

A REVISION OF THE AMERICAN PARASITIC FLIES BELONGING TO THE GENUS *BELVOSIA*

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The present paper contains descriptions of 36 species and 2 varieties of flies belonging to the genus *Belvosia*, of which 19 species and 2 varieties are new to science.

It is based on the material in the United States National Museum, together with that in the American Museum of Natural History, the University of Kansas, the Vienna Natural History Museum, and that in the private collections of C. W. Johnson, Prof. Jas. S. Hine, and Prof. A. L. Melander. Mr. C. H. Curran, in charge of the Diptera of the Canadian National Collection, kindly furnished paratypes of two of his species that I had not seen. I should especially mention the generosity of Dr. F. Maidl, of the Vienna museum, who sent all the material in that museum which had been studied by Messrs. Brauer and Bergenstamm.

Genus *BELVOSIA* Robineau-Desvoidy

Belvosia ROBINEAU-DESVOIDY, Myodaires, 1830, p. 103.—OSTEN SACKEN, Catalogue N. A. Diptera, 1878, p. 153.—VAN DER WULP, Biologia, Dipt., vol. 2, 1888, p. 29.—WILLISTON, Insect Life, vol. 5, 1893, p. 238.—BRAUER and BERGENSTAMM, Zweifl. Kais. Mus., pt. 6, 1893, p. 238.—ADAMS, in Williston's Manual, 1908, pp. 372, 373.—TOWNSEND, Taxonomy Musc. Flies, 1908, p. 103.—CURRAN, Bull. Brooklyn Ent. Soc., vol. 22, 1927, p. 150.

Latreillia ROBINEAU-DESVOIDY, Myodaires, 1830, p. 104.—BRAUER and BERGENSTAMM, Zweifl. Kais. Mus., pt. 4, 1889, p. 97; pt. 6, 1893, pp. 123, 204.

Williston BRAUER and BERGENSTAMM, Zweifl. Kais. Mus., pt. 4, 1889, p. 97; pt. 5, 1891, pp. 349, 403; pt. 6, 1893, p. 123.—TOWNSEND, Muscoid Flies, 1908, p. 103.

Latreillimyia TOWNSEND, Muscoid Flies, 1908, p. 105.

Goniomima TOWNSEND, Muscoid Flies, 1908, p. 105.

Triachora TOWNSEND, Muscoid Flies, 1908, p. 105.

Belvosiomima TOWNSEND, Proc. U. S. Nat. Mus., vol. 49, 1915, p. 413.

Belvosiosis TOWNSEND, Revista Museu Paulista, vol. 15, 1926, p. 248.

The sole original species of *Belvosia* was *bicincta*, new, from Carolina and the Antilles. *Latreillia* contained two American species, *Musca*

bifasciata Fabricius and *unifasciata*, new, as well as eight from the Old World. Brauer and Bergenstamm apparently indicated *bifasciata* as type, and this species was definitely designated by Coquillett,¹ *Latreillia* being preoccupied, *Latreillimyia* was proposed to replace it, taking the same genotype. *Willistonina* had but one originally included species, *Musca esuriens* Fabricius. *Goniomima* had but one originally included species, *Belvosia luteola* Coquillett, which was also designated as type. *Triachora* had but one originally included species, *Latreillia unifasciata* Robineau-Desvoidy, which was also designated as type. *Belvosiomima* had but one originally included species, *fosteri*, new, which was also designated as type. *Belvosiopsis* was proposed for the single species *brasiliensis*, new, also designated as type; this I place as a synonym of *Belvosia leucopyga* Van der Wulp.

Thus it appears that there are seven different generic names to consider in this group, each based on a different type species. I have studied with care all the type species, with reference not only to the generic characters originally mentioned but to others which might have this value. In nearly 40 species, represented by about 700 specimens, there is such a complete blending of the characters that I can not find one which will divide the mass in a consistent manner; nor do I see how a satisfactory division can be made into half a dozen or more genera. The genera have all been made on too few species, and the describers attribute higher value to length of antennae, distance of vibrissae from oral margin, etc., than I can find. It is true that certain species when compared with each other seem generically distinct in the absence of others which connect them; and I thought for some time that two or three genera could be maintained. The genitalia are very homogeneous and the reproductive habits are the same throughout, as far as known.

Williston, in his 1893 paper, discussed the characters in an able manner, and showed that those used by Brauer and Bergenstamm were not of generic value. He saw that if they were even specific there must be many more species than were then supposed, but left the question of specific limits for future study.

The generic characters of *Belvosia* as here taken are as follows: The head is uncommonly wide, but short, the anterior surface flattened; length at vibrissae not much less than at antennae; front broad in both sexes; eyes bare; ocellar bristles absent, frontals varying widely in the sexes and in different species, from three irregular rows to one nearly regular; proclinate orbitals present in all females, and in the males of *luteola*, *unifasciata*, *fosteri*, *ochriventris*, *slossonae*, and *equinoctialis*; vibrissae considerably above the oral margin, the distance in general about the same as the length of the second antennal joint; parafacials broad, bare; facial ridges always bristly to nearly one-half

¹ Proc. U. S. Nat. Mus., vol. 37, 1910, p. 558.

their height, often much more; penultimate joint of arista distinct and a little elongated, not geniculate; arista usually thickened for most of its length, sometimes flattened nearly to the tip; cheeks uniformly a little less than half the eye height; palpi and proboscis normal. Thorax with usually four sternopleurals (from three to six or more); scutellum with a row of long, depressed laterals, from four to six pairs, and sometimes a smaller, suberect, spiny apical pair, which are highly variable and poorly developed as a rule. The number of laterals is somewhat variable also and of slight importance in separating the species. Abdomen generally broad, never with discals, the genitalia of the male rather small and showing but feeble specific characters; they are of a common type, consisting of inner and outer pairs of thick, short forceps, the penis elbowed and ending in a vase-like opening. The wings are very uniform, third vein with only a few bristles at base, apical cell open far before the tip. Legs with good characters in the male pulvilli, which are usually enlarged, and with the bristles of the outer side of the hind tibia variously developed but subject to sexual variation in the species.

The characters which seem most useful are the color of the small hairs below the lowest frontals, and the extent of the pale pollen on the third and fourth abdominal segments; other details of the pollen of the abdomen furnish many minor points, and these seem to be very constant in well-preserved specimens. I have omitted the thoracic chaetotaxy almost entirely, as it is too uniform to give any specific characters except in rare cases. A delicate character of some importance in males is the shape of the upper curve of the compound eye; where this is more broadly rounded the front does not begin to widen for a short distance from the vertex; but in some species (*bifasciata*, for example) the eye is narrow and almost pointed above, so that the front widens immediately from the vertex. The pollen of the parafrontals gives a number of good specific characters, especially in males. The frontal bristles I view with suspicion, as they seem highly variable. The length of the third antennal joint as compared with the second has a considerable value, although some variation must be expected. The pulvilli of the males offer several degrees of development, and seem constant for the sex and species.

The nearest related genus is perhaps *Atacta* Schiner, in which the thoracic and abdominal structure are much like *unifasciata*; it, however, has a narrow front in the male, very flat facial ridges, frontal bristles reduced, and the ocellars are present.

The reproductive habits are the same in all species as far as known; the females lay large numbers of minute eggs on foliage which are swallowed by caterpillars along with the leaf which they are eating. This is the second group of Pantel, which includes *Gonia*, *Spallanzania*, etc.

The genus is known only from the New World.

KEY TO SPECIES OF *BELVOSIA*

1. Fourth abdominal segment wholly shining black, the usual pollen absent...2.
Fourth abdominal segment black, with a conspicuous large spot of pale pollen above, which does not extend down the sides nor reach the tip; abdomen elsewhere black (Argentina, Brazil).....*weyenberghiana* Van der Wulp.
Fourth abdominal segment densely pollinose on basal half or more, the pollen extending down the sides and ranging in color from almost white to reddish orange3.
2. Second abdominal segment with two or three pairs of spinelike median marginal bristles; large, spinose, robust species (Bolivia)....*manni*, new species.
Second abdominal segment with a continuous marginal row of about 18 bristles; medium-sized, less spinose species (south Brazil).
.....*australis*, new species.
3. Both third and fourth abdominal segments with pollen of deep orange or reddish color.....4.
Pollen not alike on the two segments, or else paler, at most golden.....5.
4. Pollen of head brown except facial ridges and a spot on parafacial, where it is silvery (San Domingo).....*vanderwulpi* Williston.
Pollen of head silvery white (Jamaica).....*ferruginosa* Townsend.
5. The small hairs below lowest frontals are pale and delicate.....6.
These hairs are black and generally less delicate.....14.
6. Fourth abdominal segment wholly pale pollinose to apex.....7.
Fourth abdominal segment with the tip black, including bases of marginal bristles (south Florida).....*slossonae* Coquillett.
7. Third and fourth segments of abdomen with broad, uninterrupted cross-bands of dense yellow pollen; basal abdominal segments black.....8.
Third segment not strongly contrasting with second, the band if broad clearly interrupted; abdomen generally more reddish or yellow in ground color9.
8. Third segment densely yellow pollinose to tip, like the fourth (United States).....*semiflava*, new species.
Third segment black at tip (Mexico, Brazil).....*mexicana*, new species.
9. Second abdominal segment shining translucent yellow, with median black stripe (Porto Rico, Peru).....*luteola* Coquillett.
Second abdominal segment with obvious pollen over most of its surface, or black in ground color.....10.
10. Ground color of abdomen yellow (Mexico, Panama).
.....*ochriventris* Van der Wulp.
Ground color of abdomen black, sometimes tending toward reddish but not yellow.....11.
11. Male without orbitals (*recticornis* Macquart).....12.
Male with orbitals13.
12. Third antennal joint black (Mexico, Peru, Ecuador)....*recticornis* Macquart.
Third antennal joint almost entirely red (Brazil).
.....*recticornis* var. *ruficornis*, new.
13. Third antennal joint six times the second in the male, in the female three times; male pulvilli small (Paraguay, Brazil).....*fosteri* Townsend.
Third antennal joint hardly three times the second in the male, twice in the female; front pulvilli in male longer than last tarsal joint (Peru, Guatemala, Porto Rico).....*equinoctialis* Townsend.
14. Fourth abdominal segment with dense yellow pollen to tip.....15.
Fourth abdominal segment black at tip, including the bases of the marginal bristles.....22.

15. Pollen of second and third abdominal segments gray, that of fourth deep golden, strongly contrasting (northern species)-----16.
Pollen of second and third abdominal segments velvet black, that of fourth pale golden (Brazil)-----wiedemanni, new species.
Pollen not as described-----17.
16. Thorax indistinctly striped, male with orbitals; front in both sexes translucent yellow, shining, not pollinose (eastern United States).
unifasciata Robineau-Desvoidy.
Thorax very distinctly striped; male without orbitals; front much darker (Virginia, Maryland)-----omissa, new species.
17. Large blackish species; male with large pulvilli-----18.
Moderate-sized species; male with small pulvilli except possible in *vittata*-----20.
18. Third abdominal segment with broad, deep yellow uninterrupted pollinose band matching the fourth and leaving only the apical quarter black (Mexico, Brazil)-----mexicana, new species.
Third segment not as described (compare *canalis* also)-----19.
19. Third abdominal segment with very narrow basal pollinose band; male with outer forceps brown, not swollen (Mexico, Costa Rica; *analisis* of authors).
ciliata, new species.
Third abdominal segment with interrupted pollinose band covering basal half; male with outer forceps yellowish except at tip, distinctly swollen (South America, Panama, West Indies)-----ciliata var. *formosa*, new.
20. Thorax very distinctly striped; third antennal joint of male very long, seven or eight times the second (Paraguay)-----vittata, new species.
Thorax indistinctly striped; third antennal joint not so long-----21.
21. Third antennal joint red, hairs of cheeks pale yellow (Brazil).
frontalis, new species.
Third antennal joint black, hairs of cheeks blackish but delicate (Brazil).
elusa, new species.
22. Third abdominal segment with complete dense golden pollinose band covering all but the apical fourth or fifth, which is black-----23.
Third abdominal segment wholly golden pollinose to the apex on the sides, a narrow hind margin along the middle of the dorsum black (Alberta, Middle West)-----canadensis Curran.
Third abdominal segment with narrower or distinctly interrupted cross-band-----27.
Third segment entirely black, the only pale pollen being on the fourth (Brazil, Venezuela)-----leucopyga Van der Wulp.
23. Cheeks with very thin pollen, the black ground color showing through; parafrontals shining black (Manitoba, Illinois, Kansas)-----splendens Curran.
Cheeks with dense white pollen-----24.
24. Front calypter blackened, frequently the hind one also; wings blackish; very large forms-----25.
Front calypter white or barely yellowish; wings brown; not so large-----26.
25. First and second abdominal segments with three pairs (rarely two) of median marginals; male with front pulvilli long, much longer than last tarsal joint. The largest species of all (United States, mostly northeast).
borealis, new species.
First and second abdominal segments with only a single pair each of median marginals; male with front pulvilli short, not equalling last tarsal joint (if with long pulvilli see *mexicana*) (United States, Guatemala).
bifasciata Fabricius.

26. Male with bright silvery parafrontals; antennae black, third joint in male three times the second; facial ridges of male strongly bristly (eastern United States)-----**argentifrons**, new species.
 Male with parafrontals generally with yellowish pollen, dull; antennae somewhat reddish, third joint in male twice the second; bristles of facial ridges not uncommonly strong (United States)-----**townsendi**, new species.
27. Third antennal joint only a little longer than second; vibrissae more than two-thirds the length of the third antennal joint above oral margin (wide-spread)-----**bicineta** Robineau-Desvoidy.
 Third joint usually more than twice the second, vibrissae never more than half the length of the third joint above the oral margin-----28.
28. With only a single row of frontal bristles, not counting the orbitals in female-----29.
 With at least a partial second row of frontals-----30.
29. Third abdominal segment with only narrow trace of pollinose basal band, male with bright silvery parafrontals (Brazil)-----**potens** Wiedemann.
 Third abdominal segment with pale yellow basal crossband covering half of the segment (Salvador)-----**nigrifrons**, new species.
30. Second abdominal segment with two or three pairs of median marginals; robust, spiny species (Guatemala, Brazil)-----**lata**, new species.
 Second abdominal segment with only one pair of median marginals as usual-----31.
31. Third abdominal segment with only a very narrow basal pollinose band, covering about one-sixth of its width (Brazil)-----**smithi**, new species.
 Third abdominal segment with interrupted band covering about one-half of its width, rarely a little less-----32.
32. Hind coxae on inner side with two or three strikingly long, stout spines directed backward (Paraguay, Brazil, Cuba)-----**spinicoxa**, new species.
 Hind coxae with distinct but not striking bristles-----33.
33. Hind tibia stout, with coarse, irregular bristles on outer side (Brazil).
 -----**esuriens** Fabricius.
 Hind tibia with a dense row of almost even cilia on outer side-----34.
34. Second abdominal segment shining black, parafrontals in male dark plumbeous (Brazil, British Guiana)-----**williamsi**, new species.
 Second abdominal segment opaque black, parafrontals in male with dense yellowish pollen (Canal Zone, Brazil)-----**canalis**, new species.

BELVOSIA WEYENBERGHIANA Van der Wulp

Belvosia weyenberghiana VAN DER WULP, Tijdsch. v. Ent., vol. 26, 1883, p. 26. pl. 1, fig. 16.

Male.—Front at vertex 0.34 of the head width, the sides nearly parallel for a short distance; face, parafacials, cheeks, and posterior orbits white pollinose. Parafrontals with much thinner pollen, dark and subshining over most of their area. Frontal bristles very irregular, hardly in three rows, more erect than in most of the species. The hairs of the upper parafacials are black; cheek nearly two-thirds the eye height, with black hairs, some quite bristly. Antennae blackish, the third joint quite short, one and a half times the second. Vibrissae about the length of the second antennal joint, above the oral margin; facial ridges with black bristles extending above the middle. Palpi yellow.

Thorax black, with gray pollen in front, becoming brown behind, decidedly so on the scutellum. Sternopleurals variable, from three to six.

Abdomen black subopaque, of uniform color, except on the fourth segment, which has a very striking spot of pale yellow pollen covering the whole upper surface except the apical fifth. This pollinose area bears no small hairs and ends abruptly at the sides. Second segment with 4 to 6 marginals.

Legs black. Front pulvilli elongated, nearly twice the last tarsal joint. Hind tibia with a row of nearly a dozen bristles of increasing size on the basal two-thirds, a few coarse hairs with these and extending to the tip.

Wings almost black, fourth vein rather strikingly curved backward at the bend, which is rounded. Calypters blackish.

Female.—Front 0.35 of the head width, widening from vertex. Front pulvilli small.

Length, 10 mm.

Redescribed from 1 male specimen collected at Sao Paulo, Brazil (Dr. A. Lutz), and 6 males and 10 females in the Vienna Museum, 12 of which are labeled "Beske, Brasilien"; 3 are "Natterer Brasil"; 1 simply "Brasilien." Three of these are added to the National Museum collection. The type was a male from Argentina.

***BELVOSIA MANNI*, new species**

Female.—A large robust species without pale pollen on the abdomen. Front at vertex 0.38 of the head width, widening immediately from the level of the anterior ocellus. Parafrontals with thin plumbeous pollen, becoming shining in the middle region. Frontal stripes almost black, the frontal bristles in two irregular rows, besides three proclinate orbitals each side, the small hairs below the frontals are black. Parafacials and cheeks with almost white pollen, both very broad, the cheek fully one-half the eye height, with black hairs. Facial ridges with small bristles about halfway up. The vibrissae more than half the length of the third joint above the oral margin. Antennae black, the third joint less than twice the second and somewhat protuberant near the arista. Palpi dark yellow; beard white.

Thorax decidedly black, with thin gray pollen which changes to dark brown on the scutellum. Scutellum with six pairs of long bristles in the described specimen, without any smaller apical suberect pair.

Abdomen very broad, entirely black, rather dull, without distinct pollen. The first segment with three pairs of marginal bristles, the second with three on one side and two on the other, the third with a marginal row of about 14; the fourth with a row of about the same number situated at two-thirds of the length, a few smaller bristles on the extreme apex.

Legs black, claws and pulvilli yellow; hind tibia with six or eight suberect bristles on the outer side, just behind which are numerous sloping cilia.

Wings dark brown, bend of fourth vein rather close to margin, the distance about half of that between hind cross vein and bend. Both calypters blackish.

Length, 15.5 mm.

Described from one female collected at Ixiamas, Bolivia, in December, 1921, by Dr. W. M. Mann, while director of the Mulford Biological Exploration.

Type.—Female, Cat. No. 40474, U.S.N.M.

BELVOSIA AUSTRALIS, new species

Female.—Front 0.35 of the head width at level of the front ocellus, widening rapidly below; parafrontals with thin plumbeous pollen, having a blackish appearance in some directions but not actually shining. The frontal bristles mostly in a single row except three pairs of proclinate orbitals. The hairs below the frontals are rather numerous and distinctly black. Face, parafacial, and cheek shining white pollinose, almost silvery; vibrissae not so far above the mouth as in most species, the distance being somewhat less than the length of the second antennal joint; facial ridges bristly to the middle; antennae blackish, third joint one and a half times the second. Palpi yellow, rather large and swollen; beard white.

Thorax black with gray pollen, that of scutellum dark brown.

Abdomen wholly black, the last two segments rather shining, the first with two pairs of median marginals, the second with a complete marginal row of about 20, the third with a marginal row of 14, the fourth more shining black than in the preceding, with a submarginal row of smaller bristles, about 14 in number.

Legs black, claws and pulvilli yellow, the hind tibia with a rather even row of sloping small bristles or stout cilia, about 25 in number, one below the middle somewhat larger.

Wings dark brown; both calypters blackish.

Length, 11 mm.

Described from one female, Rio Grande do Sul, Brazil, from the collection of C. W. Johnson, to whom the specimen has been returned.

BELVOSIA VANDERWULPI Williston

Belvosia vanderwulpi WILLISTON, Trans. Amer. Ent. Soc., vol. 13, 1886, p. 303.

Female (type).—Vertex 0.30 of head width. Head with brown pollen throughout except the facial ridges and an indefinite spot on the lower part of the parafacial; the facial ridges contrast strongly in color with the face, they being of a dull silvery or slightly plumbeous

color, which extends to the oral margin; frontal bristles in a single row, the lowest two or three extending almost transversely toward the eye. Antennae black, second joint more than one-half the third; arista missing. Palpi black. The parafacial hairs below the frontals are black and rather strongly developed; the hairs of the cheek are also black. The hair on the back of the head and the beard are rather dark brown in color, a very unusual mark.

Mesonotum damaged with glue so the pollen is spoiled. Sterno-pleural four on one side and three on the other. Calypters brown.

Abdomen uniformly black on the first and second segments; the third and fourth uniformly and densely covered with pollen of a peculiar deep reddish orange or burnt orange color, which extends to the tips of the segments including the rows of bristles. The color of this pollen is very characteristic and quite unlike the common forms.

Legs black.

Wings brown with a distinct yellowish tinge along the front part near the base and becoming subhyaline around the anal angle. Bend of fourth vein slightly oblique, its distance from the margin only a little less than from the cross vein. Third vein with two bristles at base.

Length, 13 mm.

Redescribed from the type specimen, now in the University of Kansas collection; it is from San Domingo, West Indies.

BELVOSIA FERRUGINOSA Townsend

Belvosia ferruginosa TOWNSEND, Trans. Amer. Ent. Soc., vol. 22, 1895, p. 71.

The original description is as follows:

Length nearly 12 mm. Eyes green in life; front brownish red on each side, more or less silvery pollinose; frontal vitta soft brownish golden; facial depression, sides of face and cheeks, rich silvery white pollinose, cheeks hairy. Antennae dark brown, the third joint linear and nearly three times as long as second; arista brown; palpi brownish black, yellowish on tips; vertex somewhat yellowish; posterior orbits silvery white. Thorax and scutellum brownish red, the former thinly pollinos before, leaving the beginnings of four narrow vittae; posterior corners of mesoscutum yellowish, also a little yellowish behind humeri. Abdomen of a beautiful iron-rust yellow, in the first and second segments the yellow shade predominating, in the third and fourth the iron-rust shade; first segment brownish under scutellum; a median pair of macrochaetae on first and second, a marginal row on third and fourth segments. Legs soft blackish, pulvilli and claws yellow. Wings uniformly pale fuscous; tegulae same color.

Bath, Jamaica (E. M. Swainson); bred from a lepidopterous chrysalis; one male. A beautiful species. Type in coll. Townsend.

The type of this species appears to be lost, as it is not in the University of Kansas collection where the other early types of Townsend's are deposited. I have not found any specimens which I could identify as belonging to this species.

BELVOSIA SLOSSONAE Coquillett

Belvosia slossonae COQUILLET, Proc. Acad. Nat. Sci. Phila., vol. 47, 1895, p. 312; Revis. Tachin., 1897, p. 84.

Male.—Front 0.37 to 0.41 of the head width at vertex, inner margins of eyes diverging only slightly, so that the front is nearly as wide as the face, rather prominent at the antennae. Parafrontals silvery on lower part, translucent brownish above except in diagonal view; frontal bristles in about three rows and there are in addition two pairs of proclinate orbital bristles as in female; face, parafacial, cheek, and posterior orbit silvery pollinose, the small hairs below the frontals are pale; cheek with pale hairs, and at the lower edge an irregular double row of black bristles. Palpi yellow; beard white. Antennae black, first two joints brown, third joint elongated and somewhat swollen at the origin of the arista, more than four times the length of the second joint. Arista thick and flattened, broad to the tip, which is bluntly rounded; its total length is about three-fourths of the third antennal joint. Vibrissae quite close to the oral margin, the distance being only half the length of the second antennal joint; facial ridges with stout bristles for more than two-thirds their height, almost up to the arista. There are some white hairs on the ridges outside of the bristles.

Thorax black, densely cinereous pollinose, with four indistinct blackish stripes; pleurae with some pale, delicate hairs mixed with darker and larger bristles; scutellum black, the margin slightly reddish.

Abdomen black, second segment with gray pollen, fading out near the middle in most angles, but in certain directions visible almost to the hind margin; third segment about the same, but with a more distinct black hind border; fourth segment with denser and slightly more yellowish pollen on the basal two-thirds, mixed with a considerable number of erect black hairs. None of the pollen of the abdomen is very deep yellow. First and second segments with one pair of median marginals, third and fourth with a marginal row.

Wings brown, more yellow basally; both calypters white, contrasting with the wing.

Legs black, front pulvilli nearly as long as last two tarsal joints; hind tibia with a sparse, suberect row of about 13 bristles, the largest just below the middle.

Female.—Front at vertex 0.38 to 0.41 of the head width; front not so brown as in the male; third antennal joint shorter and second longer, so that the third is hardly more than twice the second; the facial ridges are much less bristly than in the male.

Length, 9–12 mm.

Described from a series of 5 males and 13 females, collected by C. H. T. Townsend at Miami, Fla., October 26–November 14; 2

of these specimens were compared by Prof. A. L. Melander with the single female type of *slossonae*, formerly in the collection of Mrs. Annie Trumbull Slosson, but now in that of the American Museum of Natural History. It was collected by Mrs. Slosson at Charlotte Harbor, Fla.

***BELVOSIA SEMIFLAVA*, new species**

Male.—Front at vertex 0.40 of the head width, widening only a little for a short distance. Frontal bristles in three irregular rows, the parafrontals with white pollen becoming thinner and more gray above, the upper part black and subshining; face, parafacials, cheeks, and posterior orbits silvery white. Face rather narrow. The hairs below the frontal bristles are pale with a yellow tinge. Cheek almost half the eye height, with pale hairs. Antennae nearly black, basal joint somewhat paler, the third joint a little more than twice the second. Vibrissae rather high above the mouth, facial ridges with half a dozen small bristles reaching about halfway up their length; palpi rather dark yellow, in some specimens brown. Beard white.

Thorax black, not much pollinose except in front; scutellum more brownish.

Abdomen deep black on first two segments, not very shining, the remaining two entirely covered with deep yellow pollen. First and second segments with a single pair of median marginals, third and fourth with marginal rows of about 10.

Legs black; front pulvilli elongated, but scarcely equal to the last two tarsal joints. Hind tibia with suberect row of bristles on outer hind side, one larger below middle.

Wings brown, except toward base; calypters decidedly brown.

Female.—Front at vertex 0.40 (in two) of the head width; third antennal joint twice the second.

Length, 11–13 mm.

Described from 25 specimens of both sexes. The type and allotype are from Rio Ruidoso, White Mountains, N. Mex., collected July 19, on flowers of *Rhus glabra* (Townsend); 15 specimens from Kansas (Bourbon, Franklin, Linn, and Cheyenne Counties; R. H. Beamer, Williams), received from University of Kansas; 1, Agricultural College, Miss. (Wheeler); 3, Clemson College, S. C. (Conradi); 1, Oak Grove, Va. (Townsend); and 3 from the Kansas collection labeled "W. T." in not very legible writing. I take these labels to be in Williston's handwriting and to mean Washington Territory, but as the species is common in Kansas and not otherwise known from the Northwest I fear a mistake in labeling has occurred.

Type.—Male, Cat. No. 40467, U.S.N.M.

***BELVOSIA MEXICANA*, new species**

Male.—Front at vertex rather broad, 0.37 of head width in two specimens, widening almost immediately. Parafrontals gray pollinose

anteriorly, subshining near the vertex, the black color showing through on most of their surface. Frontals in three irregular rows. Face, parafacial, cheek, and orbit white pollinose with satiny reflection. The hairs below the lowest frontals are black, cheek with fine blackish hair. Antennae reddish brown on basal joints; the third joint black, a little more than twice as long as the second. Vibrissae considerably above the oral margin, the distance being about equal to the second antennal joint. Facial ridges bristly almost to the arista. Palpi yellow; beard white.

Thorax black with thin pollen anteriorly, posterior part and scutellum brown.

Abdomen black on the two basal joints, the third with broad golden yellow band covering all but the apical fourth; fourth entirely golden pollinose; first and second segments each having one pair of median marginal bristles; third and fourth with a marginal row.

Legs black, front pulvilli elongated, as long as last two tarsal joints. Hind tibia with numerous large, irregular bristles on outer side.

Wings and calypters dark brown.

Female.—Front at vertex 0.40 of the head width.

Length, 13.5–14 mm.

Described from two males and one female. The type is a male from Federal District, Mexico (E. G. Smyth), the other male is labeled simply "Mexico," while the female was collected at Campinas, Brazil (F. X. Williams), 1924.

Type.—Male, Cat. No. 40482, U.S.N.M.

BELVOSIA LUTEOLA Coquillett

Belvosia luteola COQUILLET, Proc. U. S. Nat. Mus., vol. 22, 1900, p. 253.

Goniomima luteola TOWNSEND, Taxonomy of Muscoid Flies, 1908, p. 105.

Male.—Front 0.40–0.41 of the head width at vertex, not widening very rapidly; frontal bristles in two or three sparse rows, quite irregular; two pairs of proclinate orbitals. Parafrontals yellowish pollinose on lowest part, the remainder translucent and subshining; face, parafacials, cheeks, and posterior orbits silvery on light ground color. Hairs of upper parafacial and cheek white. Antennae with basal joints reddish brown, third joint black, elongated, four times the second. Arista flattened nearly to the apex, which is acute. Vibrissae not very far above the oral margin, the distance equaling the length of the second antennal joint; facial ridges with about six bristles, not quite reaching the level of the arista; several small white hairs outside the bristles. Palpi yellow; beard white.

Thorax black with rather dense yellow pollen, the usual stripes narrow and distinct; sternopleurals three or four; scutellum dark yellow in ground color.

Abdomen subtranslucent yellow in ground color, except a median dorsal stripe which is black. Second segment when viewed from behind covered with yellow pollen at the base, which thins out posteriorly; the third segment has a much denser coating of yellow pollen, which, however, is not distinctly visible in some angles. The hind margins of the second and third segments are shining in all angles; fourth segment smaller than in most species, densely covered with yellow pollen to the apex. First and second segments with single pair of median marginals, those on the first quite small; third and fourth segments with a marginal row of about eight. Genitalia a little larger in proportion than in some of the species, outer forceps very slender and straight, blunt at tip; inner forceps broad at base with long hairs on the middle portion which extend forward beyond the apices.

Legs black; front pulvilli small, shorter than last tarsal joint. Hind tibia with irregular bristles, one larger at middle.

Wings decidedly brown, the veins a little yellow toward the base.

Calypters almost pure white.

Length, 9–11 mm.

Redescribed from the single male type, Vieques Island, P. R., February, 1899 (August Busck); and from seven additional males collected at Chosica, Peru, 3,000 feet, May 8 and 9, 1913, on flowers of *Mikania* (C. H. T. Townsend).

***BELVOSIA OCHRIVENTRIS* Van der Wulp**

Cnephalia ochriventris VAN DER WULP, *Biologia*, Dipt., vol. 2, 1890, p. 47.

Male.—Front at vertex 0.35 of the head width, not widening very rapidly for a short distance. Parafrontals yellow pollinose, near the vertex showing a darker and subshining ground color. Frontal bristles in three irregular rows, with two pairs of proclinate orbitals; face, parafacials, and cheeks silvery with a tinge of yellow; posterior orbits more densely yellow. Antennae reddish about to the arista, remainder black; third joint rather slender except at base, three times the second. Arista distinctly flattened but the apex acute. Vibrissae considerably above the oral margin, the distance equal to the length of the second antennal joint; facial ridges with about eight bristles extending up almost to the arista. Palpi yellow. Parafacials with pale yellow hairs above in an uncommonly large patch; cheek with hairs of same color, and there are some additional ones on the facial ridges outside the bristles; beard pale yellow.

Thorax black with dense, yellowish-gray pollen showing only very narrow, longitudinal lines. Scutellum rather yellow in ground color with dense yellow pollen.

Abdomen red in ground color except in an almost hidden median stripe; first segment subshining at the sides, remainder of the abdo-

men rather uniformly covered with deep yellow pollen, the hind margins of second and third segments not shining, the fourth segment has this pollen to the apex. First and second segments with a single pair of median marginals, third with a marginal row of 8 or 10, fourth with a submarginal row of 8 considerably smaller.

Legs black, front pulvilli elongated, equal to the last two tarsal joints. Hind legs missing in the specimen.

Wings light brown, yellow toward the base. Calypters rather pure yellow.

Female.—Front at vertex 0.37 of the head width, with three pairs of orbitals. Antennae more yellowish, rather slender, the second joint a little more than half the third in length; facial ridges with three widely spaced bristles on one side, two on the other above the vibrissae. Other characters as in the male. The second and third abdominal segments at some angles show a shining reddish hind margin, in other angles this disappears.

Length, 10–11 mm.

Redescribed from two specimens; one male from Higuato, San Mateo, Costa Rica (Pablo Schild); and one female, Potrero, Mexico, April 10, 1923 (H. T. Osborn), reared from "army worms," identified for Hawaiian Sugar Planters' Association. Originally described from the State of Guerrero, in southern Mexico.

Type.—In the British Museum.

BELVOSIA RECTICORNIS Macquart

Gonia recticornis MACQUART, Dipteres Exotiques, Suppl. 5, 1854, p. 118 (sep. 98).

Willistonina recticornis BRAUER, Sitzungsber. Kais. Mus., vol. 106, 1897, p. 354.

Belvosia bella GIGLIO-TOS, Boll. R. Univ., Torino, vol. 8, 1893, No. 158, p. 3; Ditt. del. Mess., pt. 3, 1894, p. 30, fig. 6.

Male.—Front 0.30 to 0.32 of the head width at vertex, not widening rapidly for a short distance, beyond which the inner margins of the eyes diverge rapidly to the lower part so that the face is broad. Frontal bristles mostly in two irregular rows, the parafrontals with rather dense yellowish-gray pollen anteriorly, which becomes only a little thinner toward the vertex. Face, parafacials, cheeks, and posterior orbits silvery pollinose with a very slight yellowish cast, the small hairs below the lowest frontals pale and those of the cheek also mostly pale. Antennae brownish black, a little more reddish basally, the third joint about three times the second, considerably broadened in the neighborhood of the arista. The distance from the vibrissae to the oral margin is about equal to the length of the second antennal joint; facial ridges with strong bristles almost up to the arista; palpi reddish brown to brown.

Thorax black, somewhat cinereous on the anterior part, the hind angles a little reddish; scutellum nearly black.

Abdomen black, second segment with a narrow and sometimes rather indistinct basal pale crossband interrupted in the middle; third segment with a gray pollinose crossband, interrupted in the middle, its width depending very much on the angle of view, sometimes covering all but the apical third of the segment, but in most angles about half; fourth segment densely light yellow pollinose to the extreme apex, the upper surface bare, or with a few scattered hairs; first and second segments with a pair of median marginals, third with a row of 8 or 10, fourth with a row of about 6 smaller.

Legs black, front pulvilli elongated, equal to the last two tarsal joints; hind tibia with a row of bristles the whole length, one larger at the middle.

Wings brown, both calypters of the same color.

Female.—Front at vertex 0.33 to 0.35 of the head width; facial ridges less bristly, third antennal joint about two and one-half times the second. Hind tibia with a row of suberect bristles of increasing size on the basal three-fifths, a few smaller beyond.

Length, 9.5–11.5 mm.

Redescribed from 34 specimens of both sexes. Nine were reared by James Zetek at Fort Amador, Canal Zone, from *Hylesia* sp. (Zetek 2445); five from Balboa Heights, Canal Zone (Zetek 2142); one from Ancon, Canal Zone, reared by Zetek from *Hylesia darlingi* Dyar (Zetek 1212); six from Ancon, Canal Zone (A. H. Jennings), one of them reared from *Hylesia* sp.; five specimens from Porto Bella, Panama (A. Busck); two specimens, Paraiso, Canal Zone, bred from *Hylesia* (A. Busck); one from Corozal, Canal Zone (Busck); one specimen from Misantla, Mexico, reared from *Hylesia alinda* (Wm. Gugelmann); four specimens, Guayaquil, Ecuador (J. B. Rorer).

Type.—The type of *bella* is a female labeled "Mexico" in the Zoological Museum of the Royal University at Turin, Italy. I have not seen it.

Until I saw the Vienna Museum material I had called this species *bella* Giglio-Tos. In that collection are two series of 20 specimens in all. The first, of 12 specimens from Brazil, determined on the individual specimens as *Willistonina* by Brauer and Bergenstamm, has a label on 1 specimen, "*Gonia recticornis* Mcq. Vidi Typ. Br." This connects with Brauer's notes on the Macquart types in the Bigot collection, which he received from Verrall for study; in these notes, cited above, Brauer writes that an undetermined species in the Vienna Museum is the same as the Macquart type. He also says that *pfeifferi* Schiner MS. is closely related but somewhat smaller. This connects with the second lot of the Vienna material, eight specimens under Schiner's name. These are labeled "Ind. or.?" and "Pfeifferi det B. B." These do not differ, except slightly in size, from the first series.

BELVOSIA RECTICORNIS variety **RUFICORNIS**, new

Male.—Front 0.32 and 0.33 of the head width at vertex, widening but little for a short distance, then more rapidly. The face and posterior orbit are silvery white, the facial ridges, parafacials, and cheeks pale yellow pollinose with satiny reflections; parafrontals rather more deeply yellow pollinose, the upper third, however, subshining and somewhat dark; frontals in three very irregular rows, the hairs below them pale yellow, as are also those of the cheek and a few on the facial ridges outside the bristles. Cheek almost half the eye height; antennae red, the third joint tending to become a little brown in the male, more distinctly so in the female. The third antennal joint two and a half times the second, arista thickened almost to the apex, the tip, however, slender. Palpi yellow; beard white.

Thorax black, the sides and scutellum obscurely yellowish, the pollen moderately dense in front.

Abdomen brownish black, second segment with interrupted, basal, light yellow crossband, which in some lights extends almost to the middle of the segment, gradually fading out; third segment with a similar but somewhat more distinct crossband which from some angles covers considerably more than half of the segment; fourth segment covered with dense yellow pollen to the apex; first and second segments with a single pair of median marginals, third with a marginal row, fourth with a submarginal weaker row. The yellowish pollen on the second and third segments is distinctly visible underneath and not so changeable as above.

Legs black; front pulvilli as long as the last two tarsal joints; hind tibia with a row of bristles of increasing size on basal three-fifths, only a few sloping hairs adjacent to these.

Wings light brown, both calypters pale yellow in color.

The pteropleura and adjacent parts bear a considerable cluster of fine, yellow hairs.

Length, 10–11 mm.

Female.—Front 0.37 of the head width, the upper part of the parafrontals subshining, but this region is not sharply limited.

Described from three specimens, Chapada, Brazil (H. H. Smith), from the collection of the American Museum of Natural History, and one female from the Vienna Museum, bearing only the label, "potens p. p. 266. Coll. Winthem."

Paratype.—Male, Cat. No. 40475, U.S.N.M.

BELVOSIA FOSTERI Townsend

Belvosiomima fosteri TOWNSEND, Proc. U. S. Nat. Mus., vol. 49, 1915, p. 413.

Male.—Front 0.45 of the head width at vertex; the eyes diverge from each other along their inner border very slightly so the face in

its lower part is not much wider than the vertex. Frontal bristles in several irregular rows; three proclinate orbitals present; face and parafacials silvery, cheeks and posterior orbits with a yellow tinge, the hairs on the upper parafacial pale, also those of cheeks and some just outside the bristles of the facial ridges. Facial depression decidedly deep, the vibrissae not much above the mouth, facial ridges with very strong bristles almost to the arista. Antennae red at base, third joint becoming brown beyond the arista and nearly black at tip; second antennal joint short, only about one-sixth the length of the third, which is considerably elongated. Arista flattened almost to the apex, which is acutely pointed. Palpi yellow; beard pale yellow.

Thorax black with thin gray pollen; scutellum yellowish brown.

Abdomen black, the sides tinged with reddish in ground color. Second segment with indistinct pale yellowish band, very narrow in most angles, sometimes, however, spreading almost across the segments; third segment with yellow pollen covering almost three-fourths of its length in the most favorable light, but so changeable that it usually seems to cover about one-half; fourth segment entirely deep yellow pollinose with scattering erect hairs. First segment with a small pair of median marginals; second with a normal pair; third with a marginal row; fourth with a sparse marginal row smaller than those on the third. Genitalia small, brown.

Legs black; front pulvilli minute; hind tibia on the outer side with a suberect, irregular row of about 10 bristles.

Wings slightly infuscated, bend of fourth vein with or without slight appendage. Subepaulet orange yellow, calypters pale yellow.

Female.—Front at vertex 0.43 to 0.44 of the head width. Third antennal joint hardly three times as long as the second, more slender at the base than in the male. Abdomen much more reddish than in the male.

Length, 10–11 mm.

Redescribed from original type series, two males and one female, Sapucay, Paraguay (W. T. Foster); and one male sent by the Hawaiian Sugar Planters' Association, collected by F. X. Williams at Campinas, Brazil.

Type.—Female, Cat. No. 19607, U.S.N.M.

BELVOSIA EQUINOCTIALIS Townsend

Triachora equinoctialis TOWNSEND, Proc. U. S. Nat. Mus., vol. 43, 1912, p. 348.

? *Belvosia insularis* CURRAN, Amer. Mus. Novitates, No. 260, 1927, p. 4.

? *Belvosia antilliana* CURRAN, Bull. Brooklyn Ent. Soc., vol. 22, 1927, p. 151, in key but not described; Mr. Curran informs me that by an oversight this name was not changed to *insularis* as intended. It is the same species.

Male.—Front at vertex 0.37–0.39 of the head width, widening from about the level of the posterior ocelli. Frontal bristles in three irregular rows, with two pairs of proclinate orbitals. Parafrontals with yellowish pollen anteriorly, most of their surface subshining and rather dark, a little translucent. Face, parafacials, cheeks and posterior orbits silvery white, the small hairs below the frontals white; cheek with white hair. Antennae reddish-yellow about to arista, remainder more blackish. Third joint hardly three times the second. Arista decidedly flattened almost to the apex, which is more blunt than usual. Vibrissae not far above the edge of the mouth, the distance being about half the length of the second antennal joint. Facial ridges with 6 or 7 bristles extending up almost to the level of the arista. Palpi yellow; beard white.

Thorax black, with rather uniform thin gray pollen. Scutellum reddish.

Abdomen red in ground color at the sides, black in the median portion; second segment with changeable yellowish pollen which is thin and almost invisible over most of the surface, leaving the shining red and black ground color distinctly visible in most angles. Third segment much more densely pollinose with deeper yellow. A median narrow black stripe usually and an apical black or reddish shining band always visible; fourth segment entirely yellow pollinose with scattered black hairs in addition to the usual apical bristles. First and second segments with a single pair of median marginals, third with a row of about 12. Genitalia small, the outer forceps somewhat longer than the inner and decidedly sharp at apex.

Legs black, pulvilli elongated, the front ones almost equal to the last two tarsal joints. Hind tibia with a row of unusually erect bristles on the outer side.

Wings considerable brownish at base, less so apically. Calypters whitish, the anterior with a slight yellow tinge, both with yellow rim.

Female.—Front at vertex 0.35–0.37 of the head width. Three pairs of proclinate bristles, antennae more slender, third joint less than double the second. Facial ridges with only three or four bristles.

Length, 9–10 mm.

Redescribed from the type lot, consisting of five males and two females collected at Piura, Peru, August 28 and September 4 and 8, 1910 (C. H. T. Townsend); the museum also has two additional males from Peru (Townsend), and Professor Hine has sent a female which he collected March 18, 1905, at Panzos, Guatemala. *Insularis* was described from a single female from Barrios, P. R., which I had previously compared with this typeseries and with some doubt pronounced identical.

Type.—Female, Cat. No. 15191, U.S.N.M.

BELVOSIA WIEDEMANNI, new species

Male.—Front at vertex 0.33 and 0.34 of the head width, widening almost immediately. Face and parafacials, cheeks and posterior orbits light grayish-yellow pollinose. Parafrontals are the same color anteriorly, posterior part a little darker. Frontal bristles very irregularly placed, hardly in three rows. Hairs of upper parafacials black and coarse, few in number. Hairs of cheek pale and fine. Palpi brownish red; antennae nearly black, second joint and extreme base of third a little brown. Arista not flattened, tapering to a fine point. Third antennal joint rather long, three times the second. Vibrissae about the length of the second antennal joint, above the edge of the mouth. Facial ridges bristly almost to arista; the face not much depressed. Pollen of mesonotum gray; scutellum subshining black.

Abdomen almost entirely velvet black above, except the fourth segment which is densely covered with pale yellow pollen to the apex. First abdominal segment without median marginal; second with a single pair; third with a marginal row of 14 or more; fourth with a submarginal row of about 12.

Legs black, front pulvilli rather large but hardly longer than the last tarsal joint.

Wing blackish.

Female.—Front at vertex 0.32 and 0.34 of the head width.

Length, 10 mm.

Described from eight males and five females sent from the Vienna Museum. The specimens have evidently been taken out of alcohol and are somewhat shriveled, hence the width of the front may not hold good with fresh specimens. They all bear the same labels "Hetschko 89 Blumenau," "copulata det. B. B."; "Coll. Winthem."

Two males and two females, paratypes, are retained in the National Museum collection, the remainder including the type returned to the Vienna Museum. The species *Tachina copulata* Weidemann was based upon two specimens belonging to very distinct genera, one of these belonging to the genus *Hystericia* has already been designated as the type, hence a new name is necessary for the present species. I have discussed the original specimens in these Proceedings (vol. 72. 1927, art. 7, p. 10).

Paratype.—Male and female, Cat. No. 40564, U.S.N.M.

BELVOSIA UNIFASCIATA Robineau-Desvoidy

Latreillia unifasciata ROBINEAU-DESVOIDY, Myodaires, 1830, p. 105.

Exorista flavicauda RILEY, Second Missouri Report, 1870, p. 51; Gen. Index Mo. Repts, p. 88, quoted.

Belvosia unifasciata COQUILLETT, Revis. Tachin., 1897, pp. 10, 84.—JOHNSON, Cat. Ins. of New Jersey, 1899; ed. 2, 1909.—FELT, 21st N. Y. Report, 1905, p. 65.—JOHNSON, Bull. Amer. Mus. Nat. Hist., vol. 41, 1919, p. 437.—BRIMLEY, Ent. News, vol. 33, 1922, p. 21.

Goniomyia unifasciata SHERMAN, Journ. Econ. Ent., vol. 8, 1915, p. 299.—

BRITTON, Check-List Dipt. of Conn., 1920.

Triachora unifasciata TOWNSEND, Muscoid Flies, 1908, p. 105.

Male.—Front at vertex 0.36 to 0.39 of the head width, the eyes not diverging very much to the lower part of the face. Parafrontals with a little pale pollen below, most of the surface dark and subshining. Frontal bristles in three irregular rows, with the addition of two or three proclinate orbitals. Below the lowest frontals are some rather conspicuous dark hairs which in some specimens and at some angles may appear pale in color, at least partly. Face and parafacials white, almost silvery, the former rather broad on the lower part and the latter considerably narrower below than in most species. Cheek about one-fourth the eye height with yellow pollen and mostly blackish hairs. Antennae red at base, third joint black, nearly four times the second. Arista flattened in a uniform width almost to the apex. Vibrissae not very far above the mouth, the distance a little less than second antennal joint; facial ridges bristly almost to the arista. Palpi yellow; beard white.

Thorax black, rather densely gray pollinose, the stripes slender. Scutellum entirely black.

Abdomen black, gray pollinose on the first and second segments, the latter more shining at tip; third segment with pollen slightly more yellowish; fourth segment with deep golden pollen to apex. First and second segments each with a single pair of median marginals; third and fourth with a marginal row.

Legs black, front pulvilli minute; hind tibia with coarse sloping bristles mixed with hairs on the outer side.

Wings light brown. Calypters white, the margin a little darkened.

Female.—Front at vertex 0.36 of the head width, the same in three specimens. Facial ridges more flattened than in the male. Third antennal joint hardly twice the second.

Length, 9.5–11 mm.

About 100 specimens of this species have been examined. Those belonging to the National Museum collection include the following: Two types of *Exorista flavicauda* Riley from Missouri; 1 specimen from Georgia; 2 from New York (Southwick); 38 from the District of Columbia and adjacent Virginia and Maryland, collected by Townsend, McAtee, Shannon, Greene, Quinter, and Aldrich; 14 from Mount Holyoke Gap, Mass. (Townsend); 1, Clarke County, Va. (Aldrich); 2, Chesapeake Beach, Md. (Aldrich). In the Aldrich collection, recently donated to the National Museum, are 18 specimens from Lafayette, Ind., and 4 from Ghent, N. Y., 2 from Castle Rock and Fern Rock, Pa. (Harbeck); 1, Habana, Cuba (C. F. Baker). From Dr. A. L. Melander three specimens were received, one from Dixie Landing, Va. (Townsend); one from Pennsylvania and one

from Illinois (Forbes). From Prof. Jas. S. Hine were received 1 specimen from West York, Miss., and 16 from Ohio, collected by him at Sandusky, Jefferson, Ira, Fort Ancient, Columbus, and Cincinnati. From the American Museum were received one specimen from Forest Hill, N. J. (Weidt); one, Valley of Black Mountains, N. C. (Beutenmüller); one from Mount Vernon, N. Y. (Weidt). The last is a male without orbitals but agreeing otherwise and no doubt belonging to this species.

This species has been reared from the army worm several times, first by Riley (the type of *Exorista flavicauda*). Sherman has published some notes on this habit in the Journal of Economic Entomology (vol. 8, 1914, p. 299). We have no other host record.

The type was from Philadelphia, in the Dejean collection.

BELVOSIA OMISSA, new species

Male.—Front broad, 0.40 of the head width at vertex (the same in four specimens), narrowest at the level of the front ocellus, evenly widening to the lower part of the face. Parafrontals shining dark gray, gradually more pollinose toward the frontal stripe, the frontal bristles in three irregular rows; no orbitals, a few dark hairs below the lowest of the bristles. Parafacials silvery-white, the face more pure white, cheek nearly half the eye height, thickly covered with dark hairs; facial ridges rather flattened, strongly bristled nearly to the arista. Vibrissae not very much above the edge of the mouth, the distance equaling hardly more than half the second antennal joint. Antennae black, the second joint rather reddish-brown, the third fully four times the second. Arista tapering from near the base, apical portion slender. Palpi brown; beard white.

Thorax black, including scutellum; the dorsum gray pollinose, leaving four shining black stripes very perceptible to the naked eye, the inner pair extending only a short distance behind the suture; a short dark median stripe just before the scutellum.

First three segments of abdomen black with rather a uniform gray pollen, which, however, is slightly changeable in some lights; fourth abdominal segment entirely deep orange pollinose on same ground color. First segment without median marginals; second segment with one pair; third segment with a marginal row of about 14; fourth segment with a subapical row of about 10, and rather numerous black hairs scattered over the pollinose surface. Genitalia small, the inner forceps short, black; the outer forceps yellow and considerably swollen, about as long as the inner.

Legs black, front pulvilli shorter than last tarsal segment, the other pulvilli small. Hind tibia with a single dense row of rather short cilia on the outer hind side with one stout bristle just beyond the middle.

Wing subhyaline, brownish along the veins, the third vein with three or four small setules at base. Both calypters white.

Length, 11 mm.

Female.—Front 0.40 of the head width, with three stout proclinate orbitals on each side; palpi brownish-yellow; third antennal joint three times the second.

Length, 11.5 mm.

Described from five males and one female collected near Washington, D. C. The type and one other male are from Falls Church, Va., collected June 10, 1913 (S. A. Rohwer), on flowers of chestnut. Another male was collected near Glen Carlyn, Va. (W. L. McAtee), June 11, 1916; one at Difficult Run, Va., September 14, 1913 (Shannon); and the fifth one at Plummer Island, Md. (H. L. Viereck), July 4, 1916. The single female (allotype) was collected at Falls Church, Va. (C. T. Greene), on *Ceanothus* flowers, July 4, 1917.

Type.—Male, Cat. No. 40473, U.S.N.M.

BELVOSIA CILIATA, new species

Male.—Front 0.30 to 0.31 of the head width at level of anterior ocellus, widening gradually for a short distance, then more rapidly; frontal bristles in three irregular rows, the hairs below them black and rather coarse; parafrontals with gray pollen below which becomes very thin above, so that the dark ground color shows through to some extent; face, parafacial, cheek and posterior orbit silvery white; cheek with black hairs. Vibrissae a little higher above the epistoma than in most of the species but not quite as high as in *bicincta*. Facial ridges with strong bristles almost up to the arista; third antennal joint black, rather slender, concave on front side, hardly twice as long as the second, which is reddish brown in color. Palpi yellow; beard white.

Thorax black, the sides and scutellum reddish, anterior part with thin gray pollen and with inconspicuous stripes.

Abdomen black, sometimes slightly reddish on the sides, the second segment with at most a mere trace of pollen at base, sometimes none; third segment with a narrow interrupted basal band of pale pollen, or sometimes none at all on upper surface; fourth segment with whitish or pale yellow pollen extending to the tip. First and second segments each with one pair of marginal bristles, third with a marginal row, fourth with a rather scattered submarginal row smaller than those on the third segment.

Legs black, front pulvilli fully as long as the last two tarsal joints. Hind tibia with dense, stout cilia apparently in several rows close together.

Wings and both calypters brown.

Female.—Front rather narrow for this sex, measuring at vertex 0.35 to 0.37 of the head width; three pairs of proclinate orbitals.

Length, 12–14 mm.

Described from 24 specimens of both sexes. The principal series, including type and allotype, were reared by Hy. Edwards from a Hesperid, collected in Mexico, without more definite locality. This series, including 11 specimens, bears the Edwards number 15671 and is received from the American Museum of Natural History. Other specimens received from the same museum include three from Tacubaya, D. F., Mexico (William M. Wheeler), and one from Brazil (H. H. Smith). In the National Museum collection are the following specimens: One from Ancon, Canal Zone, collected by A. H. Jennings, identified by Coquillett as *Belvosia analis* Macquart; one from Mexico without collector, with the same identification; one labeled "on *Automeris leucane* Mex."; one, Mexico City (O. W. Barrett) from the collection of C. W. Johnson; two, Federal District, Mexico (one from Juan Müller); one, Jalisco, Mexico, bred from *Copaxa lavendera*?, reared by H. L. Bowers; one, Cordoba, Mexico, collected by William Schaus; one female from Mountain Grove, Mo. (M. P. Somes). In Professor Hine's collection there is one specimen from Mexico. There is another in the Canadian National Collection.

Paratypes.—Males, Cat. No. 40476, U.S.N.M.

***BELVOSIA CILIATA* var. *FORMOSA*, new**

This variety is the same as the preceding except that the band on the third abdominal segment is very much wider, covering a little over one-half of the segment at the base; it is narrowly but distinctly interrupted.

Described from 11 specimens; 3 males, including the type, are from St. Clair, British West Indies (F. W. Urich), reared from larva of *Automeris* species; the allotype is from Ancon, Canal Zone (A. H. Jennings); 2 specimens in the Canadian National Collection from Mexico, bred from *Saturnia orizaba* by N. K. Bigelow; 1 specimen in the American Museum of Natural History from Chapada, Brazil (H. H. Smith); 1 specimen from Higuito, Costa Rica (Pablo Schild); there is also a male in the Vienna Natural History Museum, which I have lately examined and I am including as a paratype. It is labeled "Brazil Coll. Winthem" and came to me under the identification *esuriens* Fabricius.

Type.—Male, Cat. No. 40477, U.S.N.M.

Some of the specimens approach rather closely to *bicincta*, but can be separated very easily by having the pollen of the fourth abdominal segment extending to the extreme apex.

BELVOSIA VITTATA, new species

Male.—Front 0.36 of the head width at vertex, widening from about the level of the front ocellus. Frontal bristles in about three irregular rows, the parafrontals with changeable dark pollen almost tessellated in effect; the outer and upper portion shining black. Face, cheeks, and posterior orbit white pollinose with satiny reflection; below the frontal bristles there are only one or two black hairs. Cheek with fine brown hairs. Antennae dark red, the third joint very long, seven or eight times the second, black all along the front margin and about the apex. Arista broken off. Vibrissae quite close to the mouth, the distance being as usual about equal to the second antennal joint. Facial ridges not very prominent, with sparse stout bristles extending slightly above the middle.

Thorax black, the pollen distinct so as to leave four black stripes very plainly visible to the naked eye and reaching almost to the scutellum, which is black with gray pollen. Sternopleurals 3; scutellum with scars of five stout lateral bristles, no differentiated apicals and three pairs of small discals.

Abdomen black, with changeable gray pollen on the basal part of the second segment, which is not distinctly limited; the third segment is yellowish gray pollinose on about the basal half, narrowly interrupted in the middle and extending on the venter; the fourth segment is covered with dense rather light-yellow pollen to the apex, but with a narrow median black shining stripe. The first segment has no median marginals, the second a single pair, the third a marginal row, the fourth a sparse submarginal row of six or eight.

Wings brownish, the calypters whitish-yellow, in the center a little infuscated.

Legs black, front ones missing; hind tibia with cilia in a single dense, even row with one stronger bristle at three-fifths the length.

Length, 11 mm.

Described from one male, Sapucay, Paraguay, taken May 24, 1902, by an unknown collector.

Type.—Male, Cat. No. 40469, U.S.N.M.

BELVOSIA FRONTALIS, new species

Male.—Front 0.36 to 0.38 of the head width at vertex, the sides diverging quite rapidly. Face white pollinose, a distinct shade of light yellow in the dense pollen of the parafacial, cheek, and posterior orbit; parafrontals with thin yellowish pollen through which the light ground color shows considerably. In the type there is a sharp line of division just above the lowest frontal, above which the pollen is more distinctly yellow; but in the paratype this line of division is barely perceptible. Antennae deep reddish-yellow, the third joint four times the second. Vibrissae rather close to the oral margin,

facial ridges bristly almost to the arista. The hairs on the upper parafacial are black. Cheek with fine pale hairs which look a little darker in some angles. Palpi pure yellow.

Thorax black, the pollen forming more distinct stripes than in many of the species. Scutellum reddish around the margin, but with gray pollen.

Abdomen black except the last segment, but somewhat damaged in the type, so that it is impossible to describe the third segment very satisfactorily; the fourth segment with pale yellow pollen to the apex covering its whole surface, which is also sprinkled with sparse but coarse black hairs. First segment without median marginal bristles; second with a single pair; third with the usual marginal row; fourth with a rather sparse row of smaller size.

Legs black, the front pulvilli minute; hind tibia with dense, short cilia in a single row, with one bristle at the lowest third. Wings light brown; calypters pale yellow.

Length, 10 mm.

Described from two males collected at Chapada, Brazil (H. H. Smith), received from the American Museum of Natural History.

Paratype.—Male, Cat. No. 40470, U.S.N.M.

BELVOSIA ELUSA, new species

Male.—Front at vertex 0.30 to 0.35 of the head width, not widening for a short distance from the level of the ocelli. Parafrontals with gray pollen below, becoming darker over most of the area. Face, parafacials, cheeks, and posterior orbits white with satiny reflection; the hairs below the frontal bristles and on the cheek are black. Antennae brown, third joint more blackish, a little more than twice the length of the second. Vibrissae about half the length of the second antennal joint above the oral margin; facial ridges with strong bristles extending to the level of the arista. Palpi yellow.

Thorax black, the scutellum and posterior part brownish. The cinereous pollen rather dense before the suture, showing four narrow black stripes.

Abdomen subshining black, the second segment with more or less of a faint basal interrupted band of pale yellow pollen, a similar but much more distinct band on the third segment, which in most angles of view covers about one-half of the segment; fourth segment with pale yellow pollen to the extreme apex, the first and second segments each have one pair of marginal bristles, the third a rather dense row of about 14, the fourth a row of 8 or 10.

Legs black, front pulvilli minute, shorter than last tarsal joint; hind tibia with a row of more or less coarse cilia.

Female.—Front at vertex 0.34 to 0.35 of the head width, the whitish pollen of the anterior part more extended, so that the dark subshining portion is restricted to part of the upper half.

Length, 10–11 mm.

Described from two males and two females, including the type and allotype, collected at Chapada, Brazil (H. H. Smith), received from the American Museum of Natural History; and one male from San Bernardino, Paraguay (K. Fiebrig).

Paratype.—Male and female, Cat. No. 40468, U.S.N.M.

BELVOSIA CANADENSIS Curran

Belvosia canadensis CURRAN, Bull. Brooklyn Ent. Soc., vol. 22, 1927, p. 152.

Male.—Front 0.42 and 0.43, in two, of the head width at vertex, widening rather gradually; parafrontals cinereous pollinose, the pollen becomes thinner in the middle, but still somewhat evident; frontal bristles in about three irregular rows. Face, parafacials, cheeks and posterior orbits white, the parafacial and orbit silvery, the few hairs below the frontals and those of cheek black. Antennae black except at junction of second and third joints, of moderate size, the third joint slightly more than twice the second. Arista flattened for most of its length, but sharply pointed. Vibrissae considerably above the oral margin, the distance about equal to the second antennal joint. Facial ridges with a single row of moderate bristles about to the middle of the third antennal joint. Palpi brown, extreme apex paler; beard white.

Thorax black, with thin gray pollen in front. Hind angles and scutellum dark brown; sternopleurals three, the fourth hairlike.

Abdomen black, third and fourth segments golden pollinose, except a narrow hind margin, which in the third segment only occurs along the middle, the golden pollen extending to the extreme apex of the segment along the sides; in the fourth segment there is a distinct shining black margin all the way around. The first and second segments with a single pair of median marginals; third with a row of 12; fourth with about 8 considerably smaller.

Legs black; front pulvilli minute; hind tibia with a row of bristles of increasing size on the basal three-fifths, six or seven in all, not very large.

Wings blackish, front calypters the same color, hind calypters almost white.

Female.—Front at vertex 0.42 of the head width, the same in three, widening rather rapidly; three proclinate orbitals, the frontals in three irregular rows but not very strong. Third antennal joint less than twice the second.

Length, 9–11 mm.

Redescribed from a male and female paratype, the former from Calgary, Alberta, September 2, 1902; the latter, Douglas County, Kans., May 19, 1923 (W. J. Brown); 1 male collected by Professor

Hine at Fort Ancient, Ohio, June 10–12, 1902; 1 female, Mandan, N. Dak., June 16, 1918 (Aldrich); 1 female, Madison Junction, Yellowstone Park (Melander); and a series of 18 specimens from various counties in Kansas (Beamer, Williams, Brown), received from the University of Kansas collection.

The type is in the Canadian National Collection.

Paratypes.—Male and female, Cat. No. 40371, U.S.N.M.

BELVOSIA LEUCOPYGA Van der Wulp

Belvosia leucopyga VAN DER WULP, Notes from the Leyden Museum, vol. 4, 1882, p. 84; Tijdsch. v. Ent., vol. 26, 1883, p. 27; Biologia, Dipt., vol. 2, 1903, p. 470.

Belvosiosis brasiliensis TOWNSEND, Revisto Museu Paulista, vol. 15, 1926, pp. 248, 89.

Male.—Front 0.31 of the head width at vertex, the sides nearly parallel for a short distance, then diverging rapidly; face, parafacials, cheeks, and posterior orbits densely white pollinose with satiny reflection. Parafrontals gray pollinose anteriorly, the pollen becoming thinner above so that the dark ground color is quite conspicuous; frontal bristles in two irregular rows, the hairs below them black; hairs of cheek almost all pale. Antennae black, basal joints brownish red, the third joint not quite three times the second. Arista moderately flattened, the apex, however, slender. Vibrissae rather high above the mouth, the distance being greater than the length of the second antennal joint; facial ridges with the bristles almost to the level of the arista. Palpi yellow; beard white.

Thorax black, the posterior angles and scutellum brown pollinose. Sternopleurals four on one side, five on the other.

Abdomen deep black, not very shining, the fourth segment densely yellow pollinose except the apical fourth. The pollen extends all the way down the sides and is interrupted by a slender median line above.

Legs black, front and hind ones broken off.

Wings dark brown, fourth vein with a rather short bend almost angular. Calypters blackish.

Length, 11 mm.

Female.—Front 0.35 of the head width at vertex, somewhat rubbed, the parafrontals a little inflated, with very thin pollen so that the black ground color is conspicuous. From the scars it would appear that most of the bristles are in a single row; there were three proclinate orbitals. The hind tibia has a row of bristles on the basal two-thirds, too much broken to describe further.

Length, 10 mm.

Redescribed from one male and one female, collected at Valera, Venezuela, by Dr. E. P. DeBellard. Van der Wulp described it from Brazil and in 1903 reported it from Yucatan.

BELVOSIA SPLENDENS Curran

Belvosia splendens CURRAN, Bull. Brooklyn Ent. Soc., vol. 22, 1827, p. 153.

Male.—Front 0.40 to 0.42 of the head width at vertex, widening immediately so that the narrowest portion is very short; parafrontals almost entirely shining black, only the lower portion gradually becoming gray pollinose; bristles in about three rows with coarse hairs outside of them. Face gray pollinose, the pollen of the parafrontals more shining and thinner so that the dark ground color shows through perceptibly; cheek subshining black with only a little pollen, half the eye height, with black hairs, the lower ones rather coarse; posterior orbits rather plumbeous, shining black above, the hairs below the lowest frontals black. Antennae black, reddish at junction of second and third joints; second joint a little longer than usual, fully half the length of the third; arista thick basally, flattened toward apex, which is, however, acutely pointed. Vibrissae not very high above the oral margin, the distance only about half the length of the second antennal joint; facial ridges with partly double row of medium-sized bristles extending up almost to the arista. Palpi blackish basally; apices brownish-yellow; beard white.

Thorax shining black, but little pollinose in front, the scutellum shining dark brown; sternopleurals five.

Abdomen black, first and second segments subshining, third and fourth golden pollinose except the apical fourth or less, including the marginal row of bristles; first and second segments with a single pair of median marginals.

Legs black; front pulvilli only a little enlarged, about as long as the last tarsal joint. Hind tibia with a row of irregular bristles on the outer side, about 14.

Wings dark brown, both calypters the same.

Female.—Front at vertex 0.40–0.45 of the head width. Parafrontals shining as in male, but not so bristly; the usual three or four proclinate orbitals present.

Length, 13 mm.

Redescribed from one male and one female paratype, Aweme, Manitoba, bred from Lepidopterous larva by E. and A. Criddle. I have also seen a male and female from Glen Ellyn, Ill., in Professor Melander's collection, and a specimen from Kansas in that of the University of Kansas.

Type.—In Canadian National Collection.

Paratypes.—Male and female, Cat. No. 40372, U.S.N.M.

BELVOSIA BOREALIS, new species

Male.—Front 0.36 to 0.38 of the head width at vertex, widening rather gradually for some distance; frontal bristles in three irregular rows. Parafrontals white pollinose below, the pollen becoming

considerably thinner above so as to show the dark ground color to some extent. Face, parafacials, cheeks and posterior orbits densely silvery white pollinose. The hairs below the upper parafacials and those of the cheeks black. Antennae black, rather long, the third joint about two and a half times the second; vibrissae situated considerably above the oral margin. Facial ridges bristly almost to the arista. Palpi yellow to brown, beard white.

Thorax black, dorsum quite shining with very thin pollen anteriorly; scutellum dark brown; sternopleurals usually six or seven. Scutellum with six or seven pairs of lateral bristles, no distinct apicals.

Abdomen black and subshining on the first two segments, the remaining two deep golden pollinose except apical fourth. First segment with four to six spiny marginals, second segment with the same number; third and fourth with a marginal row. Venter with clusters spines mostly on the tergites.

Legs black, front pulvilli elongated, almost equal to last two tarsal joints. Hind tibia with rather long bristles and numerous coarse hairs.

Wings blackish, both calypters of the same color.

Female.—Front 0.39 to 0.40 of the head width at vertex.

Length, 15–16.5 mm.

The species is very robust, one of the females measuring 9 mm. across the abdomen.

Described from 5 males and 15 females. The type is from Harrisburg, Pa. (Sanders), and two females, including allotype, are from the same place (Walton); one female, Rockville, Pa. (Champlain); one female, Inglewood, Pa. (Kirk); one, Linglestown, Pa. (Fisher, this with the two preceding in Mr. Walton's donation to the Museum); one male, Charter Oak, Pa. (Knull); three females, Springfield, Mass. (Dimmock), identified about 1894 by Brauer and Bergenstamm as "*Latreillia bifasciata* Fab.;" One, Colebrook, Conn. (Wheeler), received from C. W. Johnson; one, Reading, Pa.; one, Pimmit Run, Va. (Knab); one, Difficult Run, Va. (Shannon); two, Ira, Summit County, Ohio (Hine); one, Agricultural College, Miss. (Turman, received from C. H. Curran). From the American Museum were received two females from Black Mountains, N. C. (Beutenmüller), and one from West Farms, New York City (Angus).

Type.—Male, Cat. No. 40481, U.S.N.M.

***BELVOSIA BIFASCIATA* Fabricius**

Musca bifasciata FABRICIUS, Systema Ent., 1775, p. 777; Ent. Syst., vol. 4, 1794, p. 325; Syst. Antl., 1805, p. 299.

Ocyptera bifasciata LATREILLE, Dict. d'Hist. Nat., vol. 24, 1804, p. 195.

Tachina bifasciata WIEDEMANN, Auss. Zweifl., vol. 2, 1830, p. 305.

Latreillia bifasciata ROBINEAU-DESVOIDY, Myodaires, 1830, p. 104.

Nemoraea bifasciata MACQUART, Hist. Nat. Dipt., vol. 2, 1835, p. 104.—

BIGOT, in Sagra's Cuba, vol. 7, 1857, p. 342.

Belvosia bifasciata MACQUART, Dipt. Exot., vol. 2, pt. 3, p. 214 (sep. p. 57).—OSTEN SACKEN, Cat. N. Amer. Dipt., 1878, p. 153.—VAN DER WULP Tijdsch. v. Ent., vol. 26, 1883, p. 23; Biologia, Dipt., vol. 2, 1888, p. 30, pl. 2, fig. 8, and 1903, p. 469.—RILEY, Fifth Mo. Rept., 1873, p. 140, fig.; Fourth Rept. U. S. Ent. Comm., 1885, p. 110.—RÖDER, Stett. Ent. Zeit., 1885, p. 345.—TOWNSEND, Psyche, vol. 8, 1897, p. 128.—COQUILLETT, Revis. Tachin., 1897, pp. 10 and 84.—JOHNSON, List Ins. N. J., 1899.—HOWARD, Insect Book, 1902, pl. 22, fig. 15.—JOHNSON, Proc. Acad. Nat. Sci. Phila., 1895, p. 332; Bull. Amer. Mus. Nat. Hist., vol. 32, 1913, p. 72.—F. H. SNOW, Kans. Univ. Sci. Bull., vol. 2, 1903, p. 217.—WILLISTON, Trans. Amer. Ent. Soc., vol. 13, 1886, p. 302; Insect Life, vol. 5, 1893, p. 238.—HARVEY, Bull. Brit. Col. Ent. Soc., December, 1906, p. 2.—WALTON, Proc. Ent. Soc. Wash., vol. 14, 1912, p. 22.—REINHARD, Ent. News, vol. 30, 1919, p. 280.—BRITTON, Checklist Dipt. Conn., 1920.—GREENE, Proc. U. S. Nat. Mus., vol. 60, art. 10, p. 14, fig.—BRIMLEY, Ent. News, vol. 33, 1922, p. 20.—WALCOTT, Checklist Ins. Porto Rico, 1923, p. 222.—JOHNSON, List Dipt. New England, 1925, p. 193.

Lalage bifasciata ROBINEAU-DESVOIDY, Dipt. Env. Paris, vol. 1, 1863, p. 563.

Willistonina bifasciata BRAUER and BERGENSTAMM, Zweifl. Kais. Mus., pt. 4, 1889, p. 97, fig.; pt. 6, 1893, p. 123.

Latreillimyia bifasciata TOWNSEND, Muscoid Flies, 1908, p. 103.—JOHNSON, Cat. Ins. New Jersey, 1910, p. 779.

Male.—Front from 0.40 to 0.45 of the head width at vertex, widening immediately, as the upper portion of the eye is very narrow, almost running to a point. Parafrontals almost silvery below, the pollen becoming thinner upward so as to show the black ground color over a considerable area. Frontal bristles in about three very irregular rows. Face, parafacials, cheeks, and posterior orbits silvery pollinose, the parafacials especially shining. Hairs below the lowest frontals black, cheek with black hair. Antennae black, reaching nearly to the vibrissae, the third joint about three times the second. Vibrissae considerably above the mouth, the distance nearly equal to the length of the second antennal joint. Facial ridges bristly to a little below the arista. Palpi varying from yellow to blackish; beard white.

Thorax black, somewhat shining, with thin pollen anteriorly. Sternopleurals from four to six.

Abdomen black on first two segments, but the second sometimes showing a trace of pollen at the base; third and fourth segments with broad dense bands of golden pollen covering all but the apical fourth or fifth, which is shining black. The first and second segments each have a single pair of median marginals, the third and fourth a marginal row. Venter without unusual development of soft hair.

Legs black, front pulvilli noticeably smaller than in most of the species, hardly as long as the last tarsal joint. Hind tibia with several large bristles on the basal three-fifths of the outer side.

Wings blackened; front calypters brown, the hind one of the same color, at least on the basal half, tending to become paler on the apical half, especially in southern and western specimens.

Female.—Front at vertex from 0.37 to 0.47 of the head width, widening immediately as in the male. The pollen of the parafrontals is in some cases thin enough to show a considerable dark area, but in most of the specimens is not very dark. Third antennal joint only a little more than twice the second.

Length, 11–14.5 mm.

Redescribed from 99 specimens of both sexes as follows: 11 from the vicinity of the District of Columbia, including Chesapeake Bay, Md., and Oak Grove, Va. (Viereck, Shannon, Greene, Aldrich, Townsend, and McAtee), also 3 reared by the late Henry F. Schoenborn from *Citheronia regalis* Huebner and *Anisota rubicunda* Fabricius, and 1 reared by Pergande from the former host; 4 from Sandusky, Columbus, and Cincinnati, Ohio (Hine, Allen); 2, North Carolina, 1 being from Southern Pines (Manee); 5 from Florida, 2 collected by Charles Palm without other data, the other 3 from Miami (Townsend); 4 from Mississippi, 1 with illegible place (J. I. Hurst), 2, Agricultural College (Allen), and 1, McHenry (Allen); 2 from Arkansas, 1 being from Lake Village (E. E. Holley), the other, Benton (D. G. Hall); 15 from Texas, 13 of these being from College Station (Reinhard), 1 Bryan and 1 Austin (Melander); 37 from Arizona, of which 36 are from Sabino Basin and Sombrero Butte (Townsend), 1 from Fort Grant (Hubbard); 1 from Socorro, N. Mex. (Williston); 1 from Lancaster, southern California, reared by Koebele from *Hemileuca* sp.? and 1 from San Pedro Madero, Chihuahua, Mexico (Townsend); 4 additional specimens are without localities.

There are nine specimens, correctly determined, in the Vienna Museum material. Two are from Kentucky; three are labeled "Texas Boll"; two "Am. b. Georgia"; one "N. America"; and one only labeled "Pöp. 852," which I take to mean the collector Pöppius.

The following seven specimens were sent by C. W. Johnson: One each from Hamilton, Mass. (J. B. Smith, reared from *Telea polyphemus* Linnaeus); Dedham, Mass. (Johnson); Philadelphia, Pa. (Johnson); Suffolk, Va. (Johnson); St. Augustine, Fla. (Johnson); Bear Creek Canyon, Colo.; and Blanco, Tex.

From the American Museum the following six specimens were received: Two from Jacksonville and Biscayne Bay, Fla. (Slosson); one each from Brooklyn, N. Y. (Akhurst); Brownsville, N. Y. (Woodruff); Browns Mills, N. J.; and one from the Williston collection without locality.

From the University of Kansas were received 10 specimens, 5 of them from Bourbon, Morris, Marshall, Wilson, and Morton Counties (Beamer, Martin, Williams); 1, Magdalena Mountains, N. Mex. (Snow); 1, Cochise County, Ariz. (Snow); 1, Galveston, Tex. (Snow); and 1, District of Columbia.

Originally described from the West Indies and redescribed by Wiedemann from the original specimens and some additional ones which he refers to as South American. I have been unable to discover any trace of the original Fabrician material, or even of the specimens added to the species by Wiedemann. On this account the identification is to some extent a traditional one, the species being the common one of eastern North America which is identified in most collections under this name. It is reasonably certain that Robineau-Desvoidy had this species identified as *bifasciata* since he refers to the black calypters and mentions specimens from Virginia and Carolina, but he probably had more than one species, as he mentions other specimens from the Antilles. In Robineau-Desvoidy, 1863, a Fabrician specimen is redescribed, the statement being made that it bears a label in the handwriting of Fabricius. This seems to agree with the accepted interpretation.

The literature of this abundant species is confused, since up to the present several species have not been separated. Osten Sacken and Coquillett followed Macquart in including *bicincta* as a synonym; Williston first indicated the distinctness of the latter, but in 1893 hesitated to recognize the forms he figured as distinct species. He suggested, however, that if these characters are specific, there must be "at least a dozen species" in America. Walton in tabulating variations of chaetotaxy in *bifasciata* in 1912 included in his series of ten specimens three which I now place in *townsendi* and four of my *borealis*. In the distribution it is distinctly a species of the Temperate Zone, although not rare in southern Florida and represented by one specimen from Guatemala.

The species has been reared from Lepidoptera, mostly the large kinds; published host records include *Citheronia regalis* Fabricius (Coquillett, 1897), *Basilona imperialis* Drury (Brimley, 1922), *Anisota senatoria* Smith and Abbott (Brimley, 1922), *Ceratomia undulosa* Walker (Brimley, 1922), *Dryocampa rubicunda* Fabricius (Riley, 1873), *Hemileuca* sp. (Coquillett, 1897). An unpublished host is *Ceratomia amyntor* Huebner, the parasite being reared by C. Zeimet at Black Mountain, N. C.

BELVOSIA ARGENTIFRONS, new species

Male.—Front at vertex 0.34 to 0.37 of the head width, not widening for a short distance. Face, posterior orbit, and cheek silvery, this color extending in an unusual manner upon the parafrontals almost to the vertex; frontal bristles mostly in one row, but a few irregular, the hairs below them black; cheek two-fifths of the eye height with black hairs, some quite coarse. Vibrissae not so far above the mouth as in many of the species, the distance being hardly equal to the

length of the second antennal joint; antennae brownish black, the third joint three times the second; palpi yellow.

Thorax black, the gray moderately dense with faint stripes. Scutellum with pollen of the same color as the thorax but more dense.

Abdomen black, second segment with a very narrow interrupted basal pollinose band of pale yellow; third and fourth segments with dense yellow pollen, the apical fifth however shining black. Genitalia small, shining black, the outer forceps concolorous, with rounded tips.

Legs black; front pulvilli slightly shorter than the last two tarsal joints; hind tibia on outer side without cilia, but with a scattered row of bristles of increasing size on the upper three-fifths.

Wings light brown, both calypters white, with only a slight tinge of yellow.

Female.—Front at vertex 0.37 to 0.40 of the head width, the parafrontal silvery below, but with a larger dark region above than in the male.

Described from six specimens of both sexes. Three males and two females, including type and allotype, were reared by C. T. Greene at Falls Church, Va., from a lepidopterous pupa (Hopkins 14802 F); one specimen from Georgia which was figured in Howard's Insect Book (1902, plate 22, fig. 15) as *Belvosia bifasciata*; the remaining specimen, a male, was sent for study by the American Museum of Natural History; it was bred at Brooklyn, N. Y., by J. Akhurst, host not given.

Type.—Male, Cat. No. 40478, U.S.N.M.

***BELVOSIA TOWNSENDI*, new species**

Male.—Front at vertex 0.32–0.36 of the head width, continuing forward quite perceptibly before becoming wider; parafrontals very distinctly yellow pollinose, the ground color showing through very little except quite far back. The bristles are in three irregular rows, the smaller hairs below them and on the cheeks are very distinctly black. Face, parafacials, and cheeks as well as posterior orbits silvery pollinose. Antennae black, junction of second and third segments reddish, the third fully twice as long as the second, with almost parallel sides. Vibrissae about as far above the epistoma as the length of the second antennal joint. Facial ridges with smallish erect bristles not quite to the level of the arista. Just outside the bristles there are also some distinct black hairs. Palpi yellow; beard white. Thorax black, gray pollinose in front, the scutellum, except the base, with yellowish pollen.

Abdomen black, the second segment with a distinct but very narrow and widely interrupted basal whitish pollinose crossband. Third

and fourth segments with golden pollen except on the apical fourth; the black hind margin becomes a little narrower underneath; first and second abdominal segments each with a single pair of median marginal bristles; third and fourth with a marginal row. Genitalia rather small, the outer forceps rather narrow at base and broad at tip.

Legs black, front pulvilli elongated, equal to the last two tarsal joints. The hind tibia on outer side with about eight irregular sloping bristles and next to them on the hind edge some sloping hairs.

Wings brown; calypters very pale brown, appearing nearly white at first glance.

Length, 11 mm.

Female.—Front 0.36–0.37 of the head width, the parafrontals without yellow pollen, but rather dark and semishining. Antennae tending toward reddish.

Length, 12 mm.

Described from 54 specimens of both sexes; the principal series, consisting of 24 males and 4 females (including type and allotype), was collected by C. H. T. Townsend between July 29 and August 1 at Oak Grove, Va., on flowers of carrot; 2 specimens, male and female, were reared from *Citheronia regalis* by Riley on July 17 and September 17, 1873, the first being mentioned by Coquillett under *bifasciata* on page 10 of his Revision of the Tachinidae; in the Aldrich collection are 4 specimens, 3 from Pennsylvania originally collected by C. W. Johnson, 1 of which is labeled "from chrysalis of *Eacles imperialis* 6/9/1891"; the fourth specimen collected at Lafayette, Ind. Recently received from C. W. Johnson for identification are two specimens, one male from Clementon, N. J., August 29, 1919, the other a female from Bainbridge, Ga. (J. C. Bradley). From Walton's collection are two males and one female, one male from Hertford, N. C., the other two from Catawissa, Pa., reared from *Eacles imperialis* from the same larva. These are Nos. 1, 2, and 4 of the analytical table published by Walton,² where they are included under *bifasciata*; two females from H. W. Allen, one collected at Mount Laurel, N. J., by L. B. Parker, the other collected at Palmyra, N. J., September 10, 1924, by R. J. and N. B. Sim; two females from Clemson College, S. C., September 23, 1908 (F. Conradi), received from J. O. Pepper; three males from the American Museum of Natural History, one collected by Mrs. A. T. Slosson at Lake Toxaway, N. C., one collected in New York, reared from *Eacles imperialis* by Hy. Edwards, the third from Newark, N. J., July, 1923; one from Wauseon, Ohio, sent by Prof. J. S. Hine; one male, Falls Church, Va., reared by C. T. Greene from large lepidopterous pupa (Hop. 14802 F); three males, Black Mountain, N. C., reared from *Ceratonia amyntor* on May 23, 1923, by Carlo Zeimet; one male, near Peaks of Otter above 3,000 feet, collected by

² Proc. Ent. Soc. Wash., vol. 15, 1913, p. 27.

William Palmer; one male, Falls Church, Va. (Greene); and one male from Riley County, Kans., in the University of Kansas collection.

Type.—Male, Cat. No. 40466, U.S.N.M.

Named in honor of Dr. C. H. T. Townsend, a very keen and experienced collector of the muscoid flies.

***BELVOSIA BICINCTA* Robineau-Desvoidy**

Belvosia bicincta ROBINEAU-DESVOIDY, Myodaires, 1830, p. 103.—WILLISTON, Trans. Amer. Ent. Soc., vol. 13, 1886, p. 302.—TOWNSEND, Trans. Amer. Ent. Soc., vol. 19, 1892, p. 89; Ann. and Mag. Nat. Hist., vol. 19, 1897, p. 33.—F. H. SNOW, Kans. Univ. Sci. Bull., vol. 2, 1903, p. 217.—JOHNSON, Proc. Acad. Nat. Sci. Phil., vol. 46, 1894, p. 278; Bull. Amer. Mus. Nat. Hist., vol. 41, 1919, p. 436.

Senometopia bicincta MACQUART, Hist. Nat. Dipt., vol. 2, 1835, p. 112.

Belvosia bifasciata FABRICIUS (part), MACQUART, Dipt. Exot., pt. 2, No. 3, (Mem. Soc. Sci. et Arts Lille, 1843), p. 212 (sep. 55).—OSTEN SACKEN, Cat. N. A. Dipt., 1878, p. 153.—VAN DER WULP, Tijdsch. v. Ent., vol. 26, 1883, p. 23.—COQUILLET, Revis. Tachinidae, 1897, p. 84.

Belvosia piurana TOWNSEND, Proc. U. S. Nat. Mus., vol. 43, 1912, p. 349.

Male.—Front 0.27 to 0.32 of the head width at vertex, widening rapidly after a short distance; frontals in two irregular rows, one containing the largest bristles is rather distinct; parafrontals densely covered with dark hair which inclines toward the median line above, while on the lower part it becomes somewhat more proclinate especially near the orbits. The parafrontals are almost silvery pollinose at the lower end, but the pollen rapidly becomes thinner upward and in their middle and upper portion they are dark and subshining. Face, parafacials, cheeks and posterior orbits silvery white pollinose. The face is a little less glistening. The hairs immediately below the frontal bristles and those of the cheek are black. Antennae brownish black, smaller than in related species, reaching a little more than half of the distance to the oral margin; second joint somewhat elongated, from one-half to two-thirds the length of the third. The vibrissae are a little higher above the oral margin than in any of the related species, although some have nearly the same distance. Facial ridges bristly up to about the middle of the third antennal joint, somewhat less than half of the total height. Palpi unusually yellow; beard white.

Thorax black, becoming brown behind, anterior portion with thin gray pollen. Scutellum shining brown.

Abdomen black, frequently with a trace of red in the ground color of the sides; second segment with a narrow basal pollinose band of gray or pale yellow interrupted in the middle; third segment with a much broader band of the same color, which is very slightly or not at all interrupted; fourth segment with denser and usually deeper yellow pollen on the basal two-thirds or three-fourths, the apex, how-

ever, very distinctly subshining black. First segment with a small pair of median marginals; second with a normal pair; third with a marginal row; the fourth has the usual row of bristles mixed with long hairs.

Genitalia brownish-black, both pairs of forceps moderately elongated, the inner bent up at tip, the outer ones slender with parallel sides, the tip bluntly rounded.

Legs black, front pulvilli longer than the last two tarsal joints; hind tibia ciliated on the outer side with dense sloping bristles of uniform size, mostly in a single row.

Wings brown, calypters varying from nearly white to brown.

Female.—Front 0.33 to 0.35 of the head width at vertex, the parafacials with denser white pollen than in the male, so that the dark ground color shows through much less distinctly, the frontal bristles are mostly in a single row with the addition of three proclinate orbitals; the hairs of the parafrontals are much shorter than in the male and are inclined in several directions. Spines of hind coxae long and stout as in *spinicoxa*. Ciliation of hind tibia coarser and less regular than in male.

Length, 11.5–14 mm.

Redescribed from 82 specimens of both sexes; 35 of these were collected in southern Brazil by H. H. Smith and received from the American Museum of Natural History; from the same museum there is one from Coparo, Trinidad. Eleven specimens were received from Prof. Jas. S. Hine, including five from Bartica, British Guiana, April 13–May 4, 1901; one from Puerto Barrios, Guatemala, March, 1905, and four from Holguin, Cuba, December 31, 1904, and March 7, 1905. These Cuban specimens agree in having black palpi and blackish calypters. Two specimens are from the Canadian National Collection—one, British Guiana; one, Tropical Research Station of the New York Zoological Society, Kartabo, British Guiana. From the Hawaiian Sugar Planters' Experiment Station were received two specimens from Blairmont, British Guiana, and one from Mera, Ecuador, all collected by F. X. Williams. In addition to the material cited, the National Museum has 18 specimens with the following data: Three from San Antonio, Tex. (Crawford); one, Brewster County, Tex. (Mitchell and Cushman); one from Rio Piedras, P. R.; one from Higuito, San Mateo, Costa Rica (Schild); one, Puerto Barrios, Guatemala (Deam); one, Culebra, Canal Zone; two, Jamaica, "reared from hawk moth pupa"; and three specimens collected in Bolivia by Dr. W. M. Mann while a member of the Mulford Biological Exploration. One of the last lot is from Rurrenabaque, Beni; one from Cavinassas, Beni; the third from Rio Ivon; one from Sapucay, Paraguay. Also 10 specimens from Sullana and Piura, Peru (Townsend), types of *Belvosia piurana* Townsend. Three specimens from

C. W. Johnson, Caura Valley and Ciudad Bolivar, Venezuela, and Bartica, British Guiana.

In the Vienna Museum material are 11 specimens; 7 in one series are labeled "Saida Exp. 1887. Dr. Paulay. R. d. Janeiro, aus ein. gr. Raupe gez."³ Of the four other specimens, one is "Brasilien," and "Willistonina bei esuriens. Fühler anders"; another is also from Brazil and is labeled "esuriens coll. Winthem"; and in faded brown ink, "T. esuriens H. Musca es. F. Para. Brasilia." The tenth is labeled "Ind. or." "Willistonina det. B. B."; and on a folded paper I find "Ind. or. oder Amazonen fl." The last bears "Wthm" and "Willistonina det. B. B." Although two of these bear the name *esuriens*, they do not agree with Wiedemann's statement that the third antennal joint in that species is more than twice as long as the two preceding.

The types of *bicincta* were said to be from Carolina and the Antilles.

BELVOSIA POTENS Wiedemann

Tachina potens WIEDEMANN, AUSS. Zweifl., vol. 2, 1830, p. 299.

Willistonina potens BRAUER and BERGENSTAMM, Zweifl. Kais. Mus., pt. 5, 1891, p. 403.

Belvosia potens ALDRICH, Proc. U. S. Nat. Mus., vol. 72, art. 7, p. 33.

Male.—Front at vertex 0.34 of the head width, the narrowest point being directly across the anterior ocellus; the entire front of the head and the posterior orbits are silvery pollinose, the frontal stripe, however, brown. In this specimen the reddish ground color of the parafacials, facial ridges, and cheeks shows through to a noticeable extent and the suture is distinctly bordered with a darker tinge to its lowest end. Frontal bristles in a single row, the hairs below the lowest are black as are also the hairs of the cheek. Face considerably depressed in the middle, the vibrissae about the length of the second antennal joint above the oral margin; facial ridges with well-developed bristles up to a point above the middle of the third antennal joint. Antennae black, second joint more dark brown with a tinge of red at the junction with the third, which is three times as long as the second and a little tapering. Palpi dark yellow, cheek almost half the eye height, beard white.

Thorax brownish black with usual thin pollen, more distinct in front. Scutellum brown with four pairs of bristles, the median pair of the same appearance as the others. The disk has about a dozen depressed small bristles. Calypters brown. Sternopleurals 4 on one side, 5 on the other.

Abdomen black, with faint reddish tinge at the sides; third segment with only a very narrow basal interrupted, white, pollinose crossband,

³A note on this material occurs in Brauer and Bergenstamm, Zweifl. Kais. Mus., pt. 7, 1894, p. 580.

hardly more than a line; fourth segment with dense pale yellow pollen, the apical third black.

Legs black, front pulvilli slightly longer than last two tarsal joints; hind tibia on outer side with a row of small, suberect bristles mixed with a few hairs not so bushy in appearance as in many species.

Wing brown throughout, narrow at apex, bend of fourth vein rectangular and rounded, its distance from the hind margin less than half of that to the large crossvein; third vein with two bristles.

Genitalia smaller than in most of the species, the inner forceps black, closely pressed together near tip and bent forward almost with an angle; outer forceps hardly so long, dark yellow in color, flat and bluntly rounded at tip.

Female.—The front is not silvery in the female, but covered with rather dense gray pollen through which the dark ground color is slightly visible.

Length, 10 mm.

Redescribed from Wiedemann's type specimen which was received for examination from the Vienna Natural History Museum. One additional male has been examined from Brazil, sent by C. H. Curran; and there are two females in the National Museum collection from Ypiranga, Sao Paulo, Brazil (Fonseca).

BELVOSIA NIGRIFRONS, new species

Female.—Front rather broad, measuring at vertex 0.38 of the head width (the same in two specimens, the other not in condition to measure), widening rapidly so that the inner border of the eye when viewed from in front is perceptibly concave. Parafrontals shining blackish gray along the inner border next to the frontal stripe, with gray pollen; frontal bristles in a single row, with some rather stout reclinate bristly hairs just outside of them; three or four proclinate orbitals of varying size. Parafacials pure white, slightly glistening; cheeks and posterior orbits of the same color. The parafacials are a little wider than usual. Vibrissae about the usual distance above the mouth; facial ridges not very prominent, bristly almost to the level of the arista. Antennae black, reddish between the joints, the third joint about twice the second, reaching nearly to the vibrissae. Cheek with black hairs; there are also a few minute black hairs on the parafacial, just below the lowest frontals.

Thorax black, rather densely gray pollinose along the front border, the scutellum with reddish ground color and brown pollen.

Abdomen black, first two segments shining; third segment shining on about the apical half, the basal half bearing an interrupted gray fascia, which fades out posteriorly; fourth segment with dense very pale yellow pollen, except the narrow apex bearing the bristles, which is shining black; the pollinose portion is destitute of hairs.

Legs black, hind tibia with several large suberect bristles on the outer hind side of increasing size, the largest a little below the middle. The pulvilli are decidedly small.

Wings and calypters uniformly blackened; four or five bristles on base of third vein.

Length, 10.5 mm.

Described from three females.⁴ The type and one other female were reared from pupae of *Callosamia colleta*, which were collected at Mirasol in the Republic of Salvador at 4,000 feet altitude, by F. Deininger. The adult emerged November 20, 1913. The third specimen was reared at La Laguna, Republic of Salvador, August 1913, by the same collector, from pupa of *Attacas orizaba*; received from C. W. Johnson.

Type.—Female, Cat. No. 40472, U.S.N.M.

***BELVOSIA LATA*, new species**

Female.—Front at vertex 0.35 to 0.37 of the head width, increasing in width rapidly; frontal bristles mostly in a single row, with three proclinate orbitals; parafrontals with rather plumbeous pollen, nearly black in some angles; face, cheeks, and posterior orbits densely white pollinose, almost silvery. The hairs below the frontals are black; cheek one-half the eye height, with black rather sparse hairs. Antennae black, more or less reddish at the junction of the second and third joints, the third somewhat less than twice the second. Vibrissae considerably above the level of the mouth, not quite so much as in *bicineta*. Facial ridges rather flat, bristly about half way. Palpi yellow; beard white.

Thorax black, anterior part densely cinereous pollinose, the hind edge and scutellum with brown pollen. Sternopleurals 3-4.

Abdomen deep black, hardly at all shining, second segment without any basal pale pollen; third segment with a very narrow interrupted basal band of pale yellow; fourth segment with dense light yellow pollen covering all but the apical fourth, which is strikingly black. First abdominal segment with one pair of stout blunt median marginals; second with two or three pairs, which like the marginal row on the third segment are uncommonly stout, erect, and blunt; the second segment also with one bristle of this kind on the margin at the side; the fourth segment with a submarginal row of about 12, almost as stout as on the third segment. Between these and the extreme tip there is another row of smaller bristles. Venter with stout spines mostly on the inflexed tergites.

⁴ A male and 7 females of *Belvosia nigrifrons*, new species, were received later from P. V. Siggers, La Cieba, Honduras. He reared them from a single larva of a large moth of the genus *Rothschildia*. The male has a narrower basal pale band on the third segment, and the front is not so strikingly darkened, being silvery with a perceptible dark tinge. The front in the male is narrowest at the vertex, where it is 0.33 of the head width.

Legs black, coxae with strong curved bristles or spines. Hind tibia with a row of erect bristles of increasing size ending just before the middle; rather numerous small hairs and bristles extending all the way to the tip.

Wings brown, both calypters deeply infuscated.

Length, 14–15 mm.

Described from four females; two, including the type, were collected at Puerto Barrios, Guatemala, March 5, 1905, by Prof. Jas. S. Hine, from whom they were received; another was collected in Brazil by H. H. Smith and was received from the American Museum of Natural History; the fourth is in the collection of the Vienna Museum, labeled "Schott. Brasilien," and "Willistonian det. B. B." This last has but three marginals on the second abdominal segment, but agrees in other characters, especially in the dense spines of the middle ventral region.

Type.—Female, Cat. No. 40471, U.S.N.M.

BELVOSIA SMITHI, new species

Male.—Front rather narrow, 0.30 to 0.32 of the head width, the narrow space continuing a little in advance of the ocelli, thence rapidly widening. Frontal bristles in three irregular rows, the outer not very strong. Parafrontals with thin somewhat plumbeous pollen. Face, parafacial, and cheek with shining white pollen, the last with yellowish brown hairs which in certain lights look pale; a few dark hairs below the frontals on the parafacial, but these are not quite black in some lights. Facial ridges bristly more than halfway. Third antennal joint black, noticeably tapering toward the tip, twice as long as the second; the first and second joints yellowish brown. Vibrissae almost half the length of third joint above the oral margin; palpi yellow; beard white.

Thorax black, brownish along the sides, with gray pollen, that of the scutellum more brown.

Abdomen subshining black, the third segment with a narrow and sometimes faint interrupted pale pollinose band at extreme base; fourth segment pale yellow pollinose, except the apex including the bristles and a distinct median black line; the pale pollinose portion has a few erect hairs rather large on the sides and the black of the apex expands underneath to include the whole width of the segment; in other words, the pale pollen does not extend much below the middle of the side of the segment; first and second segments with a single pair of median marginal bristles. The venter has rather striking soft black hair which is dense on the second and third segments, but does not form distinct patches. Genitalia blackish, outer forceps somewhat paler, not distinctly swollen.

Legs black, front claws and pulvilli much elongated, the latter as long as the last two tarsal joints. Hind tibia with dense ciliation in several rows.

Wings uniformly brown, rather long and narrow. Bend of fourth vein rather close to hind margin, the distance being about half of that between the hind crossvein and the bend. Both calypters brown.

Length, 14–15 mm.

Female.—Front at vertex 0.36 of the head width; pollen of head as in male. Antennae slightly shorter, the third joint little enlarged at base, of more uniform width. Hairs of cheek and upper parafacial decidedly black. Ciliation of hind tibia rather coarser and more bristly than in the male.

Length, 12 mm.

Described from two males and one female, collected at Chapada, Brazil, by H. H. Smith. Sent for identification by the American Museum of Natural History. The male paratype is retained by the National Museum.

Named in honor of the late H. H. Smith, a wonderfully capable and energetic collector of insects.

Paratype.—Male, Cat. No. 40479, U.S.N.M.

***BELVOSIA SPINICOXA*, new species**

Male.—Front rather narrow at vertex, measuring 0.34 to 0.37 of the head width; the sides above subparallel for a short distance; parafrontals shining brownish-black, more pollinose adjacent to the frontal stripe. Frontal bristles in two or more irregular rows, a few black hairs below the lowest ones; parafacials pure glistening white; face and cheeks of the same color. Vibrissae a little higher above the mouth than in most of the species, almost as in *bicincta*. Antennae black, second joint brown, the third a little over twice the second, considerably swollen at the base near the arista, which tapers evenly to its apex. Facial ridges moderately prominent, bearing small bristles a little more than half way to the base of the antennae. Palpi yellow.

Thorax black with the usual pale pollen anteriorly. The scutellum brown in ground color and with brownish pollen.

Abdomen black in ground color; base of second segment with a very narrow pale fascia, broadly interrupted in the middle; second segment densely yellowish white pollinose on the basal half or more, gradually fading out posteriorly; fourth segment densely pollinose with light yellow except rather broad apical black portion including the marginal bristles, the light yellow part destitute of hairs. The first and second segments have one pair of marginal bristles, the third and fourth a marginal row.

Legs black, front pulvilli nearly as long as last two tarsal joints. Hind tibia with several rather striking suberect stiff bristles on the outer hind side in addition to numerous smaller and more sloping bristles and hairs.

Wings dark brown, front calypters the same, the hind ones rather pale brown. Bend of fourth vein a little nearer the hind margin than usual, the distance being about two-thirds of that from the bend to the hind cross vein.

Described from 15 specimens of both sexes. Three males, including the type, are from Sapucay, Paraguay; the allotype and another pair are from Cavinassu, Beni, Bolivia (Mulford Biological Exploration, collector W. M. Mann); six specimens were received from the American Museum of Natural History, collected at Chapada, Brazil (H. H. Smith), and one from East Amazonas; one from Guantanamo, Cuba (Ramsden), was received from C. W. Johnson; and one female from Yucatan (G. F. Gaumer) was received from the University of Kansas.

Length, 13.5 mm.

Type.—Male, Cat. No. 40480, U.S.N.M.

BELVOSIA ESURIENS Fabricius

Musca esuriens FABRICIUS, Syst. Antl., 1805, p. 301.

Tachina esuriens WIEDEMANN, Auss. Zweifl., vol. 2, 1830, p. 309.

Willistonina esuriens BRAUER and BERGENSTAMM, Zweifl. Kais. Mus., pt. 4, 1889, p. 97; pt. 5, 1891, pp. 349, 403; pt. 6, 1893, pp. 123, 204.

Belvosia esuriens ALDRICH, Proc. U. S. Nat. Mus., vol. 72, 1927, p. 32.

Male.—Front at vertex 0.31 of the head width; the eye rather broadly rounded above so that the narrow part continues forward from the ocelli, then rapidly widening; parafrontal with three very irregular rows of bristles inclined toward the center, the pollen gray, becoming very thin toward the vertex. Face and parafacials pure white, the latter somewhat silvery; hairs below the lowest frontals black, in certain lights two or three may have a pale reflection; cheek white pollinose and with white hairs among which three or four are black. Vibrissae almost the length of the second antennal joint above the oral margin; facial ridges with seven or eight strong bristles, the row almost reaching level of arista; third antennal joint three times the second, which is brown in color; palpi yellow.

Thorax black with thin gray pollen anteriorly; the scutellum subshining with a brown tinge. Calypters decidedly brown. Sternopleurals, 4.

Abdomen black, subshining; second segment with narrow basal band of light-yellow pollen; third segment with a distinctly interrupted band of almost white pollen covering a little more than the basal half and extending on the venter; fourth segment decidedly pollinose except the tip where the bristles arise, which is black; there is also a slender black median line scarcely interrupting the pale pollen. First and second segments with one pair of median marginals; third and fourth with a marginal row.

Legs black, the front claws and pulvilli elongated, the latter slightly longer than the last two tarsal joints. Hind tibia with several rather

large suberect bristles on the outer side on the upper half, the lower half with uniform row of smaller bristles. All these bristles stand along the outer side of some more depressed hairlike ones.

Wings rather light brown in color, narrow toward the apex, bend of fourth vein rectangular but rounded, a little nearer the margin of the wing than usual; base of third vein with three or four hairs.

Length, 11.5 mm.

Redescribed from a male specimen received from the Vienna Natural History Museum, which is apparently one of those which Wiedemann had before him when he redescribed *esuriens*. It is from Brazil, labeled "Coll. Winthem." and bears the small, square, red tag without writing which Brauer says indicates Wiedemann's original specimen. Wiedemann erroneously calls this specimen a female. Four additional specimens of this species, a male and three females, have been received from the American Museum of Natural History; they were collected at Chapada, Brazil, by H. H. Smith. The male has a longer third antennal joint and a narrower band on the third abdominal segment than the Vienna specimen, but the females are like the latter.

***BELVOSIA WILLIAMSI*, new species**

Male.—Front at vertex 0.28 to 0.30 of head width, widening very slowly for a short distance. Parafrontals almost black except for a short distance anteriorly, where they are gray. Frontals in two irregular rows. Face, parafacials, cheeks, and orbits silvery white, the hairs below lowest frontals are black. Cheek with fine hairs which show a slightly reddish reflection. Antennae brown at base, third joint black, twice as long as the second. Facial ridges bristly to a little below the arista. Palpi yellow; beard white.

Thorax black, subshining, with a little gray pollen in front; scutellum more shining brown.

Abdomen shining black on the first two segments, the second with a faint trace of a basal pollinose line; third segment with a basal interrupted pale yellow crossband covering approximately one-half of the segment in the most favorable viewpoint, the remainder of the segment shining black; fourth segment with dense yellow pollen on the basal three-fourths, narrowly interrupted on the middle line; first and second segments with a single pair of median marginals; third and fourth with a marginal row.

Legs black, front pulvilli greatly enlarged, a little longer than the last two tarsal joints. Hind tibia rather evenly ciliated on the outer side with the usual larger bristle below the middle.

Length, 10.5–12 mm.

Described from three males. The type is from Campinas, Brazil, March, 1924 (F. X. Williams); one from Brazil without further data; the other, received from C. H. Curran, is from Kartabo, British Guiana, 1924.

Type.—Male, Cat. No. 40483, U.S.N.M.

Named in honor of F. X. Williams, the collector.

BELVOSIA CANALIS, new species

Male.—Front at vertex 0.30 of the head width, not widening for a little distance. Parafrontals with distinctly yellowish pollen from the anterior part almost to the vertex, where the ground color begins to show dark. Frontals in two somewhat irregular rows. Face, parafacial, cheek, and orbit silvery pollinose. Hairs below the lowest frontals black, cheek with mostly pale hairs. Antennae black, third joint a little more than twice the second. Vibrissae rather high above the mouth, the distance being about equal to the second antennal joint. Facial ridges bristly almost to the arista; palpi yellow; beard white.

Dorsum of thorax subshining, more pollinose anteriorly; scutellum with brown pollen.

Abdomen deep black, not very shining on the first two segments; third segment with pale yellow basal pollinose band, covering almost half and interrupted on the middle line. Fourth segment with dense pale yellow pollen, covering all but the apical fifth and even here more or less distinctly visible in diagonal view. First and second segments of the abdomen with a single pair of median marginals, the hairs of the median region more upright than usual. Third and fourth segments with a marginal row of bristles. Venter with more soft hair than usual, but not so much as in *smithi*. Outer forceps black, strongly swollen in the basal and middle part, the tip thin.

Legs black, front pulvilli enlarged, as long as the last two tarsal joints; hind tibia coarsely ciliated, with two larger bristles near middle.

Wings and calypters brown.

Female.—Front 0.36 and 0.37 of head width at vertex. Parafrontals not with yellow color, rather plumbeous. Three pairs of proclinate orbital bristles.

Length, 11–12 mm.

Described from one male and two females; the male is from Barro Colorado Island, Canal Zone (Greene); the females from Campinas, Brazil, March, 1924 (F. X. Williams).

Type.—Male, Cat. No. 40484, U.S.N.M.

UNRECOGNIZED SPECIES

BELVOSIA OBESULA Van der Wulp

Cnephalia obesula VAN DER WULP, Biologia, Dipt., vol. 2, 1890, p. 46, pl. 3, fig. 3.

The original description is as follows:

Blackish; head white; frontal band, palpi, and base of the antennae rufous; scutellum testaceous; front margins of the abdominal segments with yellowish-

cinereous reflections, the anal segment wholly of that color; the abdomen somewhat transparent.

Length, 10.5 mm.

Face and sides of the front silvery-white; front much broader than the eyes; frontal band and vertex rufous; frontal bristles forming on both sides three rows, the inner row descending to the end of the second antennal joint; the bristles of the intermediate row shorter and weaker; oral margin not prominent; above the vibrissae are four bristles on the facial ridges; cheeks without black hairs; beard and pilosity of the occiput whitish; eyes bare, a row of short black bristles behind them. Antennae longer than in the preceding species; basal joints rufous; third joint black, with rufous base; second joint elongate, bristly; third joint twice as long as the second; arista indistinctly jointed, thickened to near the tip. Proboscis blackish; palpi rufous, thickened toward the end. Thorax blackish, before the transverse suture with whitish-grey tomentum and two black lines; pleurae greyish; scutellum testaceous. Abdomen short ovate, very convex; first segment black; second segment blackish, with grey reflections and a white front margin, laterally rufous, slightly transparent; third segment yellowish-grey, with brown reflections on the hind margin; anal segment short, pale ochraceous; macrochaetae as in the preceding species. Legs black; shorter and more robust than in *C. onusta*, but with similar bristles; foot-claws and pulvilli short. Tegulae white. Wings brownish-grey, intense yellow at the base; venation like that of *C. onusta*.

Hab. Mexico, Teapa in Tabasco (H. H. Smith).

A single female example.

Although it is clear that this species belongs to *Belvosia*, I have not been able to identify it in the material seen.

BELVOSIA ANALIS Macquart

Belvosia analis MACQUART, Dipt. Exot. Suppl., vol. 1, 1846, p. 160, pl. 14, fig.

4.—GIGLIO-TOS, Ditt. dell. Mess., vol. 3, 1894, p. 29.

Originally described from Brazil, the type now presumably destroyed. Giglio-Tos identified a specimen from Tuxpango, Mexico, and Coquillett identified Mexican material as belonging to this species; but the original description says that the abdomen is blue, which seems to exclude it from this genus entirely, as none of the known species of *Belvosia* have this peculiar color. I have described Coquillett's species as *ciliata*.

BELVOSIA AURULENTA Bigot

Frontina aurulenta BIGOT, Annales Soc. Ent. France, 1888, p. 84.

Willistonina aurulenta BRAUER, Sitzungsber. Kais. Mus., vol. 106, 1897, p. 356.

The type is a female from Brazil, and has been examined by Brauer, who referred it to *Willistonina*. I do not find either in his remarks or in the original description the necessary characters to connect the name with any of my species.



Aldrich, John Merton. 1928. "A revision of the American parasitic flies belonging to the genus *Belvosia*." *Proceedings of the United States National Museum* 73(2729), 1–45. <https://doi.org/10.5479/si.00963801.73-2729.1>.

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