical distribution: — Hitherto known from Denmark, England and, according to specimens sent from Pater Schmitz, from Holland; it also occurs in Prussia (Schmitz, Tijdschr. v. Entom. LXIV, 1921, 3); in the place cited Schmitz terms it a somewhat

problematic species, which shows that this author also has been troubled by the species.

117. *A. analis* Lundbk.

1920. Lundbk. Vidensk. Meddel. fra Dansk naturh. Foren. 71, 30, 35.

Male. Frons considerably broader than high, greyish black, dull; bristles strong, inner bristle of lower row below the outer and much nearer to it than to the upper supraantennal; supraantennal bristles nearly equal, the upper a little more approximate than the inner bristle of middle row and the lower slightly more approximate. Antennæ not small, brown, arista distinctly pubescent. Palpi yellow, of ordinary size and armature. Thorax black, very slightly shining, with an indication of reddish anteriorly and especially on the pleura; it has brown pubescence. Mesopleura bare. Abdomen somewhat robust, black, dull or dullish, with more or less distinct, narrow paler hind margins to the segments; the very short hairs a little more visible at the hind margins of the segments and a little longer at the hind margin of sixth segment. Hypopygium of medium size, somewhat knob-like, reddish or brownish with a greyish tint; it has short hairs on the hind part and the sides; ventral plate small and short, yellowish; anal tube quite short, but stout, yellowish. Legs brown or yellowish brown, front legs not distinctly paler; hind femora with somewhat sparse, longish hairs below the basal half; bristles on hind tibiæ small and hair-like. Wings yellowish or light brownish tinged, thick veins yellow, thin veins darker, more brown; costa not reaching to the middle, 0,45 of the wing-length; costal divisions about as 11—6—4; fork longish and angle somewhat acute; costal cilia long; fourth vein evenly curved, a little more at each end. Halteres blackish or brownish.

Female. Quite similar; antennæ a little smaller; hairs below hind femora about as in the male.

Length. About 1,5 mm.

This species is related to *fusca*, but the short costa, acute fork and paler legs easily distinguish it.

A. analis is rare in Denmark, seven specimens, six males and a female, have been taken; Holte $^{16}/_8$ 1917, $^{20}/_7$ 1918 and $^{22}/_5$ and $^{11}/_7$ 1919, at Hillerød $^{21}/_6$ 1919 (Th. Mortensen) and the female at Hejls south of Kolding $^{25}/_7$ 1919 (the author).

Geographical distribution: — Hitherto only known from Denmark.

118. *A. rufipes* Meig.

1804. Meig. Klass. eur. zweifl. Ins. I, 313, 3, Taf. XV, Fig. 23 (*Trineura*). — 1805. Fabr. Syst. Antl. 336, 1 (*Trineura*). — 1830. Meig. Syst. Besch. VI, 216, 15 (*Phora*). — 1838. Zett. Ins. Lapp. 795, 3 (*Trineura*). — 1848. Zett. Dipt. Scand. VII, 2857, 6 (*Trineura*). — 1864. Schin. F. A. II, 340 (*Phora*). — 1901. Beck. Abhandl. zool. bot. Gesell. Wien, I, 59, 52 (*Phora*). — 1909. Wood, Ent. Month. Mag. 2, XX, 194, 243 (*Phora*). — 1910. Kertész, Cat. Dipt. VII, 413. — 1914. Brues, Bull. Wisc. Nat. Hist. Soc. XII, 130. — *Trineura annulata* Meig. 1804. Klass. eur. zweifl. Ins. I, 314, 4 et 1830. Syst. Besch. VI, 216, 14 (*Phora*). — *Phora pallipes* Latr. 1809. Hist. Nat. Crust. Ins. XIV, 395, 2, tab. CX, fig. 8. — *Trineura vulgaris* Fall. 1823. Dipt. Suec. Phytom. 6, 5, p. p.

Male. Frons considerably broader than high, nearly twice as broad, black, slightly greyish, dull; bristles strong, inner bristle of lower row in, or nearly in the same height as the outer and a little nearer to it than to the upper supraantennal; supraantennal bristles equal, the upper more approximate than the inner bristles of middle row, the lower a little more approximate and rather close to the upper. Antennæ of ordinary size, black, arista long, distinctly pubescent. Palpi yellow, of ordinary size, with well developed bristles. Thorax black, slightly shining, sometimes with a slight brownish tint; it has a short, brownish or brownish black pubescence. Mesopleura bare. Abdomen somewhat long and relatively slender, greyish black, dull; the short hairs are well visible and very slightly longer at the hind margins of the segments; the sides of abdomen are clothed with curious, long hairs or bristles which are blunt-ended or with the point rather stubby; they are wanting along the middle of dorsum and short at the sides of first segment. The hypopygium is small, higher than long and prolonged downwards or backwards into a short projection; when fully exposed, it is seen to have on the sides below a number of hairs similar to those on abdomen, but smaller, and besides there are quite small hairs on the apical projections; but generally the hypopygium is withdrawn so that the hairs are not seen; below there is a medium-sized, somewhat square-shaped ventral plate with the end rounded; anal tube of medium size, yellowish or dusky. Legs yellowish brown to dark reddish brown, hind femora sometimes a little darkened at tip; the hairs below the basal half of hind femora a little longish; hind tibial bristles distinct, but small and hair-like. Wings yellowish or brownish yellow tinged, sometimes more clear; veins brown or dark brown and strong; costa reaching to the middle or being shorter (down to 0,46), 1 about double 2 and distinctly longer than 2 + 3; costal cilia very long; angle at fork not large; fourth

vein issuing behind the base of the fork, distinctly though not much curved in its first part, for the rest almost straight. Halteres yellow.

Female. Similar, but abdomen without long hairs; hairs below hind femora about in the as the male or a little shorter; angle at fork generally more acute.

Length 2—3 mm; this is the common size, but much smaller specimens, especially males, may be met with, down to 1,5 mm.

Wood says that the characteristic hairs on abdomen are absent from the dorsum except on the hind margins of the segments, but, according to my examination, there are no long hairs on the dorsum, also not at the hind margins.

A. rufipes is very common in Denmark, as it is elsewhere, and it is especially common indoors, but also taken in woods; it is not rarely seen in copula; it occurs almost during the whole year, except just in midwinter. It is known as a general feeder in the larval stage, which is probably the reason of its frequent occurrence in our houses. I possess it bred from wasps nests, taken in September, the imagines emerging about $\frac{20}{10}$, from bee-hives in May, and from sick and dead larvæ of *Stilpnotia salicis* taken in July, the imagines emerging on $\frac{5}{8}$, further from fungi and from decaying seed of lupines.

Geographical distribution: — Widely distributed and common, occurring in all Europe and on Madeira and the Canaries; towards the north to northern Scandinavia; also occurring in North America and also here going far towards the north into Alasca. Zetterstedt records it from the mountains at a height of 3400 feet. — *Phora heracleellae* Bouché, which Becker considered identical with his *sordida* (= *Woodi* Lundbk.), is, as mentioned above under *Woodi*, more probably the present species.

119. *A. hirtiventris* Wood.

1909. Wood, Ent. Month. Mag. 2, XX, 194, 243, fig. 6 (*Phora*). — 1914. Brues, Bull. Wisc. Nat. Hist. Soc. XII, 121.

Male. Frons broader than high, black, slightly greyish, dull; inner bristle of lower row a little below the outer and about in the middle between it and the upper supraantennal; supraantennal bristles unequal, the lower quite small; the upper supraantennals as distant as the inner bristles of middle row, the lower more approximate. Antennæ rather large, blackish brown or blackish, arista short-pubescent. Palpi yellow, of ordinary size or scarcely, bristles somewhat

short. Thorax black, slightly shining, with brownish pubescence, about the humeri it may be a little reddish. Mesopleura bare. Abdomen somewhat slender as in *rufipes*, black, a little greyish, dull; the sixth segment is rather elongated; the short hairs a little longer at the hind margins of the segments; abdomen is clothed as in *rufipes* with long hairs on the sides, but the hairs are relatively longer and less dense; on first and second segments there are no long hairs. Hypopygium medium-sized, of common shape; it has on the sides an about vertical row of hairs similar to those on abdomen; anal tube short, but somewhat stout, yellow or yellowish. Legs yellowish or light brownish yellow, the hind legs the darker; the hairs below the basal half of hind femora long; hind tibiæ of a curious shape, the dorsal hair-seam has, a little above the lower third, a sudden and strong deflection towards the anterior, and an elongated triangular area behind it is flattened, so that it looks as if the dorsal edge here was cut off; on the upper part of the tibiæ there are four or five fine, hair-like bristles; the apical spur on middle tibiæ rather long, almost as long as metatarsus. Wings slightly yellowish tinged, veins yellow; costa not reaching to the middle, 1 about double 2 and longer than $2 + 3$; costal cilia long, but not specially long; fourth vein evenly curved and only slightly more in its first part. Halteres yellow.

Female. Unknown.

Length 1,3 to fully 1,5 mm.

Of this interesting species only one specimen, Wood's type, was hitherto known; it does not seem to be extraordinarily rare in Denmark, Dr. Mortensen has taken no less than 16 specimens in Holte from $\frac{1}{7}$ to $\frac{8}{8}$ in 1917 to 1920; they were taken on windows, but the species is no indoor form, it came, as many other species, casually on the windows in his villa at the wood. Further I have myself taken a specimen at Hejls south of Kolding $\frac{19}{7}$ 1919 and one at Ry $\frac{16}{7}$ 1918; both the latter specimens were taken with the net in low herbage in woods.

Geographical distribution: — Besides from Denmark only known from England.

120. *A. albidohalteris* Felt.

1896. Felt, 12th Rep. State Ent. New York, 228 (*Phora*). — 1903. Brues, Trans. Amer. Ent. Soc. XXIX, 368. — 1910. Kertész, Cat. Dipt. VII, 404. — 1912. Malloch, Proceed. U. S. Nat. Mus. 43, 496. — 1914. Brues, Bull. Wisc. Nat. Hist. Soc. XII, 111. — *Phora derasa* Wood, 1909. Ent. Month. Mag. 2, XX, 194, 243. — *Aphiochaeta derasa* 1914. Wood, l. c. 2, XXV, 154.

Male. Frons considerably broader than high, greyish black, dullish; inner bristle of lower row a little below the outer and about in the middle between it and the upper supraantennal, or slightly nearer to the latter; supraantennal bristles not large, the upper about as distant as the inner bristles of middle row, the lower quite small, a little more approximate. Antennæ somewhat large, blackish brown, arista short-pubescent. Palpi yellow, of ordinary size, the bristles not long. Thorax black, slightly shining, with brownish pubescence. Mesopleura bare. Abdomen black, somewhat greyish, dull; the short hairs distinctly visible, very slightly longer at the hind margins of the segments; the hairs at the sides longer behind, especially long on the sixth segment. Hypopygium somewhat small or of medium size, with a number of long bristles on each side stretching from the lower corner upwards, and above with some smaller bristles behind; ventral plate small and short; anal tube of medium size, yellow or dusky. Legs from yellow to lighter or darker brown, sometimes rather dark and often the posterior femora darkened especially along the upper and lower margin; hind femora with long, somewhat sparse hairs below the basal half; hind tibiæ of the same curious shape as in *hirtiventris*, the deflection of the hair-seam generally still more sudden and the flattened area generally only occupying about the lower third, but sometimes stretching higher up, and upon the whole somewhat varying in shape; above the area there are numerous quite small and hair-like bristles. Wings from clear to distinctly yellowish; veins pale to dark brown; costa not reaching to the middle, sometimes rather short, down to 0,42; 1 nearly three times as long as 2; costal cilia long; fourth vein a little curved at the origin, for the rest nearly straight, only a little curved again at the apex. Halteres whitish or pale yellow.

Female. Similar; antennæ of ordinary size; costa longer, reaching to or near to the middle; the hairs below hind femora about as in the male; hind tibiæ simple, the dorsal hair-seam, however, somewhat strongly deflected in about the lower third.

Length 1,3—1,8 mm.

The male of this species is known at once, but the female bears much resemblance especially to *pulicaria*; it should be distinguished by the minute lower supraantennals, the much longer first costal division, the long hairs below hind femora and also by the shape of hind tibiæ. As mentioned the shape of the flat area on the male hind tibiæ varies somewhat, but this is, I think, certainly of no specific

consequence, though in America there is, besides the present species, still another with similar hind tibiæ, *A. Smithii* Brues, but this species has the costa reaching beyond the middle.

A. albidohalteris is not uncommon in Denmark; Copenhagen, Holte, Hillerød, Suserup Skov at Sorø, Bogø south of Sealand, on Falster at Marienlyst, on Ærø and Taasinge and in Jutland at Hejls south of Kolding, Ry and Løkken and finally on Læsø (Th. Mortensen, the author); the dates are $^{12}/_6$ — $^9/_10$ in 1917 to 1921. The species has not been bred here, but in America it has been bred from various fungi.

Geographical distribution: — In Europe at present only known from Denmark and England, but also occurring in North America.

121. *A. rubescens* Wood.

1912. Wood, Ent. Month. Mag. 2, XXIII, 170, fig. 4. — 1914. Brues, Bull. Wisc. Nat. Hist. Soc. XII, 130.

Male. Frons broader than high, greyish black, dull, it may be a little reddish just at the lower corners; inner bristle of lower row in or nearly in the same height as the outer, and nearer to it than to the upper supraantennal; supraantennal bristles unequal, the lower scarcely half the size of the upper; the upper supraantennals approximate, fully as near to each other as the inner bristles of middle row, the lower about equally as distant. Antennæ not large, red, arista distinctly pubescent. Palpi yellow, well developed, with rather long bristles. Thorax reddish, sometimes blackish except humeri, it is slightly shining, with brownish pubescence. Pleura reddish. Mesopleura greyish, bare. Abdomen black, dull, the very short hairs a little more visible at the hind margins of the segments and slightly elongated at the hind margin of sixth segment. Hypopygium somewhat large, shorter than the sixth segment, but of the same breadth; it is reddish or greyish, the lower hinder corners a little produced; along the lower lateral margin there are on each side about six strong bristles and upwards some smaller hairs; ventral plate broad, yellow, not reaching to the end of the hypopygium; anal tube of medium size, yellow, the apical hairs quite small. Legs yellow, hind femora more or less darkened at the tip, the hairs below the basal part distinct, but only longish; bristles on hind tibiæ numerous and hair-like. Wings yellowish or yellowish brown, veins brown; costa reaching to the middle, 1 about equal to 2 + 3 or slightly longer; costal cilia

moderately long; angle at fork large; fourth vein evenly curved. Halteres yellow.

Female. Unknown.

Length 1,6—1,8 mm.

Wood includes this species in the group with dark halteres, describing them as yellowish brown; all my specimens have pure yellow halteres.

A. rubescens is rare in Denmark; Ermelund (the author), Holte, Hillerød (Th. Mortensen), in all 9 specimens; the dates are $24/5$ — $21/8$ in 1917 to 1920.

Geographical distribution: — Hitherto known only from Denmark and England.

122. *A. rubicunda* Lundbk.

1920. Lundbk. Vidensk. Meddel. fra Dansk naturh. Foren. 71, 32, 37.

Male. Frons somewhat broader than high, black, slightly greyish; bristles very strong, inner bristle of lower row slightly below the outer and nearer to it than to the upper supraantennal; supraantennal bristles unequal, the lower pair small, not half as large as the upper; the upper supraantennals very close-standing, much more approximate than the inner bristles of middle row, the lower still a little more approximate. Antennæ somewhat small, black, arista somewhat long, distinctly pubescent. Palpi yellow, dusky towards the base; they are somewhat narrow, with ordinary bristles. Thorax reddish or brownish red, darkest above, palest on the humeri; it is almost dull, with blackish brown pubescence. Pleura reddish with some darkenings. Mesopleura bare. Abdomen robust, yellowish red, dull, first segment like the postnotum greyish; the short hairs are distinct and slightly longer at the hind margins of the segments. Hypopygium quite small and withdrawn so that only the lower part is seen, which is blackish grey and has fine hairs; ventral plate yellow, rounded; anal tube small, yellow. Legs yellow, tarsi a little more brownish; hind femora rather broad, the hairs below the basal part distinct, but not long; bristles on hind tibiæ very small and numerous. Wings brown, veins brownish yellow, strong; costa thick, in reality a little swollen; it reaches beyond the middle, costal divisions about as 18—11—6, thus 1 about equal to 2 + 3 and 2 about double 3; fork a little longish; costal cilia moderately long; fourth vein a little S-like at the base and curved in its first part, for the rest quite straight. Halteres pale yellow.

Female. Unknown (see under remarks).

This interesting species is very rare, only one specimen has been taken, Holte $19/8$ 1917 (Th. Mortensen).

Geographical distribution: — Hitherto only known from Denmark (see under remarks).

Remarks: Since I first described this species I have been acquainted with *A. brunneipennis* Costa and I think it probable that the present species is the hitherto unknown male of the said species; they agree rather well, and I think the thickened costa in *rubicunda* is strongly in favour of this view. I keep at present my species, as I possess only one male and one rather bad female, and therefore think it well to await new material, but I feel, however, rather sure that we have here the two sexes of *brunneipennis*.

123. *A. nudiventris* Wood.

1909. Wood, Ent. Month. Mag. 2, XX, 195, 244 (*Phora*). — 1914. Brues, Bull. Wisc. Nat. Hist. Soc. XII, 125.

Male. Frons broader than high, greyish black, dull; inner bristle of lower row in the same height as the outer and nearer to it than to the upper supraantennal; supraantennal bristles not large, unequal, the lower rather small; the upper supraantennals approximate, not fully as distant as the inner bristles of middle row, the lower a little more approximate. Antennæ not large, brown or blackish brown, arista long, distinctly pubescent. Palpi yellow, of ordinary size, with well developed bristles. Thorax black or with a slight reddish hue, slightly shining, with brownish pubescence. Pleura more or less reddish. Mesopleura bare. Abdomen somewhat long and slender, black, somewhat greyish, dull; the short hairs are distinct, and they are a little longer at the hind margins of the segments; on the last segments the hairs are rather well developed at the sides. Hypopygium large, as long or fully as long as the sixth segment and broader than it, cylindrical; it is grey or reddish grey, the lower hinder corners slightly produced; in the middle of each side there is a group of bristles, consisting of three bristles below and upwards some smaller bristles or coarse hairs; ventral plate yellow, not large (the triangular point mentioned by Wood I could not see); anal tube small, yellow. Legs yellow, hind femora a little darkened at apex; hairs below hind femora not long; hind tibiæ somewhat thickened towards the end, though not very conspicuously, the bristles numerous and hair-like, but the

short hairs on the anterodorsal side more conspicuous than usual so that this side is densely clothed with short, somewhat erect hairs. Wings yellowish or yellowish brown, veins brown or pale brown; costa reaching to the middle or about, 1 about equal to $2 + 3$; costal cilia long, but not specially long; angle at fork large and approaching a right angle; fourth vein evenly curved in the whole length. Halteres yellow.

Female. Wood was not sure as to the female; I possess a female, which may possibly belong here; it is quite similar to the male in all respects, but the angle at fork is considerably more acute.

Length 1,5 mm or fully.

A. nudiventris is a rare species, I have taken only five males; Lyngby Mose $^{11}/_6$ 1918, Geel Skov $^{23}/_8$ and $^{29}/_8$ 1918 and in Jutland at Jelling $^{23}/_7$ and $^{26}/_7$ 1921; the questionable female I took in Ermelund $^{20}/_6$ 1919.

Geographical distribution: — Hitherto only known from Denmark and England.

124. *A. similata* Lundbk.

1921. Lundbk. Vidensk. Meddel. fra Dansk naturh. Foren. 72, 140, 13.

Male. Frons broader than high, black, a little greyish, dull; inner bristle of lower row slightly below the outer and nearer to it than to the upper supraantennal; supraantennal bristles unequal, the lower about half the size of the upper or somewhat more; the upper supraantennals approximate, nearer together than the inner bristles of middle row, the lower only slightly more approximate. Antennæ somewhat small, brownish, arista long, distinctly pubescent. Palpi yellow, of ordinary size, but not broad, the bristles rather long. Thorax black, very slightly shining, with blackish brown pubescence. Pleura more or less brownish, anteriorly stretching up on the humeri. Mesopleura bare. Abdomen black, dull; the short hairs a little longer at the hind margins of the segments and at the sides, especially at the sides on the hind margin of sixth segment. Hypopygium large, as long and broad as the sixth segment, cylindrical; on the sides and at the hind margin it is clothed with longish hairs, longest below, but there are no bristles; below there is a large and square, yellowish ventral plate with the end rounded and stretching about to the end of hypopygium; anal tube of medium size, yellow, with quite small apical hairs. Legs yellow, hind femora somewhat darkened towards

the tip, with the hairs below the basal half somewhat long; bristles on hind tibiæ distinct, but fine and hair-like. Wings brown and veins brown or dark brown and rather strong, the seventh vein a little weaker; costa reaching beyond the middle, 1 about equal to $2 + 3$; costal cilia long; angle at fork not acute; fourth vein somewhat curved in its first part, for the rest a little evenly curved. Halteres yellow.

Female. Unknown (see under *breviterga*).

Length 1,6 to nearly 2 mm.

I think it possible that the present species is the male of *breviterga* (see below under this species).

A. similata seems to be rare in Denmark; Ermelund ²⁹/₆ 1919 and ¹⁰/₆ 1920 (the author), Geel Skov ²⁴/₆ 1919 (not 1918 as erroneously given in my first description) (Th. Mortensen) and in Jutland in Egense Skov at the east end of Limfjorden ¹¹/₇ 1921 (the author).

Geographical distribution: — Hitherto only known from Denmark.

125. *A. pulicaria* Fall.

1823. Fall. Dipt. Succ. Phytom. 7, 6 (*Trineura*). — 1838. Zett. Ins. Lapp. 795, 4 (*Trineura*). — 1848. Zett. Dipt. Scand. VII, 2859, 7 (*Trineura*). — 1864. Schin. F. A. II, 341 (*Phora*). — 1901. Beck. Abhandl. zool. bot. Gesell. Wien, I, 62, 55 (*Phora*)? — 1909. Wood, Ent. Month. Mag. 2, XX. 195. 243 (*Phora*). — 1910. Kertész, Cat. Dipt. VII, 411. — 1914. Brues, Bull. Wisc. Nat. Hist. Soc. XII, 127.

Male. Frons broader than high, black, very slightly greyish, dull or dullish; inner bristle of lower row in or about in the same height as the outer and nearer to it than to the upper supraantennal; supraantennal bristles varying from equal or almost equal to the lower being less than half the size of the upper; the upper supraantennals nearer together than the inner bristles of middle row, the lower almost not more approximate. Antennæ of ordinary size, black to brownish or reddish brown, arista distinctly pubescent. Palpi yellow or dusky yellow, of ordinary size, with well developed bristles. Thorax black, slightly shining, almost dull, with brownish pubescence; sometimes, but rarely, thorax is paler, brownish to reddish brown. Mesopleura bare. Abdomen is not slender and it is a little depressed; it is black, slightly greyish, dull; the very short hairs almost not longer at the hind margins of the segments, only at the hind margin of sixth segment a little longer. Hypopygium small, greyish or brownish grey,

with short hairs on the sides; below there is a large, yellow, rounded ventral plate; anal tube somewhat small, but stout, yellowish brown or brown. Legs yellow to brownish yellow or brown, hind femora more or less darkened at the tip, with the hairs below the basal half short or only a little longish; bristles on hind tibiæ numerous, small and hair-like. Wings yellowish to brownish, veins paler or darker brown; costa reaching to the middle or generally beyond, sometimes considerably (to 0,54), 1 about equal to 2 + 3, at most very slightly longer, and 2 about double 3; costal cilia long; fork sometimes somewhat long, but varying, the angle not small, but also varying, sometimes rather large; the fourth vein issues generally more or less behind the base of the fork, it is well curved in its first part, for the rest slightly curved. Halteres yellow.

Female. Similar to the male; the fork often more acute.

Length 1—2 mm.

According to my experience it is difficult to get a clear idea of this species; I possess a very large material, but the species seems to be very varying; it varies, as said, considerably as regards the relative size of the supraantennal bristles; further it varies in size, and the larger specimens generally have more strongly tinged wings with stronger veins, while the smaller and weaker specimens have clearer wings with finer veins; also the fork varies, as mentioned above, and to a high degree, being shorter or longer and with the angle varying, sometimes almost rectangular, but it is, as far as I can see, not possible, to separate off any species. As said under *subtumida* I cannot satisfactorily distinguish the males of that species and the present; *pulicaria* comes also near to my species *similata*, and the two species mainly differ only by the hypopygium; it might perhaps be possible that *similata* only represents a variety of *pulicaria*.

A. pulicaria, as I understand it, is very common in Denmark all over the country and in different localities; it has been taken from $11/4$ — $10/11$; I have taken it in copula on $19/4$, $5/6$, $5/9$ and $7/10$. I have specimens bred from a nest of *Vespa media* from Ruderhegn on $30/9$, from larvæ present in a dead *Carabus hortensis*, taken in Hareskov on $25/6$, they pupated on $26/6$ and the imagines emerged on $11/7$, and from decaying larvæ and pupæ of *Depressaria nervosa*, taken at Gentofte Sø on $10/8$, the imagines emerging on $16/8$ (Kryger).

Geographical distribution: — The species is widely distributed; all Europe, towards the north to northernmost Scandinavia; further down into Formosa, in North Africa, on Madeira and the Canaries;

it also occurs in North America and is likewise recorded from Australia. By this wide distribution it must be remembered that the species is no doubt often wrongly determined.

Remarks: According to Wood, l. c. 243, Collin has examined *pulicaria* in Fallen's collection and found it rather agreeing with the present species, while *pulicaria* of Meigen is probably *subpleuralis* Wood, as said under that species; Brues, however, cites *pulicaria* Meig. under the present species, he has perhaps not been aware of Wood's remarks. I have seen the specimens in Zetterstedt's collection, and I am of the same opinion as Becker, that they are identical with the present species. Becker is of opinion that Zetterstedt's *pumila* is likewise *pulicaria*; I have examined Zetterstedt's specimens; there are two specimens in the collection to Ins. Lapp., but both are so mouldy that nothing can be said of them; further there are three specimens in the collection to Dipt. Scand., the two of them are very bad, but they are not identical with *pulicaria*; the third is another species and identical with *atripes* Brues¹; it will thus be impossible to say what *pumila* Zett. is. Zetterstedt mentions both *pulicaria* and *pumila* from Denmark, sent by Stæger; in Stæger's collection there stands under *pulicaria* a specimen, labelled "Zett. det.," it is a male of *Woodi* Lundbk. Of *pumila* there is only one specimen, a male, likewise labelled "Zett. det.," it is so mouldy that it cannot be determined, but it is in no way *pulicaria* (I think it is *alticolella* Wood.).

126. *A. longifurca* Lundbk.

1921. Lundbk. Vidensk. Meddel. fra Dansk naturh. Foren. 72, 141, 14.

Male. Unknown.

Female. Frons broader than high, black, very slightly greyish and dullish; inner bristle of lower row in about the same height as the outer and nearer to it than to the upper supraantennal; supraantennal bristles about equal, the lower only slightly weaker than the upper; the upper supraantennals more approximate than the inner bristles of middle row, the lower a little more approximate. Antennæ

¹ It is not without interest to find *atripes* here, for Schmitz (Tijdschr. v. Entom. LXIV, 1921, 8) has found that a type-specimen of *pumila* from Meigen in Winnertz's collection was *atripes*, and thinks it possible that *pumila* Meig. might be *atripes* Brues and not *pusilla* Meig. (= *clavipes* Wood) as Becker has stated. — Though Zetterstedt has not *pumila* in Ins. Lapp., there were, as said, two specimens such determined in the collection to this work.

brownish black, not large, arista distinctly pubescent. Palpi yellow, of ordinary size, with well developed bristles. Thorax black, a little shining, with brownish black pubescence. Mesopleura bare. Abdomen black, dull, with very short hairs. Legs yellow, the posterior more yellowish brown, hind femora darkest at apex, with the hairs below not long; hind tibial bristles small and numerous, hair-like. Wings brown, the thick veins not strong, yellowish brown, the thin veins

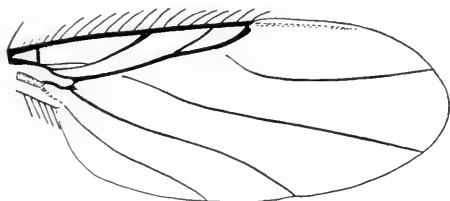


Fig. 111. Wing of *A. longifurca* ♀.

dark brown; costa reaching beyond the middle; costal divisions as 15—10—6, thus 1 about equal to 2 + 3; costal cilia long; the fork extremely long, so long that the outer branch is as long as the second costal division, the angle acute; fourth vein issuing behind the base of the fork, below the middle of the outer branch, it is well curved in its first part, the apical part straight. Halteres yellow.

Length. About 2 mm.

This species is, as seen from the description, near *pulicaria*, but distinguished by the extremely long fork; though the fork is rather varying in *pulicaria* I do not think it possible that the present species can be a variety of *pulicaria*.

A. longifurca is rare, only one specimen, a female, has been taken, Lohals on Langeland ¹⁷/₇ 1920 (the author).

Geographical distribution: — Hitherto only known from Denmark.

127. *A. longicostalis* Wood.

1912. Wood, Ent. Month. Mag. 2, XXIII, 171. — 1914. Brues, Bull. Wisc. Nat. Hist. Soc. XII, 122.

Male. Frons broader than high, black, a little greyish, dull or dullish; inner bristle of lower row slightly below the outer and near to it, much nearer than to the upper supraantennal; supraantennal

bristles not large, unequal, the lower about half the size of the upper; the upper supraantennals approximate, a little less distant than the inner bristles of middle row, the lower slightly more approximate. Antennæ small, black, arista distinctly pubescent. Palpi dusky yellow or brownish, somewhat narrow, with long bristles. Thorax black, very slightly shining, with blackish brown pubescence. Mesopleura bare. Abdomen not slender, black, dull; the very short hairs a little more visible at the hind margins of the segments, especially at the hind margin of sixth segment. Hypopygium small, with quite small hairs on the sides; below there is a somewhat large, yellow, flap-like ventral plate; anal tube small, brownish. Legs yellowish

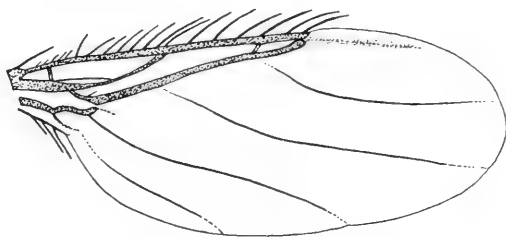


Fig. 112. Wing of *A. longicostalis* ♂.

brown or brown, the front legs a little paler; hind femora darkened above and below, without long hairs below; bristles on hind tibiæ small, numerous and hair-like. Wings brown, veins dark brown; the wings give the impression of being a little narrow; costa long, a little varying, but generally about 0,55 or more; costal divisions about as 8—7—3, thus 1 longer than 2, but shorter than 2 + 3; costal cilia very long; fork somewhat long, the angle rather large, varying, sometimes almost rectangular; fourth vein issuing behind the base of the fork, distinctly, but not much curved in its first part, for the rest slightly and evenly curved. Halteres yellow.

Female. Similar; the lower supraantennals generally relatively a little smaller; costa relatively longer, to 0,60 of the wing-length, but also here somewhat varying.

Length. Fully 1 to 1,5 mm.

I have determined this species as *longicostalis* Wood, and I think the determination correct; Wood has only one striking character, the long costa, which he gives to about $\frac{2}{3}$ of the wing-length, but he knew only the female, which as seen above has the longest costa; for the rest my description will be seen to agree well with Wood.

Mr. Collin looked at my species, when lately he visited Copenhagen, and he was inclined to think it to be *longicostalis*. As will be seen, the species is very near *pulicaria*, the distinctions should be sought in the long costa, the first costal division being longer than 2 and distinctly shorter than $2 + 3$, the narrow palpi and the smaller size, but as these characters all vary in *pulicaria*, I am not sure that the species is distinct, and I possess specimens which I dare not locate with certainty. That my males and females belong to one species will be seen below.

A. longicostalis (as I have determined it) is not rare in Denmark; Ermelund, Dyrehaven, Geel Skov, on Bogø south of Sealand, on Langeland at Lohals and in Jutland at Hejls south of Kolding, Jelling, Ry and Silkeborg (the author); the dates are $^{17}/_6$ — $^7/_10$ in 1917 to 1921. Of Wood's three specimens one was taken in a nest of *Lasius fuliginosus* and another below a dead mole; I once have taken it under a dead crow, and on two other occasions on fungi; but nearly all my specimens I have taken in a certain way; in forests of beeches where the ground is covered with dead leaves of the beeches the species may be seen running on and among the leaves; they generally do not fly, but run quickly, and in this way I have taken males and females together; they may also be taken by sweeping low over the leaves. This way of occurrence would speak for its being a separate species, but nevertheless I think it possible, that it is only an extreme variety of *pulicaria*.

Geographical distribution: — Hitherto only known from Denmark and England.

128. *A. brevipennis* Lundbk.

1920. Lundbk. Vidensk. Meddel. fra Dansk naturh. Foren. 71, 33, 38.

Male. Unknown.

Female. Frons broader than long, greyish black, slightly shining or nearly dull; inner bristle of lower row slightly below the outer and a little nearer to it than to the upper supraantennal; supraantennal bristles not large, unequal, the lower somewhat smaller than the upper; the upper supraantennals approximate, nearer together than the inner bristles of middle row, the lower a little more approximate. Antennæ somewhat small, arista distinctly pubescent. Palpi yellow, somewhat dusky, of ordinary size, the bristles well developed. Thorax black, a little shining, with brownish pubescence. Mesopleura bare. Abdomen black, dull, the hairs slightly visible. Legs brownish yellow

to dark brown, the front legs paler, bristles on hind tibiæ very fine and numerous. Wings small and short, scarcely as long as abdomen; they are considerably brown, veins brown; costa very long, 0,66 of the wing-length, costal divisions about as 14—12—7 thus 1 about equal to 2 and double 3; fork long, the angle somewhat large; costal cilia relatively very long; fourth vein, which on account of the long costa is very short, curved at the origin. Halteres whitish yellow.

Length 1,1—1,5 mm; in a specimen of a length of 1,1 mm the wing is 0,86 mm long and 0,37 mm broad.

A. brevipennis is rare; at Lohals on Langeland ²⁹/₆ 1920, Hejls south of Kolding ¹⁶/₇ 1919 and Ry ⁹/₇ and ¹¹/₇ 1918 (the author), in all four specimens, all females; they were taken under dead leaves of beeches on the ground together with the preceding species, one specimen was taken under a dead crow.

Remarks: As I first described this species I had only the two specimens from Ry; later on I have taken still two specimens, quite agreeing with the former. It will be seen that they differ from *longicostalis* mainly by the smaller wings with the longer costa; now already in *longicostalis* the wings seem to vary a little in size, and I think it possible that the present species may be a variety of *longicostalis* and thus, in accordance with what was said under that species, perhaps an extreme variety of *pulicaria*.

Geographical distribution: — Hitherto only known from Denmark.

129. *A. breviterga* Lundbk.

1920. Lundbk. Vidensk. Meddel. fra Dansk naturh. Foren. 71, 33, 39.

Male. Unknown (see under remarks).

Female. Frons considerably broader than high, black; bristles strong, inner bristle of lower row slightly below the outer and a little nearer to it than to the upper supraantennal; supraantennal bristles unequal, the lower somewhat weaker than the upper, down to less than half the size; the upper supraantennals nearer together than the inner bristles of middle row and the lower a little more approximate. Antennæ dark brown, rather small, arista distinctly pubescent. Palpi of full size, but somewhat narrow, yellow, with the bristles well developed. Thorax black, rarely brown (immature), with brownish pubescence. Mesopleura bare. Abdomen black or rarely somewhat brownish (immature), dull, the short hairs very slightly longer at the hind

margins of the segments and more distinctly seen at the sides; venter more or less pale; the third tergite is somewhat abbreviated as its hind margin is concave, at the sides it is of full length, but in the middle it is only two thirds of the length at the sides; the unchitinized part between it and the fourth segment is yellow. Legs yellow, hind femora more or less darkened at apex, the hairs below the basal half slightly longish; bristles on hind tibiæ small, numerous and hair-like. Wings yellowish or brownish, veins dark brown and thin veins rather strong; costa long, reaching beyond the middle to about 0,56 of the wing-length; costal divisions about as 5—3—2, thus 1 equal to 2 + 3; fork longish; costal cilia long; fourth vein a little S-like at the base, strongly curved in its first part, for the rest slightly and evenly curved. Halteres yellow.

Length 1,4 to fully 2 mm.

Remarks: When I first described this species I had only two specimens, but later on I have got a large material. The shape of the third abdominal tergite is rather characteristic, but on the dried specimens the shape of it is not always to be seen when abdomen is contracted, but it is always shorter than the second and fourth; it seems for the rest to vary somewhat as regards the degree of abbreviation. I strongly suspect that this species is the female of my *similata*, partly because on two occasions I have taken them in company, but especially because of their great similarity. Under *pulicaria* I have spoken of the possibility of *similata* being a variety of *pulicaria*; if now *breviterga* should prove to be the female of *similata*, this would seem to be in favour of the latter being a sure species, but, on the other hand, the possibility of its being a variety is not quite excluded thereby, for in the *pulicaria* female, according to specimens which I consider as this species, the third abdominal tergite seems to be able to vary a little in size and shape; it may thus not be quite impossible that *similata* and *breviterga*, if male and female of the same species, represent a variety of *pulicaria*. I shall, however, remark that besides the characters from the hypopygium and the abbreviated tergites, the two species have the thin veins distinctly stronger than in *pulicaria*, only in smaller specimens of *breviterga* this is less or not pronounced; perhaps only these latter may belong to *pulicaria*.

A. brevis is common in Denmark; Ermelund, Geel Skov, on Langeland at Lohals and in Jutland at Hejls south of Kolding and in

Egense Skov at the east end of Limfjorden (the author); the dates are $\frac{5}{5}$ — $\frac{15}{10}$ in 1917 to 1921. I have taken it running on leaves of bushes and in low herbage in woods; when it is examined sitting on a leaf the unchitinized area behind the third tergite is often distinctly seen as a yellow band on abdomen.

Geographical distribution: — Hitherto only known from Denmark.

Group VII.

Scutellum with two bristles.

Mesopleura bare.

Costa short.

130. *A. lactipennis* Lundbk.

1920. Lundbk. Vidensk. Meddel. fra Dansk naturh. Foren. 71, 24, 27.

Male. Frons considerably broader than high, greyish black, a little shining; inner bristle of lower row below the outer and much inwards to it, about equally distant from it and from the upper supraantennal; supraantennal bristles unequal, the lower about half as strong as the upper; the upper supraantennals rather close-standing, more approximate than the inner bristles of middle row, the lower still more close-standing. Antennæ not small, black, arista distinctly pubescent. Palpi yellow, of ordinary size and armature. Thorax black, slightly shining, with dark brownish pubescence. Mesopleura bare. Abdomen deep black, dull; the short hairs only slightly visible at the hind margins of the segments. Hypopygium small, rather retracted, a little greyish; when not quite retracted a thin bristle or long hair at each side is seen; ventral plate short; anal tube minute, dusky or blackish. Legs blackish brown, front legs, middle tibiæ and posterior tarsi a little paler; the hairs below hind femora only a little longish; bristles on hind tibiæ fine and delicate. Wings whitish or a little milky, thick veins brown, the others colourless; costa about 0,40 of the wing-length, costal divisions about as 3—1—1; the inner branch of the fork somewhat, more or less, steep and thus the angle somewhat large; costal cilia short; fourth vein very slightly and evenly curved, or nearly straight in its last part. Halteres black.

Female. Unknown.

Length 0,9—1 mm.

A. lactipennis is rare, it has only been taken at Ry in Jutland $16/7$ and $25/7$ 1918 (the author), in all three males; they were taken with the net in grass.

Geographical distribution: — Hitherto only known from Denmark.

131. *A. gregaria* Wood.

1910. Wood, Ent. Month. Mag. 2, XXI, 152, 199 (*Phora*). — 1914. Brues, Bull. Wisc. Nat. Hist. Soc. XII, 120. — 1919. Schmitz, Entom. Ber. Nederl. Ent. Ver. V, 142.

Male. Frons somewhat high, not much broader than high, greyish black; it is distinctly pubescent and hence looks as conspicuously black punctate; the middle row of bristles is placed rather high and the same is the case with the outer bristles of lower row, the inner bristle of lower row is, therefore, much below the outer, and it is nearer the eye-margin than the upper supraantennal; supraantennal bristles equal or nearly so, the upper distant, more distant than the inner bristles of middle row, the lower more approximate. Antennæ somewhat small, brownish black, arista short, somewhat thick, short-pubescent. Palpi yellow, of ordinary size and armature. Thorax black, somewhat shining, with brownish pubescence. Mesopleura bare. Abdomen black, dull, the short hairs only visible at the hind margins of the segments and increasing in length behind. Hypopygium small, greyish black, with a number of bristly hairs on each side; anal tube small, yellowish. Legs yellowish brown, hind femora somewhat darkened at the end, with sparse, long hairs below the basal half; bristles on hind tibiæ distinct, but fine. Wings a little yellowish tinged, veins yellowish brown to darker brown; costa about 0,36 of the wing-length, costal divisions about as 15—5—4; fork small; costal cilia moderately short; fourth vein very slightly curved, a little recurved at apex. Halteres black.

Female. The female was hitherto not known; it is in all respects similar to the male; hind femora likewise with long hairs below.

Length. About 1 mm.

Wood says "1 more than double 2 + 3", but a measurement gives the lengths I have given above.

A. gregaria seems to be rare in Denmark; Holte $14/7$ and $15/7$ 1918 and $16/10$ 1921, Suserup Skov at Sorø $30/7$ 1918 (Th. Mortensen); in all two males and two females.

Geographical distribution: — Denmark, England and, according to a specimen sent from Pater Schmitz, also Holland.

132. **A. subnudipennis** Schmitz.

1919. Schmitz, Entom. Ber. Nederl. Ent. Ver. V, 117, 142.

Male. Frons a little higher than broad, or about quadratic; it is greyish black, somewhat shining; the middle row of bristles placed rather high as in *gregaria*, and so also the outer bristle of the lower row, and thus the inner bristle much below the outer, and it is placed nearly in the middle between the eye-margin and the upper supra-antennal; supraantennal bristles nearly equal, the upper not approximate, a little more distant than the inner bristles of middle row, the lower a little more approximate. Antennæ somewhat small, black, arista somewhat short, distinctly, but short-pubescent. Palpi brownish or blackish, well developed and with well developed bristles. Thorax black, somewhat shining, with blackish brown pubescence. Mesopleura bare. Abdomen black, slightly greyish, dull; the very short hairs only just visible at the hind margins of the segments. Hypopygium small, only with some small hairs on the sides; below two claw-like processes are seen, one on each side, directed backwards; anal tube not short, but quite slender, blackish brown. Legs black, front legs almost not paler; hind femora with the hairs below the basal half a little longish; bristles on hind tibiæ small, but distinct. Wings somewhat yellowish or slightly brownish tinged, veins brown; costa about 0,36 of the wing-length, it is distinctly thickened from the apex of first vein to the end; costal divisions about as 3—1—1; costal cilia very short and rather fine; fourth vein slightly and evenly curved and a little recurved at the apex. Halteres black.



Fig. 113. Wing of *A. subnudipennis* ♀.

Female. Similar; costa a little longer, to 0,38, and the first costal division relatively a little shorter, Schmitz gives 13—5—4, I measured 17—7—6.

Length 0,8—1,3 mm.

This characteristic little species is nearly related to *gregaria*, but well distinguished already by the wings. As I possess only the female the above description of the male is drawn from a Dutch specimen, kindly sent me from Pater Schmitz.

A. subnudipennis is rare in Denmark; Ermelund ²⁰/₆ 1918 (the author), Holte ⁷/₅ 1920 (Th. Mortensen) and in Jutland at Hejls south of Kolding ¹¹/₇ 1919 and at Mou at the east end of Limfjorden ¹⁰/₇ 1921 (the author), in all four specimens, all females; the specimen from Mou was taken on the shore.

Geographical distribution: — Besides from Denmark known from Holland and Germany.

133. *A. pygmaea* Zett.

1848. Zett. Dipt. Scand. VII, 2860, 8 (*Trineura*). — 1901. Beck. Abhandl. zool. bot. Gesell. Wien, I, 49, Taf. III, Fig. 46, Taf. IV, Fig. 63, 64, p. p. (*Phora*). — 1910. Wood, Ent. Month. Mag. 2, XXI, 151, 199, p. p. (*Phora*). — 1910. Kertész, Cat. Dipt. VII, 412, p. p. — 1914. Brues, Bull. Wisc. Nat. Hist. Soc. XII, 129, p. p.

Male. Frons somewhat broader than high or nearly quadratic, greyish black, dull or very slightly shining; inner bristle of lower row somewhat below the outer and a little nearer to the upper supraantennal than to the outer bristle; supraantennal bristles unequal, the lower much smaller than the upper; the upper supraantennals about as distant as the inner bristles of middle row, the lower more approximate. Antennæ brownish black or blackish to red with just the apex darker; arista not long, short-pubescent. Palpi yellow, ordinary, with the bristles well developed. Thorax black, sometimes varying to brownish, it is very slightly shining, with brownish black pubescence. Mesopleura bare. Abdomen somewhat robust, black, somewhat greyish and dull; it has generally more or less distinct, narrow paler hind margins to the segments; the hairs are very short and sparse, only at the hind margins of the last two segments slightly longer. Venter yellow or darker. Hypopygium small, greyish or greyish brown, with small hairs at the sides below; anal tube short, but high, yellowish or darker to blackish. Legs yellow to dark, almost blackish brown; when yellow the hind femora with a distinct black apex; the hind femora rather broad, the hairs below the basal half somewhat long or longish; bristles on hind tibiæ distinct and not numerous, 10—11 in number, and also the posterodorsal bristles on middle tibiæ some-

what distinct. Wings yellowish, in the darkest forms clear or nearly; veins paler or darker brown; costa about 0,33 of the wing-length, costal divisions about as 4—1—1, but varying, and I have f. inst. measured about 22—7—6 so that 1 is not always double $2 + 3$; third vein a little thick and thus the outer branch of the fork much thicker than the inner, the outer branch a little angulated; costal cilia short, but a little varying; fourth vein very slightly curved and generally a little abrupted at the base. Halteres yellow.



Fig. 114. Wing of *A. pygmaea* ♀.

Female. Similar; the third abdominal tergite narrowed, much narrower than the second, roundly excised at the sides and with the hind margin narrower than the front margin; also the following segments a little narrowed, the fourth rectangular in shape (fig. 115); hind femora with the hairs below as in the male.

Length 1,3 to about 2 mm.

Remarks: I have studied Zetterstedt's types and found them identical with the present species; there are several specimens of both sexes, labelled "Smoland", and the female shows the same shape of the abdominal tergites as described above; besides there were at the end three specimens which did not belong here, one, labelled "Bjørnst.", was indeterminable, the second, labelled "Abus.", seemed to be *angelicae*, and finally the last was a large specimen, not at all similar to *pygmaea* and with four scutellar bristles; this latter specimen is perhaps the one mentioned by Zetterstedt under Obs.

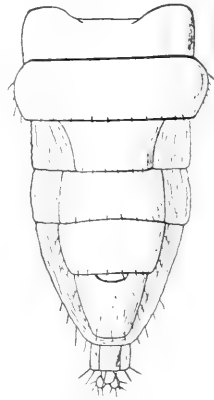


Fig. 115.
A. pygmaea ♀,
abdomen.

Schmitz remarks (Entom. Ber. Nederl. Ent. Ver. V, 1919, 187) that *pygmaea* and *branchyneura* Egg. must be different species, as the female of *branchyneura* does not show the curious constriction of the

third abdominal tergite. — Wood says for *pygmaea* 1 more than double 2 + 3; as shown by my measurements 1 is at most double 2 + 3, but often shorter.

A. pygmaea is not common in Denmark; Dyrehaven (the author), Holte (Th. Mortensen); it seems to occur during the whole year, my dates run from $\frac{3}{1}$ to $\frac{25}{12}$ in 1917 to 1921; only one specimen I have taken in the open on $\frac{18}{5}$, all the others were taken by Dr. Mortensen on the windows in his villa near the wood; the specimens taken on $\frac{25}{12}$ were brought in with a Christmas tree, taken from the wood the day before.

Geographical distribution: — The species seems widely distributed; all Europe, towards the north to southern Sweden; further recorded from Formosa and from the Canaries and also occurring in North America.

134. *A. pygmaeoides* Lundbk.

1921. Lundbk. Vidensk. Meddel. fra Dansk naturh. Foren. 72, 142, 15.

Male. Unknown.

Female. Frons a little broader than high, black, a little greyish and with an indication of being shining; inner bristle of lower row below the outer and in about the middle between it and the upper supraantennal; supraantennal bristles unequal, the lower considerably smaller than the upper; the upper supraantennals approximate, a little nearer together than the inner bristles of middle row, the lower a little more approximate. Antennæ brownish black, arista short-pubescent. Palpi yellow, of ordinary size and armature. Thorax black, very slightly shining, with brownish pubescence. Mesopleura bare. Abdomen black, dull, the very short hairs only visible at the hind margins of the segments and on the last two segments. Legs yellowish brown, hind femora a little dark at apex, with a little longish hairs below the basal half; bristles on hind tibiæ distinct and of medium size, not numerous. Wings colourless, veins yellowish; costa about 0,34 of the wing-length, costal divisions about as 11—3—2; third vein a little strong; costal cilia moderately short; fourth vein very slightly and evenly curved, a little interrupted at the base. Halteres yellow.

Length 1,5 mm.

This species evidently belongs to the *pygmaea*-group and is very near *pygmaea* and *brachyneura*; from the latter the colour distinguishes

it, and from *pygmaea* it is distinguished by the normal abdominal tergites; I have described this female as it is evidently an undescribed species, but how the male shall be distinguished from *pygmaea* I cannot say, unless the darkest, clear-winged forms of *pygmaea* should prove to belong to the present species.

A. pygmaeoides is rare; Holte ²⁵/₁₂ 1920 and ³/₄ 1921 (Th. Mortensen) and at Ry in Jutland ¹²/₇ 1918 (the author), in all three females; the specimen from ²⁵/₁₂ was taken on the window together with *pygmaea*, brought in with a Christmas tree from the wood.

Geographical distribution: — Hitherto only known from Denmark.

135. *A. Berndseni* Schmitz.

1919. Schmitz, Entom. Ber. Nederl. Ent. Ver. V, 118.

Male. I have not seen the male, but, according to Schmitz's description, it is mainly similar to the female.

Female. Frons about quadratic, black, a little greyish and somewhat shining; inner bristle of lower row below the outer and in about the middle between it and the upper supraantennal; supraantennal bristles only slightly unequal, the lower a little smaller than the

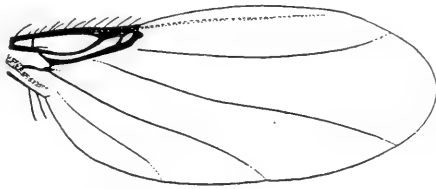


Fig. 116. Wing of *A. Berndseni* ♀.

upper; the upper supraantennals in about the same distance from each other as the inner bristles of middle row, the lower more approximate. Antennæ blackish brown, arista short-pubescent. Palpi yellow, of ordinary size, with well developed bristles. Thorax black, slightly shining, with dark brownish pubescence. Mesopleura bare. Abdomen black, a little greyish, dull; the very short hairs almost only visible behind. Legs brown, the front legs the palest, the hind legs the darkest; hind femora somewhat broad, with the hairs below the base longish; bristles on hind tibiae as in *pygmaea*, distinct and not numerous. Wings brownish yellow tinged, veins brown; costa

very short, 0,30 of the wing-length; costal divisions about as 23—7—5; outer branch of the fork a little angulated; costal cilia short; fourth vein very slightly curved, most towards the apex, but almost straight in its first three fourths. Halteres yellow.

Length. About 1,5 mm.

I have seen a female type from Pater Schmitz; in my specimen the wings are more tinged and the lower supraantennals relatively larger. The species is nearly related to *pygmaea*, but is distinguished by the short costa, and the female by the normal third abdominal tergite.

A. Berndseni is rare in Denmark, only one specimen, a female, has been taken, Ermelund ¹⁰/₄ 1918 (the author).

Geographical distribution: — Hitherto known from Denmark and Holland.

136. *A. angelicae* Wood.

1910. Wood, Ent. Month. Mag. 2, XXI, 152, 199 (*Phora*). — 1914. Brues, Bull. Wisc. Nat. Hist. Soc. XII, 112.

Male. Frons a little broader than high, black, somewhat shining; inner bristle of lower row a little below the outer and placed much inwards on the frons, nearer the middle line than the eye-margin; supraantennal bristles somewhat small, placed low on the frons, and only one pair present; they are very approximate. Antennæ not small, black or brownish black, arista somewhat short, distinctly though short-pubescent. Palpi brownish to blackish, of ordinary size and armature. Thorax black, a little shining, with brown pubescence. Mesopleura bare. Abdomen black, dull, the very short hairs almost only visible at the hind margins of the segments. Hypopygium small, on each side it has a nearly vertical or somewhat curved row of hairs of which one or two of the lowermost develop to small bristles; anal tube short, but high, brownish or blackish. Legs brown or blackish brown, hind femora with somewhat long hairs below the basal half; bristles on hind tibiæ distinct, but fine. Wings only slightly tinged, almost clear; veins brown or pale brown; costa 0,39 of the wing-length, costal divisions about as 17—5—5; costal cilia short; fourth vein very slightly curved, almost straight. Halteres yellow, with the peduncle dark to black.

Female. Quite similar to the male and the hairs below hind femora similarly developed.

Length 1—1,3 mm.

This species seems, as stated by Wood, really to possess only one pair of developed supraantennal bristles, at all events I have not been able to detect any lower pair.

A. angelicae is rare in Denmark; Bogø south of Sealand $\frac{2}{7}$ — $\frac{7}{8}$ 1917 and in Jutland at Hejls south of Kolding $\frac{19}{7}$ 1919, in Egense Skov at the east end of Limfjorden $\frac{6}{7}$ 1921 (the author) and at Frederikshavn in July 1881 (H. J. Hansen); in all 8 males and 4 females.

Geographical distribution: — Hitherto only known from Denmark and England.

137. *A. tarsalis* Wood.

1910. Wood, Ent. Month. Mag. 2, XXI, 243, 246 (*Phora*). — 1914. Brues, Bull. Wisc. Nat. Hist. Soc. XII, 134.

Male. Frons slightly broader than high, black, shining; inner bristle of lower row somewhat below the outer, nearer the eye-margin than the middle line; supraantennal bristles unequal, the lower somewhat smaller than the upper; the upper supraantennals about as distant as the inner bristles of middle row, the lower slightly more approximate. Antennæ somewhat small, blackish brown, arista distinctly pubescent. Palpi yellow, of ordinary size, the bristles well

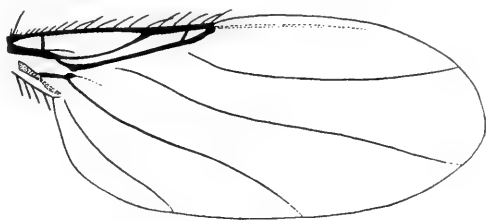


Fig. 117. Wing of *A. tarsalis* ♀.

developed. Thorax black, very slightly shining, with dark brownish pubescence. Abdomen black, dull, the very short hairs a little more visible at the hind margins of the segments. Hypopygium small, greyish black, with short hairs on the sides; ventral plate narrow, but somewhat long, yellowish; anal tube yellow, short, but somewhat high. Legs yellowish or yellowish brown, the front legs the palest; front tarsi distinctly thickened; the hairs below the basal half of hind femora distinct, but only slightly longish; bristles on hind tibiae distinct and not short, but fine. Wings a little yellowish, veins yellowish brown or brown; costa 0,42—0,44 of the wing-length, its outer part

between the apex of the first vein and the end a little thickened; costal divisions about as 7—3—2; costal cilia short or moderately short; angle at fork somewhat large, fourth vein evenly and not much curved. Halteres yellow.

Female. Similar; frons a little narrower, quadratic or about; front tarsi less thickened, the thickening, however, still observable; the fourth to sixth abdominal tergites are narrow, the fourth being suddenly considerably narrower than the third, while the fifth is a little broader than the fourth, abdomen thus being a little constricted at the fourth tergite (fig. 118); this character is obvious on fresh specimens but often not easily seen on dried material.

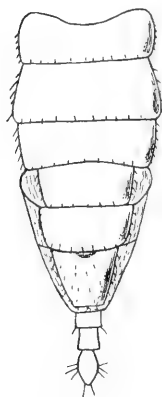


Fig. 118.
A. tarsalis ♀,
abdomen.

Length 1,2—1,5 mm.

A. tarsalis is not rare in Denmark, though in no way common; Ermelund, Geel Skov, Ørholm (the author), Holte, Suserup Skov at Sorø (Th. Mortensen), Stensby Skov in South Sealand, Bogø south of Sealand, on Langeland at Lohals, and in Jutland at Hejls south of Kolding, Jelling and Ry (the author); the dates are $^{12}/_4$ — $^{21}/_9$ in 1917 to 1921. I have taken it on bushes and with the net in low herbage.

Geographical distribution: — Besides in Denmark occurring in England and, according to a specimen sent from Pater Schmitz, also in Holland.

138. *A. brevicostalis* Wood.

1910. Wood, Ent. Month. Mag. 2, XXI, 243, 246 (*Phora*). — 1914. Brues, Bull. Wis. Nat. Hist. Soc. XII, 113.

Male. Frons about as broad as high, quadratic; it is black, very slightly greyish, a little shining, or sometimes more; inner bristle of lower row below the outer, nearer the eye-margin than the middle line and about in the middle between the outer bristle and the upper supraantennal; supraantennal bristles not small, equal or nearly so; the upper supraantennals more distant than the inner bristles of middle row, the lower more approximate. Antennæ black, of ordinary size, the bristles well developed. Thorax black, a little shining, with blackish pubescence. Mesopleura bare. Abdomen black, dull, sixth segment a little shining; the short hairs a little more visible at the

hind margins of the segments, a little longer at the hind margin of sixth segment. Hypopygium small, with short hairs on the sides; ventral plate large, dusky yellowish to blackish; anal tube quite short, but high, blackish. Legs black or brownish black, the front legs paler; hind femora somewhat broad, the hairs below the basal half longish; bristles on hind tibiæ somewhat strong, especially six to eight bristles in the lower two thirds. Wings a little yellowish or greyish yellow tinged, sometimes more brownish; thick veins dark brown or blackish,

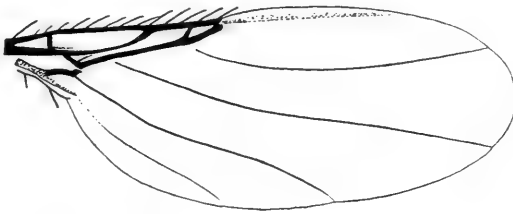


Fig. 119. Wing of *A. brevicostalis* ♂.

the others brown; the thick veins not strong, but relatively fine; costa about 0,40 of the wing-length, costal divisions about as 8—4—3 angle at fork not small; costal cilia short, though not very short; fourth vein slightly and evenly curved, especially in its first part. Halteres yellow, the peduncle dark or black.

Female. In all respects similar to the male.

Length 1—1,6 mm.

A. brevicostalis is very common in Denmark all over the country in suitable localities. Wood mentions it as common on flowers of *Angelica*, I have taken it with the net in low herbage in woods, often especially in grass, and also outside woods in open places, and once I took it on fresh, somewhat exuding stubs of *Acer*; my dates are $31/3$ — $7/9$ in 1910 to 1921. Some specimens came in February and March from shells of *Helix*, collected in winter.

Geographical distribution: — Hitherto known from Denmark, England and, according to a specimen sent from Pater Schmitz, from Holland, and also occurring in Prussia (Schmitz, Tijdschr. v. Entom. LXIV, 1921, 2).

Remarks: The three species *angelicae*, *tarsalis* and *brevicostalis* are rather similar, but well distinguished; *tarsalis* is in the male easily known by the thickened front tarsi; in the female this character is also present, but to a smaller degree, but it may be known from *ange-*

licae as this species has the inner lower frontal bristles nearer to the middle than to the eye-margin, only one pair of supraantennal bristles, dark palpi, and the costa not thickened in the outer part, finally the female of *tarsalis* is specially characterized by the fourth to sixth abdominal tergites being narrow; *brevicostalis* is known by its less shining frons, this being rather shining in the two other species, by the more distant upper supraantennals and the relatively strong hind tibial bristles.

139. *A. lata* Wood.

1910. Wood, Ent. Month. Mag. 2, XXI, 151, 199 (*Phora*). — 1914. Brues, Bull. Wisc. Nat. Hist. Soc. XII, 122.

Male. Frons broader than high, greyish black, quite slightly shining or dullish; inner bristle of lower row a little below the outer and in about the middle between it and the upper supraantennal; supraantennal bristles unequal, the lower much smaller than the upper; the upper supraantennals approximate, a little nearer together than the inner bristles of middle row, or in about the same distance, the

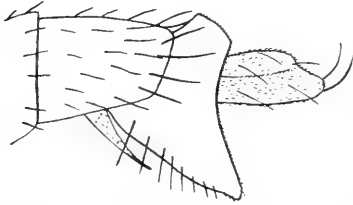


Fig. 120. *A. lata* ♂, hypopygium $\times 135$; from a specimen with the hypopygium unusually well exposed; the ventral plate is seen mainly in profile.

lower direct below the upper; not more approximate. Antennæ black or brownish black, arista short-pubescent. Palpi yellow, of ordinary size, with well developed bristles. Thorax black, somewhat shining, with brownish pubescence. Pleura somewhat shining below, often a little brownish anteriorly. Mesopleura bare. Abdomen somewhat robust, black, somewhat greyish and dull; the very short hairs only very slightly longer at the hind margins of the segments. Hypo-

pygium small, greyish brown; the sides are somewhat snout-like prolonged behind (but this shape is not rarely altered by exsiccation); there is a row of distinct hairs at the lower margin on each side; the ventral plate is of an elongated triangular shape and pointed; anal tube of medium size, yellow, it is slender at the base, a little higher outwards (fig. 120). Legs yellow or the posterior legs a little more yellowish brown and hind femora somewhat darkened at the end; front tarsi perhaps a little more slender than usual; hind femora

somewhat broad, with the hairs below the basal half somewhat long; bristles on hind tibiæ distinct and not quite small. Wings yellowish, veins pale brown, the thin veins not specially fine, costa about 0,40 of the wing-length, but varying and reaching sometimes to 0,43; costal divisions about as 11—5—3, but also a little varying; costal cilia moderately short, rather midway between short and long; fourth vein slightly curved, especially at each end, but nearly straight on the middle part. Halteres yellow.

Female. Quite similar to the male; hind femora likewise with longish hairs below.

Length 1,3 to fully 1,5 mm.

As seen from the description my specimens are not quite agreeing with Wood's description as regards the length of costa and the costal divisions, but as they are otherwise quite agreeing, especially as regards the supraantennal bristles, the hypopygium and also otherwise, I think my determination is correct.

A. lata is common in Denmark; Ermelund, Dyrehaven, Lyngby, Geel Skov (the author), Holte, Suserup Skov at Sorø (Th. Mortensen), on Langeland at Lohals and in Jutland at Hejls and Skamling south of Kolding, Ry and Laven (the author); my dates are $\frac{3}{5}$ — $\frac{14}{11}$ in 1917—1920. I have generally taken it with the net in low herbage in woods, and once on a fresh, somewhat exsuding stub of *Acer*. The specimens from $\frac{14}{11}$, by removing some five-wood, were found below it.

Geographical distribution: — Denmark and England, where it seems to be rare, as only two males are known; according to a communication from Pater Schmitz, it also occurs in Holland; Pater Schmitz has compared specimens from me, so that his species and mine are with certainty identical.

140. *A. maura* Wood.

1910. Wood, Ent. Month. Mag. 2, XX, 196, 201 (*Phora*). — 1914. Brues, Bull. Wisc. Nat. Hist. Soc. XII, 123. — 1919. Schmitz, Entom. Ber. Nederl. Ent. Ver. V, 142.

Male. Frons nearly quadratic, greyish black, dull; inner bristle of lower row somewhat below the outer and in about the middle between it and the upper supraantennal, and it is considerably nearer the eye-margin than the middle line; supraantennal bristles nearly equal, the lower a little smaller than the upper; the upper supraantennals somewhat distant, more distant than the inner bristles of

middle row, the lower more approximate. Antennæ black, of ordinary size, arista quite short-pubescent. Palpi somewhat large, deep yellow, with well developed bristles. Thorax black, somewhat shining, with brown pubescence. Mesopleura bare, shining below. Abdomen black, slightly greyish, dull; the hairs very short, a little more visible at the hind margins of the segments and a little longer at the hind margin of sixth segment. Hypopygium small, greyish black or greyish brown, with numerous, somewhat longish hairs below on the sides; below there is a flap-like, yellowish ventral plate, not reaching to the end of the hypopygium; anal tube short and high, dark at the base, paler to yellow towards the end. Legs yellowish or yellowish brown, the hairs below the basal half of hind femora long and sparse and somewhat strong; bristles on hind tibiæ rather strong. Wings slightly yellowish tinged or almost clear, veins brownish; costa about 0,40 of the wing-length, costal divisions about as 28—9—6, thus 1 not quite double 2 + 3; angle at fork rather acute; costal cilia long, but somewhat moderately; fourth vein slightly and evenly curved. Halteres black.

Female. Similar; hind femora likewise with long hairs below; angle at fork fully as acute as in the male.

Length 2 mm or about.

A. maura is not exactly common in Denmark; Geel Skov (the author), Holte, Suserup Skov at Sorø (Th. Mortensen), and in Jutland at Hejls south of Kolding (the author); the dates are $^{11}/_4$ — $^{25}/_{12}$ in 1917 to 1921. The specimen from $^{25}/_{12}$ was brought in from the wood with a Christmas tree.

Geographical distribution: — Besides from Denmark only known from England.

141. *A. Mortenseni* Lundbk.

1920. Lundbk. Vidensk. Meddel. fra Dansk naturh. Foren. 71, 25, 29.

Male. Frons considerably broader than high, black, very slightly greyish and with an indication of being shining; inner bristle of lower row somewhat below the outer and about equally distant from it and from the upper supraantennal; supraantennal bristles not large, nearly equal, the lower only slightly smaller than the upper; the upper supraantennals about equally as distant as the inner bristles of middle row, the lower close below the upper and more approximate. Antennæ rather large, black, arista very short-pubescent. Palpi

black or blackish, of ordinary size and armature. Thorax black, a little shining, with dark brownish pubescence. Mesopleura bare. Abdomen somewhat robust, black, a little greyish and dull, the hind margins of the segments indistinctly pale; the short hairs slightly longer at the hind margins of the segments. Hypopygium of medium size, greyish black, shining above in the middle at the base; on each side there is a nearly vertical, but somewhat curved series of about six strong bristles, increasing in size downwards; the posterior part besides has short hairs; ventral plate black; anal tube small, blackish. Legs black or blackish, front legs somewhat paler and also posterior tibiae and tarsi slightly paler; the legs are somewhat robust; the hairs below hind femora short and dense at the base, longer and more sparse towards the middle; bristles on hind tibiae distinct, but small and fine. Wings clear, thick veins blackish, the others more brown; costa about 0,34 of the wing-length, costal divisions about as 20—5—4; fork small with a small lumen; costal cilia moderately long; fourth vein nearly straight, but distinctly curved downwards at the end. Halteres black.

Female. Similar to the male, but the frons less broad, the palpi dusky and the antennae smaller.

Length 1,7—2 mm.

A. Mortenseni is rare; Holte $^{16}/_3$ 1917, $^{15}/_7$ and $^{19}/_7$ 1918 (Th. Mortensen), two males and a female.

Geographical distribution: — Hitherto only known from Denmark.

142. *A. coacta* Lundbk.

1920. Lundbk. Vidensk. Meddel. fra Dansk naturh. Foren. 71, 26, 30.

Male. Frons somewhat broader than high, black, slightly greyish and slightly shining; bristles strong, inner bristle of lower row much below the outer and a little nearer to it than to the upper supraantennal; supraantennal bristles small and unequal, the lower quite small; the upper pair close-standing, more approximate than the inner bristles of middle row. Antennae somewhat large, blackish or blackish brown, arista distinctly pubescent. Palpi yellow, of ordinary size and armature. Thorax black, slightly shining, with dark brownish pubescence. Pleura a little brownish, especially anteriorly. Mesopleura bare. Abdomen somewhat robust, black, dull, with narrow and indistinct paler hind margins to the segments; the short hairs a little

longer at the hind margins of the segments. Hypopygium somewhat small, at most of medium size, greyish; when fully exposed it is a little glossy just at the base; on each side there is a group of some (4) conspicuous bristles and more backwards some smaller hairs; a large subanal body seems always to be exposed; anal tube short, yellow. Legs yellow, the posterior legs may be more or less tinged with brownish and hind femora brownish at the end; the hairs below the basal half of hind femora longish and not sparse; bristles on hind tibiae fine, but not quite short. Wings brownish yellow or brownish tinged, veins brown and somewhat strong; costa about 0,42 of the wing-length, costal divisions about as 11—4—2; third vein rather thick, fork short and the outer branch a little angulated; costal cilia long, but rather moderately; fourth vein evenly and only slightly curved, beginning just below the base of the fork, slightly *s*-like at the base and not or not distinctly recurved at the end. Halteres black or brownish black.

Female. Similar; antennæ brown and the hairs below the hind femora not so long as in the male; the pale hind margins on abdomen broader and more distinct; halteres paler to brown.

Length 1,5—1,8 mm.

This species belongs to the *halterata*-group, but it will be known from *halterata*, besides by the dark halteres, by the hypopygium and the longer costa, from *plurispinosa* by the dark halteres, and from *fuscohalterata* by the relatively longer first costal division.

A. coacta is not common in Denmark, but has been taken in several localities; Bogø south of Sealand, at Lohals on Langeland, and in Jutland at Jelling and Ry (the author); the dates are $^{15}/_7$ — $^{29}/_7$ in 1917 to 1921; in all 7 males and 3 females.

Geographical distribution: — Hitherto only known from Denmark.

143. *A. erecta* Wood.

1910. Wood, Ent. Month. Mag. 2, XXI, 196, 202 (*Phora*). — 1914. Brues, Bull. Wisc. Nat. Hist. Soc. XII, 117. — 1919 Schmitz, Entom. Ber. Nederl. Ent. Ver. V, 142.

Male. Frons broader than high, black, slightly shining; inner bristle of lower row a little below the outer and nearer to it than to the upper supraantennal; supraantennal bristles unequal, the lower small; the upper supraantennals approximate, about as distant as the inner bristles of middle row, the lower close to the upper and more

approximate. Antennæ of ordinary size or smallish, blackish brown or dark brown; arista distinctly, but short-pubescent. Palpi dusky yellowish, somewhat small, with ordinary bristles. Thorax black, slightly shining, with brownish pubescence. Mesopleura bare. Abdomen black, dull, with a little paler hind margins to the segments, sixth segment a little elongated; very short hairs almost only to detect at the hind margins of the segments, a little longer on sixth segment. Hypopygium somewhat large, as long as the sixth segment, brownish; it has numerous short hairs below on the sides and dense at the hind corners; ventral plate a long, narrow process; anal tube quite small, yellowish. Legs brown, front legs a little paler; hind femora a little broad, the hairs below not long; hind tibiæ distinctly thickened in the apical half, and here on the ventral side with about four erect bristles, forming a short row; the posterodorsal bristles numerous, very small and hair-like. Wings clear or nearly so, veins brown, the thin veins fine; costa about 0,43 of the wing-length, costal divisions about as 4—2—1; angle at fork not small; costal cilia long; fourth vein distinctly curved in its first part, for the rest nearly straight. Halteres black or dark brown.

Female. Similar to the male, likewise with the apical half of hind tibiæ thickened, but without erect bristles; the palpi paler.

Length. About 1,3 mm.

The female was hitherto not known, as seen above it will be distinguished from its allies by the distinctly thickened hind tibiæ.

A. erecta is rare in Denmark; on Langeland at Lohals ¹²/₇ 1920 and in Jutland at Hejls south of Kolding ³/₇ 1919 and in Egense Skov at the east end of Limfjorden ⁵/₇ 1921 (the author); in all two males and three females. At Hejls I took two males and one female in company, and if I remember correctly they were taken on an umbellifer.

Geographical distribution: — Hitherto known only from Denmark and England.

144. *A. tibiella* Lundbk.

1920. Lundbk. Vidensk. Meddel. fra Dansk naturh. Foren. 71, 24, 28.

Male. Frons somewhat broader than high, black, slightly greyish and a little shining; inner bristle of lower row a little below the outer and equally distant from it and from the upper supraantennal; supraantennal bristles unequal, the lower somewhat smaller than the upper;

the upper supraantennals as distant as the inner bristles of middle row, the lower distinctly more approximate. Antennæ black, perhaps a little above ordinary size, arista short-pubescent. Palpi dusky yellow, of ordinary size and armature. Thorax black, very slightly shining, with brownish pubescence. Mesopleura bare. Abdomen somewhat robust, black, dull; short hairs just visible at the hind margins of the segments. Hypopygium small and withdrawn, with some hairs below on the sides; ventral plate yellow, short, but broad; anal tube minute, blackish. Legs blackish or blackish brown, front legs a little paler; the legs upon the whole somewhat robust, hind tibiæ distinctly thickened and above, near the knees, suddenly contracted; the hairs below the basal half of hind femora sparse and longish; bristles on hind tibiæ small and fine. Wings not tinged, colourless, thick veins brown, the others more pale; costa about 0,43 of the wing-length, costal divisions about as 15—5—4; costal cilia moderately long; fourth vein a little curved at the origin, for the rest nearly straight. Halteres dark brown.

Female. Similar to the male, but the legs less or not robust and hind tibiæ of common shape; palpi yellow.

Length 1—1,3 mm.

A. tibiella is rare, Ry in Jutland $\frac{9}{7}$ and $\frac{15}{7}$ 1918 (the author); one male and one female. The sexes were taken in the same locality (though not at the same time) and as they are rather agreeing I think it certain that they belong to the same species.

Geographical distribution: — Hitherto only known from Denmark.

145. *A. hirticaudata* Wood.

1910. Wood, Ent. Month. Mag. 2, XXI, 246, 248 (*Phora*). — 1914. Brues, Bull. Wisc. Nat. Hist. Soc. XII, 121. — 1919. Schmitz, Entom. Ber. Nederl. Ent. Ver. V, 142.

Male. Frons somewhat broader than high, greyish black, a little shining; inner bristle of lower row a little below the outer and only slightly nearer to it than to the upper supraantennal; supraantennal bristles unequal, the lower somewhat smaller and weaker than the upper; the upper supraantennals approximate, slightly nearer together than the inner bristles of middle row, the lower still a little more approximate and close the upper. Antennæ smallish, black, arista distinctly pubescent. Palpi blackish, not large, there are three apical bristles of ordinary size, the others small. Thorax black, a little shining,

with blackish brown pubescence. Mesopleura bare. Abdomen deep black, dull, the short hairs almost only visible at the hind margins of the segments and at the sides; at the sides they increase in length behind and are thus conspicuous on the last segments, and they are rather long at the hind margin of sixth segment. Hypopygium of medium size, greyish, when well exposed it shows above in the middle a black, polished spot just at the base; on each side there is a dense group of bristles, stretching from below upwards; the bristles are curved downwards and are strongest below; when seen from behind they present themselves as a dense, vertical series; ventral plate small; anal tube short, black. Legs black or blackish, front legs only slightly paler; hind femora with a few longish hairs below the basal part; bristles on hind tibiæ distinct, but small. Wings somewhat greyish, veins blackish; costa about 0.41 of the wing-length, costal divisions about as 16—6—5 or about 3—1—1, but varying, and sometimes 1 relatively longer; angle at fork somewhat small; costal cilia moderately long; fourth vein evenly and slightly curved. Halteres black.

Female. Similar to the male in all respects, only the palpi a little paler and with the short bristles longer.

Length 0.9—1 mm.

A. hirticaudata is somewhat rare in Denmark; in a churchyard at Copenhagen, Holte and on Bogo south of Sealand (the author); the dates are $\frac{27}{5}$ — $\frac{12}{8}$ in 1917 to 1919; in the first named locality I took it with the net in high grass, especially *Bromus*, and it was here present in rather great numbers.

Geographical distribution: — Besides from Denmark known from England.

146. *A. cinerella* Lundbk.

1920. Lundbk. Vidensk. Meddel. fra Dansk naturh. Foren. 71, 29, 33.

Male. Frons somewhat broader than high, black, slightly greyish and very slightly shining; bristles strong, inner bristle of lower row slightly below the outer and equally distant from it and from the upper supraantennal; supraantennal bristles unequal, the lower scarcely half as large as the upper; the upper supraantennals approximate, about as distant as the inner bristles of middle row or nearer together, the lower more approximate. Antennæ of ordinary size, black, arista almost bare. Palpi more or less dusky to nearly blackish,

of ordinary size and armature. Thorax black, very slightly shining, with dark brownish pubescence. Mesopleura bare. Abdomen black, distinctly greyish, dull; the very short hairs distinctly visible, almost not longer at the hind margins of the segments, except on sixth segment where they are slightly longer. Hypopygium small, greyish, only with short hairs; anal tube somewhat small, brownish or dusky yellow, with a yellow apex. Legs blackish or blackish brown; hind femora with sparse, longish hairs below on the basal half; hind tibiae with distinct, but fine bristles. Wings almost clear or very slightly yellowish, veins brown to blackish brown; costa about 0,36 of the wing-length, costal divisions about as $11-3\frac{1}{2}-3$ and thus nearly $4-1-1$; costal cilia long, but not specially long; fourth vein evenly curved, especially at both ends. Halteres yellow.

Female. Unknown.

Length 1,4—1,7 mm.

A. cinerella has only been taken in Copenhagen and in Holte (Th. Mortensen, the author), but does not seem to be rare; the dates are $\frac{22}{5}-\frac{27}{8}$ in 1917 to 1921. I have sometimes taken it on windows. All specimens are males and I have seen no female which could be thought to belong here.

Geographical distribution: — Hitherto only known from Denmark.

147. *A. halterata* Wood.

1910. Wood, Ent. Month. Mag. 2, XXI, 196, 202 (*Phora*). — 1914. Brues, Bull. Wisc. Nat. Hist. Soc. XII, 120. — 1919. Schmitz, Entom. Ber. Nederl. Ent. Ver. V, 142.

Male. Frons broader than high, greyish black, dull; inner bristle of lower row a little below the outer and slightly nearer to it than to the upper supraantennal; supraantennal bristles unequal, the lower scarcely half as large as the upper; the upper supraantennals approximate, nearer together than the inner bristles of middle row, the lower slightly more approximate. Antennæ a little large, blackish or brown, sometimes reddish; arista short-pubescent. Palpi yellow of ordinary size and armature. Thorax black, sometimes paler to brownish red; it is somewhat shining, with brownish pubescence. Mesopleura bare. Abdomen black, dull, the short hairs slightly longer at the hind margins of the segments; venter somewhat pale, lighter or darker brownish, the apical part densely clothed with conspicuous hairs or bristles. Hypopygium of medium size, greyish black, on each side

with two approximate bristles below near base, and besides with small hairs; anal tube somewhat small, yellow. Legs yellow, hind femora somewhat darkened at apex, the hairs below the basal half sparse and somewhat long; bristles on hind tibiæ small, but distinct. Wings more or less yellowish or brownish yellow, veins brown or pale brown; costa about 0,37 of the wing-length, costal divisions about as 4—1—1; third vein a little thickened, and bent a little sud-



Fig. 121. Wing of *A. halterata* ♂.

denly upwards at apex, angle at fork somewhat small; costal cilia long; fourth vein straight or nearly in its first two thirds, then curving upwards and again distinctly recurved in the apical part. Halteres yellow.

Female. Similar; antennæ smaller; venter likewise conspicuously haired in the apical part.

Length. Fully 1 to 1,6 mm.

A. halterata is not rare in Denmark; Copenhagen, Dyrehaven, Holte, Ørholm, Hillerød and on Ærø (Th. Mortensen, the author); the dates are $^{21}/_5$ — $^{28}/_{10}$ in 1917 to 1921. It may be taken on windows, but also in woods.

Geographical distribution: — Denmark, England and, according to a specimen sent from Pater Schmitz, also Holland.

Remarks: Wood divides the species into a larger, darker form with brown halteres, and a smaller, generally paler form with yellow halteres, and he declares the former to occur in woods, the latter indoors and in gardens; as said above I have taken my specimens both indoors and in woods, and they have all yellow halteres. I think it possible that Wood has mixed his species with the very similar *fuscoghalterata*.

148. *A. plurispinosa* Lundbk.

1920. Lundbk. Vidensk. Meddel. fra Dansk naturh. Foren. 71, 28, 32.

Male. Frons broader than high, greyish black, dull; inner bristle of lower row a little below the outer and about equally distant from it and from the upper supraantennal; supraantennals small, unequal, the lower about half as large as the upper; the upper supraantennals slightly more approximate than the inner bristles of middle row, the lower direct below the upper, almost not nearer together. Antennæ a little above ordinary size, black, arista very short-pubescent. Palpi yellow, of ordinary size and armature. Thorax black, only slightly shining, with brownish pubescence. Mesopleura bare. Abdomen somewhat robust, black, dull, with narrow, paler hind margins to the segments; the short hairs hardly visibly longer at the hind margins of the segments, but the lateral margins and the last segment rather hairy; venter yellowish brown to dark brown, the hinder part densely bristly as in *halterata*. Hypopygium somewhat small, greyish, on each side there is an oblique row of four bristles which are directed downwards, and above and behind these latter some smaller hairs, decreasing in size upwards; anal tube short, yellowish, dusky towards the base. Legs light brownish yellow, hind femora brown at tip, with a few longish hairs below the basal half; bristles on hind tibiæ distinct, but fine. Wings yellowish or brownish, veins brown; costa about 0,40 of the wing-length, costal divisions about as 11—3—3; third vein rather thickened; angle at fork a little acute; costal cilia long; fourth vein almost straight in its first part, curved upwards towards the end and a little recurved at apex. Halteres yellow.

Female. Unknown.

Length 1,7 mm.

This species resembles *halterata* in the costal divisions and the course of the fourth vein, but is distinguished by the more bristled hypopygium, and it is a much more black species.

A. plurispinosa is a rare species, only three males have been taken; Copenhagen ¹³/₆ 1919, Valby ²⁷/₈ 1920 (the author) and Holte ⁹/₁₀ 1921 (Th. Mortensen); all three specimens were taken on windows.

Geographical distribution: — Hitherto only known from Denmark.

149. **A. fuscohalterata** Schmitz.

1919. Schmitz, Entom. Ber. Nederl. Ent. Ver. V, 142, 144.

Male. Frons broader than high, blackish grey, dullish or with an indication of being shining; sometimes it is reddish at the lower corners; inner bristle of lower row below the outer and nearer to it than to the upper supraantennal; supraantennal bristles unequal, the lower quite small; the upper supraantennals a little more approximate than the inner bristles of middle row and the lower seem to be slightly more approximate. Antennæ black to reddish brown, a little large; arista distinctly though short-pubescent. Palpi yellow, of ordinary size and armature. Thorax black to brown or reddish brown, a little shining, with brown pubescence. Pleura varying in colour like the dorsum, but generally paler. Mesopleura bare. Abdomen black, dull; the short hairs almost only visible at the hind margins of the segments; venter yellow to dark brown or blackish, not strongly haired as in *halterata*. Hypopygium somewhat small, greyish black or brownish, with three or four bristles on each side below at the base and in a nearly vertical or more oblique row, and, besides, with some smaller hairs upwards; anal tube small, yellow or more or less dusky. Legs yellow or yellowish, hind femora with longish hairs below the basal half; bristles on hind tibiæ visible, but small and fine. Wings yellowish or brownish, veins pale to dark brown; costa about 0,43 of the wing-length, costal divisions about as 18—8—5 (or about the same as Schmitz gives viz 11—5—3); third vein a little thick; angle at fork not small, sometimes rather acute and then the fork longish; costal cilia long or more moderately long; fourth vein evenly curved in the whole length and not or almost not recurved at apex. Halteres brown to yellow.

Female. Similar to the male; the angle at fork always acute. Length 0,8 to about 1,5 mm.

Remarks: I do not feel sure as regards this species, the specimens in my material varying to no slight degree; as described above they vary in colour and as regards the fork and its angle; further the antennæ may be smaller than described, the colour of the wings varies and likewise the length of the costal cilia; that the hypopygium shows three or four bristles is, I think, of no consequence, for it may be due to one of the hairs being specially developed, and for the rest the exact number is often difficult to decide; the costal divisions and the fourth vein, on the other hand, are rather constant. I have examined

a type-specimen from Pater Schmitz and it seems to me to agree well with my average-specimens; the type-specimen has yellow halteres. Schmitz describes the hypopygium with two bristles, but in a letter to me he has declared that he had found later on that there are in reality three. The species is nearly related to *halterata*, but is in the male distinguished by the bristles on hypopygium being more than two, and in both sexes by the length of costa, the costal divisions and the course of the fourth vein. I possess a large material, but perhaps more than one species are hidden in it; I am, however, at present unable to find distinguishing characters.

A. fuscohalterata, as taken above, is common in Denmark, much more common than *halterata*; Søndermarken, Gentofte, Ørholm, Geel Skov (the author), Holte, Hillerød, Alindelille, Suserup Skov at Sorø (Th. Mortensen), Bogø south of Sealand, Stensby Skov in South Sealand, on Langeland at Lohals and in Jutland at Hejls south of Kolding, Jelling, Ry and Laven (the author); my dates are $\frac{4}{5}$ — $\frac{15}{10}$ in 1917 to 1921. I have never taken it on windows. I took it in copula on $\frac{20}{9}$, the male of this mated pair was black, the female paler with a yellowish red thorax.

Geographical distribution: — Hitherto known from Denmark and Germany.

150. *A. pallidizona* Lundbk.

1920. Lundbk. Vidensk. Meddel. fra Dansk naturh. Foren. 71, 27, 31.

Male. Frons rather broad, $1\frac{1}{2}$ times as broad as high or still broader, grey or blackish grey, dull; bristles strong, inner bristle of lower row below the outer and nearer to it than to the upper supra-antennal; supraantennal bristles not large, unequal, the lower scarcely half as large as the upper; the upper supraantennals a little more approximate than the inner bristles of middle row, the lower not or slightly more approximate. Antennæ above ordinary size, reddish to dark brown, arista apparently almost nude. Palpi yellow or pale yellow, somewhat narrow, the three apical bristles well developed, the others shorter. Thorax varying from blackish brown to red, a little shining, with brown pubescence. Pleura brown or red, palest anteriorly. Mesopleura bare. Abdomen black, dull, often with very narrow, paler hind margins to the segments; the basal half of the first segment, the fifth segment and a triangular basal spot on the sixth segment yellow or red; these colours may be rather obscured,

but are always visible to some degree; the very short hairs a little longer at the hind margins of the segments; venter yellow, its apical part not so densely bristly as in *halterata*, though distinct hairs are seen. Hypopygium somewhat small, black or greyish black, with one conspicuous bristle below on each side; ventral plate short, rectangular, whitish or yellow; anal tube short, yellow. Legs yellow or pale yellow, hind femora brownish just at apex, with sparse, slightly longish hairs below the basal half; bristles on hind tibiæ small, but distinct. Wings yellowish, veins yellow or pale brownish; costa about 0.42 of the wing-length, costal divisions about as 11—4—3; third vein a little thickened; costal cilia long; fourth vein very slightly curved in its first part, curved upwards towards the end and slightly recurved at apex. Halteres pale yellow.

Female. Similar; frons often reddish; antennæ a little smaller than in the male; abdomen without the characteristic pale colouring.

Length 1.2—1.7 mm.

This species is in the male known by the hypopygium and the curious colouring from *halterata* and *fuscohalterata*, and the female is known from *halterata* by the longer costa and other costal divisions, but from the female of *fuscohalterata* I cannot satisfactorily distinguish it.

A. palidizona does not seem to be rare in Denmark; Copenhagen, Ermelund (the author), Holte, Hillerød (Th. Mortensen), Tisvilde, and on Bogø south of Sealand (the author); my dates are $15\frac{1}{5}$ — $30\frac{1}{8}$ in 1916 to 1919. It was sometimes taken indoors on windows.

Geographical distributions:—Hitherto only known from Denmark.

151. *A. albicaudata* Wood.

1910. Wood, Ent. Month. Mag. 2, XXI, 245, 247 (*Phora*). — 1914. Brues, Bull. Wisc. Nat. Hist. Soc. XII, 111.

Male. Frons broader than high, black, a little greyish and dull; bristles strong, inner bristle of lower row almost not below the outer, nearer to it than to the upper supraantennal; supraantennal bristles rather large, equal or nearly, the upper approximate, a little nearer together than the inner bristles of middle row, the lower still more approximate. Antennæ of ordinary size, black, arista quite short-pubescent. Palpi yellow, of ordinary size, the bristles somewhat long. Thorax black, sometimes a little brownish, very slightly shining, with dark brown pubescence. Pleura more or less brownish anteriorly.

Mesopleura bare. Abdomen black, a little greyish, dull; the short hairs distinctly visible, a little longer at the hind margins of the segments and here increasing a little in length towards the end; venter yellowish brown. Hypopygium of medium size or a little large, whitish or pale yellow, only greyish or greyish black at the apex; on the sides there are numerous conspicuous hairs; below there is a large, pale yellow or whitish ventral plate; anal tube somewhat short, but high, dark with the apex paler. Legs yellow, hind femora more or less dark at apex and also hind tibiæ a little darkened just at the end; hind femora with sparse, somewhat long hairs below the basal half; bristles on hind tibiæ distinct, fine, but not quite short; the apical spur on middle tibiæ rather long, nearly as long as metatarsus. Wings yellowish or light yellowish brown, veins pale brown; costa 0,43—0,44 of the wing-length, costal divisions about as 13—6—4; costal cilia long or very long; fourth vein almost straight in the middle, but curved in both ends. Halteres yellow.

Female. Similar to the male and hind femora with similar hairs below; abdomen often somewhat pale or translucently brownish; the end-lamellæ rather large, almost hammer-shaped.

A. albicaudata is somewhat rare in Denmark; Geel Skov (the author), Holte, Hillerød and Suserup Skov at Sorø (Th. Mortensen); the dates are $^{12}/_4$ — $^{18}/_{10}$ in 1917 to 1921.

Geographical distribution: — Besides in Denmark occurring in England and, according to a specimen sent from Pater Schmitz, also in Holland.

152. *A. spinicincta* Wood.

1910. Wood, Ent. Month. Mag. 2, XXI, 245, 248 (*Phora*). — 1914. Brues, Bull. Wisc. Nat. Hist. Soc. XII, 133.

Male. Frons slightly broader than high, greyish black, dull; bristles strong, inner bristle of lower row very slightly below the outer and in about the middle between it and the upper supraantennal; supraantennal bristles not large, unequal, the lower quite small; the upper supraantennals approximate, about as distant as the inner bristles of middle row, the lower slightly more approximate. Antennæ somewhat small, brownish black, arista short-pubescent. Palpi yellow, of ordinary size, with moderately long bristles. Thorax black, slightly shining, with brownish pubescence. Mesopleura bare. Abdomen black, dull, the short hairs a little longer at the hind margins

of the segments, and here increasing in length behind; on the sixth segment the hairs at the hind margin form a row of long bristles all round, but shorter on the ventral side. Hypopygium small, greyish, with numerous hairs on the sides; anal tube small, dusky yellow. Legs yellow, hind femora not or slightly darkened at apex, with sparse, somewhat long hairs below the basal half; bristles on hind tibiæ fine, but distinct and not quite short. Wings yellowish, veins brown or pale brown; costa about 0.43 of the wing-length, costal divisions about as 11—6—4, thus 1 about equal to 2 + 3; costal cilia long; fourth vein somewhat curved at the origin, for the rest very slightly curved. Halteres yellow.

Female. Unknown.

Length 1.5 mm.

A. spinicincta is rare in Denmark, only two specimens, both males, have been taken, Hillerød ¹⁵/₇ 1917 and Suserup Skov at Sorø ³¹/₇ 1918 (Th. Mortensen).

Geographical distribution: — Besides in Denmark occurring in England and, according to a communication from Pater Schmitz, in Holland, and it is also known from Prussia (Schmitz, Tijdschr. v. Entom. LXIV, 1921, 4).

153. *A. sylvatica* Wood.

1910. Wood, Ent. Month. Mag. 2, XXI, 245, 248 (*Phora*). — 1914. Brues, Bull. Wisc. Nat. Hist. Soc. XII, 134.

Male. Frons somewhat broader than high, greyish black, dull; bristles strong, inner bristle of lower row in about the same height as the outer and in the middle between it and the upper supraantennal; supraantennal bristles unequal, the lower rather small; the upper supraantennals approximate, less distant than the inner bristles of middle row, the lower still a little nearer together. Antennæ smallish, brownish black, arista short-pubescent. Palpi yellow, not large, with ordinary bristles. Thorax black, very slightly shining, with brownish pubescence. Mesopleura bare. Abdomen black, a little greyish, dull; the very short hairs scarcely longer at the hind margins of the segments, only on sixth segment a little longer. Hypopygium somewhat small, greyish black, with short hairs on the sides below, the lower hinder corners drawn a little out; ventral plate yellowish, somewhat flap-like, reaching to near the end of the hypopygium; anal tube yellow, of medium length, but high. Legs brownish yellow,

hind femora darkened at apex, with sparse, longish hairs below the basal half; bristles on hind tibiæ not quite small, about six or seven on the lower two thirds, the rest smaller. Wings brown, veins strong, brown or dark brown; costa about 0,40 of the wing-length, costal divisions about as 10—5—4; costal cilia long; fourth vein a little curved at the origin, for the rest slightly curved. Halteres yellow.

Female. I have not seen the female, but, according to Wood, it seems fully to agree with the male.

Length 1,4 mm.

A. sylvatica seems to be very rare in Denmark, I possess only one specimen, a male, taken in Holte ¹⁶/₅ 1920 (Th. Mortensen).

Wood's description of this species is rather short, but I think my determination is correct, as my species, as seen from the description, agrees well with Wood's description. I possess another specimen, likewise a male, which I took at Hejls south of Kolding ⁹/₇ 1919; it is smaller, with paler legs and the wings scarcely as brown, but might, however, no doubt be only a smaller and weaker specimen, but the second costal division is relatively a little longer, and the costal cilia longer, so that at present it remains doubtful.

Geographical distribution: — Hitherto known from Denmark and England.

154. *A. laeta* Lundbk.

1920. Lundbk. Vidensk. Meddel. fra Dansk naturh. Foren. 71, 29, 34.

Male. Frons considerably broader than high, greyish, dull; bristles strong, inner bristle of lower row slightly below the outer and slightly nearer to it than to the upper supraantennal; supraantennal bristles unequal, the lower scarcely half as large as the upper; the upper supraantennals a little more approximate than the inner bristles of middle row, the lower direct below the upper. Antennæ somewhat small, black or brown, arista slightly pubescent. Palpi yellow, of ordinary size and armature. Thorax black with a slight greyish hue; it is almost dull, with brownish pubescence. Mesopleura bare. Abdomen somewhat tapering behind, grey, in some lights bluish grey, dull, with very narrow pale hind margins to the segments, broadest on the sixth segment; the short hairs distinctly visible and slightly longer at the hind margins of the segments. Hypopygium somewhat large and nearly cylindrical, greyish, on the sides it has numerous short hairs; ventral plate small, whitish yellow, triangularly

pointed; anal tube short, but somewhat high, yellow. Legs yellow, hind femora dark at apex, with longish hairs below the basal half; bristles on hind tibiæ of medium size; apical spur on middle tibiæ long, nearly as long as metatarsus. Wings clear or nearly so, veins yellow; costa about 0,39 of the wing-length, costal divisions about as 12—5—4; costal cilia long; fourth vein a little curved at the origin and evenly curved towards the end. Halteres yellow.

Female. Unknown.

Length. About 2 mm.

A. laeta is rare; Holte ²¹/₇ and ¹²/₈ 1918 (Th. Mortensen), only two males.

Geographical distribution: — Hitherto only known from Denmark.

11. **Phalacrotophora** Enderlein.

This genus is very nearly related to and in most respects similar to *Aphiochaeta*. The species are of black and yellow variegated colour, only one species (the American *halictorum* Mel. et Brues) is black. Frons high and narrow, from somewhat higher to twice as high as broad; it is somewhat arched, generally shining, with an impressed longitudinal middle line which is sometimes rather weak. There are three transverse rows of bristles, the anterior row of which is characteristic in the way that its inner pair of bristles is always much below the outer and either nearer together or vertically below these latter, near the eye-margin; the supraantennal bristles are generally weak and small and are either two pairs, or often only one pair. Eyes hairy. Antennæ with the third joint round, of the usual shape in *Aphiochaeta*, or it is elongated, oval and somewhat large; arista dorsal, short or longer. Palpi generally smallish and generally with somewhat short bristles. Postocular, oral and genal bristles as in most species of *Aphiochaeta*, viz one long lower postocular bristle, one oral and a couple of smaller genal bristles. Thorax with one pair of dorsocentral bristles. Scutellum with four bristles or the anterior pair quite small hairs so that only one pair of bristles is present. Mesopleura generally bare, in *epeiræ* Brues (American) with bristles, among which one or two longer. Abdomen in the male as in *Aphiochaeta*; the anal tube of hypopygium with the apical hairs generally strong; as regards abdomen in the female I shall describe it as it is constructed in the

European species (fig. 122), as I do not know whether the other species show the same construction; the four first abdominal segments are normal, the next segment is large and it has no chitinized tergite; it is narrowed behind and continued into a long connecting membrane; the following segment is long, narrow and cylindrical and has also behind a long connecting membrane and is not distinctly chitinized; then follows a cylindrical, chitinized segment at the end of which

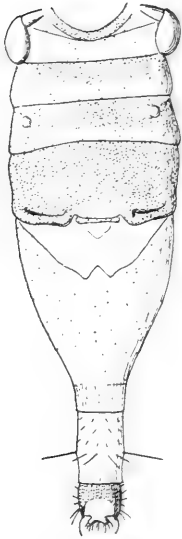


Fig. 122.
Ph. berlinensis ♀,
abdomen from
above.

the small apical segment with the lamellæ is found; the last segments together form a long, somewhat ovipositor-like part. At the front margin of the third segment at each side is a small, flat papilla or elevation of unknown function. At the basal part of the large, unchitinized segment following after the fourth, there is a somewhat large, specially thin-skinned and in the living state translucent area of a regular outline, also of unknown function. Abdomen is, as in the male, apparently bare, only at the hind margin of the cylindrical segment following after the large, unchitinized one there are long, erect hairs, and this segment has also distinct, short hairs. If we now count the abdominal segments, according to the given description, we come to the following result: first there are four normal segments, then a large, unchitinized fifth segment, a narrow, cylindrical sixth segment, a chitinized seventh segment at the end of which the small apical segment and the lamellæ, together representing the eighth and ninth segments; this would give one segment less than found in *Aphiochaeta*;

I am, however, convinced that the above way of counting is not correct, for the segment counted as the sixth evidently answers to the seventh in *Aphiochaeta*, which generally also has distinct hairs round the hind margin; and likewise the segment counted as the seventh no doubt answers to the eight in *Aphiochaeta*; now it seems to me that there is, at the base of the large, unchitinized segment, counted as the fifth, a small chitinization present, which would then represent the real fifth segment, but I have not been able to demonstrate this with certainty; (if the said chitinization represents the fifth segment, the facts would here be much as in *Chaetoneurophora thoracica*). How this now may be, no doubt the large, unchitinized

segment represents the sixth segment, or perhaps both the fifth and sixth; if so I think that the specially thin-skinned area at the base of it answers to the emargination in the front margin of the sixth tergite mentioned under *Aphiochaeta*, and we get upon the whole full conformity in the principal construction of abdomen in the two genera. Legs as in *Aphiochaeta*, but the posterior tibiæ have always, besides the posterodorsal row of bristles, also an anterodorsal row of smaller bristles, not reaching quite to the apex; in one species (*fasciata*) the hind metatarsi are thickened. Wings as in *Aphiochaeta*; costa from rather short to half the wing-length; the costal cilia generally short.

The developmental stages of the genus are known, but do not seem to have been described. Westwood mentions (Introduct. II, 1840, 575) the larva of *fasciata* (*atricapilla*) hanging on a pupa of a *Coccinella*; Rondani (Atti Soc. Ital. Sc. nat. Milano, II, 1860, 165) bred *fasciata* from pupæ of *Coc. septempunctata*; the author thinks it a parasite; Giraud (Schin. F. A. II, 1864, 343) found the larvæ of the same species in pupæ of *Coc. marginepunctata*; de Meijere (Tijdschr. v. Entom. 50, 1907, 189) bred the species (*nigrocincta* de Meij. = *fasciata* Fall. see Villeneuve, Wien. Ent. Zeitg. XXXII, 1913, 128) from a pupa of a *Coccinella*, but does not think it is parasitical; Martelli (Bull. Labor. Zool. Gen. e Ag. Portici, IX, 1914, 155) bred the species from pupæ of *Thea vigintiduopunctata* and *Adonia marginata*; he observed that the imago sucks the Coccinellid larvæ, but does not otherwise think it is parasitical; Buysson (Bull. Soc. Ent. de Fr. 1917, 249) bred it from the pupa of *Coc. septempunctata*, he considers the species as parasitical; the imagines emerged on $12\frac{1}{7}$; Lichtenstein has (Compt. Rend. Hebdom. Acad. des Sc. 170, 1920, 531) bred the species from *Thea vigintiduopunctata* and *Vibidia duodecimguttata*; he saw the imagines sucking the Coccinellid larvæ and pupæ, but without killing them; the eggs, one or more, were laid only on the pupæ, between the legs; sometimes these pupæ were first sucked; the larva hatches and goes into the pupa; it devours this empty in two days and then bores itself out, and in the course of a day it pupates on the leaf or in the ground; the imagines emerge in two to three weeks. The author thus seems to have stated that the species is a true parasite, for the sucking of the pupa before egg-deposition did not kill the pupa, moreover such pupæ were able to develop, and further it was not always that the pupæ, on which eggs were deposited, were sucked. Malloch (Proc. U. S. Nat. Mus. 43, 1912,

412) records the American species *epeirae* bred from egg cocoons of *Epeira* and *nedae* from *Neda marginalis*, but without further remarks.

According to the above, it seems that at all events *fasciata* is a parasite, and that is perhaps the case with all the species in the genus, as also the American species seem to live in a similar way. The curious, ovipositor-like shape of the end of the female abdomen also points in this direction, and this shape is, I think, present in all species, since Schmitz mentions it among the generic characters, though he only says it is generally present (Jaarb. Natuurh. Genootsch. Limburg, 1919, 126). There is, however, about the parasitism some facts to take into consideration; there is the curious observation, mentioned by Martelli and Lichtenstein, that the imagines sucks the larvæ and pupæ of the Coccinellids; I do not think it impossible that this sucking has the intention to weaken the pupæ, even if a sucked pupa may be able to develop, when no egg is laid on it, for I do not think the species as imago feeds on the larvæ and pupæ, they are at all events certainly not exclusively dependent on them. Wood remarks that he has seen the females of *fasciata* swarming at an old, half decayed tree, and I have always taken the female of *berolinensis* on and swarming around ulcerated spots on trees; though it seems to be only the females which are swarming thus, they are certainly not present here for depositing the eggs, but must be thought to seek these places for food. The males of these species are not present in the swarms and are rarely met with.

The genus *Phalacrotophora* was created by Enderlein in 1912 (Stett. Ent. Zeitg. 1912, 21), but insufficiently characterized; it was, therefore, not accepted by Malloch (Proc. U. S. Nat. Mus. 43, 1912, 518), while Brues, on the other hand, accepted it. Schmitz likewise accepts it (l. c.) after study of the type-species, and he gives a new generic diagnosis; the author here lays great stress on the arrangement of the frontal bristles, and considers them as arranged in four transverse rows; I am not able to see that this is so, the four anterior bristles I take as belonging to one row just as in the *picta*-group of *Aphiochaeta*, and fully homologous with the four bristles of the anterior row in any *Aphiochaeta*; the lower bristles of the row are sometimes placed distant from the eye-margin (*fasciata*, *berolinensis*), sometimes vertically below the outer, at the eye-margin (*bruesiana*). Nevertheless I keep the genus, because I think it natural; its main characters are, I think, the high frons and the arrangement of the frontal bristles in connection with the double row of bristles on the posterior tibiæ,

and further the curiously constructed female abdomen (which I am inclined to think will be found in all species); the systematic importance of this latter character is already referred to by Schmitz (Wien. Ent. Zeitg. XXXV, 1916, 233). I think these characters will prove sufficient to distinguish any species from species of the *picta*-group.

Of the genus at present 10 species are known from the world (Europe, North and South America, South Africa, Java), three of these are European; one species, *berolinensis*, has been found in Denmark, but no doubt also *fasciata* will be found here.

1. *Ph. berolinensis* Schmitz.

1920. Schmitz, Entom. Ber. Nederl. Ent. Ver. V, 253.

Male. Frons a little higher than broad, grey, dullish or slightly shining, at the anterior margin it is reddish; the median furrow distinct; bristles strong, the inner bristles of lower row much below the outer and rather near to each other, each bristle placed double as near to the middle line as to the eye-margin (fig. 123); only one pair of very small, approximate supraantennal bristles. Antennæ yellow, somewhat large, third joint oval; arista short, short-pubescent (fig. 124). Palpi yellow, the bristles short. Thorax yellow, almost not shining, with blackish pubescence. Scutellum with two bristles; postscutellum dark. Mesopleura bare. Abdomen black, dull, first segment yellow and abdomen sometimes indeterminate reddish on the middle of the last segments; the hairs are so small that abdomen is apparently bare, only on sixth segment hairs are visible. Venter yellow. Hypopygium small, unsymmetrical, with a large, roundish, yellowish ventral plate; anal tube large, yellow or blackish with the apex a little paler, the apical hairs unusually large. Legs yellow, hind femora somewhat broad, with long hairs below the basal half; hind tibial bristles strong, and also the bristles on middle tibiæ strong in the upper two thirds; besides the posterodorsal bristles the posterior tibiæ have also a row of anterodorsal bristles in about the upper half. Wings a little yellowish

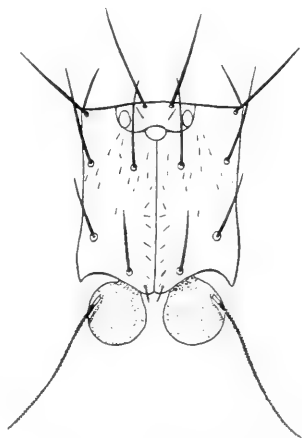


Fig. 123. Frons of
Ph. berolinensis ♀.

tinged, veins brownish yellow; costa short, about 0,40 of the wing-length; 1 about double 2 + 3; costal cilia short; mediastinal vein not observable; fourth vein shallowly curved in its first part and slightly recurved towards apex. Halteres yellow.

Female. Similar to the male; antennæ almost of the same size; the hairs representing the anterior scutellar bristles generally stronger. Abdomen with the first segment reddish, the next three black, but the second reddish at the sides; the fifth segment orange, brownish on the thinner apical part. Abdomen is of a curious construction; I shall here describe it as it presents itself for a simple examination, as regards the real numbering of the segments referring to the above generic description. The third segment has on each side at the front margin a small, flat papilla; the fifth segment is large, but has no chitinized tergite, at the base it has a large, quite membraneous area, which is clear and translucent in the living specimens; the end of abdomen is long and narrowed, ovipositor-like, the sixth segment has long, erect hairs round the hind margin; the last segment is chitinized, its hind margin is obliquely cut and has on each side a small, upwards pointing, black tooth; the segment is clothed with hairs below.



Fig. 124. Antenna of
Ph. berolinensis ♀ × 135.

Length 1,6—2,5 mm, the latter size is for the female with the ovipositor-like end of abdomen included.

Ph. berolinensis is not rare in Denmark; Dyrehaven, Espergærde (the author), Holte (Th. Mortensen), Geel Skov, Bogø south of Sealand (the author), on Funen at Veflinge (H. J. Hansen) and in Jutland at Jelling and in Ry Nørreskov (the author); my dates are $^{14}/_6$ — $^{26}/_7$. My material is taken from 1912 to 1921, but at Veflinge two specimens were taken about 1883. The females are found on ulcerating stems of trees and may be seen hovering in swarms round such places; the male seems, like the male of *fasciata*, to be rare, I have taken only three specimens on leaves of bushes.

Geographical distribution: — Hitherto known only from Denmark and Germany.

Remarks: As this species was detected there might, as also

Schmitz has remarked to me, arise some doubt, whether the present species or the one considered as *fasciata* by Becker and Wood was the real *fasciata* of Fallén, as the two species are rather similar, and the more so as *berolinensis* proved to be common in Denmark, while *fasciata* was not found here. I have, therefore, examined Fallén's types, which are found in Zetterstedt's collection, and it turned out that Fallén's species is the same as the one named so by Becker and Wood, and it is well distinguished from *berolinensis* by the higher, yellow and shining frons and the thickened hind metatarsi.

12. **Pseudacteon** Coquillett.

Small species. Frons not much broader than high, with a middle furrow and with four rows of bristles; the three upper rows consist each of four bristles and are about straight, the fourth row consists of only two lateral bristles, the inner bristles wanting; there is one pair of supraantennal bristles which are directed downwards and as large as the other bristles (fig. 125). Eyes not hairy. Antennæ with the third joint oval, with a short, apical arista. Palpi normal, with bristles especially on the outer half. There is, as far as I have been able to see, one long, lower postocular bristle and one oral bristle. Thorax with one pair of dorsocentral bristles. Scutellum with four bristles, the outer smaller than the inner. Mesopleura bare. Abdomen short in the male, second and sixth segments a little elongated. Hypopygium small, the anal tube long, with the apical pair of hairs rather strong. In the female the abdomen ends with a somewhat long, pointed and strongly chitinized ovipositor (in foreign species the ovipositor may be otherwise shaped). Abdomen is sparingly haired. Legs not slender; they are constructed mainly as in *Aphiochaeta* and without single bristles, the posterior tibiæ likewise with a dorsal palisade-like hair-seam and posterior to it a row of fine bristles or hairs; on the middle tibiæ the seam reaches only to below the middle; at the apex on the posterior side of hind tibiæ an arrangement of the hairs in transverse rows is discernible, and also on the posterior side of metatarsi. The posterior tibiæ have apical spurs, small on hind tibiæ, longer on middle tibiæ. Claws, pulvilli and empodium normal, but small. Wings with costa short, and costal cilia short or moderate; mediastinal vein not uniting with the subcostal vein; third vein unforked.

The developmental stages do not seem to be known or, at all

events, not to be described, but it is well known that the species are parasitic on ants. The European species has *Lasius niger* as its normal host, but has also been observed by some other species of ants, as mentioned below under this species. The other six species of the genus (which I take as well distinguished from *Plastophora*, see Schmitz, Zool. Mededeel. 's Rijks Mus. Leiden, II, 30) occur in the West Indies and North and South America, and of them all or almost all it is known that they are parasitic on *Solenopsis geminata*, behaving in a similar way as the European species. (It has also been suggested for *Ps. solenopsidis*, which was observed to chase only ants marching with prey, that the Phorid tried to oviposit in the prey, see Schmitz, Deutsch. Ent. Zeitschr. 1915, 502).

To the genus only one European species belongs, also occurring in Denmark.

1. *Ps. formicarum* Verrall.

1877. Verr. Journ. Linn. Soc. London, XIII, 258 (*Phora*). — 1908. Wood, Ent. Month. Mag. 2, XIX, 168, 174, fig. (*Phora*). — 1910. Kertész, Cat. Dipt. VII, 415 (*Plastophora*). — 1914. Brues, Bull. Wisc. Nat. Hist. Soc. XII, 137 (*Plastophora*). — 1918. Schmitz, Jaarb. Natuurh. Genootsch. Limburg 1917, 124.

Male. Frons a little broader than high, greyish black, dull; antennæ brownish or blackish brown, third joint oval; arista apical, short and straight, apparently bare. Palpi yellow, with ordinary bristles on the outer part. Thorax blackish, dull, with brownish pubescence and one pair of dorsocentral bristles. Scutellum with four bristles, the outer smaller than the inner. Pleura brownish. Abdomen short, black and dull, very sparingly haired. Hypopygium small; anal tube long, yellow, it is thin at the base, but much broadened outwards and thus high near the apex, and it is

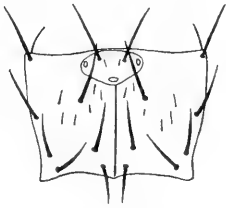


Fig. 125. Frons of
Ps. formicarum ♂.

strongly compressed with the pair of apical hairs distinct and somewhat large. Legs somewhat robust, front tarsi with the joints short, the fifth being the longest; hind femora a little dilated and also hind tibiæ, especially outwards; the legs are yellow or yellowish, hind femora with some sparse, somewhat strong anteroventral hairs below the apical half; hind tibiæ with the posterodorsal row of hairs small. Wings a little yellowish, veins brownish or pale brownish; costa

short, costal cilia moderately short; third vein somewhat strong with the apical part thickened; fourth vein evenly curved. Halteres blackish or brownish.

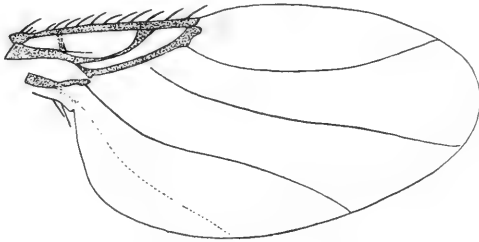


Fig. 126. Wing of *Ps. formicarum* ♂.

Female. Quite similar; the ovipositor pointed, black and shining; the hairs at the hind margin of sixth segment conspicuous.

Length 0,7 to fully 1 mm.

Ps. formicarum does not seem to be common in Denmark, but this is probably only because it has not been sought for in the right way; I have only taken it on Bogø south of Sealand on $^{30}/_7$ — $^6/_8$ 1917; I took it here with the net in grass in a garden, and it was present somewhat numerous; I have also seen a specimen in Lyngby Mose on $^{11}/_6$ 1918. I have, however, never searched for it at the nests of *Lasius niger*; it is known to be parasitic on this ant; Wasmann mentions (Biol. Zentralbl. 38, 1918, 317) that when in summer material from the nest of the said ant is spread out, the females of the Phorid occur numerous, hovering over the worker-ants, rushing down on them to sting them between the abdominal segments and here laying the egg. Donisthorpe has mentioned that the species also chases *Lasius flavus*, *unbratus*, *fuliginosus*, *Formica sanguinea*, *Tapinoma erraticum* and *Myrmica lobicornis*, but Wasmann gives good reasons for the opinion that its normal host is *Lasius niger*, and this author gives l. c. upon the whole an interesting account of its biology to which I refer. My specimens seem to be darker than those originally described, they have the legs yellowish to nearly brownish yellow, and the halteres blackish or brownish, while Verrall described both legs and halteres as pale yellow, and so also Strobl; a Dutch specimen from Pater Schmitz is, however, similar in colour to my specimens.

Geographical distribution: — Besides from Denmark known from Britain, Holland and down into Styria, and it is probably widely distributed.

13. **Gymnophora** Macqu.

Species of medium size. Head a little longer than in the other genera, with the posterior side a little arched and the frons flat; it is somewhat triangular in profile. Frons about as high as broad, it is a little narrowed anteriorly, the front margin is triangularly produced and has above a small, elongated impressed pit, but there is no longitudinal middle furrow; of frontal bristles there are only four in a row on vertex, and they are small; in some species also the outer bristles of the next row are present, they are quite small and placed near the upper outer bristles, they may be individually absent or present, and, likewise individually, there may be four bristles developed in this row; for the rest the frons has short hairs. Eyes hairy. Antennæ small, third joint globular with a long, pubescent, dorsal arista with the two basal joints short. Palpi somewhat small, club-shaped, with short bristles. Clypeus somewhat protruding, most in the female. The postocular bristles are only small hairs and the lower are not larger; there are no postvertical bristles. The jowls are a little descending below the eyes; the oral aperture large; there are no oral nor genal bristles, only small hairs along the oral margin. Thorax has behind, in front of scutellum a flattened area, from which two more or less impressed lines stretch forwards to the anterior end; also the transverse furrow is a little indicated; thorax has short hairs and two small dorsocentral bristles, placed far towards the sides. Scutellum has four small bristles, likewise towards the sides, individually six bristles may occur. Mesopleura with some few hairs above. Abdomen has in the male the sixth segment elongated. Hypopygium is generally hidden in the sixth segment, only rarely exposed; as far as I have been able to see (mainly in *arcuata*) the tergite is symmetrical or nearly so, shining, between the side parts the anal tube as usual projects, it is short or a little longer, depressed and hairy; there is the curious fact that the hypopygium is always turned to the left so that the anal tube is seen on the left side; below, that is opposite the anal tube, on the right side, a curious, flat and pointed long process is seen, I think answering to the ventral plate; there is moreover a large and complicated subanal body. In the female abdomen is somewhat curious; it has generally not tergal plates on all six segments, but, according to the species, the fourth, the fourth and fifth, or the third, fourth and fifth segments are without tergites; only in one species (*integralis* Schmitz, non-Danish) there are tergites on all

segments; some of the present tergal plates may be rather small; it is also to be noted that the chitinized tergites are rather weak, and liable to shrivel in exsiccating. The seventh segment has long hairs round the hind margin; at the end there are two styliform lamellæ. Abdomen is almost bare, only at the end of sixth segment in the male small hairs are more visible. Legs rather slender and hind femora in no way dilated; there are no bristles, the legs being clothed only with short hairs; on the posteroventral side of hind tibiæ there are in the basal half curious, a little longer and erect hairs in both sexes; on the posterior side of hind tibiæ, on a little area just at apex, the short hairs are arranged in transverse, comb-like rows, and the same is the case with the a little longer hairs on posterior side of hind metatarsi; the posterior tibiæ have small apical spurs. Claws and pulvilli small; empodium small, bristle-shaped. Wings somewhat large; costa reaching to or near to the middle, 1 very long in relation to 2 + 3; costa without cilia, only with fine and short hairs; mediastinal vein distinct and somewhat long, but ending free, not or not distinctly uniting with the first vein; third vein forked, fourth vein relatively short, ending long before the apex of the wing; the furcated concave fold between fifth and sixth vein rather conspicuous; alular margin with only some few fine hairs.¹

The developmental stages do not seem to be known; Zetterstedt says: "Larvæ parasitæ in Lepidopteris degere dicuntur", but I do not know what this statement is based upon.

The species of *Gymnophora* occur in woods especially in humid places, and are seen on leaves of bushes and in low herbage; they are also often found on stems of trees.

This genus stands in several respects somewhat apart; characteristic of it is especially the scarcity and weakness of bristles both on head, thorax and legs. The genus was hitherto considered to include only one species, *arcuata* Meig., with some synonyms, but recently Schmitz has studied it very thoroughly and proved that it includes four well distinguished European species. Here, as was also the case as regards *Phora*, difficult synonymical questions arise; I have here quite followed Schmitz in this respect.

¹ Becker says: "der grosse Flügellappen fehlt, bildet eine grade Begrenzung und trägt keinerlei Borsten." That alula is wanting is the case also in the other genera, and the margin has a few hairs; the "kleiner Flügellappen" with some hairs mentioned by Becker is a part of the alar squamula and is present also in other genera.

Of the four European species three have hitherto been found in Denmark.

Table of species.

- | | |
|---|--------------------------|
| 1. Costa just before the apex of the first vein with a triangular swelling, projecting down into the costal cell; female abdomen without tergal plates on fourth and fifth segments..... | 1. <i>arcuata</i> . |
| — Costa without such a swelling; female abdomen without tergal plates either only on third or on third, fourth and fifth segments..... | 2. |
| 2. First, second and third veins not ending quite near to each others, the enclosed cells broader than the veins; fourth vein curved somewhat strongly upwards at apex; female abdomen without tergal plate only on fourth segment..... | 2. <i>quartomollis</i> . |
| — First, second and third veins ending quite near to each others, the enclosed cells not broader than the veins; fourth vein evenly curved; female abdomen without tergal plates on third, fourth and fifth segments..... | 3. <i>fuliginosa</i> . |

1. **G. arcuata** Meig.

1830. Meig. Syst. Besch. VI, 222, 23, p. p. (*Phora*). — 1835. Macq. Suit. à Buff. II, 631, 1, tab. XXIV, fig. 5, p. p. — 1848. Zett. Dipt. Scand. VII, 2854, 1, p. p. — 1864. Schin. F. A. II, 346, p. p. — 1901. Beck. Abhandl. zool. bot. Gesell. Wien, I, 82, 71, p. p. — 1910. Kertész, Cat. Dipt. VII, 416, p. p. — 1914. Brues, Bull. Wisc. Nat. Hist. Soc. XII, 138, p. p. — 1918. Schmitz, Jaarb. Natuurh. Genootsch. Limburg 1917, 124, p. p. et 1920. l. c. 1919. 132, Fig. 10. — *Trineura rufipes* Fall. (nec Meig.) 1823. Dipt. Succ. Phytom. 5, 1, p. p.

Male. Frons black, greyish pruinose, dull; small outer bristles of second row present (generally). Antennæ black or blackish brown. Palpi yellowish brown to black. Thorax black or a little brownish black, somewhat shining, præalar callus more or less reddish; the two impressed longitudinal furrows are, seen in a certain direction, grey or almost whitish grey, sometimes translucently brownish; also the flat area behind is pruinose. Scutellum with four bristles (according to Schmitz very rarely six). Abdomen greyish black, dull. Hypopygium when exposed yellow or brownish, shining; anal tube yellow, distinct and of some length, with longish hairs. Legs yellow or yellowish brown. Wings strongly brownish tinged, veins brown or blackish brown; costa reaching to or beyond the middle, it increases in thickness from the base outwards, and it has just before the apex of first vein a somewhat triangular swelling with the top pointing downwards,

in the middle of this swelling a translucent dot is seen; divisions 2 and 3 of about equal length; fourth vein curved somewhat strongly upwards in the apical part, ending anterior to the end of fifth vein. Halteres yellowish white.

Female. Similar; abdomen without tergal plates on fourth and fifth segments; the second tergal plate is somewhat triangularly pointed at the sides, with the hind corners broadly cut off; the third

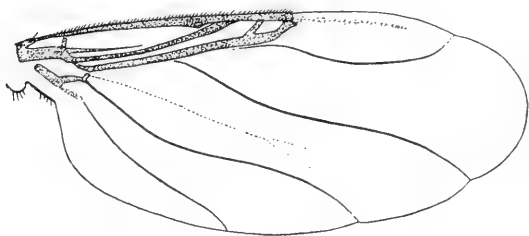


Fig. 127. Wing of *G. arcuata* ♀.

tergite is small, narrowed backwards, trapezoidal, the sixth is rounded behind, generally not, or not much, longer than broad; the eighth sternite excised in the hind margin.

Length 2 to fully 3 mm, the female generally the larger.

Remarks: I have seen three type-specimens of *Trineura rufipes* from Fallén's collection, the two were males, pinned on one pin, and they belonged to the present species, the third was a female and belonged to *quartomollis*. Professor Sjöstedt kindly communicated to me that in the collection are in all three males and seven females. — I have also seen Zetterstedt's specimens of *G. arcuata*; there are in his collection twelve specimens, seven belong to the present species, five to *quartomollis*.

G. arcuata is common in Denmark; Charlottenlund, Dyrehaven, Egebæks Vang, Holte, Geel Skov, Suserup Skov at Sorø, Tisvilde, Jægerspris, Bogø south of Sealand, on Langeland at Lohals, on Falster at Marienlyst, in Jutland at Hejls south of Kolding, Vejle and in Egense Skov at the east end of Limfjorden, and finally on Bornholm at Rø and in Almindingen; the dates are $^{27}/_6$ — $^{12}/_9$; I have taken it in copula on $^{16}/_7$ to $^{28}/_7$.

Geographical distribution: — No doubt all Europe, towards the north to northern Sweden, and it occurs also in North America (see Brues, Ann. Mus. Nat. Hung. IX, 1911, 441.)

2. *G. quartomollis* Schmitz.

1920. Schmitz, Jaarb. Natuurh. Genootsch. Limburg 1919, 134, Fig. 9. — *Trineura rufipes* Fall. (nec Maig.) 1823. Dipt. Succ. Phytom. 5, 1, p. p. — *Gymnophora arcuata* 1848. Zett. Dipt. Scand. VII, 2845, 1, p. p. — 1918. Schmitz, l. c. 1917, 125, p. p.

Both for this and the following species the full synonymy will no doubt be mainly the same as given for *arcuata*, all three species probably being included in the descriptions.

Male. Frons black, less greyish pruinose than in *arcuata*, slightly shining; outer bristles of second row not present (in any of my numerous specimens). Antennæ brownish black. Palpi yellowish to blackish. Thorax black or a little brownish black, somewhat shining, the longitudinal furrows and the flat area behind not pruinose, but the furrows not rarely reddish or brownish translucent. Scutellum with four bristles (according to Schmitz very rarely with six). Abdomen greyish black, dull. Hypopygium generally withdrawn, when exposed not large, yellow, shining; anal tube yellow, small and very slightly projecting. Legs yellow, femora sometimes darker. Wings brownish or sometimes more blackish tinged, veins blackish brown or thin veins black; costa not reaching to the middle, increasing in thickness from the base outwards; it is curved a little inwards so that the wing-margin is here a little concave; division 2 and 3 of about equal length; fourth vein nearly straight, but curved strongly upwards in the apical part, ending a little anterior to the apex of the fifth vein. Halteres yellow.

Female. Similar; abdomen without tergal plate only on fourth segment, the third tergite is short, broadly rounded behind, the fifth

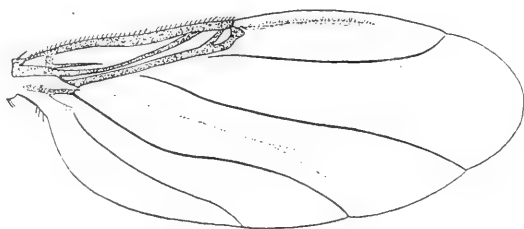


Fig. 128. Wing of *G. quartomollis* ♀.

about quadratic, the sixth longer than broad; the eighth sternite has the hind margin rounded. (The construction of abdomen in this

species only can be seen satisfactorily on specimens in alcohol, as in the dried specimens the fifth and also often the sixth tergite are as shrivelled as the fourth).

Length. Rather varying in size, 1.6—3 mm, the female the larger; the species, upon the whole, distinctly smaller than *arcuata*.

Remarks: As mentioned under *arcuata* one of three type-specimens of *Trineura rufipes* from Fallén's collection, a female, belonged to the present species.

G. quartomollis is as common in Denmark as *arcuata*; Eremelund, Egebæks Vang, Holte, Tisvilde, Bogø south of Sealand, Lohals on Langeland, in Jutland at Hejls south of Kolding, at Nørre Sundby and in Egense Skov at the east end of Limfjorden, and on Bornholm at Rø and in Almindingen; the dates are $^{28}/_6$ — $^{14}/_8$; I have taken it in copula on $^{29}/_6$ to $^{22}/_7$.

Geographical distribution: — Probably all Europe, towards the north into Sweden; it occurs probably also in North America.

3. *G. fuliginosa* Meig.

1830. Meig. Syst. Besch. VI, 215, 10 (*Phora*). — 1901. Beck. Abhandl. zool. bot. Gesell. Wien, I, 72 (*Phora*). — 1920. Schmitz, Jaarb. Naturh. Genootsch. Limburg 1919, 133, Fig. 11. — *Gymnophora arcuata* Schmitz, 1918. l. c. 1917, 125, p. p.

Male. Frons black, slightly pruinose, a little shining; outer bristles of second row not present in my specimens. Antennæ black or brownish black. Palpi black. Thorax black or blackish, distinctly shining, the longitudinal furrows and the flat area not pruinose. Scutellum with four bristles. Abdomen black, dull. Hypopygium not large, of medium size, black and shining; anal tube distinct, but short, yellowish. Legs darker than in the other species, brown to blackish brown. Wings strongly blackish or brownish black tinged and veins black or blackish; costa not reaching to the middle, thick and of uniform thickness in the whole length; the apices of first, second and third veins quite near to each other, nearly coalescing in one point and thus the subcostal cell only about as broad as the enclosing veins, and the lumen in the fork (cubital cell) quite small; fourth vein rather evenly curved and ending vertically above the apex of the fifth vein. Halteres with the peduncle dark, the knob brownish or yellowish brown.

Female. Similar; abdomen with tergal plates only on first, second and sixth segments; the second broadly rounded behind, the

sixth small, lying at the base of the segment, and at its front margin an impression or hollow; wings not blackish, but very strongly brown and costa thicker.

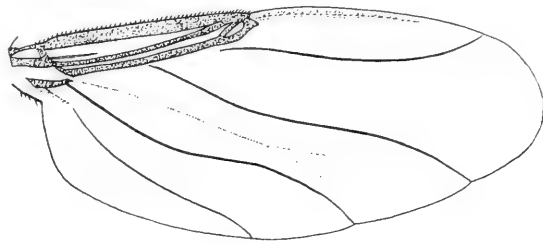


Fig. 129. Wing of *G. fuliginosa* ♀.

Length 2,2—3,5 mm, the female the larger.

G. fuliginosa seems to be rare in Denmark, I have seen only two specimens, a female, Nordskoven at Jægerspris $\frac{6}{8}$ 71 (Schlick) and a male, Lohals on Langeland $\frac{10}{7}$ 1920 (the author). The above description of the female is drawn from a German specimen, kindly sent me from Pater Schmitz.

Geographical distribution: — Probably all Europe and perhaps also in North America. .

14. **Metopina** Macq.

Very small species. Frons almost quadratic or slightly broader than long, with a middle furrow; the bristles weak; there is always a row of bristles on vertex, consisting of four or six bristles, and four supraantennal bristles which are directed forwards; further there is a various number of bristles on the middle part of the frons, near the eye-margin or on the middle (for the bristles in the Danish species see below under the species). Eyes somewhat small, sparingly hairy, the facets well separated. Antennæ rather small, third joint roundish, arista apical, distinctly or long-pubescent. Palpi somewhat large, flat, more or less clubformed. Oral bristles present below the eyes. Thorax narrow, elongated, with one pair of dorsocentral bristles (or without dorsocentral bristles, the American *pachycondylae*). Scutellum with two bristles. Pleura bare. Abdomen with second and sixth segments a little elongated. Hypopygium not small; anal tube

not protruding. (I have not been able to study the hypopygium more closely). In the male a chitinized ventral plate is present at the end (according to Schmitz, I have not been able to study it on my material). In the female there is at the base of the fifth tergite a curious, semi-circular, chitinized plate or flap which covers an opening and is able to open upwards; this feature is probably in connection with a gland; abdomen ends as usual with a pair of small lamellæ. The abdomen is very sparingly haired. Legs with hind femora not or slightly dilated; the legs have no single bristles and the hind tibiæ are simple, without any dorsal hair-seam; just at apex on the posterior side the hairs a little arranged in transverse rows and especially so on posterior side of hind metatarsi; the posterior tibiæ have small apical spurs. Claws small, strongly curved; pulvilli narrow, with emergences below quite as in *Wandolleckia* and *Puliciphora* (see Wandolleck, Zool. Jahrb. Syst. XI, 1898, Taf. XXVI, Fig. 10); the empodium I could not detect, but it is no doubt bristle-shaped; Becker says that pulvilli and empodium are wanting which thus is not correct. Wings with costa to or beyond the middle, in one species (*crassinervis* Schmitz, non Danish) it is thickened; the costal cilia very fine and short; third vein without fork, but with a curious, microscopical fissure at the apex, no doubt the remnant of a fork; the sixth vein with a curious, rather sudden curve about the middle. There seems to be no bristles on the alular margin.

The developmental stages are not described, but the larva of the American species *pachycondylæ* (if this really belongs to the genus, see Schmitz, Wien. Ent. Zeitg. XXXV, 1916, 232) is known; it lives in the nest of the ant *Pachycondyla harpax*, and is here curled about the fore-part of the host ant-larva thus partaking in the food given to this by the workers (Wheeler, Amer. Nat. XXXV, 1901, 1007, fig.). *M. galeata* (*heselhausi* Schmitz) was once met with in the nest of a hamster so that perhaps its larva lives in such places.

The genus *Metopina* stands somewhat apart among the European genera and shows, as already stated by Becker, relation to several non-European, more aberrant genera (*Puliciphora* and others). The curious opening on the fifth abdominal tergite in the female it thus has in common with these forms, likewise the shape of the head, the smaller eyes, the arrangement of the frontal bristles, and also the reduced pulvilli and empodium. The genus includes in all four species, two of which are American (the one, *pachycondylæ*, perhaps not a *Metopina*); of the two European species one occurs in Denmark.

1. *M. galeata* Hal.

1833. Hal. Ent. Mag. I, 179 (*Phora*). — 1835. Macq. Suit. à Buff. II, 666, 1. — 1838. Meig. Syst. Besch. VII, 414, 1. — 1887. v. Röder, Wien. Ent. Zeitg. VI, 288. — 1901. Beck. Abhandl. zool. bot. Gesell. Wien, I, 83, 72, Taf. V, Fig. 76—78. — 1910. Kertész, Cat. Dipt. VII, 417. — 1914. Brues, Bull. Wisc. Nat. Hist. Soc. XII, 140. — 1918. Schmitz, Jaarb. Natuurh. Genootsch. Limburg 1917, 125. — *Phora oligoneura* Mik, 1867. Verh. zool. bot. Gesell. Wien, XVII, 414, Taf. X, Fig. 10—11. — *Leptophora oligoneura* Mik, 1881. l. c. XXXI, 348. — *Leptophora perpusilla* Six, 1878. Tijdschr. v. Entom. XXI, 186, Tab. XII, Fig. 1 a—d. — *Drepanophora Braueri* Strobl, 1880. Programm. Seitenstet. XIV, 40. — *Metopina heselhausi* Schmitz, 1914. Zeitschr. f. wiss. Insektenbiol. X, 91.

Male. Frons nearly square, black, not or slightly shining; the bristles weak; above there is a row of six bristles of which the two middle ones stand at the posterior ocelli, and these bristles are the longest, two (sometimes only one) to each side near each other at the upper eye-corner, then a pair is placed at the anterior ocellus, further one at each side near the middle of the inner eye-margin, and again one

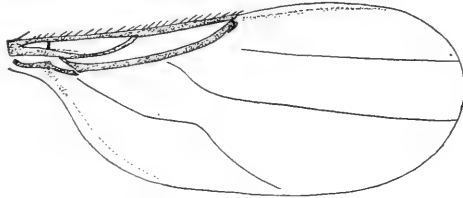


Fig. 130. Wing of *M. galeata* ♂.

at each side more forwards, in the middle between the eye-margin and the median furrow, and finally there are four forwards directed supra-antennal bristles; thus there are in all 16 (or 14) bristles. Antennæ small, brown or blackish brown, arista distinctly pubescent. Palpi brownish, large, flat, much widened towards the end, with about three long bristles. Thorax black, dull, with brownish pubescence and one pair of dorsocentral bristles. Scutellum with two bristles. Abdomen black, dull, with a little paler hind margins to the segments; it is apparently nude. Hypopygium not small. Legs yellowish or brownish yellow, hind metatarsi somewhat broad. Wings slightly yellowish or nearly clear, veins brownish or paler; costa reaching to the middle, a little thickened between first and third vein; costal cilia very short; third vein not forked, but with a microscopical fissure in the apex; fourth

vein straight, obliterated at base, fifth somewhat sharply curved near the base, for the rest straight; sixth vein doubly curved, the apical curve strong and somewhat sharp; seventh vein weaker, running near the margin. Halteres black.

Female. Similar; antennal arista more long-pubescent, almost feathery; palpi less dilated outwards; fifth abdominal segment with a semicircular chitinous plate, covering an opening.

Length 0,7 to nearly 1,5 mm, the female generally the larger.

M. galeata is not uncommon in Denmark; at Copenhagen (the author), Gentofte (Kryger), Holte, Hillerød, Suserup Skov at Sorø (Th. Mortensen), on Bogø south of Sealand, on Langeland at Lohals (the author), on Ærø (Th. Mortensen) and in Jutland at Hejls south of Kolding (the author); my dates are $^{26}/_5$ — $^{12}/_8$ in 1917 to 1920. I have taken it on flowers of umbellifers and with the net in low herbage in woods.

Geographical distribution: — The species occurs in middle Europe down into France and in Britain, it is not known north of Denmark.

II. *Platyphorinae*.

15. *Platyphora* Verrall.

Species of small size, in the female without wings or halteres. Male: Head somewhat as in *Phorinae*, but low and broad, much broader than high, excavated behind and lying close to thorax; frons broad, at the vertical margin some small bristles, for the rest the frons without bristles, only hairy. Eyes relatively small, bare; three ocelli present. Antennæ normal, not small, third joint roundish, arista dorsal or subapical, very finely pubescent, almost bare. Oral aperture small, mouth parts small; maxillary palpi with bristles. A row of not separated oral and genal bristles stretching from the mouth aperture to the lower end of the eye. Thorax broad and flat, without dorsocentral bristles. Scutellum short and broad, much broader than long, without bristles. Mesopleura of a curious shape; they are somewhat wedge-shaped, presenting a dorsal and a ventral surface and with a sharp, horizontal lateral margin in the middle where the two surfaces meet; the dorsal surface partakes, as it were, in the formation of the disc, and the dorsopleural suture has partly vanished and hence the prothoracic spiracles lie above; the upper part is hairy and has behind a

long bristle. Abdomen short and broad. Hypopygium small. Legs somewhat slender, without bristles, short-hairy; posterior tibiae with small apical spurs. Claws small; pulvilli and empodium, if present, very small. Wings as in *Phorinae*; costa reaching to about the middle, with short cilia; third vein with a small fork or unforked, and with or without fine bristles. Female: Body flat and oval. Head with the frons broader than in the male and the eyes smaller; frons quite without bristles. No ocelli. Thorax relatively shorter and broader than in the male, and fitting close to abdomen. No scutellum. Pleura constructed as in the male. Abdomen with six free segments. Legs shorter and more robust than in the male and with the femora broader. Wings and halteres absent (Enderlein and Schmitz mention a small, vestigial wing-rudiment? in shape of a very small, hairy process).

The developmental stages are not known, only Donisthorpe mentions (Entom. Record. XXVI, 1914, 276) the pupa of *Lubbocki*; they are termed small and red, but otherwise not described. The species are parasitic on ants (*Formica fusca*, *picea* and *rufibarbis*), and the larva quits the ant-pupa before it pupates itself.

Of the genus three European species are known (or perhaps four, as the probable male of *Dorni* may perhaps be a separate species). One species has hitherto been found in Denmark.

1. *P. Lubbocki* Verrall.

1877. Verrall, Journ. Linn. Soc. XIII, 260, ♂. — 1901. Beck. Abhandl. zool. bot. Gesell. Wien, I, 88, ♂. — 1910. Kertész, Cat. Dipt. VII, 418, ♂. — 1913. Collin, Ent. Month. Mag. XLIX, 174, Pl. III, fig. 3, ♂. — 1914. Donisthorpe, Entom. Record, XXVI, 276. — 1914. Brues, Bull. Wisc. Nat. Hist. Soc. XII, 105, ♂. — 1915. Schmitz, Deutsch. Ent. Zeitschr. 485, Taf. VII, Fig. 2—4, 6, Taf. VIII, Fig. 9—10. — 1918. Schmitz, Jaarb. Natuurh. Genootsch. Limburg 1917, 178. — *Aenigmatias blattoides* Meinert, 1890. Entom. Meddel. II, 212, Tab. IV, Fig. 1—6, ♀. — 1910. Kertész, Cat. Dipt. VII, 418, ♀. — 1914. Schmitz, Zool. Jahrb. Syst. XXXVII, 541, ♀. — 1914. Brues, l. c., 146, ♀.

Male. Of this species I have seen only the female, for the male I can, therefore, only reproduce Verrall's description:

Nigra, nitida; abdomine triangulari, segmento tertio parvo; femoribus posticis basi flavidis; alis apice latis, flavido-hyalinis, costa ad basin subciliata, vena cubitali ad medium costae extensa subcostali parallela, venulis undulatis. Long $\frac{3}{4}$ lin.

Broad, flat, shining; frons very broad, the eyes scarcely occupying each one sixth of the width of the head; it is moderately shining,

gently arched, and pretty densely clothed with minute bristles; the three ocelli visible slightly luteous; antennæ with the third joint rather large, somewhat rounded; thorax broad, flat, rather broader than the head, angles tolerably rounded, disk shining (in appearance suggesting a small *Sphaerocera*), beset with very minute bristles, which become rather scarcer towards the hinder part; scutellum rather dull, margined, nearly four times as broad as long; abdomen black,

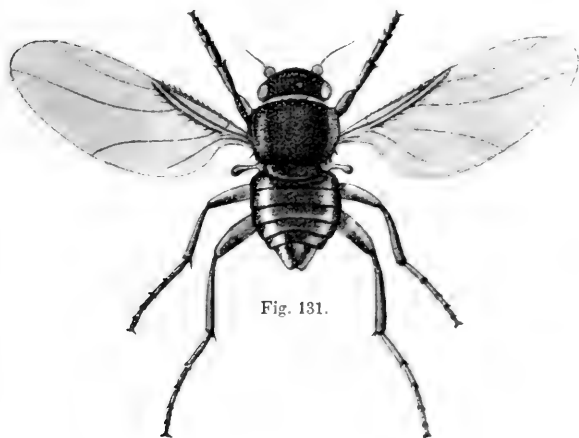


Fig. 131.

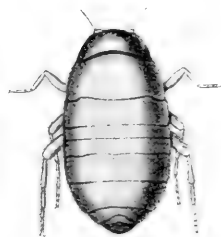


Fig. 132.

P. Lubbocki.

Fig. 131. Male (after Collin who remarks, that the minute bristles on the second thick vein are made very much too conspicuous). Fig. 132. Female (after Meinert).

narrower and shorter than the thorax (again suggestive of *Sphaerocera*); each segment after the second successively narrower, the last one being almost triangular; the third segment is very short, contracted under the second; the hind margins form a curve convex towards the thorax, the first segment being slightly emarginate in the middle; the sixth (last) is much the longest. Legs stoutish, blackish, basal two thirds of hind femora yellowish; middle tibiae with two small spines at the tip. Wings considerably overlapping the abdomen, yellowish hyaline, darker about the basal half of the costa, blunt at the tip, cubital vein extending about half the length of the wing, and the costa slightly ciliate up to its end, subcostal vein running parallel to it and ending just before it; both veins a little thickened at their ends; first veinlet curved S-like, considerably at its base, slightly at its end, vanishing distinctly before the tip of the wing; second

veinlet also s-like, diverging at its end from the first, and ending distinctly below the tip of the wing; third veinlet slightly undulated, ending very wide from the second; fourth faint, not reaching the end of the wing.

To this may be added some characters, mentioned by other authors: Hypopygium small, blackish. Front tibiæ and tarsi somewhat thickened. Wings with the third vein finely bristly, forked at the end, the inner branch often weak, sometimes wanting. Length about 2 mm.

Female. Broad and flat, of oval shape, and of yellowish brown or brownish colour, without wings or halteres. (Schmitz mentions l. c. 1914, 543, that the "Flügelrudiment" mentioned by Enderlein for *Dorni* was visible also in an individual of *blattoides*). Head and antennæ yellow, arista very finely pubescent; frons very broad. Eyes small, bare. Abdomen with six normally chitinized segments; the whole body finely hairy, with the hairs in transverse rows. Legs yellow, somewhat short and robust, especially the femora and the front coxæ broad; tibiæ and tarsi with hair-seams.

Length 1,5 mm.

P. Lubbocki is rare in Denmark, only two specimens, both females, have been taken, both by Schlick; one on $^{15}/_8$ 1890 in Geel Skov under a stone at *Formica fusca*, the other on $^{30}/_7$ 1907 at Frederikslund; this latter specimen is recorded to have been taken at *Lasius niger*, but, as Schmitz remarks l. c. 1915, 504, it no doubt has occurred with *Formica fusca*. The species is known to be parasitic on ants, the hosts are *Formica fusca*, *picea* and *rufibarbis*. Donisthorpe mentions l. c. that he found some small, red pupæ in a nest of *Formica picea* and from which he bred both sexes; the larva of the species thus leaves the *Formica*-pupa before it pupates.

Geographical distribution: — The species is known from Denmark, Britain, Holland and Luxembourg. The male was first taken in England in 1877 and described by Verrall as *P. Lubbocki*; in 1890 the next specimen, a female, was taken in Denmark and described by Meinert as *Aenigmatias blattoides*; already in 1898 Mik suggested that these two species might be male and female of the same species, and the same opinion was held by many other authors, but it was only a suggestion; Donisthorpe was the first to give in 1914, l. c., what must be taken to be the proof of the two species as really being male and female of the same species, he namely found and bred both from quite similar pupæ in a nest of *Formica picea*. Later on a

new proof has been given, as Malloch (Bull. Ill. State Lab. Nat. Hist. XI, 1915, 353) has described an American *Platyphora*, of which he had taken a pair in copula, the female being quite like the *Aenigmatias*. Concerning the whole story of the species I, for the rest, refer to the papers cited published by Donisthorpe 1914 and Schmitz 1915. On a specimen of the female from Scotland, which is darker in colour, greyish black, Schmitz has founded a var. *highlandica*.



Addenda et Corrigenda.

Part. V.

Page 537 Line 13 for "*E. flavifrons*" read "*E. planifrons*".

— 563 — 1 for "rater" read "rather".

Part. VI.

Since the manuscript was sent to press I have got still three species of *Aphiochaeta* new to our fauna, one of them also new to science:

Page 270 after *A. fungivora* add:

30a. *A. egregia* n. sp.

Male. Frons somewhat broader than high, dull; inner bristle of lower row a little below the outer and a little nearer to it than to the upper supraantennal; supraantennal bristles equal, the upper fully as distant as the inner bristles of middle row, the lower well below the upper and more approximate. Antennæ of ordinary size, black, arista rather long, distinctly pubescent. Palpi black, of ordinary size, with well developed bristles. Thorax black, a little shining, with blackish or blackish brown pubescence. Mesopleura bristly, with one long bristle. Abdomen dull black, almost velvet black; it has very short, sparse hairs on the hind parts of the segments, most distinct at the hind margins; on the sixth segment the hairs more developed, especially at the sides, at the dorsal hind margin they are only slightly elongated, but on the ventral side they are rather long. Hypopygium black, somewhat small, the lower hinder corners somewhat produced; on each side there are rather numerous bristles or bristly hairs downwards, those along the lower margin the strongest; the ventral plate a narrow process, a little broad at the end about as in *pleuralis*; a complicated subanal body is exposed; anal tube of medium size, black, thin at the base. Legs black or blackish, front legs, especially

tibiæ and tarsi, paler, brownish, also posterior tarsi slightly paler; the hairs below the basal half of hind femora longish; bristles on hind tibiæ somewhat small. Wings colourless or nearly so, thick veins blackish brown, the others paler, brownish and rather fine; costa not reaching to the middle, about 0,46 of the wing-length, costal divisions about as 7—3—2; costal cilia long; fourth vein evenly curved, only slightly more at the base. Halteres black.

Female. Quite similar; the hairs below hind femora about as in the male.

Length 1,7—2 mm.

A. egregia seems to be rare, I have only one pair which was taken in copula by my wife at Brede $\frac{3}{6}$ 1922 on the leaf of a linden-tree.

This species is easily determined as it in the group is the sole species, besides *fungivora*, with long costal cilia and black halteres. In my table to group II it will come under 12, and here it will at once be distinguished from *fungivora* by the black palpi and equal supra-antennals, so that we get:

- | | | |
|------|---|------------------------|
| 12. | Halteres black..... | 12a. |
| — | Halteres yellow or dusky yellow | 13. |
| 12a. | Palpi yellow or dusky yellow; supraantennals unequal. | 30. <i>fungivora</i> . |
| — | Palpi black; supraantennals equal..... | 30a. <i>egregia</i> . |

For the rest the species is, as seen, distinguished by many other characters.

Page 314 after *A. setigera* add:

68a. **A. producta** Schmitz.

1921. Schmitz, Entom. Ber. Nederl. Ent. Ver. V, 321, 3.

Male. Frons considerably broader than high, black, dull; inner bristle of lower row in about the same height as the outer and a little nearer to it than to the upper supraantennal; supraantennal bristles equal or nearly so, the upper a little nearer to each other than the inner bristles of middle row, the lower very slightly closer together. Antennæ black, of ordinary size, arista short-pubescent. Palpi yellow or yellowish, of ordinary size and armature. Thorax black, very slightly shining, with blackish pubescence. Mesopleura with uniform bristles. Abdomen black, a little greyish, dull; the short hairs a little longer at the hind margins on the last segments. Hypopygium somewhat large, higher than long, black or blackish, shining above on

the basal part; there are some hairs on the sides below, among which one conspicuous and bristly; the lower hinder corners sharp, finely hairy; ventral plate narrow, black; anal tube long, rather high outwards, black, it is curved downwards and has no apical hairs. Legs brown, front legs not, or almost not paler, hind femora blackish; front tarsi with the four last joints a little dilated outwards, the fifth the most; the last or two last joints blackish; hind femora with the hairs below the basal half somewhat strong, but not long, they are densest and longest at the base, being shorter outwards; bristles on hind tibiæ of some length, but not strong, on the basal part fine. Wings a little tinged, veins brownish; costa not reaching to the middle, 0,46 of the wing-length, costal divisions about as 13—8—4 (which is about the same as Schmitz gives viz 14—9—4); costal cilia long; fork not long, the angle not large; fourth vein a little curved in its first part, for the rest very slightly curved, almost straight. Halteres yellow.

Female. Unknown.

Length 1,6 to fully 2 mm.

This species belongs to the group with *sordida* and its allies, but is sufficiently distinct.

A. producta is rare in Denmark, only two males have been taken, at Esbjerg ⁹/₇ and on Fanø ¹⁰/₇ 1921 (Th. Mortensen).

Geographical distribution: — Besides known from Pomerania.

Page 350 after *A. mixta* add:

98a. *A. Collini* Wood.

1909. Wood, Ent. Month. Mag. 2, XX, 28, 36 (*Phora*). — 1914. Brues, Bull. Wisc. Nat. Hist. Soc. XII, 115. — 1919. Schmitz, Jaarb. Natuurh. Genootsch. Limburg 1918, 162.

Male. Frons broader than high, greyish black, dull; inner bristle of lower row a little below the outer and about in the middle between it and the upper supraantennal; supraantennal bristles unequal, the lower quite small or minute; upper supraantennals nearer together than the inner bristles of middle row and the lower a little more approximate. Antennæ brown to black, of ordinary size, arista distinctly pubescent. Palpi yellow, of ordinary size, bristles well developed. Thorax black, generally with the humeri and postalar calli, and often also the sides reddish, rarely thorax wholly reddish; it is a little shining, with brown pubescence. Pleura more or less reddish. Mesopleura bare.

Abdomen black or blackish, with very short hairs. Venter generally more or less yellow. Hypopygium medium-sized, ventral plate small, yellow. Legs yellow, hind femora slightly darkened at tip, the hairs below not long; bristles on hind tibiæ about as in *flava*. Wings somewhat yellowish, veins yellow, thin veins fine; costa reaching about to the middle, 1 longer than 2, as long or about as long as 2 + 3; costal cilia relatively long, nearly midway between short and long; fourth vein evenly curved, a little obliterated at base. Halteres yellow.

Female. Quite similar to the male.

Length 1.5 to about 2 mm.

A. Collini seems to be rare in Denmark, while *flava*, *mixta* and *rubella* are common here I possess only two females of *Collini*, Ermelund ²⁸/₅ 1922 and Jelling ¹⁷/₇ 1921 (the author). As I have seen only the female the above description of the male is partly taken from Wood.

Geographical distribution: — Besides from Denmark known from England and Holland.

Remarks: On pag. 352 I said that I do not know with certainty what *Collini* is, as I have seen English specimens from Mr. Collin which had long costal cilia and did not answer well to Wood's description. The species I have described here is identical with Schmitz' *Collini*, and is also quite agreeing with Wood's description, so I think, like Schmitz, that it is the true *Collini*. The species is very similar to *flava*, *mixta* and *rubella*, but distinguished by the characters given in the table; it is thus distinguished from *flava* and *mixta* by 1 being longer than 2 and as long or about as long as 2 + 3, from *rubella* by longer costal cilia, generally darker antennæ, finer thin veins, and minute lower supraantennals, and besides by some more minute characters.

By adding the above three species to our fauna the total number of Danish Phorids, on page 89 given as 210, thus increases to 213, and the number of Danish species of *Aphiochaeta*, on page 210 given as 154, is now 157.

Page 23 Line 29 after "at" add "Lysemose at Maribo".

— 28 — 19 for "(Albog)" read "(Alboge)".

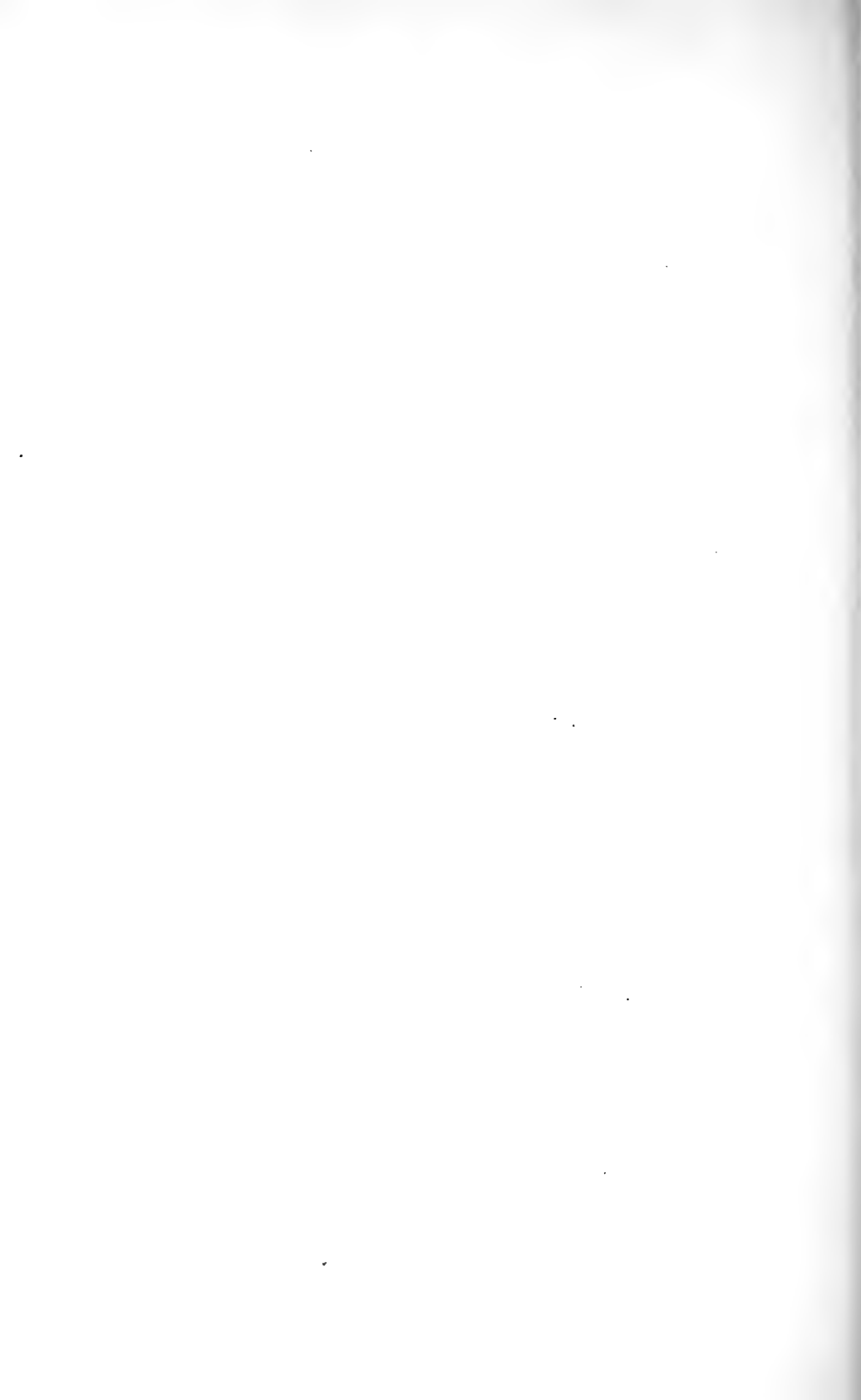
— 43 — 1 for "Lolland" read "Funen" and dele "on Funen".

— 47 — 26 for "at the sides of fifth" read "at the sides of first".

— 60 — 10 for "eight" read "eighth".

— 64 under Fig. 34 for "*W. aucta*" red "*V. aucta*".

- Page 65 Line 12 for "right" read "left".
- 110 — 31 dele the comma after "in".
- 117 — 4 after "Hillerød" add a comma.
- 128 — 30 for "symmetrical" read "unsymmetrical".
- 156 — 22 for "on" read "in".
- 177 — 28 for "fourth vein not evenly and much" read "fourth vein evenly and not much".
- 184 — 6 for "aslo" read "also".
- 206 — 2 for "*nasicornis*" read "*nasicornis*".
- 206 — 12 for "Chapellier" read "Chappellier".
- 208 — 3 for "*xanthima*" read "*xanthina*".
- 274 *A. basispinata*; a female of this species was taken at Esbjerg on 9/7 1921 together with a male (Th. Mortensen); it is quite similar to the male.
- 305 — 20 for "a" read "at".
- 328 — 3 for "Dnemark" read "Denmark".
- 364 — 27 for "guter" read "outer".
- 374 — 9 for "bristle" read "bristles".
- 399 — 22 after "pubescence." add "Mesopleura bare."
- 432 — 3 for "Maig." read "Meig."



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Synonyms are given in *italics*. References to Genera and Species which are not Danish have the page in *italics*.

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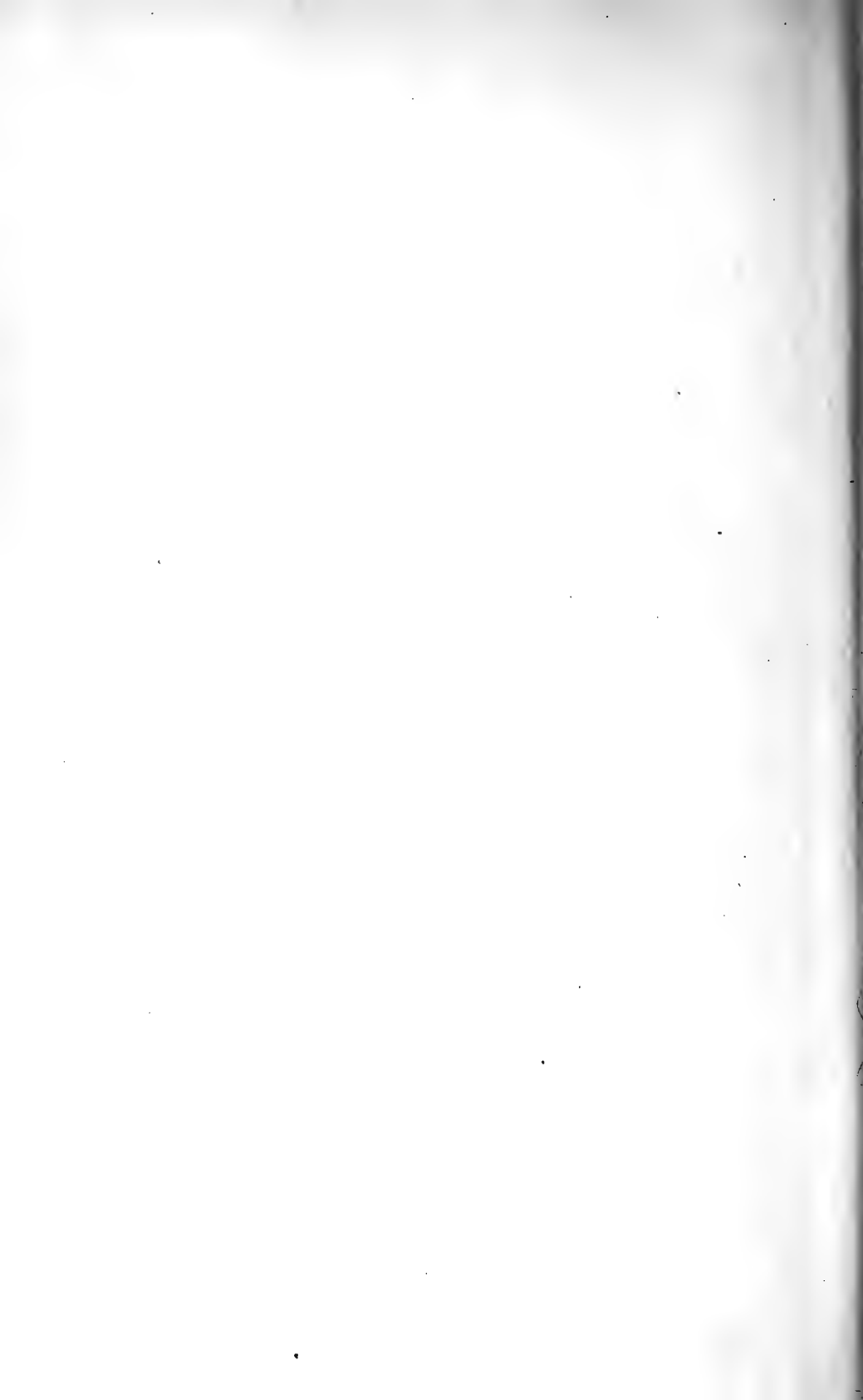
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