THE DIPTEROUS GENUS SYMPHOROMYIA IN NORTH AMERICA.

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The genus *Symphoromyia* was established by Frauenfeld in 1867.[1] Only one species is mentioned, *Atherix melaena* Meigen, which thus becomes the undoubted type of the genus. Happily, there is no nomenclatural dispute whatever about the correct application of the name, and it has never been used in any other sense than the original one. The known species are confined to Europe and North America.

The first North American species were mentioned by Osten Sacken in his Western Diptera, 1877, in a paragraph which is well worth quoting for its historic interest:

> *Symphoromyia*, sp.—Half a dozen species, which I took in Marin and Sonoma Counties in April and May, and about Webber Lake in July, all have the anal cell open and therefore belong to the genus *Symphoromyia* Frauenfeld (*Ptiolina* Schiner, not Zetterstedt). California seems to be much richer in this group than Europe or the Atlantic States of North America; but as these species resemble each other very closely, and as both sexes often differ in coloring, I deem it more prudent not to attempt to describe them.
>
> The female of one of these species which I observed near Webber Lake stings quite painfully and draws blood like a *Tabanus*. I am not aware of the fact ever having been noticed before concerning any species of Leptidae (p. 244).

The next occurrence of the genus in North American literature was when Williston described two species, *pachyceras* and *plagens*.[2] This was closely followed by an article by Bigot,[3] in which he described six species from North America, *latipalpis*, *picticornis*, *trivittata*, *fulvipes*, *atripes*, and *comata*. In an appendix to the same article, dated April 4, 1887, Bigot states that he has received Williston's paper and finds *picticornis* and *trivittata* to be synonyms of *plagens* and *pachyceras*, respectively.

The only general treatment which the genus has received in this country was by Coquillett,[4] in which 10 species are recognized.

[1] Verh. zool.-bot. Ges. Wien, vol. 17, p. 497.
[2] Trans. Amer. Ent. Soc., vol. 13, 1886, p. 287.
[3] Bull. Soc. Zool. France, vol. 12, 1887, pp. 12–15.
[4] Journ. N. Y. Ent. Soc., vol. 2, 1894, pp. 53–56.

Bigot's species are reduced to synonymy, except *latipalpis*, and seven new species are described, five of them in only one sex. In the 20 years from this paper to the present Johnson has described two species, Adams one, and Coquillett one more.

In the following pages 22 species are recognized, of which 11 are known in both sexes, the male only in 5, and the female only in 6. Two or three of them are not firmly established. These figures show how much still remains to be done in collecting and studying the group.

Generic characters.—The genus includes Leptid flies with five posterior cells, the anal cell open; third antennal joint simple, rather deep vertically, attached above its middle, usually kidney-shaped (sometimes concave in profile below the arista, then not quite kidney-shaped); arista subapical; tibial spurs none in front, two in the middle, one behind, but often quite weak in males.

Specific characters.—There are several characters which may be used singly to divide the genus into two groups of several species each. Five species have the third antennal joint concave in profile below the arista, a character applying equally to both sexes and very distinct; sides of face pilose is found in nine species, but is slight in a few cases, especially in the female; infuscation of the halteres seems to be very useful, but there are cases in which it occurs in the male and not in the female. Color characters occur in antennae, palpi, legs, and abdomen, but except the last are prone to be variable and can be used only with great caution. Width of the front is a good character in females, several species having it much wider than one eye (always measured just above the antennae, viewed from in front). Several males of the group with concave third joint have a thornlike bunch of spines on the middle coxa, a very striking thing. Many males have on the front side of the hind coxae near the tip a distinct condyle, smooth, polished, rounded or conical, which fits into a corresponding socket in the hind side of the middle coxa. I have made but little use of this, because it is normally almost invisible and I could not compare its form satisfactorily in different species. I have not studied the male genitalia, although I do not doubt that in the course of time they will be found useful in critical cases. In my opinion it is not safe to depend merely on their characters as they occur in ordinary specimens, as they are not always folded in the same manner in the same species. It will probably be necessary to detach the organs and make permanent mounts of them.

Habits.—The bloodsucking habit of the female in one species is alluded to above in the quotation from Osten Sacken. Knab[1]

[1] Proc. Washington Ent. Soc., vol. 14, 1912, pp. 108, 116; and vol. 17, 1915, p. 38.

mentions Osten Sacken's item already quoted, and adds an interesting list of cases where bloodsucking has been attributed to Leptidae of other genera; later in the same volume he mentions conversing with Prof. R. A. Cooley on the habits of a Montana species, and gives the following statement from him:

> We have repeatedly taken a species of *Symphoromyia* in the act of taking blood. They have always attacked me on the hand, and they inflict a painful wound. The first time I was bitten by one I slapped with the same caution that I would a mosquito, lest it should escape, but I soon learned that this was unnecessary, for one can pick them up with the fingers as he would an inert object. In fact, you may poke them around with the finger without causing them to fly. They come and alight almost silently and generally come singly. Our note on this species is as follows: "Note 143.—Troublesome bloodsucking fly. Causing swelling; very painful. Fly is silent when alighting."
>
> It is my impression that this is distinctly a mountain form; that is, we do not find it in our large open valleys, but only in mountainous places.

Mr. Cooley's specimens bearing the number 143 are *S. hirta* Johnson.

Prof. T. D. A. Cockerell furnishes the following hitherto unpublished instance of the bloodsucking habit:

> On July 6, 1914, at the Webber ranch, between Ward and Allens Park, Colorado, a *Symphoromyia* settled on my right hand close to the base of the little finger, and sucked blood. Unfortunately, I crushed the fly before noticing what it was, but I preserved the crushed specimen, smeared with blood. The wound was not painful; it appeared as a bright red spot, and soon healed. The next day, on the Longs Peak Trail above Longs Peak Inn, at about 10,000 feet, *Symphoromyia* attacked a lady member of our party. We captured two specimens, before they had drawn any blood, and preserved them in good condition. They belong to two different species, one of which is identical with the one from Webber ranch.

The three specimens accompanied the note; two are *S. hirta,* including the one which actually sucked blood; the other is *S. atripes.*

I found *S. atripes* Bigot very troublesome to horses on the stage road from Ashford, Washington, to Longmires Springs, in the Mount Rainier National Park. This was on August 2, 1905. There were about 100 flies at once hovering about the four-horse stage team, many biting the horses and a few the passengers. They were most abundant about the horses' heads, and I noticed the blood trickle down from punctures that the fly had left, indicating that the razor-edged mandibles cut a considerable hole in the skin. I have never seen Tabanidae attack horses so severely. See notes under *pachyceras* and *kincaidi.*

On several occasions I have had female Symphoromyias alight on my hands and clothing as if attracted, but depart without biting. However, on May 31, 1913, near Moscow, Idaho, I was bitten a couple of times by *S. inquisitor,* new species, which was plentiful that day. I captured some thirty specimens alighting upon me, or circling about my head exactly as a *Chrysops* does.

Female specimens will generally be taken by collectors when attracted in the manner just described, and occasionally on windows; rarely in any other way. Males, on the contrary, are never attracted to animals, and are only to be found on foliage in the sun, or rarely on windows. It will require much careful study to find and collocate the sexes still unknown of the species now known from only one sex, not to mention the probability of other species being in existence.

Specific names used by Williston and Coquillett (*plagens, limata, cruenta*) seem to imply a bloodsucking habit, but no observations have been published on these species, and Osten Sacken's note may have suggested the names.

Osten Sacken collected several females of *S. atripes* at Webber Lake and a single one each of *inurbana* and *cinerea;* it is therefore a fair presumption that *atripes* was the one which bit him.

The larval habits are unknown. In the nearest related genus, *Atherix,* the larvae live in water in mountain streams.[1] Other Leptidae have various larval habits; Professor Comstock showed me larvae of a species from the California Sierras which are ant-lions, like *Vermileo* of Europe; he did not succeed in rearing the adult, which remains unknown.

Distribution.—Of the 22 known North American species, only three occur east of the Rocky Mountain region, these three also occurring in the West along with the 19 others. California has 15 species; Washington and Montana, 5 each; Colorado, 4; British Columbia, Idaho, and Oregon, 3; other States and Provinces with smaller number. One peculiar thing is that, from Colorado eastward, no localities are represented in collections (with the exception of one specimen from Ohio and one from Alabama) until eastern Pennsylvania is reached. The species most widely distributed is what I have called *hirta,* which may, however, prove to be a complex; it is represented from Alabama to Alberta, and from New Hampshire to New Mexico. *Atripes,* the bad biter, occurs from Alaska to Colorado and California. Even these, however, seem to occur only here and there in the wide range mentioned. Most of the species are without doubt extremely local in occurrence within their range.

Acknowledgments.—Mr. J. E. Collin, Newmarket, England, lent me the types of Bigot's six species. Mr. Charles W. Johnson, of the Boston Society of Natural History, lent type material in *hirta, cinerea,* and *flavipalpis.* Director Samuel Henshaw, of the Museum of Comparative Zoology at Harvard University, sent me the material collected by Osten Sacken in 1876 (26 specimens, in seven species). Prof. Trevor Kincaid, of the University of Washington, sent his entire collection in the genus, rich in Puget Sound material and con-

[1] Aldrich, Ent. News, vol. 23, p. 159.

taining males of two species not before seen. All of this material and much more borrowed in smaller lots I was allowed to take to Washington and study in connection with the United States National Museum types; so that I had about 400 specimens together, including types of all species but those in the University of Kansas, which I examined later. Even with this exceptional opportunity, I did not have material enough to fully settle the status of two or three species, which must await further collection of specimens. The names of collectors are mentioned in connection with the various species; my thanks are due to them, to the gentlemen above named, and to Profs. H. F. Wickham and S. J. Hunter, and to Mr. Frederick Knab, and Dr. L. O. Howard.

Tables of Species of Symphoromyia.

MALES.

1. Face, with long, erect pile on the sides ..... 2.
   Face bare on the sides ..... 8.
2. Proboscis slender, with narrow labella, as long as height of head (California). *cruenta* Coquillett.
   Proboscis normal, short, the labella fleshy ..... 3.
3. Third antennal joint concave in profile at apex, below the artista ..... 4.
   Third antennal joint kidney-shaped as usual, hence convex ..... 7.
4. Sides of abdominal segment 2–4 broadly yellow in ground color (Puget Sound; California) ..... *sackeni*, new species.
   Sides of abdomen black ..... 5.
5. Palpi and third antennal joint yellow or reddish; pile on head very dense and long, reddish (California) ..... *pilosa*, new species.
   Palpi and third antennal joint black ..... 6.
6. Pile of sides of face and of first antennal joint very dense; fourth posterior cell closed or nearly so (California) ..... *barbata*, new species.
   Pile of moderate density; fourth posterior cell wide open or slightly narrowed (California; Washington) ..... *johnsoni* Coquillett.
7. Fourth abdominal segment expanded below on each side, with a row of stiff black hairs along the projecting margin (Oregon; Washington—*comata* Bigot). *pachyceras* Williston.
   Fourth abdominal segment plain (Idaho; Washington) ..... *inquisitor*, new species.
8. Front and middle tibiae yellow ..... 9.
   All tibiae black, knees narrowly reddish ..... 12.
9. Halteres yellow (Pennsylvania; Alabama; New Hampshire; Ohio; New Mexico; Colorado; Utah; Montana; Idaho; Alberta—*flavipalpis* Adams) ..... *hirta* Johnson.
   Halteres infuscated ..... 10.
10. Abdomen very shining (British Columbia; Washington; Oregon; California; Nevada—*picticornis* and *latipalpis* Bigot) ..... *plagens* Williston.
    Abdomen opaque ..... 11.
11. Small, light-colored species, the first antennal joint with mostly white pile below (New Jersey) ..... *cinerea* Johnson.
    Medium-sized species with black pile on the first antennal joint (California; Colorado—*fera* Coquillett) ..... *trivittata* Bigot.
12. Body gray pollinose, opaque ..... 13.
    Body black, velvety, or shining ..... 14.

13. A distinct median gray line divides the broad, central dark-brown stripe of the mesonotum (California) ..... *trucis* Coquillett.
The central stripe not so divided (Montana; Saskatchewan; New Hampshire). *montana*, new species.
14. First antennal joint greatly elongated and swollen, its vertical diameter over ½ that of the head (British Columbia; Alberta; Washington; Montana; Colorado; Utah; California)..... *atripes* Bigot.
First antennal joint much smaller, its vertical diameter only about ⅓ that of the head..... 15.
15. Rather velvet-black species, pile of abdomen yellow (British Columbia; Washington)..... *kincaidi*, new species.
Almost shining species, pile of abdomen black (Colorado)..... *pullata* Coquillett.

FEMALES.

1. Third joint of antenna concave at apex, below the arista..... 2.
Third joint convex as usual..... 5.
2. Abdomen yellow in ground color (Washington; California).. *sackeni*, new species.
Abdomen black..... 3.
3. Sides of face with a little pile (Washington; California)..... *johnsoni* Coquillett.
Sides of face bare..... 4.
4. Mesonotum with three brown stripes, all narrow and very distinct (California). *securifera* Coquillett.
Mesonotum with indistinct, broader, unequal stripes (Idaho; Montana; California). *inurbana*, new species.
5. Knob of halteres infuscated..... 6.
Knob yellow..... 11.
6. Abdomen shining black, broadly red at apex (California)..... *limata* Coquillett.
Abdomen not as indicated..... 7.
7. Sides of face pilose..... 8.
Sides of face bare..... 10.
8. Proboscis slender, longer than height of head (California) ..... *cruenta* Coquillett.
Proboscis shorter, with broad, fleshy labella..... 9.
9. Pale plumbeous species, the hairs above the notopleural suture white (Montana)..... *plumbea*, new species.
Much darker, the hairs above the notopleural suture black (Oregon; California; Montana—*comata* Bigot)..... *pachyceras* Williston.
10. Front above antennae as wide as the eye; tibiae black (Alaska; British Columbia; Alberta; Montana; Washington; Colorado; Utah; California)..... *atripes* Bigot.
Front above antennae much wider than the eye; tibiae yellow (Saskatchewan; Montana; California; New Hampshire)..... *montana*, new species.
11. Tibiae black, knees narrowly reddish..... 12.
Tibiae yellow..... 13.
12. Front above antennae about one-half wider than the eye (Idaho; Washington). *inquisitor*, new species.
Front above antennae about as wide as the eye (Washington; British Columbia). *kincaidi*, new species.
13. Abdomen shining reddish-brown except the first segment (British Columbia; Washington; Nevada—*picticornis* and *latipalpis* Bigot)..... *plagens* Williston.
Abdomen black in ground color..... 14.
14. First antennal joint yellow, the rest black (California)..... *modesta* Coquillett.
First joint not paler than the others..... 15.

15. Femora blackish (Pennsylvania to California., etc.—*flavipalpis* Adams).
hirta Johnson.
Femora yellow..... 16.
16. Pile of front and of mesonotum coarse and long, black (Colorado)..*fulvipes* Bigot.
Pile of front short, black, that of mesonotum largely white (New Jersey).
cinerea Johnson.

SYMPHOROMYIA ATRIPES Bigot.

Symphoromyia atripes Bigot, Bull. Soc. Zool. France, vol. 12, 1887, p. 15, female. Mount Hood, Oregon.

Male.—Wholly black except the knees, which are narrowly red, and the stems of the halteres, which are yellowish-brown; moderately shining on thorax and abdomen, the mesonotum a little less so, inclining to velvety on the middle, unstriped; first antennal joint greatly swollen.

Eyes not quite contiguous, vertical triangle with moderate black pile, frontal one bare, black; first antennal joint long and greatly thickened, especially bulging below, with dense, long black pile all round; the second and third joints wanting in the specimen; face bare, black; palpi large, prominent, and densely bushy black pilose; proboscis short, labella fleshy. In a slanting transmitted light there is a reddish tinge to the apical part of the hairs in the beard, and those on the palpi and the underside of the antenna.

Thorax seemingly not at all vittate, the pile blackish; hypopleura with tuft of pale pile. Abdomen with pale loose pile on sides near base. Femora and tibiae rather shining. Wings slightly tinged with brown, the base yellow.

Female.—Black, including antennae, palpi, halteres except the stalk, legs, and tarsi; moderately cinereous pollinose except the second, third, and fourth abdominal segments and the femora and tibiae, which are shining. Front black, cinereous opaque, very wide above on account of the compound eyes being nearly globular in shape, pile of front short, sparse, black; antennae rather short, first joint hardly longer than the two following together, opaque, with short black hair all round, not much thickened; second small, black; third intensely black, a little deeper vertically than long, slightly prominent below the arista, the depth not much greater than that of the first joint, arista stout, short; palpi short, thick beyond the middle, black, bare above, with black hairs below; labella black; proboscis projecting diagonally downward, about as long as the face; the face cinereous, not appreciably yellow along the lower border; occiput a little protuberant, with black hairs above, yellow on the middle and lower part, the last long. Thorax cinereous opaque, with a wide double stripe nearly black on the middle of the mesonotum and wide single stripe each side abbreviated in front and interrupted at the suture; scutellum cinereous; hairs of thoracic dorsum black, sparse, and rather small; pleura thinly pollinose, subshining, almost bare, the meta-

pleura with delicate long, pale hairs; halteres brownish-black, the stalk brownish-yellow. All the coxae with yellow hair, that of the middle ones mixed somewhat with black; femora and tibiae moderately shining, hind femora on inner side polished. Abdomen wholly black, venter the same; hairs of abdomen dense and pale on the sides at base, elsewhere short and mostly black. Wings distinctly and uniformly infuscated, stigma brown, long, extending from before the apex of the auxiliary almost to the apex of the second vein.

Length of male, 8 mm.; of female, 5.3 mm.

Material examined:

One male, Webber Lake, California, July 26, 1876.

Bigot's type female, Mount Hood, Oregon.

Sixty other females, distributed as follows: Douglas, Alaska (in Melander's collection); Bear Lake (Currie, Caudell), Stickeen River Canyon (Wickham), Kaslo (Caudell), Mount Cheam (J. Fletcher), all in British Columbia. Lake Louise, Alberta (C. S. Minot, in C. W. Johnson's collection). Longmires Springs (J. M. A.), Ashford (Dyar and Caudell), Olympic Mountains (Kincaid), all in Washington. Collins, Idaho (Melander). Midvale (in C. W. Johnson's coll.), and Gallatin Valley (Cooley), in Montana. Webber Lake, California, July 21, 1876 (Osten Sacken). Emigration Canyon, Utah (A. K. Fisher). Rabbit Ear Pass, Colorado (in Melander's coll.); Longs Peak Trail, Colorado (Cockerell), and simply Colo. 2019, from the Agricultural College in the United States National Museum.

I associate this male with Bigot's species because there are no indications to the contrary, and both sexes were collected by Osten Sacken at the same place only a few days apart. Strangely enough, nobody since his time appears to have obtained this species of female with any male. I thought for some time that the male which I have associated with *kincaidi* might belong here; but on examining Professor Kincaid's material it appeared that he had captured it with the other female.

This species is the bad biter *par excellence*, in my experience, as described in the introduction.

SYMPHOROMYIA BARBATA, new species.

Male.—An opaque black, moderately cinereous species with concave third joint, bushy pilose face, infuscated halteres, black femora, yellow tibiae, and a thornlike bunch of setae on middle coxa; fourth posterior cell nearly or quite closed in the margin.

Eyes contiguous, vertical triangle with long black pile, frontal bare, rather ashy; first antennal joint long, hardly swollen, black, cinereous, with long black pile which is longer above than below; third joint small, black, concave below arista and distinctly angulated below the concavity, its vertical diameter equal to that of the first

joint, sides of face with very long, abundant black pile; palpi brown, with mostly yellow, bushy pile; proboscis short, labella fleshy; beard yellow on lowest part and behind proboscis, black and stubbly above.

Mesonotum opaque dark brown with a double median gray stripe, rather indistinct, and gray pollen along the edges; scutellum dark opaque brown; pile of dorsum long, mostly black except on the middle of the anterior part; pleurae opaque brownish, with abundant pale pile; halteres deeply infuscated, the stems somewhat paler.

Abdomen wholly black, rather velvety above, with long erect pale pile.

Front and middle tibiae with fine short erect hairs on the apical third, which continue on the first tarsal joint; front tibia widened at apex on inner side into a blunt angle; all the tibial spurs minute, almost imperceptible. Wings subhyaline.

Length, 7½ mm.

A single male, Claremont, California (C. F. Baker, No. 8271).

The species resembles *johnsoni*, but is darker in color, face about twice as hairy, beard blacker, fourth posterior cell closed, etc. The fourth cell is probably somewhat variable and possibly useless as a character, as in one wing it is not quite closed, in the other entirely so. From the small amount of material in hand of both species they appear to be sufficiently distinct.

Type.—In the author's collection.

SYMPHOROMYIA CINEREA Johnson.

Symphoromyia cinerea Johnson, Ent. News, vol. 14, 1903, p. 25, male and female. Near Long Branch, New Jersey.—Fletcher, 34th Rep. Ent. Soc. Ont., p. 98, occurs in Northwest Territory, Canada.

Male.—A small, ashy species with pale legs, the pile mostly whitish. Head pale ashy; eyes barely contiguous; antennae rather brownish-yellow, first joint of medium size, a little swollen, densely ashy pollinose, with sparse, long whitish pile; third joint kidney-shaped, its vertical diameter not more than that of the first joint; sides of face bare; palpi yellowish-brown, with white pile; proboscis broken off from the described specimen. Mesonotum pale cinereous, with traces of darker lines; pleurae and abdomen ashy, pile mostly pale; halteres broken off; coxae black in ground color, femora brown, tibiae and base of tarsi yellow; middle coxae without spines; hind coxae with small condyles on front. Wings subhyaline, veins yellow.

Female.—Small, ashy species with yellow legs, halteres, antennae and palpi. Front with short black hairs, longer at vertex; first joint of antenna short, cinereous, thickened beyond middle, with short black hair; third joint kidney-shaped, rather large, its vertical diameter somewhat more than that of the first joint; sides of face bare; palpi yellow, the upper edge brown at widest part; proboscis short.

Thorax with indistinct brown stripes; halteres yellow. Abdomen rather evenly cinereous with a tinge of yellow. Coxae black, cinereous, the front ones yellowish toward tip, femora, tibiae, and half or more of all the tarsi yellow.

Length of male, 5 mm.; of female, 5½ mm.

One male and one female, cotypes, Long Branch, New Jersey; sent me by the describer, C. W. Johnson.

One female, Webber Lake, California, July 21, 1876 (Osten Sacken), agreeing exactly with the type female.

This is the smallest species, and one of the palest. Johnson gives the mesonotal stripes from better-preserved specimens as follows: "Three obscure brownish stripes, the wide dorsal stripe divided anteriorly by a fine hair line, the sub-dorsal stripes divided at the transverse suture forming two oblong spots; a small obsolete spot also present above base of the wing."

Three shriveled males, Washington, District of Columbia, May 12, 1895, are teneral, have been in alcohol, and are unrecognizable. In size they agree with *cinerea*. They have the halteres infuscated. On account of these specimens, I have ventured to place the species in the section of the table of males having this character. If it proves to be valid, there will be one good mark of distinction between *cinerea* and *hirta*. Under the latter species I have discussed the relations of these and allied forms.

SYMPHOROMYIA CRUENTA Coquilletl.

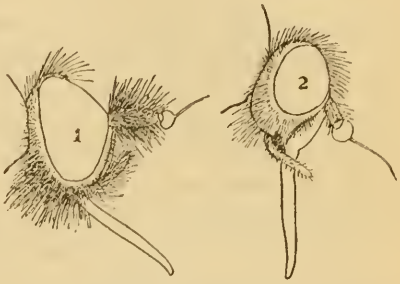
Symphoromyia cruenta COQUILLETT, Journ. N. Y. Ent. Soc., vol. 2, 1894, p. 55, male and female. Los Angeles County, California.

Male.—Black, opaque, the proboscis and legs shining; proboscis slender, longer than height of head, with narrow labella; sides of face pilose; hair everywhere black.

Eyes separated by more than the width of the lower ocellus; frontal triangle cinereous; first antennal joint cinereous, long, much swollen, tapering toward tip, with long and dense black pile; third joint small, rounded, its vertical diameter about ⅔ that of the first joint; sides of face bushy black pilose; palpi rather long and slender, black pilose; proboscis as mentioned. Thorax opaque black, from the expansion of the usual black stripes, so that the only cinereous portions are around the edges, a hair line in the center, and a wider line on each side of this; pile long and black; metapleural pile also black; halteres black, the stem brownish-yellow in the middle. Abdomen opaque black, black pilose, the incisures shining. Front and middle knees narrowly red; middle coxae not with spines; hind coxae with rather long, conical condyles. Wings uniform light brown.

Female.—Yellowish-brown pollinose, mesonotum with brown stripes, proboscis as in male.

Front with dense black pile, long for a female; first antennal joint rather large, with long black pile; third rounded or heart-shaped, vertical diameter slightly more than that of first joint; sides of face with mixed black and pale pile; beard light yellow; palpi black, with mixed hairs. Mesonotum with four brown stripes, the middle pair separated by a hair line, the outer notched at suture; a distinct brown spot above root of wing; hairs of thorax mostly black, those of metapleura, however, pale; halteres with blackish knob. Abdomen opaque yellowish-gray on black ground-color, with yellowish hairs. Femora and tibiae shining black, front and middle knees narrowly reddish.



FIGS. 1–2.—HEAD OF SYMPHOROMYIA CRUENTA 1, MALE; 2, FEMALE. ×11.

Length of male, 7 mm.; of female, 7–8 mm.

In addition to the long series of typical specimens of both sexes in the United States National Museum, I have seen five males from San Diego, California, collected by Prof. R. W. Doane.

SYMPHOROMYIA FULVIPES Bigot.

Symphoromyia fulvipes BIGOT, Bull. Soc. Zool. France, vol. 12, 1887, p. 14, female. Mount Hood, Oregon.

Female (type redescribed).—Black in ground color, brownish-cinereous pollinose, the following parts yellow: antennæ except arista, palpi, lower edge of face, halteres, sixth and following segments of the abdomen, femora, tibiae, and almost the whole of all the tarsi; comparatively coarse and strong black pile on the front, first antennal joint, palpi, mesonotum, scutellum, and middle coxae; abdomen with short blackish pile, yellow at base and on sides.

Front above antennae evidently narrower than one eye, with rather long, dense black pile; first antennal joint pollinose, not very decidedly yellow, short and a little rounded, with rather short black pile above and below; third joint deep yellow, convex at apex, its vertical diameter 1⅓ times that of first joint; sides of face bare, several small black hairs scattered on the lower half of the middle area of the face; proboscis short, labella thick and fleshy, the hard parts protrude farther than the palpi, equalling about ½ the height of the head; beard whitish.

Mesonotum brownish-cinereous pollinose, with three deep-brown stripes, very ill-defined in the specimen; the black pile above notopleural suture and on scutellum erect and conspicuous; pleurae subshining, with mostly delicate, pale hair; halteres entirely deep yellow.

Abdomen entirely brownish-cinereous pollinose, the ground-color changing to yellow in the latter part of the fifth segment.

Front and hind coxae with yellow pile; middle coxae slightly yellow at tip.

Wings slightly and uniformly yellowish-brown.

Length, 5.6 mm.

In his 1894 paper Coquillett placed this species as a synonym of *latipalpis* Bigot (=*plagens* Williston); but he evidently receded from this opinion later, as in the United States National Museum collection I found a row of 8 females bearing the name *fulvipes* in Coquillett's handwriting. They are very close to the type in their characters, but on account of their having much shorter pile on the front, lighter pollen on mesonotum, and other slight discrepancies, I did not feel sure of the identity, but consider them to belong to *hirta*.

From its early date *fulvipes* is without question a valid species; it is closely allied with *hirta* and *cinerea*, one or both of which may ultimately prove to be synonyms of it. No western males of the group are yet in collections, as far as I have seen; in a considerable number of females (about 36) from the West, there seems to be much variation in the amount of yellow in the antennae, and in the femora, etc.; none of them agree entirely with the type of *fulvipes*, and I believe they mostly go in *hirta* quite readily; however, the distinctions between *hirta* and *cinerea* almost or quite vanish in a large series, and I doubt if both can be maintained unless it shall be proved that the halteres of the male *cinerea* are infuscated, of which there is some prospect, as I have indicated under that species.

SYMPHOROMYIA HIRTA Johnson.

Symphoromyia hirta JOHNSON, Ent. News, vol. 7, 1897, p. 120. Philadelphia, Pennsylvania (one male, two females).—ADAMS, Kans. U. Sci. Bull., vol. 2, 1904, p. 439 (*flavipalpis*). Wasatch Mountains, Utah; Colorado (a female from each locality).

Male (type redescribed).—A robust black cinereous species with bare face, convex third antennal joint, yellow halteres, black femora and yellow tibiae.

Eyes barely contiguous, vertical triangle with very long, abundant black pile; frontal triangle bare, cinereous; first joint of antenna black, cinereous, very little swollen, with long black pile above and below; second and third joints missing (according to Johnson they were dark brown); face bare; palpi blackish, with bushy whitish pile like the beard; proboscis short, fleshy.

Mesonotum black, cinereous, somewhat glaucous, with three ill-defined wide blackish stripes, narrowed behind; pile bushy and black; scutellum glaucous, with very long erect black pile; pleurae blackish, with thin pollen and rather abundant delicate pale pile; halteres wholly yellow.

Abdomen black, with glaucous pollen and long bushy pile, which is yellow at base and on the sides, black on most of the dorsal surface; hypopygium somewhat embedded.

Coxae and femora black, tibiae and base of tarsi dark yellow; middle coxae with mixed black and yellow hairs, no spine.

Wings rather pale yellow.

Length, 7.5 mm.

Female (cotype redescribed; variations noted below).—Front cinereous, overlaid with brown pollen in the middle, with moderate black pile; width of front above antenna rather less than that of the eye; first joint of antenna yellowish-brown in ground color, cinereous pollinose, short and hardly swollen, with rather short black hair, that on the lower side slightly reddish; palpi wide toward the tip, dark yellow, brown on the bare upper edge before apex, the pile elsewhere mostly pale, but varying to blackish near the tip with the angle of view; proboscis short; labella fleshy; beard whitish.

Mesonotum and abdomen as in male, but with shorter pile; sixth and following segments brownish-yellow.

Legs and wings as in the male.

Length, 6.6 mm.

Material examined:

Type male and cotype female, Edge Hill, Philadelphia, lent by C. W. Johnson.

3 males, Mount Washington, New Hampshire (Slosson); 1 male, 2 females, Pennsylvania, in the United States National Museum.

3 females, Pennsylvania (Daecke); these have the tibiae dark, in one the hind tibiae quite black, but the middle and front ones are decidedly not black.

1 female, Ira, Summit County, Ohio (Hine); like the dark form just mentioned.

1 female, Thomasville, Alabama, lent by United States National Museum.

1 female, Wasatch Mountains, Utah, cotype of *flavipalpis* Adams, lent by C. W. Johnson; the legs are quite pale, femora deep brown toward base, antennae and palpi rather pale yellow.

1 female, Emigration Canyon, Utah, in the Wasatch Mountains (A. K. Fisher), is just a shade darker than the preceding.

6 females, Marshall Pass, Colorado, 10,856 feet, collected by me, are about as dark as Dr. Fisher's specimen.

8 females, Sedan, Montana (R. A. Cooley, No. 143); they have the femora black except tip, tibiae yellow, antennae from brown to black, palpi from yellow to black. These are the specimens mentioned in the introduction as sucking blood.

5 females, from Spanish City, West Gallatin Canyon, and Gallatin County, Montana, from Professor Cooley.

1 female, Nigger Hill, Montana, from Professor Melander, collected by W. M. Mann.

1 female, Collins, Idaho (Melander).

1 female, Big Horn, Wyoming, lent by United States National Museum.

2 females, Banff, Alberta (J. Fletcher), lent by Dr. C. Gordon Hewitt.

1 female, "Walrand Ranche, north of Pincher," lent by Dr. Hewitt.

2 females, "Colorado," lent by United States National Museum from a series of 8 in one lot, which are standing under the name *fulvipes* Bigot, determined by Coquillett. The femora are brown except apically.

1 female, Logan, Utah (Agr. Coll.).

1 female, Brightons, Utah; 1 female, Beulah, New Mexico (United States National Museum).

1 female, Longs Peak Trail, Colorado (Cockerell).

Under the names (chronologically arranged) of *fulvipes*, *hirta*, *cinerea*, and *flavipalpis*, we have to do with a series of female specimens from the east and all over the west, agreeing in having black, cinereous color, third antennal joint convex, face bare, and tibiae yellow or at least not black. No males have ever been assigned to *fulvipes* and *flavipalpis;* in *cinerea* only the type male has been found, which lacks the halteres; in *hirta* I have seen half a dozen eastern males. Not a single western male assignable to one of these species has come to light.

These females vary (in lots taken at the same time) in the coloration of the antennae, palpi, and legs, as well as in minor characters, to such a degree that it seems at present impossible to decide as to the number of species. I have examined type material in all four of the nominal species, and in both sexes where both where described, and have redescribed the same with care, except in the latest one, which I feel sure will fall under one of the others. I am inclined to lump all four under the oldest name, but can not see my way to do so in the absence of western males. Then again, there is a slight probability that the male of *cinerea* has infuscated halteres, which would give that species one definite character.

To sum up the principal slight differences which appear to justify the recognition of three specific names for the present:

Fulvipes.—The single female type has wholly yellow femora like female *cinerea*, but has longer black pile on front and thorax than I find in any other females in the whole mass of material I have examined.

Cinerea.—Femora wholly yellow, pile of thorax short and largely pale, that of front very short though black.

Hirta.—Femora varying from black to reddish, but always decidedly brownish or darker on the basal half.

Flavipalpis type is about halfway between the two preceding, but the femora are dark, and another specimen from about the type locality has them still darker, hence I place the name provisionally as a synonym of *hirta*.

Montana differs in having infuscated halteres in both sexes; the females of the preceding have yellow halteres.

SYMPHOROMYIA INURBANA, new species.

Female.—A smallish black species, densely gray pollinose, with yellow palpi, front and middle tibiae and halteres; face bare; third antennal joint concave below arista.

Front barely as wide as one eye, cinereous, with short, blackish pile; first antennal joint short, small, with short black pile; second half as long as first; third black, concave below arista, its vertical diameter almost equal to the whole length of the antenna to base of arista; face bare, cinereous; palpi yellow; broad beyond middle, with whitish hairs; proboscis short, labella fleshy; beard white.

Mesonotum densely pale ashy pollinose, with mostly pale pile including that above notopleural suture, vittae very indistinct; pleurae ashy, with pale pile; scutellum ashy with mostly pale pile; halteres wholly light yellow.

Abdomen wholly black in ground color, densely pollinose, a little more yellow than the thorax; pile mostly pale, not long.

Femora black, tips yellow; all the coxae and femora with pale pile, base of front tarsi distinctly yellow, others less so.

Wings almost hyaline with yellowish veins.

Length, 5.5 mm.

Seven females: Four from Hailey, Idaho (one of which is the type); one each from Webber Lake, California, July 21, 1876 (Osten Sacken); Placer County, California (Doane); and Gallatin County, Montana (Harold Morrison).

In the group of species with third joint concave below arista only three are known in the male sex, all of which have the sides of the face pilose; it would appear that the male of this species must be still unknown. The nearest relative known is *securifera*, which has a strikingly vittate thorax.

Type.—In the author's collection.

SYMPHOROMYIA INQUISITOR, new species.

Male.—Wholly black except the front and middle knees.

Eyes separated by twice the width of the lower ocellus; frontal triangle almost silvery in certain lights; first antennal joint long and greatly swollen, cinereous pollinose, and with long, bushy black hair;

second minute; third small, kidney-shaped; sides of face with long, dense black pile, becoming paler below the eye on the bucca; palpi with dense black pile. Mesonotum in well-preserved specimens dark cinereous, with four velvet-black stripes, the inner pair close together, the outer interrupted at the suture, or the anterior half indistinct; in abraded specimens the opaque black color remains; pleurae dark cinereous; pile of thorax almost wholly blackish. Abdomen opaque black above, cinereous below, the pile whitish except near apex; fifth and sixth segments not very narrow, tapering gradually. Wings uniformly subinfuscated.

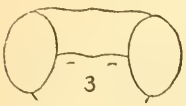


FIG. 3.—OUTLINE OF FRONT OF HEAD OF S. INQUISITOR FEMALE, TO SHOW WIDTH OF FRONT.

Female.—Head, thorax, and abdomen cinereous, except four dark stripes on mesonotum; palpi, middle, and front knees reddish; halteres yellow.

Front with short black pile; first antennal joint of medium size, a little swollen, cinereous, with short black pile above, pale below; third joint rather large, kidney shaped, its vertical diameter a little greater than that of the first joint; sides of face with rather abundant whitish pile; palpi yellowish to red, generally dark along lower edge, with pale hairs; proboscis short, labella fleshy. Pile of mesonotum largely black, of remainder of body mostly yellow, wings subhyaline, veins yellowish near base.

Length of male, 5½ mm.; of female, 4¾–5¾ mm.

Forty-five specimens, both sexes; collected about Pullman, Washington (type locality), and Moscow, Idaho, by Professor Melander and myself; one is from Juliaetta, Idaho.

The female appears to differ uniformly from *pachyceras* in having pale halteres; I find very little to separate the males.

Type.—In the author's collection.

SYMPHOROMYIA JOHNSONI Coquillett.

Symphoromyia johnsoni COQUILLETT, Journ. N. Y. Ent. Soc., vol. 2, 1894, p. 54, male and female (the female is a different species, here described as *kincaidi*, new species). Washington.

Male.—Ground color black, cinereous pollinose, abdomen darker above, mesonotum with three brownish stripes; tibiae and base of tarsi yellow, femora brownish.

Head cinereous, eyes contiguous below ocelli; first antennal joint ashy, not much thickened, with long, dense black pile; second minute; third small, concave in profile below arista and somewhat angulate on lower part; sides of face with strikingly long black hairs, not very dense; palpi a little yellow at tip, with dense whitish pile; beard whitish; proboscis short, the labella fleshy.

Thorax with three indistinct brown stripes; pile of thorax and scutellum rather mixed and changeable from brown or black to yellow; halteres black with yellow stem.

Abdomen narrow, opaque, darker above, with pale hairs, which become woolly on the sides; principal hooks of the hypopygium are yellow to piceous.

Coxae and femora black; middle coxa with several stiff, blunt bristles at tip, curved backward and united to form a thornlike structure.

Wings slightly infuscated toward the tip.

Length 6½ mm.

Female (not of Coquillett).—Black in ground color, but with pale cinereous pollen, the palpi, halteres, and front and middle tibiae yellow. Front with short black hair; first joint of antenna very short, with short black hair; third large, concave in profile below arista, its vertical diameter fully equal to the length of entire antenna from base to origin of arista; sides of face only slightly hairy; palpi bright yellow, broad near tip, with short pale hair; proboscis fleshy, shorter than height of head.

Thorax and abdomen rather uniform gray pollinose, with short pale hair, which, however, becomes blackish on the mesonotum and scutellum; halteres wholly yellow.

Femora blackish, tibiae yellow, the hind ones darker.

Wings hyaline, stigma and the veins of the basal half yellow.

Length 6 mm.

One pair, male and female, Pasadena, California, collected by F. Grinnell, jr.; one male, Ormsby Co., Nevada (Baker). I also compared the single male type in the United States National Museum.

Coquillett named the species after Prof. O. B. Johnson, who was for a long time a teacher in the University of Washington and an enthusiastic collector of the animal life in and about Puget Sound, but who has now for some twenty years been on the retired list on account of ill health; although necessarily living a secluded life, Prof. Johnson still retains a keen interest in his insect collections, and is visited for inspiration and instruction by the younger biologists of the Northwest. I note these facts as a tribute of respect and affection.

SYMPHOROMYIA KINCAIDI, new species.

Symphoromyia kincaidi COQUILLETT, Journ. N. Y. Ent. Soc., vol. 2, 1894, p. 54 (the female as *johnsoni*, new species). Washington; British Columbia.

Male.—Black, opaque above, pile of thorax and head mostly black, of abdomen largely yellow; front and middle knees narrowly red; face bare; middle coxae without curved, thornlike bunch of spines.

Eyes barely contiguous; first antennal joint rather long, moderately swollen, with dense long black pile; second minute; third small, kidney-shaped, vertical diameter a little less than that of the first joint; sides of face bare, beard brownish or yellowish; palpi

black, with dense black pile, rarely a little paler; proboscis small, labella fleshy. Thorax velvet black, without stripes, hair almost all black, a tuft of yellow on the smaller calypter; halteres black. Abdomen velvet black above, shining on incisures when they are a little extended, in side view mostly shining. Hind coxae with condyles. Wings uniformly infuscated, rather dark.

Female.—Black, head and thorax cinereous, the latter with black stripes, abdomen shining; face bare, palpi black to red or even yellow; halteres yellow.

Front with dense black pile; first antennal joint hardly longer than the two following together, swollen, black pilose; second slightly larger than usual; third kidney-shaped, vertical diameter about one-third more than that of first joint; beard yellow. Thorax with a double median dark stripe and a poorly defined one each side, pile mostly black; halteres yellow. Abdomen shining black except first joint and apex, which are opaque; hair of abdomen short, yellow. All the coxae with yellow hair. Wings uniformly infuscated, not so dark as in male.

FIGS. 4-5.—OUTER SIDE OF RIGHT ANTENNA OF S. KINCAIDI. 4, MALE; 5, FEMALE. ×20.

Length of male 6 mm.; of female 5½–6 mm.

Material examined—Males:

9 from Kanaka Bay, San Juan Island, Washington, collected by myself on foliage in the sun, May 31, 1906 (type-locality, type in author's collection).

2, Coupeville, Washington, June 23, 1907 (Kincaid).

1, Skokomish River, Washington, June 22, 1912, B. Elliott (Kincaid).

1, Victoria, British Columbia, Aug. 6, 1903 (Kincaid).

1, Gabriola Island, British Columbia, May 30, 1908, B. Elliott (Kincaid).

?1, Pacific Grove, California, Mar. 20, third joint of both antennæ gone (R. W. Doane).

?1, Blue Mountains, southeast Washington, July 15, 1896, a teneral specimen with slightly reddish legs (R. W. Doane).

Females:

4, Stickeen River Canyon, British Columbia (Wickham).

1, Friday Harbor, San Juan Island, Washington, June 2, 1906 (J. M. A.).

1, Olga, Orcas Island, Washington, July 15 (Melander).

3, Coupeville, Washington, June 23, 1907 (Kincaid).

1, Olympia, Washington (Kincaid).

2, Ashford, Washington, Dyar and Caudell (U.S.N.M.).

3, Longmires Springs, Mount Rainier, Washington, Aug. 2, 1905 (J. M. A.).

2, Washington (Piper and Kincaid).

3, Washington (O. B. Johnson), and 2, Stickeen River, Canada (Wickham), in the United States National Museum (Coquillett's type material of *johnsoni*, female).

A single female, in bad condition, from Sheep Creek, Alaska, differs only in having entirely yellow pile all over, quite long on the front. It may be a different species. It is from Professor Melander's collection.

The female of the species described above is undoubtedly Coquillett's *johnsoni;* whether I have been any more successful than Mr. Coquillett in associating the correct male with it may possibly be questioned. From the fact that Professor Kincaid collected both sexes on the same day at Coupeville, Washington, I conclude that they belong together.

I found *kincaidi* along with *atripes* Bigot in the Mount Rainier National Park in 1905, but did not at the time notice that there were two species; later I found that my notes about the biting habit were attached to *atripes,* but I am under the impression that *kincaidi* is an almost equally bad biter.

I have followed the usual procedure in retaining Mr. Coquillett's name for the male of his composite species.

SYMPHOROMYIA LIMATA Coquillett.

Symphoromyia limata Coquillett, Journ. N. Y. Ent. Soc., vol. 2, 1894, p. 54, female. Southern California.

Female.—A rather large blackish species, the antennae, palpi, and tibiae yellow; abdomen shining black on first four segments, the remainder red.

Front narrower than the eye, rusty cinereous, the short black pile arising from minute black dots; antennae bright orange, rather small, inserted far apart; first joint with short black pile, third kidney-shaped, its vertical diameter 1½ times that of the first segment; face with very scattered and small pile, hard to see, yet important as indicating that the male, as yet unknown, has a pilose face; lower margin of face reddish; palpi orange red, bare on a large part of the upper surface, with small blackish hairs otherwise; proboscis with the horny part longer than usual, yet much shorter than height of head; labella soft, fleshy; beard light yellow.

Mesonotum black, with thin pollen, a broad median darker stripe bordered by a cinereous line each side; pile short, blackish, arising from minute dots; pleura subshining black, with a tuft of pale pile on propleura and another on hypopleura; halteres with infuscated knob.

Abdomen: First segment concolorous with scutellum, a row of appressed pale hairs on its hind margin; segments 2, 3, and 4 shining black and almost bare of hairs; 5 and following red; venter concolorous with dorsum.

Coxae and femora black, subshining, the knees, tibiae, and base of tarsi reddish-yellow, hind coxae with distinct condyles fitting into middle coxae.

Wings brownish, darker toward the stigma.

Length, 8 mm.

Two females, Los Angeles County, California (United States National Museum, part of the original lot); 1 female same locality from Prof. R. W. Doane; four females from F. Grinnell, jr., San Bernardino Mountains, and San Jacinto Mountains, California.

The original type material consisted of 20 females from "Southern California;" no other specimens have been reported up to the present, the male being still unknown.

I examined the remainder of the United States National Museum series. This is perhaps the easiest of all the species to recognize.

SYMPHOROMYIA MODESTA Coquillett.

Symphoromyia modesta COQUILLETT, Journ. N. Y. Ent. Soc., vol. 2, 1894, p. 54, female. California.

Female.—Ashy gray, the halteres, legs, palpi, and first antennal joint yellow.

Front about as wide as one eye, opaque cinereous, with coarse black pile; first joint of antenna opaque cinereous on yellow ground color, with moderately long black pile; second and third joints black, the last kidney-shaped, its vertical diameter 1⅓ times that of the first joint; sides of face bare; palpi yellow with long black pile except at base where it becomes reddish and on a bare area on the curved upper surface; proboscis short, with black, thick labella; beard whitish.

Mesonotum opaque cinereous, with a broad median blackish stripe and two lateral ones on each side which unite in front of the suture; scutellum opaque, cinereous; pile of thorax and scutellum mostly black; pleurae darker, less pollinose; halteres light yellow.

Abdomen cinereous pollinose on a black ground color, with mostly pale pile, sixth and following segments reddish.

Coxae black, somewhat cinereous, with pale pile, trochanters black; femora, tibiae, and basal part of tarsi yellow.

Wings yellowish subhyaline, the venation as usual.

Length, 6.3 mm.

One specimen, Woodside, California (a few miles west of Redwood City), collected while I was on a short bicycle trip to view the effects of the famous earthquake of 1906; the date of collection was April 25, 1906, one week after the earthquake. Also one specimen collected by Osten Sacken, Sausalito, California, April 2, 1876.

The type material mentioned by Coquillett consisted of three females, collected in California in May; this I examined in the United States National Museum. The male has not yet been recognized. This is the only species yet known which has the first joint of the antenna paler than the following ones, although several species show the reverse coloration.

SYMPHOROMYIA MONTANA, new species.

Male.—A dark opaque species, thorax with three broad black stripes narrowed behind, abdomen opaque with brownish cinereous pollen; antennae black; face bare; halteres infuscated; legs except knees black (in female tibiae and base of tarsi yellow).

Head much wider than thorax; eyes not quite contiguous; ocellar triangle with black pile; frontal triangle bare; first antennal joint cinereous, long, swollen, with long black pile all round; third joint small, convex below arista, its vertical diameter two-thirds that of the first; palpi black with mixed but mostly black hairs; proboscis short, labella fleshy; beard long, whitish, the anterior part a little blackish.

Mesonotum as described, pile long, rather delicate, blackish; scutellum and pleurae dark cinereous, the former with erect black pile the latter with mostly whitish, some on mesopleura blackish; halteres with brown stem and blackish knob.

Abdomen rather robust, gray-brown, opaque, with long pale pile. Legs rather shining black, knees red.

Female.—Opaque yellowish-brown, thorax with three blackish stripes; front above antennae decidedly wider than the eye; abdomen long and broad; tibiae and base of tarsi yellow.

Front with short yellowish pile; first antennal joint short, black, yellowish pollinose, its pile short and mostly whitish; third small, black, convex below arista, its vertical diameter about equal to that of the first; face very broad, bare; palpi brownish-yellow with pale hairs; proboscis short, labella fleshy; beard pale yellow.

Thorax yellowish opaque (in well preserved specimens distinctly trivittate), with short yellowish pile; pleurae concolorous with pale pile; hatleres brown, with dark-brown knob.

Abdomen long and broad, uniformly yellowish-brown pollinose, with yellow pile. Femora black except apices, tibiae and base of tarsi yellow, hind ones somewhat darker than the others.

Length of male, 6.7 mm.; of female, 7.5 mm.

Males: Bozeman, Montana, July 20, 1906, R. A. Cooley (type); Armistead, Montana (Cooley); Prince Albert, June 18, 1905 (T. S. Willing); Ungava Bay, Hudson Bay Territory (Turner, in C. W. Johnson's coll.); Farewell Creek, South Saskatchewan (C. W. J.).

Females: Bozeman, Montana, June 18, 1913 (Cooley); Bozeman, Farewell Creek; also three females from White Mountains, New

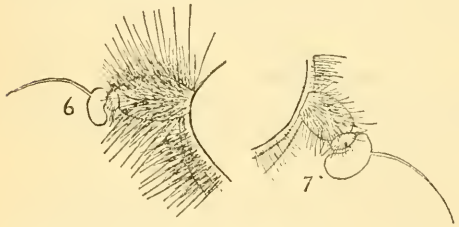
Hampshire, collected by Mrs. Slosson—these being the best preserved show the thoracic stripes very plainly.

There are several other specimens which I leave here provisionally. One male, Monida, Montana (Cooley), is very robust, first antennal joint greatly swollen, thoracic stripes unusually strong and black; another male, Gallatin Valley, Montana (Harold Morrison), has the tibiae distinctly yellow almost to the tip, thus approaching *trivittata*. It will require more material to explain all these differences.

SYMPHOROMYIA PACHYCERAS Williston.

Symphoromyia pachyceras Williston, Trans. Amer. Ent. Soc., vol. 13, 1886, p. 287, male and female. Northern California.—Bigot, Bull. Soc. Zool. France, vol. 12, 1887, p. 15 (*comata*). California.

Male.—Wholly black in color except narrowly on the knees, the inner parts of the proboscis, and the stems of the halteres, which are yellow, and the pulvilli, whitish. Opaque black pollinose on thorax except two cinereous lines on dorsum; abdomen opaque black; head a little cinereous.



Figs. 6–7.—Outer side of S. pachyceras. 6, Left antenna of male; 7, right antenna of female. ×20.

Front as wide at narrowest place as the anterior ocellus; antennae black, first joint cinereous, much thickened, with dense and long black pile; second and third joints very small, the last of the characteristic kidney shape. Face with dense and long blackish pile on the sides between the eye and the depression; palpi with dense and very black pile; proboscis fleshy, short; cheeks, occiput and ocellar triangle with long black pile.

Thorax and scutellum with long black pile above. Abdomen with mostly pale pile on the first four segments, which are almost of equal width, tapering but slightly, the fourth with its sternite flat, its projecting edges rounded behind and provided with a row of stiff black hairs; fifth segment much narrower and tapering; sixth minute; seventh with dense black hair below; hypopygium subshining black.

Legs rather shining black; middle coxae not with spines, but with rather coarse black hair about tip; hind coxae with a shining black tubercle on front side, small and hard to see.

Wings strongly infuscated, slightly less so behind.

Female.—Ground color as in male, stems of halteres paler. Cinereous pollinose; the front, three broad stripes on mesonotum not attaining the anterior margin, and most of the upper surface of the abdomen black or brown pollinose. Pile of front dense, black, long for a female; first antennal joint moderately enlarged, with

almost as long black pile as the front; third antennal joint kidney-shaped, wider than the first joint; sides of face with shorter and less dense, erect black pile than in the male; palpi broad near tip (sometimes this is indistinct owing to the organ being shriveled), cinereous pollinose, with varying yellow and black pile. Proboscis about half as long as height of head, the inner organs usually projecting beyond the retracted labella. Thorax with black pile, that of the metapleura however conspicuously yellow; halteres yellow with black knob. Coxae except sometimes the middle ones with yellow pile. Wings very little infuscated, the veins yellow at base. Abdomen tapering, cinereous, dark above, the pile almost all yellow.

Length of male, 6 mm.; of female, 6–9 mm.

24 specimens, both sexes; 3 females, California (Bigot's type material of *comata*); Portola and Woodside, California (J. M. A.); San Geronimo and Sausalito, California (Osten Sacken); Stanford University (Doane); Humboldt County, California (U.S.N.M.); Corvallis, Oregon (Kincaid); Gallatin County, Montana (Cooley); Olympia, Washington (Kincaid); Williams, Arizona (U.S.N.M.).

The Arizona specimen bears the label "Biting." Riley and Johannsen[1] state on the authority of Dr. J. C. Bradley that *pachyceras* is "a vicious biter."

I have seen the types of Williston's description. Bigot was too hasty in admitting the synonymy of *trivittata*, which has a bare face, though Bigot described it as hairy.

SYMPHOROMYIA PILOSA, new species.

Male.—A slender species with yellow antennae, palpi, and legs except femora, characterized by long and abundant pale pile, that of vertex, antennae, and sides of face reddish; third antennal joint concave below arista; middle coxae with long, curved, thornlike cluster of bristles.

Eyes narrowly contiguous below ocelli; first antennal joint of medium length, a little swollen; third axe-head-shaped, the edge downward, vertical diameter slightly greater than that of first joint, arista wholly yellow; sides of face very pilose; palpi yellow, with reddish-yellow dense pile; proboscis short, the labella fleshy; beard yellowish-white.

Mesonotum cinereous for a broad space in the median part, reddish laterally; the color of the long pile varies much in different lights, yellow or red or blackish; scutellum brown on disk, with the blackest pile of the whole body; pleurae reddish-brown, the propleura, mesopleura, and hypopleura with abundant pale pile; halteres with infuscated knob.

[1] Medical Entomology, 1915, p. 112.

Abdomen elongate, reddish at base, gradually becoming black near tip, opaque throughout, with pale pile.

Legs yellow, femora more or less reddish or brown; tarsi sometimes yellow to the tip, sometimes more or less infuscated on apical segments; middle coxa with a striking long black curved thorn as in *securifera*, but even larger, composed of at least a dozen bristles closely united, and of jet black color, contrasting strongly with the rest of the coloration.

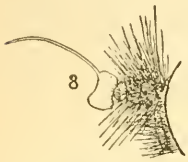


FIG. 8.—OUTER SIDE OF LEFT ANTENNA OF S. PILOSA, MALE. ×20.

Wing rather uniform yellow, veins yellow, stigma dark yellow.

Length, 7.6 mm.

Three specimens, Palo Alto, California, July 5, 1895; collected by R. W. Doane. (Type returned to Professor Doane).

I strongly suspect that the specimens have been faded from prolonged exposure to light, and the colors are not quite as they would be in fresh specimens; it may even be that the reddish pile will be found to be normally black. In any event, the species will be readily recognized by the pale antennae with concave third joint, thorn on middle coxa, etc.

The female is unknown.

SYMPHOROMYIA PLAGENS Williston.

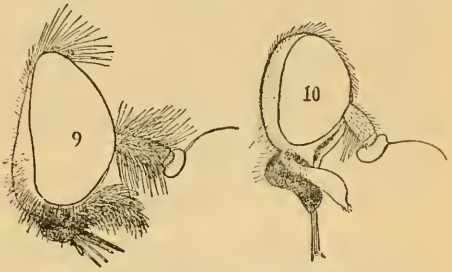
Symphoromyia plagens WILLISTON, Trans. Amer. Ent. Soc., vol. 13, 1886, p. 287, male. Washington; Mount Hood, Oregon.—BIGOT, Bull. Soc. Zool. France, vol. 12, 1887, p. 12, female (as male, *latipalpis*); p. 13, male (*picticornis*). Washington.

Reported from Ormsby County, Nevada (Baker); Beulah, New Mexico (Skinner); and British Columbia (Hine).

Male.—Black, including first two joints of antennae, arista, palpi, knobs of halteres, and femora; third joint of antenna orange yellow; tibiae and base of tarsi pale yellow. Eyes barely contiguous in the middle of the front, front destitute of hairs except in the ocellar triangle and behind it, above the antennae whitish pollinose and bare; first joint of antenna long (double the two following combined), moderately thickened, cinereous pollinose, with dense and long black hair which is slightly longer above; second joint concolorous, very short; third joint small, bare, about the same in vertical diameter as the first joint, orange yellow with a blackish arista, below which it is convex; sides of face hairy about up to the middle (not shown in the figure, as the hairs are sparse and delicate); palpi cylindrical, long, with bushy black hair; labella small, proboscis shorter than the palpi; occiput not much protuberant, above with a row of long, erect black hairs, on the lower part the hair is slightly mixed with paler. Thorax cinereous opaque above, denser in front, the hairs black except about the humeri; scutellum concolorous; pleura

concolorous, with black hairs except in front of the halteres, which are yellowish with infuscated knob. Abdomen wholly shining black, with conspicuous, woolly, reddish hair nearly to the tip, more distinct on the sides; on the apical part with black hair. Front coxae with black hair, and the same on the sternopleura behind it; hairs of middle coxae long and woolly, black for the most part, but somewhat pale at tip; hind coxae with yellow hair; all the tarsi infuscated from about the middle of the second joint. Wings infuscated, somewhat more densely across the middle, with a whitish or subhyaline streak between the first and second veins, from their fork to the stigma. Length 8 mm.

Female.—Head, thorax, and coxae black, overlaid with yellowish pollen; abdomen chestnut-brown; antennae, palpi, femora, and tibiae yellow. Front broad, with nearly parallel sides, with moderate black pile, the black ground color generally completely obscured with pollen, but in some specimens that are abraded there are shining spots like those of *Tabanus;* first antennal joint opaque, not much longer than the two following, with black hairs which are short above and long and sparse below near the tip; second joint yellow, with a circle of black hairs; third joint bright orange yellow, bare, of typical kidney shape, vertical diameter nearly a half greater than that of the first joint at widest; lower edge of face yellow in ground color nearly to the eye; palpi deep orange, widened upward past the middle and bare on this part, the hairs on basal and underside mixed yellow and black, tip somewhat pointed; labella large and soft, the proboscis projecting diagonally downward about as long as the face or slightly more; occiput with black hair above, yellow behind, becoming bushy below. Mesonotum densely pollinose, a slender ill-defined median line blackish, pile mostly black, longer above the notopleural suture and before the scutellum; pleurae with soft pale hair, the black ground color showing through on lower half; metapleura with pale long hair. Legs yellow almost to the tips of the tarsi, the coxae and the anterior trochanters black; front and hind coxae with yellow pile, middle ones with mostly black coarse hair; scutellum protuberant, concolorous with thorax, with moderate and mostly black hair. Abdomen chestnut-brown, the first and second segments black at the sides, and the former with long and abundant pale hair at the sides; metathoracic epimera (the ridge from hind coxae joining it with first abdominal segment) black; venter black at base, the rest chestnut-brown; most of the abdominal pile yellow. Wings sub-



FIGS. 9-10.—HEAD OF S. PLAGENS.
9, MALE; 10, FEMALE. ×11.

hyaline, a slight infuscation extending longitudinally across the small cross vein.

Length of male, 8 mm.; of female, 5.5–7 mm.

Material examined: Bigot's types of *latipalpis* and *picticornis*, one specimen of each, from Washington; four males from Professor Kincaid, taken at Gabriola Island, British Columbia, Rocky Point, British Columbia, Skokomish River, Washington, and Seattle; and 41 females. The females are from the following places: Gabriola Island, British Columbia (Kincaid); Friday Harbor (J. M. A.), Coupeville, Olympia, and Seattle (Kincaid), in Washington; Corvallis, Oregon (Kincaid); Humboldt County, California (E. C. Van Dyke, in the National Museum coll.); Ormsby County, Nevada (Baker in Doane's coll.). I have also seen Williston's types.

Bigot received Williston's paper while his own was going through the press, and attached a note acknowledging the synonymy of *picticornis* with *plagens*.

SYMPHOROMYIA PLUMBEA, new species.

Female.—Head, thorax, and abdomen black, covered with smooth leadcolored pollen; antennae and legs black, knees red; pile almost entirely white except on the front and partly on first antennal joint and scutellum; sides of face pilose.

Front nearly 1½ times as wide as one eye, with long black pile; first antennal joint concolorous with head, short and thick; third joint kidney-shaped, vertical diameter hardly more than that of first joint; sides of face with very delicate but rather abundant pale pile; palpi small, yellowish, with white hairs; beard and occipital hair white.

Mesonotum with rather plentiful pale pile, a few hairs on scutellum black; entire knob of halteres distinctly infuscated; pleurae concolorous with dorsom.

Abdomen wholly leadcolored, as described.

Legs black, knees narrowly red.

Wings whitish hyaline, veins dark brown.

Length, 5 mm.

A single specimen, Bozeman, Montana, June 12, 1903; from Professor Melander's collection.

Type.—In the author's collection.

SYMPHOROMYIA PULLATA Coquillett.

Symphoromyia pullata COQUILLETT, Journ. N. Y. Ent. Soc., vol. 2, p. 56, 1894, male.

Coquillett's original description is here given in its entirety:

Male.—Black, including palpi and halteres. Pile also largely black, that in front of halteres and on sides of first abdominal segment sometimes largely whitish. Face, bare; proboscis retractile, scarcely one-half as long as the palpi. Head and body subshining, not gray pollinose, thorax not vittate. Coxae as in *trucis* ("hind coxae

produced near the apex in front in the form of a rounded knob; pile of middle coxae short, not forming pencils"). Wings grayish-hyaline, slightly yellowish along the costa, stigma dark-brown. Length 7 mm. New Hampshire (Mrs. A. T. Slosson) and Colorado. Two males.

To this I can add the following: The New Hampshire specimen has been removed, and the type label is on the Colorado specimen. The only males from New Hampshire that I found in the collection were a set of *hirta*, with yellow halteres; as these have Mrs. Slosson's name on them, I incline to the opinion that Coquillett afterward discovered that his two specimens were of different species, and removed the New Hampshire specimen to *hirta*. The expression "sometimes largely whitish," referring to the pile of the sides of the first abdominal segment, evidently applied to the specimen which was removed. The table of species indicates the relationship to *kincaidi;* the differences are not great, but with so great difference of locality and a single specimen of *pullata* I could not venture to assert the identity of the species. I have seen no specimens which seem to belong with Coquillett's Colorado type.

SYMPHOROMYIA SACKENI, new species.

Male.—Black, the following parts yellow: tips of femora, all the tibiae, tarsi to the middle, venter except near tip, three pairs of coalescent spots on the sides of the abdomen, and the halteres except a part of the knob; third antennal joint concave below the arista. Eyes contiguous for a space about equal to the length of the ocellar triangle, frontal triangle almost silvery pollinose; antennae of moderate length for the sex, first joint hardly twice the length of the two following, densely cinereous pollinose, with long but not dense black hair, about of equal length above and below; second joint concolorous, with short hair; third joint more brown than black, concave on apex with an angle above and one below apically, the arista arising from the former; the lower part of this joint is larger than the upper and the vertical diameter is a third more than that of the first joint; face with a row of long black hairs close to the eye, extending nearly up to the antenna; palpi short and slender, black with mostly whitish hairs; labella very small and proboscis shorter than the palpi; occiput with black hairs, a few long ones above, those below a little mixed with yellow. Thorax above cinereous pollinose, but with some indistinct longitudinal markings of browner pollen, the hairs of the disk mostly pale yellow, those around the edges coarser and black; pleura concolorous, with mixed hairs, those of metapleura long and pale yellow; halteres yellow, but the knob largely blackish; scutellum rounded, with mixed hairs. Abdomen long and slender, the hair wholly yellow except at tip; color rather opaque black, except the venter on the basal and middle parts, and four pairs of spots on the sides, which are yellow; hypopygium prominent, black. Front coxae with black and yellow hairs, those of middle coxae black, not

spine-like, of the hind ones yellow. Wings moderately infuscated, darker in the middle, the stigma large, deep brown.

Female.—Black, all the following parts yellow: abdomen except basal part of venter; tip of front coxae, apical half of middle ones, all of hind ones; femora, tibiae, and nearly half of all the tarsi; antennae, palpi, and halteres. Third antennal joint concave in profile below the arista.

Front ochraceous pollinose, with short black pile; first antennal joint small, short, with short black pile; second minute; third very large, almost orange yellow; vertical diameter 2½ times that of first joint, concave in profile below arista, which is concolorous at base; side of face with a few small pale hairs on upper part, hard to see; palpi concolorous with third antennal joint, of moderate size, with pale hair; proboscis yellowish brown, fleshy, short. Mesonotum and scutellum ochraceous pollinose, with mixed black and yellow short pile; pleurae dark cinereous pollinose; metathoracic epimera yellow (above hind coxa, connecting with abdomen). Abdomen opaque dark yellow hairs, black toward tip. Wings subhyaline, a little yellowish.

Length of male, 7¾ mm.; of female, 6–7 mm.

Thirteen males, 14 females: East Sound, Washington (Kincaid); Friday Harbor, Washington (J. M. A.); Sonoma County, California, July 4, 1876 (Osten Sacken, 11 specimens, both sexes); Kern County (Coquillett) and Mountain View (Ehrhorn), California (both in the U.S.N.M.); San Gabriel Mountains, California (F. Grinnell, jr.). Type in Museum of Comparative Zoölogy, Harvard University, Cambridge, Massachusetts.

SYMPHOROMYIA SECURIFERA Coquillett.

Symphoromyia securifera COQUILLETT, Proc. Ent. Soc. Wash., vol. 6, 1904, p. 171, female. Santa Clara County, California.

Female.—A pale cinereous species with the halteres, third joint of antennae, and palpi yellow; legs mostly yellow; third antennal joint concave in profile below arista; face bare; mesonotum with three very distinct narrow brown stripes, the middle one not at all divided.

Front narrower than one eye, densely ashy pollinose, indistinctly marked with brown before the ocelli, the pile short and black; first joint of antenna short and rounded, not longer than the two following, yellowish, with small black hairs; third joint yellow, its vertical diameter slightly more than double that of first joint, concave in profile below arista, which is yellow at its extreme base; palpi pale yellow, with small, pale hairs; proboscis with blackish, fleshy labella; beard white, the hairs of the occiput also white up to the about the vertex.

Thorax pale cinereous, densely pollinose, dorsum striped as above mentioned; scutellum faintly brownish on the disk, elsewhere as the mesonotum; pile of thorax mixed with pale, that above notopleural

suture wholly white; halteres pale yellow; pleurae and coxae densly ashy pollinose.

Abdomen concolorous with pleurae, a slight indication of a median brown line; pile mostly white. Femora brownish-red, tibiae yellow, tarsi gradually darker beyond about the middle. Wings nearly hyaline, veins pale at base, stigma brown, venation normal.

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FIG. 11.—OUTER SIDE OF RIGHT MIDDLE COXA OF S. SECURIFERA, SHOWING SPINE-LIKE AGGLOMERATION OF BRISTLES. C, COXA; F, FEMUR; T, TROCHANTER.

Length, 5 mm.

One specimen collected by Osten Sacken, Sonoma County, California, July 6, 1876. The male is unknown. The species is peculiar in the strongly developed, narrow dark-brown lines of the thorax; other species have fainter grayer lines, and as far as I have noted the middle one is either double or much wider than in this case.

I examined the single female type in the United States National Museum; it agrees perfectly, showing also the beginning of a stripe on the abdomen.

SYMPHOROMYIA TRIVITTATA Coquillett.

Symphoromyia trivittata BIGOT, Bull. Soc. Zool. France, vol. 12, 1887, p. 13, male. Colorado.—COQUILLETT, Journ. New York Ent. Soc., vol. 2, 1894, p. 56, male (*fera*). Colorado.

Male.—(Bigot's type.) The specimen is in fine condition, but has lost the third antennal joint on the right side and part of the right front tarsus. Comparing with Bigot's description, the palpi have pale hair except about the tip; the face is bare, only the bucca having the cinereous villosity; there is no black hair on front except on ocellar triangle; and the tibiae are more decidedly yellow than indicated. Nevertheless, the three brown stripes of the mesonotum are so distinct that no doubt can exist that this is Bigot's type-specimen, and the original label in Bigot's writing is attached to it.

Bigot himself [1] stated that *trivittata* is a synonym of *pachyceras*, and the statement has been accepted up to the present; it is, however, a mistake. Depending upon Bigot's disposition of his own species, and especially upon the statement that *trivittata* has a pilose face, Coquillett naturally failed to recognize the species, and redescribed it under the name of *fera*, as I found by placing the two types side by side at the United States National Museum.

Eyes barely contiguous, frontal triangle bare, cinereous pollinose; antennae black, first joint cinereous, swollen, long, with long blackish hair above and below; third joint small, convex below the arista, its vertical diameter hardly as much as that of the first joint; face bare, very deeply grooved; palpi black, with long pale hairs, mostly chang-

[1] Bull. Soc. Zool. France, vol. 12, 1887, note following p. 22.

ing to black near the tip; beard pale; behind the compound eyes above is a considerable fringe of erect black hairs, about 15 each side of the vertical triangle; proboscis short, labella fleshy.

Thorax cinereous, with three well-developed dark-brown stripes, the middle one three or four times as wide as the gray space separating it from the lateral stripe; pile blackish, but much of it pale in some lights; pleurae cinereous, with pale pile above, that on mesopleura kinky; scutellum cinereous, brownish on disk, with long coarse quite black hair; halteres with brownish-yellow stem and dark-brown knob. Abdomen wholly densely pollinose except where the segments are a trifle pulled apart, more yellowish in color than the thorax, pile nearly all yellowish-white. Femora black, the tips narrowly yellow; tibiae yellow, but little darkened toward the tips; anterior tarsi a little yellow at base only; coxae black, front and hind ones with only pale hair, middle with black hair but no thornlike group of setae. Wings evenly subinfuscated, veins brown, stigma brown.

Length, 8 mm.

Besides the types of Bigot and Coquillett, a single specimen each, and both of them males from Colorado, the only material I have seen of this species is a set of four males collected by Osten Sacken at Webber Lake, California, July 27, 1876. The female must be very similar to that which I have described under *montana*, new species.

SYMPHOROMYIA TRUCIS Coquillett.

Symphoromyia trucis COQUILLETT, Journ. N. Y. Ent. Soc., vol. 2, 1894, p. 55, male. Southern California.

The entire original description by Coquillett is as follows:

Male.—Black, including the palpi and knob of halteres, only the tibiae sometimes yellowish. Pile of head and thorax largely black, that of the abdomen yellowish-white. Face bare; proboscis retractile, scarcely one-half as long as the palpi. Head and body opaque, gray pollinose, thorax marked with three lighter vittae. Hind coxæ produced near the apex in front in the form of a rounded knob; pile of middle coxae short, not forming pencils. Wings grayish, stigma brown. Length, 7 mm. Southern California, in April and May.

I can add from examining the types that they are rather dirty specimens; the one with the yellowish tibiae is teneral, and I should say that dark brown or black is the normal color of the tibiae; the mesonotum has such wide blackish vittae that the intervening gray color is a narrow line; the middle stripe of blackish is divided by a gray line in the best-preserved specimen, so that the mesonotum might be called blackish, with three gray lines and gray edges. I had no males that would match this species.