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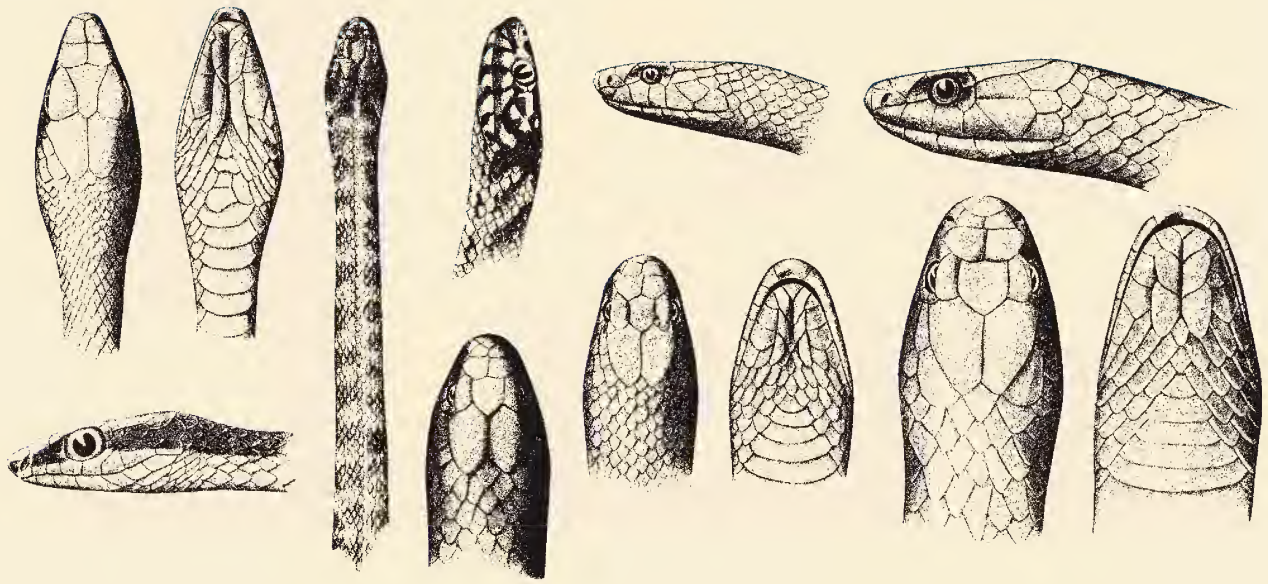

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Signal Flies of the Genus *Duomyia* (Diptera: Platystomatidae) in the Northern Territory, Australia

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ABSTRACT. A key is given to the species of *Duomyia* Walker, 1849, (approximately 26) recognized in the Northern Territory of Australia. The following new species are described: *D. nodosa*, *D. rapida*, *D. grahami*, *D. tricurva*, *D. bucina*, *D. recta*, *D. prensans*, *D. praeflava*, *D. korneyevi*, *D. lana*, *D. collessi*, *D. maceveyi*, *D. whittingtoni*. *Duomyia sericea* Hendel and *D. serra* McAlpine are newly recorded for the Northern Territory; *D. foliata* McAlpine is newly recorded for New South Wales; *D. tomentosa* Hendel is newly recorded for Western Australia; and *D. eremia* McAlpine is newly recorded for South Australia. The question of possible recent extinction of *D. irregularis* Malloch is raised, and the urgent need to establish the population status of other rarely seen species is mentioned.

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Nine of the 26 recorded Australian genera of Platystomatidae, or signal flies, are known in the Northern Territory, viz. *Achias*, *Aetha*, *Duomyia*, *Elassogaster*, *Euprosopia*, *Lamprogaster*, *Plagiostenopterina*, *Rhytidortalis*, and *Rivellia* (see McAlpine, 2001, for key to genera). This compares with 25 genera living in Queensland, and illustrates the decline in wet forest taxonomic diversity, as one proceeds from east to west in the Australian tropics, and a degree of isolation of the NT seasonally wet zone from that of the eastern Australian tropics.

The endemic Australian platystomatid genus *Duomyia* includes 70 previously described species (see McAlpine, 1973, 2001, 2011), but study of collections indicates that over 110 species exist. About 26 species are here recognized for the NT, of which 13 appear to be endemic to the Territory. Several apparent species, represented by material that is inadequate for precise characterization, are assigned provisional numbers.

The larger number of *Duomyia* species in the NT compared with that in other NT platystomatid genera correlates with the ability of numerous *Duomyia* species to survive in relatively dry climates. By contrast, the genus *Euprosopia* has only two species in the NT, compared with at least 29 species in the Queensland tropics (some undescribed).

Duomyia irregularis Malloch, from vicinity of Darwin, has apparently not been collected for more than 100 years (see p. 147). As it is a small, inconspicuous insect and recent collecting in the area has not been thorough, I do not regard this as firm evidence of extinction. The following species have each been collected on only one occasion: *Duomyia rapida* n.sp., *D. bucina* n.sp., *D. prensans* n.sp., *D. lana* n.sp.; also, some other species are known from very few specimens. Investigation of the population status of these insects by locally resident entomologists is needed.

A summary of general information on the genus *Duomyia*, including generic synonymy and a little information on habits and ecology, was previously given (McAlpine, 2001). A key to species was given by McAlpine (1973, supplemented by McAlpine, 2011).

The division of such a large genus as *Duomyia* into subgenera or species groups seems desirable, but this desideratum has not yet proved attainable. Although there are some small groups of evidently related species, many other species do not readily fit into groups or are intermediate between such groups. Malloch (1929) proposed the subgenus *Duomyza* for *D. tomentosa* Hendel. Some species are closely

related to *D. tomentosa*, but a range of species shows a gradation in character states and combinations, and some species sharing with that species the possession of minor scutellar setulae are probably not close phylogenetically. Also, the presence of spinescent posteroventral bristles on the fore femur cannot be used to define a natural group within the genus, although Enderlein (1924) proposed the genus *Helocnemia* for one such species [*Duomyia apicalis* (Walker) of Western Australia].

In this paper I recognize the informal *tomentosa* alliance, indicated below in the key to species, but less well defined outside the NT; also the *grahami* alliance, apparently endemic to the NT, including *D. grahami*, *D. tricurva*, *D. bucina*, and *D. recta*; and I have previously recognized the *ameniina* alliance (McAlpine, 2011), of which *D. ameniina* and *D. rugula* live in the NT. A less well defined *spinifemorata* alliance is discussed under *D. spinifemorata*.

Terminology and abbreviations

Descriptive terminology is that used in my previous papers (McAlpine, 1973, 2011). Terminology for parts of the aedeagus is shown in Figs 10, 22. The following abbreviations refer to institutions housing specimens:

AM	Australian Museum, Sydney
ANIC	Australian National Insect Collection, CSIRO, Canberra
BM	The Natural History Museum, London
DEI	Deutsches Entomologisches Institut, Müncheberg
NTM	Northern Territory Museum, Darwin
QM	Queensland Museum, South Brisbane. Insect collection formerly at University of Queensland
SAM	South Australian Museum, Adelaide

In my text the abbreviation NT refers to the Northern Territory of Australia. The following collectors' names are abbreviated to the initials: T.L. Bancroft, G.R. Brown, G. Cassis, D.H. Colless, A. Daniels, G. Daniels, D.E. Havenstein, K. Hill, P. Horne, M. Humphrey, K.A. Kopestonsky, Z.R. Liepa, D. Marshall, D.K. McAlpine, B.J. Moulds, M.S. Moulds, C. Owen, H. Pelz, N.B. Tindale, M.S. Upton, J.L. Wassell.

Seasonal occurrence of adults

Although collecting activity for platystomatids has not been consistent enough to establish precisely the months of adult activity for individual species, there is some evidence for seasonal difference in activity among the species living in the seasonally wet north of the Northern Territory. The field work of D. H. Colless, centred around November 1972, produced series of the following species which have not been collected at other times of the year: *Duomyia collessi*, *D. lana*, and *D. praeflava*. In February–March 1996 G. R. Brown and the author obtained 2 or more specimens of *D. grahami*, *D. tricurva*, and *D. whittingtoni*. *Duomyia spinifemorata* is known from material collected in late December to February. These last four species are not recorded for as early as November. *Duomyia korneyevi* was collected by D.H.C. in both November 1972 and March 1973. *Duomyia sericea* has been collected in the area during January, February, April, June, and August, and in Lawn Hill National Park, Queensland, near the border with Northern Territory, in May. Thus it appears that *D. korneyevi* may have two broods and *D. sericea* a greater number during the year. Several other species have been collected on only one or two occasions, but their dates are inadequate for any conclusions regarding seasonal occurrence.

Key to species of *Duomyia* of Northern Territory

1	Scutellum extensively setulose dorsally, with two pairs of marginal bristles	[*tomentosa* alliance] 2
——	Scutellum without dorsal setulae, with three or more pairs of marginal bristles	10
2	Humeral callus entirely pale-pruinescent; scutellum tawny, at least in part, with pale pruinescence dorsally	3
——	Humeral callus shining black, without obvious pale pruinescence; scutellum black to brown, without pale pruinescence dorsally	7
3	Fore and hind femora with some black dorsal bristles; scutellum with some black dorsal setulae in addition to yellow ones	sp. 44 (p. 128)
——	Fore and hind femora with all dorsal bristles pale; scutellum with all setulae pale	4
4	Fore femur with at least two black, stout posteroventral spines; male: hind basitarsus with large posterodorsal terminal gibbosity	sp. 43 (p. 125)

—— Fore femur usually without black posteroventral spines, with pale posteroventral bristles and setulae only; male: hind basitarsus variable (females not easily specifically identifiable) 5

5 Male: hind tibia without dorsal gibbosity visible in anterior view; glans of aedeagus basally strongly narrowed and curved, without sub-basal spine or tubercle; each terminal filament with subterminal lobe (Fig. 4) ..... *foliata* (p. 128)

—— Male: hind tibia with conspicuous dorsal gibbosity or tubercle; glans not much curved basally, with sub-basal spine or tubercle; terminal filament without subterminal lobe 6

6 Male: hind basitarsus with large posterodorsal terminal gibbosity, thus very asymmetrical; hind tibia with moderate dorsal gibbosity, slightly keeled at summit and with posterodistal concavity (Fig. 6); habitat in NT mainly S of 17°S ..... *nodosa* (p. 127)

—— Male: hind basitarsus without posterodorsal gibbosity, only slightly asymmetrical; hind tibia with large gibbosity surmounted by compact rounded tubercle (Fig. 7); habitat in NT mainly N of 17°S ..... *tomentosa* (p. 128)

7 Fore femur with several large black posteroventral spines; hind femur distally with short black anteroventral spinescent bristles ..... *rapida* (p. 129)

—— Fore femur without black posteroventral spines; hind femur without anteroventral bristles 8

8 Abdominal tergites 3 and 4 black, each with large, whitish-pruinescent zone on lateral margin (zone also white-haired); mesoscutal transverse suture of each side connected across median line by deep groove, apparent in profile; parafacial neither rugose nor with setiferous pits; male: glans of aedeagus very short, ovoid; membranous bulb much longer than glans; each terminal filament little longer than bulb ..... *sericea* (p. 130)

—— Abdominal tergites 3 and 4 brown to blackish, without whitish-pruinescent lateral zones (sometimes with longer whitish lateral hairs or macrotrichia); mesoscutum without transverse groove crossing median line; parafacial either rugose or with setiferous pits; male: aedeagus not as above 9

9 Parafacial quite without setiferous pits; first basal cell bare on c. basal half or more; male: aedeagus with membranous caeca vestigial and terminal filaments little longer than glans (Fig. 9) ..... *eremia* (p. 130)

—— Parafacial with numerous setiferous pits, at least on upper part; first basal cell microtrichose on almost whole length; male: aedeagus with much longer membranous caeca and terminal filaments ..... *marginalis–chaetostigma* alliance (p. 131)

10 Much of thorax, including entire mesoscutum and scutellum, with tawny ground colour; mesoscutum entirely densely pruinescent on otherwise smooth cuticle ..... [*grahami* alliance] 11

—— Thorax with black ground colour, sometimes with greenish or bluish reflections; mesoscutum with very little pruinescence except near lateral margins 14

11 Hind femur straight, in anterior view with both dorsal and ventral outlines similarly slightly convex; male: terminal filament of aedeagus at least slightly shorter than glans 12

—— Hind femur strongly (male) or slightly (female) curved, the ventral outline in anterior view at least slightly concave in contrast to the dorsal outline; male: terminal filament of aedeagus at least slightly longer than glans 13

12 Mesopleuron, sternopleuron, and pteropleuron each with diffuse dark brown spot; wing with apical brownish suffusion very slightly developed, not extending near discal crossvein; male: hind trochanter with slight ventral gibbosity bearing very small brush of yellow setulae; preglans of aedeagus expanding distally, somewhat trumpet-like; each terminal filament only slightly shorter than glans ..... *bucina* (p. 134)

—— Thoracic pleura without dark marks; wing, in mature specimens, with indistinct brownish distal zone extending to discal crossvein; male: hind trochanter without trace of ventral gibbosity and brush; preglans slender, not expanding distally; each terminal filament not more than 0.75 of length of glans ..... *recta* (p. 134)

13 Abdominal tergite 5 with tawny posterior zone; second basal cell almost entirely microtrichose; indistinct apical brownish wing cloud very restricted, not approaching discal crossvein; male: hind trochanter with long, spatulate, apically notched process (Fig. 13); hind tibia bent beyond base ..... *tricurva* (p. 132)

—— Abdominal tergite 5 usually almost unicolorous grey-brown; second basal cell with definite basal bare zone; indistinct apical wing cloud more extensive, enclosing discal crossvein (undeveloped in immature specimens); male: hind trochanter with stout ventral tubercle only, bearing brush of black and yellow setulae (Fig. 12); hind tibia straight ..... *grahami* (p. 132)

14 Prosternum widely separated from propleuron by membranous zone, without pair of elongate anterolateral lobes (Fig. 37); antenna (excluding arista) short, potentially reaching no more than two thirds distance from basal socket to centre of epistomal margin of face; arista with well developed hairing near base 15

—— Prosternum on each side connected to propleuron by sclerotized precoxal bridge (Fig. 36), or at least anterolateral angle of prosternum narrowly produced and almost touching propleuron; antenna longer, usually potentially reaching almost or quite to centre of epistomal margin; arista variable 19

15 Capitellum of halter dark brown; vertical surface between supra-alar bristle and wing base glossy, without pruinescence ..... *ameniina* (p. 145)

—— Capitellum of halter tawny-yellow to whitish; vertical surface below supra-alar bristle extensively pruinescent 16

16 Most of first basal cell and large areas in marginal and submarginal cells bare; length of some hairs on arista as great as width of antennal segment 3; fore femur with neither posteroventral tooth-like keel nor spinescent posteroventral bristles ..... *rugula* (p. 145)

—— First basal, marginal, and submarginal cells entirely microtrichose; hairs on arista all shorter than greatest width of segment 3; fore femur with either posteroventral tooth-like keel or spinescent bristles or both 17

17 Fore femur without posteroventral bristles or spines, with short, rounded tooth-like posteroventral keel (at least in male); humeral bristle present ..... *whittingtoni* (p. 145)

—— Fore femur with spinescent posteroventral bristles, sometimes also with tooth-like keel; humeral bristle absent 18

18 Posterior part of humeral callus and upper margin of sternopleuron with greyish white pruinescence; postfrons with blackish spot between ocelli, without lateral marks; fore femur with prominent posteroventral tooth-like keel, at least in male (female unknown); male: hind trochanter with small simple setulae only ..... *irregularis* (p. 147)

—— Humeral callus and sternopleuron mostly glossy, without pruinescence; postfrons with large blackish mark covering ocellar triangle and a similar mark on each side covering upper orbit; fore femur without tooth-like keel; male: hind trochanter with rather long mollisetae ..... *spinifemorata* (p. 147)

19 Fore femur with several conspicuous posteroventral black spines; vertex of head sharply carinate; discal crossvein strongly curved outwards 20

—— Fore femur without posteroventral spines, usually with slender posteroventral bristles; vertex subcarinate; discal crossvein variable 21

20 Arista bare; marginal cell of wing hyaline; fore and hind basitarsi dark brown to black ..... *serra* (p. 136)

—— Arista with numerous hairs on basal part of segment 6, some as long as its basal diameter; marginal cell suffused with yellow-brown; fore and hind basitarsi tawny-orange ventrally, darker distodorsally ..... *prensans* (p. 135)

21 Antenna (excluding arista) and palpus yellow; postfrons yellow, not browned anteriorly; scutellum not smooth and glossy 22

—— Antenna and palpus at least partly tawny to brown; postfrons extensively brown, at least on anterior part; scutellum glossy and smooth, or almost so 23

22 Scutellum pale grey-pruinescent dorsally; squama slightly narrowing distally, with posterobasal part of margin concave (Fig. 23, p.138); halter brownish-tawny; male: each terminal filament of aedeagus at least 7× as long as glans ..... *praeflava* (p. 137)

—— Scutellum without grey pruinescence, with fine, dense parallel ridges; squama broadly rounded distally (Fig. 24, p.138); halter pale yellow; male: terminal filament shorter than glans ..... *korneyevi* (p. 137)

23 Arista with numerous short hairs on basal part of segment 6; postfrons with low median hump in front of ocelli; male: hind basitarsus more than 3× as long as wide ..... *maceveyi* (p. 143)

—— Arista without such hairs; postfrons without median hump; male: hind basitarsus less than 3× as long as wide 24

24 Cheek and parafacial brown; fore and hind tarsi largely dark brown; male: lower sternopleuron, fore coxa, and fore femur with conspicuously long and numerous, crimped pale hairs; fore tarsus very asymmetrical; hind tarsus very broadly depressed, with basitarsus less than twice as long as wide ..... *lana* (p. 140)

—— Cheek and parafacial yellow; all tarsi fulvous basally; male: sternopleuron, fore coxa, and fore femur without conspicuously long or crimped hairs; fore tarsus approximately symmetrical; hind tarsus slightly depressed, with basitarsus slightly more than twice as long as wide ..... *collessi* (p. 142)

Duomyia sp. 43

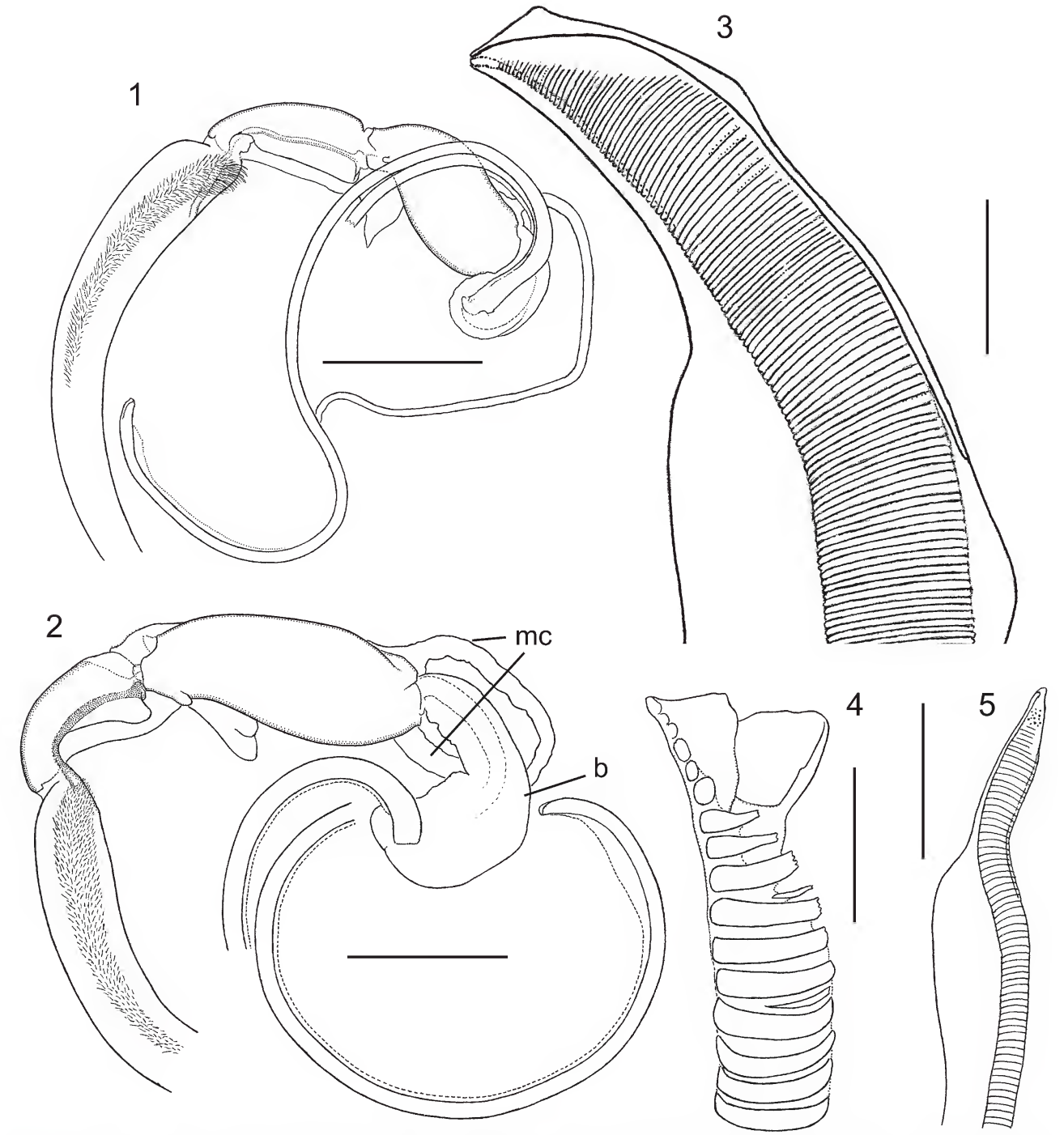
Fig. 1

Material examined. NT: 1♂, 1♀, 3 mi NE of Gosses Bluff, 23°48'S 132°21'E, April 1969, H.P. (ANIC); 1♀, Reedy Rockhole, near King's Canyon [c. 24°18'S 131°36'E], Jan. 1984, M.S.M., B.J.M. (AM).

Description. (♂, ♀). Resembling *D. pallipes* McAlpine, *D. nodosa*, and *D. tomentosa*; agreeing in most characters with description of *D. nodosa* except as indicated below.

Thorax. Fore femur with two to six black spinescent posteroventral bristles, in addition to the usual yellow bristles; hind femur of male only slightly narrowed and curved basally; hind tibia and hind tarsal segment 1 of male much modified as in *D. nodosa*.

Abdomen. Male postabdomen: stipe of aedeagus with terminal posterior concavity bounded by sclerotized ridge on right side, surface of concavity not bearing pubescence but overlapped by relatively long pubescence on and near ridge; preglans c. 0.8 as long as glans, with right membranous wing less widened distally and much less narrowed basally than



Figs 1–5. *(1) Duomyia* sp. 43, Gosse's Bluff, NT, aedeagus; only part of left terminal filament shown; only one of two membranous caeca shown. *(2) D. nodosa*, near Mulga Park, aedeagus, left terminal filament omitted, right one shown in two parts. *(3)* the same, detail of apex of terminal filament. *(4) D. foliata*, Mon Repos, the same part. *(5) D. monteithi*, near Warwick, Queensland, the same part. Scales for Figs 1, 2 = 0.5 mm. Scales for Figs 3–5 = 0.05 mm. *b*, bulb; *mc*, membranous caeca.

in *D. nodosa*, narrower throughout than in *D. pallipes*; glans more narrowed and curved basally than in *D. nodosa* and *D. tomentosa*, with very short sub-basal tubercle; each terminal filament c. 6× as long as glans, not attenuated distally.

Dimensions. Total length,♂ 5.1 mm (estimated), ♀ 8.3–9.6 mm; length of thorax,♂ 2.3 mm, ♀ 3.5–4.3 mm; length of wing,♂ 4.8 mm, ♀ 7.0–7.8 mm; length of glans of aedeagus, 0.61 mm (undersized♂).

Distribution. Northern Territory: S of 21°S ("central Australia").

Notes. This form may perhaps represent a distinct species, but the available sample of two females and a probably very undersized male leaves me in doubt. It resembles *Duomyia pallipes* of eastern New South Wales and south-eastern Queensland in the presence of posteroventral black spines on the fore femur and the nature of the modifications of the male hind tibia and tarsus, but it differs in the lack of a terminal pubescent right posterolateral prominence on the stipe (the sclerotized ridge described above appears not to form such a terminal prominence); the right membranous wing of the preglans is much narrower, and the small

sub-basal tubercle on the glans is unlike the large curved basal process of *D. pallipes* (McAlpine 1973: fig. 27). *Duomyia* sp. 43 also resembles the sympatric *D. nodosa* but differs in the presence of black posterodorsal spines on the fore femur and the differences in the aedeagus given above; the apices of the terminal filaments are somewhat similar in the two species, but in *D.* sp. 43 the dense transverse ridging covers the extreme tips.

Duomyia nodosa n.sp.

Figs 2, 3, 6

Type material. Holotype ♂, NT: Lasseter's Cave, 25°01'S 129°24'E, 31.xii.1995, M.S.M., B.J.M., K.A.K. (AM K292954). Impaled on long pin, aedeagus in microvial on pin. Paratypes. NT: 1♀, Tilmouth Well, Napperby Creek, 22°48'S 132°35'E, Jan. 2001, M.S.M., B.J.M. (AM); 1♂, Old Andado, Simpson Desert, Sept. 1972, Z.R.L. (ANIC); 1♂, 1♀, 26 km WSW of Mulga Park homestead, 26°00'S 131°25'E, Jan. 1982, D.C.R., B.G.R., R.H. (ANIC).

Other material (localities only given). Western Australia: Fitzroy River crossing, Derby–Broome road (AM); 1 km N of Millstream (ANIC); Crossing Pool, Millstream (ANIC); 13 km NE of Newman (ANIC); Minilya River (ANIC); Murchison River (ANIC); Kalbarrie (AM).

Description. (♂, ♀). Moderate-sized dull greyish fly with yellow head.

Coloration. Postfrons and parafacial yellow, face paler yellow; occipital region with greyish zone not reaching near vertex. Antenna tawny-yellow; arista becoming dark brown distally. Prelabrum and palpus tawny-yellow or paler yellow. Thorax with ground colour of cuticle largely dark brown to blackish or in part tawny-orange, particularly on parts of pleura (the latter perhaps in immature specimens), with general covering of dense grey pruinescence except on parts of sternopleuron and sometimes on five very narrow black stripes on mesoscutum; humeral callus and scutellum tawny, with pale pruinescence and setulae. Legs tawny-yellow; tibiae often slightly browned apically, fore and hind tibiae often with brown anterior mark beyond mid-length. Wing clear; subcostal cell pale yellow; apical greyish zone very indistinct or absent. Halter dull yellow. Abdominal tergites entirely densely pruinescent, tergites 1 to 4 grey (pale grey pruinescence covering brown cuticle), or largely tawny yellow; tergite 5 tawny yellow, often with grey lateral zone in female; sternite 1 brown, largely glossy, with grey pruinescent lateral margins; sternite 2 almost entirely grey pruinescent.

Head. Postfrons with irregular pitting, most marked anterolaterally, without median hump, its width near mid-length c. 0.47–0.51 of width of head; fronto-orbital and ocellar bristles absent; eye much higher than long; height of cheek c. 0.36–0.41 of height of eye; facial carina broad, sharply margined, strongly plicate, between antennal bases at least twice as wide as each antennal socket; parafacial very broad, with setiferous pits only at upper extremity. Antenna potentially extending c. 0.8–0.9 of distance from basal socket to centre of epistomal margin of face in male, extending c. 0.7 of that distance in female; segment 3 slender, acute or subacute dorsoapically; arista with simple, fine apex, without pubescence and rays on segment 6. Prelabrum reduced, very shallow; palpus moderately developed; proboscis short, with broad prementum and labella.

Thorax. Mesoscutum and scutellum with very numerous pale, short curved setulae; scutellum rounded, dorsally convex, with two pairs of stout bristles; pteropleuron with numerous entirely pale setulae on anterior part and on pteropleural ridge, with no larger bristles; other thoracic bristles typical of genus (as given for *D. grahami* below). Fore femur with numerous yellow dorsal bristles and a series of similar posteroventral bristles but without black spinescent bristles; mid femur with subapical posterior comb of yellow bristles; hind femur not curved, stout on basal half, with a dorsal to anterodorsal series of yellow bristles; hind tibia of male much modified, with prominent preapical dorsal gibbosity which has a slight longitudinal keel on distal part of summit and slight posterodistal concavity; tarsi rather broad, depressed, basitarsi least depressed; fore tarsal segment 1 asymmetrical in apical outline and distribution of ventral setulae; hind tarsus asymmetrical, particularly segments 1 and 4 of male; hind tarsal segment 1 with large terminal posterodorsal gibbosity, which is absent in female. Wing: distal section of vein 3 with only slight curvature; basal section of vein 4 1.1–1.3× as long as second section; distal section of vein 4 with sigmoid curvature, strongly convergent with vein 3 to terminate well in front of apex; membrane largely microtrichose, with variable bare zones in second basal and anal cells and base of submarginal cell.

Abdomen. Tergite 5 slightly longer than tergite 4 in both sexes; sternite 1 subquadrate, broadest at anterior margin; sternite 2 subtriangular; sternites 3 and 4 vestigial or little sclerotized; sternite 5 broad and well sclerotized in male, narrow and little sclerotized in female. Male postabdomen: distal section of outer surstylus surpassing that of inner surstylus, not much narrowed nor apically expanded but with small angular posterior prominence; stipe of aedeagus very stout, with longitudinal band of dense pubescence which is broadened towards distal end, without defined concave terminal zone seen in *Duomyia* sp. 43; preglans rather slender, strongly curved, c. half as long as glans, separated from stipe by deep constriction, but connected to it by strong sclerotization on posterior (concave) surface, with pair of very unequal posterior longitudinally attached membranous wings, the smaller right wing of characteristic shape, broad and rounded at distal end, much narrowed at basal end and discontinued well before reaching base of preglans; glans elongate–ovoid, only slightly curved basally, with sub-basal posterior tubercle; pair of long membranous caeca arising at junction of glans and membranous bulb; paired terminal filaments not much tapered distally, of equal length, each between 4× and 5× as long as glans, with the usual annular ridges very fine and numerous, present approximately to apex (Fig. 3).

Dimensions. Total length,♂ 7.4–9.9 mm, ♀ 8.3–10.0 mm; length of thorax,♂ 3.2–4.1 mm, ♀ 3.8–4.1 mm; length of wing,♂ 6.3–7.7 mm, ♀ 7.4–7.7 mm; length of glans of aedeagus, 0.82–0.91 mm.

Distribution. Northern Territory: S of c. 21°S ("central Australia"). Western Australia: coastal districts between c. 17°S and 27°S.

Notes. *Duomyia nodosa* is very similar to *D. tomentosa*

Hendel, *D. pallipes* McAlpine, and *Duomyia* sp. 43. Unlike *D. pallipes* and sp. 43 none of the posteroventral bristles of the fore femur is black and spinescent. Unlike *D. tomentosa* each of the lateral pruinescent zones on abdominal sternite 1 is very narrow (each at least one quarter of width of sternite in *D. tomentosa*). The male, like that of *D. pallipes* and sp. 43, has a large posterodorsal gibbosity on the hind basitarsus, which is absent in *D. tomentosa*. *Duomyia nodosa* also differs from other species in details of the aedeagus, particularly in the shape of the right membranous wing of the preglans (Fig. 2). In Figs 3, 4, and 5 I have shown the apex of a terminal filament at the same scale, so that the remarkable difference between the species can be appreciated. The known distribution of *D. nodosa* is widely separated from that of *D. pallipes* (temperate eastern Australia) and in NT it is apparently separate from that of *D. tomentosa*, but not from that of sp. 43.

Duomyia tomentosa Hendel

Fig. 7

Duomyia tomentosa Hendel, 1914a: 58 (nomen nudum); Hendel, 1914b: 100–101 (described); D. McAlpine, 1973: 83–84, fig. 28.

Duomyia (Duomyza) tomentosa: Malloch, 1929: 507, fig. 2b.

Type material. Holotype.♀, Queensland: Townsville, no date, F.P.D. (BM).

Material from NT (localities only given). Jabiru East (AM); Anbangbang, Kakadu National Park (AM, NTM); South Alligator River crossing, SSW of Cooinda (AM); Ferguson River Crossing, Stuart Highway (AM); Mataranka Hot Springs (ANIC); Horn Islet, Sir Edward Pellew Group (AM, QM).

Description. See D. McAlpine (1973).

Distribution. Northern Territory: mainly N of 17°S. Queensland: northern Cape York Peninsula to south-east of state. New South Wales: inland districts as far south as Gilgandra and Mendooran (few records). Western Australia: extreme north (new state record—Carson [River] escarpment, 14°49'S 126°49'E, ANIC).

Notes. *Duomyia tomentosa* closely resembles other species inhabiting NT with pale-setulose scutellum, pale-pruinescent humeral callus and usually no black bristles on fore and hind femora, but males are distinguished by details of the aedeagus (McAlpine, 1973: fig. 28) and by the armature of the hind leg: no strong gibbosity on tarsal segment 1, but a very high dorsal gibbosity surmounted by a compact rounded tubercle on the tibia (Fig. 7). Females may be difficult to distinguish from those of *D. foliata* and *D. nodosa*. Those of the former may often have darker femora and darker zones with little pruinescence on the abdomen but variation in NT populations is scarcely known. *Duomyia tomentosa* appears to be separable from *D. nodosa* by the distribution of pruinescence on abdominal sternite 1, as indicated under that species, and it seems that these two species may have separate distributions within the NT.

A male specimen clearly belonging to *D. tomentosa* (Jabiru East, AM) is atypical in possessing one black spinescent posteroventral bristle on each fore femur.

Duomyia foliata McAlpine

Fig. 4

Duomyia foliata D. McAlpine, 1973: 85–86, fig. 29.

Type material. Holotype ♂, Queensland: Cannonvale, NE of Proserpine, 1.iv.1967, M.S.U. (ANIC). Paratypes. Queensland. See list by McAlpine (1973).

Material from NT (localities only given). Mudginberri, Kakadu National Park (ANIC); 15 mi (c. 24 km) N of Tennant Creek (ANIC).

Description. See D. McAlpine (1973).

Distribution. Northern Territory: Kakadu and Tennant Creek districts. Queensland: northern Cape York Peninsula to Bundaberg district and Carnarvon Range. Western Australia: as far south as Murchison River (few records). New South Wales: southern districts (Congo, near Moruya; Jerilderie).

Notes. The males of *D. foliata* are readily distinguished from related species (those with pale-setulose scutellum, two pairs of scutellar bristles, and pale-pruinescent humeral callus) by the absence of a dorsal gibbosity on the hind tibia, but this tibia is distally compressed, with a broad shallow concavity occupying c. the distal half of its posterior surface. There are numerous distinctive features of the aedeagus: the pubescent strip on the stipe does not form a prominence at its distal end; the right membranous wing of the preglans is long, narrow, and further narrowed at each extremity, and the left membranous wing is vestigial; the glans is basally narrowed and strongly curved and lacks the sub-basal tubercle; each terminal filament has very coarse annular ridging on its distal part, the more distal ridges forming broken rings, and a distinctive sclerotized subapical lobe (see Fig. 4, and D. McAlpine, 1973: fig. 29). These features distinguish *D. foliata* from the closely related *D. monteithi* McAlpine of Queensland, which has very slender terminal filaments, each with a simple tip and very fine annular ridging (Fig. 5). Females lack such distinctive diagnostic features, but often have darker zones with little pruinescence on the abdominal tergites and brown suffusions on the femora which are usually absent in related species of NT.

Populations in the NT are very little known and need further sampling, but the aedeagal characters given above have been checked for both northern and southern Queensland populations and specimens from Western Australia (Murchison River, ANIC) and southern New South Wales.

In southern Queensland *D. foliata* has been recorded as infesting eggs of marine turtles (Hall & Parmenter, 2006), but the species is not restricted to habitats of these reptiles.

Duomyia sp. 44

Material examined. NT: 1♀, Pularumpi [Garden Point], Melville Island, June-July 1986, P.H. (ANIC); 1♀, Buffalo Creek, near Darwin, March 1996, D.K.M., G.R.B. (AM).

Description. (♀ only,♂ unknown). Resembling *D. nodosa*, *D. tomentosa* etc. in most characters, but the following points are significant.

Coloration. Head, antenna, and palpus predominantly tawny-yellow; frontal setulae mixed yellow and black or predominantly black. Scutellum tawny-yellow to tawny-

brown, with pale pruinescence and mixed yellow and black setulae; humeral callus brown to tawny-yellow with pale pruinescence; rest of thorax brown-black with almost uniform covering of pale grey pruinescence, giving darker general coloration than in *D. nodosa* and *D. tomentosa*; setulae on mesopleuron mixed back and yellowish. Legs tawny-yellow; fore femur with several black dorsal bristles, in Buffalo Creek specimen with one or two brown or yellow-brown posteroventral bristles, in Melville Island specimen with a series of fairly fine black posteroventral bristles. Wing with faint greyish apical cloud. Halter yellow. Abdominal tergites coloured much as thorax, with predominantly black setulae, except on tergite 1.

Distribution. Northern Territory: coastal habitats.

Notes. I am uncertain if the two specimens listed are conspecific, as they differ in a few details and there are no males to check aedeagal characters. However, they agree in characters given in the key to species and in my brief description. I consider this material too meagre to justify a formal name and description.

Duomyia rapida n.sp.

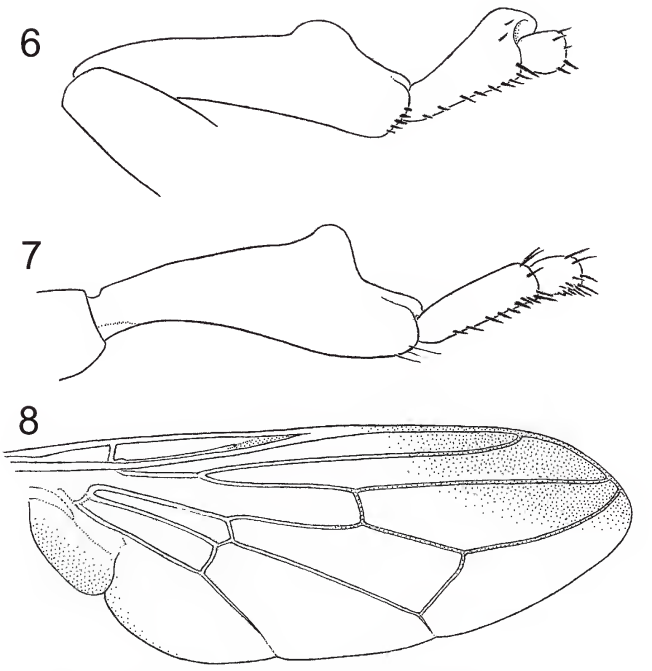
Fig. 8

Type material. Holotype.♀ (unique). NT: Arnhem Highway, just W of Mary River, 12°50'S 131°56'E, 60 m, 20.ii.2008, K.H., D.M., M.S.M., C.O., M.H. (AM, K292955).

Description. (♀;♂ unknown). Small, slender predominantly black fly with brownish shading on wing.

Coloration. Postfrons brown, with pale yellow setulae and narrowly silvery-pruinescent lateral margins; parafacial tawny-yellow, with silvery-pruinescent spot at upper extremity; face pale yellow, without darker marks; cheek region orange-tawny with thin silvery pruinescence on posterior part; upper occipital region largely black, with silvery pruinescent orbital margins and broad silvery-pruinescent zone above occipital foramen. Antenna tawny-brown. Palpus brown-black. Thorax largely black, with green-tinted reflections; humeral callus glossy, without pruinescence; scutellum black, with little dark pruinescence; setulae on mesoscutum, scutellum and pleura nearly all yellow. Coxae and femora largely black, latter with narrowly yellowish apices and with all major bristles black; tibiae brownish with yellow bases, fore one darkest, hind one with paler central zone; all basitarsi yellow with darkened apices; more distal segments of fore tarsus brown-black, those of mid and hind tarsi tawny-brown. Wing membrane tinged with yellow basally, elsewhere stained with light brown, the colouring slightly intensified anterodistally. Halter tawny. Abdominal tergite 1 with dense grey-brown pruinescence; tergites 2 to 5 shining black with bluish reflections; tergite 5 with all setulae and bristles black; sternites 1 to 4 and 6 shining black with varying amounts of grey pruinescence, the last with black setulae and little pruinescence.

Head. Postfrons without distinct pitting or central hump, its width c. 0.45 of width of head, with numerous rather coarse, compressed, curved setulae; fronto-orbital bristles absent; ocellar bristle small; facial carina broadly subtriangular, with sharply raised lateral margins on upper part and c. six vertical ridges on flattened central part; parafacial rather broad, pitted and with several curved, compressed setulae towards upper end; height of cheek 0.31 of height of eye. Antenna potentially extending distinctly beyond centre of epistomal margin of face; segment 3 apically rounded; arista almost bare, with two or three minute rays towards base of segment 6. Prelabrum moderately small; palpus rather short and broad.



Figs 6–8. *(6) Duomyia nodosa*, part of left hind leg of male, anterior view. *(7) D. tomentosa*, same part. *(8) D. rapida*, holotype, right wing.

Thorax. Mesoscutum with very numerous short, curved setulae; scutellum with numerous longer dorsal setulae and some on lateral surface; setulae on pteropleuron rather long, but none bristle-like; pteropleural ridge with several yellow setulae; major thoracic bristles as given for *D. grahami*, except that only two stout, subequal pairs of scutellars present. Fore femur with rather numerous somewhat irregularly placed dorsal bristles on almost entire length and a series of four or five stout, spinescent posteroventral bristles; mid femur with two subapical posterior bristles; hind femur with a series of dorsal bristles, distally with an irregular series of short, spinescent anteroventral bristles. Wing (Fig. 8): vein 3 distally almost straight; vein 4 strongly curved forwards apically to terminate well in front of apex; first section of vein 4 1.05× as long as second section; membrane almost entirely microtrichose.

Abdomen. Sternites 3 and 4 small; sternite 5 apparently absent; sternite 6 well sclerotized, divided; tergite 5 with setulae and bristles on median part of posterior half semi-erect and not medially inclined.

Dimensions. Total length, 6.1 mm; length of thorax, 2.3 mm; length of wing, 4.8 mm.

Distribution. Northern Territory: only known from type locality to east of Kakadu National Park.

Notes. *Duomyia rapida* is the only known species of the genus in Northern Territory that combines a black, setulose scutellum with the possession of thick, spinescent posteroventral bristles

on the fore femur. In the key of McAlpine (1973), *D. rapida* runs to *D. commoni* McAlpine, which is widely distributed in eastern Queensland and is now reasonably well known to me. I now place these two species, together with *D. convallis* McAlpine, also of Queensland, in the *commoni* alliance, characterized as follows: scutellum extensively setulose, with two pairs of bristles; humeral callus glossy, without noticeable pruinescence; femora largely blackish or dark brown; fore femur with thick black posteroventral spines.

As there is a single available specimen of *D. rapida*, the range of variation may not yet be understood. The holotype of *D. rapida* is smaller than any of the 21 available specimens of *D. commoni*, but may be exceptionally small for its own species.

The specific epithet is a Latin adjective, tearing or snatching, as suggested by the armature of the fore femur.

The species of the *commoni* alliance are distinguishable by the following key:

1 Fore femur with a series of black dorsal bristles extending to near base, pale setulae in this region few, short, and inconspicuous; hind femur with a short distal series of short black spinescent anteroventral bristles; wing membrane extensively suffused with light brown, colour intensified anteroapically; setulae on posteromedian part of tergite 5 black, posteriorly inclined but not medially directed, those on lateral margin of tergite 5 all short and black like those above margin, only becoming longer posteriorly ..... *rapida*

—— Fore femur with series of dorsal black bristles restricted to c. distal 0.6 or less of its length and replaced basally with long whitish setulae; hind femur without distal anteroventral black bristles, with only fine pale setulae in this region; wing membrane almost clear except for apical brownish cloud in marginal, submarginal, and first posterior cells and brown zone in subcostal cell; setulae on posteromedian part of tergite 5 mostly pale, decumbent, medially directed, group of setulae on lateral margin also pale and longer than those just above margin 2

2 Postfrons deep yellow, only slightly darker than parafacial; scutellum brown or tawny laterally; posteroventral spines of fore femur much shorter than half diameter of femur; anal crossvein curved on whole length ..... *convallis*

—— Postfrons brown, strongly contrasting with parafacial; scutellum almost entirely black; longer posteroventral spines of fore femur at least as long as half diameter of femur; anal crossvein curved only at anterior extremity ..... *commoni*

Duomyia eremia McAlpine

Fig. 9

Duomyia eremia D. McAlpine, 1973: 89, fig. 34.

Type material. Holotype ♂, NT: 48 miles (c. 77 km) WSW of Alice Springs, 10.ii.1966, E.B.B., M.S.U. (ANIC). Paratype ♂, same data (AM). Both specimens with aedeagus extended and exposed.

Other material. 1♀, South Australia: Anajatra, Mann Range, May 1983, G.A.H. (AM).

Description. (♀). Agreeing in general characters with that of types except as indicated.

Coloration. Fore tibia entirely brown-black; mid tibia almost so; fore femur with mixed black and white dorsal bristles, ventral bristles white.

Head. Height of cheek 0.29 of height of eye.

Dimensions. Total length, 8.1 mm; length of thorax, 3.2 mm; length of wing, 6.5 mm.

Distribution. Northern Territory: Alice Springs district. South Australia: Mann Range, far NW of state (new record for state).

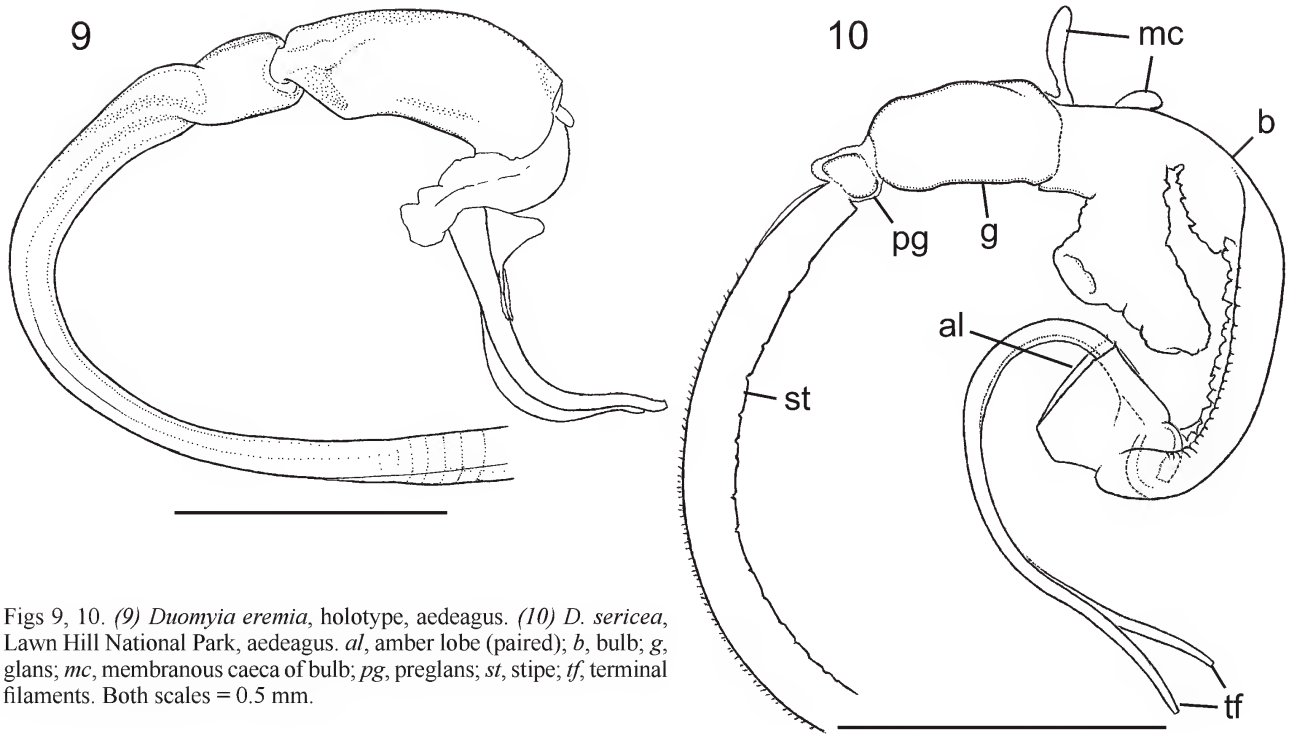
Notes. *Duomyia eremia* is sharply differentiated from related species by the characters given in the key. Also, the complete absence of a greyish apical wing cloud differentiates it from numerous species, except *D. sericea* and *D. chaetostigma*.

Duomyia sericea Hendel

Fig. 10

Duomyia sericea Hendel, 1914b: 99–100; D. McAlpine, 1973: 87 (redescribed).

Type material. Lectotype.♀ (designated D. McAlpine, 1973). Queensland: Burpengary, 26 mi (c. 42 km) N of Brisbane, no date, T.L.B. (BM). Paralectotype.♀, lower specimen on same pin, same data (BM).



Figs 9, 10. *(9) Duomyia eremia*, holotype, aedeagus. *(10) D. sericea*, Lawn Hill National Park, aedeagus. *al*, amber lobe (paired); *b*, bulb; *g*, glans; *mc*, membranous caeca of bulb; *pg*, preglans; *st*, stipe; *tf*, terminal filaments. Both scales = 0.5 mm.

Additional material (localities only given). NT: 5 km SE of Humpty Doo (AM, ANIC); Wangi Falls, Litchfield National Park (AM); Merl [Mel] Camping Area, near Cahill's Crossing (AM); East Alligator Rangers' Station (ANIC); Marrakai Road, 2 km E of Stuart Highway (AM); Anbangbang, near Nourlangie Rock (AM, NTM); Koolpin Gorge, southern Kakadu National Park (AM); Horn Islet, Sir Edward Pellew Group (QM). Queensland: north-west inland (Musselbrook–Lawn Hill district, AM, QM); north-east coast (Daintree district, ANIC); south-east (Brisbane–Morton Bay district, BM, AM, QM).

Description. See D. McAlpine (1973: 87).

Distribution. Northern Territory: northern districts. Queensland: widely but perhaps discontinuously distributed.

Notes. Among the *Duomyia* species found in the tropics, *D. sericea* is the only species with the mesoscutal transverse suture continued across the middle of the mesoscutum as a distinct groove. Also, it differs from other species having a setulose scutellum with two pairs of bristles and a black, glossy humeral callus in the possession of subtriangular whitish-pruinescent (as distinct from setulose) lateral zones on abdominal tergites 3 to 5. Antennal segment 3 is not dilated distally, as it is in a female specimen from New South Wales (Crescent Head, AM), otherwise resembling *D. sericea*. The aedeagus (Fig. 10) is remarkable for the very short, well defined preglans, long and complex bulb, and pair of partly connected amber lobes, each with mucronate apex, which sheathe the bases of the terminal filaments. However, the details of the aedeagus show some variation, which may be geographic, in the quantity of microtrichia on the stipe, the shape and size of the glans, the form of the complex bulb and its associated caeca, and perhaps the form of the amber lobes. It is difficult to evaluate this variation with so little material from the eastern part of the species' range.

The *Duomyia marginalis–chaetostigma* alliance

I use the above term for a series of little understood species living in northern and eastern Australia, which tend to run to *D. marginalis* McAlpine or *D. chaetostigma* McAlpine in the key by McAlpine (1973) and to this alliance in the above key to species. In the limited available material from NT there are several species of the alliance from the northern parts of the territory, from the Alice Springs district, and from the vicinity of the Gulf of Carpentaria. These and the more extensive collections from eastern states need more thorough sampling and study before an accurate taxonomic review can be published.

I have only seen one male clearly representing the species *D. marginalis*, viz. the holotype, from Stanthorpe, southern Queensland (QM). This specimen has distinctive features of the aedeagus, including a very large membranous lobe on the somewhat elongate preglans and a moderately stout glans (see McAlpine, 1973: fig. 39). A superficially similar male from near Leyburn, to the north of Stanthorpe, has a markedly different aedeagus and is provisionally placed as "*Duomyia* sp. 46" in the AM collection.

Duomyia chaetostigma has become better known since its original description (McAlpine, 1973), but the numerous typical specimens are only from the Binnaway–Mendooran–Dunedoo district of mid-western New South Wales. The males consistently have a narrowly ovoid preglans with broadly rounded scoop-like distal lobe, moderately slender glans, pair of terminal filaments each slightly more than 3× as long as glans and with narrow membranous margin expanded on c. distal third of filament but discontinued shortly before apex (McAlpine, 1973: fig. 40). The presence of setulae on the membrane of the subcostal cell is an aberrant condition of the holotype, not present in other specimens. The few superficially similar males from Queensland and NT disagree in aedeagal characters, and are therefore not regarded as conspecific.

Species of this alliance are not treated further in this review.

Duomyia grahami n.sp.

Figs 11, 12, 16

Type material. Holotype ♂, NT: Jabiru East, 12°40'S 132°53'E, 22–24.ii.1996, G.R.B., D.K.M. (AM, K292956); micro-pinned on double mount, left mid-leg detached, aedeagus extended. Paratypes. NT: 2♂, 3♀, Anbangbang [picnic area], Kakadu National Park [c. 12°51'S 132°47'E], Feb. 1996, G.R.B., D.K.M. (AM, NTM); 2♂, 6♀, Nawurlandja Rock area, Kakadu National Park, 12°51'S 132°47'E, Jan. 1993, G.D., A.D. (AM, ANIC).

Description. (♂, ♀). Moderately large, predominantly tawny-brown fly; wing with light brownish shading distally.

Coloration. Head, including antenna and palpus, orange-tawny; ocellar spot brownish. Thorax largely tawny, with bristles and most setulae black; mesoscutum, humeral callus, and scutellum almost uniformly yellow-pruinescent; pleura with dark brown suffusion, masked by paler grey pruinescence, covering part of mesopleuron, pteropleuron, and sternopleuron. Legs tawny, with some brownish suffusion mainly restricted to hind femur and tibia; each tarsal segment slightly paler basally. Wing membrane mostly tinged with yellow; distal part of subcostal cell deep yellow; apical part of wing beyond end of vein 2 and including distal extremity of discal cell lightly suffused with brown. Halter tawny-yellow. Abdominal tergite 1 tawny-brown; remainder of exposed tergites darker grey-brown; sternites 1 and 2 entirely grey-pruinescent.

Head. Postfrons without distinct pitting or central hump, its width c. 0.36–0.37 of width of head, with numerous short, fine setulae; facial carina not markedly convex centrally, with sharply raised lateral margins and variable number of vertical ridges; parafacial moderately narrow, with few fine setiferous pits near upper extremity only; cheek region not rugose; height of cheek c. 0.24–0.32 of height of eye; fronto-orbital and ocellar bristles very small or absent. Antenna potentially extending c. to centre of epistomal margin in male, shorter in female; arista subplumose on somewhat less than basal half, with numerous rays slightly shorter than width of segment 3. Prelabrum moderately small; palpus narrow.

Thorax without mollisetae; scutellum without setulae; the following bristles present: humeral, 1+1 notopleurals, supra-alar, postalar, posterior intra-alar, posterior dorsocentral, prescutellar acrostichal, three pairs of scutellars; pteropleuron with some upper setulae stouter, bristle-like; pteropleural ridge with few setulae; prosternum with each anterolateral angle much produced so as to meet or almost meet propleural gibbosity. Fore femur with distinct black dorsal and posteroventral bristles; mid femur with distal comb of long posterior bristles. Hind leg of male modified as follows (Fig. 12): trochanter with stout ventral tubercle bearing short brush of mostly blackish setulae; femur stouter than other femora, curved for most of length; tibia almost straight. Hind leg of female without ventral tubercle on trochanter, with femur more slender, only slightly curved, and tibia slender and straight. Wing (Fig. 11): veins 3 and 4 both curved and convergent distally, latter terminating very near wing apex; first basal section of vein 4 0.87–1.03× as long as second section; membrane almost entirely microtrichose, except for distinct basal bare zone in second basal cell.

Abdomen. Sternites 3 and 4 vestigial. Male: spiracle 5 located in pleural membrane near lateral margin of tergite, near or slightly behind mid-length of tergite; distal section of outer surstylus, immediately beyond apex of inner surstylus, convex, with broadly rounded distal outline and slight posterior angular prominence; aedeagus with stipe slender, with extensive longitudinal tract of pubescence, slightly thickened distally where it has a pair of thick longitudinal ridges; preglans elongate, curved, sharply differentiated from stipe by deep constriction and break in sclerotization, with narrow membranous margin extending most of length, distally with obliquely curved sheath-like extension attaching it to glans, its length (including sheath) c. 1.6× length of glans; glans stout, subcylindrical; bulb short, but basally bearing a small membranous caecum; paired terminal filaments of equal size, joined for c. 0.7 of length, but with internal canals separate from near bases, each stout, sclerotized except for very short membranous tip, c. 1.6× as long as glans. Female: tergite 5 nearly twice as long as tergite 4, its posterior margin almost straight and transverse only on short median part, cut off obliquely on each side but retaining distinct but obtuse posterolateral angle; spiracle 5 in membrane close to angle of tergite.

Dimensions. Total length,♂ 8.2–9.5 mm, ♀ 5.8–10.7 mm; length of thorax,♂ 3.6–4.1 mm, ♀ 2.7–4.6 mm; length of wing,♂ 7.2–8.2 mm, ♀ 6.4–8.9 mm; length of glans of aedeagus, 0.68–0.71 mm.

Distribution. Northern Territory: Kakadu National Park—localities near and up to c. 27 km S of Jabiru. The terms Anbangbang and Nawurlandja (or Nourlangie) Rock area probably refer to the same spot locality.

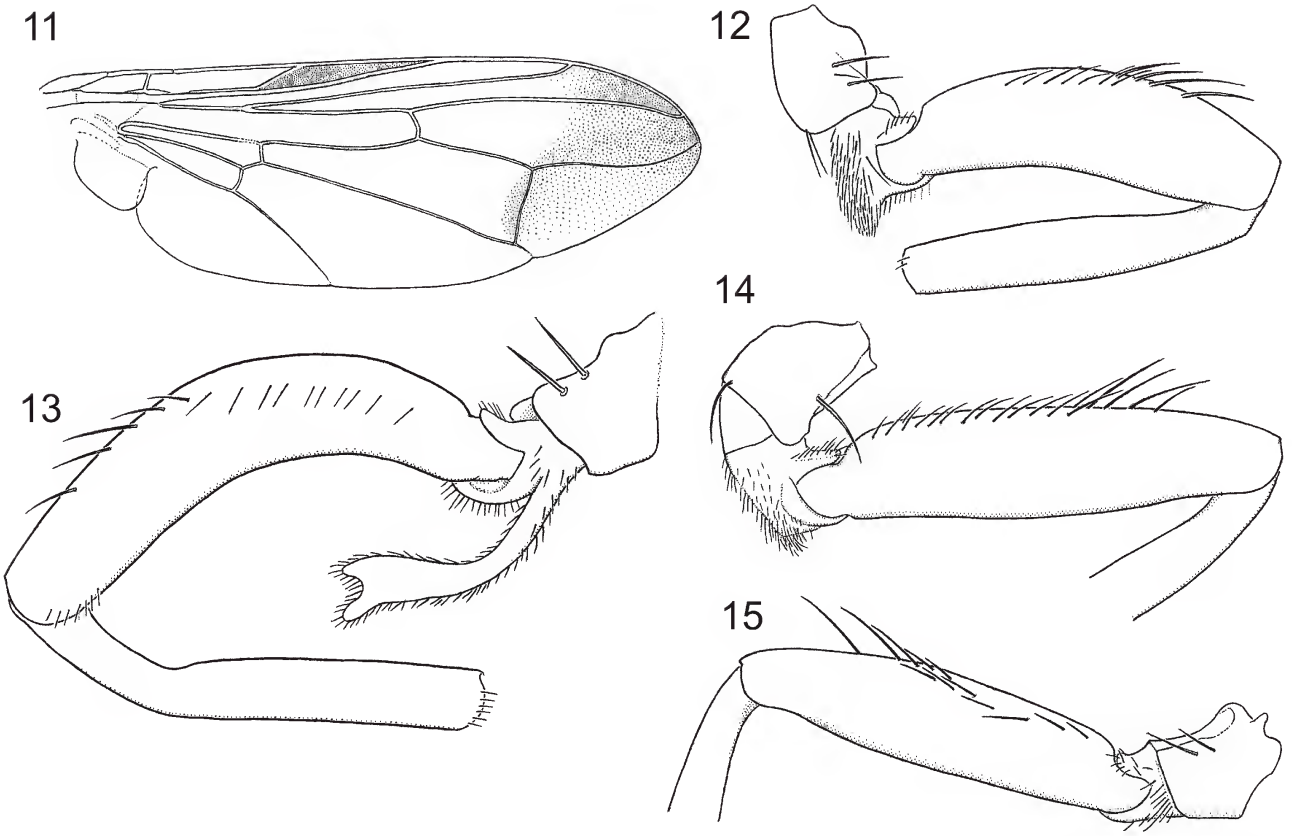
Notes. *Duomyia grahami* typifies a group of four species (including also *D. tricurva*, *D. bucina*, and *D. recta*), known only from Northern Territory and here called the *grahami* alliance. The group is characterized as follows: scutellum without setulae; mesoscutum and scutellum tawny, entirely yellow-pruinescent; antenna rather long; arista with well developed short hairs; fore femur with a series of long black posteroventral bristles; prosternum broad, touching propleuron on each side; abdominal tergite 1 pruinescent on whole width; aedeagus with preglans long and sharply demarcated, and terminal filaments short, stout, joined for at least half of length of each. Within this group it is the only species with a well defined bare zone in the second basal cell, and the male differs from that of the other three species in the modifications of the hind leg (Fig. 12). The female differs from that of *D. recta* and presumably that of *D. bucina* in the slight but distinct curvature of the hind femur. Separation of females of *D. grahami* from those of *D. tricurva* also appears possible from the almost entirely grey-black tergite 5 of the former (without large yellowish tawny posterior zone), large dark brown zones on thoracic pleura, and, in mature specimens only, by the more extensive though faint brownish distal cloud of the wing, which encloses the discal crossvein.

The specific epithet refers to Graham R. Brown, who generously cooperated in the collection of this and other species treated in this paper.

Duomyia tricurva n.sp.

Figs 13, 17

Type material. Holotype ♂, NT: Jabiru East, 12°40'S 132°53'E, 22–24.ii.1996, G.R.B., D.K.M. (AM, K292957); micro-pinned on double mount, aedeagus extended. Paratypes. NT: 1♂, 1♀, same data as holotype (AM, NTM);



Figs 11–15. *(11) Duomyia grahami*, female, right wing. *(12) D. grahami*, holotype male, part of left hind leg. *(13) D. tricurva*, holotype male, part of right hind leg. *(14) D. bucina*, male, Florence Falls, part of left hind leg. *(15) D. recta*, holotype male, part of right hind leg.

1♂, Arnhem Highway, just W of Mary River, 12°50'S 131°56'E, Feb. 2008, K.H., M.S.M. et al. (AM).

Description. (♂, ♀). Very similar to *D. grahami* and related species, agreeing with description of that species, except as indicated.

Coloration. Mesoscutum sometimes with slight brown suffusion; brown suffusions on thoracic pleura less extensive than in *D. grahami*. Tarsal segments often noticeably two-toned. Wing with apical brown suffusion pale and more restricted than in *D. grahami*, not reaching discal crossvein. Abdominal tergite 5 with tawny-yellow posterior zone, extending broadly to mid-dorsal region in female.

Head. Width of postfrons c. 0.38–0.40 of width of head; height of cheek c. 0.27–0.33 of height of eye. Antenna of male extending slightly less than distance to centre of epistomal margin. Prelabrum slightly more prominent on lower margin than in *D. grahami*.

Thorax. Fore femur usually with posteroventral bristles longer, stouter, and fewer than dorsal bristles. Hind leg of male (Fig. 13): trochanter with sub-spatulate, apically notched ventral process c. half as long as femur; femur more slender and more strongly curved than in *D. grahami*; tibia strongly bent beyond base. Hind leg of female: trochanter without process or tubercle; femur and tibia with very slight curvature. Wing: first section of vein 4 c. 0.93–1.05× as long as second section.

Abdomen. Male: surstyli not examined; aedeagus with general features of *D. grahami*; preglans very slightly thickening from base to commencement of distal sheath, c. 1.5× length of glans; terminal filaments joined for c. 0.7 of their length, each c. 1.2–1.4× as long as glans. Female: tergite 5 shaped somewhat as in *D. grahami*, but more broadly convex dorsally, with spiracle 6 inserted into small incision in lateral margin, immediately in front of posterolateral subangular prominence.

Dimensions. Total length,♂ 8.1–8.9 mm, ♀ 9.3 mm; length of thorax,♂ 4.0–4.2 mm, ♀ 4.2 mm; length of wing,♂ 7.8–8.4 mm, ♀ 8.2 mm; length of glans of aedeagus, 0.59–0.63 mm.

Distribution. Northern Territory: vicinity of Kakadu National Park.

Notes. The male of *D. tricurva* is readily distinguished from that of other species of the *D. grahami* alliance (as characterized above under that species), by the remarkably modified hind leg (Fig. 13), including the long sub-spathulate process of the trochanter and the bent tibia. The female differs from that of *D. recta* and possibly the unrecorded female of *D. bucina* in retaining slight curvature of the hind femur, and from that of *D. grahami* by the presence of a conspicuous tawny-yellow posterior zone on tergite 5 and, in well matured specimens, by the less developed apical brown suffusion on the wing.

Male-restricted modifications of the hind trochanter occur in some species of several platystomatid genera, e.g. *Euprosopia* Macquart (see McAlpine, 1973), *Achias* Fabricius (see McAlpine, 1994), and *Lamprophthalma* Portschinsky (see McAlpine, 2001). Three of the species in the *Duomyia grahami* alliance show degrees of trochanteral modification, but the only other case that I have encountered

of such a long spathulate trochanteral process, as in *D. tricurva*, is in the male of an unnamed species of *Achias* of New Guinea (BPB collection).

The specific epithet is a Latin adjective referring to the marked curvature of parts of the hind leg of the male (trochanteral process, femur, and tibia).

Duomyia bucina n.sp.

Figs 14, 18

Type material. Holotype ♂, NT: Florence Falls, Litchfield National Park, "13.06S 130.47E" [error = 13°06'S 130°47'E], 10.iv.1991, M.S.U. (ANIC); impaled on large pin, aedeagus in microvial. Paratypes. NT: 2♂, same data as holotype (AM, ANIC).

Description. (♂, ♀ unknown). Very similar to *D. grahami* and related species, agreeing with description of that species, except as indicated.

Coloration generally very like that of *D. grahami*. Scutellum more yellowish; thoracic pleura with less developed brown zones. Tarsi more uniformly tawny. Wing with faint apical brownish suffusion, not extending near discal crossvein. Abdominal tergite 5 becoming orange-tawny towards posterior margin; sternites 1 and 2 tawny-pruinescent.

Head. Postfrons c. 0.40–0.42 of width of head; parafacial slightly broader than in males of *D. grahami*; height of cheek c. 0.27–0.28 of height of eye. Antenna as in male of *D. grahami*.

Thorax. Scutellar bristles usually three pairs, but additional bristles present on right side of one paratype. Hind leg of male (Fig. 14): trochanter with relatively low, slightly bilaterally compressed tubercle, bearing moderately small, pale setulae, only slightly denser here than on rest of surface of trochanter; femur straight, not noticeably thickened; tibia straight, except for slight basal curvature. Wing: first section of vein 4 c. 1.00–1.07× as long as second section; membrane microtrichose, including that of entire second basal cell.

Abdomen. Spiracle 5 located in pleural membrane near anterior third of length of tergite 5; distal section of outer surstylus narrower than in *D. grahami*, more posteriorly curved, obliquely subtruncate; stipe of aedeagus apparently with little pubescence; preglans curved and slightly more expanding distally than in related species; terminal filaments joined for c. 0.8 of length, each nearly as long as glans.

Dimensions. Total length, 8.1–9.5 mm; length of thorax, 3.7–4.1 mm; length of wing, 7.5–7.8 mm; length of glans of aedeagus, 0.77–0.80 mm.

Distribution. Northern Territory: only known from Litchfield National Park, south of Darwin.

Notes. *Duomyia bucina* is closely similar to other species of the *D. grahami* alliance (see notes under *D. grahami*), having tawny mesoscutum and scutellum, bare scutellum, and subplumose arista. Within this group it resembles only *D. recta* in having the hind femur straight (at least in the male, Fig. 14, and presumably in the female), but differs in having some brown suffusion on the thoracic pleura, the distal wing cloud fainter and not reaching the discal crossvein in mature specimens, the hind trochanter with a distinct but low tubercle (presumably absent in the female as observed in other species), the preglans slightly shorter in relation to the glans and more distally expanded, and the terminal filaments slightly longer.

The specific epithet is a Latin noun meaning a curved trumpet, in reference to the shape of the preglans.

Duomyia recta n.sp.

Figs 15, 19

Type material. Holotype ♂, NT: Jabiru East, c. 12°40'S 132°53'E, 22–24.ii.1996, D.K.M., G.R.B. (AM, K292958); double-mounted on micro-pin, aedeagus extended. Paratype. NT: 1♀, Katherine Gorge National Park, 14°19'S 132°25'E, Dec. 1992, G.D., A.D. (AM).

Description. (♂, ♀). Very similar to *D. grahami* and related species, agreeing with description of that species, except as indicated.

Coloration generally slightly paler than in *D. grahami*. Thoracic pleura and legs without brown suffusion; all tarsal segments uniformly tawny yellow. Wing: subcostal cell quite pale; membrane otherwise with distal pale brown suffusion approximately as in *D. grahami*. Abdominal tergites tawny to tawny-brown; sternites 1 and 2 pruinescent tawny to greyish.

Head. Width of postfrons c. 0.40–0.42 of width of head; height of cheek 0.28–0.31 of height of eye; fronto-orbital bristles minute; ocellar bristle absent. Antenna potentially extending to centre of epistomal margin in male, distinctly shorter in female. Prelabrum with lower margin rather prominent; palpus slightly widened distally.

Thorax generally as described for *D. grahami*. Fore femur with some posteroventral bristles stouter than in *D. grahami*. Hind leg (Fig. 15) not noticeably sexually dimorphic; trochanter without sign of gibbosity or tubercle; femur straight, tibia almost so. Wing: first section of vein 4 0.91–0.96× as long as second section; second basal cell without bare zone.

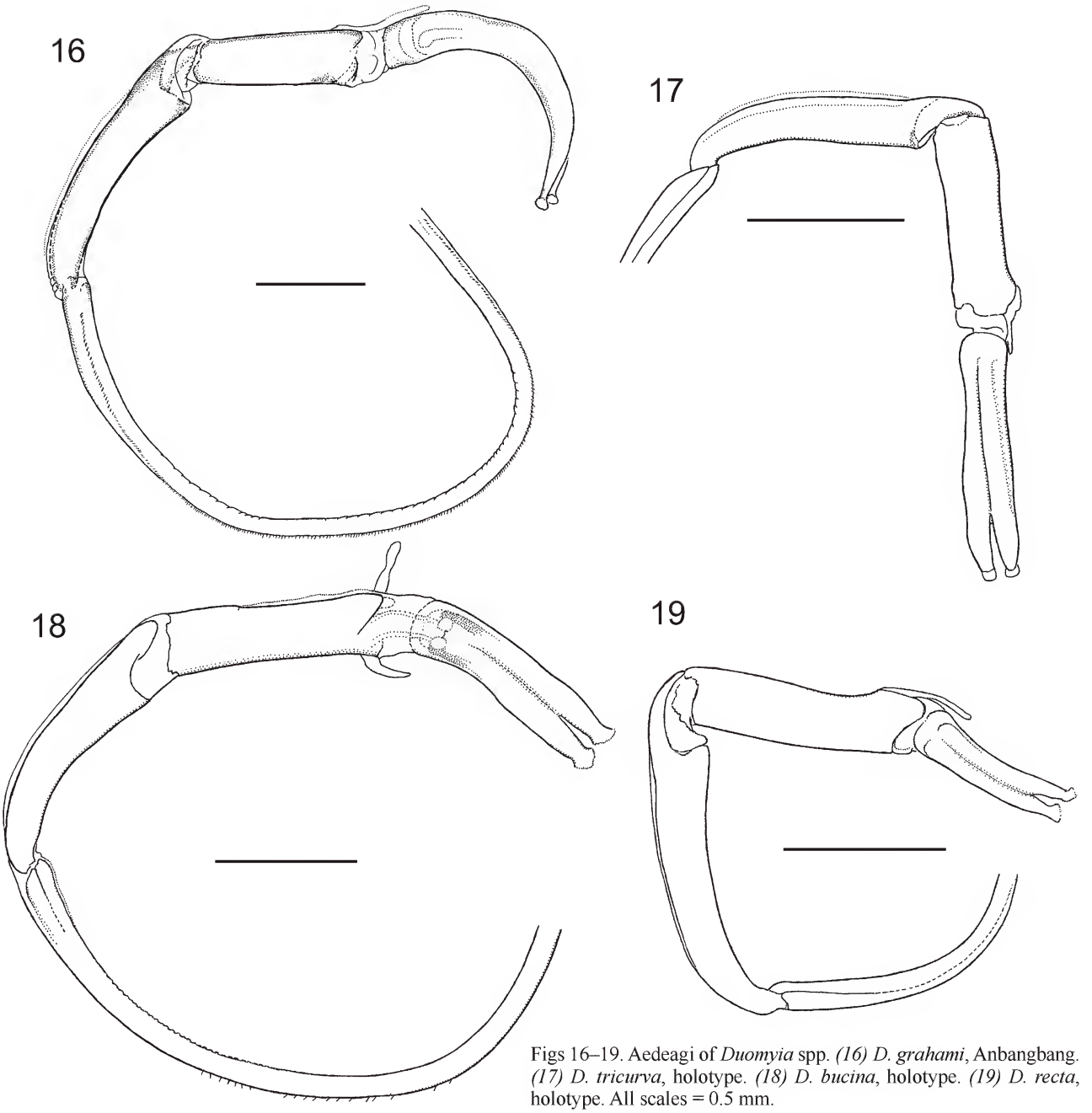
Abdomen. Male: surstyli not visible in holotype; stipe of aedeagus with pubescence apparently little developed or absent (SLM); preglans becoming slightly thicker distally, its length c. 1.4× that of glans; terminal filaments joined for c. 0.8 of length, length of each, excluding basal tunic, c. 0.63 that of glans. Female: tergite 5 with posterior margin extensively transverse and almost straight, not obliquely cut off posterolaterally on each side; spiracle 5 located in pleural membrane slightly behind mid-length of almost straight lateral margin of tergite.

Dimensions. Total length,♂ 6.7 mm, ♀ 6.5 mm; length of thorax,♂ 2.8 mm, ♀ 3.4 mm; length of wing,♂ 6.3 mm, ♀ 6.9 mm; length of glans of aedeagus, 0.72 mm.

Distribution. Northern Territory: Jabiru district to Katherine Gorge.

Notes. *Duomyia recta* belongs with the four species of the *D. grahami* alliance, discussed above under *D. grahami*. It differs from others of this alliance in the absence of brown suffusion on the thoracic pleura, in the male in the absence of any modification of the hind trochanter and femur, and in the female by having the shape of tergite 5 and position of spiracle 5 approximately as for males of the group. The terminal filaments of the aedeagus are shorter in proportion to the length of glans than in the other species of this alliance.

The specific epithet is a Latin adjective, straight, in reference to the hind femur.



Figs 16–19. Aedeagi of *Duomyia* spp. *(16) D. grahami*, Anbangbang. *(17) D. tricurva*, holotype. *(18) D. bucina*, holotype. *(19) D. recta*, holotype. All scales = 0.5 mm.

Duomyia prensans n.sp.

Fig. 20

Type material. Holotype.♀ (unique). NT: Merl [Mel] camping area [near Cahill's Crossing], Kakadu National Park, 12°25'S 132°57'E, 21.i.1993, G.D., A.D. (AM, K292959).

Description. (♀;♂ unknown). Large, stout blackish fly with conspicuous metallic green reflections on thorax and abdomen.

Coloration. Head yellowish-tawny; ocellar spot black; orbital margin of postfrons and, more narrowly, that of parafacial partly silvery-pruinescent; lunule and summit of parafacial without dark markings; facial carina with small brown marks on upper part and slight central tawny-brown suffusion; antennal groove with silvery pruinescence on pale yellow cuticle; occipital region nowhere darkened, with silvery pruinescence except near vertex. Antenna tawny-brown. Prelabrum and palpus tawny. Thorax largely black with conspicuous green reflections; lateral margin of mesoscutum between transverse suture and scutellum reddish brown; humeral callus and scutellum without pale pruinescence or almost so; propleuron extensively grey-pruinescent; mesopleuron largely shining to glossy, greyish-pruinescent on upper margin and on small posterior zone, with setulae mostly black. Legs largely black; fore and hind basitarsi orange-tawny, becoming brown distodorsally, with ventral setulae tawny, dorsal setulae black; segments 2 and 3 of hind tarsus also partly orange-

tawny; mid basitarsus brownish tawny with mainly black setulae. Wing stained with orange at base; second costal cell partly yellow, partly hyaline; subcostal cell dark brown; marginal cell largely paler brown to yellowish brown; submarginal cell brownish distally, paler yellowish basally; basal cells and anal cell partly yellowish, partly hyaline; distal and posterior parts of membrane faintly tinged with yellowish brown. Halter tawny with partly brown capitellum. Abdominal tergites 1 to 5 shining black with green to blue reflections and almost no pruinescence, with setulae mostly black, those on lateral parts of tergites 2 and 3 brown; sternites 1 and 2 shining brown-black, with very little pruinescence.

Head. Vertex prominently carinate between inner vertical bristles; postfrons without median hump, with moderately fine setulae, anterolaterally with small setiferous pits extending on to upper extremity of parafacial; width of postfrons 0.48 of width of head; fronto-orbital bristles vestigial; ocellar bristle absent; parafacial broad, almost smooth, except at upper and lower extremities; height of cheek 0.46 of height of eye. Antenna potentially extending c. 0.8 of distance from basal socket to centre of epistomal margin; arista with rather numerous short hairs on basal part of segment 6, some about as long as or slightly longer than maximum diameter of segment. Prelabrum rather small; palpus moderately slender.

Thorax. Mesoscutum with numerous moderately short setulae, and several longer ones between postalar and intra-alar bristles and immediately anterior to scutellar suture; scutellum very finely, densely and sharply rugose on almost entire surface; pteropleuron with numerous rather long, fine setulae, but no differentiated bristle; pteropleural ridge setulose; major thoracic bristles otherwise as given for *D. grahami*. Fore femur with numerous rather small dorsal bristles and five or six strongly spinescent posteroventral bristles on distal half; mid femur with subapical comb of closely placed posterior bristles and, basad from this, numerous moderately long fine mostly pale setulae; hind femur with the usual dorsal bristles and no ventral bristles; fore and hind basitarsi appearing almost cylindrical or very slightly depressed. Wing: vein 3 apically strongly curved towards vein 4; first (basal) section of vein 4 0.90× as long as second section; second section strongly curved; distal section of vein 4 converging on its whole length with vein 3, with strong sigmoid curvature, terminating well in front of apex; membrane almost entirely densely microtrichose, except for minute zones in second basal and anal cells.

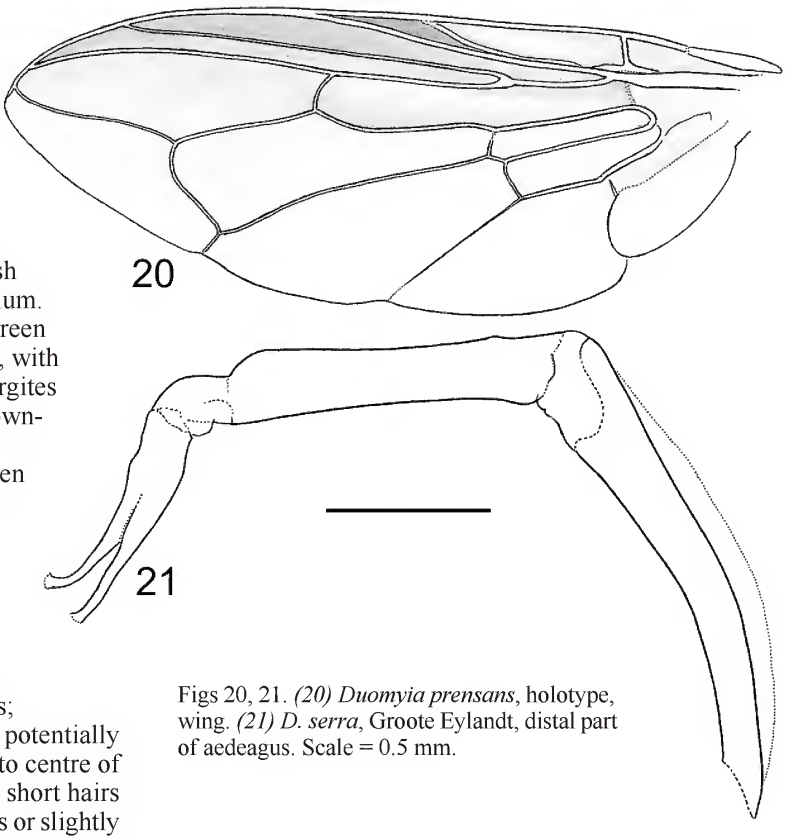
Abdomen. Tergite 5 nearly twice as long as tergite 4; sternite 2 subquadrate, shorter than sternite 1, with posterior margin almost transverse; sternites 3, 4, and probably 5 vestigial.

Dimensions. Total length, 12.0 mm; length of thorax, 5.4 mm; length of wing, 9.5 mm.

Distribution. Northern Territory: vicinity of East Alligator River.

Notes. *Duomyia prensans* belongs in the group of species having no scutellar setulae, with thickened spinescent posteroventral bristles on the fore femur, the antenna relatively long (perhaps longer in the unknown male), the scutellum entirely metallic black, and no pteropleural bristles distinguishable from the setulae or hairs. Among such forms it is differentiated from the little known *D. serra* by the pubescent arista, largely orange-tawny fore and hind basitarsi, and the brown suffusion in the marginal cell. The holotype is the most robust specimen of *Duomyia* that I have seen from NT, but is not as large as individuals of some eastern species of the *D. obscura* alliance (several still undescribed). As with many *Duomyia* spp., considerable size variation is to be expected.

The specific epithet is a Latin participle, clutching, in reference to the modification of the fore leg.



Figs 20, 21. *(20) Duomyia prensans*, holotype, wing. *(21) D. serra*, Groote Eylandt, distal part of aedeagus. Scale = 0.5 mm.

Duomyia serra McAlpine

Fig. 21

Duomyia serra D. McAlpine, 1973: 96.

Type material. Holotype ♂, Queensland: Chester River, Silver Plains, Coen district, xii.1961 (ANIC).

Other material examined. NT:♂ Groote Eylandt, no date, N.B.T. (SAM). According to Musgrave (1932: 321–322), N.B.T. collected at Groote Eylandt within the period 1920–1922.

Description. See D. McAlpine (1973: 96).

Dimensions. (♂, Groote Eylandt). Total length, 9.3 mm; length of thorax, 3.6 mm; length of wing, 6.9 mm; length of glans of aedeagus, 0.96 mm.

Notes. *Duomyia serra* is distinguished from other species of the genus as noted under *D. prensans* and in the key to species.

The only specimen available from NT differs from the holotype, from Queensland, in having the femora and tibiae more extensively dark brown (perhaps nearly black when fresh) and the setulae on the pteropleuron rather stout and black, instead of fine, hair-like, and whitish as in the holotype. On the other hand, the aedeagus (Fig. 21) is essentially similar to that of the holotype. More material is needed to establish the status of this island population.

Duomyia praeflava n.sp.

Figs 22, 23

Type material. Holotype ♂, NT: 16 km E by N of Mount Cahill [Kakadu National Park], 16.xi.1972, D.H.C., at light (ANIC); on micro-pin through polyporus. Paratypes. NT: 1♂, 2♀, same data as holotype (AM, ANIC); 1♀, Cooper Creek, 19 km E by S of Mount Borradaile [N of Oenpelli], Nov. 1972, D.H.C. (ANIC).

Other material. Queensland: 1♂, 3 km ENE of Innot, near Ravenshoe, 17°39'S 145°16'E, Nov. 1981, D.H.C. (ANIC).

Description. (♂, ♀). Small predominantly blackish fly, resembling *D. korneyevi*, agreeing with description given for that species except as indicated below.

Coloration (all specimens slightly faded). Palpus yellow, often brownish basally. Thorax largely black, with green-tinted reflections; humeral callus grey-pruinescent on upper part; scutellum almost entirely rather densely grey-pruinescent, apparently without fine rugosity; sternopleuron with pruinescence often restricted to posterior extremity. Coxae brown or partly yellowish; all tarsi brownish distally, fore ones with only basal part of segment 1 paler. Halter yellow basally, with largely brownish capitellum. Abdominal coloration much as in *D. korneyevi*, but sternites 1 and 2 more extensively smooth, glossy.

Head. Height of cheek 0.35–0.45 of height of eye. Antenna of male potentially extending to centre of epistomal margin, that of female slightly shorter; segment 6 of arista with a little basal pubescence.

Thorax. Pteropleural bristle sometimes duplicated; pteropleural ridge often without setulae (ridge not visible in some specimens). Hind basitarsus shorter and stouter than fore basitarsus in male (0.86 of length of fore tarsus in larger male, 0.89 of length of fore basitarsus in smaller male); hind basitarsus slightly longer than fore basitarsus in females. Wing: veins 3 and 4 both slightly curved distally, less strongly convergent than in *D. korneyevi*, vein 4 terminating distinctly behind wing apex; basal section of vein 4 0.97–1.11× as long as second section. Squama not as large as that of *D. korneyevi* and differently shaped (Fig. 23).

Abdomen. In male, tergite 4 shorter than tergite 5 but variable in length; sternite 2 broadly rounded to almost truncate on posterior margin; sternite 5 sclerotized, rounded anteriorly, each posterolateral angle produced into a convex extension, posterior margin between these extensions broadly excavated. Male postabdomen: surstyli longer than in *D. korneyevi*, apex of outer surstylus narrow, reflexed, only slightly surpassing apex of inner surstylus; stipe of aedeagus with pubescence restricted to longitudinal channel and occupying most of its length; preglans simple, rather slender, shorter than glans; glans subcylindrical, without membranous wing; bulb with prominent projection; tunic containing pair of sclerotized lobes embracing bases of terminal filaments; terminal filaments very elongate, each c. 8× as long as glans, with very oblique terminal gonopore.

Dimensions. Total length,♂ 3.4–4.6 mm, ♀ 3.8–5.3 mm; length of thorax,♂ 1.3–1.9 mm, ♀ 1.6–2.2 mm; length of wing,♂ 2.9–3.7 mm, ♀ 3.5–4.7 mm; length of glans of aedeagus, 0.28–0.35 mm.

Distribution. Northern Territory: Kakadu National Park and northern Arnhem Land. Queensland: near Atherton Tableland.

Notes. Among the species with black non-setulose scutellum and no thick posteroventral spines on the fore femur, *D. praeflava* is distinguished by its long, yellow antenna and extensively grey-pruinescent scutellum (i.e. with rather dense dust-like microtrichia). In the male, the aedeagus differs from that of related species in the long terminal filament and unusual structure of the bulb and tunic (Fig. 22).

The specific epithet is a compound Latin adjective meaning yellow in front, in reference to the yellow head, antenna, and palpus.

Duomyia korneyevi n.sp.

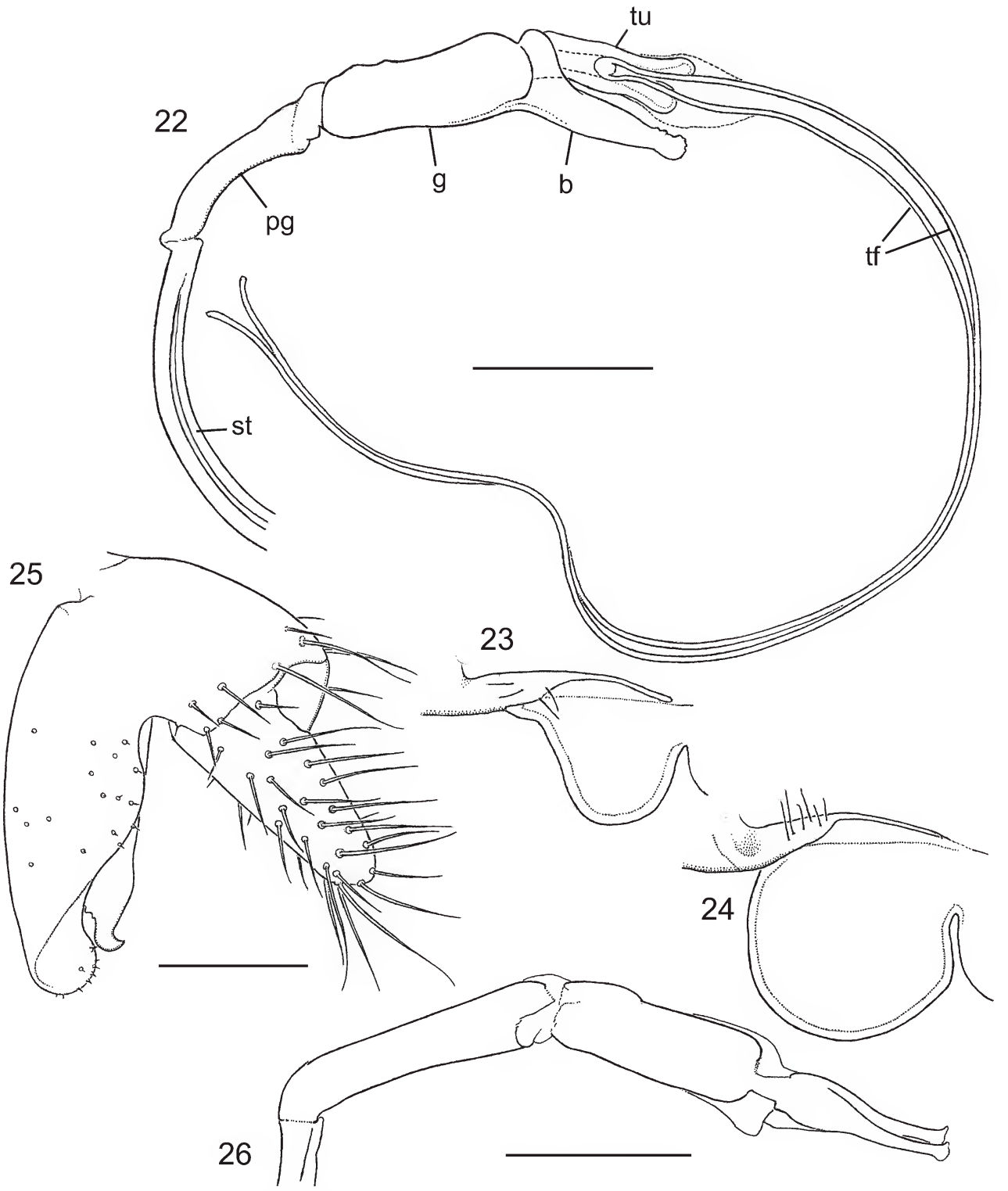
Figs 24–26

Type material. Holotype ♂, NT: Koongarra, 15 km E of Mount Cahill [Kakadu National Park], 6–9.iii.1973, D.H.C., at light (ANIC); double mounted on micro-pin through cube of polyporus. Paratypes. NT: 7♂, 1♀, same data as holotype (ANIC, AM); 1♀, Cooper Creek, 19 km E by S of Mount Borradaile [N of Oenpelli], Nov. 1972, D.H.C. (ANIC).

Other material. Queensland: 1♀, Dulhunty River, northern Cape York Peninsula, May 1992, G.C. (AM).

Description. (♂, ♀). Small to very small (for genus), predominantly blackish fly, with unmarked wing.

Coloration. Head yellow; small ocellar spot brown; no other markings visible in anterior view; upper occiput with extensive dark brown zone, largely covered with grey pruinescence. Antenna deep yellow. Prelabrum and palpus yellow. Thorax largely black; mesoscutum pruinescent mainly towards lateral margins; humeral callus shining, almost devoid of pruinescence; scutellum dorsally densely minutely rugose, without pale pruinescence; mesopleuron with grey pruinescence covering variable extent of upper part; sternopleuron with little pale pruinescence on upper margin and ventromedian part. Coxae dark brown; femora dark brown, fore and mid ones with yellow apices; tibiae tawny, with some brown suffusion; tarsi yellow, fore ones with segments 3 to 5 brown, mid and hind ones with segments 4 and 5 tawny. Wing without dark markings or shading; subcostal cell pale yellow. Halter yellow. Abdominal tergites 1 to 5 shining black or brown-black; tergites 1 and 2 with grey-pruinescent lateral zones, such zones absent on tergites 3 to 5; sternite 1 brown, shining medially and on anterior margin, grey-pruinescent elsewhere; sternite 2 brown, with grey pruinescence except on anterior margin.



Figs 22–26. *(22) Duomyia praeflava*, holotype, aedeagus. *(23) D. praeflava*, right squama, small male. *(24) D. korneyevi*, right squama, small male. *(25) D. korneyevi*, Koongarra, epandrium, left lateral view. *(26) D. korneyevi*, Koongarra, distal part of aedeagus. Scales for Figs 22, 26 = 0.3 mm. Scale for Fig. 25 = 0.1 mm. *b*, bulb; *g*, glans; *pg*, preglans; *st*, stipe; *tf*, terminal filaments; *tu*, tunic.

Head somewhat anteroposteriorly compressed, slightly carinate at vertex; postfrons without distinct pitting and median hump, with fine inconspicuous setulae; width of postfrons 0.39–0.42 of width of head; ocellar and fronto-orbital bristles not differentiated from setulae; facial carina flat to slightly concave, rugose, with sharply raised lateral margins; parafacial of moderate width, without setiferous pits, except sometimes at upper extremity; cheek with variable anterior rugosity; height of cheek 0.34–0.43 of height of eye. Antenna potentially extending to centre of epistomal margin, not noticeably sexually dimorphic; arista with segment 6 apparently bare, or almost so; segment 5

with a little short pubescence. Prelabrum moderately small; palpus slightly broadened and rounded distally.

Thorax. Mesoscutum with many short almost recumbent setulae except near lateral margins; scutellum almost semicircular in outline, convex, without setulae; pteropleuron with one stout black bristle and several mostly pale setulae, including one or few on pteropleural ridge; other thoracic bristles as given for *D. grahami*. Fore femur with an irregular series of numerous dorsal black bristles and a series of fewer posteroventral bristles, some of the latter rather long; mid femur with two to four subapical black posterior bristles; hind femur with dorsal bristles beyond mid-length; all basitarsi subcylindrical, moderately elongate, fore basitarsus shortest (both sexes). Wing: distal section of vein 3 not strongly curved; distal section of vein 4 basally almost parallel with vein 3, distally curved forwards to terminate approximately at apex; basal section of vein 4 1.0–1.2× as long as second section; membrane almost entirely microtrichose. Squama large and broadly rounded (Fig. 24).

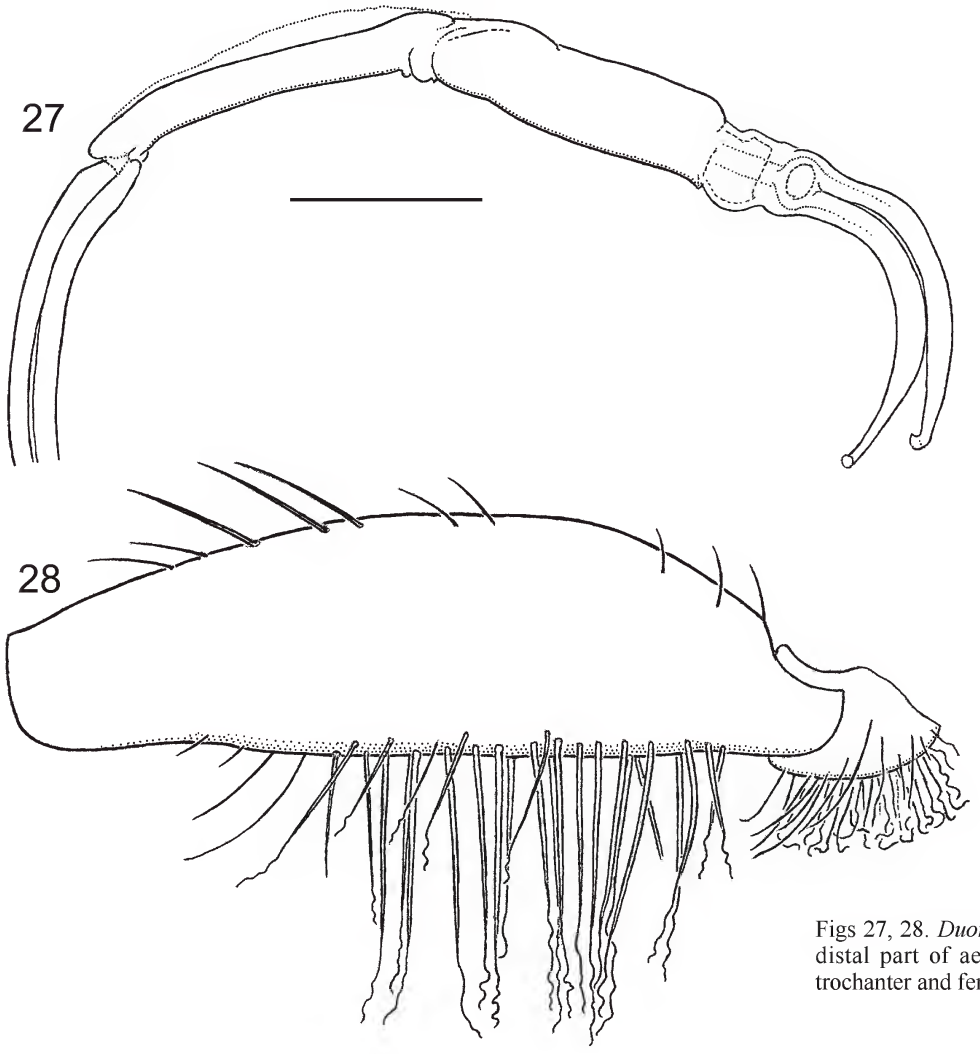
Abdomen. In male, tergite 5 c. 1.4–1.7× as long as tergite 4; sternite 1 quadrate, rather broad; sternite 2 subtriangular, almost as broad; sternites 3 and 4 apparently reduced or absent; sternite 5 well sclerotized, subtriangular, minutely setulose, with two posterolateral angles tumid, bearing slightly larger setulae. In female, tergite 5 nearly as long as in male; sternites 1 and 2 approximately as in male; sternites 3 to 5 apparently all much reduced. Male postabdomen: surstyli rather short; distal section of outer surstylus short and broadly rounded, not flexed; aedeagus with elongate preglans, c. 1.2× as long as glans; glans subcylindrical, without membranous marginal wing; bulb short, apparently without caeca; terminal filaments of equal size, bulbous on c. basal half, joined basally, variably expanded apically, length of each c. 0.72–0.78× length of glans.

Dimensions. Total length,♂ 2.9–4.1 mm, ♀ 4.1–4.2 mm; length of thorax,♂ 1.3–1.7 mm, ♀ 1.6 mm; length of wing,♂ 2.7–3.4 mm, ♀ 3.2–3.5 mm; length of glans of aedeagus, 0.33–0.34 mm.

Distribution. Northern Territory: Kakadu National Park and northern Arnhem Land. Queensland: northern Cape York Peninsula.

Notes. Among the species with black, non-setulose scutellum and no black posteroventral spines on the fore femur, *D. korneyevi* is distinguished by its long, entirely yellow antenna and very finely densely rugose scutellum (fingerprint sculpture, as distinct from the glossy and pruinescent scutellar surface types present in related species). Other significant characters are given in the above description and the key to species.

The specific epithet refers to Valery A. Korneyev, who has made a significant contribution to knowledge of Eurasian platystomatids.



Figs 27, 28. *Duomyia lana*, Burrell's Creek. *(27)* distal part of aedeagus. *(28)* male, right hind trochanter and femur. Scale = 0.3 mm.

Duomyia lana n.sp.

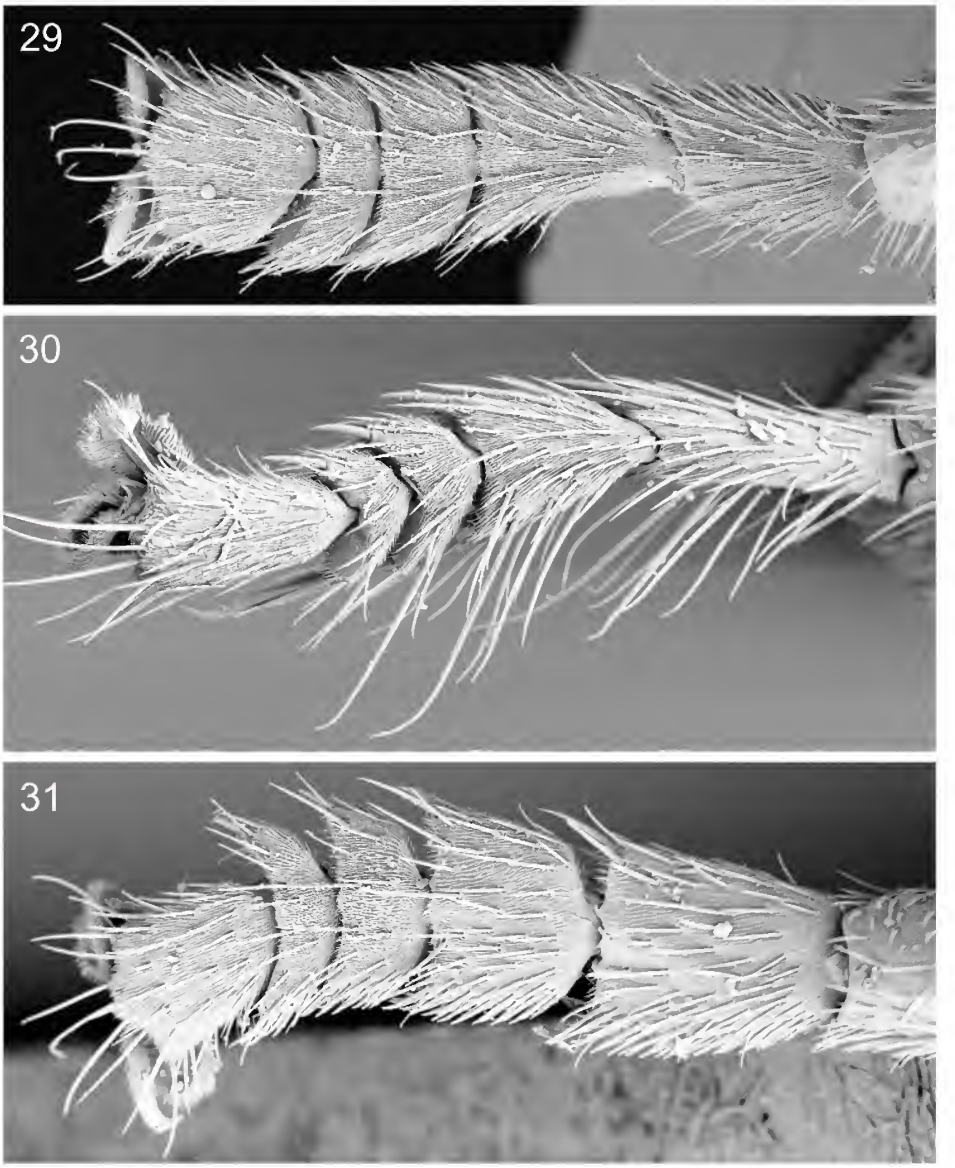
Figs 27–31

Type material. Holotype ♂, NT: Burrell's Creek, [old] Stuart Highway, 24.xi.1972, D.H.C., at light (ANIC); impaled on long pin, aedeagus extended, right mid leg glued to card. Paratypes. NT: 3♂, 2♀, same data as holotype (ANIC, AM). Apparently the old section of the Stuart Highway (termed Dorat Road on a newer map) crossed Burrell's Creek at c. 13°27'S 131°10'E.

Description. (♂, ♀). Medium-sized to small blackish fly, with green reflections and unmarked wing.

Coloration. Head largely tawny-brown to dark brown, generally darker in females; anterior part of postfrons always dark brown; face pale yellowish in male, brown in female. Antenna tawny-brown, much of segment 3 darker brown. Prelabrum blackish; palpus brown, darker distally. Thorax shining black with green reflections; mesoscutum, scutellum, humeral callus, mesopleuron, and sternopleuron almost without pruinescence. Legs largely black; tarsi brown to black; fore and mid tarsi with short paler zone at articulation of segments 1 and 2. Wing without dark markings or shading. Halter tawny with brown capitellum. Abdominal tergites 1 to 5 shining black with green reflections, almost without pruinescent zones; sternite 1 shining blackish, almost without pruinescence.

Head much higher than long, slightly carinate at vertex; postfrons without distinct pitting and median hump, with fine inconspicuous setulae; width of postfrons 0.27–0.29 of width of head in male, 0.33–0.35 in female; ocellar and fronto-orbital bristles not differentiated; facial carina flat-topped, usually shorter and broader in female than in male, with strongly raised lateral margins; parafacial narrowed for short distance near eye, without setulae; cheek without obvious rugosity; height of cheek 0.28–0.33 of height of eye; cheek bristle usually stronger in female than in male. Antenna potentially reaching 0.8 or 0.9 of distance from basal socket to centre of epistomal margin; arista apparently bare except for short pubescence on segment 5. Prelabrum moderately small in female, somewhat smaller in male; palpus moderately short.



Figs 29–31. *Duomyia lana*, male. *(29)* left fore tarsus. *(30)* left mid tarsus. *(31)* left hind tarsus.

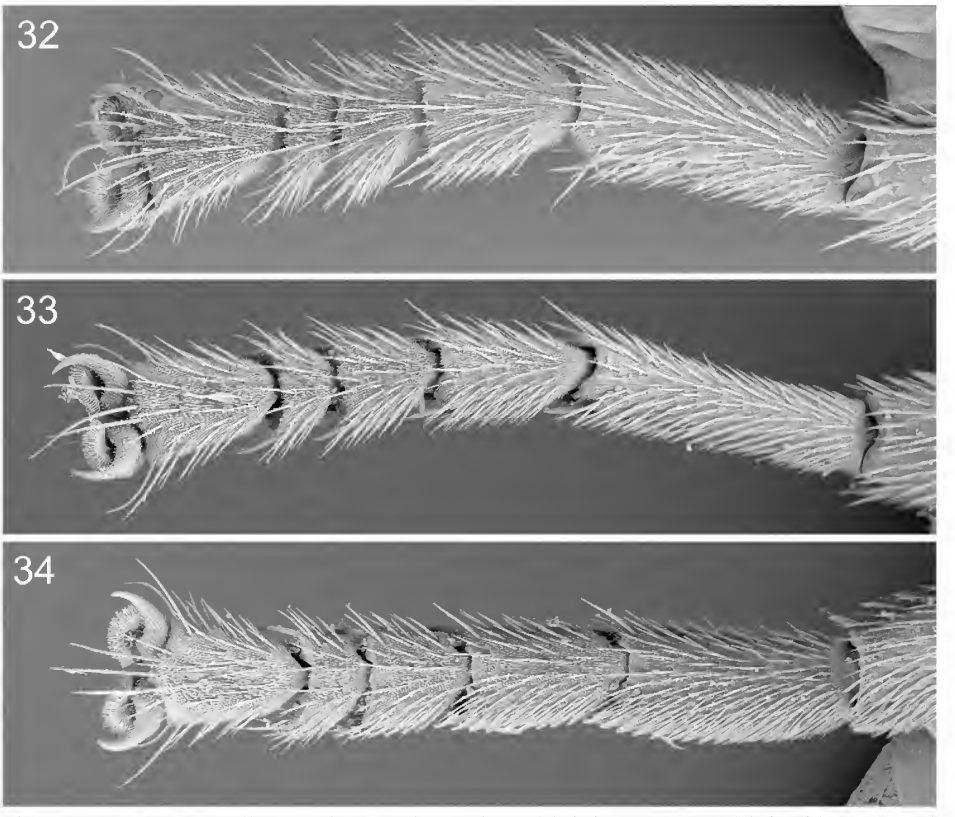
Thorax generally as described for *D. korneyevi*; pteropleuron usually with two black bristles not much longer than the pale hairs, without setulae on pteropleural ridge; mesopleuron with hair-like setulae, longer and finer in male than in female; ventral part of sternopleuron with brush of many fine whitish mollisetae in male, undeveloped in female. Fore coxa of male with large distal brush of fine mollisetae, undeveloped in female; other coxae with shorter, less conspicuous mollisetae in male, undeveloped in female; fore femur with numerous rather fine black dorsal bristles, without posteroventral keel and spinescent bristles, in male with many long fine whitish ventral hairs and mollisetae except on distal quarter, in female only rather short fine ventral setulae present; mid femur with few posterior subapical black bristles, finer in male than in female, and, in male, rather numerous fine whitish posteroventral hair-like setulae; hind femur with numerous long whitish ventral mollisetae, undeveloped in female; all tarsi strongly sexually dimorphic; fore tarsus of male (Fig. 29) with segment 1 unusually short, asymmetrical, segment 2 also asymmetrical, segments 3 to 5 unusually broad; fore tarsus of female moderately elongate, almost symmetrical; mid tarsus of male (Fig. 30) less elongate than in *D. collessi*, *D. korneyevi*, etc., segments 1 to 4 with long posterior bristles, segment 1 asymmetrical distally, segments 2 to 4 shorter and broader than in related species; mid tarsus of female without modifications present in male, only slightly stouter and more depressed than in related species; hind tarsus of male (Fig. 31) much broader and more depressed than in related species, with segment 1 c. 1.3× as long as wide; hind tarsus of female more slender, with segment 1 almost cylindrical. Wing: distal section of vein 3 slightly arched; distal section of vein 4 slightly curved forwards distally to terminate slightly behind apex; basal section of vein 4 0.92–1.2× as long as second section; membrane almost entirely microtrichose. Squama large, slightly less broadly rounded than in *D. korneyevi*.

Abdomen. In male, tergite 5 distinctly longer than tergite 4; sternite 1 quadrate; sternite 2 smaller, broadly rounded posteriorly; sternites 3 and 4 obsolete; sternite 5 large, slightly narrowed towards transverse anterior margin, posteriorly with each posterolateral angle produced into a broad subacute lobe, with very fine setulae only. In female, tergite 2 laterally with variably developed (probably size-correlated) group of long whitish setulae or mollisetae; other tergites without zones of differentiated setulae; tergite 5 slightly longer than tergite 4; sternites 1 and 2 as in male; sternites 3 to 5 obsolete. Male postabdomen: apex of outer surstylus only slightly exceeding that of inner surstylus, not reflexed, slightly broadened, with posterolateral gibbosity; stipe of aedeagus with trace of pubescence only; preglans well defined, slender, slightly longer than glans, with narrow membranous wing on most of length; glans subcylindrical, somewhat elongate; bulb simple, without processes; tunic simple; each terminal filament tapered distally, slightly longer than glans.

Dimensions. Total length,♂ 5.2–6.0 mm, ♀ 5.3–8.0 mm; length of thorax,♂ 2.0–2.7 mm, ♀ 2.2–3.2 mm; length of wing,♂ 4.0–5.1 mm, ♀ 4.5–5.8 mm; length of glans of aedeagus, 0.47–0.48 mm.

Distribution. Northern Territory: only known from type locality to south of Adelaide River town.

Notes. *Duomyia lana* belongs among those species with smooth glossy black scutellum lacking scutellar setulae, and



Figs 32–34. *Duomyia collessi*, male, Magela Creek. *(32)* left fore tarsus. *(33)* left mid tarsus. *(34)* left hind tarsus.

without posteroventral black spines on the fore femur. The male is distinguished from all other species by the brushes of dense whitish mollisetae on the fore coxa, lower part of sternopleuron, and other parts, and by the asymmetrical fore and mid tarsi and broadly depressed hind tarsus (Figs 29–31). The female lacks these modifications but is generally distinguished by having the face brown (pale yellow in male), and the fore tarsus dark brown to its base. The female of *D. maceveyi* is similar in some characters, but has numerous short hairs towards the base of antennal segment 6 and the hind basitarsus yellow.

The specific epithet is a Latin noun meaning wool, in reference to the woolly mollisetae of the male.

Duomyia collessi n.sp.

Figs 32–36

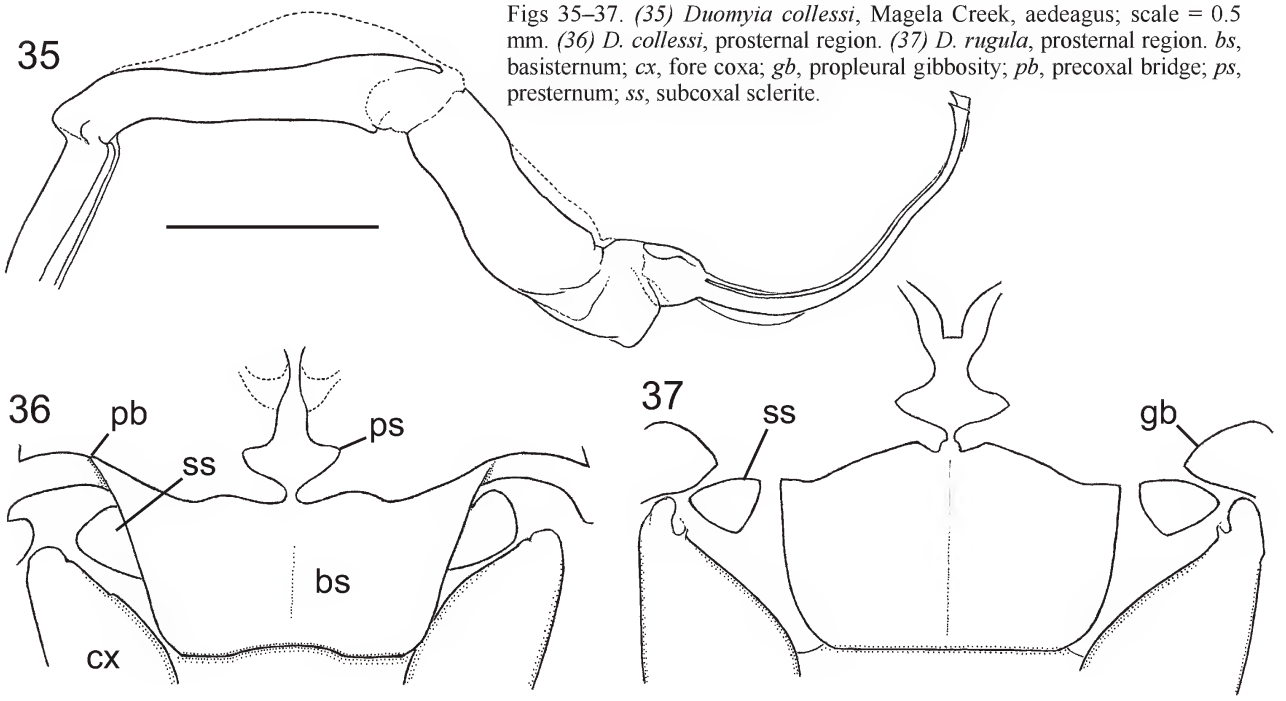
Type material. Holotype ♂, NT: Magela [or Magella] Creek, 9 km SSE of Mudginbarry [or Mudginberri] Homestead [vicinity of Kakadu National Park], 6.xi.1972, D.H.C., at light (ANIC); impaled on long pin, aedeagus extended. Paratypes. NT: 5♂, 9♀, same data as holotype (ANIC, AM); 1♂, Cooper Creek, 11 km S by W of Nimbuwah Rock, Nov. 1972, D.H.C. (ANIC); 2♀, 7 km NW by N of Cahill's Crossing, East Alligator River, Nov. 1972, D.H.C. (ANIC, AM); 1♀, 5 km NNW of Cahill's Crossing, Nov. 1972, D.H.C. (ANIC); 2♂, Baroalba Creek Springs, 19 km NE by E of Mount Cahill [Kakadu National Park], Oct. 1972, D.H.C. (ANIC); 2♀, 16 km E by N of Mount Cahill, Nov. 1972, D.H.C. (ANIC); 2♀, Nourlangie Creek, 8 km N of Mount Cahill, Oct. 1972, D.H.C. (ANIC).

Other material (localities only given). Queensland: Sweers Island Reserve, South Wellesley Islands (AM).

Description. (♂, ♀). Medium-sized to small blackish fly, with green reflections and unmarked wing.

Coloration (most of type series slightly faded). Head largely yellow to ochraceous; postfrons dark brown on substantial but variable anterior section; subgenal margin tawny-brown; occipital region largely tawny. Antenna brown to tawny-brown. Prelabrum tawny to brown, darker on lower margin; palpus dark brown. Thorax largely shining black with green reflections; mesoscutum greyish pruinescent only near lateral margins; humeral callus and scutellum glossy, almost without pruinescence; mesopleuron grey-pruinescent on less than posterodorsal quarter; pteropleuron densely grey-pruinescent centrally, shining on substantial anterior and posterior zones; sternopleuron with little pruinescence towards extremities. Legs largely dark brown to blackish; fore tarsus with segment 1 tawny-yellow, segments 2, 3, and 5 dark brown with pale creamy bases, segment 4 brown; mid and hind tarsi tawny to tawny yellow. Wing hyaline, without dark markings; subcostal cell yellowish; veins basad of humeral crossvein bright yellow, more brownish yellow distally. Halter with tawny scabellum, yellow pedicel, and partly brown capitellum. Abdominal tergites black with greenish reflections, with mostly rather short black setulae, some longer whitish setulae on tergite 2 laterally, more developed in male.

Head resembling that of *D. lana*; width of postfrons 0.29–0.31 of width of head in male, 0.30–0.34 in female; facial carina convex with strong vertical plications and strongly raised lateral margins; parafacial rather narrow (more so in male), without setulae; cheek almost smooth, apparently lacking minute setulae on anterior section except for few on extreme lower margin; height of cheek 0.25–0.35 of height of eye. Antenna generally potentially reaching slightly more than distance from basal socket to centre of epistomal margin in male, slightly less than that distance in female; arista with segment 6 bare. Prelabrum moderately small; palpus moderately short, apically rounded.



Figs 35–37. *(35) Duomyia collessi*, Magela Creek, aedeagus; scale = 0.5 mm. *(36) D. collessi*, prosternal region. *(37) D. rugula*, prosternal region. *bs*, basisternum; *cx*, fore coxa; *gb*, propleural gibbosity; *pb*, precoxal bridge; *ps*, presternum; *ss*, subcoxal sclerite.

Thorax generally as described for *D. korneyevi*; pteropleuron with mostly pale setulae, longer in male, a few setulae on pteropleural ridge; scutellum with three pairs of marginal bristles and no setulae. Fore femur with a series of numerous rather stout black dorsal bristles and a distinct series of fewer fine, mainly yellowish posterodorsal bristles; mid femur with moderately long white hair-like posterior setulae and short series of black subapical posterior bristles; hind femur slightly curved, more distinctly so in male, with dorsal black bristles and numerous fine white hair-like ventral setulae, generally longer in male; hind tibia with only slight basal curvature; fore and mid tarsi not strongly asymmetrical; fore tarsus not strongly sexually dimorphic, segment 1 not strongly depressed, c. 3× as long as wide in male, slightly more elongate in female; mid tarsus without apparent sexual dimorphism; hind tarsus with segment 1 c. 2.0–2.4× as long as wide in male, 3.1–4.1× in female. Wing: distal section of vein 3 slightly curved on c. basal half; distal section of vein 4 with slight sigmoid curvature, terminating very slightly behind wing apex; basal section of vein 4 slightly shorter to slightly longer than second section; membrane almost entirely microtrichose except sometimes for narrow bare zones in second basal and anal cells. Squama large and prominent, but not so broadly rounded as in *D. korneyevi*.

Abdomen. In male, tergite 5 much longer than tergite 4; sternite 2 large and subtriangular; sternites 3 and 4 vestigial or absent; sternite 5 with broad median notch on posterior margin separating pair of broad subangular lobes. In female, sternite 2 usually broadly rounded posteriorly, very small but distinct tergite 3 usually present, sternites 4 and 5 absent; sternite 6, as usual, represented by two separate sclerites. Male postabdomen: surstyli rather short; distal section of outer surstylus not broadened, apically slightly flexed so that sharp edge is directed anteriorly; stipe of aedeagus without pubescence; preglans well defined, slender, longer than glans, with membranous wing on most of length and prominent basal gibbosity; glans stout, irregularly subcylindrical; bulb rather short and stout, of complex shape, but without processes; each terminal filament separate from origin in tunic, with slightly expanded oblique apex, c. 1.7× as long as glans.

Dimensions. Total length,♂ 5.9–7.2 mm, ♀ 3.5–9.0 mm; length of thorax,♂ 2.4–2.9 mm, ♀ 1.6–3.6 mm; length of wing,♂ 4.9–5.6 mm, ♀ 3.4–7.0 mm; length of glans of aedeagus, 0.55 mm.

Distribution. Northern Territory: Kakadu National Park and northern Arnhem Land. Queensland: South Wellesley Islands, Gulf of Carpentaria.

Notes. *Duomyia collessi* belongs among those species with bare glossy black scutellum, long brownish tawny antenna, and no posteroventral armature on the fore femur except for fine bristles. It differs from *D. lana* in the yellow cheek and parafacial and, in the male, the lack of long woolly mollisetae on the fore coxa, sternopleuron, etc., and the relatively unmodified tarsi (Figs 32–34). From some similar undescribed species of eastern Queensland, it can be distinguished by the distribution of grey pruinescence on the mesopleuron and pteropleuron, the latter pruinescent centrally but with substantial shining anterior and posterior zones, and, in the male, by the longer terminal filaments (Fig. 35).

The specific epithet refers to Donald H. Colless, whose collections of *Duomyia* (in ANIC) form a significant basis of this study.

***Duomyia maceveyi* n.sp.**

Figs 38, 39

Type material. Holotype ♂. NT: Arnhem Highway, just W of Mary River, 12°50'S 131°56'E, 20.ii.2008, K.H., D.M., M.S.M., C.O., M.H. (AM, K292960); mounted on large pin through thorax, aedeagus in microvial. Paratypes. NT: 2♂, same data as holotype (AM, ANIC); 2♂, 2♀, South Alligator Motor Inn, Arnhem Highway, Dec. 1986, B.J.M., M.S.M. (AM, NTM); 2♂, 1♀, Nawurlandja (Nourlangie) Rock area, Kakadu National Park, 12°51'S 132°47'E, Jan 1993, G.D., A.D. (AM); 1♀, Strauss Airstrip, 45 km S of Darwin, 12°39'S 131°04'E, Jan 1993, G.D., A.D. (AM).

Other material (localities only given). Queensland: Archer River roadhouse, 13°26'S 142°56'E, (AM, ANIC); 8 km SSW of Coen, 14°00'S 143°11'E (AM); Coleman River, near Musgrave, 14°48'S 143°22'E (AM, QM); 13 km W of Musgrave, 14°48'S 143°23'E (AM); Morehead River Crossing, 15°01'S 143°39'E (AM).

Description. (♂, ♀). Moderate-sized to rather large fly, largely black, with green to blue reflections; wing without dark markings.

Coloration. Postfrons largely dark brown, with small orange-tawny suffusion in front of ocelli and on each anterolateral angle, its orbital margin silvery pruinescent; parafacial, face and cheek region orange-brown, the first with narrow silvery-pruinescent orbital margin; antennal groove with silvery pruinescence not extending on to side of carina; occipital region mostly very dark, with extensive silvery pruinescence except near vertex. Antenna tawny-brown; segment 3 usually darker greyish brown; arista dark brown. Prelabrum tawny-brown; palpus orange-tawny. Thorax largely black, with green to blue or purple reflections; humeral callus glossy, almost without pruinescence; scutellum glossy except at lateral extremities; mesopleuron largely glossy, with pruinescence restricted to upper part and immediate vicinity of fore coxa, with setulae pale. Legs largely dark brown to black; fore tarsus dark brown, with segment 1 becoming tawny-brown basally; mid and hind tarsi tawny-yellow, becoming brownish apically. Wing without distal dark zone; membrane tinged with yellow, particularly basally and anteriorly; subcostal cell yellow. Capitellum of halter variegated, tawny-grey and brown. Abdominal tergites 1 to 5 shining black, with almost no pruinescence, often with bluish reflections; sternite 1 glossy, dark brown, without pruinescence; sternite 2 densely grey-pruinescent.

Head. Postfrons without distinct pitting, with low but distinct median hump in front of ocelli and slight depression between this and convex anterior part, with scattered very fine, nearly straight setulae; width of postfrons 0.42–0.45 of width of head; fronto-orbital and ocellar bristles minute or absent; facial carina distinct, with strongly raised lateral margins and several variably developed vertical ridges; parafacial of moderate width, with variable number of setiferous pits towards upper end; height of cheek 0.28–0.32 of height of eye. Antenna potentially extending well beyond centre of epistomal margin in both sexes; arista with numerous short hairs towards base of segment 6, several of them slightly longer than maximum diameter of segment. Prelabrum of moderate size; palpus moderately narrow, with rather long setulae; prementum very broad.

Thorax. Mesoscutum with very numerous short, curved setulae; scutellum devoid of setulae, convex, almost smooth, normally with three pairs of marginal bristles; pteropleuron with fine setulae and one or two stout black bristles; pteropleural ridge with few fine setulae; major thoracic bristles otherwise as given for *D. grahami*. Fore femur with numerous irregularly placed black dorsal bristles, without posteroventral bristles; mid femur subapically with several long black posterior bristles, and, basad from these an extensive tract of long fine pale setulae; hind femur with dorsal bristles, mainly on distal half; all tarsi subcylindrical, more or less elongate. Wing: veins 3 and 4 both distally curved and convergent, latter terminating at apex; basal section of vein 4 0.88–1.00× as long as second section; membrane almost entirely microtrichose.

Abdomen. Tergite 5 slightly longer than tergite 4 in both sexes; sternite 2 subtriangular; sternites 3 to 5 vestigial in female. Male: spiracle 5 located in pleural membrane near lateral margin of tergite, slightly behind mid-length of tergite; distal section of outer surstylus beyond apex of inner surstylus subtriangular, with apical angle rounded off; aedeagus with stipe moderately slender, apparently without pubescence; preglans well demarcated from stipe, elongate, c. as long as glans, without distinct membranous margin or appendage, its distal end oblique; short but distinct flexible section present between preglans and glans; glans subcylindrical, with membranous bight distally; membranous bulb well developed, with an irregular soft appendage and beyond its base a large shield-like sclerite; terminal filaments subequal, apparently joined for very short distance basally, rather stout, much shorter than glans, arising from distal end of shield-like sclerite.

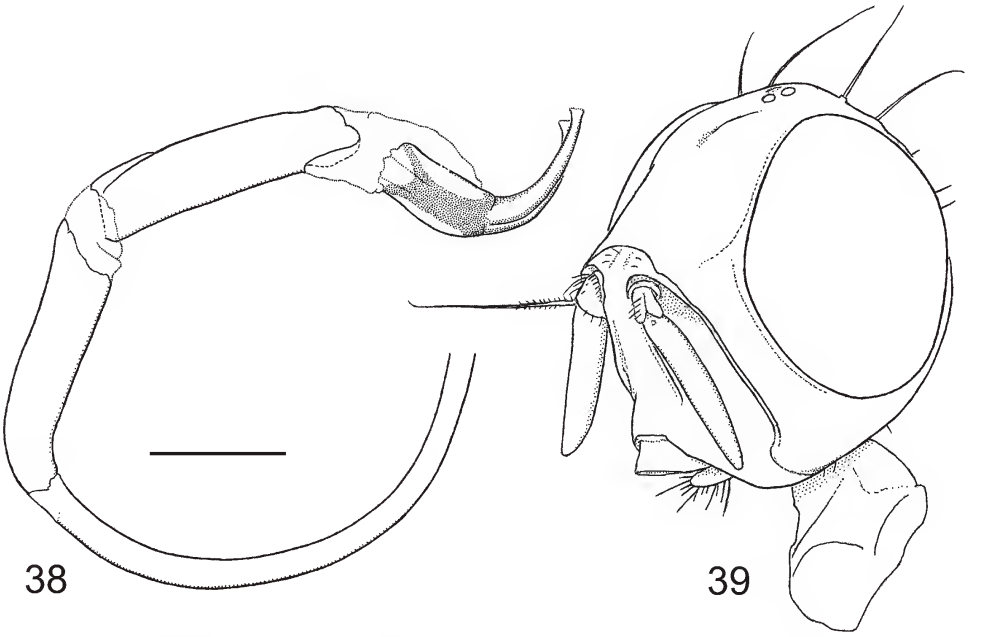
Dimensions. Total length,♂ 10.1 mm, ♀ 9.1–10.0 mm; length of thorax,♂ 4.0–4.1 mm, ♀ 3.9–4.4 mm; length of wing,♂ 7.8–8.1 mm, ♀ 7.5–8.1 mm; length of glans of aedeagus, c. 1.0 mm.

Distribution. Northern Territory: Kakadu National Park and other northern districts. Queensland: Archer River district to Cooktown district.

Notes. *Duomyia maceveyi*, together with the closely similar *D. mithrax* Hendel of northern Queensland, differs from other *Duomyia* species with largely smooth but medially humped postfrons and no scutellar setulae in the better developed basal hairing of the arista, the very broad prementum of the proboscis, and the presence of one or few strongly differentiated black bristles on the pteropleuron. They also differ from the compact, inadequately elucidated group of species, including *D. howensis* McAlpine and *D. obscura* Walker, in the termination of vein 4 at (not in front of) the wing apex and the elongate, subcylindrical hind basitarsus. The smooth, glossy scutellum and, in the females, the absence of pleural sclerotization of the abdomen and the vestigial tergite 6 and sternites 3 to 5 further differentiate *D. maceveyi* and *D. mithrax* from some other related species (not all yet named).

The only reason why *D. maceveyi* does not run to *D. mithrax* in the key of McAlpine (1973) is the consistent absence of any trace of a dark distal wing zone in the former species. Better material of *D. mithrax* is now available, and it is apparent that the aedeagus of *D. maceveyi* differs in having a more elongate preglans and a large shield-like sclerite (tunic) covering one side of the bulb at the base of the terminal filaments. The available Queensland specimens of *D. maceveyi* differ from both the sympatric *D. mithrax* and the Northern Territory specimens of *D. maceveyi* in the generally much darker face and parafacial.

The specific epithet refers to Shane F. McEvey, in appreciation of his unstinting help in several of my projects.



Figs 38, 39. *Duomyia maceveyi*, near Mary River. *(38)* aedeagus; scale = 0.5 mm. *(39)* head of male; sparse minute setulae on postfrons omitted.

Duomyia ameniina McAlpine

Duomyia ameniina McAlpine, 1973: 116–117; McAlpine, 2011: 63–64, figs 1, 2.

Type material. Holotype ♂, Queensland: Morven, 18.i.1963, D.E.H. (ANIC). Paratypes and other material. See D. McAlpine (2011).

Distribution. Northern Territory: higher rainfall areas N from c. 14°S. Western Australia: Ord River district. Queensland: widely distributed (see McAlpine, 2011 for details). New South Wales: NE of state.

Notes. *Duomyia ameniina* is the only species known in the Northern Territory with the vertical area between the supra-alar bristle and wing-base quite smooth, without microtrichia. Among Queensland species, *D. alfredi* McAlpine also has this condition but differs most obviously in having many of the setulae on the mesoscutum long and almost erect, instead of relatively short and decumbent as in *D. ameniina*.

Duomyia rugula McAlpine

Duomyia rugula McAlpine, 2011: 68–70, figs 10–12.

Type material. Holotype ♂. Northern Territory: 12 km NNE of Borroloola, 15°58'S 136°21'E [McArthur River district], 1.xi.1975, M.S.U. (ANIC). Paratype. Queensland: see McAlpine, 2011.

Distribution. Northern Territory: far east. Queensland: Archer River district. Single record for each state or territory.

Notes. *Duomyia rugula* differs from other species in NT by the long rays of the arista in combination with the substantial bare zones of the wing in the marginal, first basal, and discal cells. For further morphological details see McAlpine, 2011.

Duomyia whittingtoni n.sp.

Fig. 40

Type material. Holotype ♂. NT: Anbangbang [Nourlangie Rock, c. 12°51'S 132°47'E], Kakadu National Park, 25.ii.1996, D.K.M., G.R.B. (AM K292961); micro-pinned on double mount, aedeagus extended. Paratypes. NT: 1♂, same data as holotype (NTM); 1♂, Arnhem Highway, just W of Mary River, 12°50'S 131°56'E, 20.ii.2008, K.H., D.M., M.S.M., C.O., M.H. (AM).

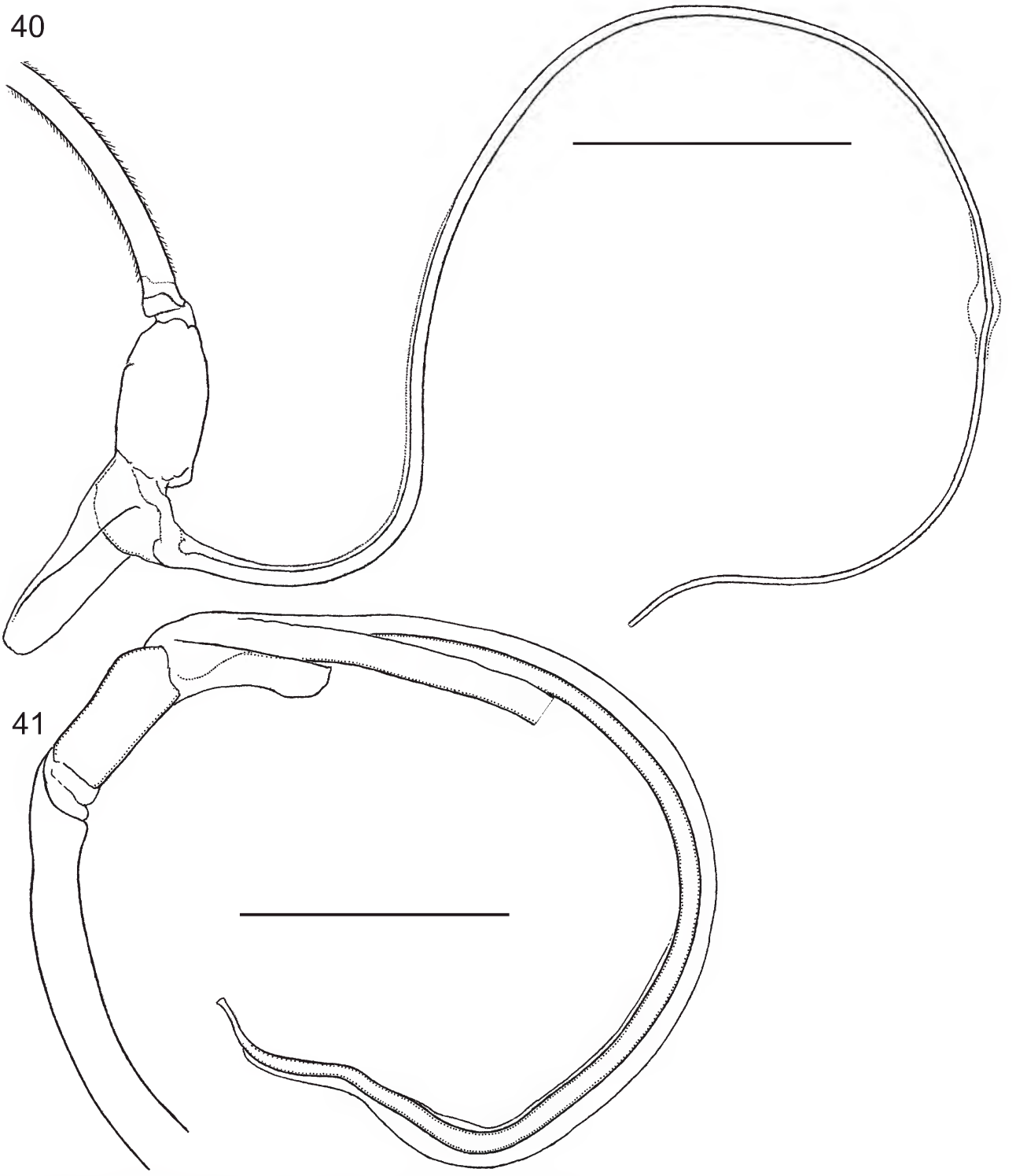
Description. (♂, ♀ unknown). Medium-sized, slender, predominantly blackish fly, with unmarked wing; belonging in same alliance as *D. spinifemorata*, q.v.

Coloration. Head yellow; postfrons with three large transversely aligned black blotches immediately in front of vertex, median one enclosing ocelli; antennal grooves brown-black, partly grey pruinescent; occiput with black ground colour extending right to vertex, but covered with dense whitish pruinescence except on broad shining black upper section. Antenna tawny-brown; segment 3 largely greyish. Prelabrum brown; palpus blackish, with tawny-brown apex. Thorax largely black, with slightly green-tinted reflections; mesoscutum pruinescent mainly towards lateral margins; humeral callus with rather sparse dark pruinescence; scutellum shining, minutely roughened but almost without pruinescence; mesopleuron partly glossy, with pale pruinescence and pale setulae on c. posterodorsal half and narrowly on margin of fore-coxal cavity; sternopleuron with little pale pruinescence on upper margin and posteroventral part. Coxae largely black; fore femur black, very narrowly tawny at apex; other femora largely blackish, or brownish on basal part; tibiae tawny, with darker markings; fore tarsus with segments 1 and 2 yellow, slightly browned distally, segments 3 to 5 brown; other tarsi more extensively yellow, but with at least segments 4 and 5 brown. Wing without dark markings or suffusion; subcostal cell pale yellow. Capitellum of halter pale yellow. Abdominal tergites 1 to 5 shining black, with greenish reflections; vicinity of suture between tergites 1 and 2 grey-pruinescent; sternite 1 largely glossy brown-black, grey-pruinescent on lateral margins; sternite 2 densely grey-pruinescent.

Head somewhat anteroposteriorly compressed. Postfrons without distinct pitting and median hump, with very fine mostly suberect setulae; width of postfrons 0.40–0.43 of width of head; ocellar bristle weakly differentiated; fronto-orbital bristles indistinguishable; facial carina flat, rugose, sharply margined laterally; parafacial moderately narrow, with few setiferous pits near upper extremity; height of cheek 0.36–0.38 of height of eye. Antenna potentially extending c. 0.6–0.7 of distance from basal socket to centre of epistomal margin; arista with numerous short hairs towards base of segment 6, some at least twice as long as basal diameter of segment. Prelabrum moderately small; palpus slightly widened distally.

Thorax. Mesoscutum with dense short, mostly somewhat recumbent setulae; scutellum short, convex, finely and weakly rugose; pteropleuron with fine setulae and no differentiated bristles; major thoracic bristles otherwise as given for *D. grahami*; prosternum with each anterolateral angle not prominently produced, separated from propleural gibbosity by membranous zone. Fore femur with numerous irregularly placed black dorsal bristles on most of length, without posteroventral bristles, but with variably developed elongate pale ventral setulae and a prominent rounded tooth-like posteroventral keel beyond mid-length; mid femur with one to three subapical black posterior bristles and numerous rather long posterior setulae; hind femur with few dorsal bristles beyond mid-length; all basitarsi subcylindrical, moderately elongate. Wing: distal section of vein 3 very slightly curved; distal section of vein 4 basally almost parallel with vein 3, distally curved forwards to terminate near or slightly in front of apex; basal section of vein 4 1.00–1.3× as long as second section; membrane almost entirely microtrichose.

Abdomen. Tergite 5 c. twice as long as tergite 4, but not noticeably broader; sternite 2 subtriangular; sternites 3 and 4 minute. Outer surstylus with free distal section extending far beyond apex of inner surstylus, subtriangular with apical part narrowly produced; stipe slender, very extensively pubescent except towards base; preglans very short, sclerotized, asymmetrical, without pubescence and processes; short flexible section present between preglans and glans; glans compact, irregularly ovoid, with large



Figs 40, 41. *(40) Duomyia whittingtoni*, Anbangbang, aedeagus. *(41) D. spinifemorata*, aedeagus. Scale = 0.5 mm (both figs). Only one of pair of similar terminal filaments shown (both figs).

terminal transparent lobe ensheathing the rather short, rotund bulb; terminal filaments separate approximately from their bases, very elongate, gradually tapered over much of length, slightly unequal in length, each c. 12 or 13× as long as glans, with extensive weak internal circular ridges, with apex simple, truncate, and with terminal, very slightly decurrent gonopore; cercus much shorter than outer surstylus.

Dimensions. Total length, 7.1–7.8 mm; length of thorax, 2.9–3.2 mm; length of wing, 5.2–6.1 mm; length of glans of aedeagus, 0.26 mm.

Distribution. Northern Territory: Kakadu National Park and vicinity.

Notes. Among the species with bare, black scutellum and

short antenna, *D. whittingtoni* is distinguished from *D. ameniina* and *D. alfredi* by the pale creamy halter and presence of dense pruinescence on the vertical surface between the supra-alar bristle and wing base, from *D. rugula* and *D. semiclara* by the entirely microtrichose first basal cell of the wing, much shorter hairs on the arista, and presence of a tooth-like posteroventral keel on the fore femur (at least in the male), from *D. irregularis* by the non-pruinescent scutellum and absence of posteroventral spines on the fore femur, and from *D. spinifemorata* by the presence of the humeral bristle and absence of seriate posteroventral spines on the fore femur.

The specific epithet refers to Andrew E. Whittington, who has made a significant contribution to knowledge of Afrotropical platystomatids.

Duomyia irregularis Malloch

Duomyia irregularis Malloch, 1929: 509–510, fig. 1b; McAlpine, 1973: 95, redescription based partly on holotype.

Type material. Holotype ♂. Northern Territory: Palmerston [former name for Darwin], Dec. 1908 anon. (DEI). Examined by me in 1969.

Other material re-examined. 1♂, "Australia, Brunetti", (AM, transferred from BM 1.ix.2008). Damaged. This bears my determination label dated 1969 and is clearly one of the specimens I previously recorded (McAlpine, 1973) from "Darwin, ii iii 1909," but it no longer bears these collection data.

Distribution. Northern Territory: vicinity of Darwin. The only material known to me was collected in 1908 and 1909, probably by F.P. Dodd. The species is not present in available more modern collections.

Notes. This species belongs in the *Duomyia spinifemorata* alliance, as described under *D. spinifemorata*. Within this alliance it is distinguished by having both tooth-like anteroventral keel and short anteroventral spines on the fore femur and whitish dorsal pruinescence on the scutellum, this pruinescence being dark or little developed in the other species. Tergite 5 is much broader than tergites 3 and 4, as in *D. spinifemorata*, but the hind femur has small black anteroventral spines, generally absent or less developed in other species of this alliance. The male genitalia remain undescribed because of the scarcity of specimens.

Duomyia spinifemorata Malloch

Fig. 41

Duomyia spinifemorata Malloch, 1929: 508–509, figs 1a, 2a; McAlpine, 1973: 94–95, redescription from type material.

Type material. Holotype ♂. Northern Territory: Palmerston [former name for Darwin], Dec. 1908 (DEI, ex Litchwardt collection). Examined by me in 1969.

Additional material (localities only given). Northern Territory: near entrance to Litchfield National Park, via Batchelor (AM); Marrakai Road, 2 km E of Stuart Highway (AM); South Alligator Motor Inn, Arnhem Highway (AM).

Supplementary description. Male abdomen: tergite 5 large, broader than preceding tergites; outer surstylus resembling that of *D. whittingtoni*, but with distal section longer, slightly tapered, with relatively broad, blunt apex; stipe of aedeagus moderately stout, apparently quite without pubescence; preglans not visibly differentiated from stipe, distally produced to overlap short flexible section between preglans and glans; glans compact, subcylindrical, with terminal ensheathing lobe resembling that of *D. whittingtoni*; terminal filaments stouter than in *D. whittingtoni*, of about equal length, each c. 9× as long as glans, attenuated at extreme apex.

Distribution. Northern Territory: northern districts.

Notes. I propose the *Duomyia spinifemorata* alliance as a provisional grouping to include *D. spinifemorata*, *D. irregularis*, and *D. whittingtoni*. This alliance is apparently endemic to the Northern Territory and is characterized by having the scutellum short, broad, dorsally minutely roughened or pruinescent, with black ground-colour and no setulae, the antenna short, the arista with obvious pubescence or short hairs, the vertex of head low and rounded, the prosternum relatively narrow and widely separated from the propleuron on each side; vein 4 terminating very near wing apex. Where known, the aedeagus has the preglans very short and the terminal filaments very long (unknown in *D. irregularis*). The *D. ameniina* alliance resembles the *spinifemorata* alliance but is distinguished by having longer hairs on the arista, vein 4 strongly curved distally to terminate well in front of the apex, and the scutellum more evenly rounded and usually glossy. *Duomyia aliceae* McAlpine also has vein 4 terminating well in front of the apex, and further differs from the *spinifemorata* alliance in the extensively grey-pruinescent mesoscutum and humeral callus, and the distinctive posteroventral armature of the fore femur (McAlpine, 2011).

Within the *D. spinifemorata* alliance, *D. spinifemorata* is distinguished by the lack of a tooth-like posteroventral keel and presence of a posteroventral series of stout black spines on the fore femur. It further differs from *D. irregularis* in the presence of three posterior black blotches on the postfrons and absence of dorsal whitish pruinescence on the scutellum; and from *D. whittingtoni* in the absence of the humeral bristle, less attenuated terminal filaments of the aedeagus (except at their apical extremities), and lack of pubescence on the stipe.

Duomyia serra McAlpine and *D. prensans* n. sp. resemble *D. spinifemorata* among species without scutellar setulae in having posteroventral spines on the fore femur, but these have the vertex prominently transversely carinate, the antenna much longer, and the capitellum of the halter brown.

The male specimen from near Litchfield National Park was taken from blossom of a myrtaceous tree.

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Two New Species of *Stenophragma* Skuse from Western Australia (Diptera, Mycetophilidae, Sciophilinae)

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ABSTRACT. *Stenophragma* Skuse was originally described for *S. meridianum* (Skuse), from Australia. Since then seventeen species have been added to the genus—from Brazil, Ecuador, Peru, Bolivia, Paraguay, Chile, Argentina, and Canada. We add two new species to the genus *Stenophragma*—*S. bickeli* n.sp. and *S. collessi* n.sp.—from Western Australia. An identification key for the Australian species of *Stenophragma* is provided. Comments are made about possible relationships among these new species and the remaining Australasian species of the genus.

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KEYWORDS: *Stenophragma*; Sciophilinae; Mycetophilidae; Australia; Taxonomy.

The current diversity of Mycetophilidae, a family known to be present already in the Jurassic, exceeds 4,100 described species distributed in approximately 180 extant genera (Evenhuis, 1994; Amorim & Silva, 2002; Pape *et al.,* 2011). The known diversity of the Australian Mycetophilidae is poor, with only 75 species, described mainly by F. A. A. Skuse, for the Australian continent, A. L. Tonnoir for Tasmania, and L. Matile for New Caledonia (Evenhuis, 2012); but the actual fauna is no doubt much richer (Yeates *et al*., 2009).

The family is certainly monophyletic (e.g., Rindal *et al*., 2009), but phylogenetic studies using morphological (Søli, 1997; Tozoni, 1998) and molecular data (Rindal *et al*., 2009) have demonstrated that Sciophilinae *s.l.* is paraphyletic in relation to the Mycetophilinae. This justifies the subfamilial rank given to taxa previously presented as tribes (Väisänen, 1984; Matile, 1989; Rindal *et al*., 2009). The Sciophilinae *s.s.* includes genera with medial and cubital forks complete, as well as genera with M_2 and/or M_4 weakly developed or missing, or with an unattached vein between the medial and cubital veins (Oliveira & Amorim, 2010).

As found in other ancient insect families with broad distribution, the Australian Mycetophilidae fauna does not compose a single clade, instead it exhibits a mixture of elements of different origins and a complex biogeographic history. *Stenophragma* Skuse is one of the genera that have species in both the Australian and Neotropical regions. *Stenophragma* is poorly known in terms of its biology. In the Neotropics, adults can be collected with Malaise traps in humid forests throughout the year, but most species show a peak of activity in the spring and autumn (Duret, 1976).

Skuse (1890) erected the genus *Stenophragma* from a species from Australia—*S. meridianum*, previously allocated in the genus *Homapsis* (Skuse, 1888; Blugledich, 1999). He also described the two other known Australian species: *S. hirtipennis* and *S. picticornis* (Skuse, 1890; see also

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Bugledich, 1999). In addition to these three species, fifteen others have been assigned to the genus: *S. paponorum* Matile, from New Caledonia (Matile, 1991); *S. longifurcata* Freeman, *S. ochracea* Freeman, *S. argentina* Duret, *S. naumanni* Duret, and *S. obscura* Duret, from Argentina (Freeman, 1951; Duret, 1976); *S. andina* Duret, from Ecuador (Duret, 1979); *S. fusca* Edwards, from Peru; *S. humeralis* Edwards, from Paraguay; *S. intermedia* Edwards, *S. morigenea* Edwards, and *S. nigricauda* Edwards, from Brazil; *S. pleuralis* Edwards, from Bolivia (Edwards, 1934, 1940); and *S. glabanum* (Johannsen) and *S. similis* (Johannsen), from northeastern USA and eastern Canada respectively (Johannsen, 1910; see also Zaitzev, 1982). However, some of the Neotropical species of *Stenophragma* appear to belong to a new genus (Christopher Borkent, pers. comm.).

In this paper, two new species of *Stenophragma* from Western Australia are described, increasing the known diversity of the genus to 20 species. An identification key for the Australian species of *Stenophragma* is provided.

Material and methods

The specimens examined in this paper belong to the Diptera collection of the Western Australia Museum (WAMA), and to the Australian Museum, Sydney (AMSA). Holotypes and paratypes are housed at the WAMA, AMSA, and at the Museu de Zoologia da Universidade de São Paulo (MZUSP), Brazil.

The wings and terminalia were detached; head, thorax, wing and terminalia were drawn after dissection. Soft parts were cleared in 10% KOH 40°C for 4–6 h, neutralized in acetic acid, dehydrated, and mounted on permanent slides with Euparal or retained in glycerin. Photographs were taken using a Canon EOS 7D with the software Camlift Controller 2.2 and were prepared using Helicon Focus 5.0 Pro software and Adobe Photoshop. Drawings were made using a camera lucida and redrawn using Adobe Illustrator 11.0. Morphological terminology follows Søli (1997), except for wing venation, which follows Amorim & Rindal (2007).

Abbreviations used are: *ae*, aedeagus; *anp*, anepisternum; *C*, costal vein; *ce*, cercus; *ce1*, first cercomere of female terminalia; *ce2*, second cercomere of female terminalia; *CuA*, basal part of anterior branch of cubital vein; *cxI*, fore coxa; *cxII*, mid coxa; *cxIII*, hind coxa; *gcap*, gonocoxal apodeme; *gcx*, gonocoxite; *gs*, gonostyle; *h*, humeral crossvein; *ktp*, katepisternum; *ltg*, laterotergite; M_1, M_2, and M_4, branches of medial vein; *mep*, mesepimeron; *mes*, metepisternum; *mtd*, mediotergite; *par*, parameres; *pem*, proepimeron; *pes*, proepisternum; *pnt*, pronotum; R_1, anterior branch of radius; R_5, posterior branch of radius; *r-m*, radial-medial crossvein; *Rs*, radial sector; *S*, sternite; *sc*, scutum; *Sc*, subcosta vein; *sc-r*, subcostal-radial crossvein; *sctl*, scutellum; and *T*, tergite.

Stenophragma Skuse, 1890

Homapsis Skuse, 1888: 1131, 1191 (preocc. Foerster, 1868). Type-species, *H. meridiana* Skuse (mon.).

Stenophragma Skuse, 1890: 612 (nom. nov. for *Homapsis* Skuse). Type-species, *Homapsis meridiana* Skuse (aut.).

Diagnosis (modified from Duret, 1976). Body and legs slender. Wing membrane usually with darker areas, covered with micro- and macrotrichia; macrotrichia widely distributed, sparsely on basal half, densely on apical half; Sc reaching C close to Rs; C ending a short distance after R_5; R_4 present or absent; first sector of CuA very long, twice the length of cubital fork; M_{1+2} extremely reduced; M_4 strong curved basally; M_4 and CuA complete and divergent. Anepisternum bare, laterotergite and mediotergite setose. Male gonostyle with two or three main branches, rows of long and short spines organized in different arrangements. Tergite nine more or less rectangular distally, with a clear waist close to apex, more or less membranous, densely covered by short, thin setulae on inner surface.

Stenophragma bickeli n.sp.

Figs. 1–3, 5–13

Diagnosis. Wing with light brown maculae on sc-r, on first section of Rs, and on CuA beyond insertion of M_4; R_4 absent. Gonostyle with dorsal, median, and ventral projections bearing combs of small spines and numerous longer spines; T9 straight at anterior margin, rounded distally.

Material examined. Holotype, ♂, AUSTRALIA, Western Australia, Pilbara region. Juna Downs Station, Great Northern Highway, c. 8 km S of Karijini Dr. toff., -22:41:36, 118:42:19, 12–17 Aug 2005, LTM sites, CVA Volunteers, PILB038/08M, [Malaise trap] (WAMA). Paratypes: 1♂, same data as holotype (WAMA); 7♂♂, same data as holotype (AMSA); 1♀, same data as holotype, except 15–19 May 2006, PILB038/12M (AMSA); 1♂, 1♀, same data as holotype, except 15–19 May 2006, PILB038/12M (WAMA); 2♂♂, same data as holotype, except Juna Downs Rd. to Packsaddle Bore, c. 5 km E of homestead, -22:52:31, 118:31:49, 15–19 May 2006, LTM sites, CVA Volunteers, PILB039/12M, [Malaise trap] (MZUSP).

Description. **Male** (Fig. 1). **Head**. Vertex dark brown, with scattered setulae. Two ocelli separated from the eye margin by less than their own diameter. Occiput dark brown. Eye setose. Scape and pedicel light brown, rounded, with small setulae; 14 light brown flagellomeres, almost twice as long as wide, with scattered setae, first flagellomere about 1.6 the length of second one. Frons dark brown, clypeus dark brown, covered with short setae; labella brown; first and second palpomeres dark brown, almost of same length; third to fifth light brown, apical ones increasingly longer, last one almost twice the length of penultimate. **Thorax** (Fig. 2). Scutum light brown, with four longitudinal dark brown bands, the lateral ones more diffuse than the central ones. Scutellum light brown. Pleural sclerites light brown. Pleural membrane brownish. Scutum moderately arched, covered with scattered small setae. Scutellum with many setulae, and six slight longer setae. Pronotum setose, with some stronger setae. Anepisternum and katepisternum more or less straight ventrally, bare. Mesepimeron reaching ventral margin of thorax, bare. Laterotergite slightly projected outwards, with 9–11 setae of different sizes, suture at contact with mediotergite incomplete dorsally. Mediotergite slightly curved in profile, ventral half with two longer setae laterally and smaller ones mesally. Haltere with whitish yellow pedicel and light brown knob, some few setae on pedicel, knob more densely setose. Coxae I and III whitish yellow, coxa II light brown, femora, tibiae and tarsi whitish yellow. First tarsomere more than twice the length of second one; tibiae and tarsi with erect darker short bristles along almost entire length, those on hind tibia more or less aligned dorsally

Figure 1. *Stenophragma bickeli* n.sp. habitus, lateral view, paratype. Scale 1 mm.

and laterally. Tibial spurs 1:2:2, about twice the length of tibial width at apex, internal spurs shorter. Tarsal claws with a large apical tooth and a smaller, more basal one. **Wing** (Fig. 3). Length 3.4 mm, width 1.3 mm. Membrane homogenously hyaline, except light brown maculation on sc-r, on first section of Rs, and on second section of CuA (beyond insertion of M_4); membrane densely covered with microtrichia on all cells, macrotrichia widely distributed, more sparsely on basal half, densely on distal half. Sc complete, reaching C just beyond base of Rs, well sclerotized, with some few setae. C ending before wing apex, extending for just a short distance beyond R_5. First sector of Rs nearly transverse, devoid of setae, less than half length of r-m. R_1 relatively long, reaching C on apical fourth of wing; R_4 absent; R_5 reaching C before wing apex, well sclerotized; r-m curved anteriorly, more or less oblique posteriorly, well sclerotized, setose. M_{1+2} extremely reduced; M_1 and M_2 running more or less parallel along most of their length; first sector of CuA very long, more than twice length of second sector of CuA; M_4 strongly curved basally; M_4 and CuA complete, divergent, well sclerotized. A_1 incomplete, absent on apical third, but well produced basally. All posterior veins with dorsal macrotrichia. **Abdomen**.

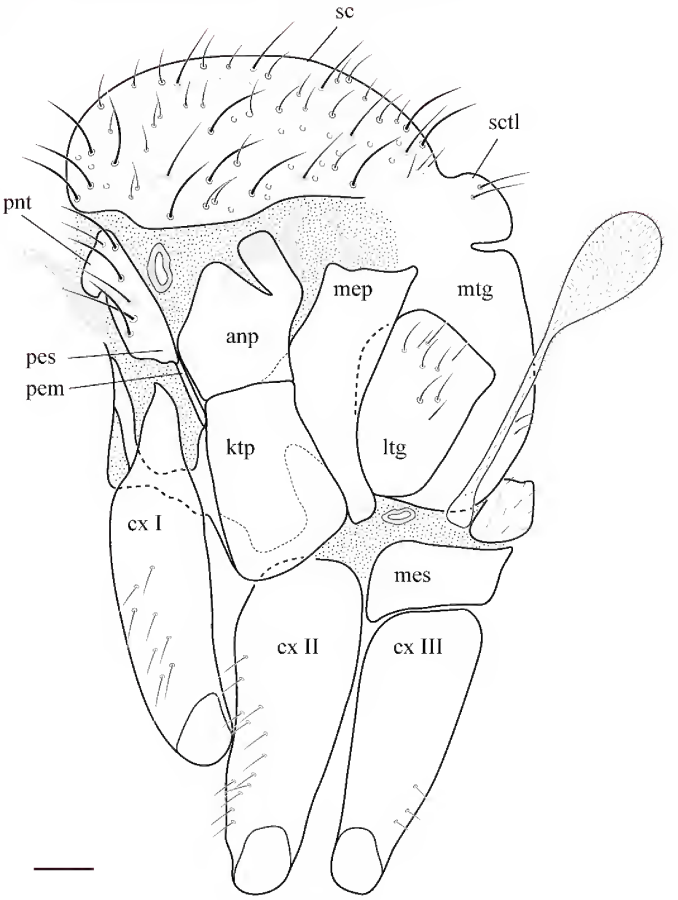
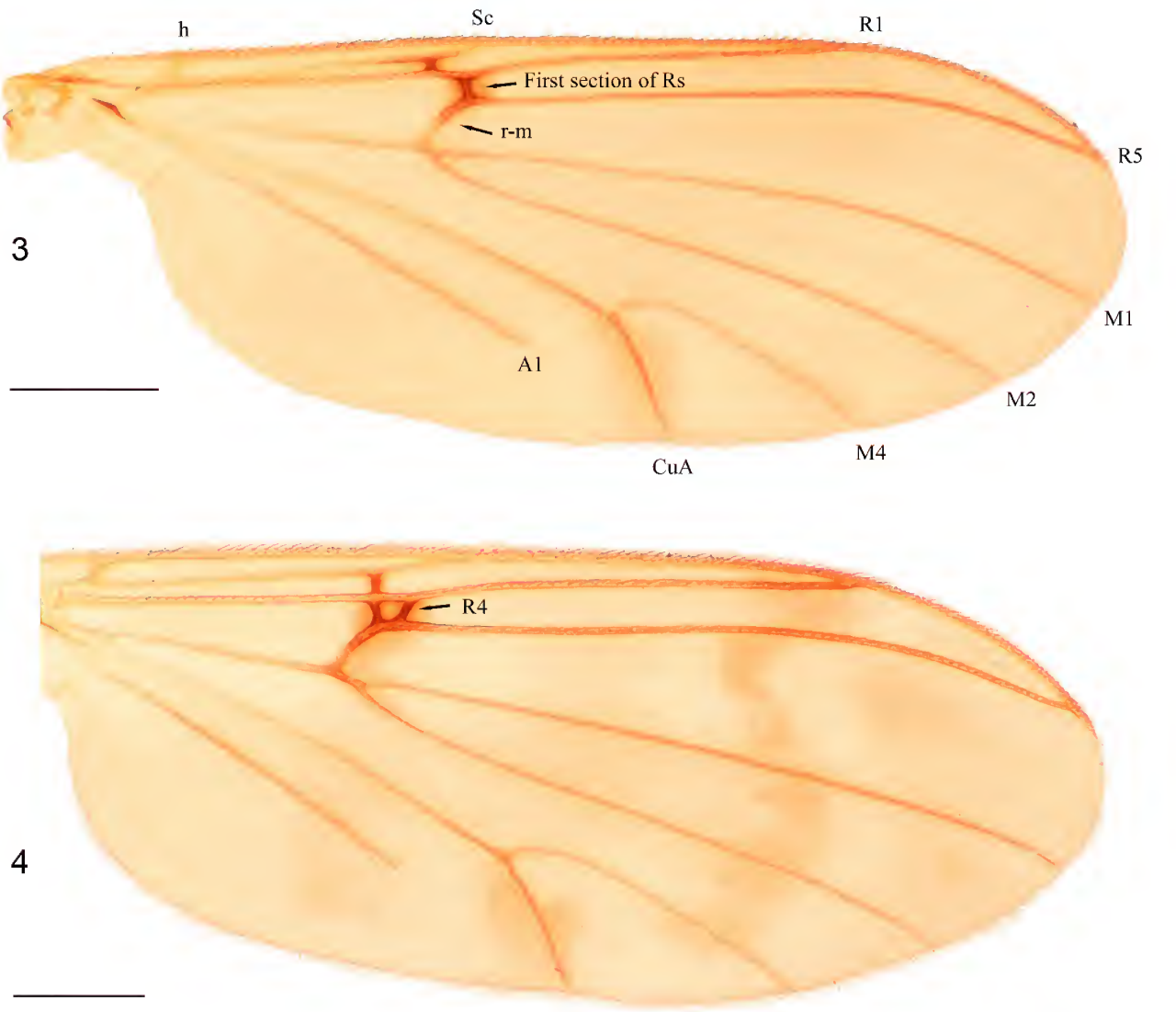


Figure 2. *Stenophragma bickeli* n.sp. thorax, lateral view, paratype. Scale 0.1 mm.



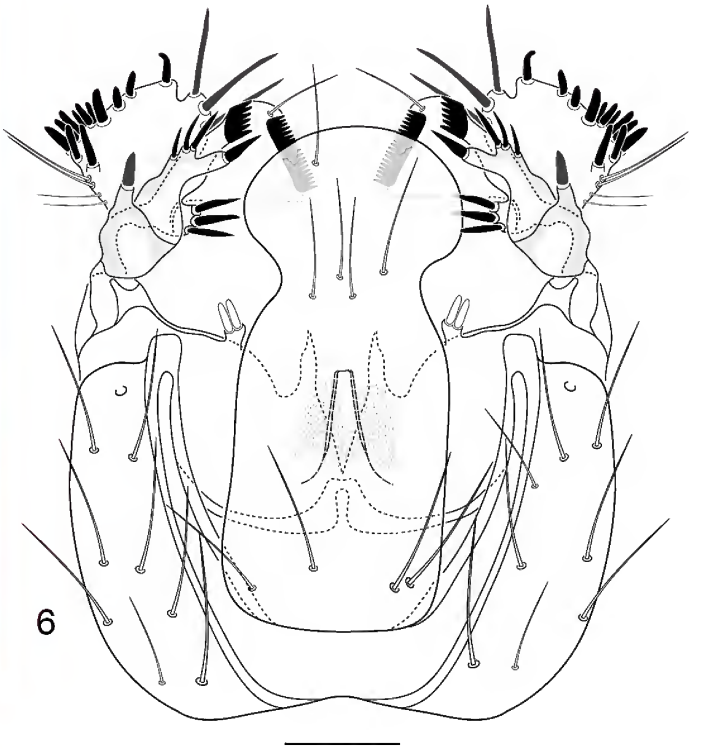
Figures 3–4. Wings of *Stenophragma*. *(3) S. bickeli* n.sp. paratype. *(4) S. collessi* n.sp. paratype. Scale 0.5 mm.

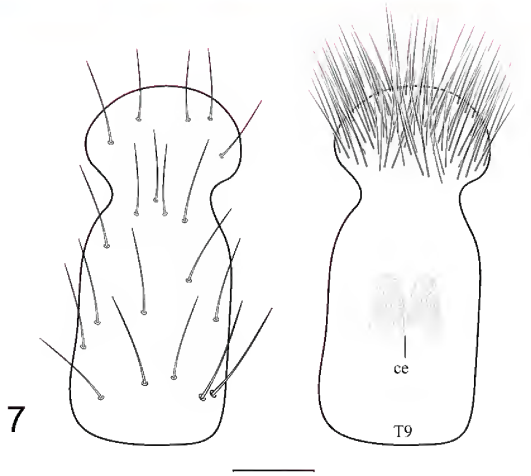
Abdomen light brown, setose, slender. T8 short and wide, S8 slender, longer than wide, rounded apically. Terminalia light brown, conspicuous, rounded. **Terminalia** (Figs. 5–11). Gonocoxites setose, fused to each other ventrally, with a pair of short, mesal extensions distally, pointed outwards at apex, besides a group of small aligned setulae; inner ventral surface with two white spines apically. Gonostyle complex, wide, with three main branches, dorsally, mesally, and ventrally; dorsal branch with one strong inner spine and four strong apical spines; median branch with one long setae apically and two rows of short spines and three strong basal spines; ventral branch wide, rounded, with short and strong apical spines and three long, very sclerotized setae on the inner margin. Aedeagus not seen; parameres membranous, straight at apex; gonocoxal apodeme well developed, sclerotized. T9 long, setose, apex as wide as base, straight at anterior margin, rounded distally, with typical waist close to apex; inner surface with many thin, long setae distally. Cercus weakly sclerotized, covered with many setulae.

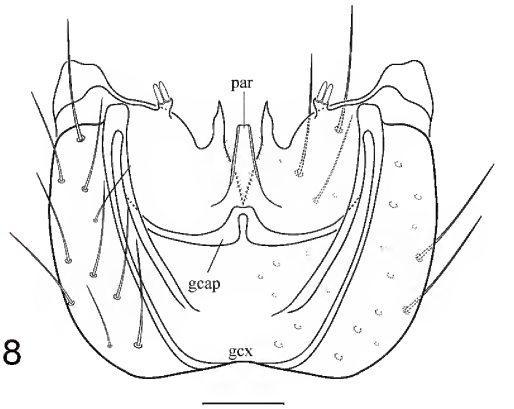
Female. As male, except as follows. Wing length, 3.8 mm, width, 1.5 mm. Antennal flagellomeres not as long as in males, near each other. Body general color lighter than in males. Abdomen yellowish. **Terminalia** (Figs. 12–13). Terminalia yellowish. Sternite 8 elongated, with a pair of posterior rounded gonapophyses, divided distally by a short medial incision, covered with fine, elongated setae on posterior margin; S9 (genital fork) not visible; S10 membranous, elongated, with microtrichia; T8 wide, short, as long as T9, covered with setae; T9 wide, short, covered with setae; T10 membranous, setose apically; Ce1 more than twice Ce2 length, covered with microtrichia and scattered setae; Ce2 ovoid, covered with microtrichia and few setulae.

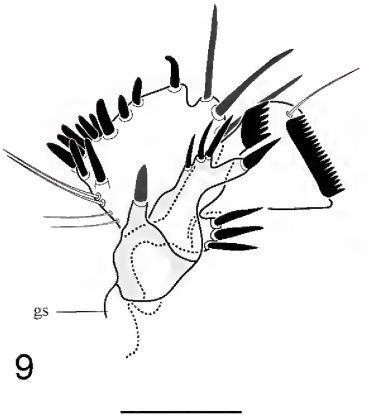
Etymology. The species name is masculine, named after the eminent dipterist Daniel J. Bickel, of the Australian Museum, Sydney. He has enormously improved the knowledge on the Dolichopodidae diversity in Australasian region and elsewhere in the world, and was an excellent advisor during the time spent working at the AMSA collection.

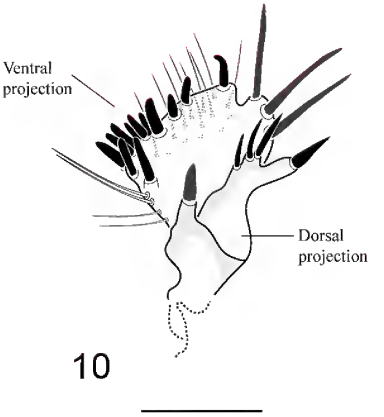
Comments. The absence of R_4 is shared by this species and *Stenophragma paponorum*, from New Caledonia. In this latter species (see Matile, 1991: fig. 12) the wings have three

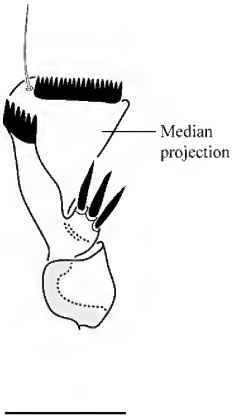




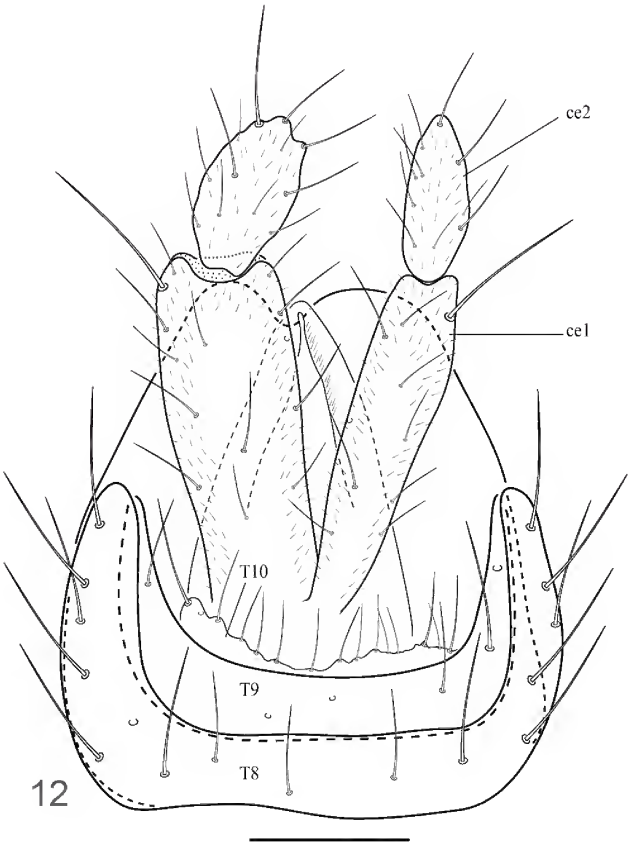


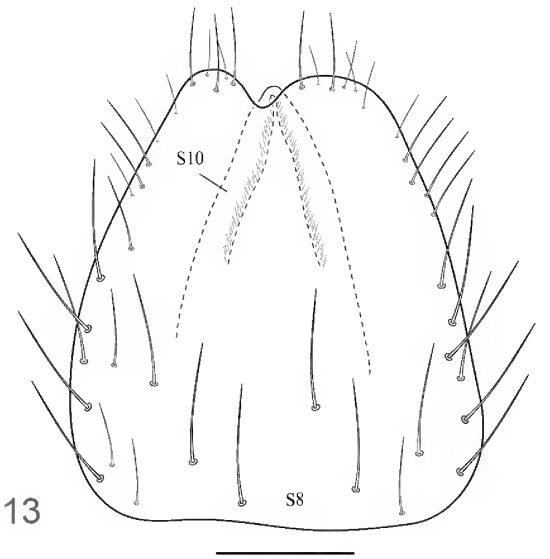






Figures 5–11. Male terminalia of *Stenophragma bickeli* n.sp. paratype. *(5–6)* Terminalia, dorsal view. *(7)* Detail of tergite 9 and cerci in dorsal view (left) and in ventral view (right). *(8)* Gonocoxite, gonocoxal apodeme, and parameres, dorsal view. *(9)* Gonostyle, dorsal view. *(10)* Detail of the ventral and dorsal projections of the gonostyle. *(11)* Detail of the median projection of the gonostyle. Scale 0.1 mm.





Figures 12–13. Female terminalia of *Stenophragma bickeli* n.sp. paratype. *(12)* Terminalia, dorsal view. *(13)* Detail of sternites 8 and 10, ventral view. Scales 0.1 mm.

vertical brown bands, one at the distal third, another from the apex of R_1 to the apex of M_4, a third between the mid of R_1 to the distal end of the first section of CuA. *S. paponorum* also shows inconspicuous brown maculae at the first section of Rs, R_4, r-m, and M_{1+2}. *S. paponorum* is known only by a female, so it is not possible at this stage to check if male features seen in the terminalia of *S. bickeli* n.sp. are shared with the New Caledonia species.

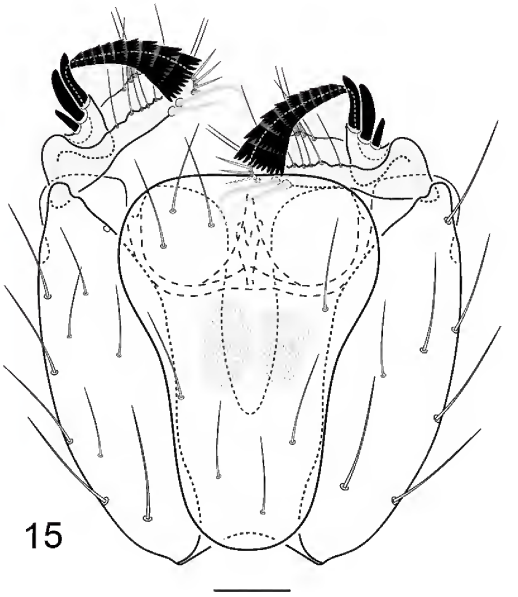
Stenophragma collessi n.sp.

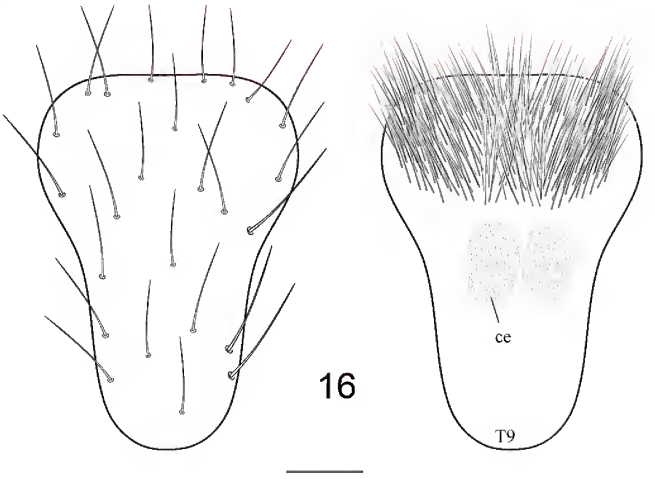
Figs. 4, 14–20

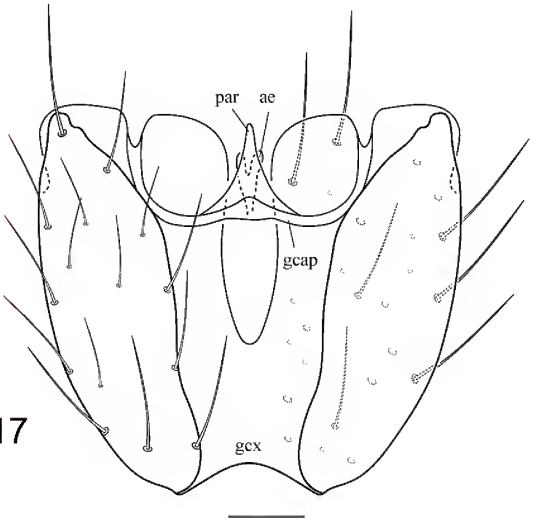
Diagnosis. Wing with light brown maculation on sc-r, on first section of Rs, R_4 and r-m, on first section of CuA, and a light brown sinuous band anteriorly on apical third of wing, from apex of R_1 to apex of M_4; R_4 present. Gonostyle long, with a ventral and a dorsal branches; T9 rounded at anterior margin, widening to apex. Female ce2 with three spines few sclerotized apically in the inner surface.

Material examined. Holotype, ♂, AUSTRALIA, Western Australia, 28km W. Yalgoo, 2 Sept. 1981, Malaise trap, G. A. Holloway coll. (AMSA K351926). Paratype: ♀, AUSTRALIA, Western Australia, 50km NW Yuna, 6 Sept. 1981, ex Malaise trap, G. A. Holloway coll. (AMSA K351927). **Additional material**. 1 individual, sex unknown, AUSTRALIA, Western Australia, 28km W. Yalgoo, 2 Sept. 1981, Malaise trap, G. A. Holloway coll. (AMSA).

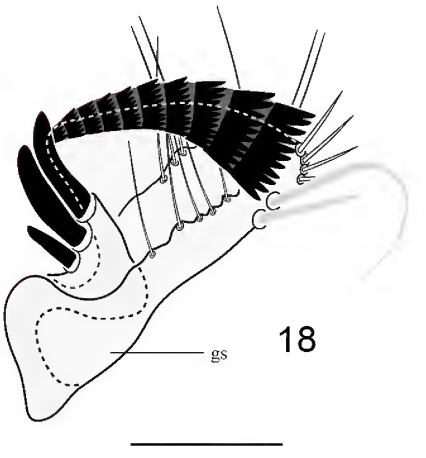
Description. **Male**. **Head**. Vertex brown, with scattered setulae. Two ocelli separated from the eye margin by less than their own diameter. Occiput brown. Eye setose. Scape and pedicel yellowish, rounded, with small setulae; first flagellomere light brownish on basal third and brown on apical two thirds, almost twice as long as wide, with scattered setae. Frons yellowish, clypeus light brown, covered with short setae; labella and palpus light brown; first and second palpomeres almost of same length; third to fifth increasingly longer, last one almost twice the length of penultimate. **Thorax**. Scutum light brown, with three large longitudinal bands brown. Scutellum light brown. Pleural sclerites light brown. Pleural membrane yellowish. Scutum moderately arched, covered with scattered small setae. Scutellum with many setulae and six longer setae. Pronotum setose, with some stronger setae. Anepisternum and katepisternum almost straight ventrally, bare. Mesepimeron reaching ventral margin of thorax, bare. Laterotergite slightly projected outwards, with 9–11 setae of different sizes, suture at contact with mediotergite incomplete dorsally. Mediotergite slightly curved in profile, ventral half with two longer setae laterally and smaller ones mesally. Haltere with whitish yellow pedicel and light brown knob, some few setae on pedicel, knob more densely setose. Coxae I and III whitish yellow, coxa II whitish yellow with basal half light brown, femora, tibiae and tarsi whitish yellow. First tarsomere more than twice the length of second one; tibiae and tarsi with erect darker short bristles ventrally along almost entire length, those on hind tibia more or less aligned dorsally and laterally. Tibial spurs 1:2:2, about twice the length of tibial width at apex, internal spurs few shorter. **Wing** (Fig. 4, female wing). Length 3.5 mm, width 1.5 mm. Membrane homogenously hyaline, except light brown maculation on sc-r, on first section of Rs, R_4 and r-m, on section of CuA (beyond insertion of M_4), and a light brown sinuous vertical band at beginning of apical third of wing, running from apex R_1 apex to apex of M_4; membrane densely covered with microtrichia on all cells, macrotrichia widely distributed, more sparsely on basal half, densely on distal half. Sc complete, reaching C beyond base of Rs, with few setae, well sclerotized. C ending before wing apex, extending for just a short distance beyond R_5. First sector of Rs almost perfectly transverse, devoid of setae, less than half length of r-m. R_1 relatively long, reaching C on apical fourth of wing; R_4 present; R_5



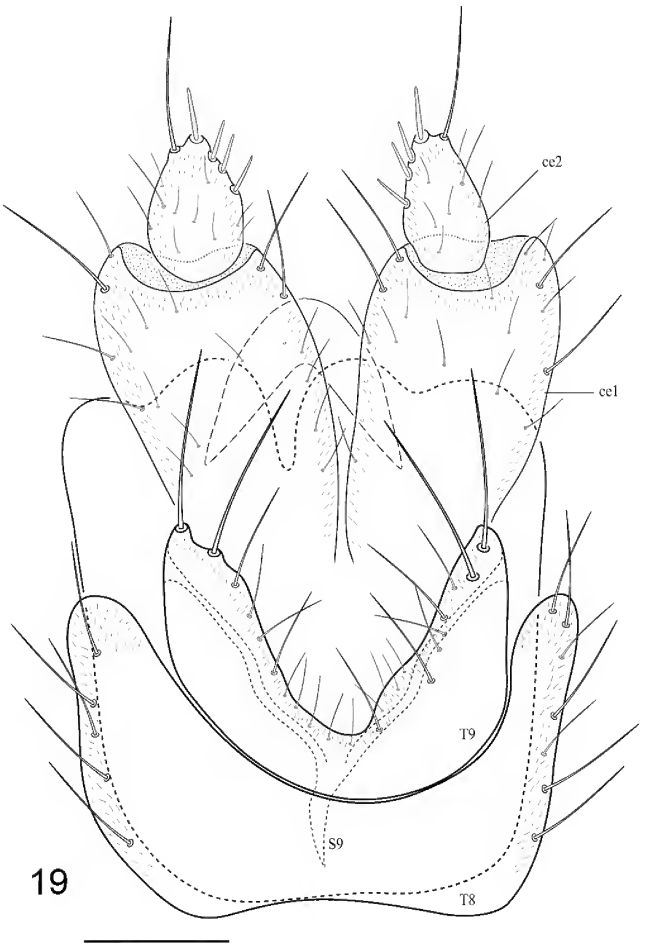


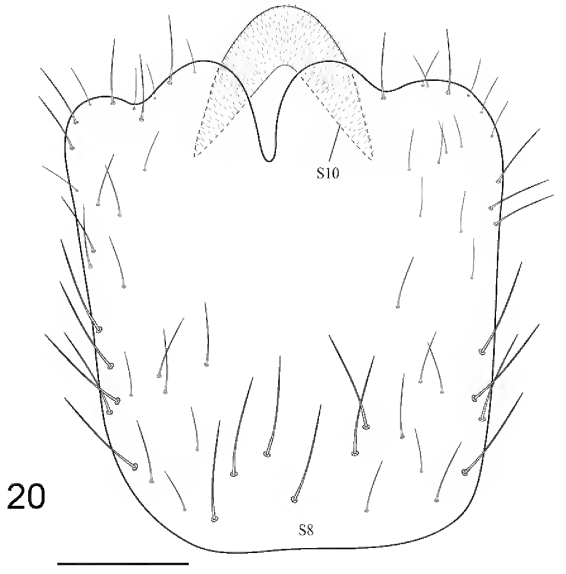


Figures 14–18. Male terminalia of *Stenophragma collessi* n.sp. holotype. *(14–15)* Terminalia, dorsal view. *(16)* Detail of tergite 9 and cerci in dorsal view (left) and in ventral view (right). *(17)* Gonocoxite, gonocoxal apodeme, aedeagus, and parameres, dorsal view. *(18)* Gonostyle, dorsal view. Scale 0.1 mm.



reaching C before wing apex, well sclerotized; r-m curved anteriorly, more or less oblique posteriorly, well sclerotized, setose. M_{1+2} extremely reduced; M_1 and M_2 running more or less parallel along most of their length; first sector of CuA very long, more than twice length of second section of CuA; M_4 strongly curved basally; M_4 and CuA complete, divergent, well sclerotized. A_1 incomplete, absent on apical third, but well produced basally. All posterior veins with dorsal macrotrichia. **Abdomen**. Abdomen brown, setose, slender. T8 short and wide, S8 slender, longer than wide, rounded apically. Terminalia light brown, conspicuous, rounded. **Terminalia** (Figs. 14–18). Gonocoxites setose, fused to each other ventrally only at basal third. Gonostyle long, with a ventral and a dorsal branches; ventral branch with two long setae (one of them much longer than the other ones), besides some regular setae, and a coniform projection





Figures 19–20. Female terminalia of *Stenophragma collessi* n.sp. paratype. *(19)* Terminalia, dorsal view. *(20)* Detail of sternites 8 and 10, ventral view. Scales 0.1 mm.

with nine regular rows of short spines; dorsal branch with three strong spines of different sizes. Aedeagus bifid at apex; parameres membranous, thin at apex; gonocoxal apodeme well developed and sclerotized. T9 long, setose, widening to the apex, rounded at anterior margin, inner surface with a concentration of thin, long setae apically. Cerci weakly sclerotized, covered with many setulae.

Female. As male, except for the following features. Wing length, 4.0 mm, width, 1.6 mm. **Wing** (Fig. 4). Abdomen brown, with some yellowish spots mesally and posteriorly on tergites and sternites. **Terminalia** (Figs. 19–20). Terminalia yellowish. Sternite 8 elongated, with a pair of gonapophyses each with a shallow distal incision, divided by a mesal deeper incision, covered with microtrichia and fine, elongated setae; S9 (genital fork) wide, with a short anterior arm; S10 membranous, rounded at apex, with microtrichia; T8 wide, short mesally, longer than T9, covered with setae; T9 wide, short mesally, covered with setae; T10 not visible; ce1 more than twice ce2 length, covered with microtrichia and scattered setae; ce2 ovoid, covered with microtrichia, few setulae, and three not strongly sclerotized spines.

Etymology. The species name is masculine, named after the great Australian dipterist, Donald H. Colless (24 August 1922–16 Feb 2012), of the CSIRO Division of Entomology's Australian National Insect Collection (ANIC), who has given an outstanding contribution to the understanding of the diversity of different groups of flies in Australasian region.

Comments. *Stenophragma collessi* n.sp. and *S. picticornis*, both from southern Western Australia, have in common a gonostyle with two well characterized branches, bearing strong spines. Nevertheless, the differences in the wing and male terminalia features are more than enough to consider them separate species.

Discussion

As noted by Edwards (1934), one of the most striking differences between the Australian and Neotropical species of *Stenophragma* concerns the shape of the cubital fork. In the Australian species M_4 connecting CuA pretty close to the wing margin, while in the Neotropical species the cubital fork is long, with M_4 sometimes connecting almost at the level of the medial fork, with the exception of *S. ochraceae*, *S. humeralis*, and *S. intermedia*. These species have shorter cubital fork, but not as short as in the Australian species. *Leptomorphus* and other sciophiline genera with plesiomorphic wings have considerably long cubital fork, so the condition shared by the Australian species of *Stenophragma* could be a putative synapomorphy.

The presence of R_4 is widespread in the Neotropical species of *Stenophragma*, although Duret (1976) noticed intraspecific variation concerning the presence of R_4 between wings of the same specimens of *S. longifurcata*. This feature also shows intrageneric variation in other genera of Sciophilinae, as in *Leptomorphus*. In the Australian fauna of the genus, both *Stenophragma bickeli* n.sp. and *S. paponorum* share the absence of R_4.

Key for the Australian species of *Stenophragma*

A key for the Patagonian species of the genus has been provided by Duret (1976), but no key is available for the Australian species of *Stenophragma*, which is furnished here.

1 R_4 absent (Fig. 3) 2

—— R_4 present (Fig. 4) 3

2(1) Maculae not completely crossing the wing, a reduced, light brown macula over first section of Rs and over second sector of CuA (Fig. 3); cercomere 1 of female terminalia slender, twice the length of cercomere 2 (Figs. 12–13) ..... *S. bickeli* n.sp.

—— Three clearly evident maculae crossing the wing, in addition to the spot over first section of Rs (Matile, 1991: fig. 12); cercomere 1 of female terminalia wide, less than twice the length of cercomere 2 (Matile, 1991: fig. 13) ..... *S. paponorum* Matile

3(1) Gonostyle dorsal arm bearing rows of short spines (Fig. 18) 4

—— Gonostyle dorsal arm bearing isolated strong spines, but not rows of short spines (Fig. 9) 5

4(3) M_4 and CuA strongly sinuous (Skuse, 1890: plate XIX, fig. 5) ..... *S. picticornis* Skuse

—— M_4 and CuA not sinuous (Fig. 4) ..... *S. collessi* n.sp.

5(3) Brown band across the wing originating at apex of R_1 only slightly curved, wide ..... *S. hirtipennis* Skuse

—— Brown band across the wing originating at apex of R_1 more or less sinuous, slender (Skuse, 1888: plate 31, fig. 9) ..... *S. meridianum* (Skuse)

The maculation on the wing membrane varies considerably within *Stenophragma* and is a helpful feature to identify many of the species of the genus. Most Neotropical species of *Stenophragma* have hyaline wings, even though *S. andina*, *S. longifurcata*, and *S. argentina* have patterned wing. All Australian species of *Stenophragma* have some degree of maculation on the wing membrane as well. A detailed study of the wing patterns also could provide useful characters for the phylogeny within the genus *Stenophragma*.

It is worth commenting that differences related to the shape of female S8 and the cerci are enough to allow species recognition, although scarce attention has been given to female terminalia morphology in the literature. With respect to the male terminalia, there is an amazing variation of the shape of the gonostyle, and T9 also shows considerable differences between the species. *S. collessi* n.sp. and *S. picticornis*, both from southern Western Australia, share a gonostyle with two branches, one of which has a sequence of rows of short spines (also seen, in different shapes, in Neotropical species). *S. bickeli* n.sp., on the other hand, known from northern Western Australia, has a gonostyle with three branches, while *S. meridianum* and *S. hirtipennis* have much simpler gonostyli. *S. paponorum* is known only from females.

Ladiges *et al*. (2011) have shown that a clade of eucalypt species from the northern and central Deserts plus the Pilbara region is closely related to a clade of species from the southern Desert plus southwestern areas. The type-locality of *Stenophragma bickeli* n.sp. is in the Pilbara region, while the type-localities of *S. collessi* n.sp. and *S. picticornis* correspond to southwestern Australia. A study of the phylogenetic relationships, and, hence, a biogeographical study of the Australian species of *Stenophragma* is outside the scope of this paper. However it is interesting that the distribution of some of the species of *Stenophragma* mirrors that known for *Eucalyptus*, indicating that the biogeographical history of the mycetophilids might fit in a general pattern known for the region.

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A New Genus and Species of the Subfamily Tachiniscinae (Diptera, Tephritidae) from Australia

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ABSTRACT. A parasitic fly *Aliasutra australica* new genus and species is described, and the subfamily Tachiniscinae is recorded from Australia for the first time. The new species superficially resembles pyrgotid flies by lacking frontal setae and wing pattern, and by having numerous proepisternal setae and brownish yellow body. It possesses a unique structure of female terminalia, which is a synapomorphy of the Tachiniscinae, and the incomplete costal vein, long tubular phallus and elongate spermathecae, which are considered synapomorphies of the tribe Tachiniscini, and is placed in that tribe.

KORNEYEV, VALERY A. 2012. A new genus and species of the subfamily Tachiniscinae (Diptera, Tephritidae) from Australia. *Records of the Australian Museum* 64(3): 159–166.

KEYWORDS: Tephritoidea; Tephritidae; Tachiniscinae; Tachiniscini; new genus; new species; Australia.

Tephritid flies of the subfamily Tachiniscinae are rare in collections and are poorly known biologically, but they are important to understanding the phylogeny of the Tephritidae, as they appear to be the earliest branch of the family. As far as known, some species are parasites of caterpillars of saturniid moths, and this is believed to be true for all the Tachiniscinae, as they share similar structure of female ovipositor. Such uncommon habits, different from other Tephritidae, which have phytophagous or saprophagous larvae, along with odd appearance of some species mimetic of bumblebees or wasps, has resulted in establishment of a nominal family Tachiniscidae, which later was shown to include some species of typically tephritid habitus and synonymised with Tephritidae (Korneyev, 1999). All hitherto known data were summarised by Korneyev & Norrbom (2006).

The subfamily included 20 described species belonging to 9 genera of two tribes, Tachiniscini and Ortalotrypetini, which were known to occur in the Afrotropical and Neotropical Regions and also in south eastern provinces of China, usually considered to belong in the Palaearctic Region. An undescribed genus and species related to Tachinisca is recognised in collections from the Oriental Region (T. Saigusa, pers. comm.).

While studying the Diptera collection at the Australian Museum (Sydney), VAK found a series of odd flies recognized by David K. McAlpine as a new genus and species, superficially resembling some Pyrgotidae and therefore preliminarily sorted with the pyrgotid genera. Detailed study of female genitalia shows that they possess essential characters of the subfamily Tachiniscinae. The new taxa are described below.

Type material is deposited in the collections as follows:

AMS	Australian Museum, Sydney;
SIZK	I. I. Schmalhausen Institute of Zoology, Kiev;
MNVM	Museum of Victoria, Melbourne.

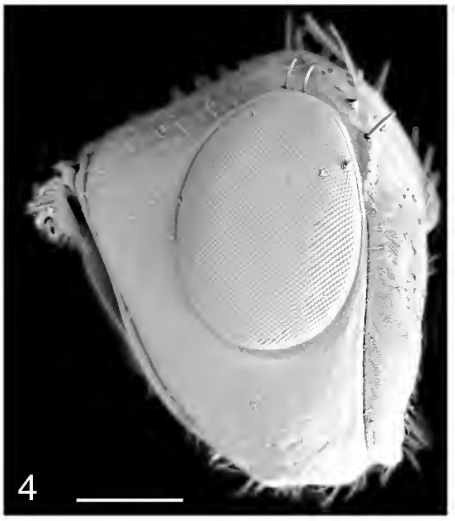
Figs 1–3. *Aliasutra australica* n.sp., paratype female, photographs. *(1)* dorsal view; *(2)* lateral left view; *(3)* head, anterior view.

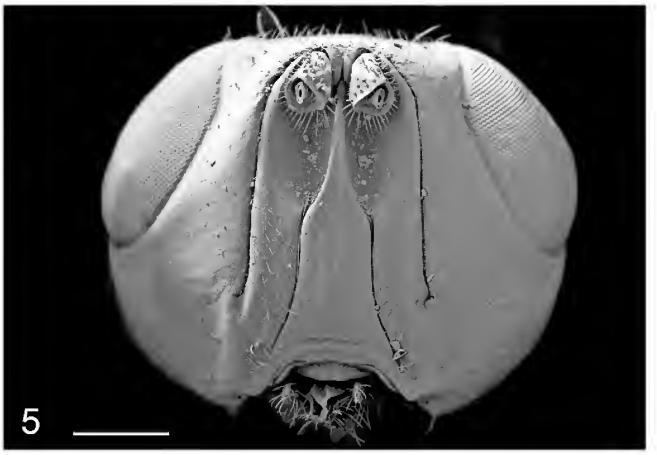
Aliasutra n.gen.

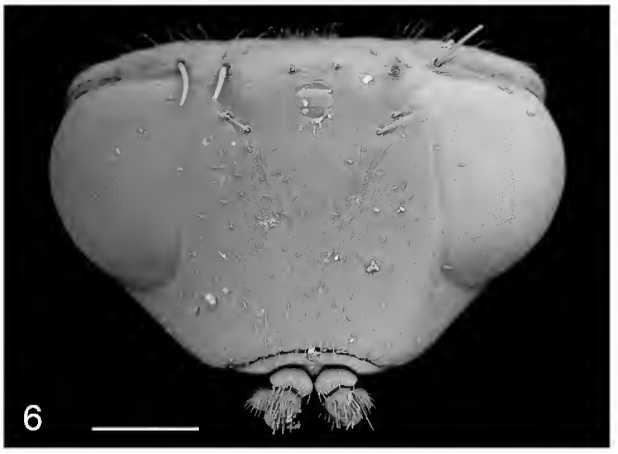
Type species: *Aliasutra australica* n.sp.

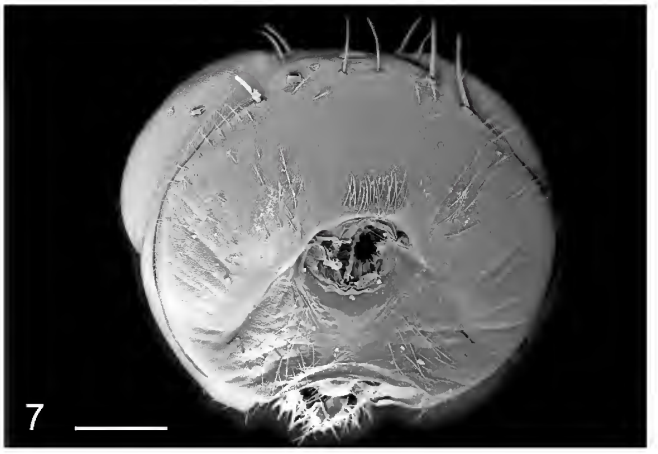
Diagnosis. Medium-sized flies (Figs 1–3), which can be recognized from other Tachiniscinae by the combination of: arista bare; costal vein not reaching apex of vein M; head and thorax uniformly brownish yellow; frontal and ocellar setae absent; 2 pairs of lateroclinate orbital setae; postvertical seta short, only 2× as long as occipital setulae; proepisternal ridge with 5–6 long biseriate setae; 2 postpronotal and 1–2 postsutural supra-alar setae; 1 dorsocentral seta aligned with intraalar setae; 3 pairs of scutellar setae; wing hyaline without pattern.

Description. Head (Figs 4–7) slightly higher than long. Frons slightly longer than wide, setulose. Frontal setae absent. Orbital plates short, only slightly extending anterior to ocellar triangle, with 2 short, lateroclinate and slightly reclinate setae. Face receding, slightly convex in profile, with distinct antennal grooves extending ventrally to 0.4 height of face, and with sharply margined medial carina, very broad on ventral 0.6; fronto-facial sutures reaching bases of antennal grooves (Fig. 5). Facial ridge as wide as antennal groove, with supravibrissal setulae in 3–5 rows, but no prominent vibrissae: lowermost setulae only twice as long as other setulae. Ptilinal fissure ending slightly below level of ventral margin of eye. Ocellar seta lacking; medial vertical seta half as long as horizontal diameter of eye and





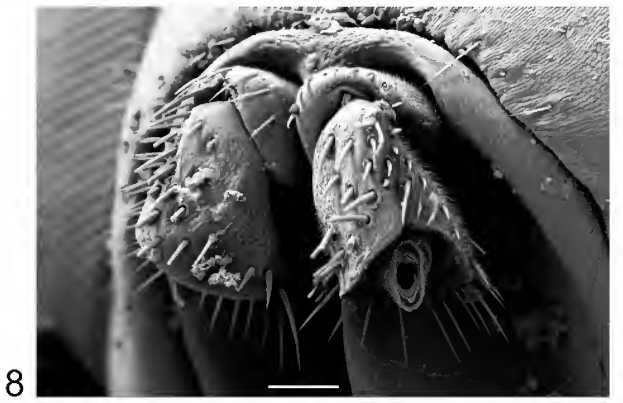


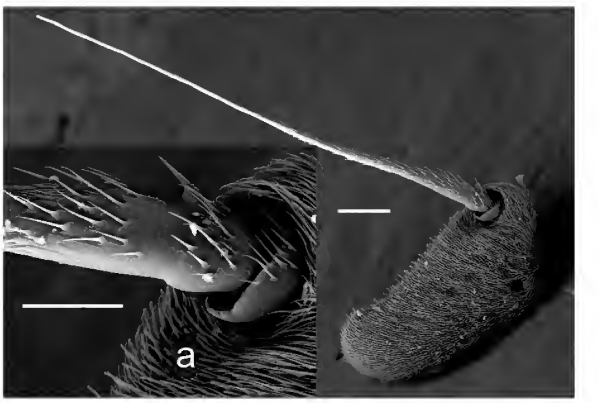


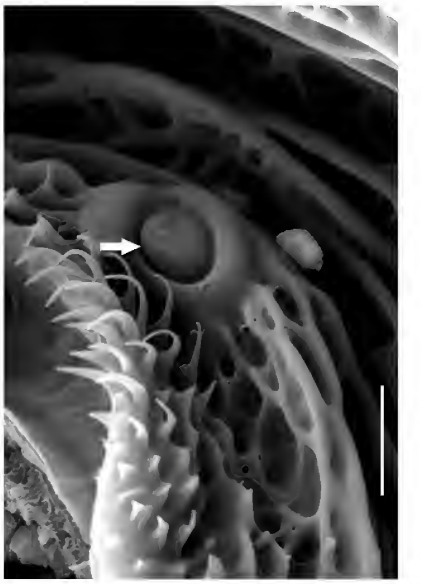
Figs 4–7. *Aliasutra australica* n.sp., head, SEM. *(4)* left; *(5)* anterior; *(6)* dorsal; *(7)* posterior. Scale = 0.2 mm.

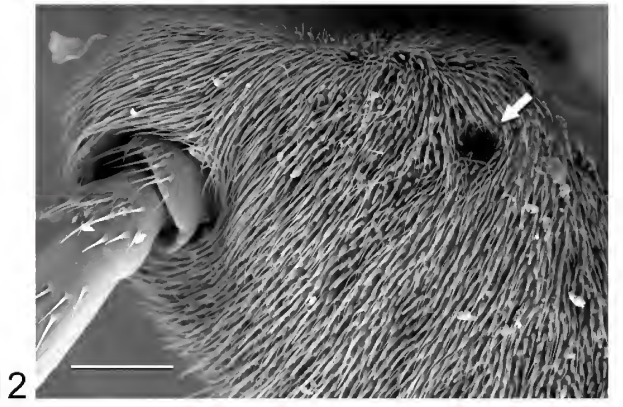
1.8× as long as lateral vertical seta; postvertical seta small, at most twice as long as occipital setulae. Postocellar seta 1.5× as long as orbital setae. Postocular setulae acuminate, weak, not differentiated from occipital setulae. No genal setae. Postgenal groove very long, reaching upper half of compound eye. Antenna attached at level of upper 0.6 of eye height; scape (Fig. 8) very short, anteriorly directed, setose in apicodorsal half; pedicel (Fig. 10) as long as wide, with dorsal cleft and pedicellar button (Fig. 11) well developed; margins of pedicel setulose, ventromedial surface sparsely microtrichose, but not setulose; 1st flagellomere (Fig. 9) oval, densely microtrichose, with laterobasal sacculus (Fig. 12); arista 2-segmented (antennal segments 4 and 5 partly fused), very short pubescent at base. Palp (Fig. 13) elongate ovoid, dorsal margin slightly concave, setulose. Prementum small, not strongly convex; labella shorter and narrower than flagellomere 1, linear.

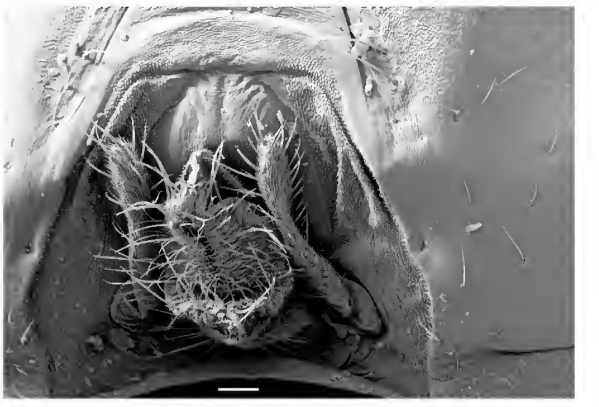
Thorax. Proepisternum less than twice as high as long, convex, with 5–6 subequal setae. Postpronotal lobe with 2–3 strong setae. Scutum with 1 presutural and 1 or 2 postsutural supra-alar, 1 intrapostalar, 1 postalar and 1–2 intra-alar setae; 1 acrostichal seta aligned slightly anterior or posterior to intra-alar and postalar setae; 1–2 dorsocentral setae (sometimes setula-like) aligned slightly anterior to intra-alar and postalar setae. Scutellum slightly convex, setulose, with 3, rarely 2 pairs of strong subequal setae. Anepisternum not produced laterally, setulose medially and posteriorly; 2 strong postsutural anepisternal setae. Anepimeron with 2(1) setae, sometimes weak (not mounted on projection). Katepisternum with 1 moderately strong lateroclinate posterodorsal seta and 10–14 reclinate setae anterior to midcoxa. Katepimeron not modified. Postnotum at most sparsely and short microtrichose or bare. Metathoracic postcoxal area unsclerotized. Legs (Figs 14–21). Fore coxa with 4–5 setae at anteroventral margin; fore trochanter with a few short setulae; fore femur with two postero-dorsal rows and one postero-ventral row of setae. Mid tibia (Fig. 17) with 1 anterodorsal seta and 1 posterodorsal setae on apical half, and with 2 long and 2 short spur-like ventroapical setae (Fig. 19); hind tibia (Fig. 20) with anterodorsal row of 4–7, and dorsal row of 7–11 setulae. Wing (Fig. 24) hyaline, without dark pattern. Subcostal vein distally curved to meet costa at right angle, but not broken apically. Vein R_{4+5} with 5–7 setulae to level of r-m (or slightly beyond it) on dorsal side, bare on ventral side. Costal vein with many equally short spinules (sensu Hackman & Väisänen, 1985) on anterodorsal margin to the mid-distance between R_{2+3} and R_{4+5} apices and sparse fine setulae along ventral and dorsal surface, but no differentiated costal spines proximal to costal break. Abdomen. Tergites 3–5 of female of equal length, tergite 6 half as long as tergite 5. Sternites (Figs 27, 29) broad,









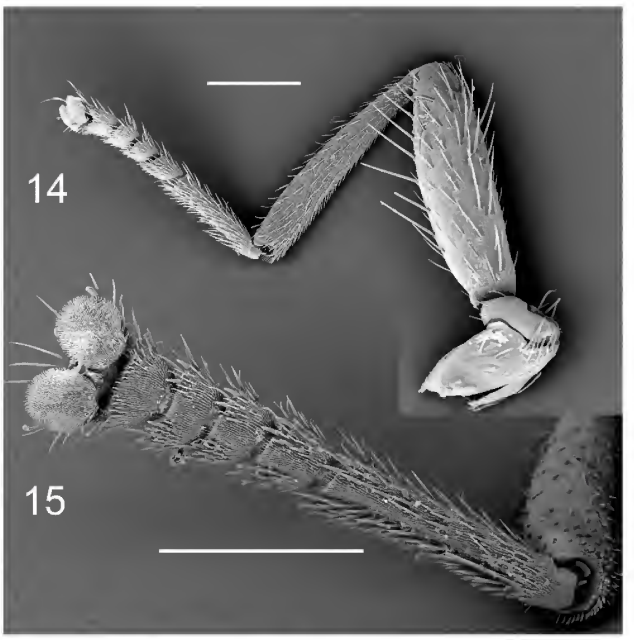


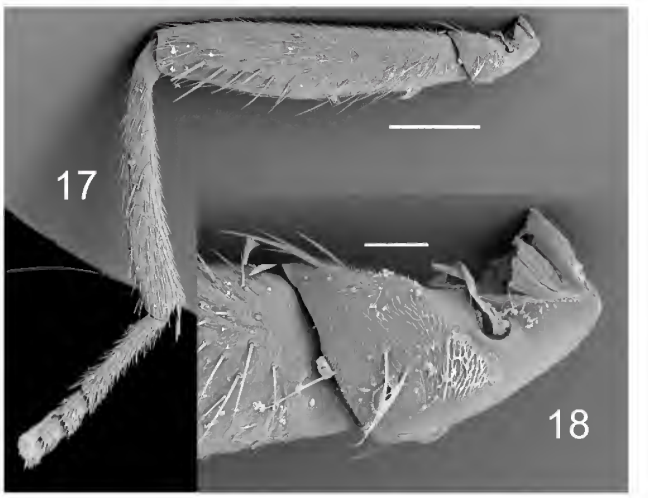
Figs 8–13. *Aliasutra australica* n.sp., head appendages, SEM. *(8)* antennae (flagellomeres detached); *(9)* flagellomere 1 and arista (a, base of arista, enlarged); *(10)* pedicel after removal of flagellomeres, apical, pedicellar button indicated; *(11)* pedicellar button; *(12)* base of flagellomere 3, sacculus indicated; *(13)* subcranial area and mouthparts, anteroventral view. Scale = 0.1 mm (8, 9, 10, 13) and 0.05 mm (9a, 11, 12).

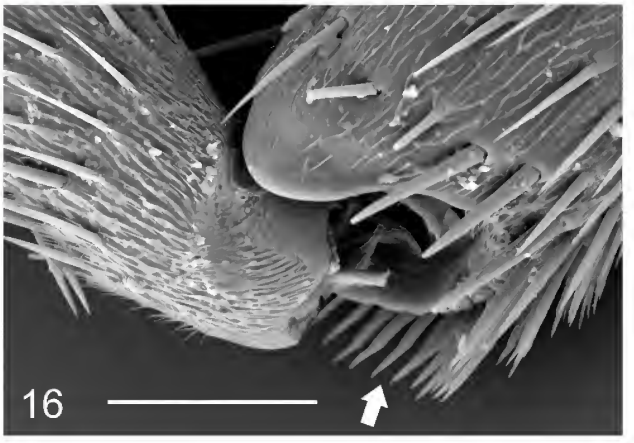
trapezoid; sternite 1 poorly sclerotized, separated from sternite 2.

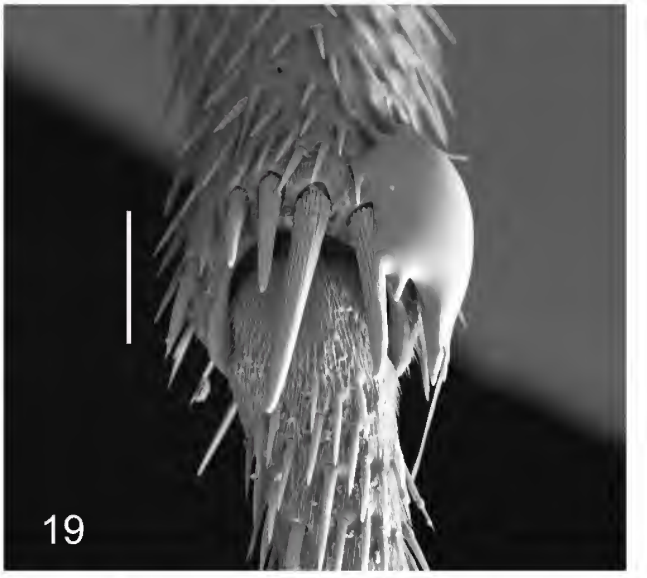
Male terminalia (Figs 27–28, 32–37). Cerci (Fig. 32–33) mostly membranous, with very short setulae, ventrobasally with subtriangular, dorsally curved sclerotized portion (subepandrial sclerite). Epandrium suboval, dorsally with very long setae; with moderately short and wide lateral (outer) surstylus and 2 prensisetae on mesal (inner) surstylus. Hypandrium with posteriorly expanded phallapodeme connected to two gonites by widely separated vanes. Phallus (Figs 28, 35–36) with short bare stipe and narrow, non-sclerotized glans (half as long as stipe) and laterally projected, serrate lobe of preglans (Fig. 36); membrane posterior to basiphallus with postero-dorsally directed microtrichia (similarly to most examined Tephritidae).

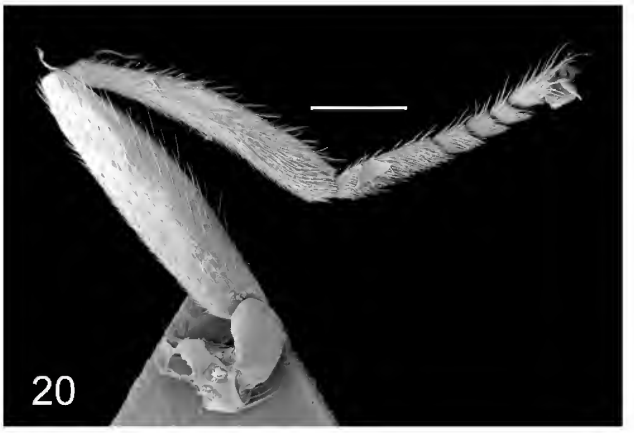
Female terminalia. Oviscape short, with large dorso-apical opening, setae on dorsal side along opening (Figs 25–26, 29) 2× as long as setulae on ventral side. Eversible membrane with large ventral area of dark scales (Figs 25–26, 30); aculeus with nonsetulose anterodorsal dilation,







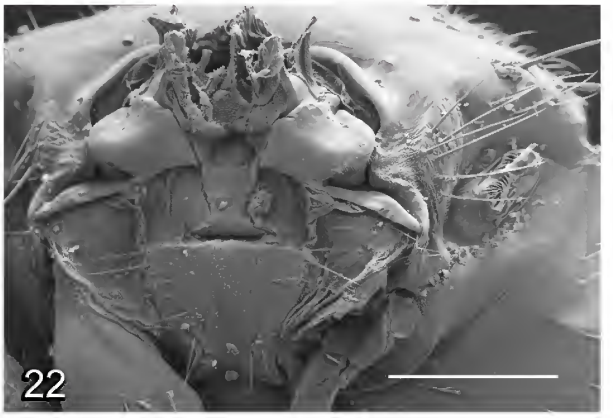


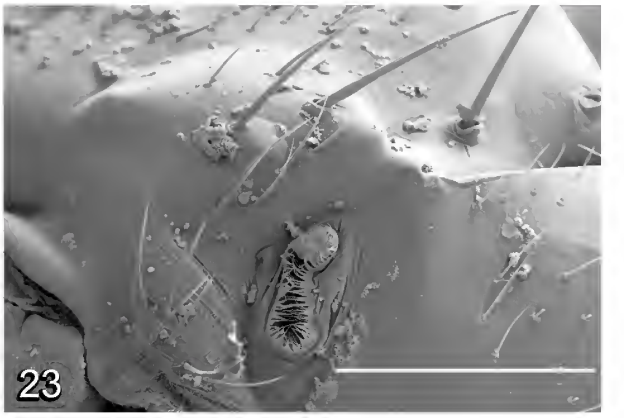


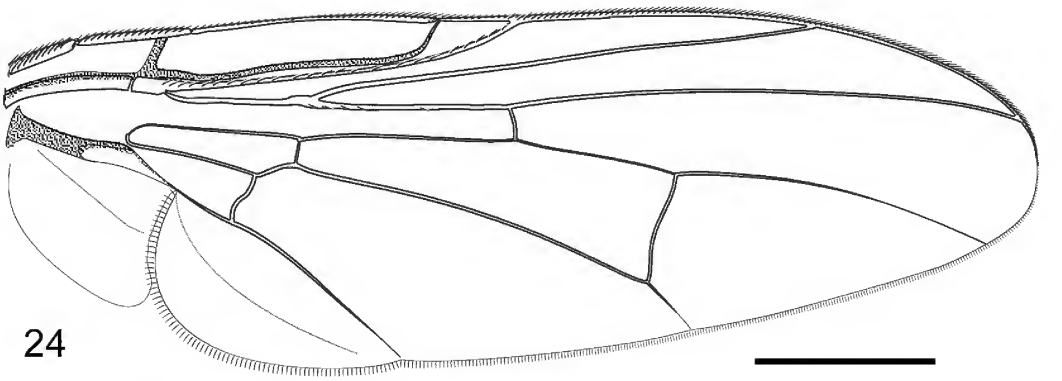
Figs 14–21. *Aliasutra australica* n.sp., left fore (14–16), mid (17–19) and hind (20–21) legs, SEM. *(14)* total, posterior view; *(15)* tarsus, ventral; *(16)* apex of fore tibia and base of tarsus, posterior, comb of apicoventral setulae indicated; *(17)* total, posterior view, apical tarsomere broken off; *(18)* mid coxa; *(19)* apex of mid tibia, ventral view; *(20)* total, anterior view; *(21)* last tarsomere, apical view, empodium indicated. Scale = 0.5 mm (14–15, 17, 20), 0.1 mm (16, 18–19, 21).

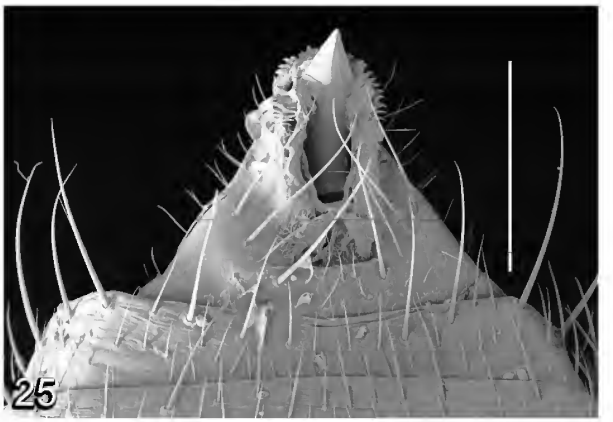
slightly narrowed in medial half, and dilated apical portion with smooth edges; ventral lobes (8th sternite) indistinct; in dissected paratype, 4 spermathecae elongate and wrinkled, spermathecal ducts separate to vagina, much shorter than spermatheca itself; ventral receptacle unrecognizable or absent.

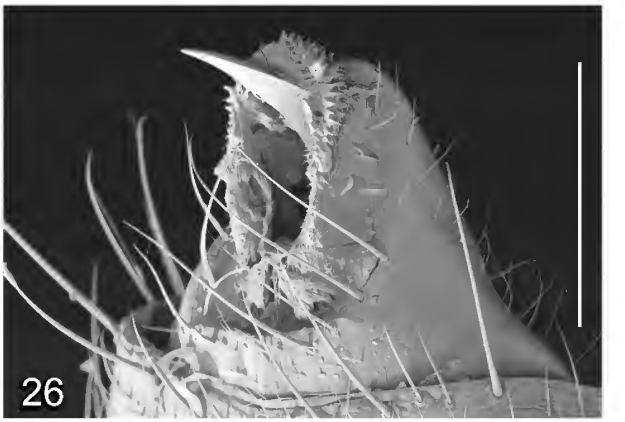
Etymology. The genus name is an anagram of "Australia".











Figs 22–26. *Aliasutra australica* n.sp. (22–23 and 25–26, SEM). *(22)* prosternal region, anterior view (head detached); *(23)* postpronotal lobe, proepisternum and anterior thoracic spiracle; *(24)* wing; 25–26, tergite 6 and ovipositor, dorsal *(25)* and laterodorsal view *(26)*. Scale = 0.5 mm (22–23, 25–26) and 1 mm (24).

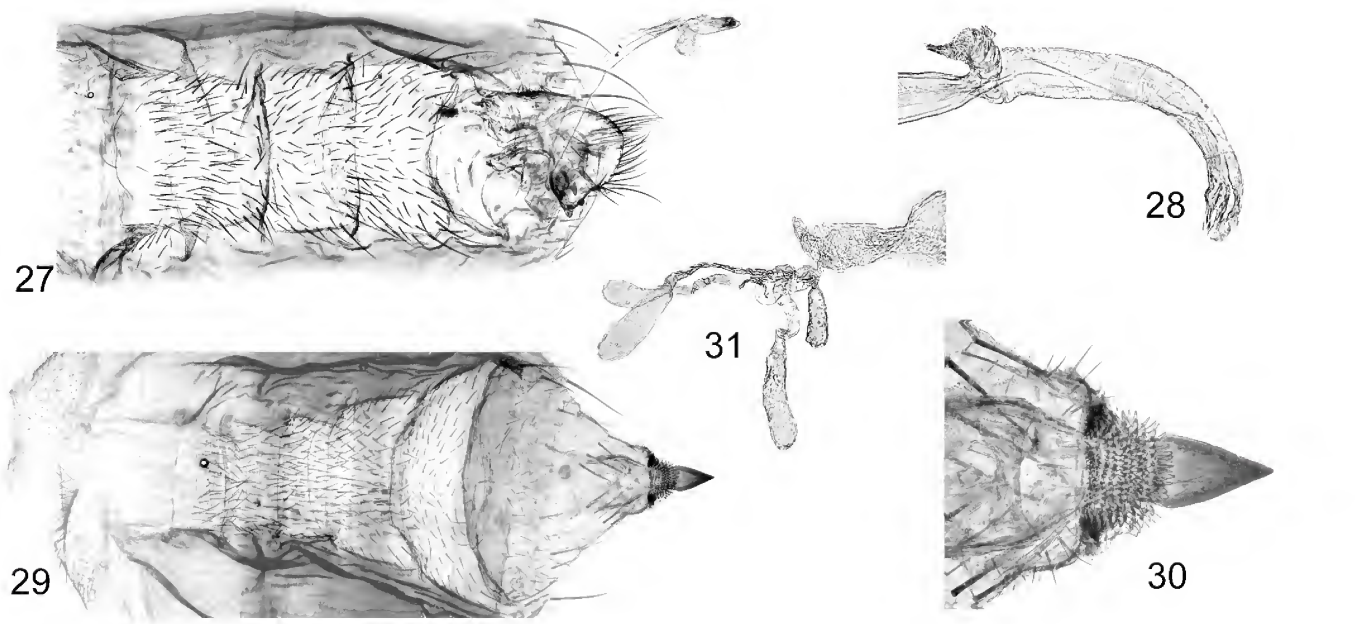
Aliasutra australica n.sp.

Figs 31–43

Material examined. Holotype ♀. Queensland: "3 mi NW Mt. Mowbullan, Bunya Mtns, Qld. 3350' [c. 1020 m], 7–8 Jan. 1970, MV lamp, G.A. Holloway Coll." (AMS K351925). Paratypes. Queensland: 6♂♂, same label data as holotype (1♀ mounted on SEM stub, wings remaining on mount) (AMS, SIZK); 1♂, 2♀♀, Burnett R., Eidsvold, 230' [c. 70 m] 9 Jan. 1970, MV lamp, G.A. Holloway (AMS, SIZK); 3♀♀, Pistol Gap, near Byfield, 23°10'S 150°40'E, 10 Jan. 1970, MV lamp, G.A. Holloway (AMS). New South Wales: 1♂, Goonoo State Forest, 5 km S of Mendooran, 24 Mar. 1971, D.K. McAlpine (SIZK); 1♂, Binnaway State Forest, 31 Mar. 1972, A. & G. Daniels (AMS); 1♀, Wheogo, 13 miles [c. 21 km] E of Dunedoo, 17 Mar. 1963, R. Lossin (AMS); 1♀, Dunedoo, 23 Mar. 1963, R.B. (MNVM).

Diagnosis. Medium-sized reddish-yellow flies with hyaline wings and brownish-black abdomen (sometimes with brown vertex and dorsal portion of occiput and brownish-yellow abdomen).

Description. Head. Reddish yellow, with ocellar triangle usually black, vertex and dorsal portion of occiput often brown; head ratio (length : height : width) = 1:1.1:1.33. Frons 1.1–1.2× as long as wide, black setulose. Two orbital setae on posterior one-fourth of frons, 0.5× as long as medial vertical seta. Eye ratio (height: length) = 1.4–1.5. Parafacial (maximum) : eye length ratio = 0.55; eye : gena height ratio = 0.5. Facial ridge with 2–3 rows of small brown or black



Figs 27–31. *Aliasutra australica* n.sp., male (27–28) and female (29–31). *(27, 29)* abdomen, ventral view; *(28)* phallus glans, enlarged; *(30)* ovipositor, partly everted and compressed, ventral view; *(31)* spermathecae and vagina.

setulae on ventral two-thirds. Antenna short, length less than half height of face; pedicel black setulose; 1st flagellomere short, somewhat narrowed to apex, twice as long as wide and 1.7–1.8× as long as pedicel. Palp yellow, black setulose. Proboscis brown.

Thorax orange to dark brown, mostly nonmicrotrichose. Mesonotum 3.15 mm long, scutum as long as wide at presutural supraalar setae. Scutellum setulose dorsally; apical setae crossed, intermediate setae as long as basal and apical setae. Proepisternum with 6–7 long setae as long as postpronotal setae. Katatergite and anatergite short and sparsely microtrichose; subscutellum and mediotergite bare. Setae black.

Legs. Yellow to brown.

Wing. Entirely hyaline, with yellow veins, 3–3.2× as long as wide, with yellowish stigma. Crossvein r-m at distal 0.6 of cell dm; 2nd costal section (cell c) 3.1× as long as 3rd costal section (stigma) and 0.95× as long as 4th section (cell r1); 2nd section of vein M 1.25× as long as 1st and 3rd section and 0.7× as long as 4th section. Cell bcu with posteroapical lobe much shorter than broadest width of cell.

Abdomen 1.1–1.2× as wide as long. Tergites nonmicrotrichose, black setose, normal in width. Female tergite 6 exposed, 0.5× as long as tergite 5.

Setae and setulae. All black.

Male terminalia. As in Figs 27–28, 32–37.

Female terminalia. As in Figs 25–26 and 30–31. Oviscape 0.55 mm long.

Measurements. Body length 7.5–8.0 mm. Wing length 5.0–6.0 mm.

Etymology. The species name is a New Latin adjective — Australian.

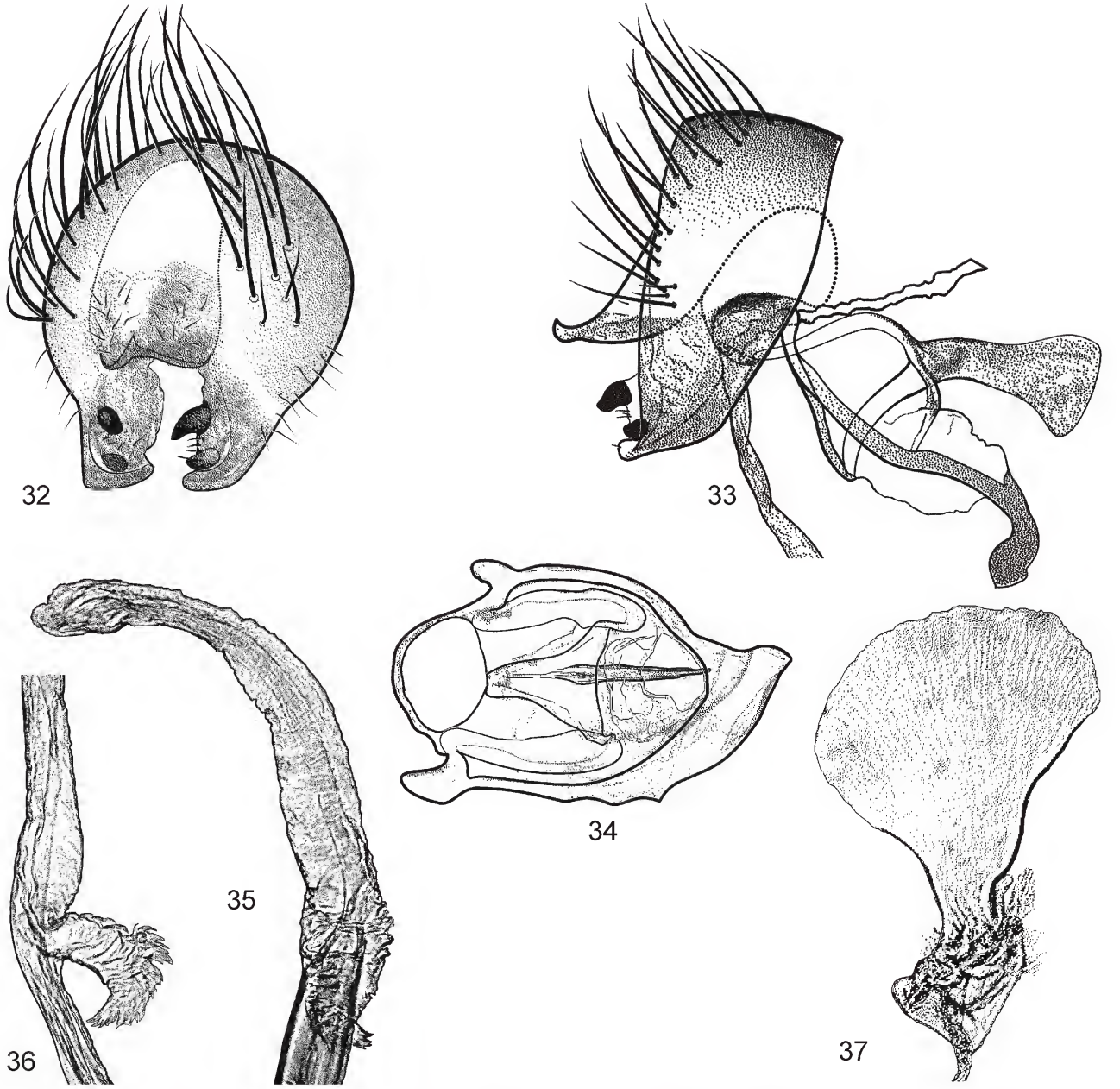
Remarks. The new species superficially reminds flies of the family Pyrgotidae in such characters as the frontal setae lacking, the postocular groove well expressed, the proepisternal setae long and numerous, and the wing mostly hyaline, differing from pyrgotids by the structure of the oviscape (aperture apicodorsal rather than apical).

Systematic position. Phylogenetic relationships in the subfamily and its classification were analysed by Korneyev & Norrbom (2006).

Aliasutra n.gen. belongs in the subfamily Tachiniscinae sharing its much specialised structure of female terminalia (oviscape with dorsoapical aperture, ventrally spinulose eversible membrane, and aculeus shape), which are the synapomorphies of the Tachiniscinae and do not occur anywhere else in the superfamily Tephritoidea. Otherwise, it shows very slight similarity to other genera of the subfamily. Its head shape (high gena, receding face) and the absence of anepimeral projection are similar to *Cyaforma* Wang, *Ortalotrypeta* Hendel, *Neortalotrypeta* Norrbom and *Agnitrena* Korneyev, but polarity of the first two characters is unclear, and the third character is obviously plesiomorphic. As in *Neortalotrypeta*, *Agnitrena* and *Bibundia*, the frontal setae are lacking in *Aliasutra*. The new genus also shares the additional postpronotal setae with *Ortalotrypeta*, *Bibundia* Bischof, *Tachinisca* Kertész, and *Protortalotrypeta* Norrbom.

On the other hand, it shares the short vertical plates with *Tachinisca* and *Protortalotrypeta,* the incomplete costal vein with *Bibundia*, *Tachinisca*, *Tachiniscidia* Malloch, and *Protortalotrypeta*, and the elongate spermathecae and phallus glans with *Bibundia*, *Tachinisca* and *Tachiniscidia* (not examined in the fossil *Protortalotrypeta*). The last 3 characters are the synapomorphies of the tribe Tachiniscini (Korneyev & Norrbom, 2006).

When included in the phylogenetic analysis (see Korneyev & Norrbom [2006] for the matrix and tree), *Aliasutra* takes position of a basal taxon in the tribe Tachiniscini along with the fossil *Protortalotrypeta*, but the polytomy remain unresolved, as the morphological data remain incomplete for the latter genus.



Figs 32–37. *Aliasutra australica* n.sp., male postabdomen. *(32)* epandrium, posterior view; *(33)* epandrium and hypandrium, right view (phallus detached); *(34)* hypandrium, ventral view; *(35)* phallus glans; *(36)* same, basal part, showing lobe of preglans; *(37)* ejaculatory apodeme.

ACKNOWLEDGMENTS. This study resulted from the studies of Australian genera of the family Pyrgotidae supported by Geddes Visiting Collection Fellowship at the Australian Museum (Sydney). I greatly appreciate constant attention to this work and generous assistance by David K. McAlpine, who has collected some of the type specimens and recognized it as a new taxon. He kindly read the manuscript and offered valuable comments and corrections. Suzanne Lindsay carried out scanning electron microscopy and assisted with macro images. Most of the type material was collected by the recently deceased Geoffrey A. Holloway, formerly of the Australian Museum.

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The *Froggattimyia-Anagonia* Genus Group (Diptera: Tachinidae)

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ABSTRACT. The genera here reviewed have in common many morphological attributes, and in both, all species are parasites of the larvae of leaf-eating insects—pergid sawflies for *Froggattimyia* and chrysomelid or curculionid beetles for *Anagonia*. Perhaps significantly, the host larvae themselves show a degree of physical resemblance and all are charged strongly with eucalyptus oil from their foodstuffs. Twelve species are recognized in *Froggattimyia*, the following six are new: *F. carnei, F. coracina, F. macdonaldi, F. woodorum, F. truncata*, and *F. vicina*, one is near *F. hirta* and remains undescribed. Twenty-five species are recognized in *Anagonia*, the following sixteen are new: *A. angustifrons, A. commoni, A. conformis, A. crosskeyi, A. dayi, A. errator, A. latistylus, A. loripes, A. minor, A. norrisi, A. perplexa, A. propinqua, A. similis, A. teratostylus, A. uptoni*, and *A. zentae; F. tillyardi* Malloch is newly combined in *Anagonia*. Most species are so highly variable as to make a classification based on internal structure at best tentative.

COLLESS, DONALD H. 2012. The *Froggattimyia-Anagonia* genus group (Diptera: Tachinidae). *Records of the Australian Museum* 64(3): 167–211.

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† Donald H. Colless, 1922–2012

Introduction

This study began many years ago, when the late Dr Phil Carne needed names for the abundant specimens of *Froggattimyia* Townsend that he was rearing from pergid sawflies. It soon became clear that the few available species-names were not at all certain in their application; also, that the sawfly (Pergidae) parasites had apparently close relatives in another, equally confused, group of species that attack leaf-eating beetle larvae—some species placed in *Froggattimyia*, others in *Anagonia* Brauer & Bergenstamm. Although males in both groups were at least moderately easy to distinguish, females were quite the opposite, and after fruitless attempts to solve that problem, the study was overtaken by other tasks and has since languished. However, my known, long-term interest in these genera (as noted by Crosskey, 1973 and Cantrell, 1988) may have diverted studies by others, so I am now attempting to complete the task.

The *Froggattimyia-Anagonia* genus-group (hereafter simply "group") as used here comprises just the members of those two genera. They have in common all or most of the following (largely distilled from the magisterial "conspectus" of Crosskey, 1973): Blondeliini (prosternum setulose; first postsutural (prealar) seta shorter than first postsutural dorsocentral seta and usually little if at all longer than first intra-alar seta; bend of vein M usually not sharply angled; scutellum with stout, divergent subapical setae, apical setae finer, decussate, or undifferentiated); frons of male markedly narrower than that of female, with at most several enlarged reclinate upper orbital bristles, inner vertical setae more or less parallel, outer vertical setae fine or undifferentiated, and ocellar setae almost always fine or lacking; frons of female broad, with one reclinate and 2 well-developed proclinate orbital bristles, inner and outer vertical bristles (the former inclinate or cruciate, the latter lateroclinate), and ocellar setae well developed; parafacial of both sexes usually haired on at least dorsal quarter, rarely with just a few setulae ventral to last frontal bristle; facial ridge bare, except for the usual few short bristles and setulae immediately above the vibrissae; vibrissae inserted well above level of lower facial margin; postpronotal lobe with line of 3–4 stout bristles; two or three presutural dorsocentral setae and 4 postsutural dorsocentral setae; 3 postsutural intra-alar setae; proepisternum haired; katepisternum typically with 2 anterior bristles (1 stout and 1 fine) and 1 stout posterior one; foretibia with 1–2 posterior *(p)* seta; midtibia with submedian vertical *(v)* seta; hindtibia with anterodorsal *(ad)* bristles forming a regular comb and apical posterodorsal *(pd)* bristle long; abdomen usually with pale areas laterally on the first 1–3 segments in the male, but not in female; tergite 1+2 excavate almost to hind margin; tergite 3 usually with one pair of median marginal bristles and usually lacking discal bristles; *i-m* (= dm-cu) distinctly

closer to bend of M than to *r-m*. Females ovolarviparous, with extensible, tubular ovipositor, segment 6 usually about as long as segment 7; sternite 7 (S7) often modified, with a variously-shaped, sclerotized "egg-guide". Throughout, T9 (ninth tergite) is replaced by *syntergosternite 6–8*.

Within Blondeliini, many of the diagnostic attributes might well be plesiomorphic, and the group therefore paraphyletic. A cladistically more "natural" cluster might result by including (apparently) related genera such as *Paropsivora, Deltomyza, Pilimyia*, and *Zenargomyia*; but for present purposes, and plain convenience, I retain the group as defined above.

Abbreviations. In this work I have used the following abbreviations for institutes:

AM	Australian Museum, Sydney;
BMNH	Natural History Museum, London;
CIE	Commonwealth Institute of Entomology, London;
CNIC	Canadian National Insect Collection, Ottawa;
MV	Museum Victoria, Melbourne;
NSWDA	NSW Department of Agriculture, Orange;
QIMR	Queensland Institute of Medical Research, Brisbane;
QM	Queensland Museum, Brisbane;
SAM	South Australian Museum, Adelaide;
SPHTM	School of Public Health and Tropical Medicine (now in ANIC, see below);
UQIC	University of Queensland Insect Collection, Brisbane [now in QM, *q.v.*];
USNM	National Museum of Natural History, Washington;
WAM	Western Australian Museum, Perth.

For persons, in alphabetic order: *DHC*, D. H. Colless; *IFBC*, I. F. B. Common; *KRN*, K. R. Norris; *MSU*, M. S. Upton; *PBC*, P. B. Carne; and *ZL*, Z. Liepa. For brevity, where the label "Terminalia in tube number" occurs more than once in a list of specimens, I have abbreviated all but the first as *T.t.* I have also not hesitated to abbreviate the names of states where these are self-explanatory.

Type specimens

I have had ready access to all existing type specimens located in overseas museums (BMNH and USNM). The remainder, previously in the School of Public Health and Tropical Medicine, Sydney, have now been relocated to the ANIC, Canberra. For new species, if the number of specimens exceeds 30 I have formally designated a set of paratypes and shown the rest in an abbreviated list of *Other specimens examined*. For less than 30 specimens, all but the holotype are to be taken as paratypes unless specifically excluded.

For already described species, I have of course given details of the provenance of the holotype, but otherwise I have merely given the states from which they have been recorded.

Taxonomic problems

There can be few families of insect as difficult taxonomically as the Tachinidae—to use the phrase of the late S. J. Paramonov, a "family *in statu nascendi*", a currently radiating, evolutionary bush, still largely unpruned. The species treated here follow the familiar pattern, with many morphological characters highly variable within species, but not consistently so across species. Despite continent wide, detailed uniformity in a few quite complex, diagnostic attributes (especially genitalic ones), it is commonly true that individual specimens may lack almost any other feature attributed to them in keys or descriptions; or, the expression of an attribute—such as hairiness of the eye—may vary from conspicuous to barely perceptible. Especially in the keys I have tried to qualify the more variable features with terms such as "usually", etc.; but, even when unqualified, the occasional "defining" attribute may still fail. Indeed, many *Froggattimyia* specimens will scarcely key to the tribe (Blondeliini) in which they are customarily placed. Nonetheless, diagnosis by weight of evidence is normally reliable.

In *Anagonia*, and to a lesser extent in *Froggattimyia*, features of the male terminalia are usually decisive at the species level. For this reason, I have not hesitated to describe several new species on the basis of only a few male specimens. Differences in terminalia are often gross and striking, but may also be quite subtle and appreciated only after considerable study; for instance, in the microsetae on the posterior surface of the male cerci.

Females, on the other hand, pose severe problems of identification and, due to strong sexual dimorphism, of associating with conspecific males. They are generally more robust, with stouter bristles and a more strongly grey-pollinose integument. This is especially true in *Anagonia*; but in both genera there are cases where, for instance, batch rearing has allowed a reasonably certain association of the sexes, yet females of two or more species seem quite indistinguishable. Some sharp groupings can be discerned on the basis of genitalic structure, but in general I have left study of that sex for future workers who may have access to better data.

I should note here that I have followed the practice of describing the type species of a genus in some detail, and other members mainly by their differences from the type species. In some cases, however, I have used some other previously described, very similar species as the standard.

Notes on morphology and characters

Morphological terms generally follow the *Manual of Nearctic Diptera* except for features of the wing venation, where I follow the nomenclature of Colless and D. K. McAlpine (1991). I have used the standard abbreviations for bristles of the legs, but not for those of the thorax. A few special features are noted below:

(a) The centre of the parafacial, as used below, is taken to be the point midway between the level of the vibrissa and that of the base of first flagellomere.

(b) The intrapostalar bristle (J. F. McAlpine, 1981), an important diagnostic feature, lies between the dorsocentral and intra-alar rows of bristles, close to the anteromedial margin of the postalar callus. In poorly preserved specimens, it may appear to lie on the callus itself.

(c) The bristle at the anterior margin of the presutural scutum, in line with the intra-alar bristle, is here treated as the first posthumeral. The presutural intra-alar bristle (when present) lies immediately anterior to the suture.

(d) The presutural dorsocentral bristles are not taken to include the small bristle sometimes present at the extreme anterior margin of the scutum and often concealed by the head.

(e) The postocellar bristles lie on or near the posterior

margin of the ocellar plate. They are noticeably larger and stouter than the other setae that invest the plate (with, of course, the occasional exception of the ocellar setae). A case could be made for calling them "postverticals".

(f) Males typically have one or more pairs of differentiated, relatively stout, reclinate upper orbital bristles dorsal to, and more or less in line with, the inclinate frontal bristles. I am interpreting these as reclinate upper orbital bristles.

(g) The most apical (subcentral) posterodorsal *(pd)* bristle on the hindtibia provides an important character. In descriptions I shall refer to it as *pd1*.

(h) The upper occipital bristles comprise 1–2 rather uneven rows of small bristles immediately behind the more conspicuous postorbital row.

Morphometrics

The potential of morphometric aids to identification and classification was investigated using a canonical set of measurements; these are listed below, together with the abbreviated names used throughout. Distances from a seta are taken from the centre of the basal socket.

Eyh greatest height of eye, measured in frontolateral view;
Frw minimum width of frons, usually just in front of ocelli (especially in females) but sometimes further forwards in *Anagonia* males;
Gnw width of gena, measured from the subcranial pit to the nearest point of the eye margin (the pit is a small depression lying at the junction of facial ridge and epistomal margin, mesad of the more ventral infravibrissal bristles; high power may be needed to locate it; if vestigial, the position is easily approximated by eye);
Hdw head width, measured in facial view;
Ivb distance between vibrissae;
Pd1 length of most apical *pd* bristles on hind tibia;
Sbs distance between basal setae of scutellum;
Sdd distance from apical *pd* to subapical *d* bristle on hind tibia, measured between bases;
Sls distance between basal seta and subapical seta of scutellum;
Ssa distance between subapical setae of scutellum; and
Vb-E distance between vibrissa base and eye margin.

These measurements were chosen in the light of previous experience, and after some preliminary trials, as potential indicators of differences in "shape" of head and scutellum, or *(Pd1)* to represent an obvious qualitative character. *Hdw* was taken to provide a consistent standard of overall size. The set was initially larger, but some characters were removed part way through after Principal Component analysis showed that they were contributing little to the exercise.

Wherever possible each measurement was performed on a set of at least 10 specimens. There was no pretence at random sampling, a notion that hardly applies to material of this kind. Simply, specimens were chosen from as broad a range of sizes and sites as possible. However, several extremely small specimens, presumably resulting from premature pupation, were excluded to avoid clouding the already highly variable statistics. For taxonomic comparisons, the most useful characters were the relative magnitudes of *Ivb, Frw, Eyh, Pd1*, and *Sls*, as expressed in the ratios *Ivb/Vb-E, Hdw/Frw, Eyh/Gnw, Pd1/Sdd*, and *Sbs/Sls*. With such "samples", the only reasonably valid statistic is the observed range; I have, though, also included the mean value in the descriptions.

I should note here that the ratio *Ivb/Vb-E* is strongly correlated with size, as reflected in *HdW*; for means of 16 species r = -0.88, and for 34 specimens in the *A. perplexa* complex, r = -0.85. However, due to its perceptible, subjective effect on head shape, it remains a useful character.

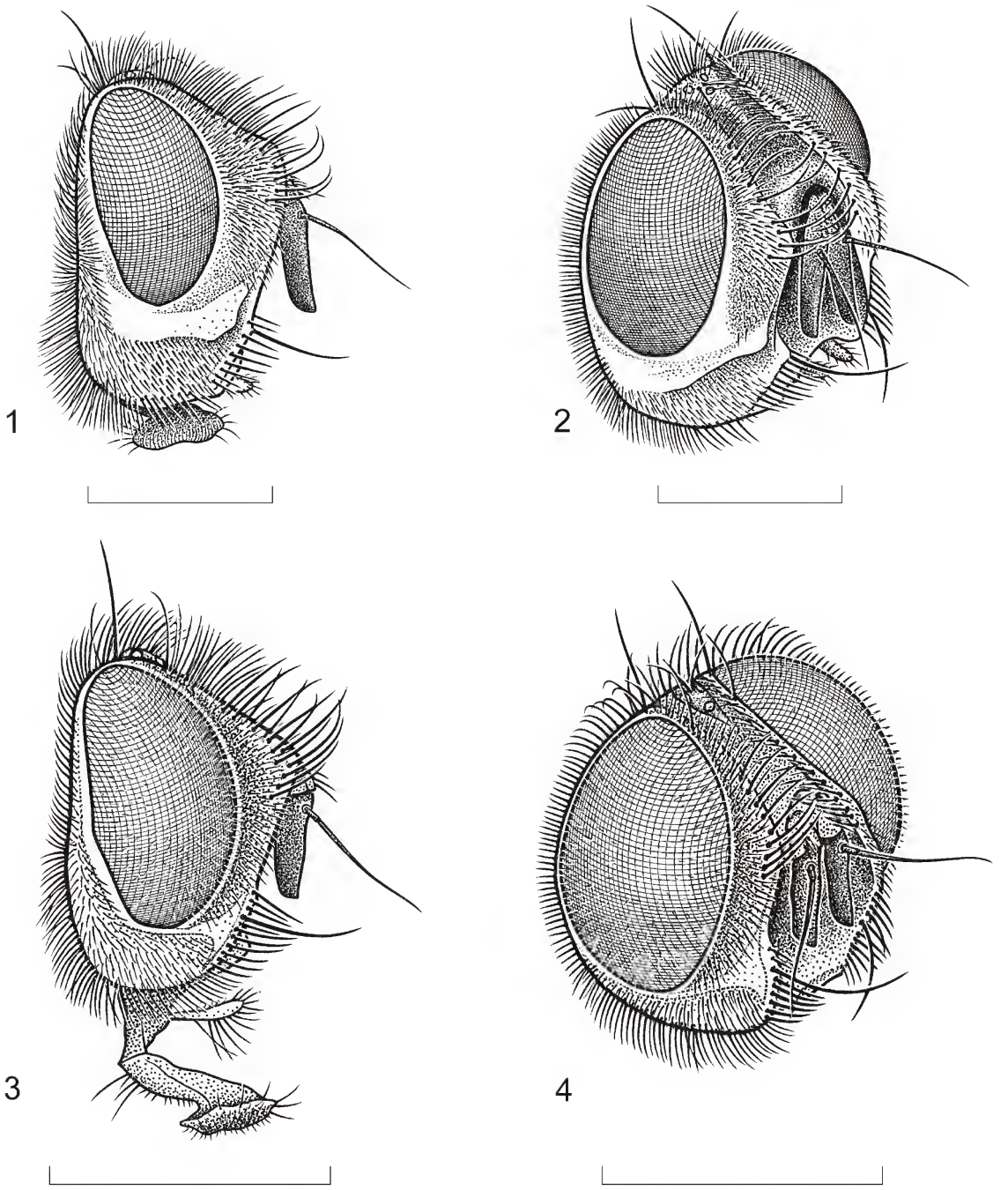
A note on taxonomic methods and concepts

I have followed the "classical" method of first selecting a "study group", in this case based on two easily recognized, very similar and presumably closely related genera, then accumulating specimens identified as belonging to that group from as many sources as possible. In the present case, most came from the ANIC, collected over many years by myself and colleagues. This material was sorted into morphospecies, using for a start the characters provided by previous workers—especially the "Conspectus" of Crosskey (1973). Other characters were added as noticed, until the stage was reached where the material was resolved into clusters that were internally relatively homogeneous, but separated from each other by sharp discontinuities of the kind that is traditionally and reasonably taken to separate "good" species. That is to say that no characters were found that would satisfactorily divide a cluster; and, with stated exceptions (e.g., many females), all specimens could be allocated with fair confidence to one cluster or the other. I call such clusters "basic taxa" (Colless, 2006). They would also seem to qualify as "homeostatic property cluster natural kinds" (Boyd, 1999). However, there are philosophical niceties here, and in any case, I doubt that the term would become popular amongst taxonomists!

These basic taxa, then, represent classical morphospecies, based on the intuitions of an experienced taxonomist. Those intuitions can also be strengthened by details of distribution. In that regard, when very similar specimens come from widely separated localities, it supports their status as comprising a good candidate for a biological species; and when two taxa are both represented in a single locality (sympatric), it makes it likely that they are in fact separate biological species. Such biological data underlie Boyd's (above) logical criterion of homeostasis. All in all, the whole process fits the model of "integrative taxonomy" (Yeates *et al*., 2010) or the broader concept of "inference to the best explanation" (Lipton, 2004).

Also, (again intuitively) a secondary level of clustering was obvious. With only one exception *(F. woodorum)*, all species clearly fell into one or other of two well delineated groups. It was clear that the two previously described genera could usefully be employed there and they were gratefully retained. A case could be made for erecting new genera for some or all of what I have called "species groups", but I see no practical reason for doing so.

The foregoing remarks are prompted by the long-lasting debate over the proper methods for taxonomic research, in which it is too often forgotten that it all starts from operations like those described above. It would be nice to check a molecular barcode on all our specimens; but we have first to delineate a study group! Otherwise, our resources may be dissipated in applying barcodes to, say, several million,



Figs 1–4. Head views of males of *Froggattimyia wentworthi* and *Anagonia rufipes. Froggattimyia wentworthi (1)* lateral, and *(2)* frontolateral views. *Anagonia rufipes (3)* lateral, and *(4)* frontolateral views. Scale bars = 2.0 mm.

randomly chosen specimens of the Australian bushfly! Intuitive alpha-taxonomy provides the basic ground in which we find our study groups; and its "good" species provide the basic hypotheses that are testable using more "high-tech." methods (Colless, 2006).

That said, experience suggests that studies at the genomic level might uncover further diversity within species such as *Froggattimyia hirta, Anagonia rufifacies*, and *A. tillyardi*, revealing "genuine" species that exhibit little or no morphological divergence. However, such studies are beyond my present resources, and, although common enough in the medically important Culicidae and Simuliidae, their application to the present genera seems unlikely in the foreseeable future.

It will be noticed that I have not attempted to provide a formal phylogenetic study. This would, in my opinion, be premature in the present state of our knowledge of these highly variable species. The most that seems appropriate is the arrangement in "species groups", of which some or most are probably monophyletic.

Diagnoses of genera

With all or most of the following attributes:

(a) larger species, head width usually >3.5 mm (almost always >3.0 mm); *(b)* eye (Fig. 1) relatively small, its lower margin at best level with, usually clearly above level of vibrissa, and gena correspondingly broad, ratio *Eyh/Gnw* no more than 2.2 (except in *F. woodorum*); *(c)* vibrissae relatively close together, *Ivb/Vb-E* 0.6–0.9 (except in *F. woodorum* with 1.1); *(d)* reclinate upper orbital bristles scarcely or not at all differentiated; *(e)* parafacial usually not setulose over its entire length (except in *F. hirta* group); *(f)* eye bare; *(g)* scutum usually without presutural median dark vitta; *(h)* numerous pale hairs on pleuron and/or abdomen (*wentworthi* group only); *(i)* tegula often pale brown, basicosta pale golden (darker in *aurea* group); *(j)* femora at least partly pale (except in *F. coracina*); *(k)* male sometimes with stout spines anteriorly at centre of midfemur; *(l)* forefemur of male with apical *ad* spine much finer than adjacent *d* spine and c. 0.4–0.6 its length; in female, *ad* spine rather stouter and longer, c. 0.75 as long as the *d* spine; *(m)* midtibia of male usually with only the stout, subcentral *ad*, rarely with smaller more basal ones (except in *F. hirta*); *(n)* intrapostalar bristle clearly differentiated; *(o)* scutellum with apical bristles well developed, almost as long and stout as adjacent subapical discal bristles, horizontal, and usually crossed (except in *hirta* group and perhaps in *F. woodorum*); *(p)* abdomen with pale dorsal pollinosity on tergites 3 and 4 interrupted at most by central narrow dark vitta (except in *F. carnei*); *(q)* female with mostly fine hairs, often recumbent, on disc of tergite 5; *(r)* ovipositor finely sclerotized, sternite 7 scoop-shaped; *(s)* parasitising larvae of pergid sawflies

..... *Froggattimyia*

With all or most of the following attributes:

(a) smaller species, head width usually < 3.5 mm (always <3.8 mm); *(b)* eye relatively large, its lower margin usually well below level of vibrissa (Fig. 4), ratio *Eyh/Gnw* usually much more than 2.2 (except rarely in *A. anguliventris* and *A. lasiophthalma*); *(c)* vibrissae relatively far apart, *Ivb/Vb-E* usually ≥ 1.0 (often > 1.2); *(d)* one or more pairs of reclinate upper orbital bristles usually clearly differentiated; *(e)* parafacial setulose over its entire length (in most males and some females, profusely so); *(f)* eye clearly haired in a few species only; *(g)* scutum usually with presutural median dark vitta; *(h)* bristles and finer setae on pleuron and abdomen all dark (setae on anepisternum in some females only); *(i)* tegula usually dark brown to black, basicosta paler brown; *(j)* femora all dark or very narrowly pale at apices (except in female *A. lasiophthalma*); *(k)* male without stout spines anteriorly at centre of midfemur; *(l)* in some species, both sexes with subapical *ad* spine of foretibia only slightly or not at all smaller than *d* spine; *(m)* in males of many species, midtibia with 1–2 smaller *ad* bristles basal to large subcentral one; *(n)* intrapostalar bristle often not differentiated; *(o)* scutellum with apical bristles fine, often barely differentiated, and usually parallel and/or upcurved; *(p)* abdomen with pale pollinosity of tergite 3 and tergite 4 also interrupted by brown or black sublateral triangles, often coalesced into broad, apical dark bands (may be absent in [some?] females [or of some species?]; *(q)* female with mostly stout, erect, sometimes spiny bristles on disc of tergite 5; *(r)* ovipositor usually well sclerotized, sternite 7 often forming a stout "piercer"; *(s)* parasitising larvae of leaf-eating chrysomelid and curculionid beetles

..... *Anagonia*

As suggested by the foregoing diagnoses, the problem species comprise *F. woodorum* (which is poorly known), the *hirta* group and *A. lasiophthalma*. *Froggattimyia coracina* is the most poorly characterized (by non-genitalic characters: the male terminalia place it immediately in the *F. hirta* group), but the small eye is diagnostic. For the others, the weight of evidence will give an accurate identification in every case known to me.

Genus *Froggattimyia*

Froggattimyia Townsend, 1916:155. Type species *F. hirta* Townsend, by original designation.
Protomeigenia Townsend, 1916:156. Type species *P. aurea* Townsend, by original designation. Synonymy by Crosskey, 1966:97.

The diagnosis is given in the foregoing key.

Key to males of genus *Froggattimyia*

1 Wing base conspicuously golden-yellow, the colour involving both membrane and veins and extending at least to apices of cells h, m, and cu1a; scutellum and most of its setulae also golden-yellow, forming, with the wing bases, a conspicuous golden, transverse band, clearly visible to the naked eye. Pollen of head and most pleural setae bright orange-yellow. Abdomen dark, the lateral pale areas of tergites 3 and 4 dusky; pollen of tergites 3 and 4 largely confined to median triangles; tergite 5 completely, and conspicuously, pale ashen pollinose ..... *F. carnei* sp. nov.

—— Body without such colour pattern, much less conspicuously marked. Scutellum at most dull brown, usually dark brown. Head pollinosity and pleural setae pale golden or the latter dark. Abdomen paler; tergites 3 and 4 extensively pollinose, tergite 5 therefore not conspicuously different from more anterior tergites 2

2 Legs, including coxae, and all pleural sclerites and hairs uniformly dark. Parafacial fully dark-setulose. Scutellum with apical setae fine, scarcely differentiated. Abdominal tergite 3 (?usually) without differentiated submedian bristles ..... *F. coracina* sp. nov.

—— Legs at least partly pale. Other attributes usually different 3

3 Postpronotal lobe with pale brown ground colour and often a similar transverse band across presutural area of scutum; pleuron often with extensive areas of pale ground colour across anepisternum, anepimeron, and upper katepisternum. Scutellum usually with apical bristles not differentiated, or small and fine, scarcely larger than adjacent setulae. Parafacial entirely or almost entirely setulose, bare on at most a narrow strip along the eye margin. Abdominal syntergite 1+2 and tergite 3 only rarely with differentiated submedian [?median marginal—see general comments] bristles. Legs often with extensive dark areas. Terminalia as in Figs 20–22 4

—— Postpronotal lobe, presutural area of scutum, and almost all of pleuron with dark ground colour. Scutellum almost always with well differentiated apical bristles, only a little smaller than preapical bristles. At least one, usually both, of abdominal syntergite 1+2 and tergite 3 with clearly differentiated pair of submedian marginal bristles. If legs with extensive dark markings, then parafacial setulose on dorsal half only. Terminalia various 5

4 Coxae mainly dark, femora with about basal 40–60% dark. Pleural sclerites and hairs extensively dark ..... *F. hirta* Townsend, *dark form*

—— Coxae mainly (usually entirely) pale, femora with at most a trace of darkening at base. Pleural sclerites and hairs usually extensively pale ..... *F. hirta* Townsend, *pale form*

5 Pleuron with pale hairs except on part or all of anepisternum. Legs without extensive dark markings. Abdominal tergite 4 often with pale setulae on ventrolateral areas 6

—— Pleural hairs all dark. Legs usually with extensive dark areas on at least forefemur. Abdominal tergite 4 with dark setulae on ventrolateral areas 9

6 Reclinate upper orbital bristles not at all differentiated from adjacent setae along narrowest part of the frontal vitta, immediately in front of anterior ocellus. Parafacial setulae usually extending well on to ventral half of sclerite. Gena usually with mainly dark setulae. Dorsum of abdomen usually golden pollinose, especially on tergite 5. Abdominal tergite 4 with mainly pale setulae on ventrolateral areas. Midfemur usually with 1–4 stout bristles near centre of anterior surface. Cerci relatively short and stout, in lateral view apices tapering abruptly, nipple-like, slightly surpassed by apices of the surstyli; surstylus obliquely truncated in lateral view, in posterior view with apical part curved outwards; syntergosternite 6–8 relatively short and stout, its posterior margin steeply declivitous (Figs 5–7) ..... *F. wentworthi* Malloch

—— Reclinate upper frontal bristles clearly distinguishable by stoutness of bristle and/or its socket over the narrowest part of the frons, between the eyes, often extending to level of anterior ocellus and sometimes terminating in a distinct prevertical bristle. Parafacial setulae sometimes confined to dorsal half of sclerite, or scarcely reaching past its centre. Gena sometimes with mainly pale setulae. Abdomen with silver or grey pollen dorsally.

Abdominal tergite 4 sometimes with mainly dark setulae on lateroventral areas. Midfemur sometimes without usual anterior group of stout bristles; syntergosternite 6–8 more rounded (except in *F. icholsoni*) 7

7 Parafacial setulae extending well on to ventral half of sclerite. Terminalia more or less identical with those of *F. wentworthi* ..... *F. nicholsoni* Malloch

—— Parafacial with setulae confined to dorsal half or scarcely extending to ventral half; syntergosternite 6–8 relatively long, its posterior margin gently sloping 8

8 Cerci short and stout, as in *F. wentworthi* ..... *F. fergusoni* Malloch

—— Cerci relatively long and narrow, their apices at least level with, and usually surpassing those of surstyli (Figs 8–12) ..... *F. vicina* sp. nov.

9 Apex of syncercus blunt, curved distally (or dorsally). Surstylus shorter than height of epandrium (Figs 16–19) 10

—— Apex of syncercus sharply pointed, straight or curved anteriorly (or proximally). Surstylus as long as, or longer than, height of epandrium (Figs 14, 15, 75) 11

10 Apex of cercus, in posterior view, broad and truncate ..... *F. truncata* sp. nov.

—— Apex of cercus, in posterior view, sharply pointed and curved anteriorly ..... *F. woodorum* sp. nov.

11 Apex of surstylus sharply pointed and curved anteriorly (or ventrally) (Fig. 14) ..... *F. aurea* (Townsend)

—— Apex of surstylus straight and rounded apically (Fig. 75) ..... *F. macdonaldi* sp. nov.

Froggattimyia wentworthi species group

I use this term to designate a set of 6 species that are closely similar structurally, to an extent that leaves their taxonomy still somewhat uncertain. All have yellow legs, pale pleural bristles (except for a small patch of dark ones on the anepisternum), and generally similar terminalia. One *(F. carnei)* has, inter alia, a very distinctive colour pattern in both sexes, but the others are reliably identified only as males. *Froggattimyia wentworthi* has a characteristic reduction of the reclinate upper orbital bristles; but dissection of the terminalia is desirable for this species and essential for the others. Females with extensive setulae on the parafacials and golden pollinosity on tergite 5 are likely to be *wentworthi* or *nicholsoni*, but those with reduced setulae and grey pollinosity on tergite 5 may be either *fergusoni* or *vicina*. If the parafacial setulosity is very reduced, completely confined to the dorsal half of the sclerite, *vicina* is the more likely (but see *F. aurea* below).

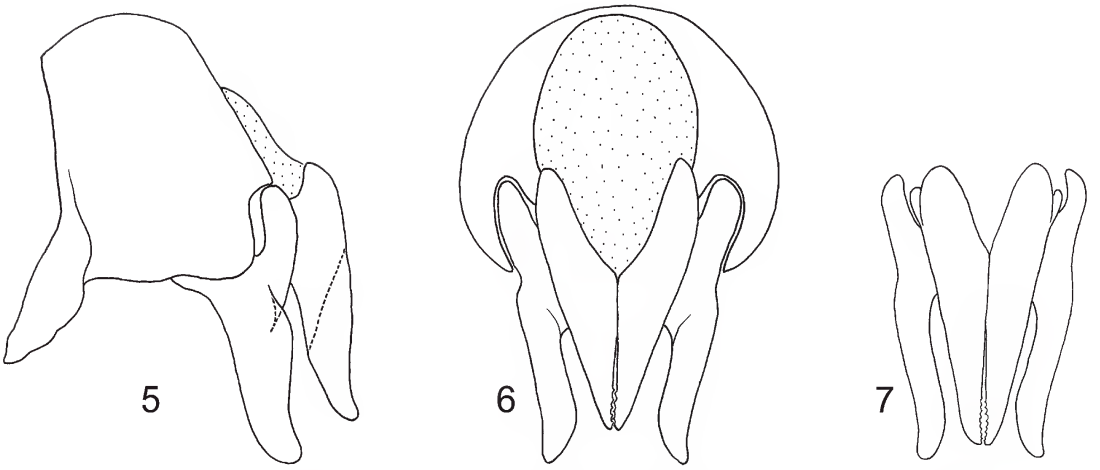
Froggattimyia wentworthi Malloch

Figs 1, 2, 5–7

Froggattimyia wentworthi Malloch, 1934:3–4.

Type. *Holotype* male in ANIC, Wentworth Falls, NSW.

Male. *Head* (Figs 1, 2): Width 3.6–4.4, mean 4.02 mm., approximately 4 times as wide as frons; *Gnw/Eyh* 0.5–0.6, mean 0.53; *Ivb/Vb-E* = 0.7–0.9, mean 0.8. Ground colour pale brown anteriorly and ventrally, dark brown to black on occiput and dorsally on fronto-orbital plate. Anterior surfaces with golden to pale golden pollinosity, except for thinner, silver pollen on face; silvery to very pale golden pollen on postorbits dorsally and silver-grey on occiput. Scape pale brown with a row of minute setulae; pedicel pale brown with pale grey pollen in appropriate light and usual cluster of short spines and setulae; first flagellomere pale brown basally, darkened to a varying degree along dorsal (anterior) margin and across apex; aristomere 3 pale brown on most of the swollen basal portion. Mouthparts pale brown. Inner vertical bristles well developed, slightly inclinate in facial view, somewhat reclinate in lateral view; outer vertical bristles at most finely or (usually) not at all differentiated; ocellar seta fine, sometimes lacking, but usually clearly differentiated; postocellar setae 2–6 (usually more than 2). Reclinate upper orbital bristles not clearly differentiated from adjacent bristles along narrowed part of interfrons, between eyes and immediately in front of ocellar triangle, but 1 or more pairs of reclinate upper orbital bristles sometimes differentiated, standing in line with upper frontal bristles. Vertex, frons, and parafacial with black hairs and setulae. Parafacial setulose to at least centre and usually with at least a few scattered setulae on ventral half; sometimes almost completely setulose and/or with a detached cluster of tiny setulae at ventrolateral angle, near eye. Genae with at least a few (usually mainly) dark setulae on anterior, convex portion, becoming orange-brown on ventral areas. Gular, postgular, and occipital areas with pale brown to orange hairs and setulae. Postocular strip with 1–2 rows of dark hairs.



Figs 5–7. *Froggattimyia wentworthi*, male terminalia, *(5)* lateral, and *(6, 7)* posterior views.

Thorax. Dorsally, ground colour mainly black, with silver-grey dusting except on 2 pairs of narrow vittae, interrupted at the suture, one between dorsocentral and acrostichal rows of bristles, reaching to about the level of second postsutural dorsocentral, the other between dorsocentral and intra-alar rows, reaching almost to scutellum; sometimes a short median postsutural vitta as well. However, ventral half of anterior pronotum with pale dusting, and postalar callus with brown ground colour. Bristles and setulae dark, except for pale brown hairs on ventral half of pronotum and sometimes at sides of scutellum. Postpronotal bristles 3–4 in a row; presutural dorsocentral bristles 3 (rarely 2 or 4) + 4 postsutural bristles (rarely 5); acrostichal bristles 3 + 3 (rarely 4); intra-alar bristles typically with 1 presutural (usually rather fine, occasionally out of line or missing) and 3 postsuturals, the first occasionally missing; also, 2–3 posthumeral bristles, a stout presutural, and 2 (rarely 3) notopleural bristles; first postsutural supra-alar (prealar) seta rather larger than first postsutural intra-alar but smaller than first postsutural dorsocentral. Intrapostalar bristle well developed, about as large as first postsutural dorsocentral. Scutellum with dull brown to dark brown ground colour, and grey dusting visible at a viewing angle of about 45°; the usual basal, lateral, discal (1 or 2), and subapical pairs of bristles present, the latter strongly divergent; apical pair usually well developed and decussate, only a little smaller than the discals. Laterally, pleuron with mostly dark brown ground colour and silver-grey pollinose. Larger bristles mostly black, finer hairs and setulae pale brown or golden, except for a patch of fine black hairs dorsally on anepisternum; the fine hairs mostly with crinkly tips. 1–2 stout upcurved proepisternal bristles and 1–3 similar proepimeral bristles; katepisternum with 1 large and 1 small anterior bristle (the latter rarely missing) and 1 stout posterior; 1 large and several smaller anepimeral bristles; and a linear group of about 6–10 quite long but slender meral bristles, variously dark or pale, with a considerable number of associated pale hairs; katepimeron haired.

Legs. Entirely pale brown except for occasional darkening around bases of femora. Bristles and setulae black, except for some golden ones on coxae and trochanters and to a varying extent posteriorly on all femora. Forefemur with conspicuous *d, pd*, and *pv* rows of long stout hairs; foretibia with 1–2 *p* bristles and occasionally 1–2 *pd*, also a row of small, barely differentiated, spiny *ad* bristles on about the basal half, and *pv, d* and *ad* preapical bristles, the first 2 stout but the last much smaller, often scarcely differentiated. Midfemur usually with a stout spine anteriorly near centre (absent in about 10% of specimens), 2–3 preapical *pd* of graded lengths, and *pv* row of stout bristles; about 10% of specimens also with 1–3 stout hairs differentiated in a sub-basal *av* row; midtibia with stout *ad* and *v* near centre (rarely with 1–2 smaller, more basal *ad*) and 2–3 *p* or *pd* bristles; also preapical *ad* and *pd* and about 6 apicals of various lengths, the *av* and *pv* usually the stoutest. Hindfemur with *ad* row of long hairs, an *av* row usually with a distinct "gap" past centre, and a *pv* row on basal half only; hindtibia with conspicuous, comb-like row of short, rather spiny *ad* bristles, including 1 longer one near centre; also 1 stout and 0–3 smaller *av*, 1 stout and 1–2 smaller *pd*, 1 stout preapical *d*, 1 shorter but stout preapical *ad* and an apical *av* spine; *Pd1/Sdd* 0.7–1.1, mean 0.53.

Wing. Membrane tinged with brown across a broad area at base, covering basal cells and extending through costal and subcostal cells and faintly along vein R2+3; veins pale brown to brown over most of their length, darkening apically; tegula and basicosta typically pale brown (occasionally mid brown), the latter paler than the former. Swollen base of vein R4+5 with 1–6 setulae dorsally, 1–5 ventrally. Costa setulose ventrally to apex of Sc. Crossvein r-m near centre of discal cell; vein M1+2 from i-m to bend a little shorter than or equal to i-m, but much longer than from bend to wing margin; bend rather sharply angled for a blondeliine. Calypters greyish to cream or pale gold, margins white to gold, with a tuft of pale golden, crinkly hairs at their external junction; lower calypter with posterior margin gently curved, its internal angle closely abutting scutellum.

Abdomen. All tergites black in ground colour, syntergite 1+2, and tergites 3 and 4, with lateral reddish brown areas that cover about 50% of the disc in both dorsal and ventral views, extending variably on to tergite 5. Tergites with silver to golden pollen, tending to become more golden on posterior segments, but absent on a narrow dark median vitta over most or all of tergites 3 and 4, and sometimes tergite 5. A pair of

median submarginal bristles (rarely with 1–2 supplementary bristles) almost always present on both syntergite 1+2 and tergite 3. Sternite 4 black with black hairs, other sternites scarcely visible. Hairs and setulae all black on dorsum, except for occasional pale ones on tergite 5; ventrally, pale brown or golden, except along margins of tergites, variably on disc of tergite 5, and on sternites 3 and 4.

Terminalia (Figs 5–7). Ground colour pale brown. In lateral view, surstyli with apices slightly surpassing those of cerci, somewhat variable in shape, but usually digitate with rounded apex, often slightly curved in a posterior direction; cerci of a similar shape. In posterior view, surstyli with their apices slightly curved outwards; cerci separated basally by a rather broad, V-shaped notch; apex with a short row of medial teeth.

Female. Similar to male, differing essentially as follows: *Head* width 4.0–4.4, mean 4.13 mm; approximately 3 times as wide as frons. Anterior surfaces with golden pollen, except on face. Outer vertical bristles and ocellar bristles well developed, as are 2 stout proclinate orbital and 1 reclinate or lateroclinate (prevertical) bristles; anterior proclinate bristle rarely (c. 1%) absent on one side; reclinate upper orbital bristles usually rather fine and irregular, more clearly differentiated than in male, but still rather distinctive. More ventral parafacial setulae usually pale. Genal setulae usually all or almost all pale. Scutellum with more conspicuous pale grey or milky pollinosity; setulae all dark above but sometimes pale laterally at base and/or ventrolaterally. Foretibia with spiny bristles in *ad* row much more prominent and of graded lengths. Midfemur with 2–9 spiny bristles of various sizes anteriorly near centre, and 1–3 stout *av* hairs towards base; midtibia with 1–2 smaller *ad* bristle basal to the large, stout one. Hindtibia with spines in *ad* row sparser and longer, and usually with 2 longer members. Wing with up to 8 setulae on base of vein Rs. Abdomen usually all dark in dorsal view except for a pale area, of variable extent, at apex of tergite 5; in ventral view mainly dark, except for posterior apical bands on tergites, sometimes with pale areas of variable extent laterally on the tergites; visible sternites (usually just sternite 5) pale brown; pollinosity, especially on tergite 5, bright to pale golden, narrow median dark vitta barely or not at all represented.

Terminalia. Forming an extensible tube about 1.5 times as long as tergite 5; segment 6 very finely sclerotized, but setose on apical half; segment 7 rather more heavily sclerotized, tergite 7 consisting of a pair of narrow hemitergites, sternite 7 a simple scoop-like structure with rounded apex.

Distribution. Qld, NSW, ACT, Vic., Tas, and WA; no doubt in SA also.

Biology. My abundant material of *F. wentworthi* has one most striking feature: the great majority of specimens have been reared. In my experience this is most unusual in Tachinidae, which are commonly taken also at light, in traps, or by hand-netting—as, indeed, is the case with the closely related *F. vicina* sp. nov. (but not other members of the group, which resemble *wentworthi* in this respect). I see no obvious reason for this phenomenon. It may be fortuitous: Dr Monty Wood has recently netted several specimens by "hilltopping". For *F. wentworthi*, the host in every case is a pergid sawfly—especially *Perga affinis* Kirby, but also *Pergagrapta polita* (Leach), *Pergagrapta bella* (Newman), *Pergagrapta gravenhorstii* (Westwood), *Pergagrapta spinolae* (Westwood), *Perga dorsalis* Leach, and *Pseudoperga* sp.

Field observations of *F. wentworthi* by Dr Carne and (especially) Mr M. F. Leask (all in MSS) state that the adult fly lays an egg in a skin-fold on the mature sawfly larva, by protruding its ovipositor forward ventrally between its legs to a quite remarkable distance, swaying back and forth to avoid the violent strokes of the host's abdomen. Eventually, the ovipositor makes contact and an egg is laid. This account is difficult to reconcile with the length of the ovipositor in dissections; while obviously extensile to some degree, it seems unlikely to attain even the length of the abdomen. Such behaviour would be possible for some species of *Anagonia*, but these observers would hardly mistake a chrysomelid larva for that of a sawfly. I am unable to explain the apparent discrepancy.

In the laboratory, the fly emerges from the host cocoon usually after some 3–5 months; but as few as 2 months, and as many as 10, have been recorded.

Notes. Malloch's holotype of *wentworthi* is very well preserved, and seems clearly conspecific with the species just described. However, it has one remarkable idiosyncrasy: both hindtibiae lack the preapical *ad* bristle. In several hundred specimens of what I am here calling *F. wentworthi*, I have seen only one similar specimen. I have to conclude that Malloch's unique specimen was, by a remarkable coincidence, an extremely rare variant.

Froggattimyia nicholsoni Malloch

Froggattimyia nicholsoni Malloch, 1934:5.

Type. *Holotype* male in ANIC, Lindfield, NSW (published as "Sydney").

Extremely similar to *F. wentworthi*, and possibly only a variant of that species; male differing principally in having the reclinate upper orbital bristles moderately well differentiated—distinctly more so than is usual in *wentworthi*, but less than in *F. fergusoni* Malloch and *F. vicina* sp. nov. Also, abdominal dorsum with grey, rather than golden pollen (but this sometimes true of *wentworthi*). Terminalia within the range of *wentworthi* in the shapes of syntergosternite 6–8, cerci and surstyli.

The female has not been distinguished, and is presumably identical with that of *wentworthi*.

Distribution. NSW, Vic., WA; no doubt in SA as well.

Biology. Bred from "sawfly larvae", some identified as *Perga* species.

Notes. I am strongly tempted to synonymize this species with *F. wentworthi*, but have taken a more cautious path following Malloch who separated the two species albeit on different grounds. All but the type were reared from sawfly larvae or cocoon masses, including *Perga* sp. and *Pergagrapta turneri* Bens.

Froggattimyia fergusoni Malloch

Froggattimyia fergusoni Malloch, 1934:4–5.

Type. *Holotype* male in ANIC, Wyalkatchem, WA.

Also very similar to *F. wentworthi*, but the male with strongly differentiated reclinate upper orbital bristles; parafacial often with setulae more or less confined to dorsal half. Terminalia with syntergosternite 6–8 rather longer, with less steeply sloping posterior margin (but not as marked as in the next species, *F. vicina* sp. nov.); surstyli in posterior view more or less straight or incurved.

Females associated with identified males are barely separable from those of *wentworthi*. The setulosity of the parafacial is rather reduced in some specimens, but the difference is hardly striking. However, with more and better identified specimens, the blue-grey pollinosity of the tergites (and especially tergite 5) may prove useful to separate this species from *wentworthi*, but not from other *Froggattimyia* spp.

Distribution. WA and SA; one doubtful record from NSW.

Biology. All but two specimens were reared from larvae of unidentified species of pergid sawfly.

Notes. With additional material, Malloch's characters for differentiating this species no longer hold. In particular, his type specimen has an abnormally broad parafacial and unusually narrow median dark stripe on the abdomen. However, I am fairly sure that this is a good species and that it includes the holotype.

Froggattimyia vicina sp. nov.

Figs 8–12

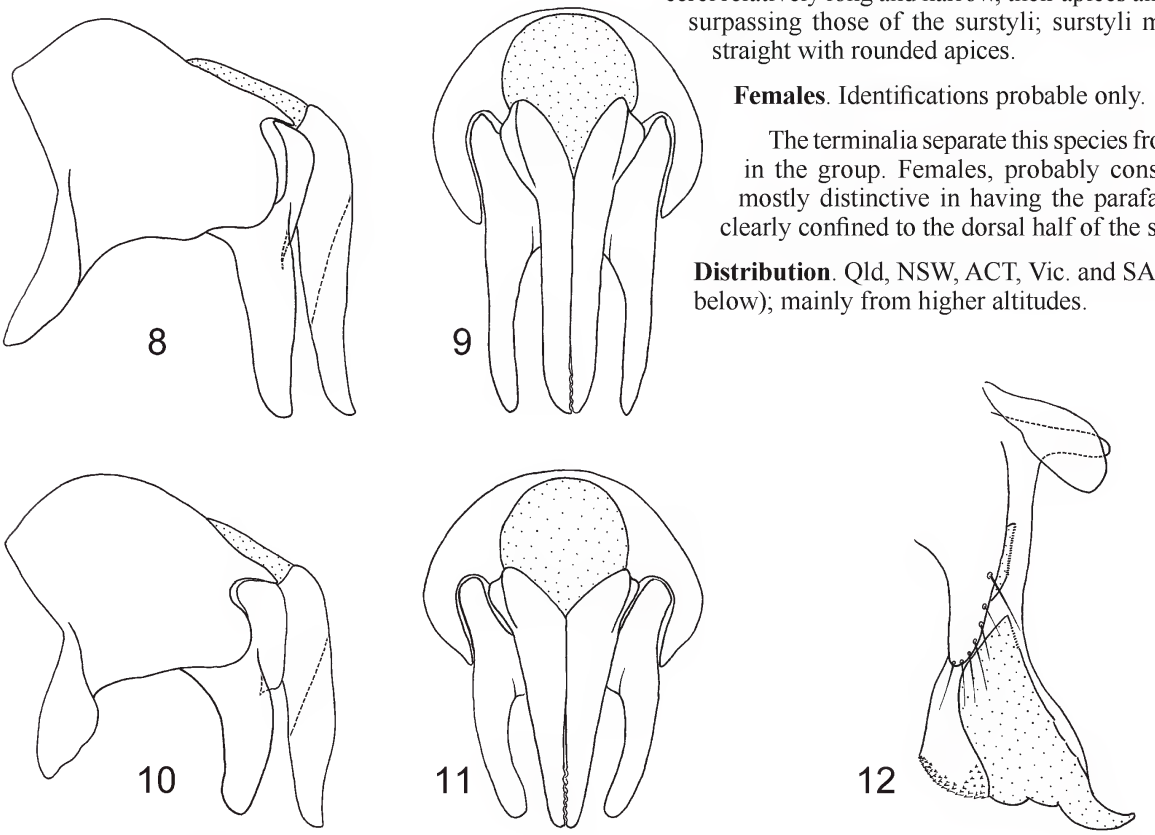
Types. *Holotype* male in ANIC no. 29-029374; Bendora, ACT, 5 Feb. 1952, Z. Liepa. Terminalia in tube 267. *Paratypes* (all males).—*Australian Capital Territory:* Black Mtn, light trap (3 specs.), 19 Dec. 1961, IFBC, T.t. 269; 31 Dec. 1965, IFBC, T.t., 249; 9 Apr. 1969, IFBC, T.t. 411; 3 mi N of Mt. Coree, 3000 ft., 13 Mar. 1967, IFBC.—*New South Wales:* Tubrabucca Ck, Barrington Tops, 4200 ft., 8 Jan. 1956, IFBC, T.t. 271; 4 specs., all NSW, bulked from different sites, ex culture (3, 9, 16, 16), 14 Apr. 1959, T.t. (4, 5, 12, 312), ex *Perga affinis affinis* (Hym.); Tooloom, 30 Oct. 1961, IFBC, T.t. 278; Springwood, coll. 2–4 Apr. 1983, K. Whitfield, ex pergid larva, T.t. 2041 (NSWDA); Ingold's Knob, Kioloa State Fst., 10 Jan. 1986, site 5, KRN, T.t. 2062.—*Victoria:* Warrandyte, 1 Dec. 1925, G. F. Hill, T.t. 268; Ferntree Gully, 22 Jun. 1932, b., A. N. Burns (MV); bred from larvae, 28 Mar. 1958, No. 570. Clunes, M. F. Leask, BMNH, T.t. 311; the same but T.t. 282; the same but 4 Apr. 1958, no. 485, T.t. 280.—*Tasmania(?):* parasite from sawfly larvae, K. Is. Nov. 1949, A.N.B. (MV); the same but from sawfly pupae, T.t. 2104.—*Queensland:* Mt. Crosby, 12 Nov. 1964, G. B. Monteith, T.t. 410; Millstream Falls, W of Ravenshoe, 25 Jun. 1971, E. F. Riek.

Male. Very similar to *F. fergusoni*; male with upper reclinate upper orbital bristles strongly differentiated and parafacial often (but not always) setulose on upper halves only. Parafacial usually somewhat broader, *Ivb/Vb-E* 0.6–0.7, mean 0.7. Terminalia (Figs 8–12, distinctive: syntergosternite 6–8 relatively long, with gently sloping posterior margin, cerci relatively long and narrow, their apices almost always surpassing those of the surstyli; surstyli more or less straight with rounded apices.

Females. Identifications probable only.

The terminalia separate this species from all others in the group. Females, probably conspecific, are mostly distinctive in having the parafacial setulae clearly confined to the dorsal half of the sclerite.

Distribution. Qld, NSW, ACT, Vic. and SA or Tas. (see below); mainly from higher altitudes.



Figs 8–12. *Froggattimyia vicina* sp. nov., male terminalia. Holotype *(8)* lateral, and *(9)* posterior views. Paratype *(10)* lateral, and *(11)* posterior views; *(12)* paratype aedeagus.

Biology. Differs from others in the group in that many (10/23) specimens were captured as adults; others were reared from *Perga affinis, Pseudoperga* sp., and perhaps *Pergagrapta* sp. The difference is rather striking and presumably statistically significant; but its cause is quite obscure.

Notes. One male, from Stanthorpe, Queensland, has an unusually dark abdomen, with only small, faint pale areas laterally on tergite 3; also, the parafacial setulosity extends well on to the ventral half. The terminalia, however, are typical. Also, one specimen labelled "K. Is." (presumably Kangaroo I., South Australia, or King I., Tasmania; collected by A. N. Burns of Museum Victoria, so probably the latter) has the cerci relatively narrow, but slightly shorter than the surstyli. However, the reduced setulosity of the parafacial places it in *vicina*. The specific epithet refers to the close similarity of the species to several others.

Froggattimyia carnei sp. nov.

Fig. 13

Types. *Holotype* male in ANIC no. 29-029371, 9 mi ESE of Murrumburrah, NSW, coll. 6 Feb. 1971, emg. 25 Mar. 1971, R. S. McInnes, ex cocoon mass of *Perga affinis*; terminalia intact. *Paratypes* (all in ANIC)—*New South Wales* (males): Cudjegong Ck, 7 mi SW of Cootamundra, Dec. 1962, (site 236), PBC, terminalia in tube 315; Riverina, Western Slopes, 1962, 1963 (B) PBC, T.t. 1; Boorowa, Dec. 1962, (site 248), PBC, T.t. 316; 4 mi WSW of Illabo, R. S. McInnes, ex cocoon masses of *Perga affinis*, coll. 6 Feb. 1970, emg. 23 May 1970; 9 mi ESE of Murrumburrah, coll. 5 Feb. 1971, emg. 21 Mar. 1971, R. S. McInnes. —*New South Wales* (females): 4 mi E Cunningar, Dec. 1962, (site 246), PBC; 9 mi ESE of Murrumburrah, coll. 5 Feb. 1971, emg. 13 Apr. 1971, R. S. McInnes (2 specs.); Wallendbeen, Dec. 1962, (site 241), PBC. —*Victoria* (female): 10.6 mi ESE of Benalla, coll. 4. Feb. 1971, emg. 13 Apr. 1971, R. S. McInnes. All reared from *Perga affinis*.

Other specimens examined: 162 males and 128 females, coll. PBC or R. S. McInnes, from NSW (Murrumbateman, Cootamundra, Junee, Holbrook, Wallendbeen, Illabo, Young, Coolac, Cunningar, Wombat, Tarcutta, Binalong, Boorowa, Muttama) and Victoria (Benalla, Euroa), Nov.–Feb. 1962–1972; also Blue Mtns, 25 Aug. 1922, SPHTM; Ballina, Froggatt, 10 Jun. 1893; Blundells, Canberra, 28 Feb. 1934, T. G. Campbell; Ararat, Vic., G. F. Hill (BM); Vic., Ballarat, Glen Park SF, M. F. Leask.

Very similar structurally to *F. wentworthi*, differing as follows:

Male. *Head*. Anterior surfaces with rich orange-brown pollinosity; postorbits with golden pollen. Ocellar bristles sometimes only slightly differentiated. Parafacial setulose only to about middle, or with a few scattered setulae on ventral half.

Thorax. Dorsally, postalar callus and scutellum with conspicuously pale brown ground colour, continuing across the wing bases to form a broad transverse pale brown band, visible to the naked eye. Median postsutural vitta more commonly present. Hairs and setulae mainly dark, but pale brown on ventral half of anterior pronotum, also around margins of scutellum and at least narrowly across its basal ⅓,

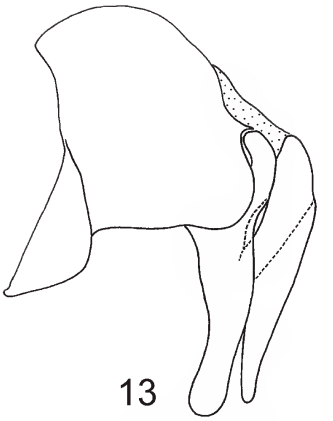


Fig. 13. *Froggattimyia carnei* sp. nov., male terminalia, lateral view.

occasionally over most of the disc; brown setulae also present sometimes in presutural area and between postpronotal lobe. Dorsocentral bristles 3 (rarely 4) + 4; acrostichals 3 + 3 (rarely 4); a fine presutural intra-alar present, close to the suture, in about 20 % of cases; also, typically, 3 postsuturals, but the first missing on at least one side in about 25% of specimens and when present finely developed; the second also occasionally missing. Scutellum with thin, fine pollinosity, visible only at extreme viewing angles. Laterally, katepisternum with small anterior bristle missing on at least one side in about 30% of specimens.

Legs. Midfemur always with a stout spine anteriorly near centre (sometimes plus 2–3 smaller associated spines); about 50% of specimens with 1–3 stout hairs differentiated in a subbasal *av* row. Hindfemur with *Pd1/Sdd* 0.6–0.9, mean 0.71.

Wing. Brown colour of wing base and veins rather paler and more conspicuous. Swollen base of vein R4+5 with 1–5 setulae dorsally, 0–2 ventrally. Calypters pale brown.

Abdomen. Dorsally, syntergite 1+2 black with small brown lenses on lateral quarters; tergite 3 black, dusky brown on lateral quarters and grey pollinose on a median triangle and narrow basal band; tergite 4 similar; tergite 5 uniformly grey pollinose, contrasting strongly with the much darker anterior segments. Both syntergite 1+2 and tergite 3 usually with 1–4 median marginal bristles, rarely with none. Ventrally, lateral brown areas of T1–3 continuing over lateral thirds of the segments; remainder of venter lightly grey pollinose. Sternites scarcely visible. Hairs and setulae all black, except for median ventral patch of pale brown hairs on segs 1–2.

Terminalia (Fig. 13). Not very distinctive; differ from those of *wentworthi* in rather subtle features of shape, principally the rather "sharper" cerci, which also lack the outward curvature in lateral view.

Female. Immediately recognizable by the characteristic colour pattern, as in the male.

Distribution. NSW, ACT, and Vic.

Biology. *Froggattimyia carnei* resembles *F. wentworthi* in that almost all known specimens have been reared from *Perga affinis* or *Perga* sp. (probably *affinis*). Many were collected at the same time and place as *F. wentworthi*, but I have no evidence as to joint parasitism of the same cocoon mass.

Notes. Despite its distinctive colour pattern, *F. carnei* is otherwise very similar to *F. wentworthi*, and the two are very likely sister-species. They have the same (unusual and presumably synapomorphous) lack of well-developed upper reclinate upper orbital hairs, and the terminalia are very similar. *Froggattimyia carnei*, however, is much more variable in the numbers of katepisternal bristles, abdominal marginal bristles, and parafacial setulae. Also, unlike *P. wentworthi*, all specimens from identified host species are from *Perga affinis* only, and all are from the southwest slopes of New South Wales (apart from a single old specimen from Canberra). One could speculate that this suggests an inability to compete with its sister-species in cooler climates. Its distinctive colour pattern may perhaps be due to character displacement induced by such competition.

The species is named after my friend and colleague, the late Dr Phil Carne.

Froggattimyia aurea species group

I place here a somewhat miscellaneous set of 4 species, 3 of them known from only a few specimens. They all possess the very distinctive feature, in the male, of having the pleural hairs all dark and the legs (usually) with extensive dark markings. The tegula and basicosta are also usually mid to dark brown, noticeably darker than in the *wentworthi* group. For the species known from only 2 or 3 specimens, I describe features of chaetotaxy, etc., as seen in those specimens. However, variation almost certainly occurs, and in the key above I have relied entirely on the distinctive terminalia.

The females are known (by associated rearing) for only two species (*F. aurea* and *F. macdonaldi* sp. nov.), and are doubtfully separable from those of *F. vicina*, etc.

Froggattimyia aurea (Townsend)

Figs 14, 15

Protomeigenia aurea Townsend, 1916:156–157. Synonymy by Crosskey (1966:103).

Type. *Holotype* male in USNM, no. 19974, Manilla, NSW.

Very similar structurally to *F. wentworthi*, differing as follows:

Male. All hairs, bristles, and setulae dark except for post gular and occipital hairs.

Head. Reclinate upper orbital bristles clearly differentiated from adjacent hairs. Parafacial with setulae clearly restricted to dorsal half. Postocellar bristles usually 2 in number.

Thorax. First postsutural intra-alar bristle small or missing, the presutural one often likewise.

Legs. Forefemur dark on basal ¼–⅓ and along ½–⅔ of dorsum; midfemur dark on basal ¼–½; hindfemur dark on basal ½ (1 specimen aberrant in having darkening confined to a trace at bases of femora). Forefemur without stout bristle(s) on anterior surface. Midfemur with subcentral *ad* and *v* bristles shorter than usual, little longer than width of tibia.

Abdomen. Tergites with silver-grey pollen; syntergite 1+2 usually with distinct pair of submedian marginal bristles (but not in holotype), but none on tergite 3.

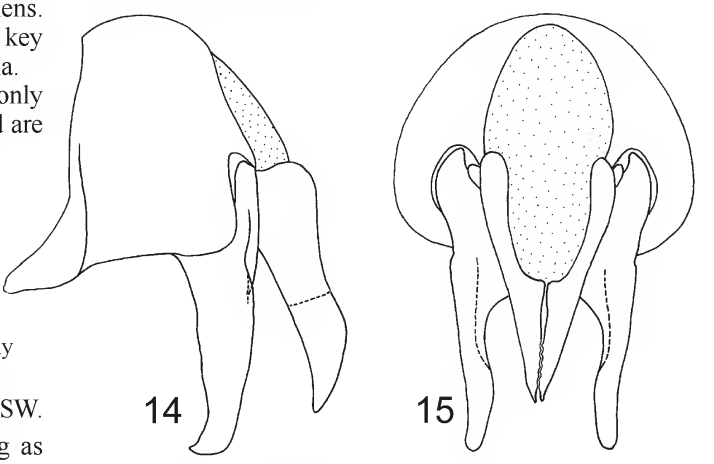
Terminalia (Figs 14, 15). Surstylus in lateral view with hooked, beak-like apex and very sparse setulae; cerci in posterior view deeply excavated basally.

Female (from associated rearing). Resembles male in silver-grey pollen of abdomen, reduced parafacial setulae, and (usually) presence of only 2 postocellar bristles, but abdominal tergite 3 with pair of well differentiated, rather characteristically erect, submedian marginal bristles. Only the postocellar setae separates these few females from those of *F. vicina*.

Distribution. Known only from NSW and Vic.

Biology. All specimens but one were reared from *Pergagrapta spinolae* Westwood or other unidentified pergid larvae.

Notes. The holotype has its highly characteristic terminalia clearly displayed *in situ*, and there is no doubt as to its association with the other specimens—including the specimen mentioned above, that has only a trace of dark colour on the femora.



Figs 14, 15. *Froggattimyia aurea*, male terminalia, *(14)* lateral and *(15)* posterior, views.

Froggattimyia macdonaldi sp. nov.

Fig. 75

Types. *Holotype* male in ANIC no. 29-029372, Ilford, NSW, larvae coll. 29 Aug. 1984, adult emerged 7 Nov. 1984, J. Macdonald, ex *Pseudoperga* sp. voucher, J. Macdonald, terminalia in tube 2105. *Paratype* female, data as for holotype.

Very similar to *F. aurea*, differing as follows:

Male. Parafacial setulae extending well on to ventral half of sclerite. Postocellar bristles indeterminate in number, scarcely differentiated from others on posterior half of plate, all with angularly bent apices. Forefemur mainly dark, except for strip on apical half of ventral surface; centre of anterior surface of midfemur with 1 long, stout bristle. Abdominal tergite 3 with pair of submedian marginal bristles. Terminalia more resembling those of *F. wentworthi*, but surstylus in lateral view tapering to a blunt point (Fig. 75).

Female (from associated rearing). Resembles male in parafacial setulosity but more ventral setulae pale golden; postocellar bristles quite well differentiated, straight, 7 in number.

Distribution. Known only from the type locality in NSW.

Biology. Both specimens were reared from larvae of *Pseudoperga* sp.

Notes. Despite the existence of only 2 specimens, they cannot be accommodated in any known member of the group and clearly represent a new species, which is named after the collector.

Froggattimyia truncata sp. nov.

Figs 16, 17

Types. *Holotype* male in ANIC no. 29-029373, 36°30'S 180°24'E, Bawley Point, NSW, 2 Jan. 1998, D.C.F. Rentz, K. McCarron; terminalia intact. *Paratypes*: 2 males; Blundell's, FCT [former abbreviation for the Australian Capital Territory, now ACT], 23 Nov. 1929, L. M. Williams, terminalia in tube 264; Blundell's, 19 Jan. 56, Fuller, T.t. 2093.

Very similar to *F. aurea*, differing as follows:

Male. *Ivb/Vb-E* 0.6–0.7 in 3 specimens known. Postocellar bristles well differentiated, 3–8 in number. First postsutural intra-alar bristle present or absent; presutural intra-alar present. Femora mainly dark, pale brown on apical ¼–⅕; midfemur sometimes with 1 rather fine bristle at centre of anterior surface. Abdominal tergite 3 with scarcely differentiated pair of submedian marginal bristles. Terminalia of holotype (Figs 16, 17) visible in situ, cerci noticeably short and curiously truncate in posterior view.

Female. Not known.

Distribution. Known only from ACT and NSW.

Biology. One specimen was taken at light; the others were presumably hand-netted.

Notes. It is remarkable that 2 of the 3 known specimens were captured 27 years apart in the same small locality. Moreover, despite that locality's popularity with collectors of Diptera, no other species of *Froggattimyia* has been recorded from there. The host is possibly a sawfly larva.

The species name refers to the appearance of the male cerci in posterior view.

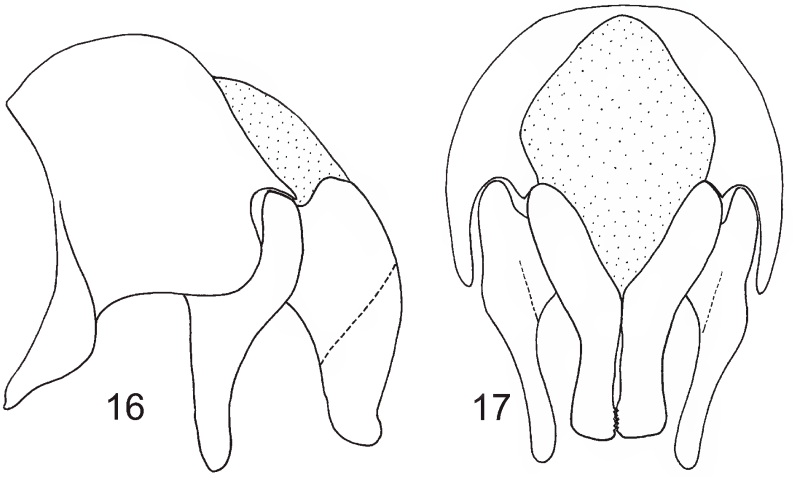
Froggattimyia woodorum sp. nov.

Figs 18, 19

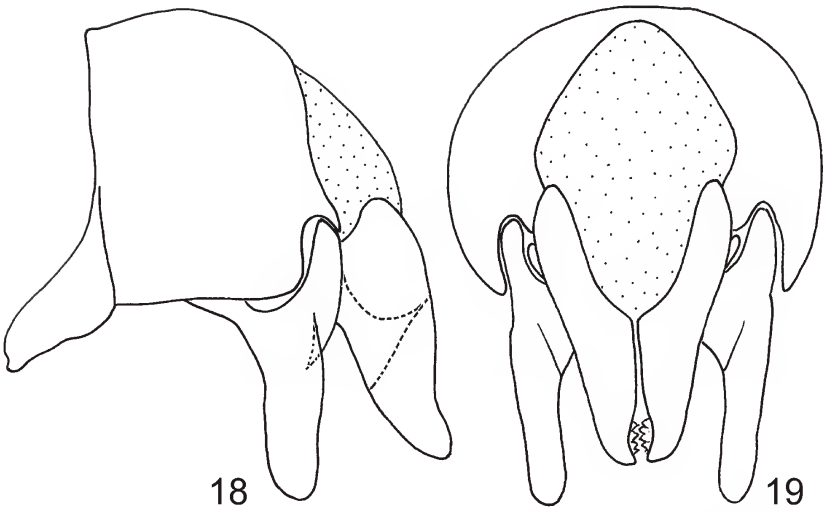
Types. *Holotype* male in ANIC no. 29-029375, Canberra, ACT, summit Mt Ainslie, 8 Jan. 2006, hand net, G. & M. Wood. *Paratypes*:—*New South Wales:* 3 males, same data as holotype; 2 males, Catherine Hill Bay, 12 Apr. 1949, S. J. Paramonov.

Very similar to *F. aurea*, differing as follows:

Male. *Ivb/Vb-E* = 1.1. Reclinate upper orbital bristles strongly differentiated; postocellar setae likewise, 2 in number. Reclinate upper orbital and parafacial setulae distinctly sparse and short. Antenna with noticeably long arista, long enough to reach lower facial margin (unlike all other *Froggattimyia* spp). Femora almost entirely dark, a small pale zone at apices; tarsi also dark; midfemur with 1 stout bristle anteriorly at centre; hindfemur with subcentral



Figs 16, 17. *Froggattimyia truncata* sp. nov., male terminalia, *(16)* lateral, and *(17)* posterior views.



Figs 18, 19. *Froggattimyia woodorum* sp. nov., male terminalia, *(18)* lateral, and *(19)* posterior views.

pd seta (Pd1) unusually long for this genus (*Pd1/Sdd* = 1.0–1.05). Abdominal syntergite 1+2 with very fine pair of submedian marginal bristles, tergite 3 with a very stout pair. Terminalia (Figs 18, 19) with relatively short, "stubby" appendages, the cerci slightly curved apically in a posterior direction.

Female. Not known.

Distribution. Known from ACT and NSW only.

Biology. A female, possibly of this species, was reared from sawfly larvae taken on a "paperbark, *Melaleuca* sp."

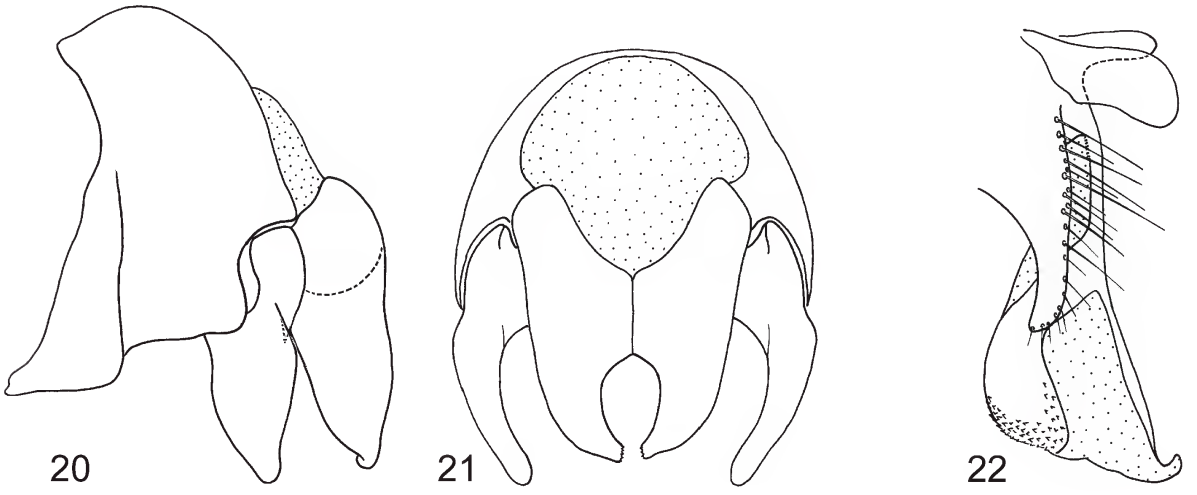
Notes. In some attributes the males resemble those of *Anagonia* spp (as does the doubtful female), but, on balance, I place it here for the present. Like the previous species, the host is unknown, but presumably a sawfly larva.

The species name celebrates the collectors of the holotype: Monty and Grace Wood.

Froggattimyia hirta species group

This group comprises mainly one common species, of which the males (only) vary remarkably in colour patterns—indeed, viewing a very pale specimen beside a very dark one, it is hard to accept them as really conspecific. However, for reasons discussed below, I regard all these as falling in the single species *F. hirta* Townsend. There is also another, related species (*F. coracina* sp. nov.), known from only a few specimens, and what is probably yet another, known from a single female and not named.

Members of the group are firmly characterized by the unusual male terminalia, with short, stout cerci and strikingly profuse short setae on their posterointernal surfaces; also, in both sexes (in almost all cases), the pale ground colour of the postpronotal lobe (except in *coracina*), the finely or not at all developed apical scutellar setae, and the lack of differentiated submedian marginal bristles on abdominal tergite 3.



Figs 20–22. *Froggattimyia hirta*, male terminalia, *(20)* lateral, and *(21)* posterior views, *(22)* aedeagus.

Froggattimyia hirta Townsend

Figs 20–22

Froggattimyia hirta Townsend, 1916:155.

Type. *Holotype* male in USNM, no. 19973, Mittagong, NSW.

For descriptive purposes I recognize 2 kinds of male: the *dark form*, with femora dark on about the basal 50%, and the *light form* with femora entirely pale (or with at most a trace of darkening). With the exception of the terminalia, other characters vary considerably within these *forms*, but morphometric analyses reveal no significant differences between them. The NSW Dept of Agriculture has 3 specimens with label data indicating that they were reared from the same batch as the holotype (it seems that W. W. Froggatt sent only one pair to Townsend for description, keeping the rest in his collection). These belong to the *dark form*, as does the holotype ("femora of male blackish on base": Townsend, 1916). I shall therefore describe that *form* first, and then the *pale form*.

Male—*dark form*. Differs from *F. wentworthi* principally as follows:

Head. fronto-orbital plate pale to mid brown dorsally. Reclinate upper orbital bristles strongly differentiated. Parafacial setulose to about level of vibrissa, setulae dark, rather small and sparse. Gena with setulae usually all dark but occasionally with extensive area of pale ones anteriorly.

Thorax. Postpronotal lobe with distinctive pale brown ground colour; notopleural (usually), supra-alar, postalar, and presutural areas likewise, forming an irregular pale brown margin to the mesoscutum; scutellum also pale brown. Mesoscutum often with at least a trace of a presutural median dark vitta. Scutellum with apical bristles usually lacking or vestigial, or (rarely) developed but small. Pleuron generally dark, but often a little paler dorsally across katepisternum and posterodorsally on anepisternum; silver-grey pollen very thin and inconspicuous. Proepisternal setulae pale and postpronotum with some fine pale hairs towards ventral margin; otherwise, pleural hairs and setulae usually all dark, but sometimes with "crinkly-tipped", pale brown hairs posteriorly on anepisternum, dorsally on katepisternum, and over katepimeron and anepimeron. Meropleural bristles all dark in main row, but sometimes a few of the secondary ones pale.

Legs. Coxae at least partly darkened. All femora with basal 40–60% dark. Foretibia with 0–1 *p* seta. Midfemur without stout spine(s) at centre of anterior surface. Midfemur usually with 1–2 smaller *ad* bristles basad to the subcentral one.

Abdomen. Setae and setulae on tergites and sternites all dark. Syntergite 1+2 and tergite 3 almost always without differentiated submedian bristles. tergites 3 and 4 with ground colour broadly pale laterally, syntergite 1+2 and tergite 5 narrowly pale laterally, leaving a dark vitta on about ¼–⅓ width of tergites; pollinosity mostly silvery to pale golden, often slightly darker on a pair of submedian triangles on tergite 3, dark median vitta on tergite 3 (and sometimes tergite 4) usually enclosed in a posteriorly directed, somewhat lighter triangle.

Terminalia (Figs 20–22). In lateral view surstyli and cerci relatively stout and tapering, but surstyli sometimes more digitate; in posterior view cerci apposed basally, broadly diverging and then converging again apically. Cerci with very characteristic, extremely profuse, moderately long hairs over posteromedial surfaces. Pregonite more extensively haired than is usual in other species.

Male—*pale form*. As for the *dark form*, differing principally as follows:

Head. Genal setulae usually mainly pale, sometimes completely so. First flagellomere often with dark area reduced (greatly so in W.A. specimens).

Thorax. Pale markings of mesoscutum and scutellum usually more conspicuous, bright yellow in very pale specimens. Pleuron with pale areas more strongly developed, in very pale specimens anepisternum and anepimeron mostly pale and pale areas present on pleurotergite and mediotergite. Pleural fine hairs and setulae mostly pale.

Legs. Coxae all or almost all pale; femora pale or (in several rather intermediate specimens) with a trace of dark basal marking.

Abdomen. Lateral pale areas of tergites rather larger; median dark non- pollinose vittae often lacking. Specimens reared from *Lophyrotoma analis* (Costa) feeding on *Rumex brownii*, all with well-developed pair of submedian marginals on tergite 3, and often on syntergite 1+2.

Female. Specimens collected along with both "pale" and "dark" males, and presumably conspecific with them, vary in colour but show no clear differentiation into distinct *forms*. Generally similar to the male, most colour patterns comprising the full range shown by *pale-* and *dark forms* combined, but differing as follows:

Genal setulae usually all pale; parafacial setulae very fine, pale, and inconspicuous on more ventral parts. Mesoscutum usually lacking the presutural median vitta. Coxae and femora all pale; midfemur with usual central cluster of 2–3 spines on anterior surface. Abdomen darker, lateral pale areas scarcely visible from above on tergite 3, not at all on other tergites. Median non-pollinose vitta often missing (abdominal pattern seemingly more variable than in male). Specimens from *Lophyrotoma analis* as for males.

Distribution. All states except NT and SA, but no doubt occurring also in the latter.

Biology. All reared specimens came from larvae of pergid sawflies; more definite identifications are *Perga affinis, P. dorsalis, Pergagrapta polita, Pterygophorus cinctus, Lophyrotoma analis* and *Lophyrotoma* sp. The last genus seems especially favoured by the *pale form*. It is perhaps noteworthy that only *F. hirta* and the related *F. coracina* have been recorded from the last 2 genera.

Notes. The above division into *pale-* and *dark forms*, based on leg colour, serves for convenience of description and recognition, but is to a large extent artificial: occasional intermediates do occur. However, male terminalia seem quite uniform and certainly no more variable than in other species, and females, although varying in colour pattern, do not cluster into distinct *forms*. There is a degree of geographic

separation between the two: the *pale form* is recorded from Queensland to Western Australia and represented in the latter state by some extremely pale specimens; the *dark form* is found mainly in Queensland and New South Wales and not recorded from Victoria or Western Australia. This might be the result of parasitising different host species or a single host that feeds on different plants. Leg colour is known to vary markedly in some other species (see *F. aurea* above).

There is also the perplexing series of the *pale form* reared from *Lophyrotoma* sp. feeding on the dock *Rumex brownii* near Brisbane (see above). Of 18 males and 6 females, all had well-developed submedian marginals on abdominal tergite 3, a condition rarely seen elsewhere. It could be that these represent a distinct, highly specialized species, but I find it more credible that larval development in a most unusual milieu is responsible. All in all, then, it seems best to recognize here just a single, variable species.

The holotype was noted by Malloch (1934) to be in very poor condition, but I have drawings of the male terminalia (kindly supplied by the late Dr C. Sabrosky). These, together with Townsend's original (1916) description and Malloch's (1934) notes leave no doubt that the species is here correctly identified. The female "type", however, as noted by Malloch (1934), is not conspecific (it is, in fact, a species of *Anagonia*). Also, the specimens from Roma, identified by Malloch (1934) as *hirta*, belong in fact to the related *F. coracina* sp. nov. (see below).

Froggattimyia coracina sp. nov.

Types. *Holotype* male in QM no. T155548; bred from *Pterygophorus analis* Costa [= *Lophyrotoma analis*], H. Tryon, Roma, Qld, 12 Feb. 1915; coll. D.A., Qld no. 576; terminalia in tube 320; condition poor. *Paratypes:— Queensland:* 1 male (badly damaged) and 1 female, same collection data as holotype (but male lacking "Col. No."); 2 females, Mingela, 21 Apr. 1955, one Norris & IFBC, the other KRN, T.t. 222; 1 female, 15°18'S 145°00'E, Isabella Creek, 32 km WNW of Cooktown, 230 m, 23 May 1977, IFBC and E. D. Edwards.

A very dark species, structurally similar to *F. hirta*, but differing as follows:

Male. *Head*. First flagellomere almost entirely dark. Parafacial setulae more profuse.

Thorax. Mesoscutum, pleuron and legs, and their hairs and setulae uniformly dark, except for brownish scutellum and postalar callus.

Abdomen. Tergites with silvery pollen, but tergite 3 and tergite 4 with narrow, apical bands and narrow, incomplete median vittae of brownish pollen.

Terminalia. Holotype with posterointernal setae on the cerci even more profuse than is usual in *hirta*; also, cerci perhaps of a slightly different shape, but this difficult to determine.

Female. Essentially similar to male, but a slightly paler ground colour barely visible under pollinosity of postpronotal lobe; also, apices of femora very narrowly pale.

Distribution. Known only from Queensland.

Biology. The holotype and two others were reared from sawfly larvae of genus *Pterygophorus*.

Notes. This might be considered a hypermelanic form of *F. hirta*, but the differences are striking and, in abdominal pattern and colour of female legs, qualitative. The completely dark pleuron and pleural vestiture, combined with the profusely setulose parafacial, are immediately diagnostic.

This species includes the specimens reared from *Pterygophorus analis* and placed in *F. hirta* by Malloch (1934). The species name is from the Latin "coracinus" meaning raven-like.

Froggattimyia sp. near *hirta*

I have a single female specimen that resembles *hirta* in the pale ground colour of the postpronotal lobe, but differs in having the parafacial setulose on the dorsal quarter only (as, e.g., in *F. aurea*); also in having tergite 5 entirely pale in ground colour, tergite 3 with a pair of submedian marginal setae, and the scutellum with moderately large apical setae.

This seems likely to represent a new species, but further material, including males, will be required to confirm this.

Specimen examined. Queensland, bred ex sawfly, 8 Jun. 1945. A. R. Brimblecombe (BMNH); CIE collection no. 18168.

Genus *Anagonia*

Anagonia Brauer & Bergenstamm, 1891:348. Type species *Anagonia spylosioides* Brauer & Bergenstamm, 1891 (= *Masicera rufifacies* Macquart, 1847) by original designation and monotypy.

Acephana Townsend, 1916:153. Type species *Masicera rubrifrons* Macquart, 1847 (= *Masicera rufifacies* Macquart, 1847) by original designation.

Opsophana Townsend, 1916:153. Type species *Masicera rufifacies* Macquart, 1847, by original designation.

All synonymy by Crosskey, 1966:95.

The diagnosis is given in the foregoing key.

Identification of species of *Anagonia*

Females of most species are unrecognized or cannot at present be accurately identified, although a few bear distinctive attributes that link them to the male. For males, the variability of most attributes makes it very difficult to produce a sufficiently accurate, conventional key for their identification. Some characters, too, need a little experience; e.g., whether an eye is haired or not, or whether the tibiae are paler than the femora; and some are often badly preserved. I have tried to catch any leakage over such couplets by multiple entries and the key given below will normally give the correct identification. However, complete confidence will always require the examination of the terminalia, which is required in any case for a few species.The male of *A. grisea* is unknown and excluded from this key (see p. 192).

Key to males of *Anagonia*

1 Eye profusely haired, or if moderately so, hairiness widely distributed; ocellar bristles inconspicuous or absent; tibiae often paler than femora 2

—— Eye hairs absent or very sparse and inconspicuous and/or ocellar setae well developed 6

2 Tergite 4 with 1 or more stout discal bristles; intrapostalar bristles finely differentiated on one or both sides ..... *A. lasiophthalma* Malloch

—— Tergite 4 without discal bristles; intrapostalar usually not developed 3

3 Abdominal tergite 3 with submedian pair of marginal bristles finely developed or absent 4

—— Tergite 3 with submedian marginals well developed 5

4 Presutural intra-alar bristle very fine or absent on both sides; upper occiput with mainly dark scales ..... *A. perplexa* sp. nov. (in part)

—— Presutural intra-alar bristle well developed on one, usually both, sides; upper occiput with mainly pale scales ..... *A. loripes* sp. nov. (in part)

5 Terminalia as in Figs 23–26; cerci in lateral view diagonally truncate at apex and longer than vertical height of syntergosternite 6–8; eye conspicuously hairy in specimens from cooler climates ..... *A. rufifacies* Macquart

—— Terminalia as in Figs 30, 31; cerci in lateral view almost mammiliform, with rounded apex, and no longer than vertical height of syntergosternite 6–8; eye often only moderately haired ..... *A. conformis* sp. nov. (in part)

6 Foretarsi with all or most segments conspicuously pale brown ..... *A. tillyardi* Malloch

—— Foretarsomeres dark brown or black 7

7 Ocellar bristles strongly developed; legs dark, tibiae concolorous with femora; tergite 3 with strongly developed pair of submedian marginal bristles 8

—— Without this combination of attributes; ocellar bristles at most weakly developed 9

8 Presutural intra-alar bristles usually undifferentiated; intrapostalar absent; tergite 5 with small discal bristles ..... *A. opaca* Malloch

—— Presutural intra-alar bristles and intrapostalar bristle clearly differentiated; tergite 5 without discal bristles ..... *A. zentae* sp. nov.

9 Abdomen in glancing posterior view intensely silver-pollinose with black spots around hair bases; thorax usually lacking presutural median vitta; (hindtibia with *pd1* clearly as long as or longer than *sdd*) ..... *A. major* Malloch

—— Abdomen in posterior view with brownish sublateral patches; thorax usually with distinct presutural median vitta 10

10 Abdominal tergite 3 with submedian marginal bristles clearly differentiated, longer than adjacent bristles 11

—— Tergite 3 with submedian marginals scarcely or not at all differentiated or extremely short 16

11 Presutural intra-alar bristle very fine or absent on both sides 12

—— Presutural intra-alar well developed on at least one side 13

12 Tibiae slightly, but distinctly, paler than femora; usually only 2 post-ocellar bristles; frons/head width less than 0.2 ..... *A. angustifrons* sp. nov. (in part)

—— Tibiae dark, concolorous with femora; usually more than 2 post-ocellar bristles; ratio frons/head width greater than 0.2; ..... *A. similis* sp. nov.

13 Hindtibia with *Pd1* bristle clearly as long as or longer than *Sdd* 25

—— Hindtibia with *Pd1* scarcely as long as, or clearly shorter than *Sdd* 14

14 Intrapostalar bristle well differentiated on at least one side, usually both 15

—— Intrapostalar bristle weakly or not at all differentiated 5

15 Tibiae dark, concolorous with femora; terminalia as in Figs 69–71 ..... *A. lateralis* Macquart

—— Tibiae at least a little paler than femora; terminalia as in Figs 47–49; ..... *A. dayi* sp. nov. (in part)

16 Presutural intra-alar bristles well developed on at least one side (usually both) 17

—— Presutural intra-alar bristles very fine or absent on both sides 30

17 Upper occiput with hairs all or mostly pale 18

—— Upper occiput with hairs all or mostly dark 21

18 Intrapostalar bristle well differentiated on at least one side ..... *A. commoni* sp. nov.

—— Intrapostalar bristle at most very weakly differentiated 19

19 Hindtibia with *Pd1* clearly longer than *Sdd*; tibiae dark, concolorous with femora; apical *ad* spine on foretibia often very small or vestigial ..... *A. anguliventris* Malloch (in part)

—— Hindtibia with *Pd1* shorter than *Sdd*; tibiae usually at least slightly paler than femora; *ad* spine on foretibia normal 20

20 Tibiae brown, at least slightly paler than femora; eye at least slightly haired; ..... *A. loripes* sp. nov. (in part)

—— Tibiae black, concolorous with femora; eye scarcely or not at all haired ..... *A. norrisi* sp. nov. (in part)

21 Foretibia with *ad* spine more or less vestigial ..... *A. anguliventris* Malloch (in part)

—— Foretibia with *ad* spine clearly developed 22

22 Intrapostalar bristle not differentiated 23

—— Intrapostalar bristle at least weakly differentiated 28

23 Hindtibia with *Pd1* bristle clearly longer then *Sdd*; (scutellum usually with apical bristles straight or slightly downcurved, parallel or divergent) 24

—— Hindtibia with *Pd1* bristle scarcely as long as, or (usually) distinctly shorter than *Sdd*; (apical scutellar bristles upcurved or at least directed upwards) 25

24 Terminalia as in Figs 35, 36 ..... *A. propinqua* sp. nov.

—— Terminalia as in Figs 32–34 ..... *A. scutellata* Malloch

25 Tibiae usually paler than femora; eye usually at least slightly haired ..... *A. conformis* sp. nov. (in part)

—— Tibiae dark, concolorous with femora; eye scarcely or not at all haired 26

26 Apical scutellar bristles upcurved 27
—— Apical scutellar bristles more or less horizontal; terminalia as in Figs 61–63 ..... *A. latistylus* sp. nov.

27 Terminalia as in Figs 66–68 ..... *A. uptoni* sp. nov. (in part)
—— Terminalia as in Figs 58–60 ..... *A. norrisi* sp. nov. (in part)

28 Hindtibia with *Pd1* bristle clearly longer than *Sdd* ..... *A. crosskeyi* sp. nov.
—— Hindtibia with *Pd1* no longer than *Sdd* ..... *A. dayi* sp. nov. (in part)

29 Upper occiput with mainly pale scales ..... *A. norrisi* sp. nov. (in part)
—— Upper occiput with mainly dark scales 30

30 Tibiae at least slightly, but distinctly, paler than femora 31
—— Tibiae dark, concolorous with femora 32

31 Terminalia as in Figs 64, 65; ratio *Frw/Hdw* 0.1–0.2 ..... *A. angustifrons* sp. nov. (in part)
—— Terminalia as in Fig. 78; ratio *Frw/Hdw* 0.2–0.3 ..... *A. perplexa* sp. nov. (in part)

32 Intrapostalar bristle small but distinct; terminalia as in Fig. 76 ..... *A. teratostylus* sp. nov.
—— Intrapostalar bristle not differentiated; apical scutellar bristles upcurved or at least directed upwards 33

33 Surstylus lacking anteriorly-directed apical hook or spine (Fig. 78) ..... *A. perplexa* sp. nov. (in part)
—— Surstylus with a minute apically-directed or anteromedially-directed hook or spine (Figs. 79, 80) 34

34 Surstylus 1.5 times or less than length of syncercus (Figs 66, 67, 79) ..... *A. uptoni* sp. nov. (in part)
—— Surstylus 2 or more times as long as syncercus (Figs 56, 57, 77, 80) 35

35 Posterior margin of surstylus with distinct angle (Figs 66, 67, 77) ..... *A. minor* sp. nov.
—— Posterior margin of surstylus more evenly rounded (Fig. 80) ..... *A. errator* sp. nov.

Anagonia rufifacies species group

The group comprises 3 species, similar in their relatively large size, tibiae usually somewhat paler than femora, and eyes usually distinctly (sometimes profusely) haired. Also, scutellum usually relatively short, with *Sbs/Ssa* averaging 3.0 or more, apical scutellar setae usually upcurved, and male terminalia with moderate to large epiphallus.

Anagonia rufifacies (Macquart)

Figs 23–26, 82

Masicera rufifacies Macquart, 1847: 87.
Masicera rubrifrons Macquart, 1847: 85.
Anagonia spylosioides Brauer & Bergenstamm, 1891: 349.

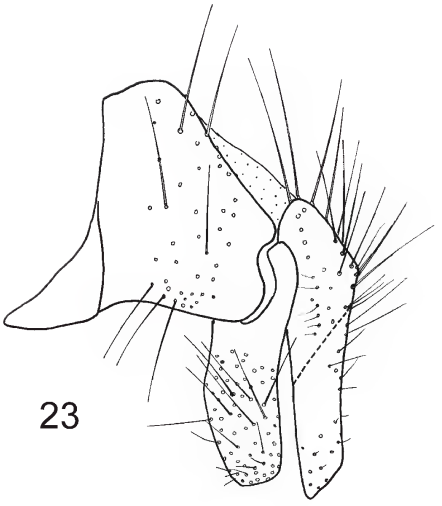
Type. *Holotype* male in BMNH, Tasmania.

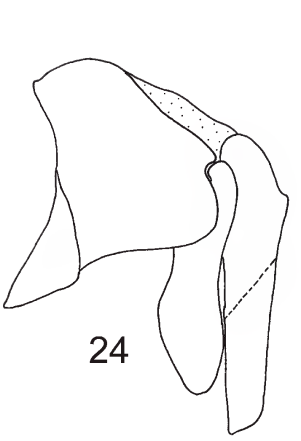
Synonymy by Crosskey, 1966:99.

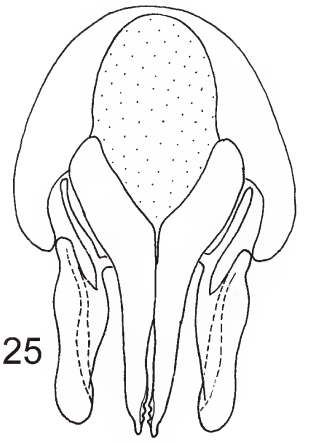
There is considerable variability in the "hairiness" and colour of males, to such an extent as to throw doubt on the conspecificity of the extreme variants. However, I see no need to invoke more than a single species (see "Discussion" below). I describe below, first, the dark, "hairy" form, which is very common and to which the type specimen belongs. It is found typically at higher elevations and in cooler climates. I then describe the differences in the paler "non-hairy" form, found mainly in less elevated, drier and warmer climates. I must stress, though, that although many specimens conform to one or the other description, intermediates are common, failing in from one to a few attributes.

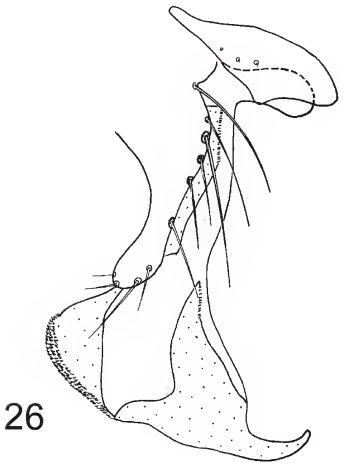
Male—*dark form*. Ground colour of integument largely dark brown to black, except on scutellum, tibiae, anteriorly on head, and laterally on abdomen. Bristles and hairs all dark, except for soft white hairs on occipital and postgular regions of head.

Head. Width 2.5–3.3, mean 3.0 mm, about 5 times as wide as frons, ratio *Frw/Hdw*, mean 0.19; ratio *Gnw/Eyh* 0.3–0.4, mean 0.35; *Ivb/Vb-E* 0.9–1.4, mean 1.3. Eye conspicuously haired. Fronto-orbital plate dark in ground colour; parafacial similar but often paler along anterior margins, sometimes completely pale; genae and face mid brown; all with thin









Figs 23–26. *Anagonia rufifacies*, male terminalia, *(23, 24)* lateral, and *(25)* posterior views, *(26)* aedeagus.

silvery or pale golden frosting; postorbital stripe silvery in lateral view, sometimes apparently discontinued at about mid height of eye. Scape and pedicel brown, first flagellomere black, with brown or dark brown arista; aristomeres 2 and 3 with light silvery frosting. Reclinate upper frontal hairs rather erect, their tips often crossing only slightly or not at all; the more dorsal members (not to be confused with the reclinate upper orbitals) often very fine, scarcely or not at all differentiated from adjacent soft hairs. One or 2 pairs of reclinate upper orbital bristles in line with reclinate upper frontal bristles; outer vertical bristles not differentiated; inner vertical bristles slightly reclinate. Soft hairs of fronto-orbital plate and vertex profuse, relatively long, and many with sharply curved tips. Ocellar bristles almost always undifferentiated; postocellar bristles 2, erect but with fine proclinate tips. Upper occiput with hairs in the postocular row relatively long and of roughly uniform length (although becoming shorter laterally), behind them 1–3 rows of short dark hairs. Parafacial completely haired, the hairs profuse, dark, and relatively long.

Thorax. Mesonotal pollen sometimes with purplish tinge; presutural median dark vitta present, usually not reaching suture. Fine hairs profuse and relatively long; notopleural area more or less completely setulose; presutural intra-alar bristle sometimes rather fine, but almost always present; postsutural intra-alar bristles normal; intrapostalar bristle not developed. Scutellum relatively broad at base, *Sbs/Ssa* 2.7–3.6, mean 3.05, usually brown, with diffusely darkened strip across base and small paler area at apex; apical setae usually diverging or parallel, almost always upcurved or, if straight, directed strongly upwards, fine (at longest, still conspicuously shorter and finer than preapicals). Pleuron with ground colour and all bristles and hairs (including proepisternal hairs) dark brown to black.

Legs. Dark brown, except for tibiae, which are almost invariably at least a little paler than femora, usually clearly so (suitable lighting angle may be required). Foretibia with poorly differentiated row of some 3–6 small *ad* spines on basal half; preapical *ad* bristle quite variable, from conspicuously shorter and finer than *d* bristle up to almost as stout and 0.8 times as long. Midtibia with 1–2 smaller *ad* bristles basad of stout subcentral one. Hindtibia with *ad* comb bristles close set, relatively long, fine, and regular, except for 2–4 longer ones (1 subcentral and 1 preapical); the subcentral *pd* bristle (*pd1*) placed at apex of a row comprising 1 shorter hair and several much shorter ones; *pd1* itself shorter than distance from its base to that of preapical *d* bristle, ratio *Pd1/Sdd* 0.6–0.9, mean 0.80.

Wing. Membrane grey, sometimes very lightly infuscated near the wing base, veins brown. Tegula dark brown to black; basicosta mid brown to dark brown, the two concolorous or (sometimes) the former rather darker than the latter. Calypters usually brownish, occasionally paler; hairs at junction of calypters usually brown, sometimes golden.

Abdomen. Ground colour (sometimes obscurely) paler laterally on a posterior strip of syntergite 1+2, all of tergite 3, and anterior ¼–¾ of tergite 4; pale area on tergite 3 extending about half way to midline in dorsal view, that on tergite 4 somewhat smaller, both rather more extensive in ventral view. Viewed posteriorly at a low angle, tergites strongly silver-grey pollinose, except for incomplete dark median vittae on tergites 3 and 4, and sometimes tergite 5, large submedian triangles on tergite 3, and dark spots around bases of major bristles and hairs. tergite 3 with pair of well-developed submedian marginal bristles; a poorly differentiated pair often present on syntergite 1+2 also.

Terminalia (Figs 23–26). Principal features are: *(a)* syntergosternite 6–8 in lateral view longest in the dorsoventral dimension; *(b)* surstylus relatively broad, sometimes more or less parallel-sided, but usually broadest on central third, then bluntly tapering; also, from about as long as cerci to (usually) a little shorter and strongly setulose on external surface; *(c)* cerci more or less approximated in posterior view, in lateral view diagonally truncate apically, posteroapical margin usually slightly concave, apex therefore characteristically sharp-pointed; epiphallus moderate, smaller than postgonite.

Male—*pale form*. Essentially resembling the *dark form*, but with many (rarely all) of the following attributes.

Head. Gena, face, and parafacial all with pale brown ground colour, sometimes extending on to anterior parts of fronto orbits. Reclinate upper frontal bristles more strongly inclinate and cruciate, clearly differentiated right up to reclinate fronto orbitals; associated soft hairs shorter and less profuse. Second postocular row sometimes with a few pale setae, especially towards centre of head (correlates with hairiness of eye). Parafacial setulae not noticeably long or profuse. Eye moderately to sparsely haired.

Thorax. Calypters usually pale, hairs at their junction pale also.

Abdomen. Integument of tergite 3 dark on up to central ⅓; that on tergite 4 sometimes a little wider.

Female. Identified here by co-occurrence with males and general resemblance. Unlike the male, there is no obvious differentiation into *pale-* and *dark forms*. All are generally similar to the *pale form* male, except in the following:

Head. Head width 2.2–3.7 mm; frons wider, 0.25–0.30 of head width. Short hairs of dorsum of head and thorax shorter, less conspicuous.

Thorax. Scutum with stout grey dusting (or pale golden in Tasmanian specimens), presutural median vitta faint or (usually) absent. Pleuron with fine hairs all pale except on anepisternum and upper anepimeron; rarely (in large specimens) dark hairs intruding on to upper katepisternum and anterior anepimeron.

Legs. Foretibia with spines in *ad* row stouter, conspicuous. Midtibia with subcentral *ad* spine long, about as long as distance between its base and that of the apical spine. Hindtibia with *ad* row coarser, the spines less uniform in length. Wing with basicosta usually pale brown.

Abdomen. Tergites uniformly dark, without lateral pale areas. Sternite 1 with pale brown hairs.

Terminalia (Fig. 82). Segment 6 much shorter than deep; Tergite and sternite 6 well developed, the former with spiracles included within its margin; posterior margin of sternite 6 sometimes with a very slight median process bearing a few setulae. Tergite 7 large, extending to about midline in lateral view, in dorsal view its posterior margin deeply emarginate; sternite 7 with a distinctive "scoop-like" shape, its ventral margin sinuous, posteriorly forming a tapering gutter that ends in a more or less completely closed pore. Relics of tergite 8, and sternites 8 and10 distinct.

Distribution. Widespread, in all states and climates except the wet tropics.

Biology. All reared specimens came from larvae of paropsine chrysomelid beetles: *Chrysophtharta bimaculata* (Olivier), *C. variicollis* (Chapuis), *C. agricola* (Chapuis), *C. amoena* (Clark), *C. ?decolorata* (Chapuis), *Paropsis porosa* Erichson, and *Peltoschema rubiginosa* (Chapuis). The large bulk of rearings, however, are from Tasmania, where the species is a major parasite of *C. bimaculata*, itself a major pest of eucalypt forests. On the mainland, and especially in more arid areas, the principal hosts are unknown.

Notes. The variability of the males can render identifications of paler specimens somewhat insecure if based on external morphology alone. The terminalia are, however, immediately recognizable—in particular, the sharply oblique truncation of the cerci in lateral view. The shape of the female sternite 7 seems *prima facie* diagnostic, but females of several closely related species remain as yet unrecognized. Indeed, it cannot be excluded that the females described above, although associated with males in various ways, might include specimens of *A. loripes* and *A. conformis*.

Anagonia loripes sp. nov.

Figs 27–29

Types. *Holotype* male in ANIC no. 29-029362, 23 km SSE of Byrock, NSW, 5 Apr. 1976, DHC (at light); terminalia in tube 2144. *Paratypes* (all males).—*New South Wales:* 1 with same data as holotype; Warambul, Royal NP, 12 Dec. 1971, G. Daniels, MV Lamp (AM).—*Australian Capital Territory:* Blundells, Canberra, 20 Feb. 1934, T. G. Campbell; Black Mtn, light trap, 26 Jan. 1967, IFBC, T.t. 294.—*Western Australia:* 18 mi W of Mogumber, 13 Apr. 1968, IFBC & MSU, T.t. 354; 19 mi WSW of Carnamah, 16 Apr. 1968, IFBC & MSU, T.t. 336; Kalbarri NP, 54 mi N of Northampton, 19 Apr. 1968, IFBC & MSU; 4 specs.: 18°27'S 123°03'E, 10 km ESE of Broome, 20 Aug. 1976, IFBC, T.t. 2110, 2113, 2121, 2122.—*Queensland:* Lockerbie, 6–10 Jun. 1969, G. B. Monteith (UQIC).

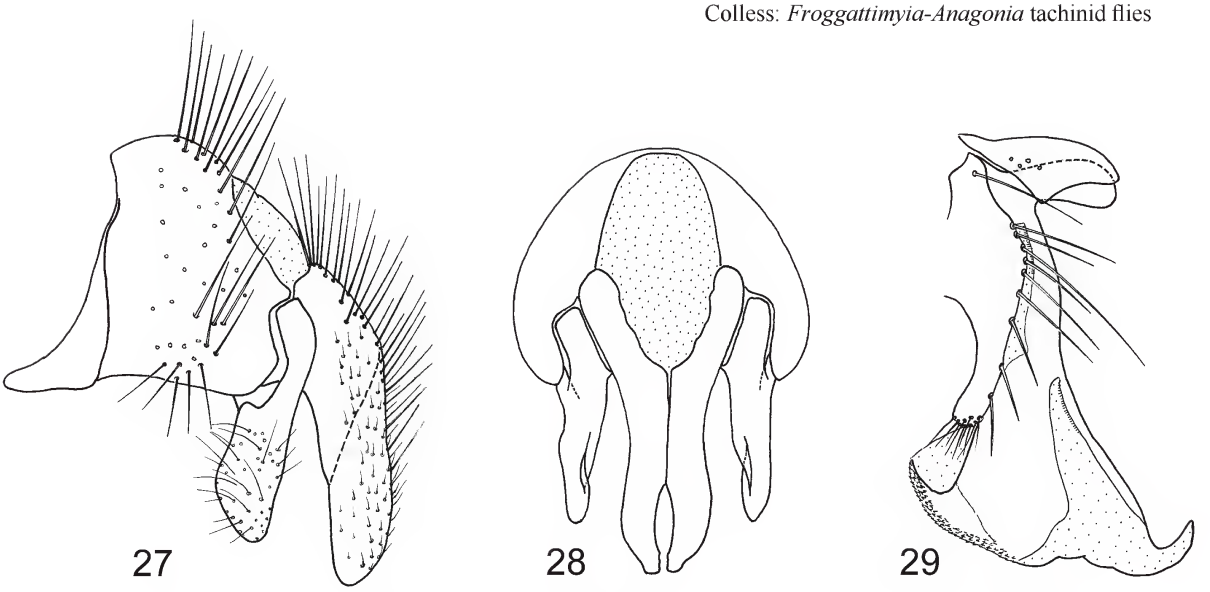
Male. Very similar to the *pale form* of *A. rufifacies*, differing as follows:

Head. Upper occiput with setae behind postocular row more frequently, and more extensively pale. Eye very sparsely or not at all haired.

Abdomen. Tergite 3 with submedian marginal pair of bristles usually finely developed or absent.

Terminalia (Figs 27–29). Cerci in lateral view usually 3–4 times as long as their greatest breadth, bluntly rounded at apex, with anterior margin more or less straight, posterior margin evenly curved; in posterior view separated on about apical ¼, rejoining at the apex, which has a series of small internal teeth; surstyli diagonally truncate, with rounded apex posteriorly, usually distinctly shorter than cerci; epiphallus large, comparable in size with postgonite.

Female. Four females taken at light along with males of *A. loripes* have very reduced hairing of the eyes, and one has dark tibiae. Otherwise they show no obvious difference from females of *A. rufifacies*.



Figs 27–29. *Anagonia loripes* sp. nov., male terminalia, *(27)* lateral, and *(28)* posterior views, *(29)* aedeagus.

Distribution. Most specimens seen came from WA, but ACT, NSW, and Qld are also represented.

Biology. Specimens of known provenance are all from light traps.

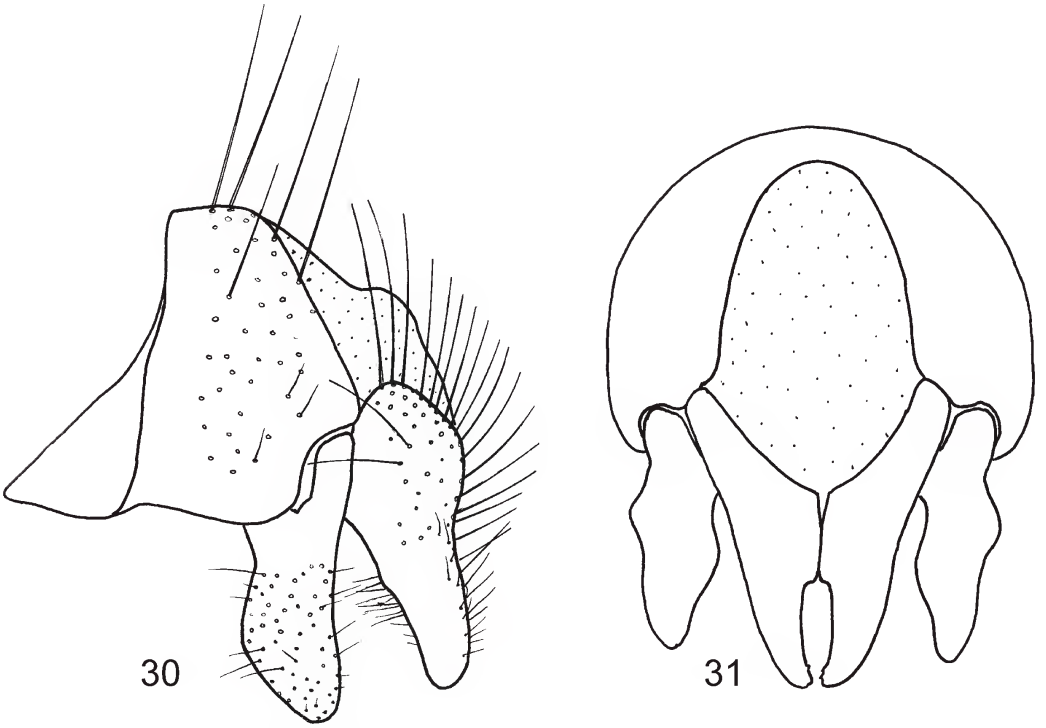
Notes. Despite the close similarity to *A. rufifacies*, this is clearly a good species. The differences in male terminalia are striking and consistent. Three males from Mt. Garnet, Queensland, have the apical scutellar setae widely separated and straight, rather than upcurved, but are otherwise typical of the species.

The name is taken from the Latin for "bow-legged", referring to the posterior view of the cerci.

Anagonia conformis sp. nov.

Figs 30, 31

Types. *Holotype* male: Stony Creek, Grampians, Vic., 1100 ft. 13 Nov. 1966, IFBC & MSU; terminalia in tube 292; in ANIC no. 29-029224. *Paratypes* (all males):—*Australian Capital Territory:* Black Mtn, light trap, 28 Jan. 1957 and 16 Mar. 1968, IFBC, T.t. 20 and 396; Black Mtn, 31 Jan. 1967 and 21 Mar. 1969, IFBC, T.t. 372 and 2497; Black Mtn, Nov. 1977, B. Selman, ex *P. atomaria*, T.t. 2210; Canberra, 15 Jan. 1975, L. R. Fox (no. 53); ex *Chrysophtharta variicollis*; T.t. 3114.—*New South Wales:* Mt Kosciusko 4700 ft, 16 Apr.



Figs 30, 31. *Anagonia conformis* sp. nov., male terminalia, *(30)* lateral, and *(31)* posterior views.

1949, E. F. Riek; T.t. 54.—*Victoria:* Little Desert, 1953, F. E. Wilson, T.t. 307; Little Desert, 13 mi S of Kiata, 6 Nov. 1966, IFBC & MSU (2 specs, one T.t. 288); 26 mi NNE Orbost, 1300 feet, 6 Nov. 1969, IFBC and MSU (6 specs, T.t. 2431, 397, 403); 1 spec. data as for holotype; Barneys Creek, Grampians, 14 Nov. 1966, IFBC & MSU.—*South Australia:* 17 mi SE of Mt Gambier, 10 Nov. 1966, IFBC and MSU (2 specs, T.t. 290).—*Queensland:* 7 mi SW of Mt Garnet, 20 Apr. 1969, IFBC and MSU, 2300 ft. (3 specs, T.t. 374, 375, 408); 16°30'S 144°55'E, Desailly Ck, 10 km NW Mt Carbine, 19 May 1981, DHC; Millstream Falls, W of Ravenshoe, 25 Jun. 1971, E. F. Riek.—*Northern Territory:* Standley Chasm, 43 km SW of Alice Springs, 11 Oct. 1972, MSU (3 specs, T.t. 2129, 2130, 2137); 6.4 km SSW of Victoria River Downs, 24 Jul. 1973, L. P. Kelsey; 16°34'S 135°41'E, 14 km NW of Cape Crawford, 6 Nov. 1975, MSU, T.t. 464.—*Western Australia:* 19 mi W of Watheroo, 15 Apr. 1968, IFBC and MSU, T.t. 342; Mt Ragged, 31 Oct. 1977, DHC (at light), T.t. 2227; 34°15'S 116°10'E, Manjimup, 19 Mar. 2001, A. D. Loch, ex *Chrysophtharta variicollis* larva on *Eucalyptus* sp, T.t. 2494; 14°19'S 126°49'E, Carson Escarpment, 15 Aug. 1975, IFBC and MSU, T.t. 461; 14°49'E 126°49'E, Carson Escarpment, 9–15 Aug. 1975, IFBC and MSU (9 specs, T.t. 452, 453, 454, 455, 456, 2138, 2139, 2142, 2390).

Male. Extremely similar to that of *A. rufifacies*, with analogous *pale form* from lower altitudes and warmer climates, and *dark form* from higher, cooler localities; former with hairing of eye rather less profuse, reclinate upper frontal hairs less erect, and soft hairs of the fronto-orbits rather shorter than in *A. rufifacies*; both forms with tibiae sometimes completely dark.

Terminalia (Figs 30, 31). Cerci in lateral view rather short and stout, 2–3 times as long as greatest breadth, rather uniformly tapering and digitate, with rounded apex, in posterior view usually distinctly forcipate, without obvious apicointernal teeth; surstyli diagonally truncate anteriorly, from a little longer to a little shorter than cerci; epiphallus large, as in *A. loripes*.

Female. Females taken at light along with males of *A. conformis* seem identical with those of *A. rufifacies*.

Distribution. Known only from all mainland states and territories.

Biology. Two specimens were reared from *Paropsis atomaria* and *Chrysophtharta variicollis*. The rest were all taken at light.

Notes. As with the previous species, separation from *A. rufifacies* is difficult, indeed, not really possible without examining the terminalia. The name is from the Latin for "similar".

Anagonia tillyardi species group

The three, perhaps four, species grouped here are exceedingly alike; the male terminalia are characteristic for the group but differ amongst themselves in at most slight details. All have *Pd1* conspicuously greater than *Sdd* (rare in other species) and epiphallus of moderate size.

Anagonia tillyardi (Malloch) comb. nov.

Figs 32–34, 83

Froggattimyia tillyardi Malloch, 1934:6

Type. *Holotype* male in ANIC, no. 5886, Blundell's, ACT.

Male. Moderate to small in size. Generally resembling the *dark form* of *A. rufifacies*, differing as follows:

Head. Width 2.2–3.2, mean 2.7 mm, *Frw/Hdw* 0.2–0.3, mean 0.19; *Gnw/Eyh* 0.2–0.3, mean 0.22; *Ivb/Vb-E* 1.0–1.4, mean 1.2; *Frw* almost always a little less than *Gnw*, ratio 0.8–1.0, mean 0.9. Parafacial pale brown, but with a dark band of variable extent along the eye margins, and moderately profuse setulae, short on the dorsal half. Reclinate upper frontal hairs all well differentiated, inclinate, mostly cruciate; soft hairs relatively short, straight, or gently inclinate. Eye at most very sparsely haired, mainly on ventral parts. Ocellar hairs almost always differentiated, but fine.

Thorax. Median dark vitta highly variable, occasionally lacking, usually at least partly developed before and/or after the suture. Presutural dorsocentral bristles with 3 (or 4) on at least one side in about 40 % of specimens. Intrapostalar seta almost always present, but extremely fine, barely differentiated. Scutellum relatively narrower at base, *Sbs/Ssa* 2.5–3.0; mean 2.74, apicals straight, directed from slightly upwards to slightly downwards.

Legs. Foretarsus conspicuously pale brown, usually on all segments, but on segments 1–3 only in occasional specimens from arid regions. Hind, and to a lesser extent mid, tarsi usually pale brown on at least segments 4 and 5. Foretibia with preapical *ad* spine only a little finer and shorter than the subapical *d* spine. Hindtibia with *Pd1* seta conspicuously long, ratio *Pd1/Sdd* 1.08–1.33, mean 1.22.

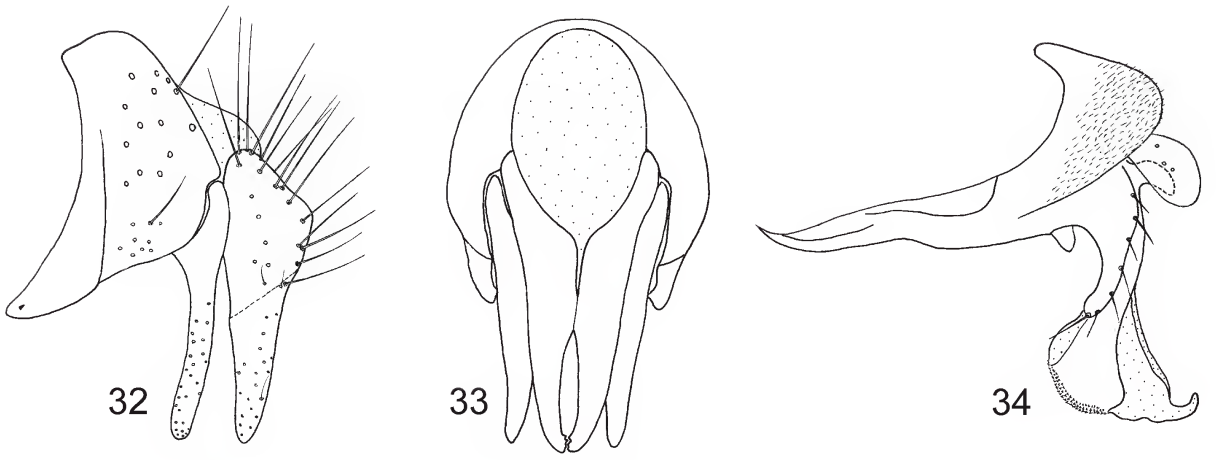
Abdomen. Tergite 3 with well-developed pair of submedian marginal bristles.

Terminalia (Figs 32–34). Characteristic features are (in lateral view) the gently tapering cerci, digitate surstyli with minute, socketed setulae on the apical ½–⅔, and (especially) the strongly microtrichiose anteroventral lobe of the hypandrium. In posterior view, surstyli only partly obscured by the cerci, their lateral margins usually visible from base to apex.

Female. Generally similar to the male, differing (as usual in the genus) in the much stouter, grey dusting of the scutum; and as follows:

Head. Frons about 0.3 of head width; gena about 0.3 of eye height; *Ivb/Vb-E* 1.2–1.7, mean 1.4.

Thorax. Prescutal median vitta of scutum usually lacking, postscutal present in about 50% of specimens. Proepisternal setulae almost always pale.



Figs 32–34. *Anagonia tillyardi*, male terminalia, *(32)* lateral, and *(33)* posterior views, *(34)* aedeagus.

Legs. Foretarsus usually brown, paler than tibia, but difference much less conspicuous than in male, best seen on posterior surface, and sometimes barely, if at all, perceptible (especially in specimens from arid areas); difference rarely perceptible on mid- and hindtarsi. Tarsal segments often (but not always!) apparently narrower than usual.

Abdomen. Tergites all dark. Tergite 5 usually with short stout spiny bristles on disc.

Terminalia (Fig. 83). Telescopic, a little longer than segment 5, intersegmental membranes between segments 6 and 7 and 7and 8 about as long as succeeding segment. Sternite 6 about twice as long as deep, its posterior margin more or less straight, with usual small median cluster of tiny setulae; tergite 6 completely divided into 2 hemitergites; both tergite and sternite very finely sclerotized laterally. Tergite 7 with narrow parallel-sided hemitergites, rounded apically, slightly expanded basally; sternite 7 elongate, with apical sclerotized part scoop-like, tapering, in lateral view slightly sinuous, with apex curved in a slight but very characteristic, dorsal direction; basal, finely sclerotized part narrowed, "handle-like"; both sternite 7 and tergite 7 with tiny curved setulae on the apical sclerotized part.

Distribution. Widespread, in all states and climates except for the wet tropics and Tasmania (I have one unconfirmed report from that state also).

Biology. Taken regularly at light, and reared from a variety of paropsine Chrysomelidae, including *Chrysophtharta variicollis, C. amoena, C. obovata, Paropsis atomaria, Chrysolina hyperici*, and *Peltoschema suturalis* (Germar).

Notes. This is certainly the species described as *F. tillyardi* by Malloch (1934). However, it remains possible that the very similar *A. scutellata*, may be an earlier synonym (see below under that species). There is also *Delta grisea* Malloch, which is not only a typical *Anagonia* (as recognized by Crosskey [1973]), but seems to have slightly paler foretarsi as in *A. tillyardi*. The name *grisea* may therefore have priority. However, the holotype of *grisea* is a female, and colours can be unreliable and hard to evaluate in such old specimens; moreover, it has the ocellar bristles quite undifferentiated, a feature that I have never seen in numerous specimens of *A. tillyardi*. I am therefore unwilling to base a synonymy on the existing evidence.

Anagonia scutellata (Malloch)

Delta scutellata Malloch, 1930:334. Synonymy by Crosskey (1973:139).

Type. *Holotype* male in ANIC [formerly in SPHTM], Mullewa, Western Australia.

Male. Exceedingly similar to *A. tillyardi* and doubtfully distinct (see below). Differs mainly in colour of tarsal segments, which are uniformly dark. No difference observed in terminalia. However, specimens other than those from ACT almost all (11/13) with 3 presutural dorsocentral bristles on at least one side and lacking the pair of submedian marginal bristles on abdominal tergite 3. Specimens from ACT rarely (5/20) with 3 presutural dorsocentral bristles and all with differentiated submedian marginals on tergite 3.

Female. Differs from *A. tillyardi* in colour and bristle characters as for the male; but indistinguishable from female of *A. propinqua* (see below).

Distribution. Widespread on the Australian mainland. I have also seen a male, apparently of this species, from Wau in Papua New Guinea.

Biology. Specimens have been reared from larvae of the chrysomelids *Liliocentris bakewelli* (Baly) and *Chrysophtharta m-fuscum* (Boheman). The remainder were taken at light.

Notes. The relatively slight difference from *A. tillyardi*, and especially the complete correspondence in fine detail of the male terminalia, suggests that *A. scutellata* cannot be maintained as a separate species. It could, perhaps, represent a variant "form", breeding in an unusual host. Even more bothersome is the possibility that this might be true of the ACT specimens, whereas the others, with their rather distinctive chaetotaxy, may comprise yet another, different species. It is certainly true that reared specimens of *A. scutellata* (one from Queensland, and a long series from ACT) are from hosts from which *A. tillyardi* has never been reared.

Principal Component analysis of head measurements (not shown) does show a degree of separation of the two species, but of no diagnostic value. The situation is intriguing, but the evidence either way inconclusive. Since there exists a

holotype male for *scutellata*—and therefore an available name—it seems best to let the matter rest there for the present.

Anagonia propinqua sp. nov.

Figs 35, 36

Types. *Holotype* male in the ANIC no. 29-029366, Black Mtn, ACT, light trap, 29 Dec. 1964, IFBC; terminalia in tube 109. *Paratypes* (all males): 3 specimens as for holotype but 27 Dec. 1962, 18 Jan. 1965, 25 Jan. 1966, T.t. 125, 107, 167, respectively; 35°30'S 150°24'E, Bawley Point, NSW, 18 Nov. 98, D. C. F. Rentz, T.t. 2158.—*Victoria:* 6 mi NW of Wedderburn, 13 Mar. 1966, MSU & J. A. Grant, T.t. 85; 26 mi NNE Orbost, 1300 feet, 6 Nov. 1969, IFBC, T.t. 405.—*South Australia:* Farina, 48 km NW of Leigh Creek, 17 Sep. 1978, MSU and R. Barrett, T.t. 2237.—*Western Australia:* 40 mi S of Balladonia, 21 Mar. 1968, IFBC & MSU, T.t. 337; Cunerdin, 9 Sep. 1986, G Hall, ex *Paropsis* larvae, T.t. 2027 (with puparium); Ludlow, 3 Dec. 1985, G. Tribe, ex larvae of *Trachymela tincticollis*, T.t. 2152; 1 km NNE of Millstream HS, 21°35'S 117°04'E, 16 Apr. 1971, MSU & Mitchell, T.t. 423.—*Queensland:* 2 spec., 7 mi SW of Mt Garnet, 20 Apr. 1969, IFBC & MSU, T.t. 376 and 2221 resp.; Darr River, 31 km NNW Longreach, 7 Apr. 1976, DHC, T.t. 2116; 15°29'S 145°16'E, Mt Cook NP, 10 May 1981, DHC (at light), T.t. 2242; 38 km S of Cunnamulla, 28 Apr. 1976, DHC (at light), T.t. 2140.—*Northern Territory:* 2 spec., Ongeva Ck, 99 km NE of Alice Springs, DHC, 13 Oct. 1978, T.t. 2200, 2216; Koongarra, 15 km E of Mt. Cahill, 6–9 Mar. 1973, DHC, T.t. 2392; Standley Chasm, 43 km SW of Alice Springs, 11 Oct. 1962, MSU, T.t. 2126.

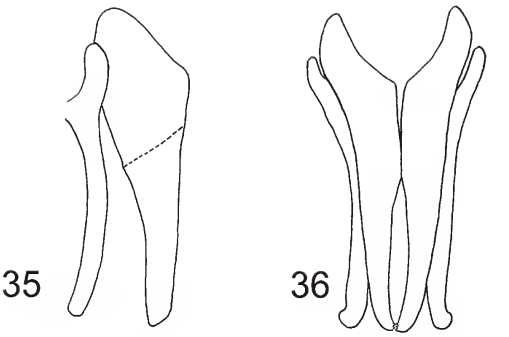
Other specimens examined: 60 males from above localities and: ACT (Blundells, Mt Ainslie, Bulls Head), NSW (Mt Kosciusko, Urunga, Coffs Harbour, Wilcannia), Vic. (Hoppers Crossing), Qld (Cooktown vicinity, Kuranda, Townsville, Biggenden, Daintree, Yeppoon, Charleville), WA (Geraldton, Collie, Dryandra, Yanchep, Pingrup, Broome), NT (Victoria River Downs, Mt Solitaire, Alice Springs vicinity, Entire Creek).

Exceedingly similar to *A. scutellata*, differing as follows:

Male. *Thorax* almost always with 3 presutural dorsocentral bristles on each side. Intrapostalar often not at all differentiated.

Abdomen. Tergite 3 with pair of submedian marginal bristles usually very finely (or not at all) developed.

Terminalia (Figs 35, 36). Differ principally in the antero-ventral lobe of the hypandrium, which is not microtrichiose but set with fine parallel ridges; also, surstyli rather longer and thinner, and (usually) largely concealed in posterior view, with their apices more obviously turned out and hook-like. Some Western Australian specimens with surstyli very long and curved.



Figs 35, 36. *Anagonia propinqua* sp. nov., male terminalia, *(35)* lateral, and *(36)* posterior views.

Female. Apparently identical to that of *A. scutellata*.

Distribution. Widespread on the Australian mainland, including the wet tropics, but not known from Tasmania.

Biology. Reared from a wide variety of chrysomelid larvae, especially paropsines, including *Chrysophtharta agricola, C. variicollis, C. flaveola* (Chapuis), *C. amoena, Paropsis aegrota* (Boisduval), *P. atomaria, Trachymela tincticollis* (Blackburn), *Phyllocharis cyanipes* (F.), and *Chalcomela* sp. Surprisingly, I have also seen two separate rearings from the curculionid *Bryachus squamicollis* Pascoe. I am aware of only one other species reared from both Curculionidae and Chrysomelidae (see *A. major*, below).

Notes. Despite the close similarity to *A. scutellata*, I have no doubt that this is a good species. The Western Australian specimens with very long and narrow surstyli are rather distinctive and might represent yet another new species, but the evidence is too equivocal for any action here. The name comes from the Latin for "near".

Anagonia grisea (Malloch)

Delta grisea Malloch, 1930:333.

Type. *Holotype* female in ANIC, Mullewa, Western Australia.

As discussed above, *grisea* is very likely a senior synonym of one of the three foregoing members of the *tillyardi* group; but, the holotype being a female, I am unable to say which.

Anagonia anguliventris species group

Includes at least two species, distinguished from others most dramatically by the gross overdevelopment of the female abdominal tergite 5, which is produced anteriorly and posteriorly to appear diamond-shaped in dorsal view, while the ovipositor is extremely long, much longer than in members of any other group. Also, in both sexes, gena relatively wide, *Pd1* seta on hindtibia extremely long; male with subapical *ad* spine on foretibia small, sometimes hardly differentiated, and scutellum relatively stout, *Sbs/Ssa* averaging about 3.2; male terminalia with epiphallus small to very small.

Considering the close similarity of the females, the males are extraordinarily different from each other, to such an extent that association with the females is difficult to accept. However, on available evidence, I see no alternative.

Anagonia anguliventris (Malloch)

Figs 37–39

Froggattimyia anguliventris Malloch, 1932:273. Synonymy by Crosskey (1973:138).

Type. *Holotype* female in USNM, Mt Stromlo, 8 Mar. 1932, Australian Capital Territory.

Male. A relatively large, dark species, generally resembling the *dark form* of *A. rufifacies* but differing as follows:

Head. Width 3.3–3.9, mean 3.60 mm; *Frw/Hdw* 0.2–0.2, mean 0.21; *Gnw/Eyh* 0.4–0.5, mean 0.42; *Ivb/Vb-E* 0.8–1.2, mean 0.93; the difference in width of frons and gena impart a distinctive shape to the head. Eye very sparsely or not at all haired. Reclinate upper frontal hairs strongly inclinate, the upper pairs cruciate. Soft hairs of fronto orbits not markedly long or profuse. Parafacial hairs short, strongly curved, profuse. Postocellar setae usually 2, but up to 7 sometimes present. Upper occipital hairs variable, with from very few to many dark hairs behind the postocular row.

Thorax. Presutural median dark vitta usually well developed, reaching to, or almost to suture; pollinosity of scutellum and adjacent mesoscutum usually with brownish tinge. Scutellum relatively broad at base (*Sbs/Ssa* 2.6–4.3, mean 3.17, the highest for the group); apical setae highly variable in shape and strength, sometimes not differentiated.

Legs. Tibiae almost always concolorous with femora, but rarely a little paler, approaching the condition in *A. rufifacies* (see "Notes" below). Hindtibia with *pd1* bristle conspicuously long (*Pd1/Sdd* 0.9–1.4, mean1.15). Foretibia with preapical *ad* bristle extremely fine, vestigial or not at all differentiated.

Wing. Tegula dark brown, basicosta brown, usually paler at centre or margin.

Abdomen. Very dark, paler areas on tergites 3 and 4 not at all conspicuous. Tergite 3 with submedian pair of marginal bristles usually not differentiated (rarely distinct in specimens from WA).

Terminalia (Figs 37–39). Remarkably small for so large a species (Fig. 37 is drawn to the same scale as Fig. 40). Surstyli about as long as cerci, both rather digitate, tapering to blunt, rounded apices; epiphallus small.

Female. Relatively large, head width 3.3–3.7 mm, mean 3.6 mm; gena (as in male) relatively broad, *Gnw/Eyh* 0.4–0.5, mean 0.43. As usual, paler than the male, with grey-dusted scutum lacking the presutural median vitta; but with the same characteristic setation of hindtibiae and abdomen; preapical *ad* bristle of foretibia rather larger, but still noticeably small. Abdominal tergite 5 lozenge-shaped, remarkably produced both anteriorly and posteriorly; shape rather variable, but length usually 1.3–1.7 times breadth.

Terminalia (see Cantrell, 1988:119). Segments greatly elongated, forming a long tubular ovipositor, about 3 times as long as tergite 5; tergite 6 largely membranous, lightly sclerotized apically; tergite 7 consisting of little more than a pair of narrow, lightly sclerotized hemitergites, sternite 7 more strongly sclerotized at apex, latter rounded, rather "scoop-like". Intersegmental membranes supported by a narrow but conspicuous, median sclerotized strip.

Distribution. Most specimens are from southern states (NSW, ACT, Victoria, South Australia, and Western Australia). I have one aberrant specimen (see above) from North Queensland, but the species seems to be at least rare in the tropics.

Biology. In the Canberra region, the species has been reared almost entirely from *Paropsis atomaria*, but a few from *Chrysophtharta variicollis* as well; whereas the few specimens from Western Australia were reared from *Paropsisterna* sp. ("*amoena*"—sic) and one from *Trachymela tincticollis*. Identified males have also been taken frequently in light traps.

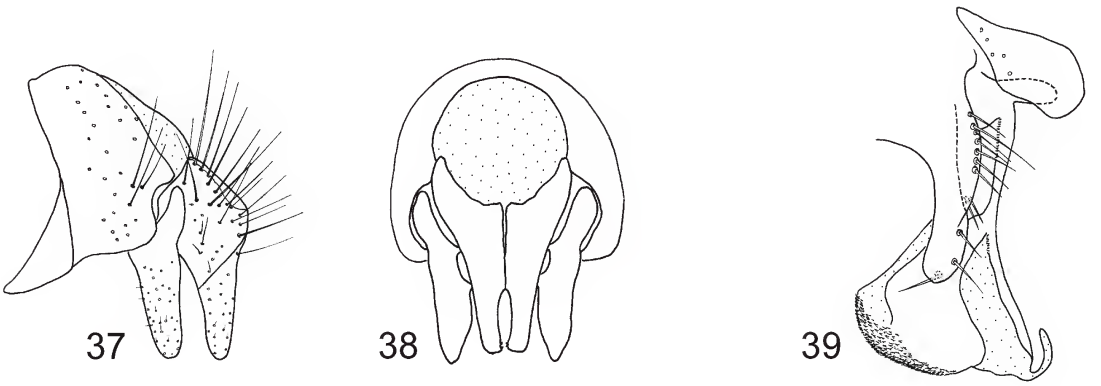
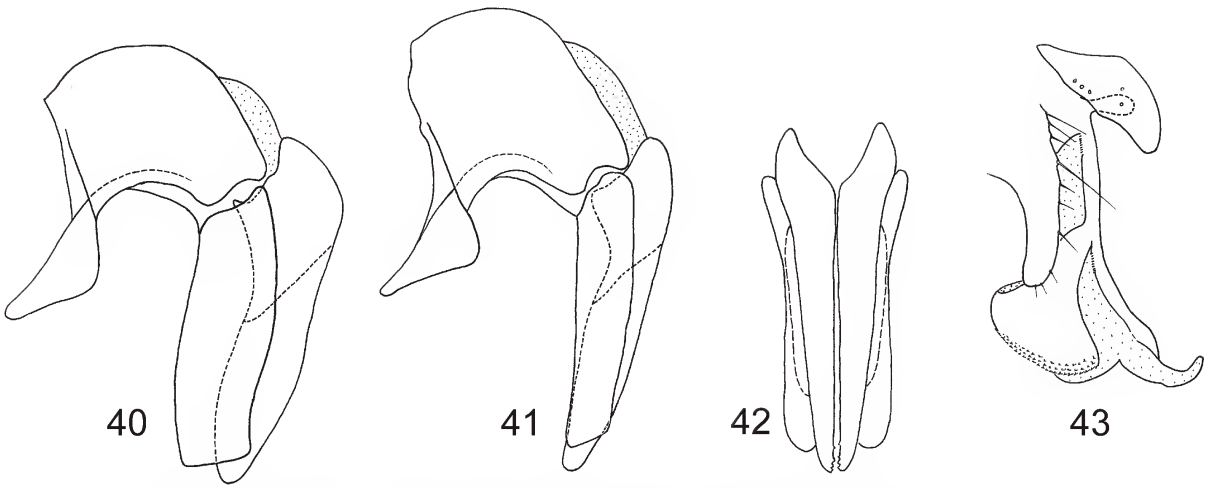


Fig. 37–39. *Anagonia anguliventris*, male terminalia, *(37)* lateral, and *(38)* posterior views, *(39)* aedeagus.



Figs 40–43. *Anagonia major*, male terminalia, *(40, 41)* lateral, and *(42)* posterior, *(43)* aedeagus.

Notes. This is certainly the species described by Malloch. I have not seen the holotype but Dr Norm Woodley has checked the crucial features for me. Also in the ANIC, there are 2 males and 2 females reared from the same batch as the holotype. Moreover, *A. major*, which has an extremely similar female, has never appeared in extensive rearings from *Paropsis atomaria*, the species from which the holotype was reared.

Despite the normally dark tibiae, I have seen several males with terminalia as described above, but with the tibiae paler than the femora; two, in particular, have the foretibia conspicuously pale and the metatarsus likewise. Two females are available, presumably of this species or the next, with aberrant setation: one with a stout pair of submedian marginals on tergite 3 and distinct intrapostalars, the other with very stout intrapostalars and tergite 5 more grossly enlarged than usual. Perhaps some of these represent distinct species; but granted the wild variability of tachinids in general, I am more inclined to regard them as simple developmental or genetic variants.

The association of the sexes is based on a large series of co-reared specimens from various dates and localities around Canberra.

Anagonia major (Malloch)

Figs 40–43

Delta major Malloch, 1930:334. Synonymy by Crosskey (1973:138).

Type. *Holotype* male in ANIC, Eccleston, Allyn River, NSW.

Male. Structurally rather similar to *A. anguliventris* but rather smaller and paler; differing as follows:

Head. Paler, fronto-orbital plate brown in ground colour, parafacial and gena pale brown, with stout silver dust. *Hdw* 2.6–3.2 mm, mean 2.94 mm; gena a little narrower on average, but still broader than in other species, *Gnw/Eyh* 0.2–0.3, mean 0.25. Reclinate upper frontal bristles usually stouter, less strongly cruciate, the upper pairs often reclinate. Postocellar setae usually 2; parafacial setulae usually fine and sparse; upper occiput rarely with at most a few dark hairs behind the postocular row.

Thorax. Strongly silver pollinose on mesoscutum and scutellum; presutural median vitta absent. Apical scutellar bristles relatively long, straight, and parallel. Proepisternal hairs sometimes pale, especially in specimens from the tropics.

Legs. Foretibia with apical *ad* bristle rarely vestigial, usually small but clearly differentiated, about 0.3–0.5 times length of adjacent *d* bristle.

Wing. Tegula brown to pale brown; basicosta pale yellowish brown.

Abdomen. Strongly silver pollinose, in posterior glancing view little or no dark area visible, presenting an almost uniform silver-grey field with strongly contrasting dark spots around seta bases.

Terminalia (Figs 40–43). Surstylus typically blade-like, more or less quadrilateral, with apex somewhat diagonally truncate (occasionally rather more elongate than those figured); cercus a little longer than surstylus, strongly tapering to a rounded apex. Shape of syntergosternite 6–8 characteristic, elongate and curving ventrad (a feature often visible in dried specimens). Epiphallus tiny, c. 0.2 of length of postgonite; pregonite lightly bristled. S5 usually with spiny bristles.

Female. No reliable differences have been found from females of *A. anguliventris*. The *A. major* specimens are, perhaps, somewhat paler on average, and some have a few pale brown hairs on the pleura; but I have found nothing of diagnostic value.

Distribution. From all states and territories except Tasmania. Unlike the preceding and very similar species, it is common in the tropics.

Biology. Commonly taken in light traps. In Western Australia, reared from *Trachymela tincticollis* and *Paropsisterna picta;* also, and most unusually, from a curculionid, *Gonipterus* sp. (the latter a single specimen only, but from a reliable source).

Notes. The sexes were associated on the basis of a small but convincing series co-reared from Perth. It is extraordinary that two species (this and *anguliventris*) can be so similar—

indeed, virtually indistinguishable as females—while differing so markedly in their male terminalia.

Malloch's allotype is an *Anagonia*, but not *major*. I cannot identify it further.

Anagonia lasiophthalma species group

Includes 4 species grouped principally by the remarkable development of sternite 7 of the female terminalia, as a sharp-pointed, highly sclerotized, downcurved "piercer". This device is no doubt adapted in some way to the host, which (for 3 species at least) is the larva of a curculionid beetle (*Gonipterus* and *Oxyops* spp). In all but *A. zentae* the tibiae are usually paler than the femora and the foretibia has the subapical *ad* bristle differentiated but small; also, in all 4, the apical scutellar bristles, although variable in some species, are usually upcurved and, in all but *A. lasiophthalma, Pd1* on hindtibia is (on average) very short. In all but *A. dayi* the scutellum is rather narrow basally, ratio *Sbs/Ssa* averaging about 2.2–2.5, but the difference is scarcely diagnostic. In the male terminalia, all but *A. zentae* have the cerci with a rather larger set of internoapical teeth than is usual. The species are, however, otherwise remarkably disparate, and one cannot exclude the possibility of convergent development of the piercer. A very similar structure occurs elsewhere in Tachinidae; e.g., the Nearctic genera, *Phorocera*, subgenus *Pseudotachinomyia* (Wood, 1972), and *Celatoria* and *Eucelatoria* (Wood, 1985).

Anagonia lasiophthalma (Malloch)

Figs 44–46, 84

Froggattimyia lasiophthalma Malloch, 1934:6. Synonymy by Crosskey (1973:138)

Type. *Holotype* female in ANIC, no. 5887, Canberra, Australian Capital Territory.

Male. Generally resembling the *pale form* of *A. rufifacies* in colour and chaetotaxy, differing principally as follows:

Head. Width 2.6–3.4 mm, mean 2.97 mm. Frons rather narrow, *Frw/Hdw* 0.2–0.3, mean 0.20. Gena rather wide, *Gnw/Eyh* 0.2–0.3, mean 0.26. *Ivb/Vb-E* 0.9–1.1, mean 1.1. Eye strongly and conspicuously haired. Postocellar setae 2–8, almost always more than 2, usually 4 or more.

Thorax. Median dark vitta well developed, extending postsuturally more than half way to scutellum. Presutural intra-alar bristle usually fine or absent on at least one side. Intrapostalars often finely differentiated on at least one side. Apical scutellars curved or directed upward and relatively stout. Scutellum distinctly narrow basally, ratio *Sbs/Ssa* 2.2–2.6, mean 2.40.

Legs. Tibiae all pale brown. Foretibia with preapical *ad* bristle distinct but usually very small, c. 0.2 length of *d* counterpart. Hindtibia with *pd1* moderately long, ratio *Pd1/Sdd* 0.8–1.1, mean 0.97.

Wing. Basicosta and tegula various shades of brown, sometimes concolorous, but tegula usually distinctly paler.

Abdomen. Tergite 3 with pair of stout submedian marginal bristles, a finer, finer pair often on syntergite 1+2 also. Also, tergite 4 and sometimes tergite 3 with 2 or more strongly differentiated bristles on disc.

Terminalia (Figs 44–46). Cerci with very distinctive, stout posterobasal lobes and conspicuous apical medial teeth; the lobes commonly visible in the dried specimen. Also, surstyli strongly pigmented and densely pilose on their inner surfaces.

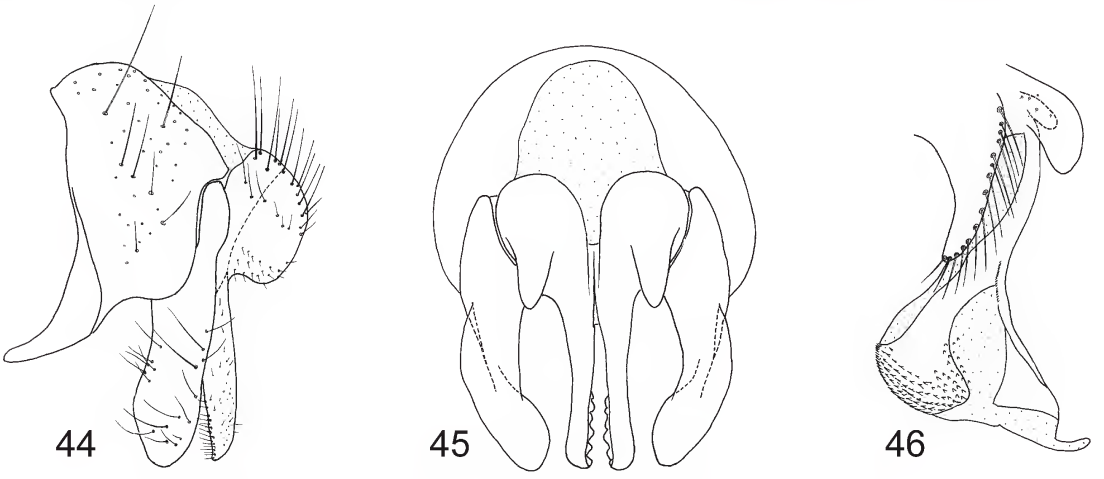
Female. Differing from the male in the usual sexual characters, and as follows:

Head. Width 3.6–4.0 mm, mean 3.72 mm. *Frw/Hdw* mean 0.2 Postgular and sometimes subcranial setae pale.

Thorax. Median dark vitta poorly developed, presutural portion usually lacking. Presutural intra-alar bristle well developed. Intrapostalar bristles usually distinct. Pleuron with soft hairs mostly pale on all but anepisternum (more obviously so than in *A. rufifacies*).

Wing. Tegula and basicosta both pale brown.

Legs. Femora and tibiae concolorous, pale to mid-brown. Hindtibia with *pd1* rather shorter, ratio *Pd1/Sdd* 0.6–0.8,



Figs 44–46. *Anagonia lasiophthalma*, male terminalia, *(44)* lateral, and *(45)* posterior views (dense pile on medial surface not shown), *(46)* aedeagus.

mean 0.76.

Abdomen. Sternite 1 with pale brown hairs.

Terminalia (Fig. 84). Tergite 6 more or less entire, slightly emarginate posteriorly; Sternite 6 in lateral view about as long as high, with stout, posteroventrally projecting, scoop-like, median boss, lined apically with several fine setae; tergite 7 completely divided, with 2 more or less crescent-shaped basal portions, the apical ⅔ represented by 2 narrow, parallel hemitergites; sternite 7 forming a conspicuous, sharp-pointed, thornlike "piercer", curved anteroventrally, emarginate basally with a group of tiny setae on each angle; dorsal membrane of tergite 7, above the piercer and enclosing the hemitergites, with a conspicuous area of tiny dark tooth-like spicules; these also extend posteriorly on to what is presumably the membranous tergite 8. More posterior parts so lightly sclerotized as to be hardly recognizable. In dried specimens, and presumably in life, the piercer is clearly visible, with its apex resting in the hollow of the median boss of sternite 6.

Distribution. Known from cooler climates in most southern states (NSW, ACT, Victoria, Tasmania, and southern Western Australia), and no doubt occurring in South Australia also. It is one of only three *Anagonia* species known from Tasmania.

Biology. Regularly taken in light traps; but a number were also reared from leaf-eating larvae of curculionid beetles —principally *Gonipterus scutellatus* (Gyllenhal), but one from *Oxyops fasciatus* Boisd. Two anomalous rearings—one from a "sawfly larva" and one from the chrysomelid *Paropsis atomaria*—are from reputable sources, but erroneous labelling cannot be excluded.

Notes. Malloch's holotype and paratype, which seem to have been co-reared, both lack the usual, well differentiated discal bristles on abdominal tergite 4, and the submedian marginal pair on tergite 3 is very finely developed. This is a very rare variant in other material. There is no doubt, however, that they are conspecific with the material described above.

The development of the extraordinary piercer seems correlated with that of the median boss on sternite 6, in that one can envisage the former arising from extreme enlargement of a sclerite resembling the latter. It might also be noted that the shape of sternite 6 is highly reminiscent of that of sternite 7 in *A. rufifacies*.

Anagonia dayi sp. nov.

Figs 47–49, 85

Types. *Holotype* male in ANIC no. 29-029226, Black Mtn, ACT, light trap, 8 Jan. 1965, IFBC. Terminalia in tube 129. *Paratypes* (all males)—*Australian Capital Territory:* 5 specs. as for holotype, but 17 Feb. 1957, T.t. 30; 6–7 Feb. 1966 T.t. 199; 26 Jan. 1967; 14 Feb. 1967; and 2 Apr. 1968; Black Mtn Peninsula, Canberra, 30 Jan. 1980, H. E. Evans, T.t. 388; Canberra, 13 May 1959, M. F. Day, ex larvae of *Gonipterus scutellaris* [sic], T.t. 97.—*New South Wales:* Bald Rock NP, 24 Nov. 1980, G. Daniels, M. A. Schneider, prey of asilid, T.t. 2186 (UQIC).—*Queensland:* Eidsvold, May–Jun. 1923, Bancroft, T.t. 31.—*South Australia:* 67 mi E of Ceduna, 3 May 1968, IFBC & MSU, T.t. 317.—*Western Australia:* 3 specs. 25 W Coolgardie, 27 Oct. 1958, E. F. Riek, T.t. 36, 53, 317; 17 mi SE of Coolgardie, 28 Apr. 1968, IFBC & MSU; 35 mi SSW of Norseman, 32°38'S 121°29'E, 17 Nov. 1969, Key & MSU, T.t. 382.

Male. Specimens from the arid region in the general vicinity of the Nullarbor Plain differ somewhat from the remainder and are described separately below, as the *western form*. Otherwise, generally resembling the *pale form* of *A. rufifacies* in colour and chaetotaxy, differing principally as follows:

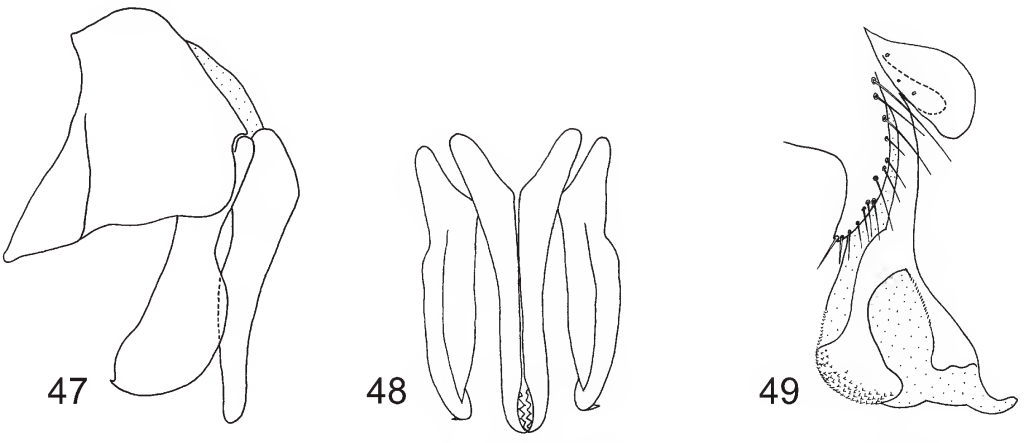
Head. Width 2.9–3.6 mm, mean 3.28 mm; *Frw/Hdw* 0.2–0.3, mean 0.25; *Ivb/Vb-E* 1.1–1.4, mean 1.15. Eye bare; reclinate upper orbital bristles discontinued well before level of ocelli (specimens from ACT only); dorsal ⅓ of occiput with at most a few scattered dark setae behind the postocular row; ocellar setae fine or (usually) absent; postocellar bristles 3–6.

Thorax. Median dark vitta usually present before and after suture; presutural intra-alar bristles and intrapostalar bristle sometimes fine, occasionally absent on one or (rarely) both sides; apical scutellar bristles more or less horizontal, usually slightly cruciate.

Legs. Tibiae pale to mid-brown, contrasting with femora. Hindtibia with *Pd1* small, *Pd1/Sdd* 0.6–0.9, mean 0.76.

Wing. Tegula concolorous with basicosta or (usually) the former a little darker.

Abdomen. Syntergite 1+2 and tergite 3 without differentiated submedian bristles; sternite 1 with pale brown hairs.



Figs 47–49. *Anagonia dayi* sp. nov., male terminalia, *(47)* lateral, and *(48)* posterior views, *(49)* aedeagus.

Terminalia (Figs 47–49). Surstylus strongly pigmented, with very characteristic shape, expanded on apical ⅔ with anteriorly directed sharp tip; with profuse long hairs on both internal and external surfaces and, especially, along posterior margin. Cerci slim, curved in posterior direction, with fairly prominent apical internal teeth.

Male—*western form*. Differs from the normal form as follows: postocellar setae almost always 2 in number; dorsal ⅓ of occiput with 2 or more rows of black setae behind the postocular row; apical scutellar setae usually upcurved; scutum often with median dark vitta fine or absent; abdomen usually with a pair of differentiated submedian bristles on tergite 3; sternite 1 with dark setae.

Female. The specimens described below are believed to be conspecific with the males, on the basis of a reared pair with identical labelling and presumably from a single batch. Apart from the usual sexual characters, differing from the male in (usually) having a finely developed pair of submedian marginal setae on abdominal tergite 3; also, rather inconspicuous pale hairs on proepisternum and katepisternum, posteroventrally on the anepimeron, and ventrally in the stigmatal area.

Terminalia (Fig. 85). Very similar to those of *A. lasiophthalma*, differing as follows: tergite 6 completely or almost completely divided into roughly triangular hemitergites; sternite 6 with stout triangular median boss posteriorly, but less strongly developed; membrane of tergite 7 with very fine, inconspicuous spicules, but those on tergite 8 coarse, thorn-like.

Distribution. The few known specimens have, remarkably, been recorded from all mainland states. The species is presumably to be found wherever there are larvae of eucalypt-defoliating curculionids.

Biology. Taken in light traps and one pair reared from larvae of the curculionid *Gonipterus scutellatus*.

Notes. The species is named for my colleague Max Day, whose many contributions to entomology include the timely lodgement of a reared pair of this species. The correlation of the sexes, as so often the case in this genus, would otherwise remain obscure.

Anagonia commoni sp. nov.

Figs 50, 51, 86

Types. *Holotype* male in ANIC no. 29-029223, Black Mtn, ACT, light trap, 17 Mar. 1958, IFBC, terminalia in tube 141. *Paratypes*: 11 males, as for holotype but 21 Jan. 1955, T.t. 142; 26 Jan. 1955, T.t. 161; 26 Feb. 1955, T.t. 49; 14 Jan. 1957, T.t. 50; 7 Jan. 1964, T.t. 123; 21 Jun. 1965, T.t. 2180; 16 Feb. 1965, T.t. 130; 3 Feb. 1967; 31 Dec. 1967; 16 Jan. 1968; 22 Apr. 1968.—*New South Wales:* Talmalmo, nr Albury, Feb. 1962, Slaney, T.t. 291, ex weevil larva.—*Western Australia:* 19 mi W of Watheroo, 15 Apr. 1968, IFBC & MSU, T.t. 322.

Male. Generally resembling the *pale form* of *A. rufifacies*, differing as follows:

Head. Eye with very sparse hairing or (usually) none; postocellar setae 2–4; upper occiput with few or (usually) no dark hairs behind the postocular row.

Thorax. Median dark vitta usually well developed, before and behind suture. Intrapostalars clearly differentiated, often stouter than usual in congeners; proepisternal hairs pale.

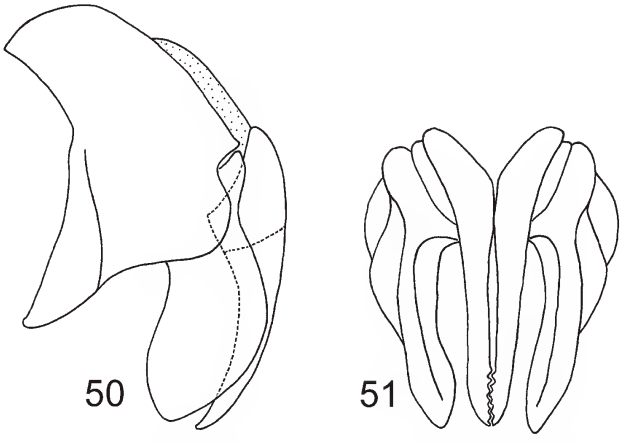
Legs. Foretibia with preapical *ad* usually 0.5–0.6 length of adjacent *d* bristle. Tibiae usually paler than femora, but difference not very striking. Hindtibia with shortest *Pd1* in the whole group: *Pd1/Sdd* 0.5–0.7, mean 0.62.

Abdomen. Syntergite 1+2 with 2–4 differentiated submedian marginals; tergite 3 with submedian marginals at most slightly differentiated.

Terminalia (Figs 50, 51). Surstyli characteristically expanded, leaf-like, with rounded apex and many short, stout bristles on both surfaces; cerci very characteristically curved in anterior direction and with substantial apicointernal teeth.

Female. Recognized on the basis of a single specimen apparently co-reared with the above male from Talmalmo. Differs from male in usual sexual characters.

Terminalia (Fig. 86). Tergite 6 as in *A. dayi*; sternite 6 with straight posterior margin, no median projection; tergite 7 with apical parallel pieces rather fine, completely separated from the strongly sclerotized basal pieces; sternite 7 more



Figs 50, 51. *Anagonia commoni* sp. nov., male terminalia, *(50)* lateral, and *(51)* posterior views.

finely developed than in two preceding species, relatively broad and not so strongly downcurved; membrane of tergites 7 and 8 finely spiculate, individual spicules resolved only with high power, but segments 6–7 with intersegmental membrane coarsely and conspicuously spiculate.

Distribution. Qld, NSW, ACT, and WA, and no doubt occurs in Vic. and SA as well.

Biology. As for the previous species, a single co-reared pair from a weevil larva (presumably *Gonipterus scutellatus*) has enabled correlation of the sexes. Other specimens were taken at light.

Notes. The species is named for my colleague, the late Dr Ian Common, whose light traps contributed so much of the material studied here.

Anagonia zentae sp. nov.

Figs 52, 53, 87

Types. *Holotype* male in ANIC no. 29-029370, Black Mtn, ACT, light trap, 25 Feb. 1966, IFBC; terminalia in tube 88. *Paratypes*:—*Australian Capital Territory:* 26 males, all as for holotype but: 23 Mar. 1960, T.t. 134; 18 Feb. 1961, T.t. 89; 31 Dec. 1961, T.t. 90; 25 Feb. 1965, T.t. 196; 6 Jan. 1965, 3 specs., T.t. 151, 168, 164; 11 Jan. 1965, T.t. 103; 22 Jan. 1965, T.t. 188; 14 Jan. 1966, T.t. 155; 3 Feb. 1966; 21 Mar. 1966, T.t. 132; 20 Dec. 1966; 2 specs., 6 Jan. 1967; 2 specs., 9 Jan. 1967; 13 Jan. 1967; 16 Jan. 1967; 2 specs., 20 Jan. 1967; 14 Feb. 1967; 27 Feb. 1967; 28 Feb. 1967; 6 Mar. 1967; 4 Jan. 1968, T.t. 297; 2 specs., 7 Jan. 1968; also 1 male each: Black Mtn, Jan. 1968, M. E. Irwin, Malaise trap.—*Western Australia:* 60 W Coolgardie, 29 Oct. 1958, E. F. Riek, T.t. 185; Millstream, 23 Oct. 1970, DHC, T.t. 432.—*Northern Territory:* Roe Ck, 12 mi SW Alice Springs, 23–28 Sep. 1972, E. F. Matthews, T.t. 429.—*South Australia:* Sleaford Bay, Oct. 1959, J. Casanova.

Other specimens: 57 putative females from various localities.

A small to medium sized species, with very dark integument and major bristles exceptionally strongly developed.

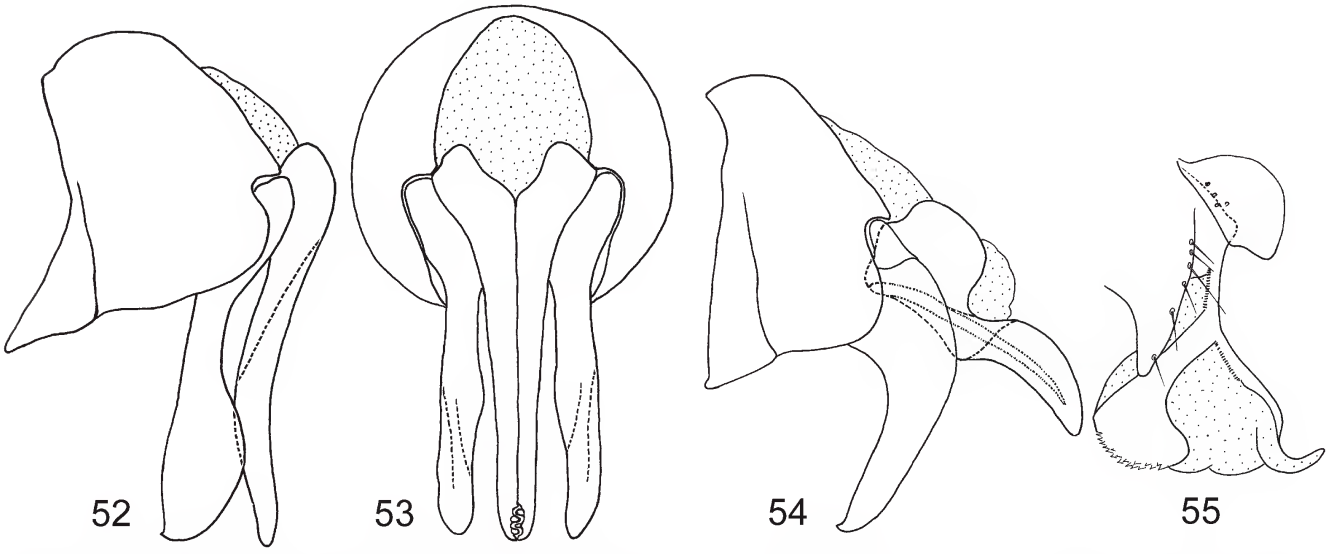
Male. *Head*. Width 1.8–2.4, mean 2.12 mm. Eye quite strongly haired in specimens from ACT but very sparsely so in those from other areas. Gena narrow, ratio *Gnw/Eyh* 0.2–0.3, mean 0.27 (the lowest for the group); parafacial also narrow, reflected in ratio *Ivb/Vb-E* 1.5–1.9, mean 1.75 (the highest for the group). Fronto-orbital plate and parafacial with very dark brown integument and silvery frosting. Ocellar bristles strongly developed. Reclinate upper frontal bristles stout and usually continuous with 2 stout reclinate orbital bristles. Upper occiput with 1–2 rows of black setae behind the postocular row, becoming 3–4 rows laterally, the pale occipital setae off-white and rather inconspicuous.

Thorax. Presutural median dark vitta variable. Presutural intra-alar bristle well developed on both sides. Intrapostalar seta well developed. Scutellum (as usual) with paler integument, but with a large dark patch on about the basal third; rather narrow basally, ratio *Sbs/Ssa* 2.2–2.9, mean 2.34 (the lowest for the group). Apical scutellar setae upcurved.

Wing. Tegula and basicosta both dark brown. Lower calypter grey-brown on about basal half.

Legs. All dark. Foretibia with preapical *ad* spine stout, about half as long as adjacent *d* spine. Hindtibia with *ad* comb coarse, of sparse, spiny setae; *Pd1* very short, ratio *Pd1/Sdd* 0.5–1.0, mean 0.75in posterior direction (often visible in dried specimens).

Terminalia (Figs 52, 53). Surstylus with slender stem and expanded, leaf-like apical half, with short, spiny setae and a sharp, anteriorly directed tip; cercus characteristically slender and curved in posterior direction (often visible in dried specimens); postgonite remarkable, almost teratological in appearance, difficult to resolve (or illustrate) but apparently rather "twisted" and spoon-like, with a stout flange on external surface.



Figs 52–55. Male terminalia. *Anagonia zentae* sp. nov., *(52)* lateral, and *(53)* posterior views. *Anagonia opaca* Malloch *(54)* lateral view, and *(55)* aedeagus.

Female. A long series of specimens closely resemble the male in provenance, chaetotaxy and colouration differing significantly as follows: eye with very sparse hairing or none at all; integument of head paler, mid-brown. Proepisternal hairs pale. Lower calypter uniformly creamy in colour. Basicosta pale brown, lighter than tegula.

Terminalia (Fig. 87). Tergite 6 completely divided; sternite 6 with a median triangular process but scarcely protruding ventrally. Tergite 7 with apical hemitergites very narrow and fine but joined to their basal sections, associated membrane finely spiculate; sternite 7 strongly curved and sclerotized, its base scarcely emarginate. Dorsal membrane of tergite 8(?) with coarse black denticles, much more conspicuous than in 2 preceding species.

Distribution. Recorded from all mainland states but Queensland, where it no doubt occurs as well.

Biology. Nothing known except that the species comes readily to light. However, the structure of the female terminalia suggests strongly that, like other members of the group, *A. zentae* also parasitizes larvae of leaf-eating curculionids.

Notes. I am fairly convinced of the above association of the sexes, based on their close similarity in many attributes and co-occurrence in light traps in Canberra. It is curious that practically all males are from Canberra, while some 30% of females came from areas of very arid semidesert. However, the latter were all taken in early spring, when males may not yet have been active.

The relationship to other members of the group seems beyond doubt, in view of the close similarity in the remarkable female terminalia. Likewise, in the male the shapes of the surstylus and cercus clearly resemble those of *A. dayi*. However, in many other features, e.g., the male ocellar bristles and postgonite, *A. zentae* is remarkably unlike most other members of the group.

The species name commemorates my friend and colleague—and tireless collector—the late Zenta Rosalia Liepa.

Anagonia opaca species group

Distinguished mainly by the male terminalia: syntergosternite 6–8 very short and declivitous and cercus clearly differentiated into a basal, usually lobate part and an apical, more or less digitate part, the whole structure distinctly shorter than the surstylus; the latter usually curved or bent in an anterior direction. Also, presutural intra-alar seta commonly lacking on at least one side and intrapostalars lacking. Diagnosis of some species depends very much on genitalic characters.

Anagonia opaca (Malloch)

Figs 54, 55, 88

Delta opaca Malloch, 1930:334.

Type. *Holotype* female in ANIC, Sydney, NSW.

A small, very dark, strongly bristled species; not especially resembling any other, but attributes not mentioned below are more or less as in the *pale form* of *A. rufifacies*.

Male. *Head*. Width 1.7–2.4, mean 1.88 mm; gena rather narrow, *Gnw/Eyh* mean 0.30; *Ivb/Vb-E* 1.3–1.8, mean 1.56. Eye bare. Ground colour of fronto-orbital plate and parafacial dark brown, almost black, of gena dark brown, all with stout silvery dust. Reclinate upper frontal bristles widely spaced, above ptilinum 4–5 in number on at least 1 side (other species with 5–10, usually 6 or more), very stout, rather erect but apically cruciate. Upper occiput with mainly black hairs, forming 1 complete row behind postocular row, plus several partial rows of scattered hairs. Ocellar bristles very stout, divergent, comparable in size to adjacent reclinate upper orbital bristles; 2–3 postocellar bristles, usually 2.

Thorax. Median dark vitta stout. Presutural intra-alar bristle almost always undifferentiated; usually 2+4 dorsocentral bristles; no intrapostalar bristle. Scutellum typically with broad basal wedge of dark colour and paler border; apical scutellar setae usually parallel, variable in strength but commonly rather fine.

Wings. Calypters usually pale, upper one sometimes grey-brown brown to black; tegula dark brown, basicosta somewhat paler.

Legs. Dark. Foretibia with preapical *ad* spine 0.5–0.8 length of adjacent *d* spine. Hindtibia with very coarse, sparse *ad* comb; *pd1* usually noticeably short, *Pd1/Sdd* 0.7–1.0, mean 0.88.

Abdomen. Very dark, pale lateral areas often restricted to tergite 3, extending at most anteriorly on to tergite 4; submedian marginal pair of bristles strongly developed on tergite 3 (rarely a fine pair on syntergite 1+2); dorsum of tergite 4 often with 1 or 2 stout discal bristles (or an anteriorly displaced marginal); bristles on tergite 5 conspicuously long and stout.

Terminalia (Figs 54, 55). Surstylus in lateral view pointed, with very characteristic anteriorly curved, sickle-like shape; cercus much shorter than surstylus; basal lobe relatively long but not very prominent, with many microtrichiae scattered amongst the setulae, about as long as apical part and separated from it by a distinct area of membrane; apical part digitate, frequently exserted as in Fig. 54. Epiphallus scarcely developed, at most a very slight prominence.

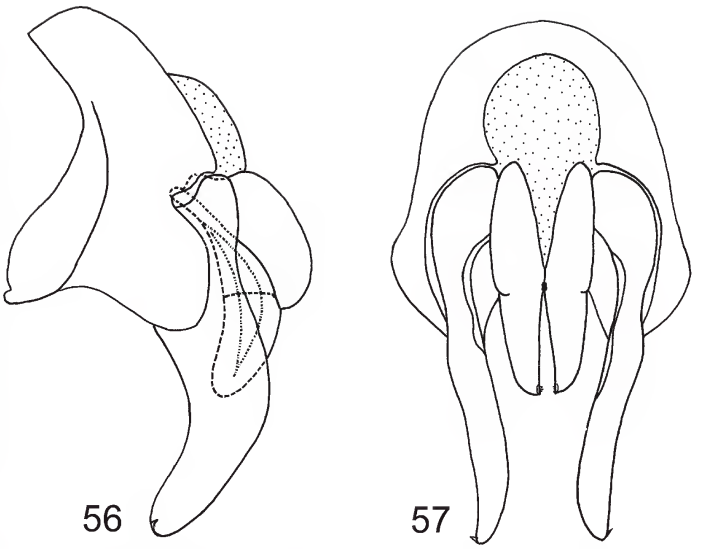
Female. Association based on co-collection, plus stout resemblance in chaetotaxy (I cannot however exclude the possible inclusion of a few specimens of some very similar species, e.g., *A. minor*). Differs from male in usual sexual characters, including paler integument, stouter silvery pollen, and median vitta of thorax usually missing. Also, reclinate upper frontal bristles above ptilinum often only 2 or 3 in number; tegula brown, basicosta pale brown.

Terminalia (Fig. 88). Tergite 6 deeply emarginate apically or completely divided; sternite 6 with small but distinct setulose median projection. Tergite 7 finely sclerotized, hemitergites more or less parallel-sided, not expanded basally; sternite 6 finely sclerotized on basal half, apical half broad in ventral view, only a little longer than wide, rounded apically; in lateral view scoop-like, with a slight but characteristic ventral deflexion.

Distribution. I have specimens from all mainland states, but none from the wet tropics.

Biology. All material was netted or taken at light. Nothing is known of the host, which is presumably a rarely investigated beetle.

Notes. A very distinctive species, especially in the male with its strongly developed ocellar bristles. The female holotype is old and fragile and I forbear to dissect its terminalia. However, I have no doubt about the identity of this species, and the association of the sexes.



Figs 56, 57. *Anagonia minor* sp. nov., male terminalia, *(56)* lateral, and *(57)* posterior views.

Anagonia teratostylus sp. nov.

Fig. 76

Types. *Holotype* male in ANIC no. 29-029368, Mt Solitaire, 30 km WNW of Alice Springs, NT, 29 Sep. 1978, MSU and R. A. Barrett, terminalia in tube 2500. *Paratypes* (all males):—*Northern Territory:* 32 km WNW of Alice Springs, 8 Oct. 1978, DHC, at light, T.t. 2230; 2 males, Entire Ck, 155 km ENE of Alice Springs, 13 Oct. 1978, DHC, T.t. 2249, 2615.—*Queensland:* Moura, F. D. Page & L. Rigby, T.t. 2614.

A small dark species. Only the male is known, practically identical to *A. opaca* in size, colouration and parameters of head shape, but rather less bristly and differing otherwise as follows:

Head. Eye moderately to sparsely haired; ocellar setae well developed, but not as stout as in *opaca*. Hindtibia with *Pd1* long, ratio *Pd1/Sdd* 1.0–1.1, mean 1.08. Abdomen without differentiated submedian marginal bristles on tergite 3.

Terminalia (Fig. 76). Syntergosternite 6–8 very narrow, its posterior margin steeply declivitous, almost vertical, its surface with extensive areas of very fine setulae. In lateral view surstylus of most unusual shape, broad and foliate on basal ⅔, with a deep subapical notch on anterior edge setting off a more or less thumb-like apical part. Cercus with basal lobe only slightly protruding, about as large as apical part, both with extensive areas of profuse, minute, fine setulae. Epiphallus well developed, tapering. Lobes of S5 with small, stout denticles instead of the usual setae.

Distribution. The few specimens from the vicinity of Alice Springs in the Northern Territory were matched, surprisingly, by one from central Queensland.

Biology. The NT specimens were taken at light.

Notes. The specific identity is guaranteed by the extraordinary terminalia, but there is little else to assist in identification. The name refers to the most unusual surstylus.

Anagonia minor sp. nov.

Figs 56, 57, 77

Types. *Holotype* male in ANIC, no. 29-029363, Black Mtn, ACT, light trap, 27 Jan. 1965, IFBC, terminalia in tube 87. *Paratypes* (all males):—*Australian Capital Territory:* 17 specs. as for holotype, but: 20 Dec. 1957, T.t. 195; 4 Jan. 1965, T.t. 198; 5 Jan. 1965, T.t. 187; 7 Jan. 1965, T.t. 199; 15 Jan. 1965, T.t. 119; 22 Jan. 1965, T.t. 117; 9 Dec. 1965, T.t. 170; 16 Dec. 1965 (2 specs.), T.t. 138 and 144; 17 Dec. 1965, T.t. 154; 22 Dec. 1965, T.t. 137p; 5 Jan. 1966 (2 specs.), T.t. 143 and 152; 17 Jan. 1966, T.t. 167; 18 Jan. 1966, T.t. 153; 20 Jan. 1966, T.t. 160; 26 Jan. 1966, T.t. 329.—*Queensland:* 15°14'S 145°07'E, 7 km N of Hopevale Mission, 4 Oct. 1980, DHC (at light), T.t. 2162; 15°02'S 145°16'E, Mt Cook NP, 10 May 1981, DHC, (at light), T.t. 2231.

A small very dark species, integument and vestiture mainly dark brown to black.

Male. *Head*. Width 1.6–2.1, mean 1.87 mm. Eye very inconspicuously haired, mainly on ventral parts. Integument of head very dark, almost black in ground colour, with stout silvery frosting. First flagellomere appearing rather shorter than usual (but I cannot find a convincing ratio to support this). Frons rather narrower than usual, *Frw/Hdw* 0.20; gena relatively narrow, *Gnw/Eyh* 0.30. Margins of face strongly diverging, parafacial therefore rather narrow, *Ivb/Vb-E* 1.4–1.7, mean 1.54. Fine hairs of vertex and front of head relatively long and profuse. Ocellar setae very finely developed; postocellar setae 2–5, usually 3 or more. Upper occiput with at least 1 row of black setulae behind postorbital setae.

Thorax. Integument dark, median vitta stout. Dorsocentral bristles 2+4; presutural intra-alar absent on at least one side, usually both; intrapostalar absent. Scutellum with c. basal half blackish, remainder dark brown; apical setae highly variable in shape.

Wing. Tegula brown to dark brown. Upper calypter dark on internal margin, remainder grey-brown on about basal ⅔, apical portion pale.

Legs. Foretibia with apical *d* spine unusually large in some specimens, 2.0–2.5 times as long as *ad* spine. Hindtibia with *pd1* usually shorter than apical *d*, ratio *Pd1/Sdd* 0.8–1.2, mean 0.96; *ad* comb rather distinctive, sparse but longer than usual in such small specimens.

Abdomen. Syntergite 1+2 sometimes with a pair of submedian marginals; those on tergite 3 usually differentiated but quite fine.

Terminalia (Figs 56, 57, 77). Strongly sclerotized, dark, especially sclerites of phallus. Structurally similar to *A. perplexa* (below). syntergosternite 6–8 similarly short and precipitate posteriorly. Curvature of surstyli rather angulate (not well brought out in the figure), its base expanded posteriorly in a fairly characteristic fashion. Cerci not exserted and short, apex falling at or somewhat short of bend of surstylus; basal lobe very conspicuous, separated from apical part by a distinct notch; apical part a little shorter than basal part, with a subapical patch of setulae. Epiphallus developed but very faintly sclerotized and seen only with careful microscopy (not at all in some specimens apparently because overlain by very dark postgonites).

Female. Not recognized; perhaps very similar to the *A. opaca* female.

Distribution. Most material taken in the ACT; two specimens from northern Queensland are available.

Biology. Nothing known except that the species enters light traps. Despite the many males taken in light traps in Canberra, I am unable to recognize the female.

Notes. Very similar in some respects to members of the *perplexa* complex (below) especially in the male terminalia, but very different in size and colour. Very similar externally to *A. opaca*, but males immediately recognizable by the finely developed ocellar bristles, and by the terminalia. The distinctively high *Ivb/Vb-E* reflects little more than overall size.

Anagonia norrisi sp. nov.

Figs 58–60

Types. *Holotype* male in ANIC no. 29-029364, Black Mtn, ACT, light trap, 6 Feb. 1967, IFBC (terminalia in situ, exserted). *Paratypes* (all males):—*Australian Capital Territory:* 18 specs. as for holotype, but 8 Feb. 1955, terminalia in tube 146; 16 Feb. 1955, T.t. 145; 13 Jan. 1960, T.t. 126; 15 Jan. 1964, T.t. 124; 10 Feb. 1964, T.t. 118; 7 Jan. 1965, T.t. 131; 5 Feb. 1965, T.t. 111; 5 Jan. 1966, T.t. 158; 20 Jan. 1966, T.t. 150; 4 Jan. 1967 (2 specs.); 5 Jan. 1967; 18 Jan. 1967; 25 Jan. 1967; 31 Jan. 1967; 9 Feb. 1967 (2 specs.); 10 Feb. 1967. Canberra, 25 Jan. 1957, P. B. Carne, T.t. 2118, emerged from larva of *Gonipterus* sp.; Black Mtn Peninsula, Canberra, 30 Jan. 1970, H. E. Evans, T.t. 393.—*New South Wales:* nr. Queanbeyan, 10 Feb. 1955, S. J. Paramonov, T.t. 35.—*Western Australia:* Fitzroy Crossing, 19 Jul. 1968, P. Ferrar, T.t. 380.

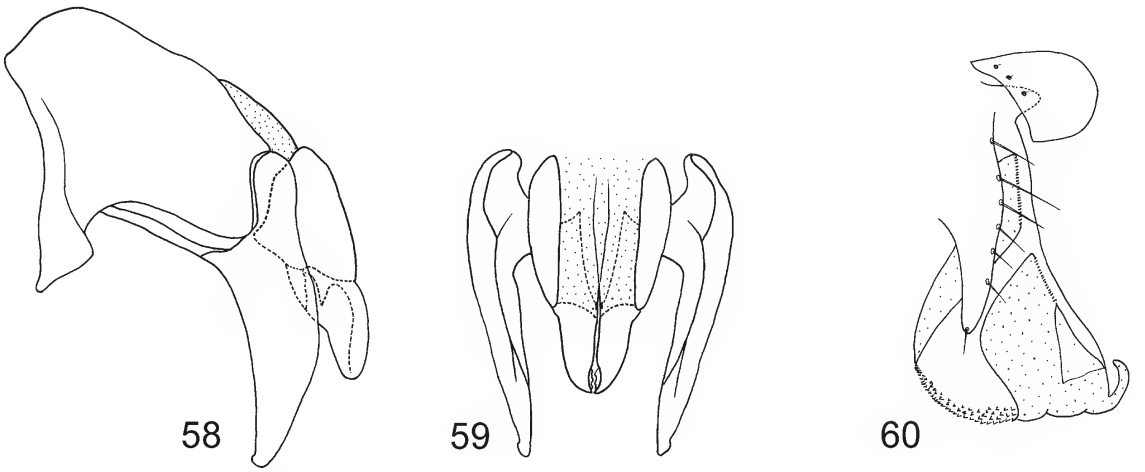
A large, rather pale species, practically identical to *A. perplexa* sp. nov. (see below), but differing as follows:

Head. Occiput with mainly pale "scales", usually at least a few in the first row of setae behind the postocular row.

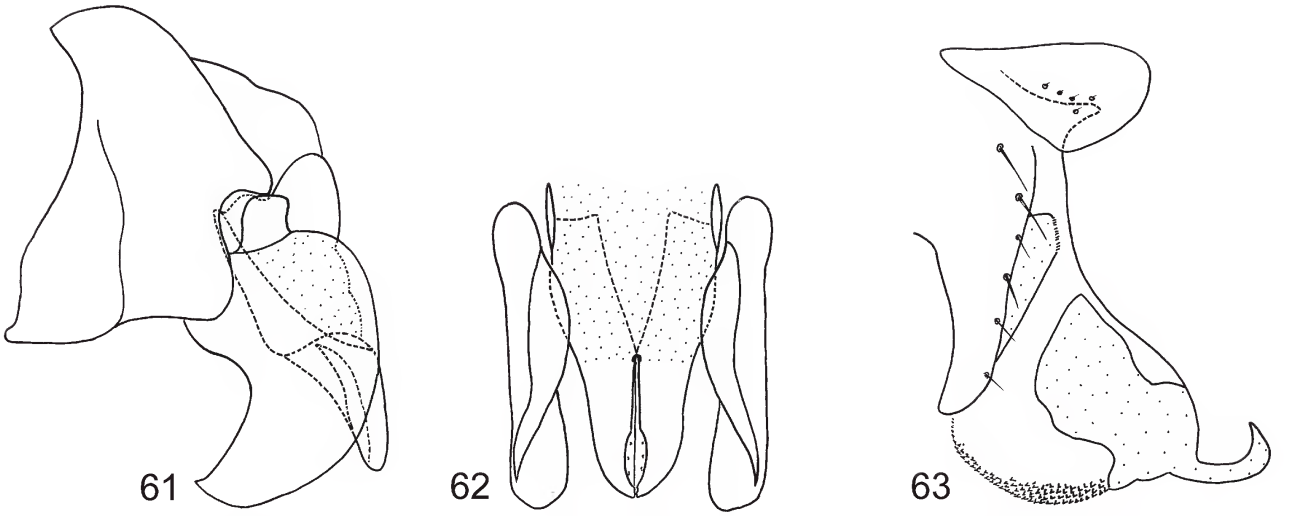
Thorax. Median vitta sometimes absent. Presutural intra-alar seta absent on at least one side in about 50% of specimens.

Terminalia (Figs 58–60). In lateral view syntergosternite 6–8 relatively long, gently sloping; surstylus falcate, with hooked tip; cercus with basal lobe not prominent, about as long as the remainder.

Distribution. Of specimens seen, all but one came from Canberra; the other (and quite typical) was from Western Australia.



Figs 58–60. *Anagonia norrisi* sp. nov., male terminalia, *(58)* lateral, and *(59)* posterior views, *(60)* aedeagus.



Figs 61–63. *Anagonia latistylus* sp. nov., male terminalia, *(61)* lateral, and *(62)* posterior views, *(63)* aedeagus.

Biology. Most specimens were taken at light, but one was reared from larvae of the weevil *Gonipterus scutellatus*.

Notes. Despite the strong external resemblance to several other species, the terminalia are quite different and the species is obviously a good one. It is dedicated to my colleague, friend, and noted dipterist, the late Dr K. R. Norris.

Anagonia latistylus sp. nov.

Figs 61–63

Types. *Holotype* male in ANIC no. 29-029361, 1 km NE of Millstream, WA, 21°35'S 17°04'E, 6 Nov. 1970, MSU & Feehan; terminalia in tube 2123. *Paratypes* (all males):—*Western Australia:* 4 specs. Millstream, 23 Oct. 1970, DHC, T.t. 430, 431, 2117, and 2125; 3 specs. as for holotype, but 1 Nov. 1970, T.t. 434, 435, and 436.—*Australian Capital Territory:* Black Mtn, light trap, 23 Jan. 1962, IFBC, T.t. 114; the same, but 15 Jan. 1965, T.t. 63, and 19 Dec. 1967, T.t. 296.

Generally resembling others in the group; more distinctive features as follows:

Male. *Head*. Width 2.3–3.0, mean 2.70 mm. Frons relatively narrow, *FrW/HdW* mean 0.18; *Ivb/Vb-E* 1.0–1.4, mean 1.17. Eye almost or entirely bare. Parafacial and much of fronto-orbital plate pale in ground colour; the former rather sparsely haired. Ocellar setae usually barely differentiated but occasionally moderate; postocellar setae 2. Upper occiput with 1–2 rows of black setulae behind postocular row.

Thorax. Median vitta usually well developed. Presutural intra-alar lacking on at least one side, usually on both.

Legs. Tibiae dark, concolorous with femora. Hindtibia with *pd1* short, ratio *Pd1/Sdd* 0.6–0.9, mean 0.83. Hindtibial *ad* comb distinctly sparse.

Abdomen. Rather noticeably pale, syntergite 1+2, tergite 3, and tergite 4 pale on lateral third. Syntergite 1+2 and tergite 3 with submedian marginal bristles not differentiated.

Terminalia (Figs 61–63). Surstylus greatly expanded, but still pointed and angled in the fashion typical of the group. Cercus structurally resembling that of *A. opaca*; basal lobe small, separated from apical part by an extensive membranous region about as long as the apical part itself; the latter thumb-like, with a central patch of setulae.

Female. Not recognized.

Distribution. ACT and northern Western Australia.

Biology. All specimens were taken at light.

Notes. The name refers to the species only really conspicuous feature, the greatly expanded surstylus. In other ways it is a quite typical member of the group. Despite its enigmatic distribution the type series is quite homogeneous and clearly represents a good species.

Anagonia perplexa complex

I am for convenience grouping here a set of 5 species from the *opaca* group that are exceedingly similar, especially in their male terminalia. The latter exhibit good and stable differences, but they involve obscure features of the cercus, mostly requiring high magnification. There are also more gross differences in colour; but these are sometimes difficult to discern and to describe.

Anagonia perplexa sp. nov.

Fig. 78

Types. *Holotype* male in ANIC no. 29-029365, 12 mi W of Pemberton, WA, 31 Mar. 1968, IFBC & MSU, terminalia in tube 346. *Paratypes* (all males):—*Western Australia:* 2 specs. as for holotype, but T.t. 319 and 345; as for holotype, but 5 Apr. 1968, T.t. 333; 15 mi SE of Donnybrook, 29 Mar. 1968, T.t. 343; 2 specs. 5 mi N of Nannup, 1 Apr. 1968, IFBC & MSU, T.t. 318 and 349.

A relatively large and pale species, but with body hairs all dark.

Male. *Head*. Width 3.0–3.2, mean 3.12 mm. Frons rather broad, *FrW/HdW* mean 0.25; *Ivb/Vb-E* 1.0–1.2, mean 1.06. Eye sparsely to moderately haired. Fronto-orbital plate with rather profuse long fine hairs. Ground colour of parafacial mainly mid- to (rarely) dark-brown, pale-brown along anterior margin; gena pale brown. Ocellar setae rather variable, from finely to moderately developed, but always distinct; postocellar setae 2 or (rarely) 3. Upper occiput with a complete row of black setae behind the postocular row and some scattered black setae behind those.

Thorax. Median vitta strongly developed. Presutural intra-alar extremely fine or not developed on at least one side, often on both. Intrapostalars lacking. Scutellum brown with narrow dark basal band; apical scutellars well developed but highly variable in shape.

Legs. Tibiae paler brown than femora, often conspicuously so. Hind tibia with *Pd1* usually a little shorter than *Sdd*, ratio 0.7–1.0, mean 0.87.

Abdomen. Colour unremarkable, as in, for instance, *A. rufifacies* (*pale form*). Submedian apical bristles on tergite 3 barely or not at all differentiated.

Terminalia (Fig. 78). Structurally, rather like a magnified version of *A. minor* (above). Cercus with prominent basal lobe, separated from apical part by a distinct "notch", with usual small stout bristles and a patch of fine microtrichiae on the margin adjacent to the notch; apical part curved, thumb-like, a little shorter than basal part, its apex about at the bend of the surstylus, with stout fine setulae over most of its posterior surface and a band of microtrichiae along the lateral surface, extending into the basal part. Surstylus rather abruptly angled, apical part narrowed. Epiphallus well developed, with pointed or rounded apex.

Female. Not known with sufficient certainty. Two specimens captured along with males at light may belong here, but the evidence is not compelling.

Distribution. All specimens came from localities in southwestern Western Australia.

Biology. Nothing known except that adults come to light.

Notes. The species is distinguished from others in the complex by the fine details of the shape and vestiture of the cercus. Its name is self-explanatory [I am not sure whether this would pass muster with the new rules].

Anagonia angustifrons sp. nov.

Figs 64, 65

Types. *Holotype* male in ANIC no. 29-029222, 26 mi NNE of Orbost, Vic., 1300 feet, 6 Nov. 1969, IFBC, terminalia mounted on card. *Paratypes* (all males):—*Australian Capital Territory:* Cotter River, 18 Nov. 1954, Z. Liepa, T.t. 106; Lee's Springs, 24 Feb. 1959, Z. Liepa, T.t. 466; Black Mtn, light trap, 20 Nov. 1959, IFBC, T.t. 121; the same, but 15 Oct. 1965, T.t. 136; as for holotype, but terminalia not dissected.

Extremely similar to *A. perplexa*, differing as follows:

Male. *Head*. Width 2.5–3.6, mean 2.87 mm. Frons narrow, *Frw/Hdw* 0.1–0.2, mean 0.16. *Ivb/Vb-E* 1.1–1.4, mean 1.16. Ocellar setae usually very finely developed. Some specimens with more dark hairs on the upper occiput.

Abdomen. Some specimens with submedian marginals on tergite 3 well developed.

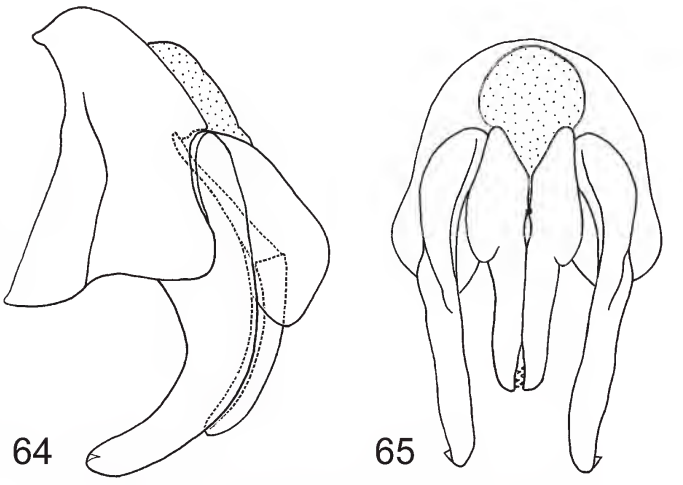
Terminalia (Figs 64, 65). Cercus with basal lobe less prominent, longer, posterior margin drawn out into a blunt-pointed sublobe that covers the base of the apical part, without the fringe of microtrichiae, but with a patch of same at the dorsal half of its base. Apical part relatively longer and narrower (digitate rather than thumb-like), with a subapical patch of setulae.

Female. Not recognized.

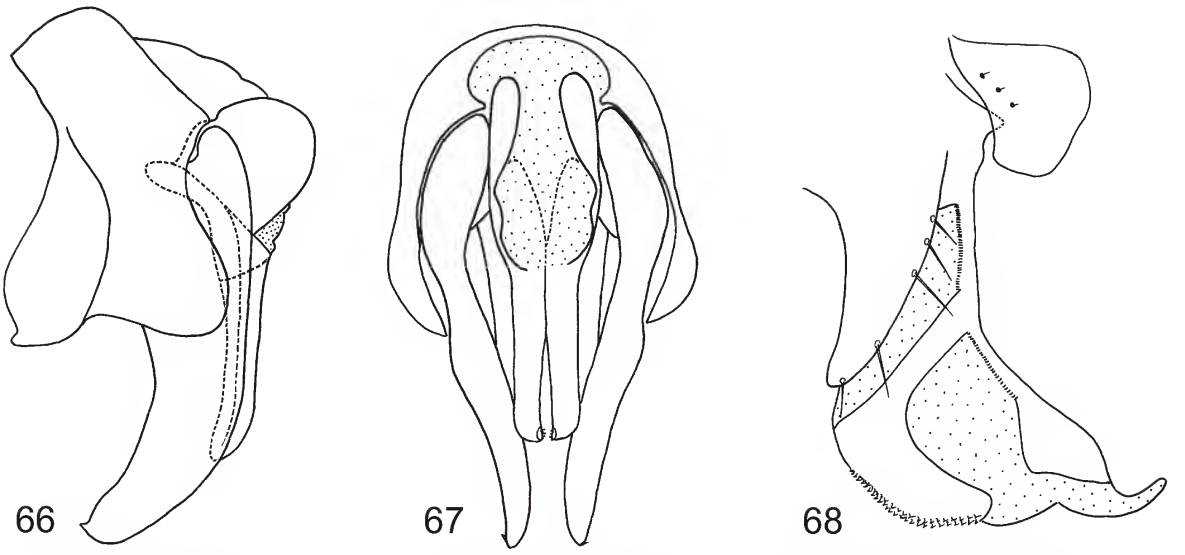
Distribution. ACT and Victoria and presumably more widespread in southeastern Australia.

Biology. Nothing is known except that adults come to light.

Notes. The name refers to the very narrow frons, relatively the narrowest in the entire group.



Figs 64, 65. *Anagonia angustifrons* sp. nov., male terminalia, *(64)* lateral, and *(65)* posterior views.



Figs 66–68. *Anagonia uptoni* sp. nov., male terminalia, *(66)* lateral, and *(67)* posterior views, *(68)* aedeagus.

Anagonia uptoni sp. nov.

Figs 66–68

Types. *Holotype* male in ANIC no. 29-029369, 18 mi W of Mogumber, WA, 13 Apr. 1968, IFBC & MSU; terminalia in tube 325. *Paratypes* (all males):—*Western Australia:* Wyndham, 4 Jan. 1930, T. G. Campbell, T.t. 72; 21 mi W of Kojunup, 21 Mar. 1968, IFBC & MSU, T.t. 359; 5 km SE of Millstream HS, 21°37'S 117°06'E, 17 Apr. 1971, IFBC & MSU, T.t. 2203; 14°49'S 128°49'E, Carson Escarpment, 9–15 Aug. 1975, IFBC & MSU, T.t. 459.—*Australian Capital Territory:* Black Mtn, light trap, 11 Jan. 1958, IFBC, T.t. 127.

Very similar to *A. perplexa*, but rather smaller and differing as follows:

Male. *Head*. Width 1.8–2.6, mean 2.16 mm. *Ivb-VbE* 1.2–1.4, mean 1.30. Eye sparsely, finely or not at all haired. Ocellar setae sometimes not developed. Parafacial with ground colour very pale in tropical specimens, but only along anterior margin in those from southern areas.

Thorax. Apical scutellars directed upwards.

Legs. Tibiae concolorous with femora. Hindtibia with *pd1* usually short, *Pd1/Sdd* 0.4–1.0, mean 0.77.

Terminalia (Figs 66–68, 79). Cercus with basal lobe prominent, rounded, separated by a relatively large, membranous "notch" from apical part, with a patch of fine microtrichiae on ventral part of base; apical part straight, almost rod-like, about 1.5–2.0 times as long as basal part, with stout preapical tuft of spiny setulae and several scattered along the shaft, apex lying at about the bend of surstylus. Surstylus bent at about ⅔ its length from base (about ½ in other species).

Female. Not recognized.

Distribution. Most of the few specimens known are from Western Australia, but there is also one from ACT.

Biology. All that is known is that adults come to light.

Notes. Apart from the expected difference in ratio *Ivb/b-E*, due to overall size difference, *A. uptoni* differs from the other relatively small species, *A. minor*, in *Ivb* independent of size. It is noticeable that specimens from the north of Western Australia are distinctly paler than those from the south.

Named for my colleague Murray Upton, whose passion for Lepidoptera never precluded collection of many interesting Diptera.

Anagonia errator sp. nov.

Fig. 80

Types. *Holotype* male in ANIC no. 29-029360, Illungnarra waterhole, 90 km SSW of Urandangi, NT, 15 Oct. 1978, DHC (at light), terminalia displayed *in situ. Paratypes* (all males):—*Northern Territory:* 2 specs. as for holotype, T.t. 2498 and 2215; 22 km WSW of Borroloola, 2 Nov. 1975, MSU, T.t. 465; Caranbirini waterhole, 33 km SW of Borroloola, 21 Apr. 1976, DHC, T.t. 2205.—*Australian Capital Territory:* Black Mtn, light trap, 17 Jan. 1962, IFBC, T.t. 140; the same, but 9 Jan. 1964, T.t. 147.—*Western Australia:* Mt Claremont, Perth, 10 Apr. 1968, IFBC & MSU, T.t. 344; 16°08'S 136°06'E.

Male. Externally, practically identical to *A. uptoni*, differing mainly in the terminalia. Also, rather larger, *HdW* 2.2–2.9, mean 2.61 mm; *Ivb/Vb-E* 1.1–1.2, mean 1.16.

Terminalia (Fig. 80). Rather similar to *A. perplexa*, but (in lateral view) cercus with basal lobe rather less prominent, with a (usually) small patch of microtrichiae centrally at base, and separated from apical part by a distinct "notch". Apical part a little shorter than basal part, its apex at about the bend of the surstylus, curved and "thumb-like", with subapical patch (rather than tuft) of setulae covering about ⅓ its length, rest of posterior surface with numerous microtrichiae.

Distribution. Specimens seen from Northern Territory, Western Australia and the ACT.

Biology. Most specimens were taken at light, but one was reared from larvae of the weevil, *Gonipterus scutellatus*.

Notes. Despite the stout similarity to *A. uptoni*, the fine detail of the terminalia leaves no doubt that this is a good species. The name refers to the remarkably wide geographic distribution of the few specimens seen.

Anagonia similis sp. nov.

Fig. 81

Types. *Holotype* male in ANIC no. 29-029367, Illungnarra waterhole, 90 km SSW of Urandangi, NT, 15 Oct. 1978, DHC (at light), terminalia in tube 2224. *Paratype* male:—*New South Wales:* Dubbo, 24 Jan. 1909, T.t. 2187 (pinned above an adult weevil, probably *Gonipterus* sp).

Very similar to *A. errator* and *A. uptoni*, but differing as follows:

Male. *Head*. Width 3.0–3.1, mean 3.05 mm. *Ivb/Vb-E* 1.2–1.3, mean 1.24. Postocellar setae 5–6.

Terminalia (Fig. 81). Structurally resembling *A. uptoni*, with apical part of cercus similarly rod-like, but basal lobe of cercus longer and narrower, almost as long as apical part, and much less prominent.

Female. Not known.

Distribution. Qld and NSW.

Biology. The association of one specimen with an *adult* weevil is suggestive, but inconclusive.

Notes. Although rather like a "large" form of *A. uptoni*, the differences seem more than enough to recognize this as a basic taxon and presumably a good species; the basal lobe of the cercus is especially distinctive. Also, the *Ivb/Vb-E* ratio is remarkably high for such large specimens and the postocellar setae are distinctive (although that might be spoilt by discovery of further specimens!).

The paratype, associated with an adult specimen of weevil, suggests that this may be the host. However, the evidence is very indirect, since the actual host would have no doubt been a larva.

Ungrouped species

The remaining species display no attributes that could be convincingly used for groupings. There are resemblances among the female terminalia, but until species can be accurately identified as females there is little point in pursuing that aspect.

Anagonia lateralis (Macquart)

Figs 69–71, 89

Masicera lateralis Macquart, 1846:291.

Type. *Lectotype* male in BMNH (Crosskey, 1971:274); type locality: Australia.

A very dark species of small to moderate size. Differs significantly from the *pale form* of *A. rufifacies* as follows:

Male. *Head*. Width 2.0–2.5, mean 2.20 mm. Frons relatively narrow, *Frw/Hdw* mean 0.20; gena likewise narrow, *Gnw/Eyh* 0.3–0.4, mean 0.31. *Ivb-Vb/Vb-E* 1.1–1.5, mean 1.32. Eye with at most very sparse hairs. Reclinate upper frontal bristles more or less contiguous with reclinate upper orbital bristles. Upper occiput with black setae behind the postocular row highly variable, from a few scattered setae (usual) to a complete row.

Thorax. Prescutal median dark vitta variable. Presutural intra-alar seta rarely fine or absent. Intrapostalar bristle usually strongly developed (but occasionally lacking). Proepisternal hairs usually dark, rarely pale or mixed. Scutellum usually largely pale, with dark band on basal 10–30% (occasionally wider); apical setae upcurved or upward directed.

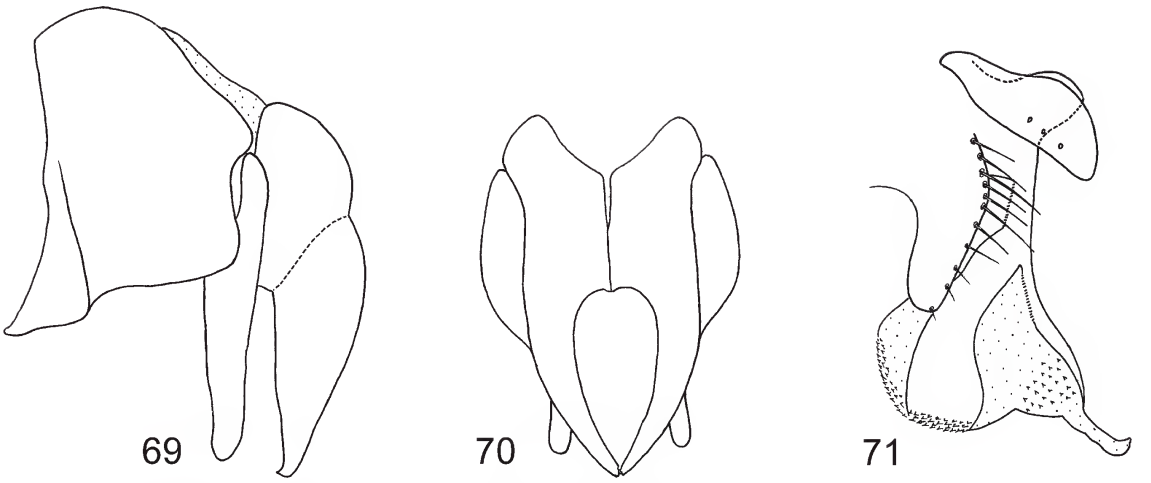
Wing. Tegula very dark brown, basicosta brown. Lower calypter grey-brown on basal half.

Legs. All dark. Foretibia with preapical *ad* spine stout, at least 0.5 of length of adjacent *d* spine, often almost as long. Hindtibia with *ad* comb noticeably sparse and coarse; *pd1* fairly long, *Pd1/Sdd* 0.8–1.2, mean 0.97.

Terminalia (Figs 69–71). Surstylus in lateral view narrow-digitate, sparsely setulose on about basal ⅔; cerci each with broad basal portion and strongly tapered apical portion, the latter widely separated basally, strongly incurved apically to produce a forcipate appearance in posterior view. Epiphallus about as broad as long, rounded; pregonite rather stout and curved, with spiny bristles; acrophallus unusual, membrane spiculate on "heel" as usual, but also in area of the "toe". The characteristic, forcipate cerci are normally visible in dried specimens.

Female. Association with the male is reliably based on co-rearing, plus general resemblance in chaetotaxy. Other females were identified by characteristic terminalia. Resembles male in all but usual sexual characters, but head with at most a few scattered dark setae behind the postorbital row, often none at all; proepisternal setae always pale.

Terminalia (Fig. 89). Tergites 6 and 7 and sternites 6 and 7 large, strongly developed, almost completely enclosing the segments; intersegmental membrane with fine pale pile. Tergite 6 entire, with small apical medial notch; sternite 6



Figs 69–71. *Anagonia lateralis*, male terminalia, *(69)* lateral, and *(70)* posterior views, *(71)* aedeagus.

saddle-shaped, with profuse tiny spiny bristles on apical quarter. Tergite 7 almost completely divided, but hemitergites large, quadrilateral, each linked to sternite 7 by a small basal sclerotized strip; sternite 7 also saddle-shaped, with scattered, short spiny bristles, becoming dense and microscopic along posterior margin. Dried specimens may be identified by the collapsed sclerites, which form a protruding, shiny, almost semicircular keel.

Distribution. Recorded from all mainland states except Victoria, where it no doubt occurs also. The species seems especially prevalent in the more arid inland areas.

Biology. Specimens were reared from larvae of the genus *Calomeles* (Chrysomelidae), an unidentified species feeding on *Acacia* sp. near Braidwood, NSW and (perhaps significantly), *C. satelles* in Perth, WA. *Anagonia lateralis* is abundant at light in arid areas, presumably parasitising chrysomelid larvae that feed on desert acacias.

Notes. I have checked Crosskey's lectotype, which has the characteristic terminalia described above. I am moreover fairly convinced that the association of the sexes is correct. The species does, however, display a remarkable degree of variability in, for instance, the colour of the upper occipital bristles and the length of *pd1* of the hindtibia. It is also unusual in that both sexes can normally be identified as dried specimens by virtue of the large characteristic terminalia.

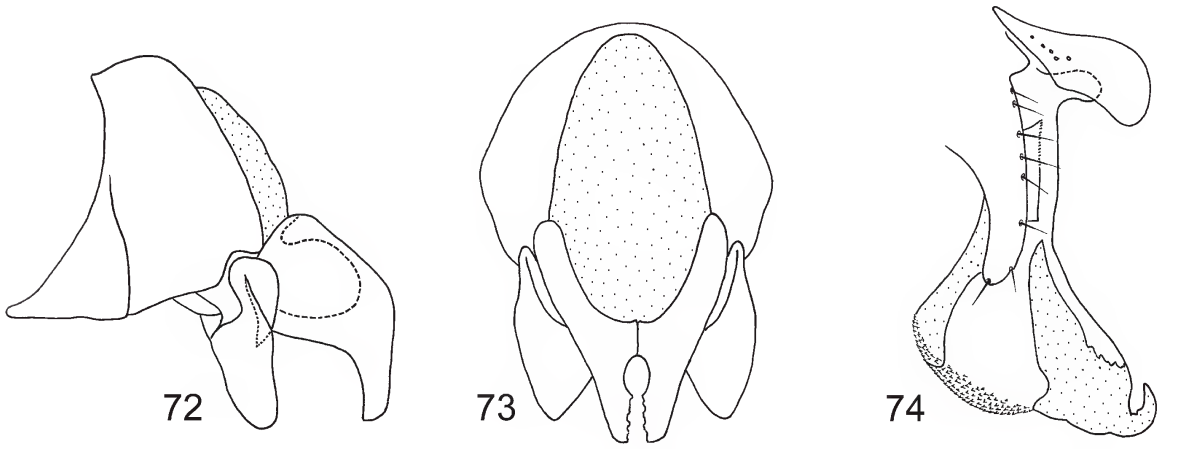
Anagonia crosskeyi sp. nov.

Figs 72–74

Types. *Holotype* male in ANIC, no. 29-029225, 16 mi W of Ouyen, Vic., 15 Mar. 1966, MSU and J. A. Grant, terminalia in tube 190. *Paratypes—Victoria:* 1 male, same data as holotype, T.t. 102.—*Western Australia:* 1 male, 1 mi WNW of Balladonia Motel, 3 Nov. 1969, Key & MSU, T.t. 384.

Generally similar to *A. rufifacies* (*pale form*), but all hairs and bristles dark (except as usual on occiput); differing also as follows:

Male. *Head*. Width very variable, 3.8 mm in 1 specimen, 2.5 mm in 2 others. Frons rather wide, *Frw/Hdw* 0.2–0.3; gena also rather wide, *Gnw/Eyh* 0.3–0.4. *Ivb/Vb-E* normal for size, 1.1–1.2 (means omitted, as 3 specimens very different in size). Eye practically bare. Fronto-orbits dark in ground colour, parafacial somewhat variable. Ocellar setae not differentiated; postocellar setae 2–4.



Figs 72–74. *Anagonia crosskeyi* sp. nov., male terminalia. *(72)* Lateral, and *(73)* posterior views, *(74)* aedeagus.

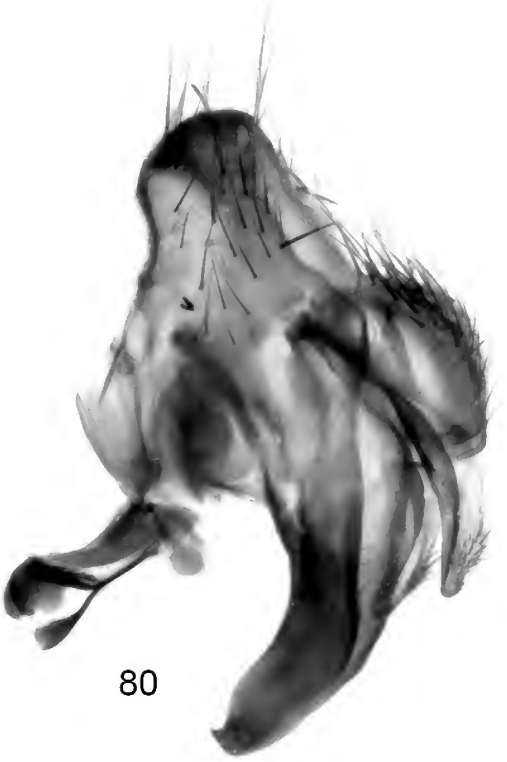
Figs 75–78. Lateral views of *Froggattimyia-Anagonia* male terminalia. *(75) Froggattimyia macdonaldi* sp. nov., *(76) Anagonia teratostylus* sp. nov., *(77) A. minor* sp. nov., and *(78) A. perplexa* sp. nov.

Thorax. Median vitta poorly differentiated. Presutural intra-alar bristles well developed. Intrapostalar well differentiated. Scutellum brown with variable degree of darkening at base; apical setae very variable, from fine to unusually stout. Calypter pale except along extreme medial margin.

Legs. Tibiae concolorous with femora. Foretibia with preapical *ad* spine about 0.5 times as long as adjacent *d* spine, which is rather smaller than usual. Hindtibia with *pd1* long, *Pd1/Sdd* 1.1–1.4; *ad* comb variable, from profuse to quite sparse.

Abdomen. Submedian marginal bristles lacking on syntergite 1+2, barely or not at all differentiated on tergite 3.

Terminalia (Figs 72–74). Appendages noticeably small



Figs 79–81. *Anagonia* male terminalia, lateral views. *(79) Anagonia uptoni* sp. nov., *(80) A. errator* sp. nov., and *(81) A. similis* sp. nov.

compared with syntergosternite 6–8. Surstylus paddle-shaped, bluntly tapering, with short, wiry bristles. Cercus with greatly expanded basal section with normal hairs and profuse microtrichiae, tapering to a shorter apical section, which is curved, sharp-pointed and claw-like, with conspicuous apicointernal teeth over much of its length. Epiphallus well developed with rounded apex.

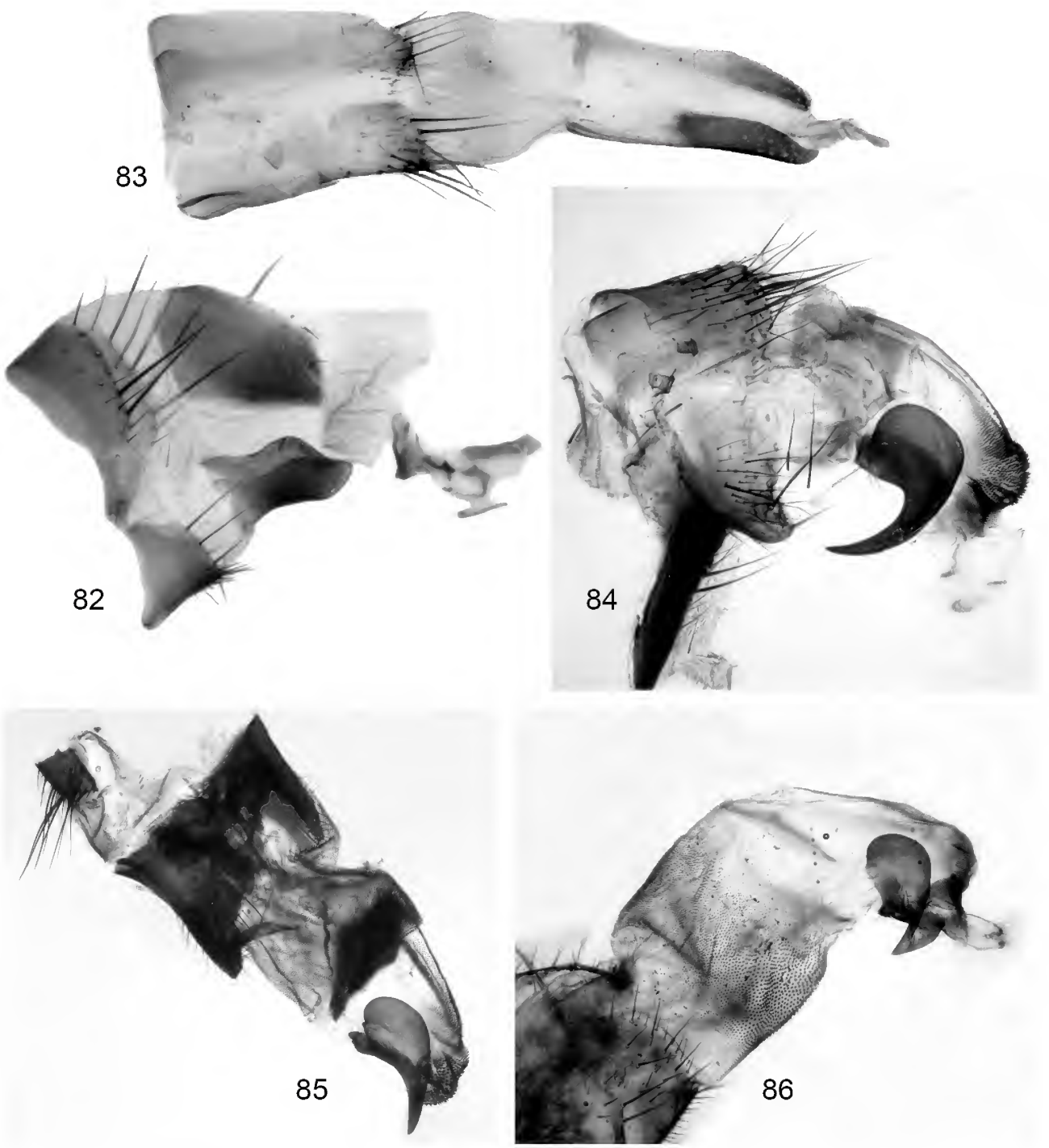
Female. Unknown.

Distribution. Seen only from Victoria and Western Australia.

Biology. All specimens were taken at light.

Notes. Despite the few specimens seen, the extraordinary terminalia guarantee specific status. One specimen from Western Australia is 1.5 times as large as the other two from Victoria, but, again, the terminalia leave no doubt that they are conspecific.

The name commemorates my friend and colleague, Dr Roger Crosskey, whose magisterial pioneering studies made this study possible.



Figs 82–86. *Anagonia* female terminalia, lateral views. *(82) Anagonia rufifacies, (83) A. tillyardi, (84) A. lasiophthalma, (85) A. dayi* sp. nov., and *(86) A. commoni* sp. nov.

Figs 87–89. *Anagonia* female terminalia, lateral views. *(87) Anagonia zentae* sp. nov., *(88) A. opaca*, and *(89) A. lateralis*.

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