

SYNOPSIS OF HAWAIIAN EULOPHIDAE INCLUDING APHELININAE (Hym. : Chalcidoidea)

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Abstract: The Hawaiian Chalcidoidea comprises 10 families. Studies on the family Eulophidae are presented here. On the basis of morphological characters, Aphelininae is treated as one of 6 subfamilies. A total of 33 genera and 71 species are enumerated. Keys to all categories are included with descriptions of a new genus and 4 new species, synonymy, distribution and host records.

In the Hawaiian Chalcidoidea, the family Eulophidae (including the subfamily Aphelininae) comprises one of the important economic groups of parasitic Hymenoptera. Except for a small number in this family, all have been introduced to the Islands. They are principally parasitic on Aphididae, Aleyrodidae, Diaspididae, Pseudococcidae, Coccidae, Tephritidae, Agromyzidae, Gracilariidae and Noctuidae. In general, the Chalcidoidea of continental faunas represent a large number of genera, with complex speciation within a single genus. But in Hawaii, the introduced genera are largely represented by one or two species each. There are not many species involved in the few endemic genera.

The Hawaiian Sugar Planters' Association has for many years been interested in controlling sugar cane pests and pests of other economic plants in Hawaii. Many prominent entomologists contributed biological and systematic information on the parasitic Hymenoptera. Likewise, the Hawaii State Department of Agriculture has contributed interesting work on parasitic Hymenoptera.

Knowledge of Eulophidae from the Hawaiian Islands is based on papers by Ashmead (1901), Timberlake (1922, 1924, etc.), Fullaway (1920, 1932, etc.), Swezey (1929, 1946, 1950, etc.) and other investigators. I am including species of eulophids studied by the aforementioned investigators, excluding those species that were released in the field for biological control but have not become established over the span of years.

The purpose of this study is to provide a suitable key to the families of Chalcidoidea, and to the genera and species of Eulophidae. Included are bibliography, synonymy, host records for all the known local species, distribution records, and description of new species.

A total of 33 genera and 71 species of Hawaiian Eulophidae are listed in Table 1. This list includes the subfamily Eulophinae with 5 genera, 13 species; Tetrastichinae with 5 genera, 13 species; Elachertinae with 4 genera, 6 species; Entedontinae with 7 genera, 12 species; Euderinae with a single genus and a species; and Aphelininae with 11 genera and 27 species.

The following papers on Eulophidae were very useful in this study. W. H. Ashmead

Table 1. Distribution of species of Hawaiian Eulophidae.

	Hawaiian Islands										Others	
	Hawaii	Maui	Molokai	Lanai	Oahu	Kauai	Niihau	Nihoa	Laysan	Midway		Kure
EULOPHINAE												
1. <i>Diglyphus begini</i>	×	×			×							U.S.
2. <i>Pnigalio externa</i>	×	×			×	×						
3. <i>Sympiesis konae</i>	×											
4. <i>S. sparsus</i> , n. sp.	×	×			×	×						
5. <i>S. hawaiiensis</i> , n. comb.	×	×										
6. <i>S. vagans</i> , n. comb.	×	×			×	×		×				
7. <i>S. mauiensis</i> , n. comb.	×	×			×							
*8. <i>Hemiptarsenus semialbiclavus</i>	×				×							Australia, Philippines, Saipan, Caroline Atolls, Marshall Is.
9. <i>Pauahiana swezeyi</i> , n. sp.	×	×	×		×							
10. <i>P. maculatipennis</i> , n. comb.	×	×			×	×						
11. <i>P. lineata</i> , n. sp.	×				×	×						
12. <i>P. metallica</i> , n. sp.	×		×		×	×						
TETRASTICHINAE												
13. <i>Tetrastichus beardsleyi</i>					×							S. Nigeria, Fiji, California
14. <i>T. giffardianus</i>		×	×		×							U.S., Worldwide, Guam, Palau, Yap, Caroline Atolls
*15. <i>T. hagenowii</i>	×	×	×		×	×						Yangambi, Nairobi, Africa
16. <i>T. dacicida</i>		×			×	×						Africa
17. <i>T. nr bruchophagi</i>					×							Nairobi, Africa
18. <i>T. nr skolowskii</i>		×			×	×						
19. <i>T. sp.</i>	×											
*20. <i>Ootetrastichus beatus</i>	×				×							Queensland, Australia, Fiji, Guam, Saipan, Palau
21. <i>O. formosanus</i>	×		×		×	×						Taiwan, Guam, Palau, Caro- line Atolls, Truk, Ponape
*22. <i>Aceratoneuromyia indicum</i>					×							India, Guam, Fiji
23. <i>Melittobia peles</i>	×				×							
*24. <i>M. hawaiiensis</i>	×	×	×		×							Guam, Ponape, Wake, Truk, S. Africa, West Indies
*25. <i>Melittobiopsis ereunetiphila</i>					×	×						Guam, Indonesia
ELACHERTINAE												
26. <i>Euplectrus platypenae</i>	×	×	×		×							Continental U.S., Mexico West Indies, Philippines, Fiji
*27. <i>Elachertus advena</i>	×	×			×				×			Guam, Palau, Caroline Atolls, Ponape, Kusaie, Gilbert
28. <i>E. giffardi</i>					×							

* Data taken from Yoshimoto & Ishii, 1965, *Insects of Micronesia*, B. P. Bishop Museum 19(4).

	Hawaiian Islands										Others	
	Hawaii	Mau	Molokai	Lanai	Oahu	Kauai	Niihau	Nihoa	Laysan	Midway		Kure
29. <i>E. sp.</i>												
30. <i>Cirrospilus sp.</i>		×	×		×	×						
31. <i>Zagrammosoma flavolineatum</i>					×							Colorado, California
*32. <i>Euderus metallicus</i>	×	×	×		×	×			×			Guam, Palau, Yap, Caroline Atolls
ENTEDONTINAE												
*33. <i>Burksia viridimaculata</i>	×				×							Palau, Florida
34. <i>Chrysocharis parksi</i>					×	×						Continental U.S.
35. <i>C. majoriani</i>					×							Sao Paulo, Brazil
*36. <i>Derostenus fullawayi</i>	×	×			×	×						U.S., Canada, Palau
37. <i>D. sp.</i>												
38. <i>Horismenus depressus</i>					×							California
39. <i>H. sp.</i>					×		×					Canada, New York, S. Carolina, California
40. <i>Pediobus wilderi</i>	×		×		×							
41. <i>P. detrimentosus</i>	×	×	×		×	×						
42. <i>P. sp.</i>					×							
43. <i>Ceranisis brui</i>	×	×			×	×						
44. <i>Closterocerus sp.</i>	×				×							
APHELININAE												
45. <i>Eretmocerus corni</i>					×							Continental U.S., Argentina, Paraguay, Chile
46. <i>E. haldemani</i>					×							Florida, Mississippi, California
47. <i>Archenomus perkinsi</i>					×							
48. <i>A. imitatrix</i>					×							
49. <i>Centrodora xiphidii</i>			×		×	×						
50. <i>Marietta carnesi</i>					×							Japan, Mauritius, Far East
51. <i>M. graminicola</i>			×	×	×							Texas, Maryland
52. <i>Aphytis chrysomphali</i>	×				×							Worldwide
53. <i>A. proclia</i>					×							Worldwide
54. <i>A. lingnanensis</i>					×							China
55. <i>Aphelinus gossypii</i>					×							
56. <i>A. mali</i>					×							Worldwide
57. <i>Aphelinus maidis</i>	×				×							Worldwide
58. <i>A. semiflavus</i>					×							
59. <i>Prospaltella bicolor</i>					×							
60. <i>P. koebelei</i>	×											
61. <i>P. transvena</i>	×											
62. <i>Encarsia formosa</i>					×							Worldwide
63. <i>E. pergandiella</i>					×							

	Hawaiian Islands										Others	
	Hawaii	Maui	Molokai	Lanai	Oahu	Kauai	Niihau	Nihoa	Laysan	Midway		Kure
64. <i>Aspidiotiphagus citrinus</i> <i>agilior</i>					×							Worldwide
65. <i>A. citrinus citrinus</i>	×				×							Worldwide
66. <i>Aneristus ceroplastae</i>	×	×	×		×	×						Worldwide
67. <i>Coccophagus hawaiiensis</i>					×							
68. <i>C. lycimnia</i>	×	×			×	×						Worldwide
69. <i>C. viridis</i>					×							Worldwide
70. <i>C. ochraceus</i>	×				×							Continental U.S., S. Africa, Eritrea
71. <i>C. sp.</i>					×							

(1904), J. Erdos (1951), M.N. Nikolskaja (1952), O. Peck (1963), and O. Peck, Z. Bouček & A. Hoffer (1964).

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The following key to the families of Chalcidoidea is included in the text primarily to separate the Hawaiian Chalcidoidea as well as families not yet known here. The key may be useful for neighboring Polynesia and other areas in the Pacific.

KEY TO FAMILIES OF CHALCIDOIDEA (after B.D. Burks)

1. Head with an anterior cavity; soft-bodied, small dark species with pale colored, wingless ♂♂; developing only in figs **Agonidae**
- Head without an anterior cavity 2
- 2 (1). Tarsi with 3 segments; minute egg parasites; wings often with bristles arranged in longitudinal rows **Trichogrammatidae**
- Tarsi with 4 or 5 segments 3
- 3 (2). Hind wing pedunculate; small to minute egg parasites; tarsi with 4 or 5 seg-

	ments	Mymaridae
	Hind wing not pedunculate.....	4
4 (3).	Hind tarsus with 4 segments	5
	Hind tarsus with 5 segments	6
5 (4).	Hind coxa not large and flat; small to moderate-sized specimens with anten-	
	nal segments reduced in number, often only 2 or 3 funicle segments present	
	Eulophidae, except some Aphelininae
	Hind coxa large and flat; body slender and wings elongate; small to minute	
	species	Elasmidae
6 (4).	Hind coxa large and long	7
	Hind coxa not large and long	8
7 (6).	Hind coxa round in cross-section; hind femur enlarged and toothed ventral-	
	ly; cercus biscuit-like and located well anterior to posterior margin of 7th	
	gastral tergum	Chalcididae
	Hind coxa approximately triangular in cross-section, ridged dorsally; hind	
	femur usually not enlarged and toothed ventrally; cercus exerted and arti-	
	culated at bases, located at posterior margin of 7th tergum.....	Torymidae
8 (6).	Mid tibial spur large, for jumping; mesopleuron without a femoral furrow;	
	tarsi always with an elongate 1st segment	
	Encyrtidae (including Thysaninae, Eupelminae, Tanaostigmatinae)
	Mid tibial spur relatively weak.....	9
9 (8).	Mandible sickle-shaped, thorax gibbous	Eucharitidae
	Mandible not sickle-shaped	10
10 (9).	Abdomen short, subtriangular; thorax elevated and grossly punctate... Perilampidae	
	Abdomen elongate	11
11 (10).	Pronotum semiquadrate, thorax usually unilobate-punctate dorsally ... Eurytomidae	
	Pronotum transverse.....	12
12 (11).	Stigmal vein minute, sessile; all species minute... Eulophidae (most of Aphelininae)	
	Stigmal vein elongate, never sessile; species moderate to large in size	
	Pteromalidae

Family EULOPHIDAE

KEY TO HAWAIIAN SUBFAMILIES OF EULOPHIDAE

1. Submarginal vein of fore wing broken proximal to marginal vein, usually shorter than marginal, radial vein rarely long, postmarginal vein nearly always absent or slightly developed, rarely equal or longer than radial.....2
 Submarginal vein of fore wing not broken before uniting to marginal vein, usually equal or longer in length than marginal, radial rarely short, postmarginal vein always present, usually equal to or longer than radial.....4
2. Parapsidal furrows incomplete; abdomen often petiolate; axilla rounded at anterior margin, rarely produced.....**Entedontinae**
 Parapsidal furrows complete; axilla angulate and produced into scapula 3
3. Scutellum with 2 longitudinal grooved lines**Tetrastichinae**
 Scutellum without grooved lines **Euderinae**
4. Parapsidal furrows wanting, incomplete or slightly visible on posterior 1/3...**Eulophinae**

- Parapsidal furrows complete, entire, distinct.....5
5. Postmarginal vein distinctly developed; small to medium-sized wasps over 1 mm long, body usually long, weakly sclerotized; tarsi 4-segmented..... **Elachertinae**
- Postmarginal vein wanting; small wasps of usually less than 1 mm long; body usually stout and not metallic in color; tarsi 5-segmented (except *Eretmocerus* and *Archenomus* 4-segmented).....**Aphelininae**

Subfamily EULOPHINAE

KEY TO HAWAIIAN GENERA OF EULOPHINAE

1. ♀ with 2 funicle segments; ♂ with 2 or 3 unbranched funicle segments; scutellum with 2 dorsal grooved lines **Diglyphus**
♀ with 3 or 4 funicle segments; ♂ with 4 or 5 branches; scutellum without dorsal grooved line 2
2. Antenna inserted near middle of face; costal cell of fore wing narrow...**Hemiptarsenus**
Antenna inserted below middle of face; costal cell of fore wing broad.....3
3. Propodeum with transverse costula.....**Pnigalio**
Propodeum without transverse costula 4
4. Propodeum micro-reticulate, with distinct median carina; ♀ funicle 4-segmented; ♂ with 4 or 5-segmented funicles and with or without branches.....**Sympiesis**
Propodeum generally smooth and polished, without carina, or if present, a short, thin, indistinct carina extending 1/2 its length; ♀ funicle 3-segmented; ♂ funicle 3-segmented and unbranched **Pauhiana**

Genus **Diglyphus** Walker

Diglyphus Wlk. 1844, Ann. Mag. Nat. Hist. **14**: 409 (type: *Cirrospilus chabrias* Wlk.; monobasic).—Peck, 1963, Canad. Ent., Suppl. **30**: 102-4.—Peck, Bouček, & Hoffer, 1964, Canad. Ent., Mem. **34**: 92.

Solenotus Foerster, 1856, Hym. Stud. **2**: 74, 76.

Diaulinus Schulz, 1906, Spolia Hym., p. 143.

Diglyphus begini (Ashmead)

Diaulus begini Ashm., 1904, Mem. Carnegie Mus. **1**: 356, 372.

Diaulinus sp., Timb., 1924, Proc. Haw. Ent. Soc. **5**: 444.—Look, 1951, *Ibid.* **14**: 205.

DISTRIBUTION: Hawaiian Is. (Oahu, Maui).

HOSTS: Lepidoptera, Gracilariidae: *Parectopa marginestrigata* (Walsm.) (reared by Swezey). Diptera, Agromyzidae: *Liriomyza pusilla* (Meigen). (See Peck 1963 for additional host records).

Genus **Pnigalio** Schrank

Pnigalio Schr., 1802, Fauna Boica **2**(2): 315 (type: *Ichneumon pectinicornis* Linnaeus; monobasic).—Peck, 1963, Canad. Ent., Suppl. **30**: 86-90.

Pnigalio externa (Timberlake) Fig. 1a.

Notanisomorphomyia externa Timb., 1927, Proc. Haw. Ent. Soc. **6**: 522.

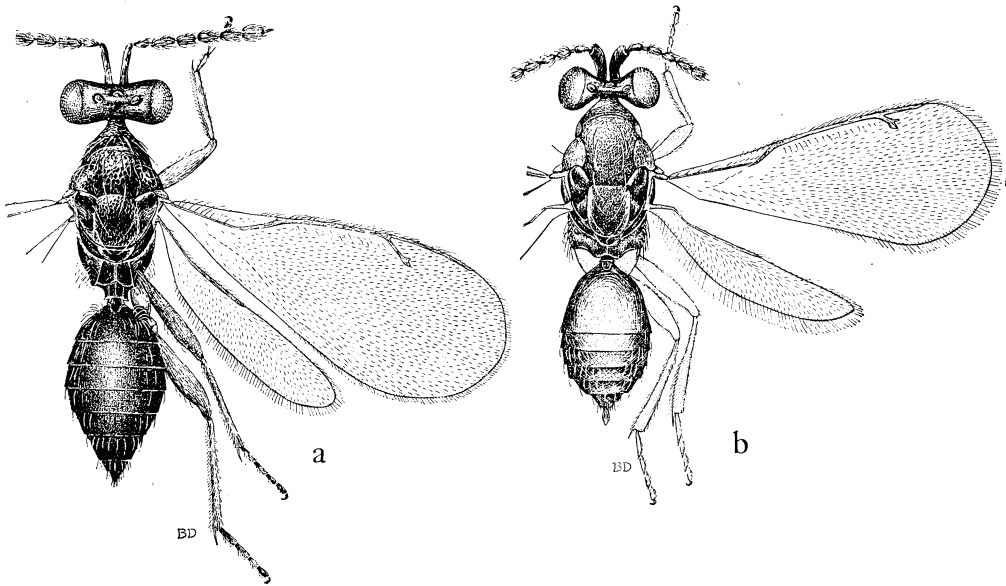


Fig. 1. a, *Pnigalio externa* Timberlake, ♀; b, *Sympiesis sparsus* n. sp., ♂.

DISTRIBUTION: Hawaiian Is. (Oahu, Maui, Hawaii, Kauai).

HOSTS: Lepidoptera, Gracilariidae: *Bedellia orchilella* Walsm.; *Cremastobombycia lantanella* Busck, *Parectopa marginestrigata* (Walsm.), *P. neraudicola* (Swezey), *P. hibiscella* (Sw.), *P. epibathra* (Walsm.), *P. hauicola* (Sw.); Lyonetiidae: *Euhypostracoma trivitella* Sw.; Hyponomeutidae: *Philodoria pipturicola* Sw.; Gelechiidae: *Aristotelia* sp. Diptera, Agromyziidae: *Agromyza* sp. in *Cocculus*.

Genus *Sympiesis* Foerster

Sympiesis Foers., 1856, Hym. Stud. 2: 74, 76 (type: *Eulophus sericeicornis* Nees; orig. design.).—Peck, 1963, Canad. Ent., Suppl. 30: 90-99.

KEY TO HAWAIIAN SPECIES OF SYMPIESIS

- 1. Body metallic greenish blue 2
- Body brownish to fuscous with some metallic tinge 3
- 2. Mesonotum and scutellum small, with deep reticulation; tergites 2-5 with broad, longitudinal yellow streak along both lateral margins.....**vagans**
- Mesonotum and scutellum polished, with shallow, or impression of, reticulation; tergites either brownish or fuscous.....**hawaiiensis**
- 3. Anterodorsal corner of prepectus, a small area immediately behind tegula, tibiae and tarsi yellowish.....**sparsus**
- Body entirely brownish to fuscous; legs brownish yellow or partly fuscous 4
- 4. Body length of ♀ 3.0-3.4 mm long; abdomen elongate, fusiformly pointed; coxae brownish or fuscous, ♂, 2.0 mm long; legs except tarsi fuscous or metallic black **mauiensis**

Body length of ♀ 2.0-2.5 mm long; abdomen short and ovate; fore and mid coxae yellowish brown, ♂ 1.5 mm long; legs entirely brownish yellow except coxae dark brown **konae**

Sympiesis konae Ashmead

Sympiesis konae Ashm., 1901, Fauna Hawaiiensis 1: 331.

DISTRIBUTION: Hawaiian Is. (Hawaii)

Sympiesis hawaiiensis (Ashmead), n. comb.

Hemiptarsenus hawaiiensis Ashm., 1901, Fauna Hawaiiensis 1: 330.

DISTRIBUTION: Hawaiian Is. (Hawaii).

Z. Bouček and G. J. Kerrich have examined the type specimen of ♀ *Hemiptarsenus hawaiiensis* Ashm. No. 1297, British Museum (Nat. Hist.). Both verified that *Hemiptarsenus* of Ashmead is not congeneric but closely related to *Sympiesis* Foerster. I am tentatively placing this species under this genus.

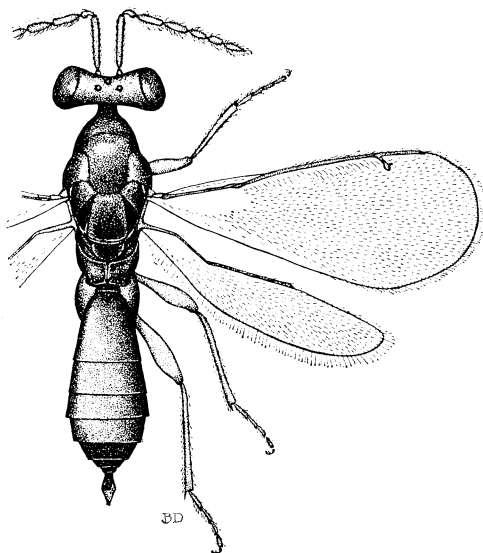


Fig. 2. *Sympiesis mauiensis* (Ashmead), ♂.

DISTRIBUTION: Hawaiian Is. (Nihoa, Maui, Oahu, Kauai).

HOSTS: Lepidoptera, Gracilariidae: *Parectopa hibiscella* (Swezey), *P. marginestrigata* (Walsm.), *P. hauicola* (Swezey). Diptera, Agromyzidae: *Liriomyza pusilla* (Meigen) reared by C. Garcia.

Sympiesis sparsus Yoshimoto, n. sp. Fig. 1b.

Sympiesis sp. Swezey & Bryan, 1929, Proc. Haw. Ent. Soc. 7: 296.

♀. Body length 2.0-2.5 mm; fore wing 1.5-2.0 mm long.

Body generally fuscous to aeneous black or sometimes reddish brown. Parts of scape

Sympiesis mauiensis (Ashmead), n. comb.

Fig. 2.

Ophelinus mauiensis Ashm., 1901, Fauna Hawaiiensis 1: 329.—Swezey, 1931, Proc. Haw. Ent. Soc. 7: 502.

DISTRIBUTION: Hawaiian Is. (Hawaii, Maui, Oahu, Kauai).

HOST: Lepidoptera, Hyponomeutidae: *Hyposmocoma chilonella* Wlsm.

Sympiesis vagans (Timberlake), n. comb.

Fig. 3.

Pseudopheliminus sp., Timb., 1924, Proc. Haw. Ent. Soc. 5: 352, 354, 445.—Editor, 1924, *Ibid.* 5: 485.

Pseudopheliminus vagans Timb., 1926, Bull. B. P. Bishop Mus. 31: 27, 41.—Krauss, 1944, Proc. Haw. Ent. Soc. 12: 92.—Look, 1951, *Ibid.* 14: 205.—Swezey, 1951, *Ibid.* 14: 205.

and occasionally apex of club pale yellow. Mouthparts including mentum area orange yellow. Legs entirely yellow except for mid and hind coxae which are concolorous with body; sometimes anterior 1/2 of fore coxa yellowish. Anterior dorsal corner of prepectus and a small area behind tegula pale yellow. Fore wing hyaline and sparsely ciliate.

Head as wide as thorax; front of face longitudinally convex without scrobes; fronto-vertex and clypeal area broad. Ocelli in obtuse-angled triangle, posterior pair separated from inner eye margin by 1/2 the distance between posterior ocelli. Eyes hemispherical and surface with sparse, short hairs.

Antenna inserted below middle of face; scape elongate, touching anterior ocellus; funicle and club segments with dense, thick long hairs; ratio of antennal segments 4.0 : 1.5 : 2.5 : 2.0 : 1.5 : 2.75* (*club=1.5 : 1.0 : 0.10). Pronotum short, acute anteriorly; mesoscutum with indistinct parapsidal furrows; mesoscutum with shallow, large reticulation and scutellum more or less rectangular, sloping at edge, surface slightly convex in center, with predominantly minute reticulation, and 2 pairs of bristles at lateral periphery.

Abdomen shorter than head and thorax combined, flattened dorsally and ovate. Ovipositor sheath exerted about 1/2 distance of length of last tergite. Surface of hind coxa rugose. Dense, long white hairs on metapleura. Propodeum rugulose with a median carina.

Fore wing cilia short on anterior and posterior margin except in basal portion and lateral margin longer; submarginal, marginal, radial and postmarginal approximately in ratio of 5.5 : 12.0 : 1.5 : 3.0; submarginal vein with 10-12 bristles.

♂. Length of body 1.0-2.0 mm; fore wing 0.8-1.5 mm long. Similar to ♀ in general except as follows: in general, antennal funicle and club segments shorter than ♀; scape elliptical, somewhat flattened on outer side.

Holotype ♀ (BISHOP 6120), Upper Hamakua Ditch Trail, Hawaii, 30.VII.1921, O.H. Swezey. Allotopotype ♂, same data as holotype.

Paratypes. OAHU: 2♀♀, Kaluanui, 22.II.1931, ex *Hibiscus*, Swezey; ♀, Kaluanui, 26.III.1933, ex *Broussaisia*, Swezey; ♀, Puu Kaua, 3.V.1925, Swezey; ♀, Kawaihoa, 18.VII.1932, ex *Perrottetia*, Swezey; ♀, Konahuanui, 26.II.1914, Swezey; ♀, Mt Kaala, 22.II.1929, Swezey; ♀, Mt Kaala, 4.VII.1916, Zimmerman; ♀, Mt Kaala, 22.I.1938, Swezey; ♀, Mt Kaala, 6.III.1929, Swezey; ♀, Kahana, 27.II.1928, ex *Philodoria pipturiella*, Swezey; ♀, ♂, Opaepa, 30.II.1913, Swezey; ♀, Castle Trail, 27.IX.1938, ex *Hibiscus arnottianus*, Bryan, Jr.; 3♂♂, Mt Tantalus, 4.VII.1956, Beardsley; ♂, Mt Tantalus, 27.I.1927, Swezey; ♂, Mt Olympus, 3.I.1915, Swezey; ♂, Palolo, 3.I.1915, Swezey; ♂, Kaumuohona, 12.XII.1907, Swezey. HAWAII: 3♀♀, ?♂♂, Upper Hamakua Ditch Trail, 30.VII.1921, Swezey; ♀, Kilauea, 13.X.1929, ex ferns, Swezey; ♂, Kilauea, 4.VIII.1946, Zimmerman; ♂, Kipuka Ki, Kilauea, 7.VI.1947, on *Pipturus*, Swezey; ♂, Upolu, 9.VI.1922, Swezey; 2♀♀, Nauhi Gulch, 1500-1800 m, 30. IX. 1931, Swezey & Williams. MAUI: 3♂♂, Iao Valley, 28. II. 1926, on "Ohia lehua", Swezey; ♂, Waikapu, 23.III.1924, Swezey; ♂, Kula Pipe Line, 1350 m, 20. III.1922, Swezey; ♂, Olinda, 13.V.1926, on *Cheirodendron*, Swezey. KAUAI: 4♂♂, Kalalau Lookout, 1200 m, VIII.1953, Hardy; ♂, Kalalau, 20.VIII.1921, on *Osmanthus*, Swezey; 3♂♂, Kokee, 21.VIII.19??, Swezey; ♂, Kumuweia, 27.VI.1932, ex *Cheirodendron*, Swezey; 2♂♂, Nualolo, 26.VI.1932, ex *Pipturus* & *Bidens cosmoides*, Swezey.

Not in type series: 10♀♀, Ukulele, Maui, 13.VII.1919, on *Rubus*, Timberlake; ♀, Kula Pipe Line, Maui, 3.IV.1932, Bryant; ♀, Haelelaau, Maui, 19.XII.1928, on *Broussaisia*, Swe-

zey; ♀, Kalalau, Kauai, 20.VIII.1921, on *Osmanthus*, Swezey; ♀, Lanai, 900 m, II.1894, Perkins.

Genus **Hemiptarsenus** Westwood

Hemiptarsenus Wstw., 1833, Mag. Nat. Hist. **6**: 122 (type: *H. fulvicollis* Wstw.; design. Wstw., 1840).—Peck, 1963, Canad. Ent., Suppl. **30**: 101.

Hemiptarsenus semialbiclavus (Girault)

Hemiptarsenoideus semialbiclava Gir., 1916, Mem. Queensland Mus. **5**: 220.

Hemiptarsenus semialbiclavus Gir., 1924, Homo Perniciosus and New Hymenoptera p. 4.—Van Zwaluwenburg, 1947, Proc. Haw. Ent. Soc. **12**: 30.—Look, 1948, *Ibid.* **13**: 219.

DISTRIBUTION: Hawaiian Is. (Oahu, Hawaii).

HOST: Diptera, Agromyzidae: *Pseudonapomyza spicata* Malloch.

Genus **Pauahiana** Yoshimoto, n. gen.

♀. Antenna 8-segmented with a ring segment; antennal segments gradually thickened apically with an ovate club; ♂ antenna similar to ♀ except antennal scape large, ovate, 1.3× as long as broad, flattened, and convex to elongate-ovate, 3× as long as broad and slightly flattened. Antennal scape nearly reaching anterior ocellus; funicle 3-segmented, segment 1 longest. Head and frontovertex narrow and clypeal area broad. Hind tibia with 2 spurs. Marginal vein 2× longer than submarginal vein; postmarginal vein 2.3–2.5× longer than radial. Propodeum short and without a definite median carina. Parapsidal furrows incomplete or faintly indicated on posterior 1/3. Fore and hind marginal cilia of fore wing short, apical margin slightly longer.

Type Species: *Pauahiana swezeyi* Yoshimoto, n. sp. (present designation).

This new genus is closely related to the genera *Necremnus* Thomson and *Diaulomorpha* Ashmead but differs from the former in having a longer postmarginal vein, the scape not extending beyond the anterior ocellus and the ♂ antennal scape enlarged. It differs from the latter by not having 2 grooved lines on the scutellum and funicle segments 2 and 3 subequal in length.

The ♀ type specimen of *Necremnus maculatipennis* Ashm. No. 1298 at British Museum (Nat. Hist.) and allotype ♂ No. 6483 at USNM are not *Necremnus* but closely related. *Diaulomorpha australiensis* Ashmead No. 4902 of USNM is also a near relative of this genus.

Because *Pauahiana swezeyi* n. sp. exhibits essential characteristics of this group and is commonly found in large numbers throughout the Hawaiian Islands, I am designating this species as type rather than selecting Ashmead's. Furthermore, based on the external morphology and color pattern of the named species of this group, it seems that the ancestral stock may have evolved from a group similar to this species.

This genus is named in honor of the late Princess Bernice Pauahi Bishop, direct descendant of the Hawaiian Monarchy and in whose memory Bishop Museum was established.

KEY TO SPECIES OF PAUAHIANA N. GEN.

1. Mesonotum and scutellum metallic bluish green; meso- and metapleura brown and

- polished 2
 Mesonotum and scutellum brown to black with some metallic tinge; pleura concolorous with body 3
 2. Fore coxa and tibiae yellowish; ratio of antenna (5.0 : 1.5 : 2.0 : 1.5 : 1.5 : 3.0); ♂ lower 1/2 of face yellowish..... **swezeyi**
 Coxae and tibiae fuscous; ratio of antenna (4.0 : 1.5 : 2.0 : 1.0 : 1.0 : 2.0); funicle segment 2 and apex of club orange yellow; face entirely brown or frontovertex with yellow spots **metallica**
 3. Fore coxa brownish to fuscous..... 4
 Fore coxa yellowish; ♂ lower 1/2 of face including mouthparts and gena pale yellow **swezeyi**
 4. Antennal funicle segments 1 and 2, and tip of club distinctly yellow to yellow-orange; legs pale yellowish except coxae and hind femur brown or fuscous..... **maculatipennis**
 Antenna brown except tip of club whitish; legs pale yellow except tarsi and tibiae brownish **lineata**

Pauahiana swezeyi Yoshimoto, n. sp. Fig. 3b.

♀. Body length 1.7 mm; fore wing 1.5 mm long.

Thorax metallic bluish green: sometimes meso- and metacoxae shiny brown to fuscous; head pale brown to dark brown with a single large yellow spot covering area of ocelli; abdomen shiny black to dark brown. Antenna brown to dark brown mixed with irregular yellowish spots. Fore wing hyaline except for a small pale brown spot extending vertically from radial area. Legs, mouthparts including mentum area yellowish.

Head as wide as thorax; face convex without scrobes and with few short scattered hairs; frontovertex narrow, clypeal area broader; ocelli in a very obtuse angled triangle, posterior pair separated from inner eye margin by slightly more than distance between posterior ocelli.

Antenna inserted somewhat below middle of face; scape elongate, nearly touching anterior ocellus; funicle segment 1 longest, cylindrical, 3× as long as broad; funicle segment 2 shorter and slightly broader than 1, 3× as long as broad; segment 3 broader than 2, as long as broad and shorter than 2; club 2× as long as broad, broader than last funicle segment; scape and pedicel with scattered thin hairs, funicle and club segments with thick hairs; antennal ratio 5.0 : 1.5 : 2.0 : 1.5 : 1.5 : 3.0. Pronotum short, acute anteriorly; mesoscutum with indistinct parapsidal furrows; mesoscutum and scutellum with regularly spaced hairs; surface of mesoscutum and scutellum with minute reticulation, scutellum broad and flattened, 2 pairs of bristles at lateral periphery.

Abdomen shorter than head and thorax combined (4 : 6), flattened dorsally and ovate, 7-segmented; tergite 1, 2× as long as 2, other tergites subequal in length. Ovipositor sheaths exerted about length of last tergite. All coxae smooth and polished.

Fore wing cilia short on anterior and posterior margin except on basal portion and apical cilia longer; submarginal, marginal, radial and postmarginal approximately in ratio of 5.0 : 9.5 : 1.0 : 2.5; submarginal vein with 15 bristles.

♂. Length of body 1.5 mm; fore wing 1.3 mm. Similar to ♀ in general except as follows: Antennal funicles and club segment much more slender than those of ♀; scape

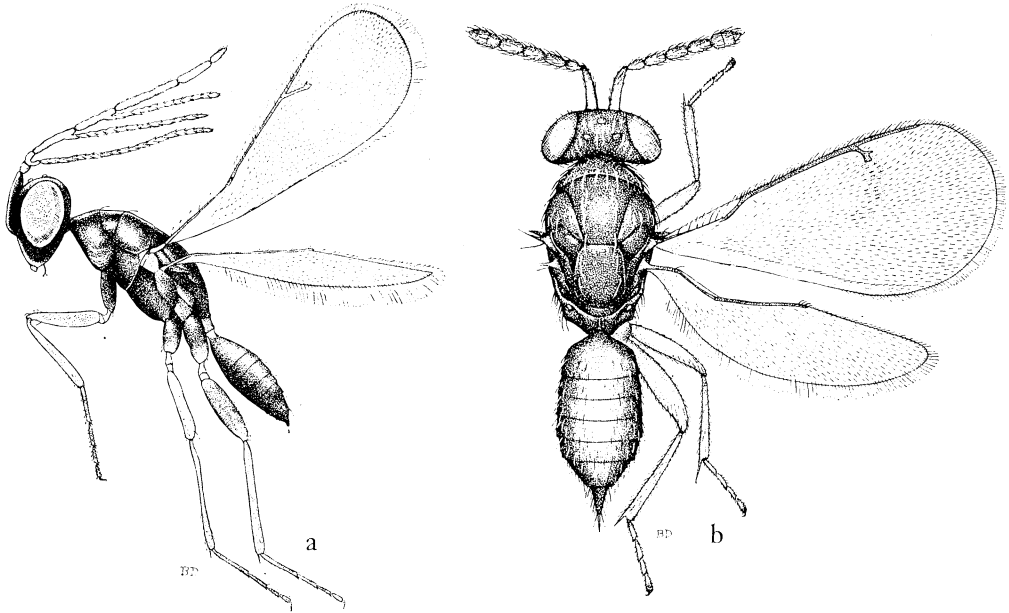


Fig. 3. a, *Sympiesis vagans* (Timberlake), ♂; b, *Pauahiana swezeyi* n. sp., ♀.

expanded into a large, broad, ovate shape, $1.3\times$ as long as broad, flattened at outer side and convex at inner side; pedicel and funicle segments with fewer brownish spots, club brown. Lower $1/2$ of face largely yellowish.

Holotype ♀ (BISHOP 6121), Mt Tantalus, Oahu, 27.VIII.1933, O.H. Swezey, ex *Metrosideros*. Allotopotype ♂, 4.VII.1956, J.W. Beardsley. Paratypes: paratopotypes ♂, 29.III.1918, ♀, 23.II.1925, Swezey, ♀, VI.1955, Beardsley, 7♀♀, 8♂♂, VII.1956, Beardsley; 3♀♀, Pupukea Trail, Oahu, 27.II.1957, Beardsley, ♀, Mt Olympus, Oahu, 31.III.1935, Swezey; ♀, Palolo, Oahu, 3.I.1915, Swezey; ♂, Palolo, Oahu, 14.IV.1936, ex *Metrosideros*, Swezey; 3♂♂, Kalihi, Oahu, 22.IV.1923, Swezey; ♂, Pauoa Flats, Oahu, 27.IV.1934, *Metrosideros*, Swezey; 2♀♀, 2♂♂, Kawaiiloa Rdg., Oahu, 20.XI.1934, ex *Metrosideros*, Swezey; 2♀♀, Kilauea, Hawaii, 19.VI.1934, ex *Metrosideros*, Swezey; ♀, Kilauea, Hawaii, 12.VII.1934, ex *Dodonaea*, Swezey; 3♀♀, Kilauea, Hawaii, 1200 m, 25.I.1915, Gifford; 2♀♀, Kilauea, Hawaii, 4.VII.1946, Zimmerman; ♂, Kilauea, Hawaii, 14.VI.1947, ex *Trioza* gall on *Metrosideros*, Swezey; 6♀♀, Kilauea, Hawaii, 14.X.1929, ex "Ohia lehua", Swezey; 2♂♂, Upololu, Hawaii, 9.VI.1922, ex "Ohia lehua," Swezey; 4♂♂ Kilauea, Hawaii, 22.VI.1917, ex "Ohia lehua," Swezey; 3♂♂, 6♀♀, Niulii, Hawaii, 1.V.1917, ex psyllid on "Ohia", Swezey; ♂, Upper Hamakua, Hawaii, 14.X.1929, Swezey.

Not in type series: OAHU: ♀, Tantalus, 8.VIII.1909, ex *Pipturus* leaf miner, Swezey; ♂, Tantalus, 19.III.1918, ex psyllid in galls on leaves *Metrosideros tremuloides*, Swezey; ♂, Tantalus, 29.III.1918, Swezey; ♂, Kalihi, 450 m, Osborn; ♂, Waimano, 5.I.1913, Swezey; 2♂♂, Manini Gulch, 25.IX.1934, ex *Metrosideros*, Swezey; ♂, Wailupe, 23.I.1915, Swezey; ♂, Palolo, 26.XII.1914, Swezey; ♂, Pacific Hts., 29.III.1918; 2♂♂, ♀, Mt. Kaala, 11.VIII.1912, Swezey; 16♀♀, 23♂♂, Hauula, 11.V.1916, ex *Trioza* on *Metrosideros*, Swezey; ♀, 5♂♂,

Wahiawa, 3.VI.1921, ex "Ohia lehua", Swezey; 2♀♀, 3♂♂, Kalihi, 17.V.1914, Swezey; ♀, Palikea, 30.VI.1935, ex *Pelea*, Swezey; ♀, Waiahole, 13.VIII.1933, ex *Parectopa hibiscella*, Swezey. HAWAII: 3♀♀, Kilauea, 1200 m, 15.I.1915, Swezey; 3♀♀, Kilauea, VIII.1920, ex *Cheirodendron*, Swezey; 4♀♀, 2♂♂, Kilauea, 15.V.1911, 27.VI.1917, ex "Ohia lehua", Swezey; 6♂♂, Kilauea, 14.VI.1947, 12.VII.1934, ex psyllid on "lehua", ex *Trioza* gall, Swezey; 8♀♀ 20♂♂, Niulii, 9.V.1917, Swezey; 11♀♀, Kohala Mt, 24.V.1917, Swezey; 3♀♀, Upololu, 9.VI.1922, ex "Ohia lehua", Swezey; ♀, Honokaa, 760 m, 28.V.1922, Swezey. MOLOKAI: 8♀♀, 9♂♂, Kainalu, 180-450 m, 540-660 m, 21.VII.1927, Bryan Jr. MAUI: ♂, Iao Vall., 28.II.1926, ex "Ohia lehua", Swezey; ♂, Iao Vall., 29.VII.1906, Swezey?

***Pauhiana maculatipennis* (Ashmead), n. comb.**

Necremnus maculatipennis Ashm., 1901, Fauna Hawaiiensis 1 (3): 331.

♀. Body length 2.1-1.2 mm; fore wing 1.5-1.2 mm long.

Mesonotum and scutellum ferrugineous to fuscous, leathery, pleura brownish. Lower portion of head pale brown. Antenna dark to pale brown, except funicle segments 1 and 2 plus part of segment 3 and apex of club yellowish. Mouthparts including mentum area brown. Fore wing with infuscate to dark brown maculate spots on radial vein area. Legs yellowish except coxae, hind tibia and femur concolorous with body.

Dense hairs around ocelli. Ocelli in obtuse-angled triangle, posterior pair separated from inner eye margin by about 2× their own diameter and very near to occipital margin.

Antennal club and funicles with dense thick hairs; antennal ratio 4.0 : 1.5 : 2.0 : 1.5 : 1.0 : 2.0. Posterior margin of pronotum with 4 distinctly separated long hairs. Propodeum reticulate. Hind coxa predominantly smooth with a little irregular rugulosity. Fore wing with pale brown spots on radial and at apex of submarginal vein. Metapleuron with sparse thin hairs.

Posterior margin of tergites 2-5 with a row of evenly spaced long hairs. Fore wing of submarginal, marginal, radial and postmarginal approximately in a ratio of 4.0 : 8.0 : 0.5 : 4.0.

♂. Length of body 1.2 mm; fore wing 1 mm. Similar to ♀ in general except as follows: Antenna flattened, scape ellipsoidal, 2× as long as broad; pedicel, funicles, gradually becoming thicker in size, club larger in length and width than *swezeyi*.

Specimens examined: OAHU: 4♀♀, 5♂♂, Mt Olympus, III.1935, I.1936, VI.1935, Swezey, ex *Parectopa* in *Dubautia*; 2♀♀, ♂, Mt Tantalus, VIII.1933, Swezey, ex *Hibiscus*; ♀, Mt Tantalus, VI.1956, VII.1956, Beardsley, reared ex *Pipturus*; ♀, Mt Tantalus, III.1935, Swezey, ex *Hibiscus*; 2♀♀, 4♂♂, Mt Tantalus, III.1915, Swezey, ex *Parectopa ureralla*; ♀, Tantalus, I.1929, II.1906, Swezey; 2♂♂, Tantalus, XII.1906, Swezey, ex leafminer *Pipturus*; ♀, Kahana, IX.1924, Swezey, *Dubautia*; ♀, ♂, Hauula, I.1934, Swezey, ex leafminer in *Dubautia*; 2♀♀, ♂, Kaluanui, II.1931, Swezey, *Hibiscus*; 2♀♀, Waiahole, VII.1933, Swezey, ex *Parectopa hibiscella*; 3♀♀, ♂, Cook Trail, III.1916, Swezey, on *Pipturus albidus*; 2♂♂, Kawailoa Rdg., IV.1933, XI.1934, Swezey, ex *Metrosideros*, ex *Usara*; 2♂♂, Kaumuohona, XII.1907, Swezey; ♂, Pupukea XII.1933, Swezey, ex leafminer in *Mespero mania*; ♂, Castle Trail, 600 m, XI.1937, Zimmerman. KAUAI: 2♀♀, Milolii, VIII.1925, Swezey, ex *Bedellia* in *Dianella*; ♀, Puu Ka Pele, VII.1932, Swezey, *Acacia koa*; ♀, Kumuwia, VI.1932, Swezey, ex *Pipturus*. HAWAII: ♀, Kohala Mts, V.1917, Swezey, "Ohia lehua"; ♀, ♂,

Upololu, VI.1922, Swezey. MAUI: ♀, Haleakala, 1200 m, IV.1894, Perkins.

Pauhiana lineata Yoshimoto, n. sp.

♀. Body length 1.7 mm; fore wing 1.3 mm long.

Mesonotum and scutellum brownish, with 2 yellowish brown lines running vertically from mesonotum to scutellum on lateral margin. Antenna generally brownish with tip of club whitish, scape sometimes yellowish at base. Fore wing with dark brown maculate spot around radial vein area. Legs brownish except tarsi and between articulation of femora and coxae.

Head, frontovertex, ocelli angle and its distances from eye margin similar to *swezeyi*. Antennal ratio 4.0 : 1.5 : 2.0 : 1.5 : 1.5 : 4.0. Pronotum similar to *swezeyi*. Mesonotum and scutellum shiny and micro-reticulate.

Abdomen similar to *swezeyi* except for a definite row of spaced long hairs on posterior margins of each tergite. Ovipositor sheaths slightly exerted. Coxae smooth and polished. Propodeum with median carina and surface rugulose. Long dense whitish hairs on metapleuron.

♂. Body length 1.3-1.4 mm; fore wing 1.0-0.8 mm long. Similar to ♀ in general except for antenna. Antennal club slightly broader than funicles; scape ellipsoidal, 3× as long as broad, slightly flattened at its sides; segment 1 elongate, and cylindrical; 2 subcylindrical, shorter and slightly broader than 1; 3 subequal with 2; club 4× as long as broad, slightly broader than funicle segment 3.

DISTRIBUTION: Hawaiian Is. (Oahu, Hawaii).

Holotype ♀ (BISHOP 6122), Mt Tantalus, Oahu, 10.III.1935, Swezey, ex *Opostega maculata*. Allotopotype, ♂ same data as holotype. Paratypes: paratopotypes, 2♀♀, 1.X.1911, 29.VIII.1909, Swezey, ex *Pelea* leaf miner; 4♀♀, 1♀, 16.XII.1906, Swezey, ex spiral leaf miner of *Pelea* leaf miner; 2♀♀, Kaumuohona, Oahu, 23.I.1909, Swezey, ex miner in *Pelea* leaf; 4♀♀, Pacific Hts., Oahu, 17.XI.1918, Swezey, ex *Opostega* B; 3♀♀, ♂, Palolo, Oahu, 5.IX.1915, Swezey, ex *Opostega* A; 2♀♀, Palolo, Oahu, 22.II.1922, Swezey, ex *Opostega maculata*; ♂ Kaulauea, Hawaii, Kipuka Puaula, 12.X.1927, Swezey; ♀ Kumuweia, 4.VII.1932, Swezey, ex *Opostega*, mine in *Pelea*.

Pauhiana metallica Yoshimoto, n. sp.

♀. Body length 1.5 mm; fore wing 1.5 mm long.

Mesonotum, scutellum, vertex and occipital region of head metallic bluish green. Pleura, coxae, femora, hind tibia, and abdomen polished brown. Antenna fuscous except funicle segment 2 and sometimes part of scape orange yellow. Mandibles and anterior mentum area orange yellow. Fore wing with brown maculate spots below radial vein and infusate area at end of submarginal vein.

Head as wide as thorax; frontovertex, ocelli similar to *swezeyi*. Antenna similar to *swezeyi* except smaller in size; antennal ratio 4.0 : 1.5 : 2.0 : 1.5 : 1.5 : 4.0. Mesoscutum and scutellum similar to *swezeyi*. Hind coxa rugulose. Dense, thick, hairs on metapleuron. Propodeum microreticulate. Fore wing of submarginal, radial and postmarginal in ratio of 5.0 : 9.0 : 1.5 : 3.0.

♂. Length of body 1.2 mm; fore wing 1.0 mm long. Similar to ♀ in general except

as follows: Antenna elongate; scape ovate, 1.5× as long as broad; funicles and club segments flattened, subequal in width.

DISTRIBUTION: Hawaiian Is. (Hawaii, Molokai, Oahu, Kauai).

Holotype ♀ (BISHOP 6123), Malamalama, Oahu, 8.II.1925, Swezey, ex *Euphorbia*. Allotopotype ♂, same data as holotype. Paratypes: paratopotypes 6♀♀, 3♂♂, 8.II.1925, Swezey, ex *Euphorbia*; 3♀♀, Palolo, 14.IV.1935, Swezey, *Metrosideros*; ♀, Palolo, Oahu, 3.IX.1906, Swezey?; ♀, Palolo, 25.VI.1921, Swezey: 3♀♀, Waikane, 14.XII.1924, Swezey, ex *Philolalia splendida*; ♀, Mt Tantalus, 4.VII.1956, Beardsley; ♀, Mt Kaala, Oahu, 22. I. 1929, Swezey; Pauoa Flats, 23.IV.1934, Swezey, *Metrosideros*; ♀, Manoa, Oahu, 15.III.1929, Swezey; ♂, Kahauiki, 28.II.1926, Swezey; ♂, Kumuweia, Kauai, 27.VI.1932, Swezey, *Acacia koa*; ♀, Upper Hamakua Ditch Trail, 4.X.1921, Swezey, ex "Ohia lehua."

Not in type series: OAHU: ♀, ♂, Waikane, 14.XII.1924, Swezey, ex *Philodoria splendida*. MOLOKAI: ♀, Kawela, 23.XII.1925, ferns, Bryan Jr. KAUAI: 2♂♂, Kokee, 14.VI.1932, Swezey; ♀, Mohihi Rdg., 15.VII.1937, Zimmerman; ♀, Kokee, 21.VIII.1937, at light, Zimmerman. HAWAII: ♀, Upper Hamakua Ditch Trail, 1.X.1929, Swezey, *Sadleria* ferns; ♂, Waimea, 20.X.1912, Swezey?, ex leg miner in "Ohia"; ♂, Kohala Mt, 24.IX.1919, Swezey, ex *Philodoria buscebes*.

Subfamily TETRASTICHINAE

KEY TO HAWAIIAN GENERA OF TETRASTICHINAE

1. Mesonotum with median grooved line..... **Tetrastichus**
Mesonotum without median grooved line 2
2. Antennal funicle 2-segmented..... **Melittobiopsis**
Antennal funicle 3-segmented..... 3
3. ♀ Antenna with 4 ring segments..... **Ootetrastichus**
♀ Antenna with 1 or 2 ring segments 4
4. Pronotum transverse, subquadrate or rounded anteriorly..... 5
Pronotum long, conical **Melittobia**
5. Scutellum with 2 distinct longitudinal grooved lines **Tetrastichus**
Scutellum with 4 distinct longitudinal grooved lines..... **Aceratoneuromyia**

Genus *Tetrastichus* Haliday

Tetrastichus Hal., 1843, Trans. Ent. Soc. Lond. 3: 297.—Peck, 1963, Canad. Ent. Suppl. 30: 120-156.

KEY TO HAWAIIAN SPECIES OF TETRASTICHUS

1. Body 0.75-1.0 mm long; yellowish brown species..... **beardsleyi**
Body 1.5-2.2 mm long; brown, fuscous to jet-black species..... 2
2. Mesonotum with irregular pattern of hairs; propodeum smooth, shiny..... **hagenowii**
Mesonotum with 1 or 2 definite rows of hairs on lateral margins; propodeum punctate or micro-reticulate 3
3. Two rows of short hairs (5 in each row); each hair set in a minute depressed area; frontal eye margins and anterolateral corner of mesonotum with yellow markings; trunk of fore wing yellow..... sp.

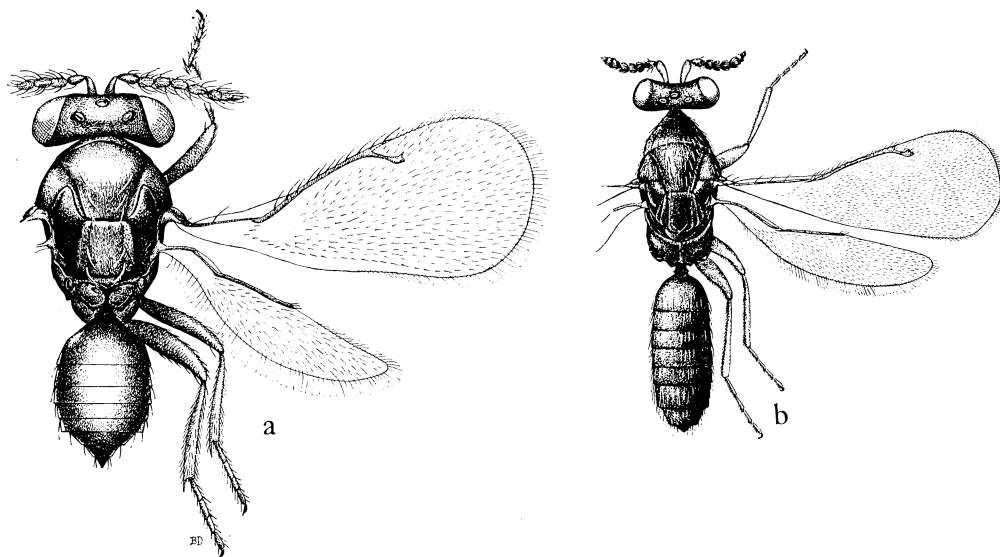


Fig. 4. a, *Tetrastichus giffardianus* Silv., ♀; b, *Melittobia hawaiiensis* Perkins, ♂.

- A single row of 3 to 4 hairs along lateral margin of mesonotum.....4
- 4. Compound eyes reddish with few scattered minute hairs or without visible hairs 5
- Compound eyes dull brownish red with distinctly longer hairs 6
- 5. Hind coxa smooth; trochanter of leg and antennal scape brown; radial vein with 7 cilia..... nr **bruchophagi**
- Hind coxa reticulate; trochanter of leg and antennal scape yellowish; radial vein with 10-12 cilia.....nr **sokolowskii**
- 6. Propodeum not polished, reticulation and carinae distinct; tarsi yellow except tarsal pad; marginal cilia short; radial vein with 3-4 cilia **dacidia**
- Propodeum polished, reticulation and carinae not distinct; antennal scape yellowish brown; terminal tarsal segment and pad brownish; radial vein with 4-6 cilia ...
..... **giffardianus**

Tetrastichus beardsleyi Fullaway

Tetrastichus (Epitetrastichus) beardsleyi Full., 1956, Proc. Haw. Ent. Soc. **16** : 43.

DISTRIBUTION: Hawaiian Is. (Oahu).

Tetrastichus giffardianus Silvestri Fig. 4a.

Tetrastichus giffardianus Silv., 1915, Bol. Lab. Zool. Portici **9** : 372-75.—Swezey, 1923, Proc. Haw. Ent. Soc. **5** : 302.—Timberlake, 1924, *Ibid.* **5** : 442.—Willard, 1927, *Ibid.* **6** : 510, 513-15.—Krauss, 1944, *Ibid.* **12** : 92.—Pemberton, 1949, *Ibid.* **13** : 338.—Pemberton & Willard, 1918, J. Agric. Res., Wash., D.C. **12**(2) : 103.—Bess, Van den Bosch & Haramoto, 1961, Proc. Haw. Ent. Soc. **17** : 368, 372.—Peck, 1963, Canad. Ent., Suppl. **30** : 134.

DISTRIBUTION: S. Nigeria, Fiji, California, Hawaiian Is. (Oahu, Maui, Molokai).

HOSTS: Diptera, Trypetidae: *Rhagoletis completa* (Cresson), *Dacus dorsalis* Hendel.

Tetrastichus hagenowii (Ratzeburg)

Entedon Hagenowii Ratz., 1852, Ichneumoniden der Forstinsecten 3: 211.—Ashmead, 1901, Fauna Hawaiiensis 1: 329.

Tetrastichus hagenowii: Fullaway, 1913, Proc. Haw. Ent. Soc. 2: 287.—Perkins, 1913, Fauna Hawaiiensis, Intro. pp. 107, 214.—Terry, 1910, Proc. Haw. Ent. Soc. 2: 91.—Timberlake, 1924, *Ibid.* 5: 442.—Pemberton, 1941, *Ibid.* 11: 19.—Peck, 1963, Canad. Ent., Suppl. 30: 134.

DISTRIBUTION: Continental U.S., Europe, Fiji, Palestine, Hawaiian Is. (probably all islands).

HOSTS: Blattaria: *Blatta orientalis* L., *Blatella germanica* L., *Eurycotis floridana* Walker, *Periplaneta americana* (L.), *P. australasiae* Fabricius, *P. fuliginosa* Serville. Hymenoptera, Evaniidae: *Evania appendigaster* (L.) (after Peck 1963).

Tetrastichus dacicida Silvestri

Tetrastichus dacicida Silv., 1915, Bol. Lab. Zool. Portici 9: 375.—Weber, 1951, Proc. Haw. Ent. Soc. 14: 330.—Chong, 1953, *Ibid.* 15: 8, 19.—Fullaway, 1954, *Ibid.* 15: 264.—Bess, Van den Bosch, Haramoto, 1961, *Ibid.* 17: 368, 371.

DISTRIBUTION: S. Nigeria, Africa, California, Hawaiian Is. (Oahu).

HOST: Diptera, Trypetidae: *Dacus dorsalis* Hendel.

The introduction of this species to the Hawaiian Islands from February to May, 1950 was probably unsuccessful. To this date, no mention of establishment of this species has been found in the literature. Not represented in the HSPA or Bishop Museum collections.

Tetrastichus nr **sokolowskii** Kurdjumov

Tetrastichus sokolowskii Kurd., 1912, Rev. Russe Ent. (Ent. Obozr.) 12: 238.—Chong, 1954, Proc. Haw. Ent. Soc. 15: 282.—Weber, 1955, *Ibid.* 15: 636.—Peck, 1963, Canad. Ent., Suppl. 30: 150.

DISTRIBUTION: Nairobi, E. Africa, Hawaiian Is. (Oahu, Kauai, Maui).

HOST: Lepidoptera, Plutellidae: *Plutella maculipennis* Curtis.

This parasitic wasp was introduced in May 1953 from Nairobi, E. Africa to control the diamond-back cabbage moth.

Tetrastichus sp.

Tetrastichus sp., Giffard, 1919, Proc. Haw. Ent. Soc. 4: 233.—Timberlake, 1924, *Ibid.* 5: 443.—Editor, 1924, *Ibid.* 5: 486.—Krauss, 1944, *Ibid.* 12: 92.—Suehiro, 1960, *Ibid.* 17: 297.

DISTRIBUTION: Hawaiian Is. (Oahu).

Tetrastichus nr **bruchophagi** Gahan

Tetrastichus bruchophagi Gahan, 1913, Proc. U.S. Natl. Mus. 46: 439.—Swezey, 1931, Proc. Haw. Ent. Soc. 7(3): 383, 390; 1934, *Ibid.* 8(3): 381.

DISTRIBUTION: N. America, Europe, New Zealand, Argentina, Hawaiian Is. (Oahu).

HOST: Hymenoptera, Eurytomidae: *Systole geniculata* Foerster (see Peck 1963, for additional host records).

Genus *Ootetrastichus* Perkins

Ootetrastichus Perk., 1906, Haw. Sugar Planters' Assoc. Expt. Sta., Ent. Bull. 1: 236 (type: *O. beatus* Perkins; monobasic).

KEY TO HAWAIIAN SPECIES OF OOTETRASTICHUS

Body yellowish except for a large marking on mesonotum; tiny spots on dorsolateral margin of abdomen and apical 1/2 of tarsi slightly brownish **beatus**
 Body brownish with metallic tinge; antennae brownish, apical 1/2 of abdomen dark brown **formosanus**

***Ootetrastichus beatus* Perkins**

Ootetrastichus beatus Perk., 1906, Haw. Sugar Planters' Assoc. Expt. Sta., Ent. Bull. 1: 263-64.—Timberlake, 1924, Proc. Haw. Ent. Soc. 5: 442.

DISTRIBUTION: Australia, Fiji, Guam, Saipan, Palau, Hawaiian Is. (Oahu; introduced from Fiji, 1905).

HOST: Leafhopper eggs.

***Ootetrastichus formosanus* Timberlake**

Ootetrastichus formosanus Timb., 1921, Proc. Haw. Ent. Soc. 4: 558-64; 1924, *Ibid.* 5: 442.

DISTRIBUTION: Taiwan, Hawaiian Is. (Oahu, Molokai, Hawaii; introduced from Formosa in 1916).

HOST: Homoptera, Delphacidae: *Perkinsiella saccharicida* Kirkaldy.

Genus *Aceratoneuromyia* Girault

Aceratoneuromyia Gir., 1917, Ins. Inscit. Menst. 5: 151 (type: *A. australia* Gir.; monobasic, orig. design.).

***Aceratoneuromyia indicum* (Silvestri)**

Syntomosphyrum indicum Silv., 1909, Bol. Lab. Zool. Gen. Agraria Portici 4: 232.—Fullaway, 1948, Proc. Haw. Ent. Soc. 13: 216.—Chong, 1953, *Ibid.* 15: 8; 1962, *Ibid.* 18: 63.—Weber, 1951, *Ibid.* 14: 330; 1953, *Ibid.* 15: 127.—Bess, Van den Bosch, & Haramoto, 1961, *Ibid.* 17: 368, 371, 375.

Aceratoneuromyia indicum (Silv.), Gradwell, 1959, Ent. Month. Mag. 94: 277.

DISTRIBUTION: India, Guam, Fiji.

HOST: Diptera, Trypetidae: *Dacus dorsalis* Hendel, *Dacus cucurbitae* Coquillett.

***Aceratoneuromyia* sp.**

Aceratoneuromyia sp., Fullaway, 1961, Proc. Haw. Ent. Soc. 17: 320.

DISTRIBUTION: Hawaiian Is. (Oahu).

Genus *Melittobia* Westwood

Melittobia Wstw., 1847, Trans. Ent. Soc. Lond. 5 (Proc.): XVII, LXV (type: *M. audouinii* Wstw.; monobasic).—Peck, 1963, Canad. Ent., Suppl. 30: 161-63.

Melittobia peles Perkins

Melittobia peles Perk., 1924, Proc. Haw. Ent. Soc. **5**: 441.

DISTRIBUTION: Hawaiian Is. (Oahu, Hawaii).

Melittobia hawaiiensis Perkins Fig. 4b.

Melittobia hawaiiensis Perk., 1907, Proc. Haw. Ent. Soc. **1**: 124; 1925, *Ibid.* **6**: 216; 1910, Fauna Hawaiiensis **2**: 658.—Swezey, 1907, Proc. Haw. Ent. Soc. **1**: 121; 1908, *Ibid.* **1**: 174; 1909, *Ibid.* **2**: 17; 1909, Haw. Sugar Planter's Assoc. Expt. Sta. Bull. **6**: 28; 1913, Proc. Haw. Ent. Soc. **2**: 194; 1915, *Ibid.* **3**: 103; 1926, *Ibid.* **6**: 250; 1931, *Ibid.* **7**: 390.—Giffard, 1913, *Ibid.* **2**: 200.—Timberlake, 1924, *Ibid.* **5**: 441.—Williams, 1927, *Ibid.* **6**: 433, 435, 437, 460.—Swezey & Bryan, 1929, *Ibid.* **7**: 296.—Weber, 1948, *Ibid.* **13**: 206.—Mitchell, 1952, *Ibid.* **14**: 369.—Beardsley, 1960, *Ibid.* **17**: 168.

DISTRIBUTION: Guam, Wake, Truk, West Indies, South Africa, and Hawaiian Is. (Hawaii, Maui, Molokai, Oahu).

HOSTS: Hymenoptera, Vespidae: *Pachodynerus simplicicornis*; Sphecidae: *Pison argentatum*. Diptera, Sarcophagidae: *Amobia* sp.

Genus **Melittobiopsis** Timberlake

Melittobiopsis Timb., 1926, Proc. Haw. Ent. Soc. **6**: 317 (type: *Melittobiopsis ereunetiphila* Timb.; monobasic).

Melittobiopsis ereunetiphila Timberlake

Melittobiopsis ereunetiphila Timb., 1926, Proc. Haw. Ent. Soc. **6**: 319.—Swezey, 1941, *Ibid.* **10**: 457.

DISTRIBUTION: Indonesia, Guam, Hawaiian Is. (Oahu, Kauai).

HOST: Lepidoptera, Tineidae: *Ereunetis flavistriata* Walsm.

Subfamily ELACHERTINAE

KEY TO GENERA OF HAWAIIAN ELACHERTINAE

1. Hind tibia with very short spurs 2
Hind tibia with very long spurs.....**Euplectrus**
2. Antennal funicles 2-segmented.....3
Antennal funicles 3-segmented.....**Elachertus**
3. Wings with 2 dark areas; in dorsal view head longer than wide.....**Zagrammosoma**
Wings hyaline; in dorsal view head wider than long.....**Cirrospilus**

Genus **Euplectrus** Westwood

Euplectrus Wstw., 1832, Phil. Mag. (3) **1**: 128 (type: *E. maculiventris* Wstw.; monobasic).
—Peck, 1963, Canad. Ent., Suppl. **30**: 164-69.

Euplectrus platypenae Howard Fig. 5a.

Euplectrus platypenae How., 1885, Bull. U.S. Dept. Agr., Div. Ent. **5**: 26-27.—Fullaway, 1923, Proc. Haw. Ent. Soc. **5**: 354; 1924, *Ibid.* **6**: 22.—Swezey, 1927, *Ibid.* **6**: 355, 360,

503; 1928, *Ibid.* 7: 9; 1924, Haw. Planters' Record 28(3): 318.—Hadden 1927, Proc. Haw. Ent. Soc. 6: 386.—Swezey & Bryan, 1927, *Ibid.* 6: 414.—Muir & Swezey, 1924, Rept. Comm. Exp. Sta. Haw. Sugar Planters' Assoc. p. 12.—Bianchi, 1946, Proc. Haw. Ent. Soc. 13: 345.—Weber, 1952, *Ibid.* 14: 348.—Davis, 1955, *Ibid.* 15: 403.—Peck, 1963, Canad. Ent., Suppl. 30: 169.

DISTRIBUTION: Continental U.S., Mexico, West Indies, Philippines, Fiji, Hawaiian Is. (Oahu, Hawaii, Molokai, Maui).

HOSTS: Lepidoptera, Noctuidae: *Laphygma exempta* (Walker), *Peridroma margaritosa* (Haworth), *Agrotis ypsilon* Rottenburg, *Pseudaletia unipuncta* (Haworth). (See Peck, 1963 for additional host records).

Genus *Elachertus* Spinola

Elachertus Spinola, 1811, Ann. Mus. Hist. Nat., Paris 17: 151, (type: *Diplolepis lateralis* Spin.; design. by Gahan & Fagan, 1923).—Peck, 1963, Canad. Ent., Suppl. 30: 173.

Elachertus advena Timberlake

Elachertus advena Timb., 1924, Proc. Haw. Ent. Soc. 5: 443; 1926, Bishop Mus. Bull. 31: 33.—Sakimura & Linford, 1940, Proc. Haw. Ent. Soc. 10: 454.—Suehiro, 1960, *Ibid.* 17: 297.

DISTRIBUTION: Guam, Midway, Hawaiian Is. (probably all islands).

HOST: Coleoptera, Scolytidae: *Hypothenemus* sp.

Elachertus giffardi Timberlake

Elachertus giffardi Timb., 1927, Proc. Haw. Ent. Soc. 6: 519.—Editor, 1927, *Ibid.* 6: 558.

DISTRIBUTION: Hawaiian Is. (Oahu).

Elachertus sp.

Elachertus sp., Timb., 1924, Proc. Haw. Ent. Soc. 5: 444.—Editor, 1924, *Ibid.* 5: 486.

DISTRIBUTION: Hawaiian Is. (Oahu).

Genus *Cirrospilus* Westwood

Cirrospilus Wstw., 1832, Phil. Mag. (3) 1: 128 (type *C. elegantissimus* Wstw.; monobasic).—Peck, 1963, Canad. Ent., Suppl. 30: 182–88.

Cirrospilus sp.

Cirrospilus sp., Timb., 1922, Proc. Haw. Ent. Soc. 5: 15; 1924, *Ibid.* 5: 444.

DISTRIBUTION: Hawaiian Is. (Oahu, Kauai, Maui).

HOSTS: Lepidoptera, Gracilariidae: *Cremastobombycia lantenella* Busk, *Parectopa marginestrigata* (Walsm.)

Genus *Zagrammosoma* Ashmead

Zagrammosoma Ashm., 1904, Mem. Carnegie Mus. 1: 354, 393 (type: *Hippocephalus multilineatus* Ashm.; monobasic).—Peck, 1963, Canad. Ent., Suppl. 30: 188–91.

Zagrammosoma flavolineatum Crawford Fig. 5b.

Zagrammosoma flavolineata Craw., 1913, Proc. U.S. Nat. Mus. **45**: 255.—Fullaway, 1950, Proc. Haw. Ent. Soc. **14**: 15.—Beardsley, 1961, *Ibid.* **17**: 314.

Zagrammosoma flavolineatum: Peck, 1961, In Muesebeck *et al*, Agr. Monog. U.S. Dept. Agr. **2**: 459; 1963, Canad. Ent., Suppl. **30**: 188.

DISTRIBUTION: Colorado, California, Hawaiian Is. (Oahu).

HOSTS: Lepidoptera, Gracillaridae: *Parectopa marginestrigata* (Walsm.); Elachistidae:

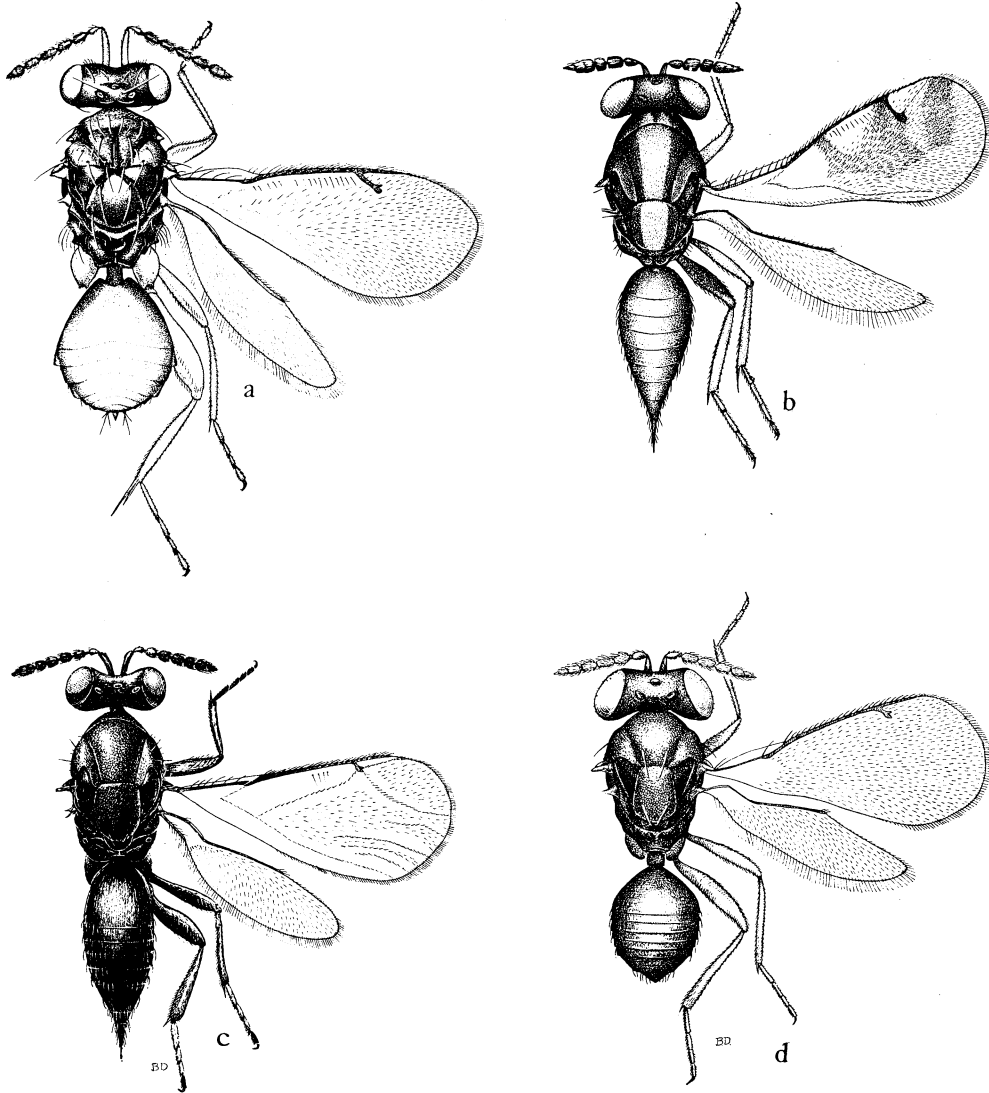


Fig. 5. a, *Euplectrus platypenae* Howard, ♀; b, *Zagrammosoma flavolineatum* Crawford, ♀; c, *Euderus metallicus* (Ashmead), ♀; d, *Chrysocharis parksii* Crawford, ♀.

Swezeyula loniceræ Zimmerman & Bradley.

Subfamily EUDERINAE

Genus **Euderus** Haliday

Euderus Hal., 1843, Trans. Ent. Soc. Lond. **3**: 298 (type: *Entendon amphis* Walker: monobasic).—Peck, 1963, Canad. Ent., Suppl. **30**: 197–201.

Euderus metallicus (Ashmead) Fig. 5c.

Omphale metallicus Ashm., 1901, Fauna Hawaiiensis **1**: 327.—Swezey, 1912, Proc. Haw. Ent. Soc. **2**: 160, 162; 1915, *Ibid.* **3**: 103.—Bridwell, 1919, *Ibid.* **4**: 42.—Perkins, 1913, Fauna Hawaiiensis, Introd., p. 170.

Secodella metallicus: Timb., 1924, Proc. Haw. Ent. Soc. **5**: 440; 1926, Bishop Mus. Bull. **31**: 33.—Swezey, 1926, Proc. Haw. Ent. Soc. **6**: 233; 1935, *Ibid.* **9**: 94.—Swezey & Bryan, 1927, *Ibid.* **6**: 413; 1929, *Ibid.* **7**: 296, 310.—Swezey & Williams, 1932, *Ibid.* **8**: 183.

Euderus metallicus: Krauss, 1944, Proc. Haw. Ent. Soc. **12**: 92.

DISTRIBUTION: Guam, Hawaiian Is. (probably all islands).

HOSTS: Lepidoptera, Tineidae: *Bedellia orchilella* Walsm.; Gracilariidae: *Parectopa ure-rana* (Swezey), *epibathra* (Walsm.), *haucicola* (Swezey), *ureraella* (Swezey), *Philodoria basalis* Walsm., *P. pipturicola* Swezey, *P. auromagnifica* Walsm.; Alucitidae: *Orneodes objurgatella* Walsm.; Carposinidae: *Heterocrossa inscripta* Walsm.; Hyponomeutidae: *Hyposmocoma liturata* Walsm., *H. empedota* Meyr., *alliterata* Walsm.; Gelechiidae: *Aristotelia* sp.; Pyralidae: *Scoparis* sp. Diptera, Agromyzidae: *Agromyza* sp.; trypetid fly. Coleoptera, Curculionidae, *Heteramphus swezeyi* Perkins.

Subfamily ENTEDONTINAE

KEY TO HAWAIIAN GENERA OF ENTEDONTINAE

1. Body weakly sclerotized and sculptured; abdomen usually sessile..... 2
Body strongly sclerotized and sculptured, abdomen often petiolate.....5
2. ♀ antennae with 2-segmented funicle; ♂ rarely without 3-segmented funicle 3
♀ antennae with 3-segmented funicle; postmarginal vein 1.5 × as long as radius,
usually longer..... **Chrysocharis**
3. Thorax smooth; antennal club broader than funicle **Ceranisus**
Thorax minutely reticulate; antennal club not so 4
4. Wing with a single fuscous streak at stigma; flagellar segments not transverse
..... **Derostenus**
Wing with 2 or 3 transverse bands, outer one at apical margin; flagellar segments
transverse **Closterocerus**
5. Scutellum without median grooved line 6
Scutellum with median grooved line.....**Horismenus**
6. Body shiny metallic bluish black; thorax and abdomen stout, propodeum with 2
submedian carinae **Pediobius**
Body yellow with patches of brown; thorax and abdomen elongate; propodeum

with a median carina.....**Burksia**

Genus **Burksia** Fullaway

Burksia Full., 1955, Proc. Haw. Ent. Soc. **15**: 409 (type: *Burksia viridimaculata* Fullaway)

Burksia viridimaculata Fullaway Fig. 6.

Burksia viridimaculata Full., 1955, Proc. Haw. Ent. Soc. **15**: 410.

DISTRIBUTION: Florida, Palau, Hawaiian Is. (Oahu).

Genus **Chrysocharis** Foerster

Chrysocharis Foerster, 1856, Hym. Stud. pp. 79, 82 (type *C. femoralis* Foers.; design. by Ashmead, 1904).—Peck, 1963, Canad. Ent., Suppl. **30**: 201-5.

Chrysocharis parksi Crawford Fig. 5d.

Chrysocharis parksi Craw., 1912, Proc. U.S. Nat. Mus. **43**: 173-74.—Timberlake, Proc. Haw. Ent. Soc. **5**: 440.—Krauss, 1936, *Ibid.* **9**: 16.—Peck, 1963, Canad. Ent., Suppl. **30**: 203.

DISTRIBUTION: Continental U.S., Hawaiian Is. (Oahu).

HOSTS: Diptera, Agromyzidae: *Agromyza parvicornis* Loew, *Cerodontha femoralis* Meigen, *Liriomyza langei* Frick, *L. pictella* Thomson, *L. pusilla* (Meigen), *Ophimyia texana* Malloch, *Phytomyza aquilegiae* Hardy, *P. atricornis* Meigen, *P. obscurella* Fallen (After Peck 1963).

Chrysocharis majoriani (Girault)

Chrysocharodes majoriani Gir., 1917, Descr. Hym. Chalc. Var. cum Observ. p. 10.

Chrysocharis majoriani: Davis & Krauss, 1962, Proc. Haw. Ent. Soc. **18**: 129.—Krauss, 1962, *Ibid.* **18**: 131.

DISTRIBUTION: Sao Paulo, Brazil, Hawaiian Is. (Oahu).

HOSTS: Diptera, Agromyzidae: *Phytobia maculosa* (Malloch).

This species was introduced from Brazil on 18 September 1961, for control of *Phytobia maculosa* but was probably not established here.

Genus **Derostenus** Westwood

Derostenus Wstw., 1833, Mag. Nat. Hist. **6**: 495 (type *D. gemmeus* Wstw.; monobasic).—Peck, 1963, Canad. Ent., Suppl. **30**: 213-16.

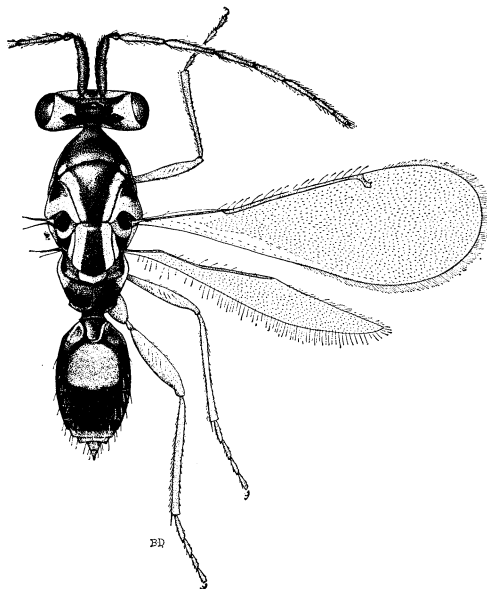


Fig. 6. *Burksia viridimaculata* Fullaway, ♂.

Derostenus fullawayi Crawford

Derostenus fullawayi Crawford, 1913, Proc. U.S. Nat. Mus. **46**: 348.—Peck, 1963, Canad. Ent., Suppl. **30**: 214-5.

Achrysocharis fullawayi: Timb., 1924, Proc. Haw. Ent. Soc. **5**: 440.—Van Zwaluwenburg, 1947, *Ibid.* **13**: 10.—Look, 1948, *Ibid.* **13**: 219; 1951, *Ibid.* **14**: 205.

Derostenus fullawayi: Peck, 1951, *In* Muesebeck *et al.*, Agr. Monogr. U.S. Dept. Agr. **2**: 466.

DISTRIBUTION: Palau, Hawaiian Is. (Oahu, Hawaii, Maui, Kauai).

HOSTS: Lepidoptera, Gracilaridae: *Cremastobombycia lantanelle* Busck, *Parecpopa hibiscella* (Swezey). Diptera, Agromyzidae: *Liriomyza pusilla* (Meigen), *Pseudonapomyza spicata* Malloch.

Derostenus sp.

Achrysocharis sp., Timb., 1924, Proc. Haw. Ent. Soc. **5**: 440.—Davis & Krauss, 1962, *Ibid.* **18**: 129.

DISTRIBUTION: Hawaiian Is. (Oahu, Kauai).

Genus **Horismenus** Walker

Horismenus Walk., 1843, Ann. Mag. Nat. Hist. **11**: 117 (type: *H. cleodora* Walk.; monobasic).—Peck, 1963, Canad. Ent., Suppl. **30**: 217-23.

Horismenus depressus Gahan Fig. 7a.

Horismenus depressus Gahan, 1930, Proc. U.S. Nat. Mus. **77**(8): 8.—Peck, 1963, Canad. Ent., Suppl. **30**: 217.

DISTRIBUTION: California, Hawaiian Is. (Oahu).

SPECIMENS EXAMINED: ♀, Honolulu, Hawaii, 24.VI.1941, ex *Pithecolobium dulce* pods (USNM); 11 ♀♀, 2 ♂♂, Honolulu, Hawaii, 24.VI.1941, ex *Acanthoscelides limbatus* Horn (USNM); 2 ♂♂, Barbers Point, Oahu, III.1960, E. J. Ford, Jr. (USNM); ♂, Honolulu, Hawaii, 18.V.1945, Weber, ex *Acacia koa* pod (USNM); ♀, Kaena Point, Oahu, 15.X.1927, Swezey; 4 ♂♂, Kalaua, Oahu, 16.XI.1932, Swezey, ex *Acacia confusa*.

Horismenus sp.

Horismenus sp., Swezey, 1923, Proc. Haw. Ent. Soc. **5**: 302.—Willard, 1924, *Ibid.* **5**: 356.—Timberlake, 1924, *Ibid.* **5**: 441.—Swezey, 1939, *Ibid.* **10**: 189.—Beardsley & Tuthill, 1959, *Ibid.* **17**: 60.—Hinckley, 1960, *Ibid.* **17**: 265.

DISTRIBUTION: Hawaiian Is. (Oahu, Niihau).

HOSTS: Coleoptera, Bruchidae: *Mimosestes sallaei* (Sharp). Hymenoptera, Braconidae: larva parasite.

This species was introduced as a parasite of bruchids in Hawaii by Bridwell and Willard from Brownsville, Texas in 1921 (Timberlake 1924).

SPECIMENS EXAMINED: 4 ♂♂, 9 ♀♀, Waianae, Oahu, 3.VII.1938, Swezey ex *B. sallaei* in *A. farnesiana* (USNM), 3 ♂♂, 13 ♀♀, Honolulu, Hawaii, 15.VII.1941 (No. 675), ex *Acanthoscelides sallaei*.

Horismenus sp. differs from *H. depressus* by the unpolished coxae, surface of scutellum

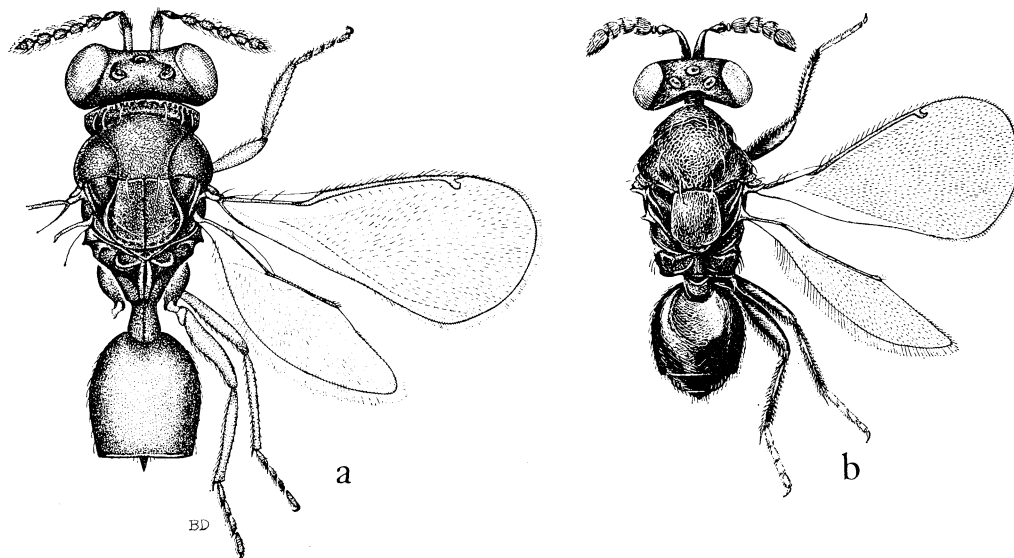


Fig. 7. a, *Horismenus depressus* Gahan, ♀; b, *Pediobius wilderi* (Howard), ♀.

not flattened but raised at base, reticulate and propodeum stouter.

Genus *Pediobius* Walker

Pediobius Walk., 1846, Ann. Mag. Nat. Hist. **17**: 184 (type: *Entedon* (*P.*) *imbreus* Walk.; design. by Ashmead, 1900).—Peck, 1963, Canad. Ent., Suppl. **30**: 223.

Pediobius wilderi (Howard) Fig. 7b.

Mestocharis wilderi How., 1892, Proc. Ent. Soc. Wash. **2**: 298.

Pleurotropis wilderi: Crawford, 1912, Proc. U. S. Nat. Mus. **43**: 179.—Bianchi, 1945, Proc. Haw. Ent. Soc. **12**: 246.—Look, 1946, *Ibid.* **12**: 474.—Bess, 1951, *Ibid.* **14**: 214.

Pediobius wilderi: Burks, 1958, In Krombein, Agr. Monog. U.S. Dept. Agr. **2**: Suppl. **1**: 28.—Peck, 1963, Canad. Ent., Suppl. **30**: 234.

DISTRIBUTION: Canada, New York, District of Columbia, South Carolina, California, Hawaiian Is. (Oahu, Hawaii).

HOSTS: Hymenoptera, Ichneumonidae: *Tromatobia rufopectus* (Cresson). Araneida, Argiopidae: *Aranea solitaria* (Emerton), *Argiope aurantia* Lucas. (After Peck 1963).

Pediobius detrimentosus (Gahan)

Pleurotropis detrimentosus Gah., 1931, Proc. U.S. Nat. Mus. **77**(8): 9.—Beardsley, 1956, Proc. Haw. Ent. Soc. **16**: 8.

DISTRIBUTION: Hawaiian Is. (Hawaii, Oahu).

HOST: Hymenoptera, Braconidae: *Bracon omiodivorum*, reared from cocoon.

Pediobius sp.

Pleurotropis sp., Timb., 1924, Proc. Haw. Ent. Soc. **5**: 441.—Editor, 1924, *Ibid.* **5**: 486.—Sakimura & Linford, 1940, *Ibid.* **10**: 454.

DISTRIBUTION: Hawaiian Is. (Oahu).

Genus **Ceranisis** Walker

Ceranisis Walk., 1842, Entomologist **1**: vi, plate N. 2 (type: *Cirrospilus pacuvius* Walker; monobasic).—Peck, 1963, Canad. Ent., Suppl. **30**: 117-18.

Ceranisis brui Vuillet

Thripoctenus brui Vuill., 1914, Memoir Soc. Biol. France 66, p. 553.—Swezey, 1950, Proc. Haw. Ent. Soc. **14**: 10.

DISTRIBUTION: Hawaiian Is. (Hawaii, Maui, Oahu, Kauai).

HOST: Thysanoptera: probably *Isoneurothrips fullawayi* (Moulton).

Genus **Closterocerus** Westwood

Closterocerus Westw., 1833, Mag. Nat. Hist. **6**: 419 (type: *C. trifasciatus* Westw.; monobasic).—Crawford, 1912, Proc. U.S. Nat. Mus. **43**: 175.—Peck, 1963, Canad. Ent., Suppl. **30**: 192-96.

Closterocerus sp.

Closterocerus sp., Look, 1948, Proc. Haw. Ent. Soc. **13**: 219.

DISTRIBUTION: Hawaiian Is. (Hawaii, Oahu).

HOST: Diptera, Agromyzidae: *Pseudonapomyza spicata* Malloch.

Astichus cyaneus Ashmead in the Fauna Hawaiiensis [1901, Vol. **1** (3): 326] was misidentified and placed in the Eulophidae. The type specimen ♀, No. 1308 at British Museum (Nat. Hist.) was also examined by Z. Bouček and G. J. Kerrich and they both verified that it belongs to the family Pteromalidae. Later at the USNM, Washington D. C., Dr B. D. Burks, examined my specimen that had been compared with the type and agreed, further indicating that it belongs to the subfamily Tridyminae, tribe Tridymini using A. B. Gahan, 1951, unpublished key to the subfamilies and tribes of the family Pteromalidae. Comprehensive study of the family Pteromalidae will be taken up after this present study.

Subfamily APHELININAE

KEY TO HAWAIIAN GENERA OF APHELININAE

1. Antenna with more than 5 segments, club small, segmented..... 2
 Antenna with 5 segments, club large, undivided **Eretmocerus**
2. Tarsi 5-segmented 3
 Tarsi 4-segmented..... **Archenomus**
3. Wing normal..... 4
 Wingless or dwarfed form **Aphelinus**
4. Fore wing with an oblique hairless line from region of stigmal vein (speculum);
 antennae 6-segmented 5

- Fore wing without oblique hairless lines; antennae 7 or 8-segmented 8
5. Fore wing without maculate spots 6
Fore wing whitish with rounded fuscous spots **Marietta**
6. Body robust; ovipositor not prominent.....7
Body slim; ovipositor distinctly exerted **Centrodora**
7. Marginal vein equal to or longer than submarginal vein; body generally yellow...
..... **Aphytis**
Marginal vein shorter than submarginal vein; body dark colored..... **Aphelinus**
8. Fore wing not amygdaliform; stigmal vein present; cilia on marginal fore wing
short; 3 funicle segments in unequal length..... 9
Fore wing amygdaliform; stigmal vein absent; cilia on marginal fore wing long;
3 funicle segments subequal in length..... **Aspidiotiphagus**
9. Lateral margin of fore wing with long ciliae, usually longer than 1/4 of wing width
..... **Prospaltella**
Lateral margin of fore wing with shorter ciliae..... 10
10. Hind tibia flattened **Aneristus**
Hind tibia normal..... 11
11. ♀ club 3-segmented, shorter than funicle; ♂ with 8 antennal segments ... **Coccophagus**
♀ club 2-segmented, as long as funicle; ♂ with 7 antennal segments..... **Encarsia**

Genus **Eretmocerus** Haldeman

Eretmocerus Hald., 1850, Am. J. Sci. Arts (2)9: 111 (type: *E. corni* Hald.; monobasic).—
Peck, 1963, Canad. Ent., Suppl. 30: 239–41.

Eretmocerus corni Haldeman

Eretmocerus corni Hald., 1850, Am. J. Sci. Arts. (2)9: 110.—Kotinsky, 1907, Proc. Haw.
Ent. Soc. 1: 127.—Timberlake, 1924, *Ibid.* 5: 438.—Fullaway, 1913, *Ibid.* 2: 216; 1932,
Ibid. 8: 113, 119.—Weber, 1953. *Ibid.* 15: 129.—Peck, 1963, Canad. Ent., Suppl. 30:
240.

DISTRIBUTION: Continental U.S., Argentina, Paraguay, Chile, Hawaiian Is. (Oahu).

HOST: Homoptera, Aleyrodidae: *Pealius hibisci* (Kotinsky).

Eretmocerus haldemani Howard

Eretmocerus haldemani How., 1908, Proc. Ent. Soc. Wash. 10: 65.—Weber, 1953, Proc. Haw.
Ent. Soc. 15: 129.—Peck, 1963, Canad. Ent., Suppl. 30: 240.

DISTRIBUTION: Florida, Mississippi, California, Hawaiian Is. (Oahu).

HOSTS: Homoptera, Aleyrodidae: *Aleuroplatus coronatus* (Quaintance); *Aleurothrix*
floccosus (Maskell); *Trialeurodes vaporariorum* (Westwood).

E. haldemani was released on Oahu 19 August 1952 for control of aleyrodids.

Genus **Archenomus** Howard

Archenomus How., 1898, Proc. Ent. Soc. Wash. 4: 136 (type: *A. bicolor* How.; monobasic).
—Peck, 1963, Canad. Ent., Suppl. 30: 241.

Pteroptrichoides Full., 1913, Ann. Rpt. Haw. Agr. Expt. Sta. (1912): 27.

Pseudopteroptrix Full., 1918, Proc. Haw. Ent. Soc. **3**: 464.

KEY TO SPECIES OF HAWAIIAN ARCHENOMUS

Antennal funicle segment 2 transverse, 1/2 length of segment 1 and 3 **perkinsi**
 Antennal funicle segments subequal in length **imitatrix**

Archenomus perkinsi (Fullaway)

Pterotrichoides perkinsi Full., 1918, Proc. Haw. Ent. Soc. **3**: 463; 1920, *Ibid.* **4**: 239, 245; 1932, *Ibid.* **8**: 113.—Timberlake, 1924, *Ibid.* 438.—Swezey, 1950, *Ibid.* **14**: 3.

DISTRIBUTION: Hawaiian Is. (Oahu).

HOST: Homoptera, Diaspididae: *Morganella longispina* (Morgan); *Leucaspis indica* Fullaway.

Archenomus imitatrix (Fullaway)

Pseudopteroptrix imitatrix Full., 1918, Proc. Haw. Ent. Soc. **3**: 464; 1920, *Ibid.* **4**: 239, 234; 1932, *Ibid.* **8**: 119.—Timberlake, 1924, *Ibid.* **5**: 439.

DISTRIBUTION: Hawaiian Is. (Oahu).

HOST: Homoptera, Diaspididae: *Howardia biclavis* (Comstock).

Genus **Centrodora** Foerster

Centrodora Foerster, 1878, Verh. Naturh. Ver. Preuss. Rheinl. u. Westfalens **35**: 66 (type: *C. amoena* Foerster; monobasic).—Peck, 1963, Canad. Ent., Suppl. **30**: 242-43.

Paraphelinus Perkins, 1906, Bull. Haw. Sugar Planters' Assoc. Expt. Sta., Div. Ent. **1**: 264.

Centrodora xiphidii (Perkins)

Paraphelinus xiphidii Perk., 1906, Bull. Haw. Sugar Planter's Assoc. Expt. Sta., Div. Ent. **1**: 264; 1910, Fauna Hawaiiensis **2**: 658; 1913, *Ibid.* Introduction, 107, 215; 1908, Proc. Haw. Ent. Soc. **2**: 21.—Timberlake, 1924, *Ibid.* **5**: 434.—Swezey, 1929, *Ibid.* **7**: 286.

Centrodora xiphidii: Bianchi, 1941, Proc. Haw. Ent. Soc. **11**: 14.

DISTRIBUTION: Hawaiian Is. (Oahu, Maui, Kauai).

HOSTS: Diptera, Agromyzidae: *Melanagromyza simplex* (Loew), *Xiphidium varipenne* Swezey.

Genus **Marietta** Motschulsky

Marietta Mots., 1863, Bull. Soc. Imp. Nat. Moscou **36** (2): 51 (type: *Marietta leopardina* Mots.; monobasic).—Peck, 1963, Canad. Ent., Suppl. **30**: 243-245.

KEY TO HAWAIIAN SPECIES OF MARIETTA

Antennal scape slender, subequal in width to pedicel..... **carnesi**
 Antennal scape broad, 2× width of pedicel **graminicola**

Marietta carnesi (Howard)

Perisopterus carnesi How., 1910, Ent. News **21**: 162-163.—Timberlake, 1925, Proc. Haw.

Ent. Soc. 6: 10.—Fullaway, 1932, *Ibid.* 8: 117.

Periossoterpis chinensis Fullaway, 1920, *Ibid.* 4: 244.

Marietta carnesi: Timberlake, 1924, *Ibid.* 5: 438.—Swezey, 1936, *Ibid.* 9: 110.—Peck, 1963, *Canad. Ent., Suppl.* 30: 243.

DISTRIBUTION: Japan, Mauritius, Far East, Hawaiian Is. (Oahu).

HOSTS: Homoptera, Diaspididae: *Lepidosaphes* sp.; Coccidae: *Saissetia nigra* (Nietner), *S. oleae* (Bernard), (see Peck 1963 for additional host records).

Timberlake (1925) mentioned that this was probably the species Kotinsky reported as introduced from China in 1906.

***Marietta graminicola* Timberlake**

Marietta graminicola Timb., 1925, *Proc. Haw. Ent. Soc.* 6: 180.—Swezey, 1932, *Ibid.* 8: 12, 273.—Fullaway, 1932, *Ibid.* 8: 11, 117.—Peck, 1963, *Canad. Ent., Suppl.* 30: 243.

DISTRIBUTION: Texas, Maryland, Hawaiian Is. (Oahu, Maui, Molokai).

HOSTS: Homoptera Pseudococcidae: *Trionymus insularis* Ehrhorn, *Antonina graminis* (Maskell).

This species was reported by Fullaway (1932) as a hyperparasite on *Anagyrus antonina* Timberlake, *A. swezeyi* Timberlake and *A. nigricornis* Timberlake (Hym., Encyrtidae).

***Marietta* sp.**

Periossoterpis sp., Fullaway, 1920, *Proc. Haw. Ent. Soc.* 4: 239, 240.

Marietta sp., Timberlake, 1924, *Proc. Haw. Ent. Soc.* 5: 438.

Genus **Aphytis** Howard

Aphytis How., 1900, *Canad. Ent.* 32: 168 (type: *Aphytis chilensis* How.; monobasic).—Peck, 1963, *Canad. Ent., Suppl.* 30: 246-61.

KEY TO HAWAIIAN SPECIES OF APHYTIS

Body whitish to pale yellow; ovipositor sheath short (1.0); cilia of fore wing long...

..... **chrysomphali**

Body brownish yellow; ovipositor sheath long (1.5); cilia of fore wing short **proclia**

***Aphytis chrysomphali* (Mercet)**

Aphelinus chrysomphali Mercet, 1912, *Trab. Mus. Nac. Cien. Nat., Madrid* 10: 53, 67.

Aphelinus limonus Rust, 1915, *Ent. News* 26: 75.—Fullaway, 1920, *Proc. Haw. Ent. Soc.* 4: 239.—Timberlake, 1924, *Ibid.* 5: 412, 437.

Aphytis chrysomphali: Mercet, 1927, *Eos* 3: 489-90.—Timberlake, 1926, *Proc. Haw. Ent. Soc.* 6: 315.—Fullaway, 1932, *Ibid.* 8: 113, 117.—Swezey, 1936, *Ibid.* 9: 110; 1950, *Ibid.* 14: 3.—Hardy, 1950, *Ibid.* 14: 8.—Peck, 1963, *Canad. Ent., Suppl.* 30: 247-49.

DISTRIBUTION: Probably worldwide; Hawaiian Is. (Oahu, Hawaii).

HOSTS: Homoptera, Coccidae: *Saissetia nigra* (Nietner); Diaspididae: *Diaspis bromeliae* (Kerner), *Hemiberlesia cyanophylli* (Signoret), *H. rapax* (Comstock), *H. cydoniae*

Comstock, *Hemichionaspis minor* Maskell; *Chrysomphalus aonidum* (L.), *C. rossi* Maskell, *Lepidosaphes auriculata* Fullaway, *L. beckii* (Newman), *Pseudoparlatoria giffardi* Fullaway, *Morganella longispina* (Morgan), *Aonidiella inornata* McKenzie.

Aphytis proclia (Walker)

Aphelinus proclia Walk., 1839, Monog. Chalciditum 1, p. 9.

Aphelinus diaspidis Howard, 1881, Ann. Rpt. U.S. Dept. Agr. (1880): 355.—Fullaway, 1913, Proc. Haw. Ent. Soc. 2: 213, 216; 1920, *Ibid.* 4: 243-244; 1932, *Ibid.* 8: 113, 117.—Timberlake, 1924, *Ibid.* 5: 412, 437.—Muir, 1913, *Ibid.* 2: 228.

Aphelinus fuscipennis Howard, 1881, Ann. Rpt. Dept. Agr. (1880): 356.—Kotinsky, 1906, Proc. Haw. Ent. Soc. 1: 30.—Fullaway 1920, *Ibid.* 4: 239.

Aphytis proclia: Peck, 1951, In Muesebeck *et al*, Agr. Monog. U.S. Dept. Agr. 2: 434; 1963, Canad. Ent., Suppl. 30: 256-61.

DISTRIBUTION: Worldwide, Hawaiian Is. (Oahu).

HOSTS: Homoptera Diaspididae: *Diaspis bromeliae* Kerner, *D. echinocacti* Bouché, *Aulacaspis rosae* Bouché, *Hemichionaspis minor* Maskell, *Aspidiotus cydoniae* Comstock, *Pinnaspis buxi* Bouché (see Peck 1963 for additional host records).

Aphytis lingnanensis Compere

Aphytis lingnanensis Comp., 1955, Univ. Calif. Publ. Ent. 10: 272, 274, 281, 303, 307, 314.

Aphytis holoxanthus De Bach, 1960, Ann. Ent. Soc. Amer. 53: 701-5.—Davis & Krauss, 1964, Proc. Haw. Ent. Soc. 18: 394.

Because of poor specimens, I was not able to put this species in the key.

DISTRIBUTION: China, Taiwan, California, Texas, Hawaiian Is. (Oahu).

Genus **Aphelinus** Dalman

Aphelinus Dalman, 1820, Handl. K. Svensk. Vetensk Akad. 21: 181 (type: *Entedon abdominalis* Dalman; monobasic).—Peck, 1963, Canadian Ent., Suppl. 30: 261-69.

KEY TO HAWAIIAN SPECIES OF APHELINUS

1. Middle and hind tibia brownish 2
 Legs except coxae and hind femur polished cream yellow; abdomen concolorous
 with legs except lateral margin brownish **semiflavus**
2. Abdomen concolorous with thorax 3
 Base of abdomen yellowish..... **gossypii**
3. Body brownish..... **maidis**
 Head jet black, body mostly black **mali**

Aphelinus gossypii Timberlake Fig. 8.

Aphelinus gossypii Timb., 1924, Proc. Haw. Ent. Soc. 5: 408, 410, 437.—Swezey & Bryan, 1929, *Ibid.* 7: 295.—Fullaway, 1932, *Ibid.* 8: 118.

DISTRIBUTION: Hawaiian Is. (Oahu).

HOST: Homoptera, Aphididae: *Aphis gossypii* Glover, prob *A. medicaginis* Koch.

Aphelinus mali (Haldeman)

Eriophilus mali Hald., 1851, Pennsylvania, Farm J. 1: 130-31.

Aphelinus mali: Howard, 1881, Ann. Rpt.

U. S. Dept. Agr. (1880): 356-57.—

Kirkaldy, 1907, Proc. Haw. Ent. Soc.

1: 100.—Fullaway, 1913, *Ibid.* 2: 216.

—Timberlake, 1924, *Ibid.* 5: 410.—

Peck, 1963, Canad. Ent., Suppl. 30: 263-66.

DISTRIBUTION: Worldwide, Hawaiian Is. (Oahu).

HOSTS: Homoptera: Aphididae; Diaspididae (see Peck, 1963 for additional host records).

Aphelinus maidis Timberlake

Aphelinus maidis Timb., 1924, Proc. Haw.

Ent. Soc. 5: 405, 408, 411, 436.—

Swezey, 1928, *Ibid.* 7: 181, 209.—

Fullaway, 1932, *Ibid.* 8: 118.

DISTRIBUTION: Hawaiian Is. (Oahu, Hawaii).

HOST: Homoptera, Aphididae: *Aphis maidis* Fitch, *A. sacchari* Zehntner.

***Aphelinus semiflavus** Howard

Aphelinus semiflavus How., 1908, Ent. News 19: 366.—Timberlake, 1924, Proc. Haw. Ent.

Soc. 5: 409, 411, 437.—Fullaway, 1932, *Ibid.* 8: 118.—Peck, 1963, Canad. Ent., Suppl.

30: 268.

DISTRIBUTION: Continental U.S., Worldwide, Hawaiian Is. (Oahu).

HOSTS: Homoptera, Aphididae: *Toxoptera aurantii* (Fonscolombe), *Aulacorthum circumflexum* (Buckton); Aleyrodidae: *Aleyrodes shizuokensis* (reared by Beardsley, June 1957). (See Peck 1963, for additional host records).

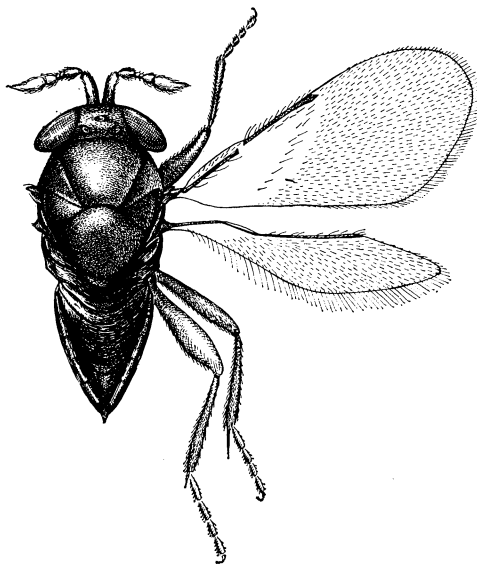


Fig. 8. *Aphelinus gossypii* Timberlake, ♀.

Genus Prospaltella Ashmead

Prospalta How., 1894, Insect Life 7: 6 (preoccupied by *Prospalta* Walker, 1857).

Prospaltella Ashmead, 1904, Proc. Ent. Soc. Wash. 6: 126 (n. name).—Peck, 1963, Canad. Ent., Suppl. 30: 275-83.

KEY TO HAWAIIAN SPECIES OF PROSPALTELLA

1. Body yellowish or parts of body with combination of brown and yellow color 2
Brownish to black species with pale yellow scutellum **bicolor**

* A junior synonym of *A. asychis* Walker (Ferrière, 1965, Hymen. Aphelin. d'Europe, p. 77).

2. Pale to orange yellow species..... **transvena**
 Head, meso- and metanotum yellow; abdomen and pronotum brown..... **koebelei**

Prospaltella bicolor Timberlake

Prospaltella bicolor Timb., 1926, Proc. Haw. Ent. Soc. **6**: 310.—Fullaway, 1932, *Ibid.* **8**: 112.

DISTRIBUTION: Hawaiian Is. (Oahu).

HOST: Homoptera, Diaspididae: *Aspidiotus cydoniae* Comstock.

Prospaltella koebelei Fullaway

Prospaltella koebelei Full., 1920, Proc. Haw. Ent. Soc. **4**: 245; 1932, *Ibid.* **8**: 119.—Swezey, 1950, *Ibid.* **14**: 3.

DISTRIBUTION: Hawaiian Is. (Hawaii).

HOST: Homoptera, Diaspididae: *Morganella longispina* Morgan.

Prospaltella transvena Timberlake

Prospaltella transvena Timb., 1926, Proc. Haw. Ent. Soc. **6**: 312.—Fullaway, 1932, *Ibid.* **8**: 112, 119.

DISTRIBUTION: Hawaiian Is. (Oahu, Hawaii).

HOSTS: Homoptera, Aleyrodidae: *Trialeurodes vaporariorum* (Westwood), *Pealius hibisci* (Kotinsky), *Aleyrodes sonchi* (Kotinsky). *Aphis sacchari* Zehntner.

Prospaltella sp.

Prospaltella sp., Timberlake, 1924, Proc. Haw. Ent. Soc. **5**: 434-35.

Genus **Encarsia** Foerster

Encarsia Foerst., 1878, Verh. Naturh. Ver. Preuss. Rheinl. u. Westfalens **35**: 65 (type: *Encarsia tricolor* Foerster; monobasic).

KEY TO HAWAIIAN SPECIES OF ENCARSIA

- Base of the fore wing narrow; cilia on margin short; abdomen and legs pale yellowish. Thorax brownish..... **pergandiella**
 Base of the fore wing broad; cilia on margin long; abdomen brownish, thorax yellowish **formosa**

Encarsia formosa Gahan

Encarsia formosa Gah., 1924, Proc. U.S. Nat. Mus. **65** (4): 14.—Swezey, 1949, Proc. Haw. Ent. Soc. **13**: 327; 1952, *Ibid.* **14**: 344.—Peck, 1963, Canad. Ent., Suppl. **30**: 283-85.

DISTRIBUTION: Worldwide, Hawaiian Is. (Oahu).

HOST: Homoptera, Aleyrodidae: *Trialeurodes vaporariorum* (Westwood), *Aleyrodes shizuokensis* (reared by Beardsley, 1957).

Encarsia pergandiella Howard

Encarsia pergandiella How., 1907, U. S. Dept. Agr., Bur. Ent., Tech. Ser. **12**: 78.—Peck, 1963, Canad. Ent., Suppl. **30**: 286.

Encarsia versicolor Girault, 1908, Psyche **15**: 53-57.—Timberlake, 1924, Proc. Haw. Ent. Soc. **5**: 435.—Fullaway, 1932, *Ibid.* **8**: 112.

DISTRIBUTION: Continental U. S., Hawaiian Is. (Oahu).

HOST: Homoptera, Aleyrodidae: *Aleyrodes sonchi* Kotinsky, *Trialeurodes vaporariorum* Westwood (see Peck 1963, for additional host records).

Encarsia sp.

Encarsia sp., Timberlake, 1924, Proc. Haw. Ent. Soc. **5**: 435.—Editor, 1924, *Ibid.* **5**: 486.—Fullaway, 1932, *Ibid.* **8**: 118.

Genus **Aspidiotiphagus** Howard

Aspidiotiphagus How., 1894, Insect Life **6**: 229-30, (type: *Coccophagus citrinus* Craw; monobasic).—Peck, 1963, Canad. Ent., Suppl. **30**: 288-93.

KEY TO HAWAIIAN SUBSPECIES OF ASPIDIOTIPHAGUS

Fore wing proportionately larger; antennae longer**citrinus citrinus**
Fore wing proportionately smaller; antennae smaller**citrinus agilior**

Aspidiotiphagus citrinus agilior Berlese

Aspidiotus citrinus var. *agilior* Berl., 1916, Redia **12**: 5, 7-8, 10-12.

Aspidiotus agilior: Timberlake, 1924, Proc. Haw. Ent. Soc. **5**: 436.—Fullaway, 1932, *Ibid.* **8**: 118.

Aspidiotiphagus agilior: Swezey, 1939, Proc. Haw. Ent. Soc. **10**: 179.

Aspidiotiphagus citrinus agilior: Peck, 1951, *In* Muesebeck *et al*, Agr. Monog. U. S. Dept. Agr. **2**: 438.

DISTRIBUTION: Almost worldwide, Hawaiian Is. (Oahu).

HOSTS: Homoptera, Diaspididae: *Parlatoria zizyphus* (Lucas), *Fiorinia florinae* (Targioni-Tozzetti), *Diaspis echinocacti* Bouché.

Timberlake (1924) remarked that the "species of *Aspidiotiphagus* was introduced by Koebele about 1894 from China and Japan, but whether it was this or the preceding species or both, is unknown." The preceding species he refers to is *A. citrinus citrinus* (Craw).

Aspidiotiphagus citrinus citrinus (Craw)

Coccophagus citrinus Craw, 1891, Calif. State Bd. Hort., Div. Ent., Destructive Insects, pp. 25, 28.—Kotinsky, 1911, Proc. Haw. Ent. Soc. **2**: 25.

Aspidiotiphagus citrinus: 1894, Howard, Insect Life **6**: 228.—Fullaway, 1913, Proc. Haw. Ent. Soc. **2**: 213, 216; 1920, *Ibid.* **4**: 243-46; 1922, Hawaiian Forest. & Agric. **19** (1): 7; 1932, *Ibid.* **8**: 118.—Swezey, 1923, Proc. Haw. Ent. Soc. **5**: 300; 1952, *Ibid.* **14**: 379.—Timberlake, 1924, *Ibid.* **5**: 436.—Browne, 1939, *Ibid.* **10**: 187.

DISTRIBUTION: Worldwide.

HOSTS: Homoptera, Diaspididae: *Pinaspis buxi* Bouche, *Phenacaspis cockerelli* (Cooley) = *P. sandwicensis* (Fullaway), (see Peck 1963, for additional host record).

Genus *Aneristus* Howard

Aneristus How., 1895, *Canad. Ent.* **27**: 351 (type: *Aneristus ceroplastae* Howard; monobasid).—Peck, 1963, *Canad. Ent., Suppl.* **30**: 293-94.

Aneristus ceroplastae Howard Fig. 9a.

Aneristus ceroplastae How., 1895, *Canad. Ent.* **27**: 351.—Timberlake, 1924, *Proc. Haw. Ent. Soc.* **5**: 433.—Swezey, 1931, *Ibid.* **7**: 486; 1932, *Ibid.* **8**: 6; 1936, *Ibid.* **9**: 110.—Fullaway, 1932, *Ibid.* **8**: 112.—Ehrhorn, 1941, *Ibid.* **11**: 16.—Beardsley, 1955, *Ibid.* **15**: 386.—Peck, 1963, *Canad. Ent., Suppl.* **30**: 293.

Prococophagus orientalis Howard, 1896, *In* Howard & Ashmead, *Proc. U.S. Nat. Mus.* **18**: 633.—Fullaway, 1913, *Proc. Haw. Ent. Soc.* **2**: 216, 218, 287; 1920, *Ibid.* **4**: 239, 241; 1932, *Ibid.* **8**: 119.—Timberlake, 1915, *Ibid.* **3**: 404.—Illingworth, 1929, *Ibid.* **7**: 248.

DISTRIBUTION: Worldwide, Hawaiian Is. (Oahu, Hawaii, Kauai, Molokai, Maui).

HOSTS: Homoptera, Diaspididae: *Hemiberlesia rapax* (Comstock); Coccidae: *Ceroplastes rubens* Maskell, *Saissetia hemisphaerica* (Targioni-Tozzetti), *S. nigra* (Nietner), *S. oleae* (Bernard), *Coccus viridis* Green, *C. hesperidum* L., *Coccus longulus* Dougl.

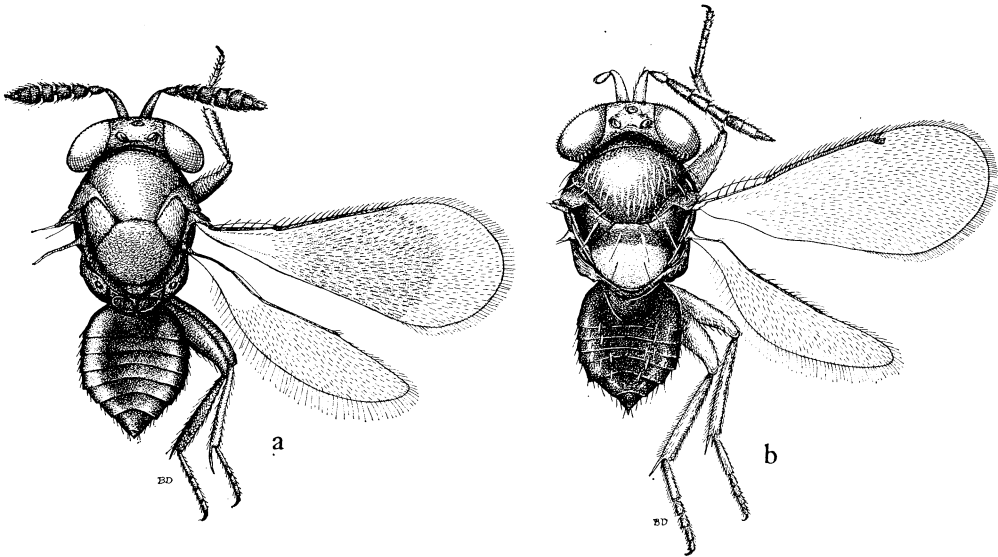


Fig. 9. a, *Aneristus ceroplastae* Howard ♀; b, *Coccophagus hawaiiensis* Timberlake, ♀.

KEY TO HAWAIIAN SPECIES OF COCCOPHAGUS

1. Body black, except apical half of scutellum and sometimes posterior part of metanotum yellowish; antennae brownish to fuscous..... 2
- Body brownish yellow; antennae yellow except pedicel black..... **ochraceus**
2. Fore and mid tibiae yellowish..... **lycimnia**
- Fore, mid and hind tibiae brownish to fuscous..... **hawaiiensis**

Genus *Coccophagus* Westwood

Coccophagus Westw., 1833, Phil. Mag. (3) **3**: 344 (type: *Entedon scutellaris* Dalman; designated by Westwood, 1840).—Peck, 1963, Canad. Ent., Suppl. **30**: 295-318.

Coccophagus hawaiiensis Timberlake Fig. 9b.

Coccophagus hawaiiensis Timb., 1926, Proc. Haw. Ent. Soc. **6**: 315-17.—Fullaway, 1932, *Ibid.* **8**: 112.—Swezey, 1936, *Ibid.* **9**: 125.—Peck, 1963, Canad. Ent., Suppl. **30**: 302.

DISTRIBUTION: Hawaiian Is. (Oahu).

HOST: Homoptera, Coccidae: *Saissetia nigra* (Nietner), *S. oleae* (Bernard), *Coccus viridis* Green.

Coccophagus lycimnia (Walker)

Aphelinus lycimnia Walk., 1839, Monog. Chalciditum **1**: 11.

Platygaster lecanii Fitch, 1858 (1859), Trans. N. Y. State Agr. Soc. **18**: 805-6.

Coccophagus lecanii: Smith, 1878, Amer. Nat. **12**: 661.—Ashmead, 1901, Fauna Hawaiiensis **1**: 328.—Fullaway, 1911, Proc. Haw. Ent. Soc. **2**: 216; 1920, *Ibid.* **4**: 239, 242; 1931, Agric. Ext. Ser. Ext. Bull. **9**: 8.

Coccophagus lycimnia: Mercet, 1931, Eos **7**: 400-2.—Peck, 1963, Canad. Ent., Suppl. **30**: 305-12.

DISTRIBUTION: Worldwide, Hawaiian Is. (Hawaii, Maui, Oahu, Kauai).

HOST: Diaspididae, Pseudococcidae, Coccidae, *Coccus viridis* Green, Dactylopiidae, Margarodidae, Encyrtidae (after Peck 1963).

Coccophagus ochraceus Howard

Coccophagus ochraceus How., 1895, Tech. Ser. U.S. Dept. Agr., Div. Ent. **1**: 38.—Ashmead, 1901, Fauna Hawaiiensis **1**: 328.—Fullaway, 1920, Proc. Haw. Ent. Soc. **4**: 242; 1932, *Ibid.* **8**: 112.—Timberlake, 1924, *Ibid.* **5**: 434.—Peck, 1963, Canad. Ent., Suppl. **30**: 312-13.

DISTRIBUTION: Continental U.S., Africa, Eritrea, Hawaiian Is. (Hawaii, Oahu).

HOSTS: Homoptera, Coccidae: *Lecanium corni* Bouché, *Saissetia hemisphaerica* (Targioni-Tozzetti), *S. nigra* (Nietner), *S. oleae* (Bernard), after Peck 1963; *Coccus viridis* Green.

Coccophagus sp.

Coccophagus sp. Timberlake, 1924, Proc. Haw. Ent. Soc. **5**: 433.

DISTRIBUTION: Hawaiian Is. (Kauai).