

INSECTS OF HAWAII

A Manual of the Insects of the Hawaiian Islands, including an Enumeration of the Species and Notes on their Origin, Distribution, Hosts, Parasites, etc.

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VOLUME 10

DIPTERA: NEMATOCERA — BRACHYCERA

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of the female has a broadly U-shaped concavity in the middle of the hind margin (fig. 61f); the hind margin of the seventh tergum is straight while the apex of the eighth tergum is gently concave (fig. 61c). The eighth sternum has a pair of submedian lobes as in figure 61f. Refer to Cook (1956d:608) for more detailed information on this species.

Length of males: body, 1.34–2.1 mm.; wings, 1.3–2.0 mm.

Length of females: body, 1.7–2.4 mm.; wings, 1.4–1.86 mm.

Family MYCETOPHILIDAE Newman
The Fungus Gnats

Mycetophilites Newman, 1834, Ent. Mag. 2:386.

Mycetophilidae Macquart, 1838, Dipt. Exot. nouv. ou peu Connus 1(1):76.

Mycetophilinae Zetterstedt, 1838, Insecta Lapponica 3, Diptera, p. 853.

Mycetophilides Westwood, 1840, Intro. to Modern Class. Ins. 2:521.

Fungivoridae Speiser, 1910, in Sjostedt's, Wissensch. Ergebnisse der Schwedischen Zoologischen Exped. Kilimandjaro, 2(10): 35.

For more complete synonymy see Handlirsch, in Schröder (1925:954).

The name comes from the Greek mykes, mushroom, fungus, + philios, loving.

The members of this family in Hawaii are moderately small, dark-colored flies characterized by their elongate coxae, by the absence of cell 1st M_2 (discal) in the wing (fig. 62), by the lack of a complete transverse suture on the mesonotum or of a midpleural pit, and by the presence of spurs on the tibiae. In many respects they are similar to the Sciaridae, but can be differentiated because the eyes are separated on the front, the midpleural pit is absent (in Hawaiian species), and the wing venation (figs. 63b and 65b) and development of the antennae, and the palpi are characteristic (figs. 65a and 65g). Many workers have considered the Sciaridae as a subfamily of Mycetophilidae, but Shaw (1948:192 and 1952:20) has pointed out that while this group is obviously of mycetophilid stock it should be considered a distinct family because of the presence of a midpleural pit, the general shape of the katepisternum, the apparent lack of a meron, and the presence of a distinct precoxal bridge.

The head is small and the eyes round. The flagellar segments of the antennae are broad and flattened, especially in the males. In the Hawaiian species the palpi have three well-developed segments with the last segment elongated (fig. 65a); just two ocelli are present. For information on the details of the thoracic sclerites, refer to the works of Shaw (1948 and 1951). The mesonotum is moderately arched, the scutellum is small, and the metanotum is rather elongated (about equal in length to the 1st abdominal segment). The legs are long and slender and tibial spurs are well developed (fig. 64c). The wings are often infuscated in our species. The subcostal vein may be well developed and extending to wing margin or it may be rudimentary (fig. 66b). Vein R_4 is present in some species and is fused with R_5 (or lacking) in others (figs. 63b and 65b). The abdomen is slender and rather club-shaped, especially in the males. In the females the segments are rather broad and the abdomen is flattened dorsoventrally. The

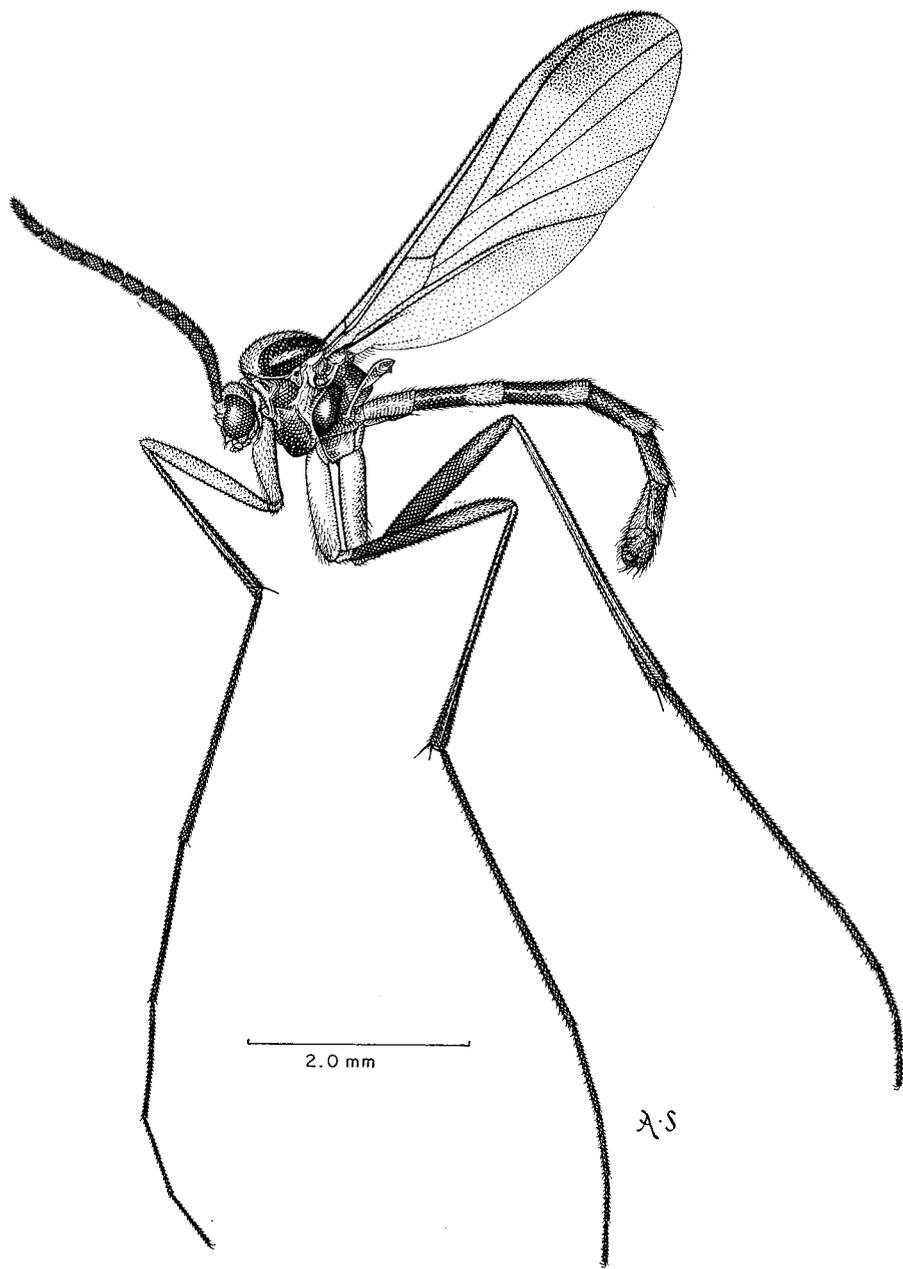


Figure 62—*Orfelia (Tylparua) hawaiiensis* (Grimshaw). Adult male.

basistyli of the genitalia are usually separated basally on the ventral surface by a membranous area or a distinct furrow, and the dististyli are usually rather small

and sharp-pointed (figs. 63e and 65c). The cerci are elongate and slender. The ninth tergum is very broad and expanded and extends about to apices of the dististyli (figs. 64d and 65e) except in the subgenus *Trigemma*.

The adults of the fungus gnats are found in moist, dark habitats, usually in association with decaying plant material and dense vegetation. These flies are rather uncommon in Hawaii and are found only in the wet areas in the mountains. Nothing is known about the habits of our species and the immature stages are completely unknown. The larvae of mycetophilids are known to be slender, vermiform, and subcylindrical, usually whitish or yellowish in color. The head is small, heavily sclerotized, and black or brown in color. They usually have one pair of spiracles on the thorax and seven on the abdomen. Shaw and Fisher (1952:177) says spiracles are lacking in the genus *Platyura* "though anal gills have been observed." It is probable that the larvae of all of our species are terrestrial and live in association with decaying plant materials.

Just a single genus, *Orfelia* A. Costa, with two subgenera is known from Hawaii. Five species are known to date; all are endemic. In most of the literature the subfamily to which our genus belongs has been spelled Ceroplatinae. This has been corrected to Keroplatinae by Paul Freeman (1951:12). The original spelling of the genus upon which the subfamily name is based, was *Keroplatus* (Bosc, 1792, Act. Soc. Hist. Nat. Paris 1:42). This was emended to *Ceroplatus* by Fabricius (1798, Ent. Syst. Suppl., p. 550). Freeman feels that the emendation was incorrect and that the original spelling of Bosc should be retained.

Edwards (1929a:163) defined this genus (as *Platyura*) as including "all members of the Ceroplatinae which possess the following combination of characters: Palpi incurved, slender, of three distinct segments. Labium well preserved, but always shorter than head, labella large. Antennae 16-segmented, shorter than body, cylindrical or somewhat flattened, not broadly flattened (as in *Ceroplatus*) nor pectinate (as in *Platyroptilon*). Tarsi and usually tibiae with small spiny bristles; no empodia; hind tibia with outer and inner apical combs, and at least one long spur. Wings without macrotrichia on membrane; media and radius fused for a shorter or longer distance; no trace of fold-like basal portion of media." According to Shaw and Fisher (1952:185) *Orfelia* (as *Zelmira*) separates from *Platyura* (*sens. str.*—the group which has been known under the generic name *Apemon* Johannsen) by having the "base of M indistinguishable," rather than "base of M evident or represented by a fold." Most of our species fit in the subgenus *Tylparua* Edwards; one species apparently represents a new subgenus. For a monograph of the genus and the setting up of the subgenera refer to Edwards (1929a). It is interesting to note that most of Edwards' nineteen subgeneric names were anagrams of *Platyura* and now none of these is under *Platyura*.

Genus **ORFELIA** A. Costa

Zelmira Meigen, 1800, Nouv. Class., p. 16. Rejected name.

Orfelia A. Costa, 1857, Il Giambattista Vico, Giornale Scientifico, Naples 2:448.

Platyura of most authors, but not of Meigen, 1803, Illig. Mag. fur Insekten. 2:264.

Stone (1941:415) pointed out that *Platyura* Meigen, 1803 (based upon the genotype *P. marginata* Meigen), is generically distinct from *Zelmira* Meigen, 1800 (based upon the genotype *Platyura fasciata* Meigen), and *Apemon* Johannsen, 1909, is a synonym of *Platyura* Meigen. The *Platyura* of most authors (including the usage in the previous Hawaiian literature) is synonymous with *Zelmira* Meigen. If the Commission rules that the Meigen 1800 names are to be rejected, the name *Zelmira* would not be available and the next name for this genus is apparently *Orfelia* A. Costa.

According to Shaw and Fisher (1952:185), members of this genus are distinguished from other Keroplatinae by having the base of M indistinguishable, the maxillary palpi normal (not porrect) and with three or four distinct segments, and mouthparts not greatly elongated.

Type of genus: *Platyura fasciata* Meigen, by present designation.

KEY TO SUBGENERA AND SPECIES OF ORFELIA IN HAWAII

1. Only two ocelli present. Middle and hind tibiae each with two well-developed spurs. Each tibia with about six rows of setulae which are much more closely set than are the others and which appear as conspicuous black lines. Subgenus **Tylparua** Edwards.....2
 - Three ocelli present. Each tibia with but a single spur. All rows of tibial setulae alike. **Trigemma** n. sub. gen.....
 -**infurcata** n. sp.
2. Second anal vein very weak, represented by only a rudiment at base of wing (fig. 65d). Costal margin not brown fumose.....3
 - Second anal vein well developed, extending at least to a level with the m-cu crossvein. Costal margin brown fumose (fig. 64b).....4
3. Sc incomplete (fig. 66b), not extending to costa, or greatly weakened on apical portion. Wings rather evenly but lightly infuscated. Mesonotum predominantly rufous, discolored with brown to black. Flagellar segments of male antennae about as wide as long (fig. 66a).....
 -**insularis** (Grimshaw).
- Sc complete, extending to costa. Apical one-fourth to one-third of wing more darkly infuscated than remainder of wing (fig. 65d). Mesonotum typically reddish yellow with a broad, shining black stripe down each side. Flagellar segments two times longer than wide (fig. 65g).....
 -**hawaiiensis** (Grimshaw).

4. Vein R_4 absent. Second anal vein extending well beyond the level of the m-cu crossvein (fig. 64b) . . . **cratericola** n. sp.
 Vein R_4 present. Second anal vein ending about opposite the m-cu crossvein (fig. 65b) **fuscocostata** (Grimshaw).

Subgenus **TRIGEMMA**, new subgenus

One Hawaiian species fits near *Orfelia* (*Laurypta*) Edwards from the Malay Peninsula, Ceylon, and the Seychelle Islands. It differs, however, by lacking vein R_4 ; by having the mesopleura setulose; by having the section of the costa from the tip of R_1 to R_5 much shorter (about two-thirds as long) than that section from apex of Sc to R_1 and the portion of costa beyond tip of R_5 more elongate, extending about three-fourths the distance to vein M_1 (fig. 63b); and by having longitudinal bare strips on the mesonotum, rather than having the mesonotum uniformly setulose. Also the male genitalia are probably very different.

The group differs from other mycetophilids in the Hawaiian fauna by having three ocelli, a single spur on each tibia, setulose metanotum and mesopleura, and all of the rows of tibial setulae alike, not with some rows more closely set and conspicuously differentiated from the others. Also the second anal vein appears to be completely lacking in *Trigemma*.

Type of subgenus: *Orfelia* (*Trigemma*) *infurcata* n. sp.

Orfelia (**Trigemma**) **infurcata**, new species (figs. 63a-e).

This differs from all known species of *Orfelia* by the characters given under the subgeneric discussion above.

MALE. A small, slender, predominantly dark-colored species. *Head:* Entirely dark brown to black. Three prominent ocelli present. Epistome moderately produced and with rather numerous short black setae. Palpi brown, last segment about equal in length to remainder of palpus. Antennae brown to black, just a little longer than the thorax; attenuated portion of basal flagellar segment yellow; scape and pedicel tinged with yellow. Flagellum 14-segmented, most of the segments about as wide as long (fig. 63a); apical flagellar segment about two times longer than wide. *Thorax:* Entirely brown to black except for the yellow humeral ridges and the yellow conjunctiva between the sclerites of the pleura. Mesonotum rather thickly black setulose but with a bare strip inside each dorsocentral row (between the dorsocentral and acrostichal setae) and another broader bare strip between the dorsocentral and supraalar setae on the posterior half of the mesonotum. Dorsal surface of metanotum thickly setulose, sides bare. Upper portion of each mesopleuron (anepisternum) thickly covered with short black setae. Stems of halteres yellow, knobs brown. *Legs:* Coxae brown; femora yellow, tinged lightly with brown; the tibiae and tarsi brown to black. Each middle and hind tibia with a single, rather long, spur. *Wings:* Rather evenly infuscated. Sc complete, ending in the costa before the base of R_s . Vein R_5 straight, entering the costa well before the wing apex so that the section of costa between the tips of

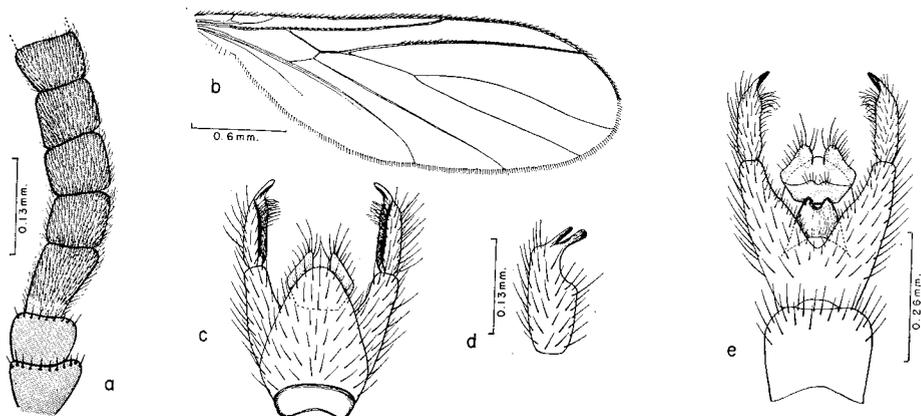


Figure 63—*Orfelia (Trigemma) infurcata* n.sp.: a, basal portion of antenna; b, wing; c, male genitalia, dorsal view; d, male dististylus; e, male genitalia, ventral view.

R_5 and R_1 is short compared to that section from R_1 to Sc ; the free portion of the costa beyond the tip of R_5 is rather elongate, extending about three-fourths the distance to M_1 and making cell R_5 appear unusually broad as shown in figure 63b. The junction of veins R_s and M_{1+2} is about two-thirds as long as the base of R_s and the free portion of M_{1+2} is about half as long as M_2 . The 2nd anal vein seems to be completely lacking and is represented only by a slight longitudinal folding in that area of the wing. *Abdomen*: Entirely brown to black, slender, sides nearly parallel; thickly covered with black setae. Basistyli joined in the middle, separated by a broad V-shaped cleft. Dististyli well developed, about two-thirds as long as basistyli (fig. 63e), bipronged at apex (fig. 63d) and hollowed out and thickly haired on inner surface. Ninth tergum small compared to other Hawaiian *Orfelia*, extending only to about the apices of the basistyli (fig. 63c). The cerci are large and rather well developed. Immediately above and between the basistyli is a well-developed sclerotized plate which has a U-shaped concavity on its hind margin (fig. 63e), this is evidently part of the aedeagus.

Length: body, 3.55 mm.; wings, 2.8 mm.

FEMALE. Similar in most respects to the male. Antennae short, about two-thirds to three-fourths as long as the thorax, the two basal segments yellow. The abdomen is much broader, and the basal four or five segments are tinged with yellow in the ground color.

Holotype male, allotype female, and 13 paratypes (7 males and 6 females): from Puu Kokekole, Molokai, 3,600 ft., July, 1953 (D. E. Hardy and M. Tamashiro). Also 3 paratype females, one each from the following localities: Alakai Swamp, Kauai, 3,800 ft., July, 1952 (D. E. Hardy); Mt. Waialeale Trail, Kauai, 4,500 ft., August, 1953 (D. E. Hardy); and Honomanu, Maui, June 23, 1920 (E. H. Bryan, Jr.).

Type, allotype, and a series of paratypes in the B. P. Bishop Museum. The

remainder in the following collections: U.S. National Museum, British Museum (Natural History), Hawaiian Sugar Planters' Association, and the University of Hawaii.

This species has been taken only in very wet areas in the mountains.

Subgenus **TYLPARUA** Edwards

Platyura (*Tylparua*) Edwards, 1929, Proc. Linn. Soc. N. S. Wales 54(3):172.

This subgenus apparently differs from the typical subgenus ("*Platyura*" of Edwards) by lacking the median ocellus and by having the metanotum bare or nearly so; the anal vein is rather poorly developed, except in *cratericola* n. sp., and the antennal pubescence is rather long.

This subgenus is definitely known only from Hawaii although Edwards (1929a) says that "*P. funerea* Brunetti" from India also lacks the median ocellus and may belong here.

Type of subgenus: *Platyura hawaiiensis* Grimshaw.

Orfelia (*Tylparua*) **cratericola**, new species (figs. 64a-d).

This species is readily differentiated from other known *Orfelia* (*Tylparua*) by the well-developed anal vein and lack of vein R_4 as well as by the body coloration, the development of the male antennae (fig. 64a), and the male genital characters (fig. 64d). It is closest to *O. fuscocostata* (Grimshaw) and is differentiated by the above characters.

MALE. *Head:* Subshining black, rather densely covered with black hairs on the occiput and on the vertex. The eyes are densely brown to black pilose; the palpi are dark brown to black, tinged with yellowish on the basal segments. The apical segment of each palpus is about equal to the combined lengths of the two preceding segments. The face has a dense mystax of black hairs on the oral margin and is indistinctly gray pollinose. The labella are yellow-brown. The basal segment of the antenna is dark brown to black; the apical portion of the pedicel is yellowish; the flagellar segments are chiefly black; the first two are tinged with yellow. The first flagellar segment is nearly two times longer than wide and is strongly narrowed at the basal portion. The second segment is about as wide as long; the remainder, except for those at the apex, are broader than long (fig. 64a). *Thorax:* Mesonotum chiefly subshining black; yellow behind the humeri and on the lateral margins, rather thickly black haired especially along the sides. The prothorax, with the exception of the black epimera, is entirely yellow. The scutellum and the parascutellum are also yellow; the remainder of the pleura are brown to black, faintly tinged with yellow. The metanotum and the knobs of the halteres are black, the stems of the halteres are yellowish. *Legs:* Predominantly yellow; the trochanters and tarsi and the bases of the femora and apices of the tibiae are brown to black. The basitarsi are approximately equal in length to the remainder of the tarsal subsegments. *Wings:* The costal cell, to the humeral crossvein, is hyaline, the costal margin beyond that point is dark brown fumose; this fumosity becomes

somewhat lighter toward the apical portion of the wing and no distinct costal band is discernible. The remainder of the wing is light brown fumose. The subcostal vein enters the wing margin at a point about opposite the forking of the radial sector. The costa extends about half way between the tips of veins R_5 and M_1 . The fusion of the media and radius is less than the length of the free portion of the radial sector and is about two-fifths to one-half as long as M_{1+2} . Vein R_1 is lacking and cell R_2 is relatively broad. The anal vein is well developed and extends three-fourths to four-fifths the distance to the wing margin. The subcostal cell has a longitudinal fold which simulates a fork of the subcostal vein (fig. 64b). *Abdomen*: Chiefly dark brown to black; indistinctly yellow to rufous on the bases of segments 3 to 5. The entire abdomen is densely covered with short black hairs. *Genitalia*: About equal in length to the sixth abdominal segment, dark yellow-brown to black in color, and densely black haired. The ninth tergum is one-half longer than wide and has a distinct concavity on the posterior margin. The eighth tergum is expanded on the sides with a narrow sclerotized bridge joining the side pieces. The claspers are slender and sharp-pointed and have no setae on the ventral portion. The basistyli (ninth sternum) are strongly narrowed apically and are joined on the inner basal margins for a distance about equal to one-third their length; this juncture appears to be semi-membranous and a deep longitudinal furrow separates the basistyli (fig. 64d). The eighth sternum is convex, rather acutely pointed in the middle of the hind margin.

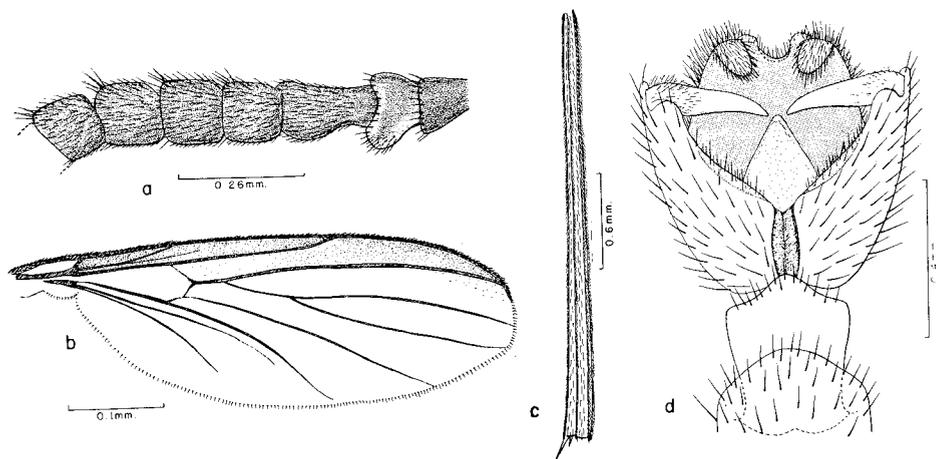


Figure 64—*Orfelia (Tylparua) cratericola* n.sp.: **a**, basal portion of antenna; **b**, wing; **c**, middle tibia; **d**, male genitalia, ventral view.

Length: body, 6.7–7.0 mm.; wings, 5.5–5.7 mm.

FEMALE. Fitting the description of the male in most details; the costal margin of the wing, however, is darker brown fumose and the remainder of the wing is

more intensely fumose. The antennae are about equal in length to the thorax, and the segments are not modified as in the male. Otherwise fitting the description of the male except for genital characters.

Length: body and wings, 6.7–7.0 mm.

Holotype male, allotype female, and two paratypes (1 male and 1 female): Paliku, Haleakala Crater, Maui, elev. 6,500 ft.; August, 1952 (W. C. Mitchell).

The type and allotype are being deposited in the U.S. National Museum. One paratype is in the B. P. Bishop Museum and one is in the University of Hawaii collection.

Orfelia (Tylparua) fuscocostata (Grimshaw) (figs. 65a–c).

Platyura fuscocostata Grimshaw, 1901, Fauna Hawaiiensis 3(1):2, pl. 1, figures 2–3.

Endemic. Hawaii (type locality: Kilauea), Maui, Molokai, and Kauai.

Type in the British Museum (Natural History).

This species appears to be rare. It has been poorly known and previously recorded from only a few female specimens. It is differentiated from other Hawaiian *Orfelia* by the brown fumose costal margin on the wing, by the presence of vein R_4 , and by the second anal vein ending about opposite the m-cu crossvein. Its closest relative seems to be *O. cratericola* n. sp. The female specimens which have been seen are predominantly shining black. The species apparently is quite variable in coloration, or else two or more species may be represented in this concept; it has not been possible to obtain a large enough series of specimens to determine the importance of the various color differences.

The type female and a topotypic female have the thorax entirely shining black except for the yellow humeral ridges and yellow conjunctiva between the sclerites of the pleura. The hind coxae are black, the middle coxae are brown, the hind femora are yellow-brown, all of the tarsi are dark brown; the legs are otherwise mostly yellow. The abdomen is dark brown to black, the posterior margins of segments 2 to 6 are yellow. The antenna of the typical female has the two basal joints and the attenuated portion of the first flagellar segment yellow; the remainder of the antenna is dark brown and the segments are about as wide as long. The wing is as in figure 65b.

One female from North Slope, Hualalai, Hawaii, 4,000–6,000 ft., July, 1953 (D. E. Hardy), has a faint indication of rufous coloration on the front portion of the mesonotum and the mid and hind coxae are yellow. The pleural sclerites, excepting the metapleura, are brown. Female specimens from Nualolo Valley, Kauai, August 11, 1953 (D. E. Hardy); Puu Kukui, Maui, 4,500 ft., April, 1954 (M. Tamashiro); and Puu Kolekole, Molokai, July, 1952 (M. Tamashiro) have the abdomen completely black and all coxae and the middle and hind femora blackened.

Two male specimens from Puu Kolekole, Molokai, July, 1952 (M. Tamashiro) and Mokuleia, Kukuiala, Oahu, 1,500 ft., December 13, 1952 (C. Hoyt) and three from Napau Crater, Hawaii, 2,900 ft., July, 1956 (D. E. Hardy), seem to fit with the females in all structural details; but they differ strikingly in coloration. It was

first assumed that the males represented a new species but after careful comparisons it was decided that it would be best to place them under *fuscocostata*.

MALE. Head brown to black, face mostly yellow. Antennae about one-third longer than the head and thorax combined, colored as in the female; the flagellar segments, except for the attenuated first segment and those at apex, are distinctly broader than long (fig. 65a). The epistome is strongly produced and a well-developed mystax is present just above the oral margin (fig. 65a). The coloration of the thorax is rather similar to *O. hawaiiensis*. The mesonotum is largely yellow, with a broad band of black along sides and hind margin. The scutellum is black, except for a narrow band of yellow across its base. The metanotum is brown to black in the median portion, yellow on the sides. The pleura are yellow except for the dark brown to black metapleuron (pleurotergite) and except for a slight discoloration of brown on the lower portion of each sternopleuron (katapisternum of mesothorax) and on the upper edge of each hypopleuron (metathoracic epimeron). The coxae, trochanters, and femora are almost entirely yellow. The costal margin of the wing is brown fumose, the remainder rather faintly infuscated. The subcostal vein enters the costa nearly opposite the base of the radial sector. The fused portion of $M_{1+2} + Rs$ is about half as long as the free portion of M_{1+2} . The second anal vein ends about opposite the $m-cu$ crossvein (fig. 65b). The abdomen is polished blue-black on the basal halves of the segments and yellow on the apices. The ninth tergum is about one-half longer than wide and has a shallow concavity on its posterior margin (fig. 65c); in *cratericola* the posterior margin has a more distinctly U-shaped concavity. In *fuscocostata* the eighth sternum is convex on its hind margin and terminates in a blunt point. The lateral lobes of the basistyli are sharp-pointed and extend approximately as far as the apex of the aedeagus. The dististyli (claspers) are slender and sharp-pointed and are devoid of bristles or hairs except on the dorsal portion near the base (fig. 65c).

Length: body, 6.0–7.0 mm.; wings, 4.5–5.0 mm.

Orfelia (Tylparua) hawaiiensis (Grimshaw) (figs. 62, 65d–g).

Platyura hawaiiensis Grimshaw, 1901, Fauna Hawaiiensis 3(1):3, pl. 1, figure 4.

Endemic. Hawaii (type series from Oloa, Kilauea, and Kona), Kauai, Molokai, Maui, and Lanai. (Rather common in wet areas in the mountains.)

Type in the British Museum (Natural History).

This species is differentiated from other Hawaiian *Orfelia* by the modification of the male antennae, the wing infuscation, the coloring of the thorax, and the male genitalia. The male antennae are about two times longer than the thorax and the flagellar segments are about two times longer than wide (fig. 65g). The anterior and median portions of the mesonotum and most of the pleura are yellow; the scutellum, metanotum, metapleura, and sides of mesonotum are usually shining black. The metanotum is completely bare. The subcostal vein enters the costa about opposite the base of the radial sector. The apical fourth to third of the wing is infuscated and the venation is as in figure 65d. The terga of the abdomen are shining black with yellow apices; the sterna are often all yellow. The genitalia

are yellow, tinged with brown. The ninth tergum is very broad, rather short, and evenly convex on hind margin (fig. 65e). The dististyli are short and sharp-pointed, each has two to four short erect setae on the ventral surface. The cerci are rather long and slender (fig. 65f).

Length: body and wings, 4.0–6.0 mm.

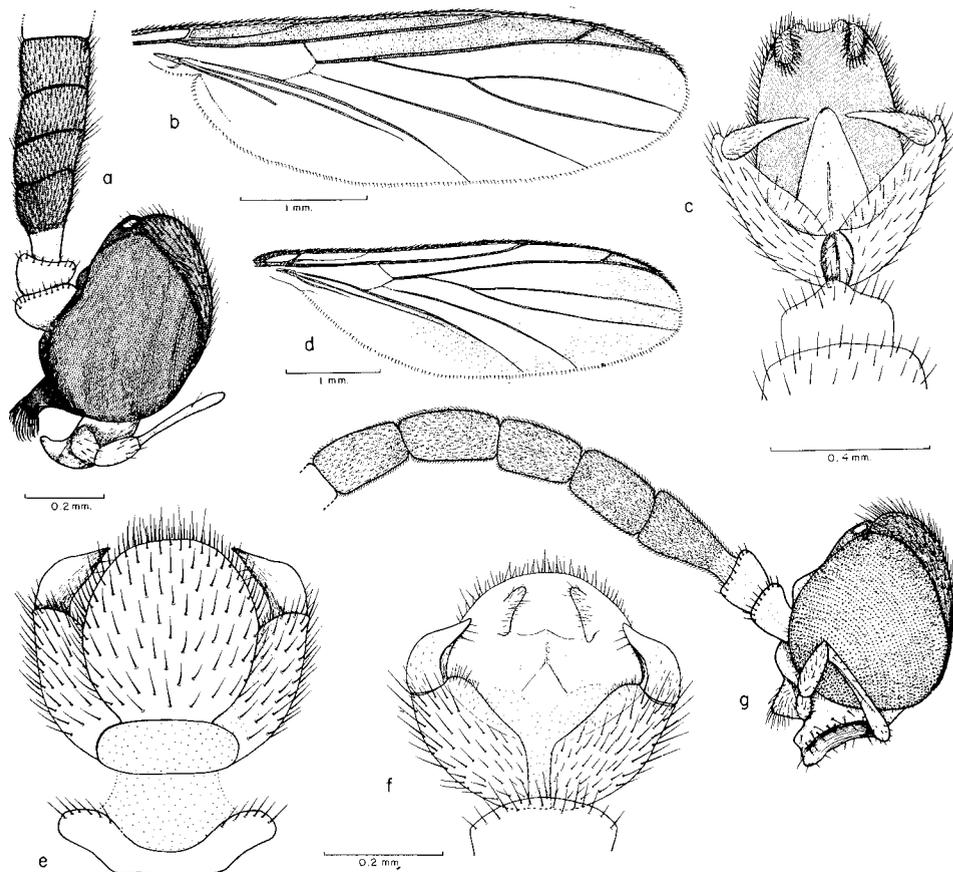


Figure 65—*Orfelia (Tylparua) fuscocostata* (Grimshaw): **a**, head, lateral view; **b**, wing; **c**, male genitalia, ventral view. *O. (Tylparua) hawaiiensis* (Grimshaw): **d**, wing; **e**, male genitalia, dorsal view; **f**, male genitalia, ventral view; **g**, head, lateral view.

Orfelia (Tylparua) insularis (Grimshaw) (figs. 66a–d).

Platyura insularis Grimshaw, 1901, Fauna Hawaiiensis 3(1):4, pl. 1, figure 5.

Endemic. Molokai, Hawaii, Lanai, Maui, Oahu, and Kauai (type series from “Molokai Mts., 3000 ft.,” and “Kona, Hawaii, 4000 ft.”). This is the most common of the Hawaiian mycetophilids. It has been taken at numerous localities in the mountains on all of the main islands.

Type in the British Museum (Natural History).

This is the smallest species of *Orfelia* in Hawaii. It is most closely related to *O. hawaiiensis* (Grimshaw) because of the rudimentary second anal vein and the development of the male genitalia. Typically, it is readily differentiated by the incomplete subcostal vein. A few specimens have been seen, however, which have a faint Sc extending to the wing margin. The best supplementary characters for distinguishing it are the shorter antennae and broader flagellar segments in the male (fig. 66a); the presence of several small setae on apical margin of the metanotum; the predominantly rufous, tinged with brown, mesonotum; and the more evenly infuscated wing. The subcostal vein usually ends abruptly about half way between the humeral crossvein and the base of Rs. Cell R_3 is narrowed and vein R_4 arises just slightly over half way between the tips of R_1 and R_5 . The costa extends about half way between the tips of veins R_5 and M_1 (fig. 66b). Typically, the mesonotum is dirty yellow, paler on the sides and behind the humeri; individuals vary, however, from this condition to those which are almost entirely brown to black. The male genitalia are as in figures 66c and d. The ninth tergum is very broad, convex at apex, and densely setulose; it is nearly as wide as long. The basistyli are narrowly separated at base. The dististyli are short, and each is tapered to an acuminate point and has two ventral setae near apical third (fig. 66d). The cerci are rather long and slender.

Length: body and wings, 3.5 mm.—5.0 mm.

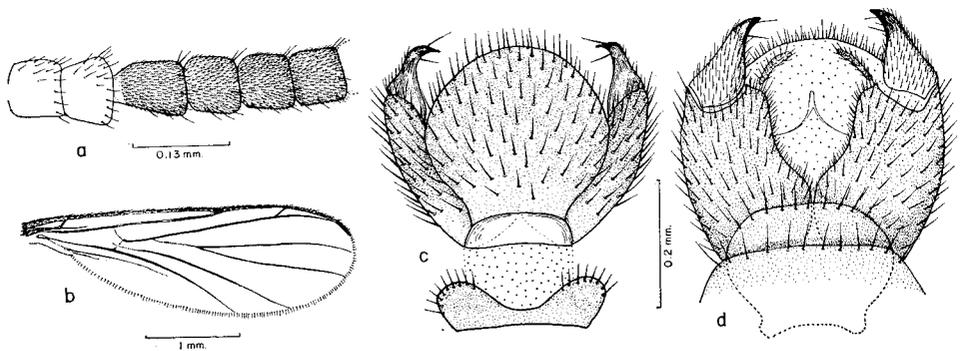


Figure 66—*Orfelia (Tylparua) insularis* (Grimshaw): **a**, basal portion of antenna; **b**, wing; **c**, male genitalia, dorsal view; **d**, male genitalia, ventral view.

Family SCIARIDAE Billberg
Dark Winged Fungus Gnats

Sciaraedes Billberg, 1820, Enumeratio Insectorum in Museo Billberg. Stockholm, Gadel 4:121.

Sciarinæ Zetterstedt, 1838, Insecta Lapponica, 3, Diptera, p.825.

Sciaridae Bigot, 1852, Ann. Soc. Ent. France (2)10:484.

Lycoriidae Speiser, 1910, in Sjostedt's, *Wissenschaft. Ergebnisse der Schwedischen Zool. Exped. Kilimandjaro* 2(10):31.

The family name is derived from the Greek *skiaros*, shady; evidently referring to the fumose wings of many of the species.

Small, chiefly dull-colored flies characterized by the wing venation; the midpleural pit; the large well-developed sternopleura (katapisterna of mesothorax), and by the development of a bridge of eye facets extending across the top of the head (fig. 68a). The subcosta and anal veins are short, poorly developed. The costa ends near the wing tip, the radius is unbranched, and media is three-branched with M_{3+4} arising from a common stem with Cu_1 as in many of the mycetophilids.

These flies have been treated as a subfamily of Mycetophilidae by many workers but, as Shaw has pointed out (1948:192; 1951:20), the group is sufficiently distinct from Mycetophilidae to be considered as a separate family. They are distinguished by the presence of midpleural pits, the greater development of the sternopleura, the shorter coxae, and by the lack of a meron at the base of the mesothoracic coxa. The sciarid wing venation is almost identical with that of the cecidomyiid subfamily Lestremiinae, compare figures 67a and 83b. The two groups may easily be confused—especially since the eye bridge is also developed in both—unless one checks for the continuous costa and the lack of tibial spurs on the Lestremiinae.

The number of rows of facets in the eye bridge is of value in distinguishing some Hawaiian species. From one to five rows are present, depending upon the genus and species. The eyes are pubescent and the antennae are 16-segmented in all of our species; the color of the segments is of some importance, but is variable and cannot be considered a reliable character. The shape of the flagellar segments is useful in separating some of the species. The maxillary palpi are typically three-segmented (fig. 70a); many workers consider the palpi to be four-segmented with a rudimentary first. Frey (1942:7) says they are three-segmented with the basal portion united with the galae. Two of our genera (*Plastosciara* Berg and *Spathobdella* Frey) have two-segmented palpi, and *Hyperlasion* Schmitz has but a single segment (fig. 79c). The presence or absence of a sensory structure on the first segment of the palpus is an important character in distinguishing Hawaiian species. Body color and color pattern of the mesonotum and pleura are useful characters but not entirely reliable, especially with slide preparations or teneral specimens. The wing venation is as shown in figure 69b. Comparison of the lengths of vein R_1 and crossvein r-m and the presence or absence of macrotrichia on the medial veins seem to be the only wing details of particular usefulness in separating our species. Just one species which has macrotrichia on the branches of media is known in the Islands. Lengersdorf (1930:24) uses this as a primary divisional character within the genus *Lycoria* (= *Sciara*). Frey (1942) uses it to set off a group of "genera." Edwards (1928a:17) uses it as a primary division of the species under the genus *Sciara*. I much prefer to treat our single species as a subgenus of *Sciara*. I have been unable to find any distinctive differences in the thoracic

chaetotaxy in any of our species. The male genital characters, especially the clasping structures, are very important in differentiating species. It is essential, however, that one have well-prepared microscope slide mounts for study. I believe it is obvious that many of the descriptions and figures of sciarid genitalia in the literature have been based upon insufficient material and poorly prepared mounts.

The larvae are elongate, slender, nearly white with heavily sclerotized black heads. The head is prognathous, subquadrate in shape, slightly tapered anteriorly. The front (median dorsal sclerite) is triangular, rather abruptly constricted on the posterior half of the head. The antennae are comparatively large and rounded, and a single ocellus is present just below each. The spiracles are brown to black and are present on the prothorax and the first seven abdominal segments. Those of the prothorax are several times larger than the latter, and each has five oblong openings in a row above the button-like spot (remnant of the previous tracheal opening).

The larvae most commonly develop in decaying plant and animal matter and in various types of fungi. They very often are abundant in potting soil in greenhouses and in potted plants. Outside of Hawaii, some sciarids are found breeding in tree sap, some are known to be leaf miners, and several are associated with ants and termites. The larvae of some species in the United States and Europe are gregarious and have the habit of migrating in a long rope-like line.

The larvae of some species may be of considerable economic importance. We have practically no information on their feeding habits in Hawaii. Elsewhere they have been recorded attacking the roots and underground portions of a wide range of plants, including mushrooms, lettuce, cucumbers, potatoes, wheat, corn, clover, alfalfa, apples, pineapples, carnations, pansies, tulips, as well as many ornamental plants grown in greenhouses and in pots. It is probable that most, if not all, of our species are primarily scavengers or fungivores, but, like some other flies with similar habits, they may on occasion attack living plant tissues. I suspect that plants with roots or other underground portions damaged by insects, disease, mechanically or by other factors, would be especially prone to attack by these flies. Illingworth (1934a) reported that under certain weather conditions the larvae of "*Sciara molokaiensis*" (very probably this was *S. garretti* Shaw; I have a number of records from pineapple fields) are very destructive to living roots of pineapple plants. He found the larvae devouring the ends of the new roots as fast as they pushed out and noted that rots would then set in and cause the death of the plant. The damage was done primarily to newly set plants. "By pulling up plants that have failed, it is not uncommon to find clusters of the worms congregated on the end of the cut surface." Illingworth said that these flies undoubtedly do far more damage to pineapple than anyone suspected. They breed in very large numbers in the plant material which is decomposed and plowed under for fertilizer, and he felt that "they become a real menace to growing plants during periods of drought." He found that the soil moisture conditions appear directly to influence the feeding habits of the larvae. When the soil was moist and ample decaying organic matter was present, the larvae did not attack the

roots. When the moisture was reduced so that the feeding medium started to dry out, the larvae began feeding upon the roots; they turned to the living tissues as their only supply of moisture.

Illingworth also reported damage caused by sciarids attacking the roots of greenhouse plants. "Maidenhair fern were badly injured. Seedlings of some flowering plants are often almost a complete failure because of the ravages of these maggots." One species (*Plastosciara pernicioso* Edwards) is considered an important greenhouse pest in England and has also been reported as being destructive to the roots and stems of cucumbers in that country. We know nothing of the habits of the *Plastosciara* in Hawaii.

Sciaridae have apparently been the limiting factor in the few attempts which have been made to grow mushrooms commercially in Hawaii. A venture began again in 1953, using man-made caves which had been part of the defense system for Oahu. Within a few months after operations had begun, all of the growing boxes were infested with *Sciara garretti* Shaw (obviously brought in with the organic fertilizers), and the damage to the mushrooms soon became so severe that the business would have been greatly curtailed if control of the flies had not been effected. Control was accomplished by painting the flats with DDT, thus killing the adults as fast as they emerged.

The species of *Sciara* which we have observed in the laboratory locally (*molokaiensis* Grimshaw, *garretti* Shaw, and *hardyi* Shaw), require 24 to 30 days to complete their life cycle. This time varies somewhat depending upon weather (humidity) conditions.

The adults are often abundant at lights and are commonly seen on windows. In the field they inhabit moist places and are often found in association with mosses, lichen growths, rotting wood, and other decomposing vegetation and humus materials.

These flies have long been considered the "problem children" of the Diptera because of their reputation for being difficult (or impossible) to identify. Frey (1942:6) said that Professor Carl Lundström, the Finnish specialist on the Nematocera, wrote "Tufri fran detta!" (God preserve us!) on the title page of his copy of Winnertz's pioneer work *Beitrag zu einer Monographie der Sciariden*. The large majority of the species in the older literature have been based upon color characters, and even many of the recent descriptions place far too much emphasis on color and disregard some of the important structural details. The most recent revisional studies of the family are those of Frey (1942 and 1948). He has made outstanding contributions in putting the taxonomy of this group on a sound basis. His generic concepts seem a bit extreme, however, and for the Hawaiian species I prefer to follow Shaw (1952:491) in treating *Lycoriella* as a subgenus of *Sciara*. I also consider *Leptosciara* as a subgenus of *Sciara sens. lat.* Shaw (1953) has presented an excellent review of the sciarid literature and a translation into English of Frey's 1942 key to genera, arranged in dichotomous form. Dr. R. Tuomikoski, Helsinki, Finland, is now working on a generic revision of the family, and some of the concepts used in this book will have to be modified to fit his more up-to-date classification.

The Hawaiian sciarids have been almost completely neglected. Previous to Shaw's brief paper (1952), just one species (*Sciara molokaiensis* Grimshaw) had been treated in our literature. This had been based upon a single female and was completely unrecognizable from the original description. The collections in Hawaii and the references to these flies in our literature have been consistently misidentified. O. A. Johannsen reported two new species of "*Neosciara*" in material sent to him (Bryan, 1934:405), but he did not describe these.

KEY TO GENERA AND SUBGENERA OF SCIARIDAE

1. Palpi with but 1 or 2 segments 2
 Palpi 3-segmented 5
2. Palpi 2-segmented (fig. 68b). Flagellar segments of antennae
 (except apical and basal) about one-half longer than wide . . . 3
 Palpi with but 1 segment, this with a large sensory structure
 at the apex (fig. 79c). Flagellar segments about two times
 longer than wide **Hyperlasion** Schmitz.
3. Second segment of palpus very tiny, not over one-fourth as
 long as first (fig. 67i). **Plastosciara** Berg 4
 Second segment of palpus slightly longer than first (fig. 80a)
 **Spathobdella** Frey.
4. Eye bridge broad, made up of 5 rows of facets (fig. 68a) . . .
 **Plastosciara (Plastosciara)** Berg.
 Eye bridge narrow, 1-2 rows of facets in width
 **Plastosciara (Cosmosciara)** Frey.
5. Median veins setose, bearing distinct macrochaetae (fig.
 69b). Thorax entirely rufous in the Hawaiian species . . .
 **Sciara (Leptosciara)** Frey.
 Median veins bare 6
6. Middle and hind tibiae each with 2 strong apical spurs . . .
 **Sciara (Lycoriella)** Frey.
 Middle and hind tibiae with but a single spur. Vein R₁ very
 short, about equal to r-m crossvein. Third segment of
 palpus very short, about equal in length to the second
 **Scatopsiara** Edwards.

Genus **PLASTOSCIARA** Berg

Pseudosciara Kieffer, 1898, Bull. Ent. Soc. France 1898:194; *nec Pseudosciara*
 Schiner, 1866, Verh. Zool.-bot. Ges. Wien 16:930.

Plastosciara Berg, 1899, Comun. Mus. Nac. Buenos Aires 1(3):78.

The members of this genus are characterized by two segments in the palpi with the second very small, rather short flagellar segments of the antennae, sparsely haired eyes, lack of macrotrichia on the median veins, and by having the spurs of the hind tibiae about equal in length and usually about equal or but little longer than the diameter of the tibia. Another detail which seems of importance

in separating *Plastosciara* is the presence of just two strong bristles on the margin of the scutellum and the sparse, or completely absent, acrostichal hairs.

Subgenus **COSMOSCIARA** Frey, 1942

Cosmosciara Frey, 1942, Not. Ent. 22:39.

Plastosciara (*Cosmosciara*) Frey, 1948, Not. Ent. 27:71, 88.

Dr. R. Tuomikoski, Helsinki, Finland, has informed me in correspondence that *Termitosciara* Schmitz (1915, Tijds. Ent. 58:281) may be an older name for this group.

The group has been characterized by Frey as very small individuals, with narrow eye bridge, composed of two or three rows of facets, bare r-m crossvein, and with the female abdomen not elongated and the male claspers differently developed than in *Plastosciara sens. str.*

I am not certain that the presence or absence of setae on the r-m crossvein is of any subgeneric value. This seems quite variable in the material studied and most of our species have some setae over the entire crossvein. Our species seem to fit Frey's concept of *Cosmosciara* except for the variation in the setae on r-m and except that some have longer tibial spurs than he indicates is typical. This appears to be an excellent specific character but, at least in this case, does not seem of any generic or subgeneric value.

Three Hawaiian species fit in this subgenus.

Type of subgenus: *Plastosciara perniciosa* Edwards.

KEY TO SPECIES OF PLASTOSCIARA (COSMOSCIARA)

1. Spurs of hind tibia at least one-third to one-half longer than diameter of segment. Male clasper not more than two times longer than wide. Ninth tergum of male quadrate or nearly so, covered with bristles (fig. 67j). Crossvein r-m about equal in length to base of M (fig. 67h) 2
 Spurs of hind tibia very short, slightly less than diameter of tibia. Claspers more slender, two and a half times longer than wide (fig. 67g). Ninth tergum two times wider than long, bristled only on posterior portion (fig. 67f). Crossvein r-m about half as long as M (fig. 67d)
 **brevicalcarata** Hardy.
 2. Costa extending two-thirds the distance to M₁. Crossvein r-m bare. Apices of ninth sternum produced into distinct lobes, extending over bases of claspers. Claspers short and broad, scarcely a third longer than wide and with a clump of four short, thick spines at apex (fig. 67c)
 **adrostylata** Hardy.
- Costa extending four-fifths the distance to M₁. Crossvein r-m setose. Hind margins of ninth sternum not distinctly lobate. Claspers two times longer than wide, blunt at

apices, and with two moderately strong subapical spines
(fig. 67j) **longicosta** Hardy.

Plastosciara (Cosmosciara) adrostylata Hardy (figs. 67a-c).

Plastosciara (Cosmosciara) adrostylata Hardy, 1956, Proc. Haw. Ent. Soc. 16:72.

Endemic. Oahu (type locality: Waikane), Hawaii, and probably on other islands. Probably living in rotting wood. It has been collected "ex dead *Xanthoxylum*." A male specimen from Keaau Orchard, Oloa, Hawaii, light trap collection, August, 1956, appears to be this species.

Type in the B. P. Bishop Museum.

This species, as well as *P. longicosta* Hardy, would not fit Frey's concept of *Plastosciara* (Frey, 1948:46) because of the more elongate spurs on the hind tibiae. In Frey's key it runs imperfectly to *Spathobdella* Frey; but in that genus the second segment of the palpus is elongated. Both species differ from *P. flavibasis* Edwards, from Samoa, by having the eye bridge narrowed to a single row of facets and then discontinuous on the top of the head for a distance equal to the length of two or three facets, not "three facets wide." Also the thorax is brown, not "shining black"; the tibial spurs are longer than the diameter of the tibia, not "fully as long as . . ."; the abdominal sclerites are brown, not with the first tergum yellow and two to four black; the claspers of the male have several spines at apex, not "with two bristly spines at tip"; and the wings measure 1.4 to 1.5 mm., not 2.0 mm. *P. adrostylata* and *longicosta* are separated by the wing venation and by the characters of the male genitalia as pointed out in the above key and as shown in figures 67b and 67j. For more complete details refer to the original description.

Length: body, 1.5-1.7 mm.; wings, 1.4-1.5 mm.

Plastosciara (Cosmosciara) brevicealcarata Hardy (figs. 67d-g).

Plastosciara (Cosmosciara) brevicealcarata Hardy, 1956, Proc. Haw. Ent. Soc. 16:73.

Endemic. Oahu (type locality: Honolulu). Rather common on windows and at light.

Type in the B. P. Bishop Museum.

This species is distinguished from other known *Cosmosciara* by the very short tibial spurs and by the short broad ninth tergum of the male (fig. 67f). The male claspers are more slender and the ninth tergum much broader than in any other known Hawaiian species; the tergum also has setae only along the posterior margin (fig. 67f). The wing venation also differs from that of other Hawaiian species as shown in figure 67d. For the details of the palpus refer to figure 67e, and for further descriptive information refer to original description.

Length: body, 1.3 mm.; wings, 1.1 mm.

Plastosciara (Cosmosciara) longicosta Hardy (figs. 67h-j).

Plastosciara (Cosmosciara) longicosta Hardy, 1956, Proc. Haw. Ent. Soc. 16:75.

Endemic. Oahu (type locality: Halawa Ridge), Kauai, and Maui. Reared from rotting wood and taken on windows and at light.

Type in the B. P. Bishop Museum.

Fitting close to *P. adrostylata* Hardy, but differing by having the male clasper two times longer than wide and the apical spines stronger and not densely clumped; the ninth sternum is not as distinctly lobate on the hind margin, and the other structures of the genitalia are differently developed (fig. 67j). Also the costa extends about four-fifths the distance between the tips of R_{4+5} and M_1 rather than two-thirds the distance; the r-m crossvein is setose over most of its length rather than bare, and the flagellar segments of the antennae are longer than wide. See figures 67h, i, and j, and refer to original description for further details.

Length: body, 1.5 mm.; wings, 1.35 mm.

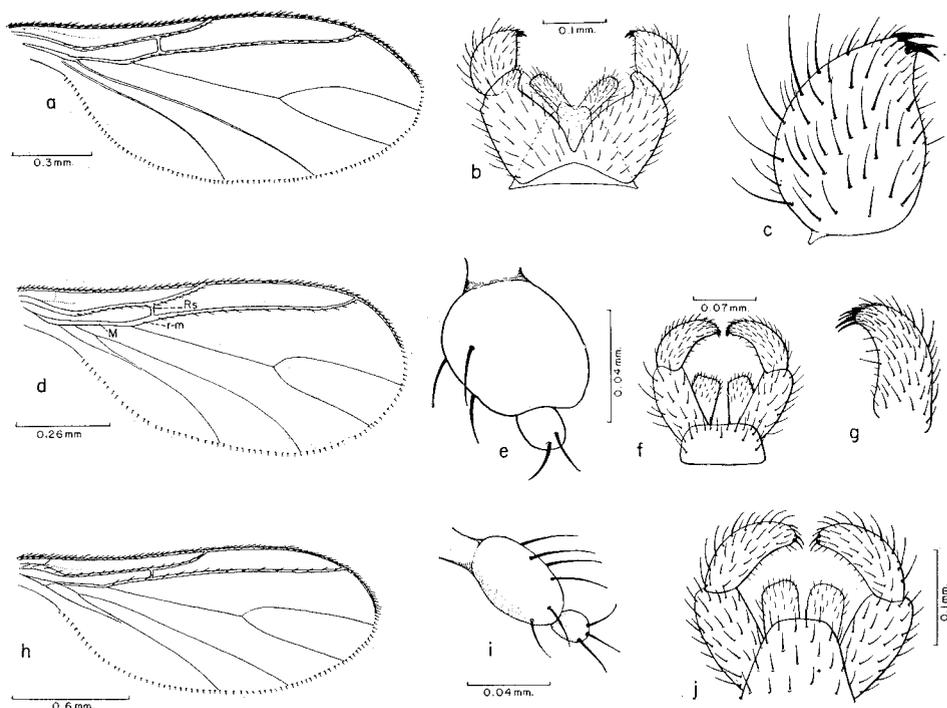


Figure 67—*Plastosciara* (*Cosmosciara*) *adrostylata* Hardy: a, wing; b, male genitalia, ventral view; c, male clasper. *P. (Cosmosciara) brevicarata* Hardy: d, wing; e, palpus; f, male genitalia, dorsal view; g, male clasper. *P. (Cosmosciara) longicosta* Hardy: h, wing; i, palpus; j, male genitalia, dorsal view.

***Plastosciara (Cosmosciara) perniciosa* Edwards.**

Plastosciara perniciosa Edwards, 1922, Ent. Month. Mag., 3rd ser. 8:160.

This species apparently does not occur in Hawaii, but I am giving comparative notes on it since Edwards has recorded it from Samoa and the Marquesas and I feel that there is a possibility he may have been dealing with one of the species which occurs here in Hawaii. There obviously has been some confusion regarding the recognition of this species and I feel that Edwards, and others, may have been dealing with a complex of related species. The original description

gives the following pertinent details: Eyes bare, eye bridge narrow (I presume Edwards meant that the bridge narrows to one or two rows of facets), "forming a distinct though narrow dorsal bridge, the portions from each eye being narrowed almost to a point, the points touching"; antennae black, flagellar segments a little over one-half longer than wide; first segment of palps nearly globular, the second minute; thorax dark brown to black; scutellum with two bristles; legs dark brownish, tibial spurs very short, considerably shorter than the diameter of the tibiae; hind basitarsi proportions to tibiae, 22:48; wings slightly grayish tinged; costa extending three-fourths to apex of M_1 ; crossvein r-m a little longer than the vertical portion of Rs; R_1 ending in the costa far before the base of cell M_1 ; median fork shorter than its stem; stem of M_{3+4} and Cu_1 very short; anal vein approximates Cu and actually seems to unite with it so at first sight they appear as one vein; abdomen dark brown, conjunctiva whitish; male claspers a little over twice as long as wide, with a single subterminal spine mixed with some hairs.

Length: wing, 1.2-1.5 mm.; body, male, 1.0-1.3; female, 1.5-1.8 mm.

Type in the British Museum (Natural History).

I have studied three female specimens (from England), determined by Edwards as *P. pernicios*. These have three rows of facets in the eye bridge; the spurs of the hind tibiae are one-half longer than the diameter of the tibia; the r-m crossvein is several times longer than the vertical portion of Rs (I feel Edwards may have made an error on this character), and vein R_1 ends at a point opposite the apical two-thirds of M_{1+2} . These specimens very probably represent a distinct species from Edwards' type of *pernicios*.

The genitalia as figured by Frey (1948, fig. 130) are probably correct for *pernicios*. Lengersdorf's figure of this species (1930, fig. 10) is obviously based upon a specimen in poor condition; the claspers appear to be shrunken. *P. pernicios* apparently is closest to *P. brevicarata* Hardy (of the Hawaiian species) but is distinguished by the single strong spine at apex of each clasper, probably also by wing venation and other details.

P. pernicios is said to be a common greenhouse pest in England. The larvae are reputedly destructive, especially to cucumbers grown under glass.

Subgenus **PLASTOSCIARA** Berg

Plastosciara (*Plastosciara*) Berg, Frey, 1948, Not. Ent. 27:70.

This subgenus is characterized by Frey (1948:70) as including medium-sized species with distinctly setose r-m crossvein ("Y" of Frey); broad eye bridge made up of 4-6 (rarely 3) rows of facets; short tibial spurs; dark halteres; black haired abdomen; attenuated female abdomen with the last segment very long and drawn out and with an elongate ovipositor; and with short and thick male claspers armed with several stout spines on the inner surface below the apex.

I have seen but one Hawaiian species which would fit here because of its very broad eye bridge. It does not entirely fit Frey's concepts, however, since the r-m

is not setose except for two to three scattered hairs and the male claspers are rather slender and armed with two to three short subapical spines (fig. 68d). The females of this species have not been studied, so it is not known whether or not they will fit Frey's concept.

Type of subgenus: *Plastosciara lignicola* (Winnertz).

Plastosciara (Plastosciara) latipons Hardy (figs. 68a-d).

Plastosciara (Plastosciara) latipons Hardy, 1956, Proc. Haw. Ent. Soc. 16:77.

Endemic. Oahu (type locality: Ewa). Known only from light-trap collections at Ewa.

Type (no. 2484) in the B. P. Bishop Museum, Honolulu.

This species differs from all known *Plastosciara (Plastosciara)* by having the male claspers three times longer than wide and with no strong spines on inner margin (fig. 68d).

The eye bridge is made up of five rows of facets and occupies the entire area between the antennae and the lower ocellus (fig. 68a). The palpus is as in figure 68b; the second segment is less than one-fifth as long as the first and has three setae at its apex. The thorax and abdomen are predominantly brown and the legs chiefly yellow. The genitalia are as in figures 68c and 68d. For further details see the original description.

Length: body, 1.6 mm.; wings, 1.4 mm.

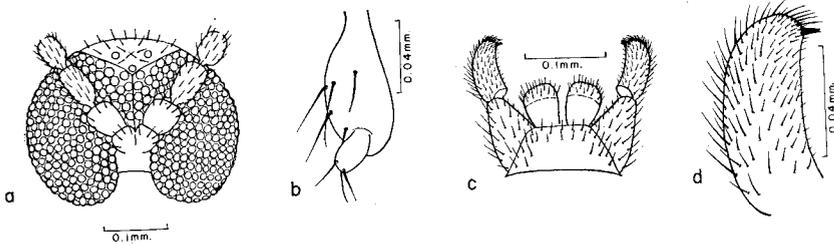


Figure 68—*Plastosciara (Plastosciara) latipons* Hardy: **a**, head, front view; **b**, palpus; **c**, male genitalia, dorsal view; **d**, male clasper.

Genus **SCIARA** Meigen

Lycoria Meigen, 1800, N. Class. Mouches, 17. Rejected name.

Sciara Meigen, 1803, Mag. f. Insektenk. 2:263.

I am using this name in a broad sense to include those Hawaiian sciarids which have three-segmented palpi, the flagellar segments of the antennae approximately two times longer than wide, the middle and hind tibiae each with two spurs, and the legs more elongate with more slender segments, the tibiae being distinctly longer than the femora.

Type of genus: *Tipula thomae* Linnaeus.

No species of typical *Sciara* are known from Hawaii.

Subgenus **LEPTOSCIARA** Frey, **new status**

Leptosciara Frey, 1942, Not. Ent. 22:28.

This group is separated from *Sciara sens. lat.* by having macrotrichia on the medial veins (fig. 69b). I find no supporting characters except that the last palpal segment is very elongate and slender in the species at hand, but this is probably a specific character since some of the European species which Frey places in *Leptosciara* have the third segment short. *Sciara (Leptosciara)* is very close to *Sciara (Sciara)*. Frey separates it by the setose r-m crossvein, the slender body, and the strong dorsocentral bristles in contrast to lacking setae on the r-m, having the body stout, and the dorsocentrals hair-like.

Just a single species appears to be present in Hawaii. To my knowledge it is the only *Leptosciara* which has been reported from the Pacific. It is probable, however, that a number of the species in the literature under *Sciara* should belong here. It certainly appears that *Sciara distigma* Edwards, from Fiji, fits in this subgenus: or it may possibly be a *Sciara (Sciara)*.

Type of subgenus: *Sciara longiventris* Zetterstedt.

Sciara (Leptosciara) hawaiiensis Hardy (figs. 69a-d).

Sciara (Leptosciara) hawaiiensis Hardy, 1956, Proc. Haw. Ent. Soc. 16:78.

Endemic. Oahu (type locality: Mt. Tantalus), Maui, Kauai, Molokai, Hawaii, and Lanai. This is a rather common species in the mountains from 1,500 to 5,000 feet in elevation, and it has been reared from rotting wood and from *Freyinetia* plants ("Ieie") on several occasions. It is found at lower elevations (in light-trap collections), but in fewer numbers than in the mountains.

Type in the B. P. Bishop Museum.

I have been unable to ally this to any species known to me. It seems to fit closer to *Sciara distigma* Edwards, from Fiji, than to any other *Sciara* known to me. The Fijian species differs, however, by having the mesonotum shining orange colored, with a pair of black, widely separated oval spots at about the middle, and by having the hairs on the thorax small and inconspicuous (this may be a *Sciara sens. str.*). In Edwards' key to the Oriental species (1928a:20), it runs to *Phorodonta pubericornis* Edwards; but the claws are simple, not toothed, the male antennal segments are not covered with long pubescence, and the constrictions between the segments are not unusually long. *Sciara dives* Johannsen and *S. vicina* Johannsen, both from New York, may possibly be *Leptosciara*, but they are black species with very differently developed genitalia.

S. hawaiiensis is easily differentiated from all other known Hawaiian sciarids by the setose median veins, the elongate third palpal segment, the entirely rufous thorax, and by the genital characters. For details of the palpi, wings, and genitalia see figures 69a, b, and c, and for further descriptive information refer to original.

Length: body and wings, 1.8-2.2 mm.

Dr. R. Tuomikoski, Helsinki, Finland, has informed me that this species apparently belongs to an undescribed genus which he has in manuscript. He in

licated that the diagnostic characters are as follows: (1) apex of front tibia with a comb-like row of setae traversing a bare area on the anterior side; (2) clasper with one of the most apical spines stronger than the others; and (3) posterior pronotum without macrotrichia. *S. hawaiiensis* fits these characters: the front tibia is as in figure 69d, the apical spine on the clasper is stronger than the rest, and the pronotum is bare.

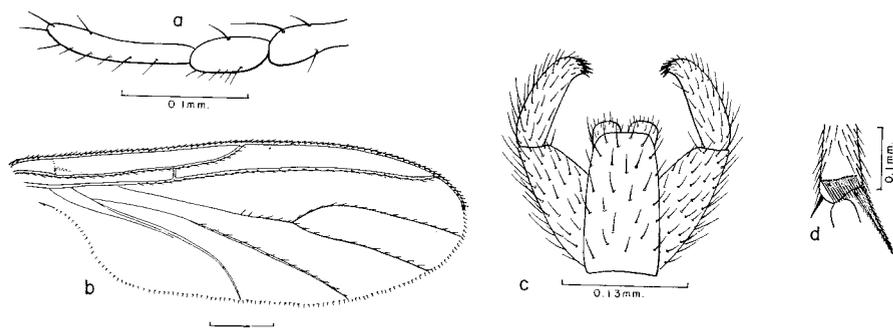


Figure 69—*Sciara (Leptosciara) hawaiiensis* Hardy: **a**, male palpus; **b**, wing; **c**, male genitalia, dorsal view; **d**, apex of front tibia.

Subgenus **LYCORIELLA** Frey

Lycoriella Frey, 1942, Not. Ent. 22:22.

Most of the species of Hawaiian sciarids fall into Frey's *Lycoriella* because the median veins and the r-m crossvein are devoid of macrotrichia; the rostrum is not elongated; vein M_1 is not strongly arcuate; the eyes are haired; the spurs of the middle and hind tarsi are about equal in length, and the third segment of the palpus is longer than the second.

My concept of *Lycoriella* is probably much too broad and will have to be modified when Dr. Tuomikoski publishes his generic revision of the sciarids. He has informed me, in correspondence, that of the species which I have treated under *Lycoriella*, only *Sciara (Lycoriella) solispina* Hardy clearly belongs to the subgenus *Lycoriella sens. str.* of his manuscript. This is a well-defined group characterized by the peculiar sensory structure consisting of a deeply excavated hollow with a rather narrow opening on the first segment of the palpus; by the anterior apex of the front tibia lacking a comb of setae but having a rounded patch of dense hairs separated from the usual hair coating by a narrow hairless area (fig. 76e); and by the presence of a small tuft of setae on the median ventral line of the ninth sternum of the male (fig. 76d). Also, the dististyli are rather long, each with a stout apical spine and with the inner side not conspicuously excavated longitudinally. The other species which I have tentatively treated under *Lycoriella* lack the above characters; the front tibia has a small comb of hairs on the anteroventral apex (fig. 71c), and the palpi and genitalia are quite different. Tuomi-

koski says these species "belong to other subgenera than *solispina*." . . . "Taken in such a narrow sense, *Lycoriella s. str.* (subgenus) will include species like *auripila* Winn., *sensu* Frey, *mycorum* Frey, *paucisetulosa* Frey, *stramentosum* Frey, *furcorum* Frey, *lundstroemi* Frey, *pauciseta* Felt, *agraria* Felt, *nitidicollis* Meig., *sensu* Edw. 1925, *solispina* Hardy."

Type of subgenus: *Bradysia (Chaetosciara) paucisetulosa* Frey (Frey, 1948:63).

This was previously (Frey, 1942:22) misidentified as *Sciara vivida* Winnertz. The type specimen has been checked by Tuomikoski and found to possess the essential characters of his concept of *Lycoriella sens. str.*

KEY TO SPECIES OF SCIARA (LYCORIELLA) SENS. LAT.

1. Mesonotum rufous, usually with a few streaks of brown . . . 2
 Mesonotum entirely dark-colored 4
- 2(1). First palpus without a sensory structure (fig. 77a).
 Claspers of male without strong bristles on inner median surface 3
 First palpus with a large sensory structure (fig. 70a).
 Claspers with two large spines near middle (fig. 70f).
 Each pleuron with a conspicuous yellow stripe extending longitudinally through the middle (fig. 70d)
 **garretti** Shaw.
- 3(2). Ninth tergum of male very large, swollen, extending nearly to apices of ninth tergum (basistyli) (fig. 77c).
 Sternopleura entirely yellow to rufous
 **spatitergum** Hardy.
 Tergum small, not conspicuously developed. Lower portions of sternopleura brown **radicum** Brunetti.
- 4(1). Claspers each containing three or more strong spines at or near apex 5
 Just a single spine at apex of clasper (fig. 76c)
 **solispina** Hardy.
- 5(4). Male claspers with three strong spines below (near apical two-thirds) besides the group of apical spines (fig. 72c). Costa ending just beyond middle of distance between tips of R_{4+5} and M_1 (fig. 72b) **hoyti** Hardy.
 Claspers with not more than one strong spine below besides apical or subapical set. Costa extending about three-fourths to M_1 6
- 6(5). Male claspers very broad, not two times longer than wide, equal in width to slightly wider than the apices of basistyli. Claspers shaped as in figure 73b with a distinct concavity on upper, inner surface
 **latistylata** Hardy.

- Claspers narrower, about three times longer than wide, distinctly narrower than basistyli, and very different in shape and development from the above. 7
- 7(6). Claspers with a very strong spine situated on a prominence below the inner median surface (fig. 75b).
 **prominens** Hardy.
 Without such a spine on the inner median surface. 8
- 8(7). Antennae entirely dark-colored. First palpus with a sensory structure (fig. 71a). Male clasper with one strong apical and four subapical spines (fig. 71e). . **hardyi** Shaw.
 Scape, pedicel, and sometimes basal half of first flagellar segments usually yellow. Palpus without a sensory structure (fig. 74a). No strong apical spines on clasper (fig. 74b). **molokaiensis** Grimshaw.

Sciara (Lycoriella) garretti Shaw (figs. 70a-g).

Sciara (Lycoriella) garretti Shaw, 1952, Proc. Haw. Ent. Soc. 14:494.

Sciara (Lycoriella) johannseni Shaw, 1952, Proc. Haw. Ent. Soc. 14:493, Figure 1.,
nec johannseni Enderlein, 1912. Zool. Anz. 40:282. **New synonym.**

Sciara (Lycoriella) laffooni Shaw, 1952, Proc. Haw. Ent. Soc. 14:494. **New synonym.**

Endemic? Oahu (type locality: "Island of Oahu"), Maui, Kauai, Hawaii, Laysan, and Midway (probably occurs on all of the main islands and on most of the smaller islands of the Hawaiian chain). This species is very common in the lowlands. A series of females, which seem to fit here, are in the B. P. Bishop Museum collection from Ocean Island (Gilbert Islands), April, 1923 (D. T. Fullaway). It is probable that this is an immigrant to Hawaii.

Type in the Shaw collection; to be deposited in the U. S. National Museum.

I have studied the type series. The species was described from two males which supposedly differed from *johannseni* Shaw by having the entire antenna dark brown. The antenna of the type is actually identical with that of the type of *johannseni*, the basal segments are yellow and the flagellar segments brown, lightly tinged with yellow; the paratype has the scape slightly discolored with brown. It is not unusual to have the basal antennal segments tinged with brown on this species. The genitalia and other details are identical with *johannseni*. Shaw's differences in the "structure of the hypopygium" are based upon the poor preparations which he had for study. It appears that all of these were mounted without clearing or relaxing, or they were dehydrated too abruptly causing shrinkage and contortion of the structures.

S. johannseni Shaw was based upon one male, whose head is glued on a paper point, and on one wing and the abdomen which are mounted on a slide (the remainder of the body is missing). The abdomen is poorly mounted and the genitalia are slightly twisted, accounting for Shaw's misinterpretation as shown in

his figure 1. A pin containing two females is marked paratype (the original indicated one paratype male); one of these had the tip of the abdomen glued under, and, upon superficial examination, could have been mistaken for a male. I have mounted this specimen.

Shaw based his *johannseni* upon coloration differences in the antennae (flagellar segments ochreous rather than dark brown) and upon the differences which he saw in the male claspers. I find the flagellar segments of the type brown with a faint yellowish tinge. This character is of no value—I have seen variations from black to all yellow, depending upon tenacity of the specimen, upon bleaching due to age, or on exposure to heat (in light traps). Shaw's figure is of a clasper which is twisted so that it is seen nearly in ventral view rather than lateral; he failed to indicate the apical and subapical bristles which are present. The male specimen from Honolulu, which Shaw indicated as an "atypical variety of *Sciara johannseni*," is in fairly good condition and is much more typical of the species than is the specimen which Shaw designated as the type.

S. laffooni Shaw was "described from two males from light trap . . . in Honolulu." I have studied the type and the paratype and find these are both specimens of *S. garretti* (and *johannseni* Shaw). They are mounted on paper points, but the diagnostic characters were obvious and I have made a slide mount of the paratype. Another male specimen was in the collection returned from Shaw; it consists of one wing and the abdomen mounted on a slide. This was not designated as a paratype but is obviously the specimen figured (fig. 4) by Shaw as *laffooni*. This is a good species, but the name *laffooni* is not available for it since the type is a synonym.

This species resembles *S. radicum* Brunetti very closely except that *radicum* has no sensory structure on the palpus and the genitalia are very different (fig. 75c). In coloration, except for the dark colored lower portion of the sternopleura, it is much like *S. spatitergum* Hardy. The genitalia and palpi are very different, as discussed under that species and as shown in figures.

S. garretti can be readily differentiated from other Hawaiian sciarids by the presence of a large sensory pit on the first segment of the palpus (fig. 70a); by the two large spines on the inner median surface of each clasper (dististylus) (figs. 70e-f) (in a large series of specimens some individuals will vary slightly from the typical form); and by the predominantly rufous mesonotum and the distinct yellow stripe which extends longitudinally from front to hind margin of each pleuron at a level with the upper two-fifths of the sternopleuron (fig. 70d). The mesonotum usually has two or three narrow brown vittae extending over the front portion in a W-shaped pattern (fig. 70c). The sides of the mesonotum are narrowly brown and the hind portion is often discolored with brown before the scutellum. The scutellum is brown, tinged with rufous. The pleura are largely brown, the brown colored lower three-fifths of each sternopleuron sets off the yellow longitudinal stripe. The basal segments of the antennae are normally yellow (fig. 70a) and the first flagellar segment is often partially yellow. The tip of the female abdomen is as in figure 70g.

Length: body, 1.25–1.75 mm.; wings, 1.6–2.0 mm.

This species has been reared from decaying sugarcane, pineapple, and other plants. It is common in the pineapple fields when the mulch is rotting and is probably the species which Illingworth (1934) reported as causing damage to pineapple plants. An infestation of *S. garretti* caused very severe damage to mushrooms in a commercial planting at Kaneohe, Oahu, until controlled by painting the sides of the planting boxes with a DDT solution.

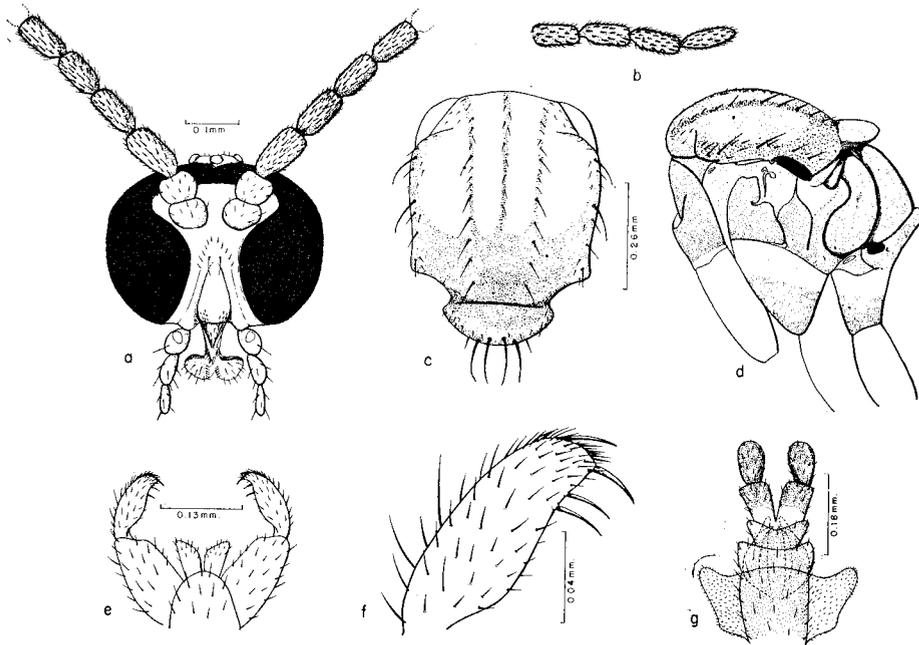


Figure 70—*Sciara (Lycoriella) garretti* Shaw: **a**, head, front view; **b**, apex of antenna; **c**, mesonotum, dorsal view; **d**, thorax, lateral view; **e**, male genitalia, dorsal view; **f**, male clasper; **g**, female genitalia, dorsal view.

***Sciara (Lycoriella) hardyi* Shaw (figs. 71a–e).**

Sciara (Lycoriella) hardyi Shaw, 1952, Proc. Haw. Ent. Soc. 14:493.

Endemic? Oahu (type locality: Honolulu), Maui, Molokai, Kauai, and Hawaii (probably on all of the main islands).

Type in Shaw collection; to be deposited in U.S. National Museum.

I have studied the type male. This is a common lowland species and breeds in decaying vegetation. Shaw separated this species by its all dark-colored antennae and black mesonotum. The antennal coloration is not reliable, and some specimens are easily confused with *S. molokaiensis* Grimshaw because the basal segments are often yellow, just slightly tinged with brown. The important characters for separating it are: the presence of a moderately small sensory struc-

ture on the first segment of each palp (fig. 71a), subshining black mesonotum, brown to black pleura, and the claspers (dististyli) with a strong apical spine and four subapical spines (fig. 71e). Three prominent bristles are present on the outside median surface of the dististylus. The third segment of the palpus is nearly two times longer than the second. For other details see figures 71b-d.

Length: body, 1.2-1.55 mm.; wings, 1.5-1.7 mm.

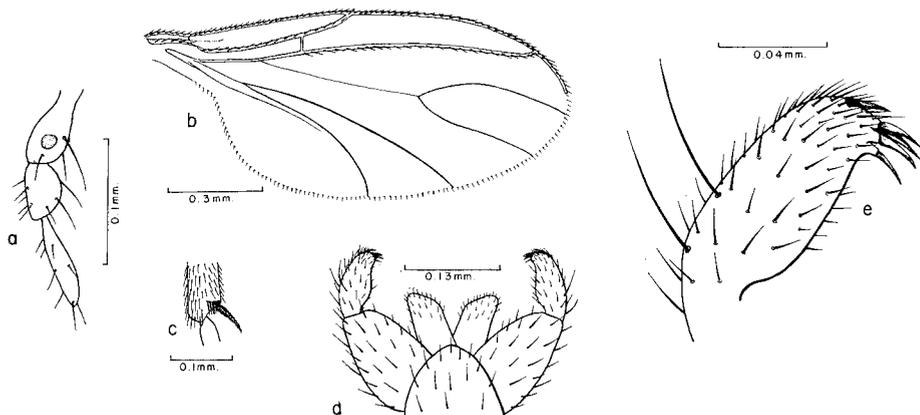


Figure 71—*Sciara (Lycoriella) hardyi* Shaw: a, palpus; b, wing; c, apex of front tibia; d, male genitalia, dorsal view; e, male clasper.

***Sciara (Lycoriella) hoyti* Hardy (figs. 72a-c).**

Sciara (Lycoriella) hoyti Hardy, 1946, Proc. Haw. Ent. Soc. 16:80.

Endemic. Hawaii (type locality: Keanakolu, north slopes of Mauna Kea, 5,200 ft.). Reared from moss.

Type in the B. P. Bishop Museum.

An almost entirely dark brown to black species resembling *S. hardyi* Shaw, but the palpi are short and the sensory structure on the first segment is rather large, as in figure 72a, and the male genitalia are very different, as in figure 72c. The females are difficult to separate from those of *S. prominens* Hardy. The most reliable characters for separating them seems to be the presence of a dense clump of sensory setae on the first segment of the palpus and the short costa and subcosta in *hoyti*; the costa extends just slightly beyond the middle of the distance between the tips of veins R_{4+5} and M_1 , and subcosta ends about opposite the forking of M_{3+4} and Cu_1 , well before the base of r-m crossvein (fig. 72b). In *prominens* the costa extends about four-fifths the distance to M_1 , and the subcosta is rather well developed and extends to the middle of the r-m crossvein. Also, in *hoyti*, the wings are less dusky and vein R_1 is shorter (about equal or slightly longer than r-m crossvein) rather than one-half longer, as in *prominens*.

The antennae are entirely brown. The palpi are as in figure 72a and the wings

and genitalia are as in figures 72b and c. The claspers are broad, about two times longer than wide, with three closely grouped spines at apex and three moderately strong, distinctly spaced spines on underside at about apical two-thirds.

Length: body, 1.7–2.0 mm.; wings, 1.5 mm.

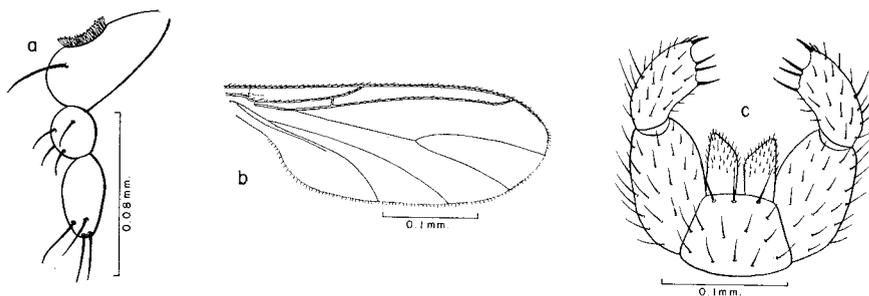


Figure 72—*Sciara (Lycoriella) hoyti* Hardy: **a**, palpus; **b**, wing; **c**, male genitalia, dorsal view.

***Sciara (Lycoriella) latistylata* Hardy (figs. 73a–e).**

Sciara (Lycoriella) latistylata Hardy, 1956, Proc. Haw. Ent. Soc. 16:82.

Endemic. Oahu (type locality: Kuliouou, 1,500 ft.).

Type in the B. P. Bishop Museum.

A predominantly dark-colored species resembling *S. hardyi* Shaw until the male genitalia are studied. It is readily distinguished from all other known Hawaiian sciarids by the distinctive shape of the male claspings structures (fig. 73a). The claspers are very broad, equal in width or slightly wider than the apices of the lobes of the sternum (basistyli). The inner surfaces are markedly concave

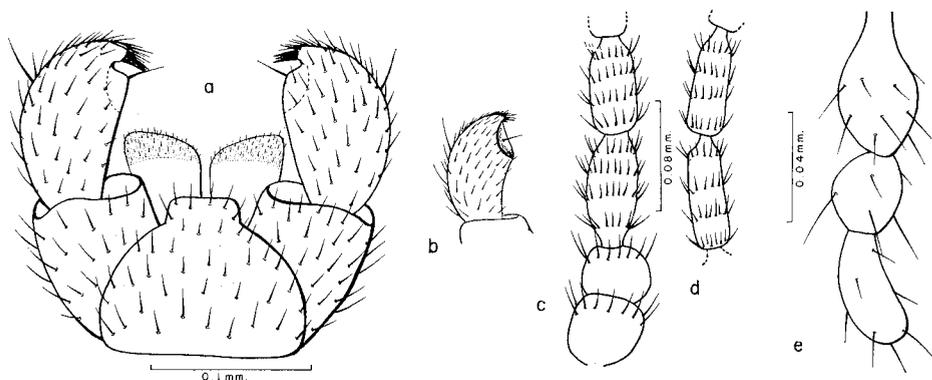


Figure 73—*Sciara (Lycoriella) latistylata* Hardy: **a**, male genitalia, dorsal view; **b**, inner view of male clasper; **c**, basal portion of antenna; **d**, middle flagellar segments; **e**, palpus.

on the upper half and have one strong spine arising from near the ventral edge of the concavity at the apical two-thirds of the clasper; there are also four or five rather well-developed subapical spines present (fig. 73b). The claspers are about equal in length to the sternum (fig. 73a). The antennae are entirely dark brown, the flagellar segments are about three times longer than wide (not including constriction between nodes) and each has four distinct whorls of setae (figs. 73c-d). Eye bridge made up of three or four rows of facets. Palpi with no sensory structure on the first segment (fig. 73e). For other details refer to the original description.

Length: body, 1.7-1.8 mm.; wings, 1.4-1.5 mm.

Sciara (Lycoriella) molokaiensis Grimshaw (figs. 74a-c).

Sciara Molokaiensis Grimshaw, 1901, Fauna Hawaiiensis 3(1):2.

Sciara (Lycoriella) stonei Shaw, 1952, Proc. Haw. Ent. Soc. 14:495. **New synonym.**

Endemic? The most abundant lowland species on all of the main islands (type locality: "Molokai Mts., 6,500 ft." The elevation is an error—the highest point on Molokai is 4,970 ft.).

Type in the British Museum (Natural History).

This species was based upon one female specimen and has been unrecognizable from the original description. Shaw separated it by noting that the scape and pedicel are yellow and the flagellum all black. Actually the first flagellar segment is often yellowish, and the color of the antenna is of little value in distinguishing this species.

I compared specimens from the mountains of Molokai with the type in the British Museum and designated three females and one male (from Puu Kolekole and Maunawainui) as homotypes; the identity of the species was established from these. I also have studied the type series of *S. stonei* Shaw (Shaw collection, to be deposited in the U.S. National Museum).

S. molokaiensis is distinguished from other Hawaiian species by the subshining black mesonotum, lack of a sensory structure on the first segment of the palps

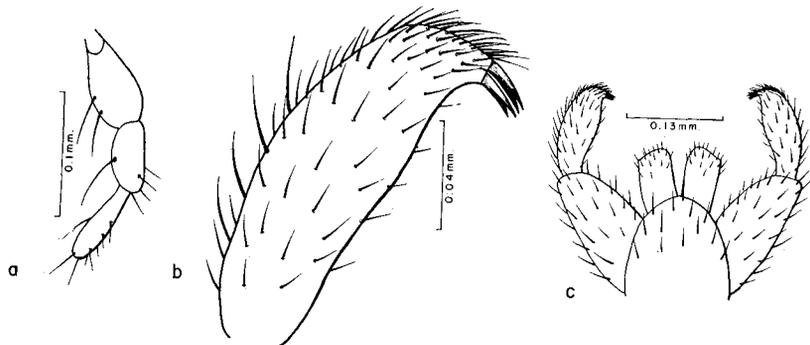


Figure 74—*Sciara (Lycoriella) molokaiensis* Grimshaw: a, palpus; b, male clasper; c, male genitalia, dorsal view.

(fig. 74a), and by the four subapical spines on the claspers (dististyli) (fig. 74b). The third segment of the palpus is about one-half longer than the second (fig. 74a) and is often capitate in shape. The first two antennal segments are yellow, the first flagellar segment is tinged with yellow basally and is sometimes all yellow. The pleura and genitalia are brown to black. The genitalia are as in figure 74c. The "peculiar hook-like structure" at base of dististylus referred to by Shaw seems to be present on all of our species. I do not consider it distinctive.

Length: body, 1.5–2.25; wings, 1.85–2.75 mm.

This species is attracted to lights in large numbers. At the University of Hawaii approximately 85–90 percent of the sciarids in the light-trap collections have been this species.

***Sciara (Lycoriella) prominens* Hardy (figs. 75a–b).**

Sciara (Lycoriella) prominens Hardy, 1956, Proc. Haw. Ent. Soc. 16:83.

Endemic. Oahu (type locality: Pupukea) and Hawaii. All of the specimens have been taken in the mountains from 2,000–7,000 feet in elevation.

Type in the B. P. Bishop Museum.

Fitting in the *hardyi* Shaw complex of species because of the predominantly dark coloration, but the male genitalia are very different from any other known *Sciara* in our fauna (fig. 75b). The females resemble those of *S. hoyti* Hardy and are differentiated by the characters given under that species. The antennae and palpi are entirely dark-colored. The flagellar segments are about three times longer than wide. The first segment of the palpus lacks a sensory structure and is strongly attenuated at the base. The thorax is dark brown to black on the dorsum, lighter brown on the sides. The wing venation is as in figure 75a. The abdomen is entirely dark brown. The male claspers are about three times longer than wide and about equal in length to the ninth sternum; each has a series of small spines along inner margin and at apex, besides the large submedian spine (fig. 75b). The ninth tergum is gradually tapered, rounded at apex, and it extends almost to apices of ninth sternum (basistylus). The male genitalia closely resemble those of *Sciara forceps* Petzey (1918:328, fig. 1), but that species has the radius and medius setulose and would fit in a different subgenus.

Length: body, 2.0 mm.; wings, 1.7–1.85 mm.

***Sciara (Lycoriella) radicum* Brunetti (figs. 75c–e).**

Sciara radicum Brunetti, 1912, Fauna of Brit. India, p. 139.

Oahu.

Immigrant. Described from Calcutta, India, and recorded from England, Samoa, Marquesas, and Fiji by Edwards (1928b:33).

Type in the Indian Museum, Calcutta.

I have compared specimens from Oahu with specimens from Samoa and they fit the species recorded as *radicum* by Edwards. He had compared the series from Samoa and Fiji with Indian specimens in the British Museum and concluded that they were the same.

The species superficially resembles *S. spatitergum* Hardy very closely. The thorax is predominantly reddish with the mesonotal markings as in *spatitergum* and *garretti* Shaw but with the lower three-fifths of the sternopleuron discolored with brown and the upper portion yellow as in *garretti*. This latter character may not be consistent; the extent of discoloration on the sternopleura varies somewhat in the specimens which have been studied. *S. radicum* is distinguished from *garretti* by the lack of a sensory structure on the first segment of the palpus and by the very different genitalia as shown in figures 70f and 75c. The palpi are very similar to those of *spatitergum*, but the third segment is somewhat shorter and thicker, being two times longer than wide (fig. 75e) rather than three times longer than wide (fig. 77a). The male genitalia are strikingly different. The ninth tergum is very short, not extending over half the length of the sternum (basistyli); the claspers are more slender, rather square-tipped, with the spines arranged as in figure 75c. In *spatitergum* the ninth tergum is greatly enlarged, swollen, and extends nearly to the apices of the sternum. The claspers are short and thick and somewhat pointed at apices (fig. 77b). The specimens of *radicum* which I have studied have a slightly raised portion in the middle of the underside of each tarsal claw. It approaches the *Phorodonta* character of having the claws toothed, yet is hardly developed into a distinct tooth (fig. 75d). Edwards stated that "the male claspers are very short"; this statement would not fit the specimens I have seen.

Length: body: *in situ*—1.25–1.5 mm., on slide—1.75–1.9 mm.; wings, 1.55 mm.

Brunetti (1912:140) found this species breeding in decaying lily bulbs and gave a few notes concerning its biology and mating behavior.

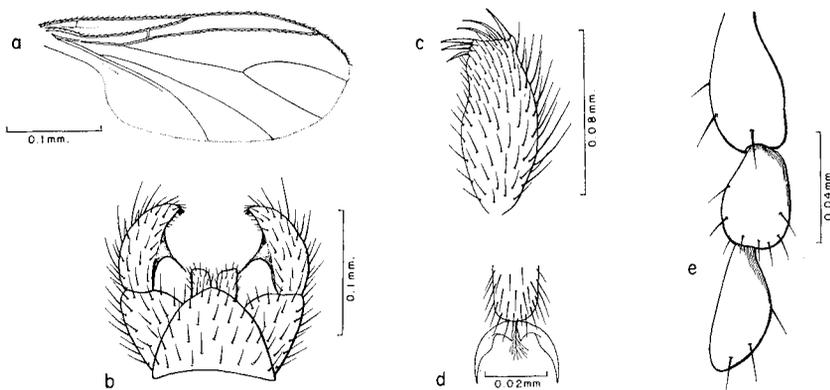


Figure 75—*Sciara (Lycoriella) prominens* Hardy: **a**, wing; **b**, male genitalia, dorsal view (*Lycoriella) radicum* Brunetti; **c**, male clasper; **d**, tarsal claw; **e**, palpus.

***Sciara (Lycoriella) solispina* Hardy (figs. 76a–e).**

Sciara (Lycoriella) solispina Hardy, 1956, Proc. Haw. Ent. Soc. 16:84.

Endemic. Hawaii (type locality: Kaula Gulch, north slopes of Mauna Kea, 7,000 ft., elevation).

Type in the B. P. Bishop Museum.

Fitting in the complex of species which have the body and antennae entirely dark brown to black. It differs from all known species of *Sciara* from Hawaii by having the male claspers terminating in a single strong spine (fig. 76c).

The flagellar segments of antennae are approximately three times longer than wide. The palpi are brown, tinged with yellow, the basal segment has a large conspicuous sensory structure near the apex (this is a deeply excavated hollow with a somewhat narrower opening); the third segment is rather short, slightly less than one-half longer than the second (fig. 76a). Thorax dark colored with no distinct vittae on mesonotum. Apex of front tibia anteriorly with a rounded patch of dense hairs separated from the usual hair coating by a narrow hairless area (fig. 76e). Wings as in figure 76b. Genitalia as in figures 76c and d. Ninth sternum with a small tuft of setae on the median ventral line. The ninth tergum is narrow and rather elongate, about two times longer than wide. The claspers are rather slender, the inner margin straight; each clasper terminates in a strong bristle (fig. 76c).

Length: body, 2.0 mm.; wings, 1.5 mm.

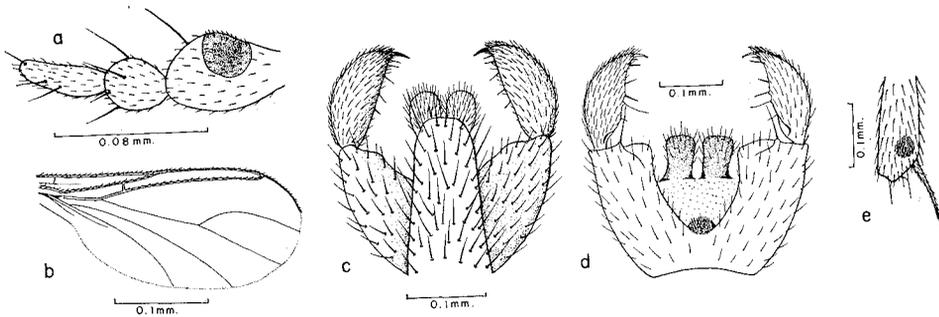


Figure 76—*Sciara (Lycoriella) solispina* Hardy: **a**, palpus; **b**, wing; **c**, male genitalia, dorsal view; **d**, male genitalia, ventral view; **e**, apex of front tibia.

***Sciara (Lycoriella) spatitergum* Hardy (figs. 77a-c).**

Sciara (Lycoriella) spatitergum Hardy, 1956, Proc. Haw. Ent. Soc. 16:85.

Endemic. Oahu (type locality: Honolulu), Maui, Molokai, and Hawaii; probably on all of the main islands. A very common species at light; some specimens have been reared from rotting sugarcane, rotting sweetpotatoes, and from coffee grounds.

Type in the B. P. Bishop Museum.

This is the species which Shaw (1952:492, fig. 4) figured as *S. laffooni* Shaw, "described from two males from light trap . . . in Honolulu." I have studied the type and the paratype and found that these are both specimens of *S. garretti* Shaw (equals *S. johannseni* Shaw, *nec johannseni* Enderlein). They are mounted on paper points, but the diagnostic characters are obvious and I have made a

slide mount of the paratype. Another male specimen was in the collection returned by Shaw; it consisted of one wing and the abdomen mounted on a slide. This specimen was not designated as a paratype, but is obviously the specimen figured by Shaw as *lafooni*. This specimen represents a good species, but the name *lafooni* is not available for it since the type is a synonym.

S. spatigerum closely resembles *S. garretti* Shaw in coloration and mesonotal markings. It is distinguished by the lack of a sensory structure on the first segment of the palpus (fig. 77a), by the all-yellow lower half of pleura, and by the shape and development of the genitalia (fig. 77c). It also closely resembles *S. radicum* Brunetti, but the male genitalia are very different.

The scape, pedicel, and sometimes the basal segment of the flagellum are yellow, antennae otherwise brown. The palpi are as in figure 77a. The mesonotum is largely yellow, brown on the sides and sometimes on hind portion in front of scutellum. It has a brown vitta down each dorsocentral area from anterior margin and nearly covering before the scutellum; a faint (often lacking) vitta extends down the middle of the mesonotum. The sternopleura, hypopleura, and metapleura are yellow; the remainder of the pleura are brown. The genitalia are yellow and the very large tergum is readily visible *in situ*. The ninth tergum is broadly expanded and very greatly developed compared to other Hawaiian sciarids. Each clasper (dististylus) has one apical and four subapical spines (fig. 77b).

Length: body and wings, 1.4–1.5 mm.

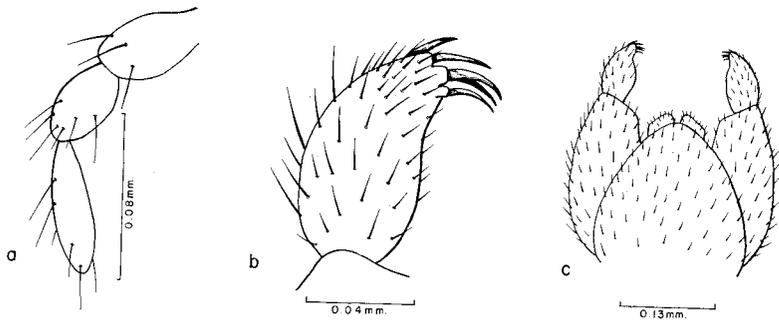


Figure 77—*Sciara (Lycoriella) spatigerum* Hardy: a, palpus; b, male claspers; c, male genitalia, dorsal view.

Genus **SCATOPSCIARA** Edwards

Sciara (Scatopsciara) Edwards, 1927, Trans. N. Zealand Inst. 57:798.

Scaptosciara Frey, 1942, Not. Ent. 22:34; 1948, Not. Ent. 27:69. Shaw, 1953, Proc. Haw. Ent. Soc. 15:29. (Misspellings of *Scatopsciara* Edwards).

This genus is characterized by having the mid and hind tibiae with only a single apical spine (the other rudimentary). Frey (1948:69) further characterizes

the genus *sens. str.* as having veins M_1 and 2 longer than M_{1+2} , the mesonotum polished black, the eye bridge with only two or three rows of facets, and the r-m crossvein distinctly bristled. I believe his concept to be too restricted; the genotype is the only species I know which fits these characteristics.

Type of genus: *S. quinquelineata* Macquart (syn. of *vitripennis* Meigen).

Subgenus **UDDMANIELLA** Frey

Scatopsiara (*Uddmaniella*) Frey, 1948, Not. Ent. 27:69.

A change of name for *Uddmania* Frey, 1942, Not. Ent. 22:38; *nec* Bergroth, 1915, Ann. Mag. Nat. Hist. (8)15:487. *Uddmannia* Frey 1948, Not. Ent. 27:69, is a misspelling. Note also that Frey misspelled the generic name; it should be *Scatopsiara*.

Frey characterized this subgenus as differing from typical *Scatopsiara* by the dull-colored mesonotum, shorter M_1 and 2, and the bare or sparsely bristled r-m crossvein.

Seven European species fit in this subgenus and probably *S. unicalcarata* Edwards from New Zealand also belongs here.

Type of subgenus: *S. pusilla* Meigen.

Scatopsiara (*Uddmaniella*) **nigrita** Hardy (figs. 78a-a-d).

Scatopsiara (*Uddmaniella*) *nigrita* Hardy, Proc. Haw. Ent. Soc. 16:86.

Endemic. Oahu (type locality: Palolo Valley) and Hawaii. The species is rather common at lights, on windows, and in rotting vegetation.

Type in the B. P. Bishop Museum.

A small dark brown to black species apparently related to *S. unicalcarata* Edwards from New Zealand. It differs (as compared with the original description) by being smaller, body 1.7 mm., not 3.0 mm.; the tibial spurs are longer, about one-half longer than the width of the tibia, not about "half as long as tibial diameter"; the r-m crossvein is over two times longer than basal section of M, not "about as long"; and veins M_1 and 2 diverge toward wing tip, not "straight and parallel." In Frey's key to the species of northern Europe (1948:69) it runs in the section with *S. calamophila* Frey and *leucoptera* Frey, but it is very different from either of these species.

Male antenna entirely dark colored. The flagellar segments, not counting the constrictions, are one-half longer than wide (fig. 78b). First segment of palpus nearly two times longer than wide and lacking a sensory structure. Second segment just slightly longer than wide and the third just a little longer than second and about one-half longer than wide (fig. 78a). Eye bridge, four facets wide. Thorax dark brown to black. Mesonotum with a narrow rufous to yellow line down each dorsocentral row. Wings as in figure 78c. Front tibia with a very small comb on anteroventral apex near insertion of the spur. The single spur of each hind tibia is one-half longer than the width of the tibia, and the basitarsus is about two-fifths the length of the tibia. The ninth tergum is twice as wide as long; its posterior

margin is gently convex. The ninth sternum is deeply concave on its hind margin, cleft nearly to the base of the segment. The claspers are two times longer than wide, somewhat tapered at the apex, and armed with one moderately strong apical and four or five subapical spines (fig. 78d).

Length of male: body, 1.6–1.7 mm.; wings, 1.3–1.4 mm.

Length of female: body, 2.0 mm.; wings, 1.75 mm.

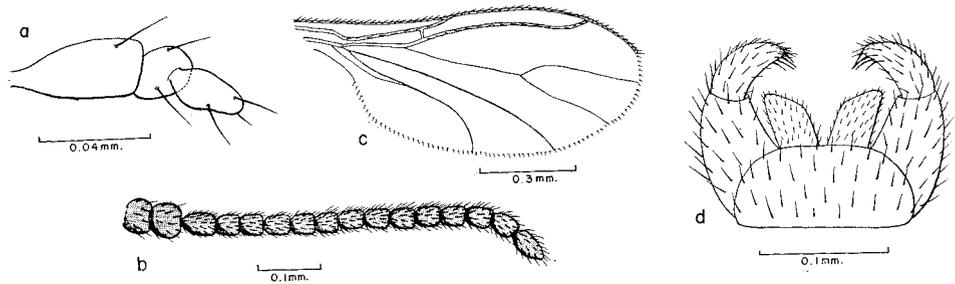


Figure 78—*Scatopsiara* (*Uddmaniella*) *nigrita* Hardy: **a**, palpus; **b**, antenna; **c**, wing; **d**, male genitalia, dorsal view.

Genus **HYPERLASION** Schmitz

Hyperlasion Schmitz, 1919, Tijds. v. Ent. 61:96.

This has been previously treated as a synonym of *Scythropochroa* Enderlein (see Frey, 1942, 40–41), but Dr. R. Tuomikoski has recently informed me that *Hyperlasion* is certainly not a synonym of *Scythropochroa*. He said that *Hyperlasion* is characterized by the deep sensory excavation of the first palpal segment and by having no clearly defined hair patch or comb at the apex of the front tibia.

This genus is readily differentiated from other sciarids in Hawaii by the distinctive, one-segmented palpi (fig. 79c) and by the very short tibial spurs which are about equal in length to the diameter of the tibia.

Dr. Tuomikoski has indicated that *Ceratiosciara* Enderlein (1911, Arch. f. Naturgesch. 77(1), Suppl. 3:183) is probably an older name for *Hyperlasion*. But he has not yet seen Enderlein's type and cannot be certain.

The genus (sens. str.) contains but two known species. Dr. Tuomikoski has recently (in correspondence) found *H. viridiventris* (Frey) to be conspecific with *H. wasmanni* Schmitz.

Type of genus: *Hyperlasion wasmanni* Schmitz.

Hyperlasion magnisensoria (Hardy), **new combination** (figs. 79a–d).

Scythropochroa magnisensoria Hardy, 1956, Proc. Haw. Ent. Soc. 16:89.

Endemic. Oahu (type locality: Kuliouou Valley, 1,500 ft.), Maui, Molokai, Hawaii, and Lanai. This species occurs in the mountains from 1,500–7,000 feet in elevation.

Type in the B. P. Bishop Museum.

This species fits in the group of *Scythropochroa sens. lat.* (of Frey, 1942) which has the base of vein M_{3+4} plus Cu_1 shorter than the base of M rather than longer, as in the type, the Palearctic species, and *S. nitida* Edwards from New Zealand. It superficially seems more closely allied to *S. samoana* Edwards than to any other species known to me. *S. samoana*, however, probably lacks the deep sensory excavation on the first palpal segment and probably it has a clearly defined hair patch or comb at apex of front tibia. *S. samoana* differs strikingly by being three times larger (body, 5.5 mm. rather than 1.5 mm.); by being predominantly black colored rather than rufous to brownish red; and the wing venation differs considerably in the two species. In *magnisensoria* vein R_1 is about half as long as R , not longer than R , and ends well before the fork of M_{1+2} , not beyond the fork; M_{1+2} is just slightly longer than M_2 , not one-half longer, and R_{4+5} ends slightly before level of tip of M_2 , not beyond.

In the male the eye bridge is two facets wide over most of the vertex, but is briefly interrupted on the upper portion by a space equal to the combined width of about three facets. The antennae are yellow, tinged with brown. The flagellar segments, not counting the short constrictions, are approximately two times longer than wide (fig. 79a). The palpus is short and thick, scarcely longer than wide, and has a large sensory pit, or excavation, occupying nearly the entire apex (fig. 79c). The front tibia has no clearly defined hair patch or comb at apex. The thorax is entirely rufous, tinged slightly with brown. The wing venation is as in figure 79b and the male genitalia as in figure 79d. The ninth tergum is short and broad, nearly twice as wide as long. The claspers are a little over two times longer than wide and have four subapical spines and two spines near median surface below, besides a row of strong bristles around the apex (fig. 79d).

Length of body and wings of both sexes: 1.3–1.5 mm.

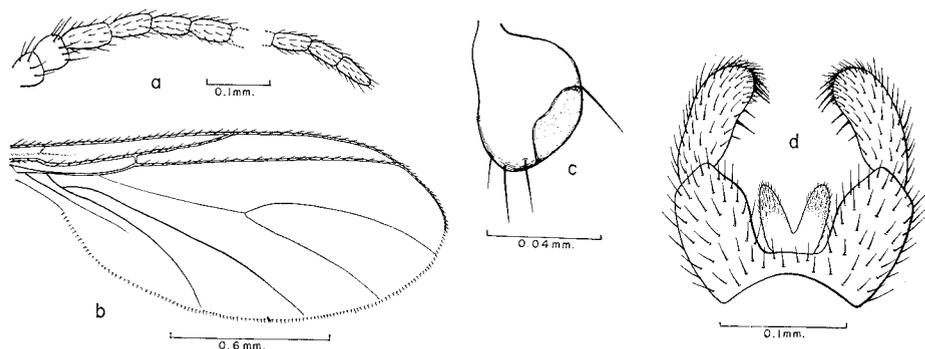


Figure 79—*Hyperlasion magnisensoria* (Hardy): a, antenna; b, wing; c, palpus; d, male genitalia, ventral view.

Genus **SPATHOBDELLA** Frey

Spathobdella Frey, 1948, Not. Ent. 27:72.

This genus is distinguished from *Plastosciara* Berg by having the second seg-

ment of the palpus elongate, at least as long as the first. The group contains but two known species (*S. cunctans* (Winnertz) and *dehrita* Frey), both from Europe. One species at hand apparently fits here; I see no satisfactory way to separate it from *Spathobdella*.

Type of genus: *Sciara cunctans* Winnertz.

***Spathobdella setigera*, new species** (figs. 80a-c).

This is readily distinguished from the other two known species by lacking the single strong apical or subapical spine on the male clasper.

MALE. Head: Eye bridge composed of two rows of facets, eyes rather thickly haired. Antennae yellow-brown, the nodes of the flagellar segments one-half longer than wide; the attenuated portions of the segments about one-third as long as the nodes. The first segment of the palpus oblong, about half again as long as wide. The second segment three times longer than wide and slightly longer than the first (fig. 80a); it has three apical setae and four setae on the dorsal surface. **Thorax:** Dark brown to black. Dorsocentral and marginal setae well developed on mesonotum, acrostichals lacking except for a few small setae near front margin of thorax. Scutellum apparently with four to six moderately strong setae on hind margin (broken off on one side on the specimen at hand). **Legs:** Largely yellow, coxae and trochanters tinged with brown. Spurs of hind tibiae one-half times longer than the diameter of the tibia. Hind basitarsi about half as long as the tibiae, the latter with a row of moderately strong, erect setae extending down the posterodorsal surface on the apical two-thirds of the segment. **Wings:** Slightly fumose, costa extending four-fifths the distance to the apex of vein M_1 . R_1 equal in length to the r-m crossvein and one-third longer than the base of M. The base of $M_{3+4} + Cu_1$ about four-fifths as long as M. Crossvein r-m with three or four setae. M_{1+2} slightly longer than M_2 . **Abdomen and genitalia:** Dark brown to black, clothed with brown to black setae. The ninth tergum one-half wider than long, gently convex on the hind margin, and with the setae distributed over the posterior half of the segment (fig. 80c). The sternum short and broad, not much longer than the claspers. The latter about two and one-

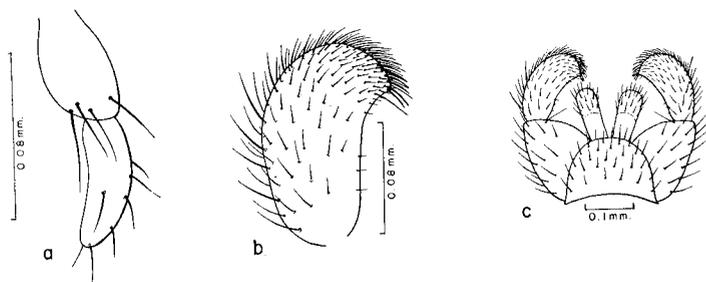


Figure 80—*Spathobdella setigera* n.sp.: a, palpus; b, male claspers; c, male genitalia, dorsal view.

half times longer than wide, blunt at apices, with no spines but with the apices densely covered with hairs (fig. 80b).

Length: body, 2.0 mm.; wing, 1.7 mm.

FEMALE. Unknown.

Holotype male: Keanakolu, Hawaii, 5,200 ft.; October 29, 1952 (C. P. Hoyt). Type returned to the B. P. Bishop Museum (Type No. 2487).

Family CECIDOMYIIDAE Newman
Gall Midges

Cecidomyites Newman, 1834, Ent. Mag. 2:386.

Cecidomyidae Macquart, 1838, Dipt. Exot. 1(1):79; also 1838, Mem. Soc. Sci. Lille 1(2):83.

Cecidomyides Westwood, 1840, Intro. Modern Class. Ins., London 2:518.

Cecidomyidae Rondani, 1856, Dipt. Ital. 1:41.

Cecidomyidae Schiner, 1864, Verhandl. Zool.-Bot. Gesellschaft, Wien 14:211.

Cecidomyiidae Kertész, 1902, Cat. Dipt. 2:1.

Itonidae Felt, 1911, Jour. N. Y. Ent. Soc. 19:31.

Itonididae Felt, 1912, Jour. N. Y. Ent. Soc. 20:102.

For more complete synonymy see Handlirsch, in Schröder (1925:956).

The family name comes from the Greek *kekidos*, a gall, plus *myia*, fly, and refers to the galls formed by many of the species.

Rather small, fragile flies, usually with slender legs and antennae; characterized by having the thickening of the costa continuous around the wing, becoming weakened and gradually evanescent on the hind margin. The costa is often broken for a short way beyond tip of R_{4+5} ; the thickening beyond the radial veins is less distinct in the Lestremiinae. Most of our species (excepting the subfamily Lestremiinae) may be recognized by the reduced wing venation, there being but three to four longitudinal veins and no crossveins. The antennae are also very characteristic, consisting of numerous cylindrical, subglobose petiolate or binodose segments usually bearing prominent whorls of long hairs; the males usually have twisted and looped filaments, called circumfila, (fig. 98a) or have verticili on the segments. Some Lestremiinae very closely resemble specimens of Sciaridae and some (especially *Anarete*) look very much like scatopsids. Enderlein (1911:125; 1936:59) has treated Lestremiinae as a subfamily of Sciaridae, and, according to Edwards (1938:23), "the genus *Anarete* has sometimes been placed in the Scatopsidae, while two apparently scatopsid genera have been included by Felt in the Lestremiinae and a species of *Lestremia* has been described by Malloch in the Sciarine genus *Zygoneura*." The Lestremiinae are differentiated from these other groups by having the costal margin thickened all around the wing, the wing membrane hairy, and the flagellar segments of antennae with crenulate whorls or verticili (even if short). The development of the antennal segments and their sensory structures are different (figs. 59b, 70a, 82a, and 87e) as are the genitalia