

## NOTES ON HAWAIIAN SCIARIDAE (Diptera) AND DESCRIPTIONS OF TWO NEW SPECIES<sup>1</sup>

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**Abstract:** Two new species are described from the Hawaiian Islands: *Bradysia bishopi* n. sp. from Oahu I. and *Phytosciara (Prosciara) vulcanata* n. sp. from Hawaii I. and Maui I. New combinations include *Bradysia molokaiensis* (Grimshaw), *Bradysia setigera* (Hardy), *Lycoriella (Lycoriella) hoyti* (Hardy), *Lycoriella (Lycoriella) solispina* (Hardy). New synonyms include *Sciara (Lycoriella) hardyi* Shaw=*Bradysia impatiens* (Johannsen) and *Plastosciara (Cosmosciara) brevicealcarata* Hardy=*Plastosciara (Termitosciara) pernicioso* Edwards. New records for the Hawaiian Islands include *Corynoptera brevipalpis* Steffan and *Lycoriella (Lycoriella) mali* (Fitch).

The following notes and new descriptions are presented to provide names for a forthcoming paper on laboratory studies of Hawaiian Sciaridae. In order to bring the generic placement of Hawaiian Sciaridae up to date, all name changes since Hardy (1960) are included. A revisionary study of Hawaiian Sciaridae is in progress and will include detailed locality records, but since new species are still being discovered, it may not be completed for several years.

***Bradysia bishopi* Steffan, new species** Fig. 1a-f.

*Sciara (Lycoriella) radicum*: Hardy (not Brunetti 1912), 1960: 227-228, fig. 75c-e.

♂. **Head:** Interfacetal hairs abundant, extending well beyond outer curvature of facets; eye bridge 4 facets wide. Anterior ocellus almost touching margin of eye bridge. **Antenna:** flagellomeres with distinct necks about  $1/6 \times$  as long as base; hair about subequal to width; hyaline sensilla abundant; flagellomere 4 (fig. 1a) about  $2.4 \times$  as long as wide. Prefrons with 2 long and 9 shorter median setae. Clypeus bare. Palpus 3 segmented (fig. 1b), 1st with 2 dorsal setae and several stout hyaline sensilla; 2nd slightly shorter than 1st; 3rd subequal to 1st.

**Thorax:** Acrostichals and dorsocentrals well developed, dorsocentrals extending along dorsal  $1/3$ . Posterior pronotum bare; anterior pronotum and proepisternum each with 4 long setae. Posterior mesepimerite relatively long. **Legs:** length of coxa, 0.33 mm; femur, 0.43; tibia, 0.54; basitarsomere, 0.27; fore tibial comb (fig. 1c) composed of 12 long setae in single row. Hind tibial comb composed of 9 long apical setae, spurs almost  $2 \times$  as long as width of tibial apex. Tarsal claws elongate with indistinct basal tooth. **Wing:** length, 1.52 mm, width, 0.57. R-M index 2.0, C-M index 0.7, r-m/bM 0.8, stCu/bM 0.6. Posterior wing veins bare.

**Abdomen:** Abdominal setae long. Terminalia as in fig. 1d. Basimere simple. Distimere finger-like with 5-7 stout spines along apex and preapex, usually apical spine distinctly separated from preapical spines, but considerable variation occurs. Genital rod elongate. Tegmen and Tergite IX as figured (fig. 1d-e).

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♀. Similar to ♂ but larger. Wing length, 1.94 mm. Vaginal furca with inflated stem (fig. 1f).

Holotype ♂ (BISHOP 9942), HAWAIIAN ISLANDS: Oahu I. : Kailua, at black light; 11.XI.1968, W. A. Steffan; allotype ♀ and 100 ♂♂ and 100 ♀♀, same data. All speci-

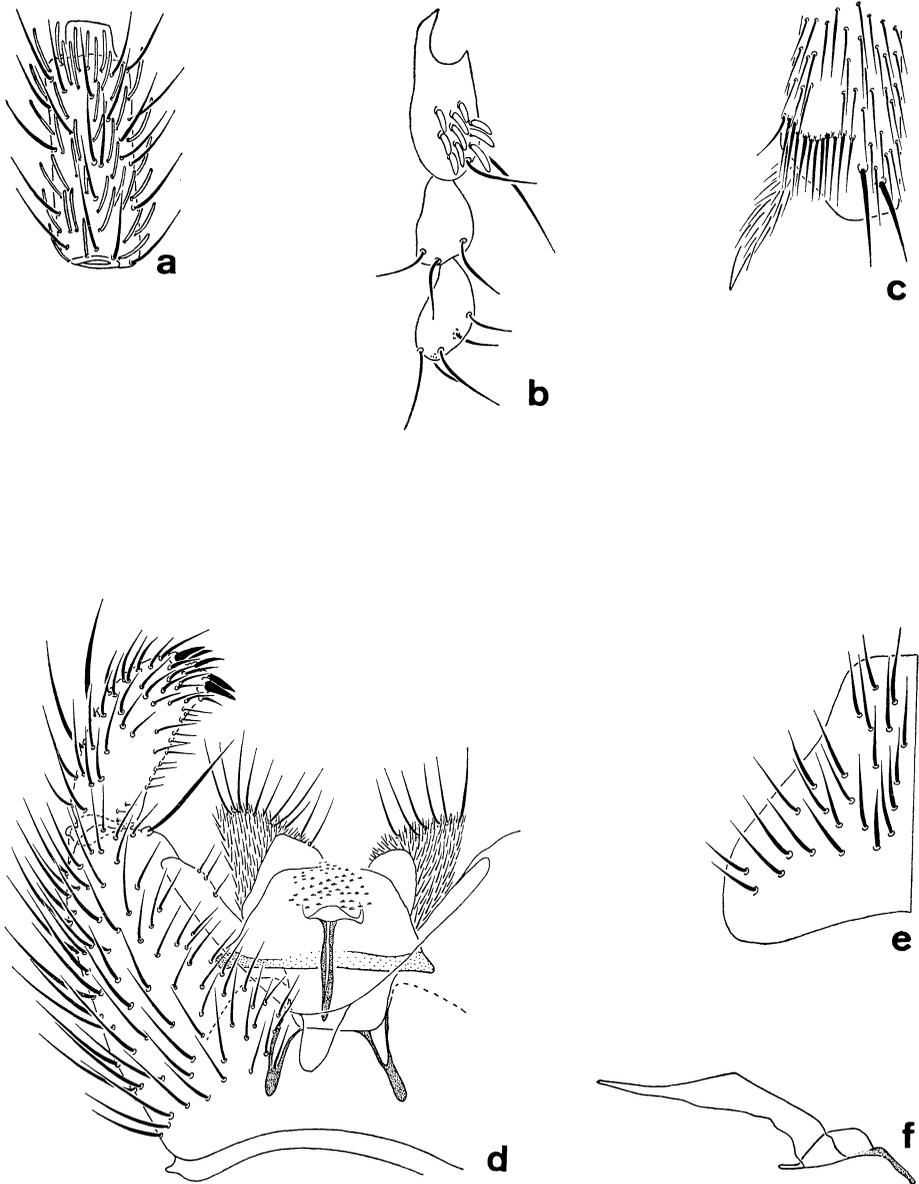


Fig. 1. *Bradysia bishopi* ♂, a, flagellomere 4; b, maxillary palpus; c, apex of fore tibia; d, genitalia, ventral view; e, tergum IX; ♀, f, vaginal furca, lateral view.

mens were reared from a single ♀ captured on the above date. The holotype ♂ and allotype ♀ are from generation F<sub>9</sub>. The holotype, allotype, and 9 ♂♂ paratypes are on slides; all other paratypes in alcohol.

Several species may be involved in the complex named *Sciara radicum* by Edwards (1928, 1933a, 1933b), Hardy (1960), and *B. radicum* by Steffan (1969). These misidentifications of *B. radicum* were all based on Edwards' initial misidentification of a Samoan species as *S. radicum* (Edwards, 1928). Steffan (1972) redescribed *B. radicum* and found that Edwards' *S. radicum* was distinctly different from the cotype specimens of *S. radicum* Brunetti.

The species identified as *B. radicum* from Micronesia (Steffan, 1969) may be identical to *B. bishopi*. There are some differences between these various populations and some differences between the Hawaiian populations called *S. radicum* (Hardy, 1960; Steffan, unpubl.). An intensive study of these populations is needed before they can be identified as *B. bishopi*. Therefore, only specimens reared from the same female parent of the holotype are designated paratypes of *B. bishopi*.

#### **Bradysia impatiens** (Johannsen)

*Sciara impatiens* Johannsen, 1912: 136, fig. 137, 252.

*Neosciara impatiens*: Pettey, 1918: 327.

*Bradysia impatiens*: Stone & Laffoon, 1965: 233.

*Sciara (Lycoriella) hardyi* Shaw, 1952: 493. — Hardy, 1960: 223-224, fig. 71a-e. **New Synonym.**

This is apparently a cosmopolitan species closely associated with man. It is common in greenhouses. In Hawaii, it is a common lowland species and is found on all major islands. The Palearctic species, *B. fungicola* (Winnertz, 1867) may be conspecific. There may be several closely related species involved rather than the apparently highly variable *B. impatiens*. *B. impatiens* belongs to *B. fungicola* group of Tuomikoski (1960) which is distinguished by the light setation and the more or less toothed tarsal claws.

#### **Bradysia molokaiensis** (Grimshaw), new combination

*Sciara molokaiensis* Grimshaw, 1901: 2. — Shaw, 1952: 491-492.

*Neosciara molokaiensis*: Bryan, 1934: 405-406, 447.

*Sciara (Lycoriella) molokaiensis*: Hardy, 1960: 226-227, fig. 74a-c.

*Sciara (Lycoriella) stonei* Shaw, 1952: 495, fig. 5. — Hardy, 1960: 226 (Synonymy).

The identification of *B. molokaiensis* is uncertain since the type female supposedly deposited in the British Museum (Natural History), is apparently lost. The only specimen of *B. molokaiensis* in the British Museum collection has the locality label, "Honolulu 1902." The unique female of *B. molokaiensis* was reportedly collected in the Molokai Mountains on Molokai Island. The published elevation of 6500 ft. is incorrect since the highest point on Molokai is 4970 feet. Probably the species currently called *B. molokaiensis* is not the true *B. molokaiensis*, since it is usually found in the lowland areas of all the major islands. It is rarely collected in the higher elevations. Hardy (1960) designated homotypes from Puu Kolekole and Maunawainui, Molokai. *B. molokaiensis sensu* Hardy is very similar to *B. scabricornis* Tuomikoski (1960) and belongs in Tuomi-

koski's *B. fungicola* group.

**Bradysia setigera** (Hardy), new combination

*Spathobdella setigera* Hardy, 1960: 234-235, fig. 80a-c.

There is considerable variation in the number of segments of the maxillary palpus with varying degrees of fusion of segments 2 and 3; however, there are usually 3 distinct segments. Therefore, *B. setigera* does not belong to *Spathobdella*, which is characterized by 2-segmented palpi. The genitalia of *B. setigera* are very similar to those of *Corynoptera pammela* Edwards which was described from Malaya. *B. setigera* fits in Tuomikoski's *B. praecox* group keying out near *B. iridipennis* Zetterstedt *sensu* Frey (1948).

**Bradysia spatitergum** (Hardy)

*Sciara (Lycoriella) spatitergum* Hardy, 1956: 85-86, fig. 10a-c; 1960: 229-230, fig. 77a-c.

*Bradysia spatitergum*: Steffan, 1968: 515-518, fig. 1a-g, 2.

*B. spatitergum* is closely related to *B. radicum* Brunetti 1912, not Hardy 1960. *B. radicum* has been redescribed from cotype specimens collected in Calcutta, India (Steffan, 1972) and differs from the Hawaiian species previously identified as *B. radicum*. *B. spatitergum* was redescribed by Steffan (1968). It is an introduced species and probably came from South America. It is widespread on all the major Hawaiian Islands and has also been recorded from Brazil and Panama (Steffan, 1968).

**Bradysia tritici** (Coquillett)

*Sciara tritici* Coquillett, 1895: 408, fig. 48a-f.

*Sciara ocellaris*: Comstock, 1882: 203-204, fig. 2, 2a, 2b, 4 (misidentification of *Cecidomyia ocellaris* Osten Sacken, 1862) (in part, not fig. 1, 3, 3a, 3b, not gall, not reference to Osten Sacken's species); — Mik, 1883: 128; 1884: 190-192; Johannsen, 1912: 138, fig. 263, 265.

*Sciara (Lycoriella) garretti* Shaw, 1952: 494, fig. 3; Hardy, 1960: 221-223, fig. 70a-g (synonymy of *S. (L.) garretti*, *S. (L.) johannseni* and *S. (L.) laffooni*).

*Sciara (Lycoriella) johannseni* Shaw, 1952 (not *S. johannseni* Enderlein, 1912): 493, fig. 1.

*Sciara (Lycoriella) laffooni* Shaw, 1952: 494-495, fig. 4.

*Bradysia tritici*: Steffan, 1965: 290 (synonymy of *S. ocellaris*: Comstock and *S. garretti*).

*Bradysia tritici*: Steffan, 1969: 723, 725-727, fig. 22a-i (synonymy of *S. johannseni* and *S. laffooni*).

*B. tritici* is a cosmopolitan species closely associated with man. It is commonly found in greenhouses and around potted plants. In the Hawaiian Islands, it is probably distributed throughout the island chain and is primarily restricted to the lowlands.

**Corynoptera brevivalpis** Steffan

*Corynoptera brevivalpis* Steffan, 1969: 695-697, fig. 10a-h.

This is a new record for Hawaii. *C. brevivalpis* was described from the Palau Islands in Micronesia. On Oahu I., Hawaii, it was reared from a rotting *Acacia koa* stump along the Mt Tantalus trail.

**Corynoptera latistylata** (Hardy)

*Sciara (Lycoriella) latistylata* Hardy, 1956: 82-83, fig. 7a-d; 1960: 225-226, fig. 73a-c.  
*Corynoptera latistylata*: Steffan, 1969: 699-701, fig. 12a-h.

*C. latistylata* apparently is an introduced species. It was found in Micronesia and appears to be very similar, if not identical, to *Sciara infantula* Edwards (1931), described from Sumatra. In Tuomikoski (1960), *C. latistylata* keys out to his *Corynoptera forcipata* group near *C. parvula* (Winnertz).

**Ctenosciara hawaiiensis** (Hardy)

*Sciara (Leptosciara) hawaiiensis* Hardy, 1956: 78-80, fig. 5a-c; 1960: 218-219, fig. 69a-d.  
*Ctenosciara hawaiiensis*: Steffan, 1969: 712.

*C. hawaiiensis* is a common species in the mountains of all major Hawaiian Islands. Adults have been reared from rotting *Metrosideros*, *Freycinctia*, *Acacia koa* and several other rotting woods. The larvae are a prominent element under the bark of dead *Acacia koa* (Steffan, 1973).

In addition to the type species, *C. hyalipennis* (Meigen), and *C. hawaiiensis*, the Micronesian species *C. multispinosa* Steffan also belongs to this genus.

**Lycoriella (Lycoriella) hoyti** (Hardy), new combination

*Sciara (Lycoriella) hoyti* Hardy, 1956: 80-82, fig. 6a-c; 1960: 224-225, fig. 72a-c.

The type series of *L. hoyti* was reared from moss collected on the north slope of Mauna Kea, on the island of Hawaii, at 1585 m. It has been collected in the mountains of Oahu, Molokai and Maui.

*L. hoyti* would fit in Tuomikoski's (1960) group 3 of *Lycoriella (Lycoriella)*. The distimere is similar to that of *L. pallidor* Tuomikoski but it differs in the absence of any medial setae on the basimere.

**Lycoriella (Lycoriella) mali** (Fitch)

*Malobrus mali* Fitch, 1856: 486.

*Sciara mali*: Osten Sacken, 1858: 11.

*Lycoriella mali*: Steffan, 1965: 290.

*Sciara pauciseta* Felt, 1898: 224-225, fig. 2, 4, 12; 1899 (1896): 224-225, fig. 2, 4, 12. — Steffan, 1965: 290 (synonymy).

*Neosciara pauciseta*: Pettey, 1918: 323.

*Lycoriella (Lycoriella) pauciseta*: Tuomikoski, 1960: 79.

This species was originally described from specimens reared from a rotting apple infested by the codling moth, *Carpocapsa pomonella*. Felt (1898) described *S. pauciseta* from specimens reared from decaying potatoes. *L. mali* is commonly found in greenhouses. The Hawaiian specimens were collected by W. Gagné at Kokee, Kauai, 18.XI. 1968, by sweeping vegetation and represent a new state record. In North America, it is found in British Columbia, Ontario, California, and from New Hampshire to Pennsylvania and New Jersey.

*L. mali* fits in group 2 of Tuomikoski's *Lycoriella (Lycoriella)* which is characterized by a median lobe on the basimere with about 10 setae. This group contains *L. (L.)*

*brevipila* Tuomikoski, *L. (L.) solani* (Winnertz), *L. (L.) curvispina* Tuomikoski and *L. (L.) pallidior* Tuomikoski. *L. mali* is closely related to *L. solani*.

***Lycoriella (Lycoriella) solispina* (Hardy), new combination**

*Sciara (Lycoriella) solispina* Hardy, 1956: 84-85, fig. 9a-c; 1960: 228-229, fig. 76a-e.

This is apparently an introduced species and is either very closely related to or conspecific with *Lycoriella similans* (Johannen, 1925) described from New York. The male terminalia and wing venation are similar. The paratype male of *L. similans* I examined has 3-4 rows of facets while *L. solispina* has 3 rows. Additional specimens of *L. similans* need to be studied before the relationship of these two species can be determined.

*L. solispina* belongs to the complex containing *L. similans* Johannsen, *L. caesar* Johannsen from Canada and the Palearctic species *L. auripila* Winnertz, *L. fucorum* Frey and *L. approximatonervis* Frey. *L. auripila* may be an older name for *L. similans*.

***Phytosciara (Prosciara) vulcanata* Steffan, new species** **Fig. 2a-h.**

♂. *Head*: Interfacetal hairs abundant, extending well beyond outer curvature of facets; eye bridge 3 facets wide. Anterior ocellus less than 1-2 width of ocellus from margin of eye bridge. *Antenna*: flagellomeres with distinct necks; hairs about 1/2 width, on tubercles; hyaline sensilla present on flagellomere 1; flagellomere 4 (fig. 2a) about 2.5 × longer than wide; flagellomeres becoming longer anteriorly. Prefrons with 6 long median and 10 shorter lateral setae. Clypeus with 1 median seta. Palpus 3 segmented (fig. 2b); segment 1 with 2 long dorsal setae and numerous hyaline sensilla in a circular patch on dorsal surface, 3rd segment long, almost 2 × as long as 2nd.

*Thorax*: Acrostichals and dorsocentrals well developed, dorsocentrals extending along anterior 1/4. Posterior pronotum bare, pale; anterior pronotum with 4 long setae, pale; proepisternum with 6 long median setae, pale. Posterior mesepimerite relatively long. Legs pale; fore legs: length of coxa, 0.48 mm; femur, 0.66; tibia, 0.85; basitarsomere, 0.60; fore tibial comb (fig. 2c) composed of 9 long setae in single row, preapical setae enlarged and extending over base of comb. Hind tibial comb with 5 and 7 enlarged apical setae, spurs distinctly longer than width of tibial apex. Tarsal claws (fig. 2d) with 2 large subbasal teeth. *Wing*: length, 2.54 mm, width, 0.97 mm. Venation as in fig. 2e. R-M index 1.4; C-M index 0.7; r-m/bM 1.3; stCu/bM 0.8.

*Abdomen*: Abdominal setae long. Terminalia as in fig. 2f-g. Each basimere with submedial lobe covered with dense, long setae. Distimere with 5-6 stout subapical setae arranged on short subdorsal lobe, apex of distimere with dense patch of setae on ventral surface. Tegmen and Tergite IX as figured.

♀. Similar to ♂ but larger. Wing 3.13 mm. Vaginal furca as figured (fig. 2h).

Holotype ♂ (BISHOP 9943), HAWAIIAN IS.: Hawaii I.: east slope Mauna Loa, 2134 m, ex pitfall trap P. 0280 10-17.VII.1972. J. Jacobi. Allotype ♀, same as holotype except Kipuka Puau. 1220 m, ex pitfall trap P. 0106. 1-2.XI.1971. J. Jacobi. Paratypes: 33 ♂♂, 25 ♀♀, Hawaii I.; Kipuka "6"; 32.9 km of W Hilo. 1600 m, sweeping. 1.XII.1968. HW 177. W. Gagné. 3 ♂♂, Hawaii I.: Kazumura Lava Tube nr. Mt. View. 400 m. ex rat feces. 15.VII.1972. WS72-67. F. W. Howarth.

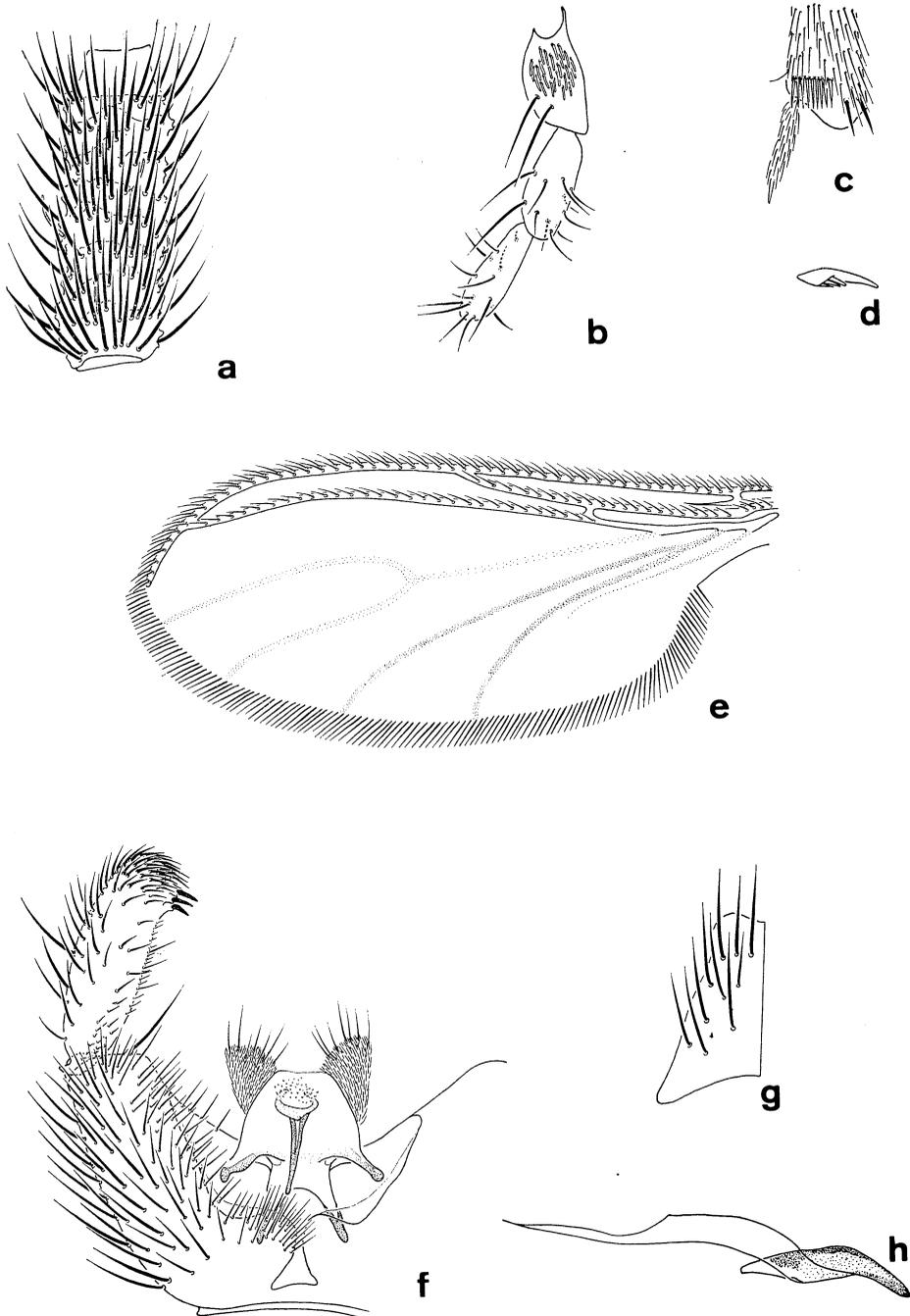


Fig. 2. *Phytosciara (Prosciara) vulcanata*, ♂, a, flagellomere 4; b, maxillary palpus; c, apex of fore tibia; d, tarsal claw; e, wing; f, genitalia, ventral view; g, tergum IX; ♀, h, vaginal furca, lateral view.

**Plastosciara (Termitosciara) perniciosa** Edwards

*Plastosciara perniciosa* Edwards, 1922: 160-161.

*Cosmosciara perniciosa*: Frey, 1942: 39 (type-species of *Cosmosciara* by original designation).

*Plastosciara (Cosmosciara) perniciosa*: Frey, 1948: 71.

*Plastosciara (Termitosciara) perniciosa*: Tuomikoski, 190: 39.

*Plastosciara (Cosmosciara) brevicealcarata* Hardy, 1956: 73-75, fig. 2a-c; 1960: 214, fig. 67d-g.

**New Synonym.**

I have examined Edwards type series and find *P. perniciosa* conspecific with *P. brevicealcarata*. This is apparently a cosmopolitan species frequently found in greenhouses and undoubtedly has been spread throughout the world by man. *P. perniciosa* will be redescribed and its distribution discussed in a later publication. *P. adrostyalata* Hardy, *P. longicosta* Hardy and *P. latipons* Hardy also belong in the subgenus *Termitosciara*.

*P. perniciosa* in Hawaii displays some unusual biological behavior involving winged and wingless males and females. This phenomena will be discussed in a subsequent paper.

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