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## THE *METASYRPHUS* SPECIES OF NORTH AMERICA (DIPTERA, SYRPHIDAE)

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*Metasyrphus* was erected by Matsumura and Adachi in 1917, with *Syrphus corollae* Fabricius as the genotype. The genus is a large one in North America and also difficult, as the numerous species appear to grade one into another. The present key has been prepared to make identification as simple as possible without too much use of the characters in the genitalia.

The genus was revised nearly 20 years ago (Fluke, 1933), but recent studies of the male terminalia (Fluke, 1950) have aided in a better understanding of the group and the recording of a few new species.

An improved technique and a higher magnification (75×) have enabled me to see more characters on the genitalia. By the use of a smear of petroleum jelly in the bottom of a porcelain spot dish before glycerine is added, the specimen can be placed and held in any position while it is examined or a sketch of it is made.

The superior lobe in this group is somewhat bivalved above, the inner edge has very fine hairs, and the outer edge is somewhat wavy. Also found were hairs on the sides of the superior lobes, very fine hair over the penis sheath around the rough ridges, and stubby pale setae on the lower apical areas of the envelope of the ejaculatory hood. These latter were shown in sketches of *M. arcuatus?* (Fallén) made by J. S. Collin (1931, Ann. Mag. Nat. Hist., ser. 10, vol. 7, p. 68).

All the species of the Syrphini have not been restudied, but, among those examined, the stubby setae were not seen on any

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*Syrphus*, *sensu stricto*, and generally not on *Epistrophe* or *Stenosyrphus*. They have already been recorded on several species of *Dasysyrphus* but are apparently absent in others; those observed were erect and not decumbent as in *Metasyrphus*. It should be noted that these additional characters are almost invisible except in properly prepared specimens and in the presence of sufficient light.

The ribbing on the penis sheath does not appear to have any specific regularity, but it has not been studied in great detail, and the differences in these rough areas as seen in the sketches should not be taken to indicate species differences. Great care has been used, however, to record relative size and shape of all structures.

There are several species with exceptionally long styles (surstyli), which are described "as long or longer than ninth tergite which surrounds the cerci and anal opening." This character is generally easily seen on mounted specimens, and when it is well understood will enable one to determine a number of species quite readily. On *wiedemanni* and *pomus* the styles are irregular in outline as well as long, and the tips diverge rather sharply; others with long styli include *meadii*, *venablesi*, *gentneri*, *fumipennis*, *medius*, and *talus*.

Considerable difficulty will be experienced determining females from the western states which belong to the *meadii-venablesi* complex. Large series of both sexes should be collected whenever possible with an attempt to associate the two. In many cases the problems will not be entirely cleared until critical studies of life histories as well as of the genitalia are made.

I have been helped considerably in this study by the loan of specimens, principally by the Canadian National Museum, by the American Museum of Natural History through Dr. Curran, and by the Colorado Agricultural and Mechanical College through Dr. Thatcher. Much of the material has been received over a period of years from numerous collectors. Their names appear in the designations of type material under the descriptions of new species.

Types of all species, except where stated otherwise, are in the collection of the American Museum of Natural History.

#### METASYRPHUS MATSUMURA AND ADACHI

MATSUMURA AND ADACHI, 1917, Ent. Mag., vol. 2, p. 147. CURRAN, 1930, Bull. Amer. Mus. Nat. Hist., vol. 61, p. 56 (*Syrphus*). FLUKE, 1933, Trans.

Wisconsin Acad. Sci., Arts and Lett., vol. 28, p. 77. ENDERLEIN, 1938, Sitz. Gesellsch. Naturfor. Fr., Berlin, p. 204 (*Posthosyrphus*). FLUKE, 1950, Trans. Wisconsin Acad. Sci., Arts and Lett., vol. 40, p. 141.

Face yellow, with or without a black shining stripe; eyes generally bare, sometimes lightly pilose; thorax usually shining, without conspicuous longitudinal vittae; lower lobe of the squamae without hairs on the disc; metasternum usually hairy; abdomen emarginate, oval, and with prominent yellow spots or cross bands; male genitalia with rough ribbing on the penis sheath and small decumbent setae at the tip of the ejaculatory hood.

TYPE OF THE GENUS: *Syrphus corollae* Fabricius.

This diagnosis excludes the so-called *amalopis* (*Dasysyrphus*), *emarginatus*, and *laxus* groups.

#### KEY TO THE NORTH AMERICAN SPECIES OF *Metasyrphus*

1. Metasternum bare, third longitudinal vein curved into first posterior cell . . . 2  
Metasternum hairy, third longitudinal vein nearly straight . . . . . 3
2. Second and third abdominal bands entire . . . . . *aberrantis* (Curran)  
These bands broken into spots . . . . . *lapponicus* (Zetterstedt)
3. Face with a definite median black vitta reaching well over the tubercle . . . 4  
Face entirely yellow, although the oral margin may be black and the tubercle lightly infuscated . . . . . 39
4. Second and third abdominal bands entire or no bands present . . . . . 5  
Abdominal bands broken into spots . . . . . 29
5. Abdomen entirely black (Greenland) . . . . . *nigroventris* Fluke  
Abdomen yellow fasciate . . . . . 6
6. Males—those with holoptic eyes . . . . . 7  
Females—those with dichoptic eyes . . . . . 18
7. Pile of the scutellum pure white, fasciae of the abdomen narrow . . . . .  
. . . . . *canadensis* (Curran)  
Pile of scutellum yellow or black or mixed, abdominal fasciae wide . . . . . 8
8. Hind femora yellow; genital styles long, yellow . . . . . *venablesei* (Curran)  
Basal half or more of hind femora black . . . . . 9
9. Genital styles longer, equal to or longer than ninth tergite which surrounds the cerci and anal opening (fig. 27) . . . . . 10  
Genital styles shorter than this area (fig. 28) . . . . . 14
10. Abdominal fasciae nearly straight, at least on their fore margins, genital styles irregular in outline (eastern) . . . . . 12  
Abdominal fasciae wavy, genital styles nearly straight in outline (western) . . . . . 11
11. Front entirely yellow, spots if present very pale, spots on the second tergite reach the side margins . . . . . *venablesi* (Curran)  
Frontal spots usually definite, spots on the second tergite isolated from the sides . . . . . 13
12. Larger and paler (9 to 12 mm.) (east of Rocky Mountains) . . . . .  
. . . . . *wiedemanni* (Johnson)  
Smaller and darker (7 to 8 mm.) . . . . . *pomus* (Curran)

13. Pile of face white, wings hyaline (western)..... *meadii* (Jones)  
 Pile of face black, wings brownish tinged..... *fumipennis* (Thomson)
14. Front margins of abdominal fasciae nearly straight.... *vinelandi* (Curran)  
 Abdominal fasciae distinctly wavy on both margins.....15
15. Considerable yellow pile on the sides of the face, front without prominent  
 black spots; if with black spots compare *astutus*, (Europe).....  
 ..... *nitens* (Zetterstedt)  
 Facial pile nearly all black, front usually with prominent black spots above  
 the antennae.....16
16. Black of cheeks broadly continuous with the facial stripe, spots on the  
 front large and usually connected (eastern).....  
 ..... *nitens* subspecies *confertus*, new subspecies  
 Black of cheeks separated from facial stripe, spots on front smaller and  
 usually separated.....17
17. Darker species, facial stripe black and extends well above tubercle, spots  
 above antennae black (Colorado)..... *pingreensis* (Fluke)  
 Paler, facial stripe brownish and usually narrow and abbreviated, spots  
 above antennae brownish (western)..... *subsimus*, new species
18. Hind femora black on basal half or more.....19  
 Hind femora yellow, at least on the basal fourth.....24
19. Lower half of front shining yellow, upper half black.....20  
 Front with side dust spots and brown to black spots adjacent to the an-  
 tennae.....21
20. Front with a pair of side pollinose spots (Europe).... *nitens* (Zetterstedt)  
 Front entirely shining (northern)..... *depressus* Fluke
21. Pile of scutellum white, abdominal bands narrow and whitish yellow.....  
 ..... *canadensis* (Curran)  
 Pile of scutellum mostly black, abdominal bands broader and yellow in  
 color.....22
22. Pile of face mostly black, especially near the tubercle, eyes sparsely hairy,  
 abdominal bands wavy (Colorado)..... *pingreensis* (Fluke)  
 Pile of face pale, eyes practically bare.....23
23. Yellow bands of abdomen distinctly wavy, fifth sternite yellow with some-  
 times a small median black spot (western)..... *meadii* (Jones)  
 Yellow bands of abdomen not distinctly wavy, fifth sternite mostly black  
 with yellow borders (eastern)..... *vinelandi* (Curran)
24. Hind femora entirely yellow.....25  
 Hind femora with at least a dark ring at the extreme base or apically...27
25. Fifth sternite yellow, black hairs on front femora relatively few, facial  
 stripe very narrow (western).....26  
 Fifth sternite with a median black spot, black hairs on front femora  
 dominant on the apical half (eastern).....  
 ..... *nitens* subspecies *confertus*, new subspecies
26. Front with definite spots above the antennae, pile around the facial tubercle  
 black..... *subsimus*, new species  
 Front without definite spots above the antennae, pile of the face entirely  
 yellowish..... *venablesi* (Curran)
27. Abdominal bands on third and fourth tergites reach the side margins.....  
 ..... *medius* (Jones)

- Abdominal bands separated from the side margins..... 28
28. Hind femora yellow on basal half, larger species (9 to 12 mm.) (eastern)  
..... *wiedemanni* (Johnson)  
Hind femora black on basal half or more, smaller species (7 to 8 mm.)  
(eastern)..... *pomus* (Curran)
29. Third pair of spots narrowly connected, anterior half of front of female  
shining yellow (fig. 53)..... *depressus* Fluke  
All the spots distinctly separated..... 30
30. Genital styles extend beyond penis sheath (fig. 27), pile of face of male  
black, female similar to *luniger-astutus* (see description).....  
..... *gentneri*, new species  
Genital styles do not extend beyond penis sheath (fig. 28)..... 31
31. Front of both sexes inflated, two black dots above the antennae.....  
..... *lundbecki* (Soot-Ryen)  
Front of both sexes normal, not unusually puffed out..... 32
32. Pile of the mesonotum and pleura white, third segment of antennae ex-  
ceptionally large, pile of the face dominantly pale..... *perplexus* (Osburn)  
Pile of the mesonotum yellowish, sometimes with a few black hairs above  
the base of the wings, antennae much smaller..... 33
33. Abdominal spots narrow and straight, anterior one-sixth of front of female  
shining yellow, face above tubercle yellow (western).....  
..... *rufipunctatus* (Curran)  
Abdominal spots broader and arcuate..... 34
34. Abdominal spots reach the sides, at least narrowly; entire front of male  
and lower third of female yellow; fourth and fifth sternites of female  
reddish..... *chillcotti*, new species  
All the spots well separated from the sides, front with black spots or an  
arc above the antennae, sternites black, only the segmental sutures  
yellow..... 35
35. Abdominal spots of the male almost as broad as long, kidney-shaped;  
pile on the face of the female mostly black; moderately small, narrow  
species (8 to 9 mm.) (Alaska)..... *curtus* (Hine)  
Abdominal spots not kidney-shaped, facial pile of female nearly all pale,  
relatively larger species (10 to 12 mm.)..... 36
36. Spots on the third and fourth tergites distinctly broader and their inner  
ends much closer to the bases of the segments than their outer ends  
(Europe)..... *luniger* (Meigen)  
These spots narrower and their inner and outer ends about equally distant  
from the bases of the segments..... 37
37. A patch of black pile on the mesonotum just above the wing base, pile of  
the face of male mostly black (northern).....  
..... *luniger* subspecies *vockerothi*, new subspecies  
Pile of the mesonotum entirely pale..... 38
38. Pile of the face largely black. *luniger* subspecies *vockerothi*, new subspecies  
Pile of the face yellow, black only down the sides next to the eyes (western)  
..... *luniger* subspecies *astutus*, new subspecies
39. Fourth and fifth tergites reddish yellow (western)..... *snowi* (Wehr)  
Fourth tergite black, with a yellow band or spots..... 40
40. Abdominal fasciae broken into spots..... 41

- Abdominal fasciae entire.....44
41. Fifth tergite reddish yellow.....42  
Fifth tergite yellow, with a black fascia (Colorado)....*montanus* (Curran)
42. Pile of scutellum entirely yellowish (Colorado).....*flukei* (Jones)  
Pile of scutellum mostly black.....43
43. Abdominal spots reach the side margins (western)....*palliventris* (Curran)  
Abdominal spots well separated from the side margins (western)..*talus* Fluke
44. Sides of the abdomen continuously yellow, antennae yellow.....  
.....*ochrostomus* (Zetterstedt)  
Sides of the abdomen all black or alternately yellow and black.....45
45. Pile of face black, only occasionally a few pale-colored hairs, front inflated..  
.....*sculleni*, new species  
Pile of face yellowish to white, black only opposite the antennae next to  
the eyes, front normal.....46
46. Abdominal bands reddish brown to blood-red, oral margin broadly black  
(Colorado).....*montivagus* (Snow)  
Abdominal bands always yellow, upper oral edges yellow, if the hind femora  
of the male are entirely yellow, see couplet 6.....47
47. Abdominal bands broad, reaching the side margins, at least narrowly on the  
third and fourth tergites.....*latifasciatus* (Macquart)  
Abdominal bands narrower, those on the third and fourth tergites always  
free from the margins.....48
48. Antennae large and mostly black, fore margin of band on third tergite  
nearly straight; spots on the second tergite reach the sides broadly,  
length 10 to 12 mm.....*lebanoensis* (Fluke)  
Antennae smaller and more yellowish, fore margin of band on third tergite  
undulate; spots on the second tergite smaller and seldom reach the sides  
.....*venablesi* (Curran)

### ***Metasyrphus nitens* (Zetterstedt)**

Figures 1, 13, 23, 30, 37

*Scaeva nitens* ZETTERSTEDT, 1843, Diptera Scandinaviae, vol. 2, pp. 184, 712;  
*op. cit.*, vol. 7, p. 3137.

*Syrphus nitens* VERRALL, British flies, Syrphidae, vol. 8, p. 377.

Metcalf recorded this species from North America on the basis of reared material. In 1933 I suggested that these specimens were *venablesi* Curran, although doubtful because of the curved spiracles found on the posterior respiratory process of the larvae.

Since then more material has come to hand, including a male *nitens* from Germany determined by Oldenburg and two males and a female from Holland determined by Van Doesburg. These last two males agree in all essentials with Verrall's figure, differing from the German specimen in a narrower front and broader abdominal bands. The Holland and German specimens appear to represent two different species. I am at present accepting

Van Doesburg's determined specimens as typical of *nitens*, since they appear to be the same as Verrall's understanding of it.

The North American material before me, all eastern, is considerably different from either of the two European forms. They are quite uniform in general appearance, and the females are very different from the single Holland female before me; they have paler legs, darker front, and the abdominal bands do not reach the sides as they do in the Holland specimen.

The genitalia offer small but apparently consistent differences. I therefore question the occurrence of typical *nitens* in North America and have named our representatives a new subspecies.

### ***Metasyrphus nitens* subspecies *confertus*, new subspecies**

Figures 14, 24, 38

*Syrphus nitens* METCALF (not Zetterstedt), 1916, Bull. Maine Agr. Exp. Sta., no. 253, p. 242.

*Syrphus venablesi* FLUKE (not Curran), 1933, Trans. Wisconsin Acad. Sci., Arts and Lett., vol. 28, p. 89.

Face with a median black vitta and black pile, pile of scutellum black, hind femora of female yellow, abdominal fasciae wavy. Length 9 to 11 mm.

**MALE:** Face yellow; cheeks, oral margins, and a narrow median vitta black; the vitta goes well over the tubercle and a little above the lowest depression of the face; pile all black; lightly yellowish pollinose except the shining median vitta. Pile of the cheeks yellowish white. Front yellow, yellowish pollinose, except for a large brown to black spot above each antenna; pile long and black; upper angle of front a little less than a 90-degree angle. Ocellar triangle black, with black pile; occipital pile whitish, becoming black above. Antennae brownish to blackish, obscurely yellow beneath each segment; arista brownish.

Thorax shining aeneous, the mesonotum a little dulled anteriorly; the pile yellowish white, more yellowish along the sides. Scutellum translucent yellow, the basal corners dark; pile black, some yellow hairs around the edges, all yellow below. Legs not distinctively colored, generally yellowish to brownish, black on the basal third to half of the four front femora and all but the apical sixth of the hind femora, but the line of demarcation not distinct; pile generally black on the femora and hind tibiae, a few long yellow hairs at the bases of the femora, pile of front

tibiae all yellow. Wings hyaline, squamae white, the edge and fringe yellow, plumule white, halteres yellow.

Abdomen opaque black, first, fifth interstices and the venter shining; second tergite with a pair of yellow spots, pointed inwardly; third and fourth tergites each with a yellow undulating fascia which has a small projecting point on the fore margin at the middle, more prominent on the third than on the fourth tergite. Apical margins of the fourth and fifth and the basal corners of the fifth tergites yellow. On some specimens the bands are more undulating than on the type. Pile black, yellow on the yellow areas and basally on the sides. Venter black, the incisures broadly, and the fifth sternite entirely, yellow (black on the Vermont specimen).

FEMALE: Similar; front yellow below, with two black spots above the antennae, black above, with yellowish pollinose side spots, pile black; occipital pile yellow on upper half; pile of face yellow. Legs yellow, basal sixth of the femora infuscated, tarsi infuscated above.

TYPES: Holotype, male, Madison, Wisconsin, May 17, 1935 (C. L. Fluke); allotype, female, Madison, Wisconsin, June, 1935 (C. L. Fluke); paratypes, one male, Madison, Wisconsin, May 15, 1917 (L. G. Gentner); one male, same data as holotype; one male, Madison, Wisconsin, April 26, 1929; one male, Madison, Wisconsin, April 26, 1934 (P. O. Ritcher); one male, Jordan, Ontario, September 7, 1919 (C. H. Curran); one male, Laural Lake, Vermont, near Jacksonville, June 21, 1934 (H. D. Pratt); one male, Maine Agricultural Experiment Station, Lot 1747 (Metcalf); one male, with pupa, Saugus, Massachusetts, June 14, 1923; one female, Madison, Wisconsin, June 22, 1933; one female, Rhinelander, Wisconsin, June 6, 1941; and one male, Dane County, Wisconsin, June, 1950.

These specimens may represent a mixture of forms, as there is considerable variation in the shape of the abdominal markings, but the genitalia seem to be the same. The males will be separated with difficulty from those of *pingreensis* Fluke. The characters given in the key are the only ones that appear usable. Two of the males included here are the ones I recorded as *pingreensis* in 1933. The females will also be difficult to distinguish from those of *venablesi* Curran. The abdominal bands of the latter usually reach the sides of the abdomen. Their



geographical ranges will help to separate them, and other characters are suggested in the key.

### **Metasyrphus venablesi** (Curran)

Figures 2, 15, 22, 39, 46

*Syrphus venablesi* CURRAN, 1929, Canadian Ent., vol. 61, p. 45.

*Metasyrphus venablesi* FLUKE (in part), 1933, Trans. Wisconsin Acad. Sci., Arts and Lett., vol. 28, p. 89.

This species is very difficult to identify, since the type is a female and the male is very close to *meadii* (Jones). The males indicated in my 1933 interpretation belong to another species if we are correct in assuming that the allotype male is the opposite sex of *venablesi*. Until someone can collect large series of both sexes that undoubtedly belong together, the species related in this group will be difficult to determine. The females are remarkably similar, but the males can usually be separated on genital characters. Length 10 to 12 mm.

MALE: Face whitish yellow, with a narrow, brownish black, somewhat diffused stripe that reaches well over the tubercle; upper mouth edge light brown; cheeks black, yellow just below the mouth; pile generally yellowish, a few black hairs around the tubercle, white on the cheeks. Front yellow, with faint light brown spots above the antennae, sometimes more prominent; pile black. Antennae brown, yellow beneath the third segment; arista yellowish brown. Ocellar triangle black, with black pile. Occipital pile whitish to pale yellow, with a few black hairs intermixed above.

Thorax shining metallic, the pile pale yellow, black on the disc of the scutellum. Legs yellow, the basal fourth of the four front femora, basal half or more of the hind femora, and the apical three or four segments of the tarsi dark brown to black. The blackening on the hind femora often partly or almost wholly absent. These paler leg forms do not appear to be anything more than varieties, as there are intermediates. Coxae and trochanters black. Squamae yellowish, plumule whitish, halteres yellow.

Abdomen black, with broad, gently undulating cross bands; isolated into two large spots on the second tergite, inner ends pointed, outer anterior corners reach side margins indefinitely; bands on the third and fourth tergites broad, fore margin nearly straight, rear margin scalloped in the middle; apical margin of the fourth and more broadly the fifth and basal corners of the

fifth yellow. Venter black, the incisures yellow. Genital styles long, yellow.

FEMALE: Similar, the front heavily pollinose but leaving a narrow, often almost obliterated, black Y. Abdominal bands narrower and usually reaching the sides a little broader, the spots on the second tergite very clearly going over the margins near the base of the tergite.

Spots above the antennae absent on the type and only very faint on the paratype before me, but sometimes they are distinct and light brown in color. The fifth sternite on both sexes is yellow.

Specimens before me are a paratype female, a topotype male, and both sexes from California, Oregon, Washington, Idaho, and Utah.

Three males (variety with yellow hind femora) are from Oregon, Idaho, and Utah. With the first two are two females from the same localities that appear to be associated with these males. One male from Oregon has black pile on the face, and the spots on the second tergite are isolated from the margins.

There are before me numerous female specimens and a few males that are doubtfully this species. If lumping should be resorted to, the classification of this group would be greatly simplified, but I believe there are many distinct species that will be recognized only after more collecting and a very critical study of the genitalia.

### ***Metasyrphus meadii* (Jones)**

Figures 27, 47

*Syrphus meadii* JONES, 1917, Ann. Ent. Soc. Amer., vol. 10, p. 223.

*Metasyrphus meadii* FLUKE (in part), 1933, Trans. Wisconsin Acad. Sci., Arts and Lett., vol. 28, p. 87.

There should be no question on the identity of the males of this species, with their very long styles and coarse ribbing of the penis sheath. The front has two black spots above the antennae, the facial pile is generally pale colored, and the abdominal bands are undulated. If we are correct in identifying the male of *venablesi*, it is possibly the only species that might cause confusion, but it has an almost entirely yellow front, and the spots on the second tergite reach the sides, never on *meadii*. *M. fumipennis* (Thomson) is also a very close relative, but I am not sure of this species, which should have darkened wings, a character that may be value-

less except in well-matured specimens. *M. meadii* is typically a western species, and I know of no specimens taken east of the Rocky Mountain area that belong to it.

The females as well as the males have the basal half or more of the hind femora black.

### ***Metasyrphus subsimus*, new species**

Figures 29, 44, 49-51, 54

Related to *venablesi* Curran; smaller, pile of face of male black, styles of male genitalia much shorter, mesonotum shining with brassy reflections; also related to *latifasciatus* (Macquart), but the face has a definite stripe, and the front in both sexes is pollinose and maculated. Length about 8 to 10 mm.

MALE: Face shining yellow, with a narrow, abbreviated, brown stripe, the pile practically all black, lightly pollinose along the eye borders; cheeks shining dark red to black, very lightly whitish pollinose, white pilose; frontal triangle yellow, lightly yellowish pollinose, with a prominent shining black spot above each antenna, pile all black; ocellar triangle black, with black pile, golden pollinose and pilose posterior to the ocelli; occiput heavily coated with gray pollen that is golden near the vertex, the pile golden above, becoming white below, several black cilia overhang the eyes above. Eyes practically bare. Antennae relatively small, the apex rounded, brownish above on all segments, with the under half yellow; arista darkened.

Thorax shining, the mesonotum with distinct brassy to aeneous reflections, the pile all golden; pleura darker, with somewhat of a bluish cast, the pile pale yellow, pollinose only on the upper area. Scutellum a duller yellow with black pile, the fringe yellow.

Legs yellow, the basal one-fourth to one-third of the front and middle femora, basal two-thirds or more of the hind femora, an indefinite broad apical area on the hind tibiae, and the apical four segments of all the tarsi darker reddish brown to black. Pile of the four front legs yellow, black on the outer margins of the femora, of the hind legs black, yellow at the base of the femora and under the tarsi. Wings hyaline, the stigma quite dark; squamae yellow, plumule pale yellow, halteres yellow.

Abdomen black, with the usual yellow bands on third and fourth tergites and spots on second tergite; first tergite shining; spots on second tergite triangular, their inner ends pointed and their outer ends free from the margins; bands on the third and

fourth tergites about average in width, the sides free from the margins; apical margins of the fourth and fifth tergites and the basal corners of the fifth tergite yellow, the disc of the fifth broadly black; exposed genital segments shining reddish brown to black. Venter shining black, the segmental sutures broadly yellowish, pile yellow and erect basally, becoming shorter, black, and oppressed posteriorly.

**FEMALE:** The facial pile pale, partially black around the tubercle, the front shining, with golden pollinose side spots but leaving a definite black Y, two brown spots above the antennae; legs paler, all the femora yellow, with only a suggestion of a pre-apical dark ring on the hind pair; spots on the second tergite reach the side margins by their anterior corners, the fifth sternite nearly always with a definite black spot. Otherwise these females are very much like those of *venablesi* (Curran), but I believe my collecting notes indicate they belong to the males described here which are not at all like those of *venablesi*. They are generally smaller, although some are as large as Curran's species.

**TYPES:** Holotype, male, Lake City, Colorado, August 8-21, 1938, 9000 feet elevation (Fluke); allotype, female, same place, August 8-15, 1936; six males, same data as holotype; two males, Masonville, Colorado, September 5, 1933; one male, Red River, New Mexico, August 14, 1940, 9000 feet elevation (F. M. Snyder); two males, Science Lodge, west Boulder County, Colorado, July 31, 1939 (U. N. Lanham); one male, Anthony Lake, Blue Mountains, Oregon, August 6, 1929, 7100 feet elevation (H. A. Scullen); one male, Portland, Oregon; six females, same data as holotype; five females, same data as allotype; two females, Arts and Science University of Colorado Laboratory, Boulder County, Colorado, September, 1932 (M. T. James); one female, Pingree Park, Colorado, August 17, 1932 (Fluke); one female, Buckley, Washington, August 7, 1935 (R. H. Beamer).

### ***Metasyrphus sculleni*, new species**

Figures 3, 16, 25, 31, 40

Face yellow, front inflated, pile of face all black, legs of female yellow. Length 9 to 10 mm.

**MALE:** Face shining yellow, narrowly brownish along the mouth edge, widest at the depression above the tubercle, the pile all black; cheeks blackish, the pile pale black along the

slit; front inflated, shining yellow, the pile abundant and all black, two brownish spots just above the antennae; ocellar triangle black, with black pile with paler hairs above; occiput with yellowish pile above, white below, the cilia black. Antennae yellow, lightly darkened on the upper third; arista yellow, stout.

Thorax semi-shining black, the pile abundant and all golden; scutellum yellow, with abundant black pile, yellowish on the basal corners, the fringe yellow. Legs reddish to orange, the basal two-thirds of the hind femora and the basal one-fourth to one-third of the four front femora brown to black, a ring on the hind tibiae and the apical tarsal segments darker; pile mostly black, all yellow on the four front tibiae and tarsi. Wings yellowish hyaline, squamae and plumule yellow to light brown, halteres yellowish.

Abdomen dull black, the first tergite and apices of the other tergites somewhat shining; marked with yellow as follows: second with a broad isolated pair of spots which are very narrowly separated from the sides; second and third each with a broad wavy yellow band isolated from the sides, the first much narrower at the middle; apical margins of the fourth and fifth and the basal corners of the fifth. Venter shining black, the incisures broadly yellow, pile rather long, kinky, and black.

FEMALE: Similar, but paler, the front with the same indication of puffiness, mostly shining, yellow below the depression, with two small brown dots above the antennae, black above the depression, with a weak narrow Y, the sides very lightly dusted with yellow pollen; there are no black cilia.

Scutellum dominately yellow-haired, a few black hairs near the apex. Legs almost entirely yellowish and the pile nearly all yellow. Yellow spots on the second tergite larger and go over the sides in about one-half of their width. Venter pile black, short and appressed on the third to fifth sternites, yellowish and erect on the first and second sternites.

TYPES: Holotype, male, Breitenbush Hot Springs, Oregon, 2222 feet elevation, July 3, 1934 (H. A. Scullen); allotype, female, Savaryid, British Columbia, "10-7-17" (I judge this is July 10 rather than October 7, but it is impossible to tell from the label); paratypes, three males: Grave Creek at Reuben Creek, 20 miles north of Granite Pass, Oregon, June 16, 1937 (Bolinger-Jewett); Mary's Peak, Oregon, June 6, 1915; Mary's

Peak, Oregon, July 12, 1931 (N. P. Larson); one male, Packwood, Washington, July 22, 1949 (L. D. Beamer); three females, Sumner, Washington, June 4 and 15, 1933 (R. Latta); one female, Mt. Rainier, Washington, July 30, 1933 (Chas. Martin); one female, Olympia, Washington, May 26, 1932 (Chas. Martin); and one female, Pepperwood, California, June 17, 1935 (E. W. Balsler).

The two paratype males from Mary's Peak have a very narrow brownish facial stripe; otherwise they are similar to the other two males which have no indication of a mid-stripe.

These specimens have been in my collection for some time, and I have hesitated to name them. The recent genital studies indicate that they are a distinct species. They belong to the *venablesi* complex, but the inflated front separates them off rather easily.

### **Metasyrphus luniger** (Meigen)

Figures 4, 17, 33

*Syrphus luniger* MEIGEN, 1822, Systematische Beschreibung der Europäischen Zweiflügeligen Insecten, vol. 3, p. 300.

*Syrphus ? arcuatus* COLLIN, 1931, Ann. Mag. Nat. Hist., ser. 10, vol. 7, p. 68.

*Metasyrphus luniger* FLUKE, 1949, Proc. U. S. Natl. Mus., vol. 100, no. 3256, p. 41.

As I reported in 1949, the specimens of this species taken in North America represent a complex of several forms, intergrading into *perplexus* (Osburn), which indicates a possibility that the American forms are variations of the latter species rather than of *luniger*. The genitalia of both American and European representatives are similar, with only minor differences observed. All the specimens from North America do not appear to be typical *luniger*, and I am therefore describing them as new subspecies, one occurring generally in the Canadian provinces, mostly arctic, and another in the Rocky Mountain district of Colorado. There remain a few forms that are not typical of the two new subspecies described here, but I believe they are not distinct enough to receive additional names.

Collin's paper noted above should be consulted in any study of this group. He mentions two forms from Greenland, and these are undoubtedly one or more of the groups discussed here. His "Greenland I" is probably *vockerothi*, but since the females of

these forms are difficult to separate I am unable to decide the question without examining his specimens.

**Metasyrphus luniger** subspecies **astutus**, new subspecies

Figures 7, 8, 19, 28, 34, 42

Differs from typical *luniger* in the shape of the abdominal spots, their inner ends less bulbous and generally more elongate; in some specimens they actually connect in the middle on tergites 3 and 4 (see fig. 8). The genitalia show small, but I believe distinct, differences, principally in the length of the cerci, being slightly longer on *astutus*. The penis sheath is also different.

The pile on the mesonotum is yellowish tinged, not so deeply colored as on *luniger* but seldom with any black hairs, as found on the form *vockerothi* found principally in the arctic north.

There is a large series of this subspecies from Colorado, and they are remarkably uniform in general color and appearance except for the tendency for the spots to connect. A full description is advisable, since this may be a distinct species.

MALE: Face yellowish white, mostly shining, and the pile is all pale except for the hairs on the sides above the depression; with a prominent to black mid-stripe that reaches to the lowest part of the depression above the tubercle; mouth edge along the sides are yellow, separating the mid-stripe from the black cheeks; front yellow, with brown spots just above the antennae, pollinose on the upper half in the ocular angle, which is less than 90 degrees, shining below, the pile all black; occiput gray pollinose, the pile yellowish, with a few black cilia above; ocellar triangle black, with black pile. Antennae relatively small, blackish, with yellow below near the base of the third segment.

Thorax shining black, with somewhat of a bluish tinge along the sides of the mesonotum and on the pleura, the pile all yellow to golden, seldom a black hair or two just above the wing base; scutellum yellow, with black pile, pale along the edges. Legs yellowish red; the coxae, trochanters, basal third to half of the four front femora, all but the apical fourth or less of the hind femora black; pile generally black on the outer sides of the femora and tibiae, yellowish otherwise, and the longer hairs at the bases of the femora yellow. Wings hyaline, squamae pale yellow, plumule white, halteres yellow.

Abdomen black, with three pairs of arcuate isolated spots, the first pair on the second tergite pointed on the inner ends;

the next two pairs sometimes narrowly connected (fig. 8) but usually separated; apical margin of the fourth and fifth and basal corners of the fourth yellow. The discs of the tergites generally opaque, shining on the sides, apices, and basal margins. Venter shining black, the interstices yellow, pile whitish to yellow and erect, with short, appressed, black hairs on the third sternite and beyond. Genital styles yellow, with yellow pile.

FEMALE: Front shining, with two prominent side pollinose spots that are not connected, black on the upper two-thirds including the ocellar triangle, yellow below, with brown spots above the antennae; pile all black. The abdominal spots somewhat narrower, the ones on the second tergite, however, quite large, also sometimes connected as on the male. Fourth and fifth sternites generally without erect pale pile, only short black setae present; fifth usually entirely reddish but sometimes with a narrow black fascia.

The pile of the mesonotum is sometimes quite pale yellowish, with a whitish appearance on the pleura, and this often in the past has confused this form with *perplexus*, but the antennae are much smaller and the fifth sternite of *perplexus* is always nearly entirely black. It is virtually impossible to separate the females with the spots connected from those of *meadii* (Jones). The males are amply distinct, differing in the long styli of *meadii* (fig. 27).

TYPES: Holotype, male, Lake City, Colorado, August 8-15, 1936, 9700 feet elevation (C. L. Fluke) in the American Museum of Natural History; allotype, female, June 20, 1940, in the collection of the Colorado Agricultural and Mechanical College at Fort Collins; paratypes, four females, same data as allotype; 116 males and five females, Fort Collins, Colorado, June to September, mostly September, 1940, and apparently student collections; one female, same data as holotype; one female, Estes Park, Colorado, August 22, 1936 (C. L. Fluke); one male and three females, Cameron Pass, Colorado, August, 1936 (C. L. Fluke); one female, Pagosa Springs, Colorado, June 22; two males and one female, Pingree Park, Colorado, August, 1926 and 1939 (Fluke and James); one female, Chambers Lake, Colorado, September 3, 1932; one male, Masonville, Colorado, September 4, 1934; one female, Skalkaho Pass, Hamilton, Montana, July 19, 1949 (L. D. Beamer); one female, Missoula, Montana, May 15, 1941 (L. J. Lipovsky); one male, Moses



Coulee, Washington, April 2, 1933; one male, Pullman, Washington, April 15, 1941 (L. J. Lipovsky); one male, Moscow Mountains, Idaho, June 9, 1920 (A. L. Melander); one male, Timpanogas, Utah (C. L. Hayward); four males and one female, Ferguson Gulch, Salt Lake County, Utah, September 22, 1951 (Y. Sedman); one male, Leeds, Utah, April 20, 1951 (Harmiston); three males, Salt Lake City, Utah, April 14, 1939, May 8, 1949, and April 22, 1951 (Y. Sedman); two females, Low Bush, Ontario, Lake Abitibi, June 11, 1925 (N. K. Bigelow).

***Metasyrphus luniger* subspecies *vockerothi*, new subspecies**

Figures 9, 10, 26, 29, 36, 43

*Metasyrphus luniger* FLUKE (not Meigen), 1949, Proc. U. S. Natl. Mus., vol. 100, no. 3256, p. 41.

*Metasyrphus perplexus* FLUKE (not Osburn), *loc. cit.*

Differs from typical *luniger* in the black pile of the face on the male, darker oral margin and legs, and usually with some black pile on the mesonotum along the sides, often absent on the females; the abdominal spots are less bulbous than in *luniger* and their outer ends are usually almost as near to the base of the segments as the inner ends; the spots are also decidedly smaller.

This form has also been called *perplexus*, but the antennae are much smaller in *vockerothi*. I had considered this a variety of *perplexus* until the differences in the antennae were noted.

Pile on the eyes is frequently present and often conspicuous on some of the females, but I believe this is a variable character and not of specific value. A full description of this form is given in the references above.

The fifth tergite is shining black, with the apical margin and sides narrowly yellow and usually a yellowish streak in the basal corners quite similar to those on *perplexus*. A few specimens have the basal corners of the fifth tergite entirely yellow, but this condition appears to be a rarity. On *astutus* these spots are on the average more prominent.

TYPES: Holotype, male, Reindeer Depot, Mackenzie Delta, June 30, 1948 (J. R. Vockeroth); allotype, female, same data, July 6, 1948; paratypes, three males and nine females, same place as holotype (Vockeroth and Brown); one male, Gillam, Manitoba, June 22, 1949 (J. B. Wallis); one pair, Whitehorse, Yukon Territory, June 11, 1949, and July 5, 1948 (Watson and

Hughes); one male, Fort Harrison, Quebec, July 18, 1949 (D. P. Whillans); one male and two females, Great Whale River, Province of Quebec, July and August (Vockeroth); one male, 36 miles west of Dawson, Yukon, August 24, 1949 (P. F. Bruggeman); three females, Watson Lake, Yukon Territory, June 17, 1948 (Mason and Hughes); three females, Fort Chimo, Quebec, July 27, 1948 (R. H. MacLeod); one female, Champagne, Yukon Territory, August 4, 1948 (Mason and Hughes); two females, Yellowknife, Northwest Territory, July 6 and 11, 1949 (E. F. Cashman); two males and eight females, Matanuska, Alaska, June 10 to July 17, 1944 (J. Chamberlin), rotary trap collection; one male, Mt. Washington, New Hampshire, June, 1907; one male, Cuchara, Colorado, August 7, 1940, 8000 feet elevation (F. M. Snyder); one male, University of Wisconsin Arboretum, Madison, May 17, 1950 (D. G. Allen); one female, Madison, Wisconsin, September 21, 1917 (C. L. Fluke); and one male, Isle Royale, Michigan, August 3-7, 1936 (C. Sabrosky).

Types in the Canadian National Collection; paratypes in the American Museum of Natural History, the United States National Museum, and the collection of the author.

### ***Metasyrphus perplexus* (Osburn)**

Figures 5, 6, 18, 21, 35, 41

*Syrphus perplexus* OSBURN, 1910, Jour. New York Ent. Soc., vol. 18, p. 55.

*Metasyrphus perplexus* FLUKE, 1933, Trans. Wisconsin Acad. Sci., Arts and Lett., vol. 28, p. 99.

Belongs to the *luniger* complex but is readily known by the larger antennae. The pile of the mesonotum and pleura is white, without any trace of yellow, although a few black hairs may sometimes be seen on the male just above the wings. The male has a wide ocular angle at the apex of the front, and there is a pair of large black dots just above the antennae. It is easily confused with *vockerothi* and *astutus* and only clearly separated on the size of the antennae. The spots are not so arcuate as on the two forms of *luniger*. It is a rather large species found east of the Rocky Mountains.

Specimens before me are from Wisconsin, Minnesota, Tennessee, and Colorado.

**Metasyrphus gentneri**, new species

Figures 11, 20

Belongs to the *luniger-perplexus* complex and is closest to *astutus* but differs from all in the elongate styles on the genitalia, as long as those on *meadii* Jones. Face with a median black stripe and with black pile (male), antennae average. Length 10 to 11 mm.

MALE: Face shining yellow, with a black stripe and usually black pile, a few yellow hairs sometimes present on the lower slopes; oral margin and cheeks black, the cheeks with a bluish cast; yellow beneath the mouth opening, pile of the cheeks pale; front yellow, with a rather inconspicuous brownish arc just above the antennae; the ocular angles with yellowish pollen; frontal pile black; ocellar triangle black, with black pile; occipital area heavily coated with gray pollen, the pile yellowish to white, a few black cilia above. Antennae almost entirely black, very briefly yellowish on the under side, arista short and dark brown.

Thorax shining, with slight bluish reflections, especially on the pleura; the pile all yellowish; scutellum translucent yellow, the pile black, yellow on the borders. Legs yellow; basal third of the four front femora and basal two-thirds of the hind femora black, upper sides of the tarsi darkened; pile yellow, generally black on the outer surfaces of the femora and all of the hind tibiae. Wings hyaline, the veins yellowish, third vein only gently curved; squamae pale, with yellow fringe; halteres yellow, plumule white.

Abdomen mostly opaque black, shining on the first tergite and on the borders of the other tergites, with three pairs of arcuate yellow spots which are well separated from the side margins; apical margins of the fourth and fifth and basal corners of the fifth yellow. Genital styles elongate, covered with black pile (nearly always pale on *astutus* and *vockerothi*), pile on the ninth tergite black. Venter shining black, the segmental sutures yellow, the erect pile pale, and the short appressed pile from third sternite on, black.

FEMALE: Very similar to that of *luniger-astutus* and practically impossible to separate unless associated with the males. The pollinose spots on the front usually quite large and narrowly separated, somewhat smaller on the *luniger* forms; the arc above the antennae not distinct as two separate spots. The legs also

appear to be somewhat darker, especially the hind femora, but here again there is some variability.

**TYPES:** Holotype, male, Talent, Oregon, March 8, 1934 (L. G. Gentner); allotype, female, same data, March 7, 1934; paratypes, four males and one female, same data, March 4, 1934 to May 4, 1936; two males and three females, Walla Walla, Washington, March 3, 1932, April 4 and May 8, 1940 (C. W. Woodworth); one male, Sumner, Washington, May 27 1933 (R. Latta); one male, Whittier, California, March 10, 1933 (Chas. H. Hicks); one female, Redwood City, California, March 21, 1948 (P. H. Arnaud); one male, Mill Creek Canyon, Salt Lake County, Utah, June 14, 1951; one female, Woodland, Utah, July 19, 1950 (Harmiston); and one male, Kimball Junction, Summit County, Utah, July 22, 1951 (Sedman).

I take considerable pleasure in naming this species after my former colleague, L. G. Gentner, of Talent, Oregon.

### ***Metasyrphus chillcotti*, new species**

Figures 12, 32

Related to *palliventris* Curran, but the basal third or half of all the femora black, fifth and usually the fourth sternites reddish. Length 8 to 10 mm., average about 9.5 mm.

**FEMALE:** Face yellow, with an abbreviated black stripe that fades out above at the depression; cheeks and oral margin black, although sometimes the sides of the oral margin somewhat yellowish; cheeks black; front shining, black on upper two-thirds and yellow below, with triangular whitish dust spots at the depression which follow the ocular margins to the cheeks; pale brown spots above the antennae; pile black on the front and ocellar triangle, pale yellowish elsewhere except for a few black hairs between the antennae and the eyes; occiput thickly coated with gray pubescence and pale yellow pile. Antennae relatively small, all the segments darkened, paler on their under sides.

Thorax shining bluish to greenish, the mesonotum very slightly dulled in the middle with fine pubescence, the pleura somewhat more bronzed; pile all pale yellowish, darker along the sides, giving the appearance of yellow side margins, although the ground color is also paler. Scutellum translucent yellow, the pile yellow and black mixed.

Legs yellow, basal third of the front and middle femora and the basal half of the hind femora black, the tarsi generally darkened

above, pile pale colored, black on the outer sides of the femora and on all the hind tibiae except apically on the outer side, also black above on the hind tarsi. Wings hyaline, stigma dilutely yellowish; squamae whitish, the fringe pale yellow, halteres yellow; plumule white.

Abdomen with three pairs of spots, the second and third pair arcuate, and all spots reach the sides by their anterior corners or very nearly so. Apex of the fourth and fifth and the sides and basal corners of the fifth yellow. Fifth and usually the fourth entirely reddish.

MALE: Similar, the front entirely yellow, the abdominal spots broader and somewhat more arcuate, and the fifth is reddish, with a black basal spot. Cerci yellow, similar in shape to related species.

TYPES: Holotype, female, Fort Churchill, Manitoba, August 25, 1950 (J. G. Chillcott); allotype, male, Chesterfield, Northwest Territory, Canada, August 12, 1950 (J. G. Chillcott); paratypes, three females, same data as allotype, August 10 and 15, 1950; two females, Ft. Chico, Quebec, July 23 and 24, 1948 (R. H. Macleod); one female, Great Whale River, Province of Quebec, June 27, 1949 (J. R. Vockeroth); one female, Reindeer Depot, Mackenzie Delta, July 5, 1948 (J. R. Vockeroth); one headless female, Kidluit Bay, Richards Isle, Northwest Territory, July 31, 1948 (G. E. Shewell). A note attached to this last specimen states "very difficult to catch—mud-sedge bank above falls." Types deposited in the Canadian National Museum in Ottawa, the American Museum of Natural History, and the collection of the author.

This species is quite similar to my interpretation of *neoperplexus*, but the definite black stripe over the tubercle, darker antennae, and paler legs of *chillcotti* will separate them.

### ***Metasyrphus montanus* (Curran)**

*Syrphus montanus* CURRAN, 1924, Kansas Univ. Sci. Bull., vol. 15, p. 174.

*Metasyrphus montanus* FLUKE, 1933, Trans. Wisconsin Acad. Sci., Arts and Lett., vol. 28, p. 103.

This species is amply distinct from *curtus* Hine to which I compared it in 1933. The female is quite similar to the male, having slightly narrower spots on the abdomen, entirely yellow legs except the coxae and trochanters and a slight infuscation of brown at the bases of the femora, and yellow fourth and fifth

sternites. The pile on the face and scutellum of both sexes is white to yellowish. The front of the female is mostly shining, the side dust spots being quite small; upper half black and the lower half yellow, with very faint small brown spots above the antennae.

Specimens before me are from Cameron Pass and Walden, Colorado, July and September.

### ***Metasyrphus medius* (Jones)**

Figure 48

*Syrphus medius* JONES, 1917, Ann. Ent. Soc. Amer., vol. 10, p. 224.

*Metasyrphus medius* FLUKE, 1933, Trans. Wisconsin Acad. Sci., Arts and Lett., vol. 28, p. 87.

Two males are before me which I believe belong to this species. They are entirely like those of *wiedemanni* (Johnson), except that the bands reach the sides as they do in the female, the front is yellow, with only faint indications of brown spots above the antennae, and the femora are definitely paler, almost entirely yellow, on one specimen (Chicago, Illinois) but with a dark median band on the hind femora of the other specimen (Fenville, Michigan). The Chicago specimen has the band on the second tergite interrupted; it is entire on the Michigan one. The genitalia appear to be identical to those of typical *wiedemanni*.

### ***Metasyrphus lapponicus* (Zetterstedt)**

Figure 52

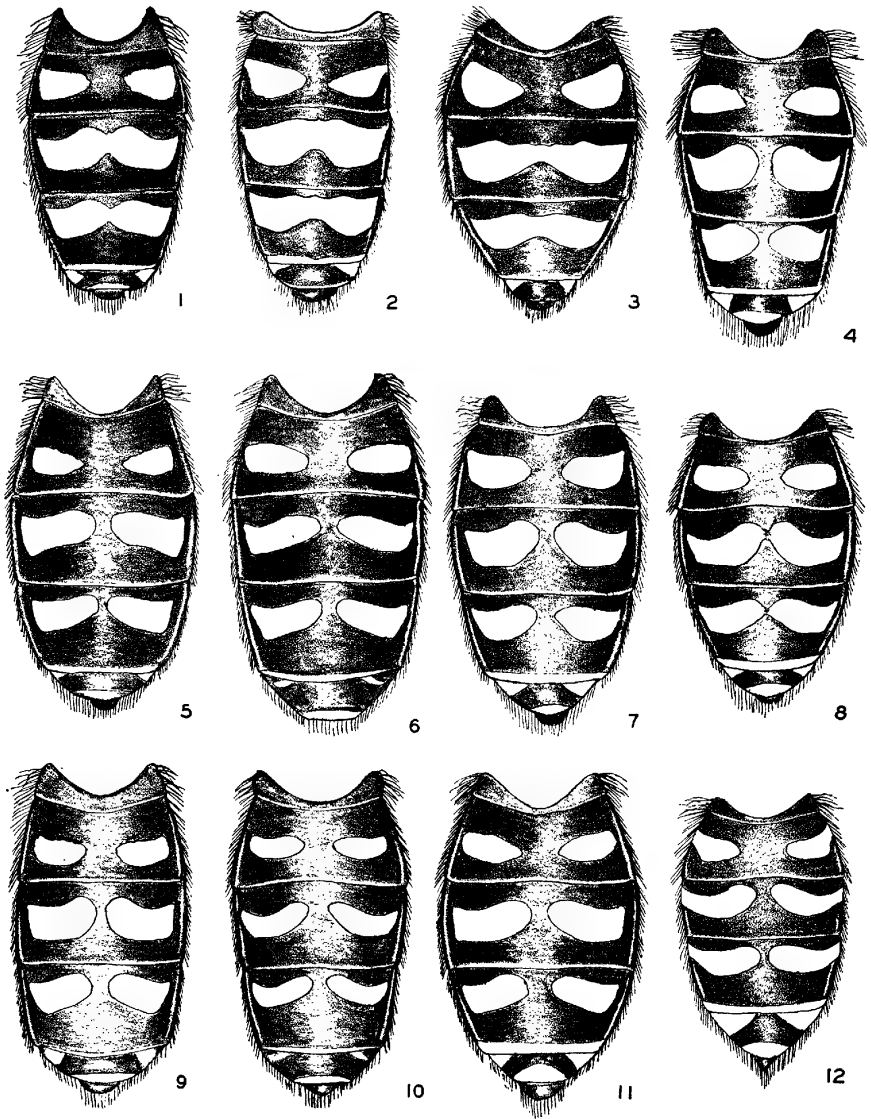
*Scaeva lapponica* ZETTERSTEDT, 1838, Insecta Lapponica, p. 598.

*Metasyrphus lapponicus* FLUKE, 1950, Trans. Wisconsin Acad. Sci., Arts and Lett., vol. 40, p. 141.

There has been some question in my mind whether *lapponicus* belongs to *Metasyrphus* as defined here. The adults have a decidedly curved third longitudinal vein, and the metasternum is bare. The genitalia also are somewhat different, and previously I had indicated that the penis sheath lacked the rough corrugations that I think are typical of this genus. A more detailed study since then shows that the penis sheath is somewhat roughened but not ribbed. Pile also occurs on the tenth segment which I believe is absent in the other species; the superior lobe lacks the dorsal spine (dorsal in the sketches) which is always present in all the others studied. The ejaculatory hood is also

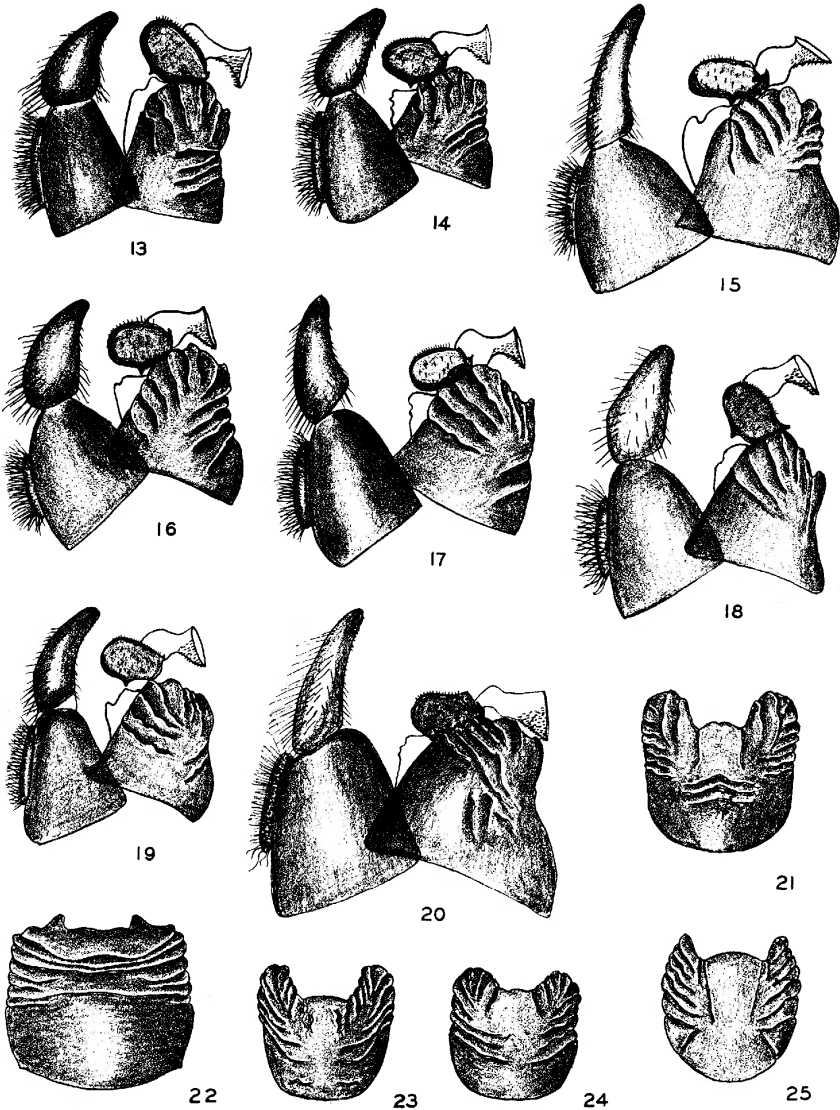
spinose on this species. The beginnings of a lingula and the rather different shape of the styles are also characters worth noting.

Curran's species *aberrantis* is similar to *lapponicus* in its genital characters.

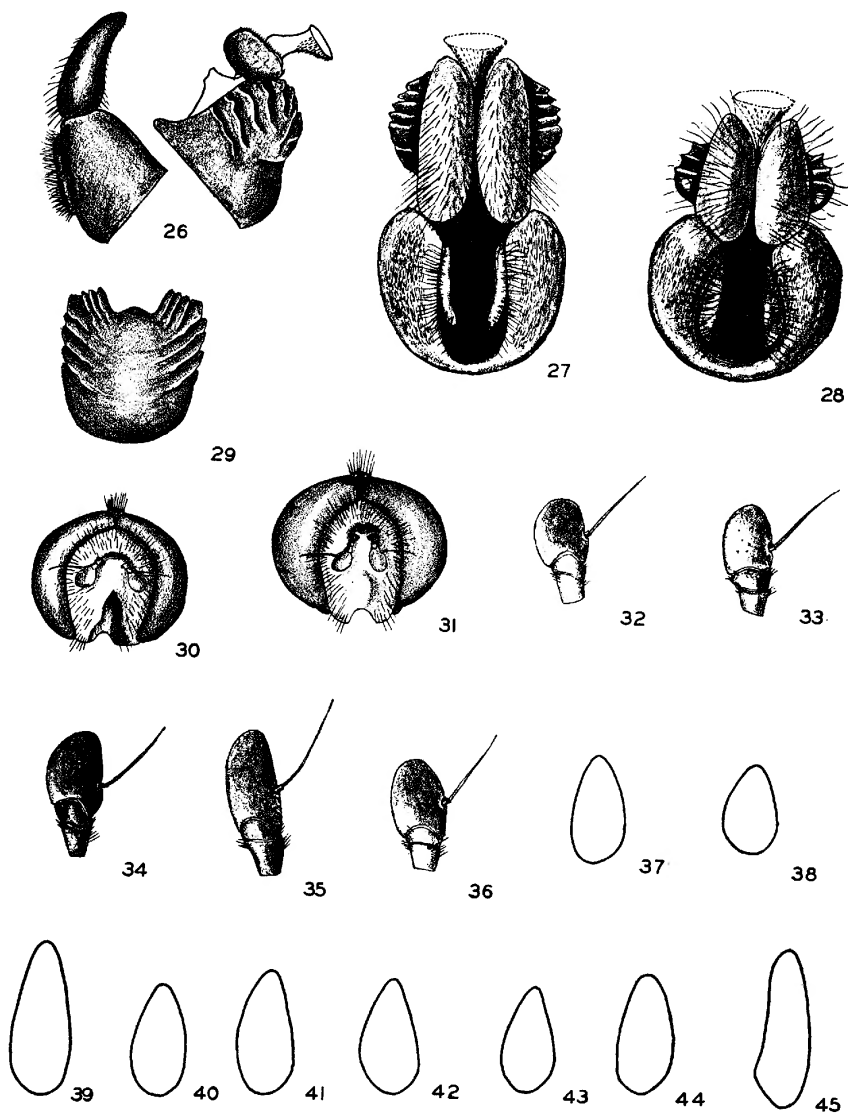


FIGS. 1-12. Abdomens of *Metasyrphus* species. 1. *M. nitens* (Zetterstedt), male. 2. *M. venablesi* (Curran), male. 3. *M. sculleni*, new species, male. 4. *M. luniger* (Meigen), male. 5, 6. *M. perplexus* (Osburn), male and female. 7, 8. *M. luniger astutus*, new subspecies, both males. 9, 10. *M. luniger vockerothi*, new subspecies, male and female. 11. *M. gentneri*, new species, male. 12. *M. chillcotti*, new species, female.

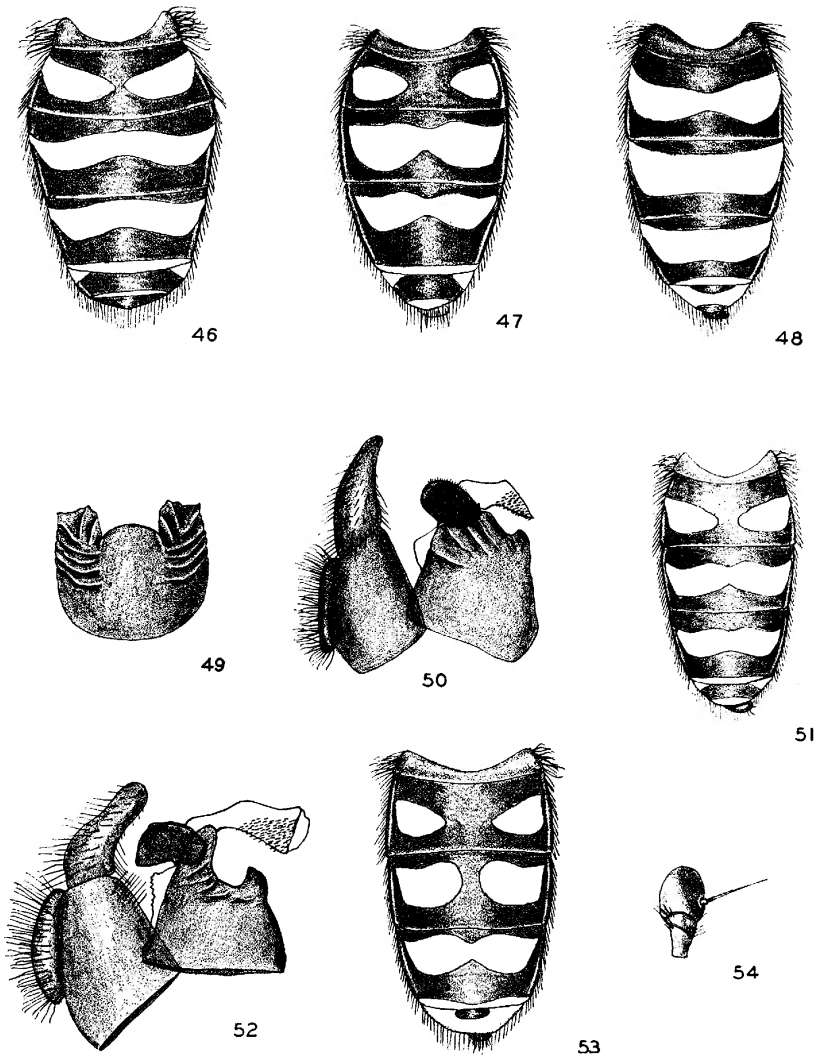




FIGS. 13-25. Male genitalia of *Metasyrphus* species. 21-25. Ventral view of penis sheath. 13. *M. nitens* (Zetterstedt). 14. *M. nitens confertus*, new subspecies. 15. *M. venablesi* (Curran). 16. *M. sculleni*, new species. 17. *M. luniger* (Meigen). 18. *M. perplexus* (Osburn). 19. *M. luniger astutus*, new subspecies. 20. *M. gentneri*, new species. 21. *M. perplexus* (Osburn). 22. *M. venablesi* (Curran). 23. *M. nitens* (Zetterstedt). 24. *M. nitens confertus*, new subspecies. 25. *M. sculleni*, new species.



FIGS. 26-45. *Metasyrphus* species. 32-36. Female antennae. 37-45. Styles of the genitalia. 26. *M. luniger vockerothi*, new subspecies, genitalia. 27. *M. meadii* (Jones), genitalia. 28. *M. luniger astutus*, new subspecies, genitalia. 29. *M. venablesi* (Curran), penis sheath. 30. *M. nitens* (Zetterstedt), head. 31. *M. sculleni*, new species, head. 32. *M. chillcotti*, new species. 33. *M. luniger* (Meigen). 34. *M. luniger astutus*, new subspecies. 35. *M. perplexus* (Osburn). 36. *M. luniger vockerothi*, new subspecies. 37. *M. nitens* (Zetterstedt). 38. *M. nitens confertus*, new subspecies. 39. *M. venablesi* (Curran). 40. *M. sculleni*, new species. 41. *M. perplexus* (Osburn). 42. *M. luniger astutus*, new subspecies. 43. *M. luniger vockerothi*, new subspecies. 44. *M. subsimus*, new species. 45. *M. wiedemanni* (Johnson).



FIGS. 46-54. *Metasyrphus* species. 46. *M. venabilesi* (Curran), female abdomen (paratype). 47. *M. meadii* (Jones), male abdomen. 48. *M. medius* (Jones), male abdomen. 49. *M. subsimus*, new species, penis sheath. 50. *M. subsimus*, new species, genitalia. 51. *M. subsimus*, new species, male abdomen. 52. *M. lapponicus* (Zetterstedt), genitalia. 53. *M. depressus* Fluke, male abdomen. 54. *M. subsimus*, new species, male antenna.

