NUMBER 40, 81 pages 14 November 1994

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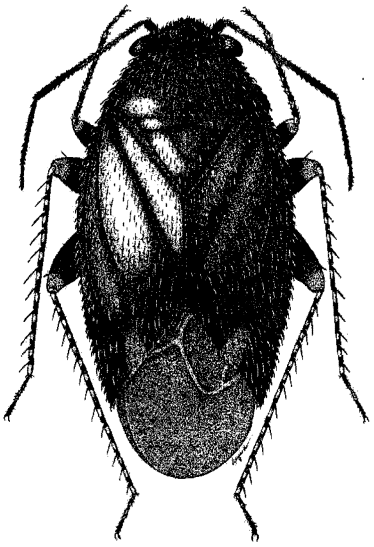
ADAM ASQUITH



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ISSN 0893-1348

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REVISION OF THE ENDEMIC HAWAIIAN GENUS *SARONA* KIRKALDY (HETEROPTERA: MIRIDAE: ORTHOTYLINAE)[1]

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ABSTRACT. The endemic Hawaiian genus *Sarona* Kirkaldy is revised and proposed as the sister taxon to the North American genera *Slaterocoris* Wagner + *Scalponotatus* Kelton. Forty species are included in the genus *Sarona*, the following 39 of which are described as new: *Sarona akoko, S. alani, S. annae, S. antennata, S. aula, S. azophila, S. beardsleyi, S. dakine, S. flavidorsum, S. gagnei, S. haleakala, S. hamakua, S. hie, S. hiiaka, S. iki, S. kaala, S. kanaka, S. kane, S. kau, S. kohana, S. kuaana, S. kukona, S. laka, S. lanaiensis, S. lissochorium, S. makua, S. mamaki, S. maui, S. mokihana, S. myoporicola, S. oahuensis, S. oloa, S. palolo, S. pittospori, S. pookoi, S. pusilla, S. saltator, S. xanthostelma.* Illustrations are presented for the antennae and male genitalic structures of all species; habitus views are presented for four species; scanning electron micrographs are presented for setal structure, pretarsus, and other diagnostic characters. A key to separate males is provided.

INTRODUCTION

Although the Miridae undoubtedly represent the most speciose family of Heteroptera in the Hawaiian Islands (Howarth, 1990), our current understanding of the group is elementary. Zimmerman (1948) recognized 12 genera with endemic species, and subsequently *Hyalopeplus pellucidus* (Stål) (Carvalho & Gross, 1979) and the genus *Loulucoris* (Asquith, 1994) were recognized as endemic. Although the relationships of some of the genera have been reviewed (Schuh, 1974; 1984), and new species have been described (Carvalho, 1952a), the Hawaiian mirid fauna remains largely unstudied. For example, despite revisionary treatments of the Hawaiian *Cyrtopeltis* by Carvalho & Usinger (1960) and Gagné (1968), undescribed species are still being discovered (Asquith, 1993; G. Cassis, pers. commun.).

As an initial step in a review of the Hawaiian Miridae, I here provide a revision of the endemic genus *Sarona* Kirkaldy. This project was actually initiated in part by the late Wayne Gagné, in conjunction with his work on the genus *Nesiomiris* Kirkaldy. Gagné collected 25 of the 40 species of *Sarona*, of which five species are known only from his collections, and he provided valuable data on host plant associations. This revision would be much less thorough without his extraordinary field work.

The primary objectives of this paper are to (1) diagnose and describe the 40 known species; (2) aid identification by providing a key to the males of all species; (3) summarize distributional and host plant data, and (4) provide a diagnosis and description of the genus, and discuss the characters that support a group relationship between *Sarona* and *Slaterocoris* + *Scalponotatus*. The phylogeny and biogeography of the genus is treated in a separate paper (Asquith, 1995).

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1. Contribution No. 1994-021 to the Hawaii Biological Survey.
2. Research Associate, Bishop Museum Department of Natural Sciences.

MATERIALS AND METHODS

Approximately 1500 specimens were examined from the Bernice P. Bishop Museum (BPBM), the University of Hawaii, Manoa (UH), the Hawaii Department of Agriculture (HDA), and my own collecting efforts. In determining the sister group to *Sarona*, I examined all genera of Indo-Pacific Orthotylini, most North and Central American genera, and descriptions and illustrations of many Palearctic and Asian taxa.

Dissections of male genitalia were performed using the techniques described in Kelton (1959) and Stonedahl & Schwartz (1986). Terminology for specific structures of the male genitalia is described in the sections on species identification and generic relationships, and illustrated in figures 7, 8, 13, 14, 22–24. Because of the intra- and interspecies variation in the ventral flexion of the hemelytra, total length was measured from the apex of the tylus to the cuneal fracture (tylus-cuneus length). Pronotal width was measured across the widest aspect of the pronotum.

Species diagnoses are for males unless stated otherwise. Because the females are unknown for some species, keys are also based on males only. Host plant confirmation was based on a long series of adults, the presence of teneral specimens or nymphs, or a combination of these occurrences. Males are abbreviated as "M" in text; females as "F".

SYSTEMATICS

Sarona Kirkaldy

Sarona Kirkaldy 1902:142. Kirkaldy 1906:136; Reuter 1910:165; Zimmerman 1948:201; Carvalho 1952b:74, 1955:68, 1958:31. Type species: *Sarona adonias* Kirkaldy.

DIAGNOSIS: Recognized by the wide, robust form (Figs. 20, 21); oblique to strongly vertical head (Fig. 4); posterior margin of eyes and posterior margin of vertex conforming to and obscuring the anterior margin of the pronotum; hemelytra posteriad of cuneal fracture weakly to strongly deflexed ventrally; metafemora distinctly enlarged; abdomen short, very wide, and dorsoventrally flattened; vesica of male genitalia with single spicula attached to the right dorsal surface of ductus seminis (Fig. 13); spicula with a flange on left proximal surface (Fig. 14); K structure of female genitalia with digitiform, sclerotized process apically (Fig. 15).

DESCRIPTION: *Male.* Macropterous. Small, compact orthotylines (Figs. 20, 21); length (apex of tylus to cuneal fracture) 1.45–3.50 mm; width of pronotum 1.00–1.80 mm. Color variable from pale yellow to black; tibiae with dark spots at bases of spines (except *pittospori* n. sp.); tarsi bicolored, proximal segments pale, distal segment dark. Dorsal surface shining, weakly rugulose, with minute, shallow punctures (Fig. 1); transversely rugose on pronotum and scutellum. Dorsum with decumbent to erect, simple or weakly bristle-like setae; some species also with scale-like, sericeous, silvery setae (Figs. 2, 3).

Body robust, compact. Head narrowly ovate in lateral view (Fig. 4); obliquely angled to strongly vertical; strongly concave behind; posterior margins of eyes and vertex straight, contiguous, conforming to and obscuring anterior margin of pronotum; vertex flat to weakly concave or convex transversely, posterior margin occasionally weakly carinate, circular depressions sometimes present near borders of eyes; frons flat to broadly but strongly convex transversely, always weakly sloping anteriorly; antennal fossa slightly removed from anterior margin of eye. Antennal segment I very short, stout, three times longer than wide, cylindrical, weakly narrowed basally; segment II cylindrical, basal third slightly narrower than distal portion, sometimes greatly enlarged and fusiform (Fig. 106); segments III and IV cylindrical, narrower than segments I and II, consistent widths throughout;

Figs. 1–3. Scanning electron micrographs of *Sarona* characters. **1**, *S. myoporicola* n. sp., dorsal surface of hemelytra showing dimpled texture. **2–3**, *S. haleakala* n. sp., simple and sericeous, dorsal setae.

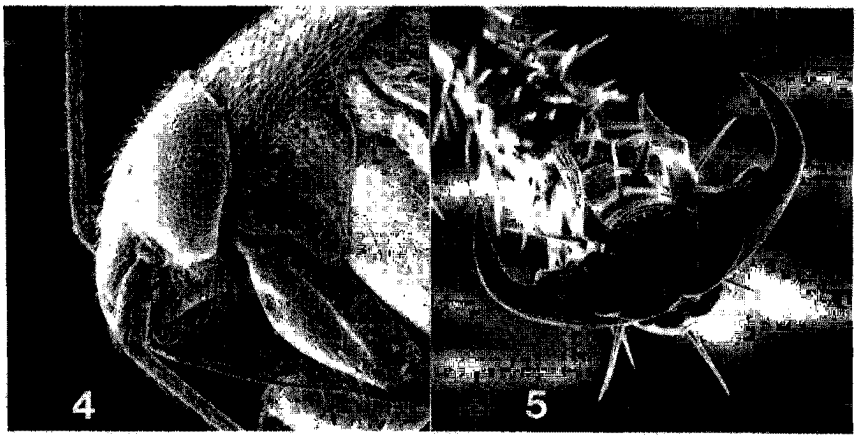
all antennal segments clothed with short, decumbent simple setae and frequently with erect, bristle-like setae; eyes large, occupying half to two-thirds of head height in lateral view; posterior margin of eye straight, contacting anterior margin of pronotum; anterior margin of eye moderately emarginate; lower margin of antennal fossa even with or below ventral margin of eye; tylus not strongly protruding anteriorly, straight and flat basally, straight to strongly convex distally (Fig. 4); lora and juga short, widths greater than diameter of antennal segment I; gula obsolete; gena short, narrow, slightly less than or equal to width of antennal segment I; buccula short, very narrow, less than widths of antennal segment III or IV; apex of rostrum reaching from mesocoxae to past metacoxae onto abdomen.

Pronotum trapezoidal, widest at posterior end; without distinct anterior and posterior lobes; moderately to strongly convex transversely, particularly lateral margins; flat to weakly convex longitudinally; lateral margins straight; posterior margin broadly rounded laterally, straight medially; anterior angles broadly rounded, indistinct; calli indistinct, frequently indistinguishable; mesoscutum narrowly to moderately exposed; scutellum weakly to moderately arched, anteromedial area occasionally flat.

Hemelytra moderately elongate; margins weakly to moderately arcuate; widest midway between apex of scutellum and apex of clavus; claval vein occasionally weakly elevated; cuneal fracture distinct; cuneus length equal to or slightly greater than width; hemelytra bent at cuneal fracture, area posteriad of fracture deflexed ventrally; membrane short, not extending past cuneus by more than cuneus length; membrane moderately to strongly infuscated.

Abdomen short, wide, moderately dorsoventrally flattened, lateral margins weakly explanate. Femora short, slightly flattened, narrowly oval in cross section, with inclined, pale, simple setae; hind femora distinctly enlarged, greatest width almost twice that of mesofemora; tibiae with several rows of minute spinules; tibial spines with dark spots at bases (except *pittospori* n. sp.); proximal tarsal segments pale, distal segment dark colored; claws very broad basally, strongly curved distally; pulvilli very small, parempodia convergent apically (Fig. 5).

Posterodorsal margin of male genital capsule usually with a short tergal process arising from right side. Phallotheca boat-shaped, open as a split along distodorsal surface (Fig. 13). Vesica: ductus seminis simple, cylindrical, flexible proximally, slightly enlarged and rigid apically, horseshoe-shaped secondary gonopore open on ventral surface (Fig. 13); a single, heavily sclerotized spicula present, base of spicula attached to the right, dorsal surface of ductus near its middle; spicula elon-



Figs. 4–5. Scanning electron micrographs of *Sarona* characters. **4**, *S. myoporicola* n. sp., lateral view of head. **5**, *S. mokihana* n. sp., tarsal claws and pretarsus.

gate, strongly curved basally, ventral surface concave on basal half, concavity partially enclosing the ductus; spicula expanded into flange on left side at distal end of concavity, flange occasionally folded ventrally, partially enclosing the ductus (Fig. 14).

Female. Macropterous. Similar to male except usually lighter in color and wider, with hemelytra more arcuate laterally. Sclerotized rings with lateral margins folded medially; K structures with basal and apical margins concave; a longitudinal, sclerotized bar running through middle of K structure, emerging as a digitiform process from apical concavity, oriented ventromesally (Fig. 15).

DISTRIBUTION: Southeastern Hawaiian Islands.

ETYMOLOGY: Kirkaldy (1902) did not indicate the derivation of the name *Sarona.* I interpret the name to be from the Greek, *saros* (broom). The gender is feminine based on the specific epithet *adonias*, the feminization of the Greek, *adonis* (beautiful).

DISCUSSION: With the exception of *Sarona adonias*, which is found on Hawaii and the Maui Nui complex, all species of *Sarona* are single island endemics. Species are known from all the major southeastern Hawaiian islands except Niihau and Kahoolawe. The island of Oahu has the most species, eleven (Table 1), but some islands, such as Molokai with only three species, have been poorly collected and probably still harbor undiscovered species. Species are found from 122 m (400 ft) on Kauai (*akoko* n. sp.) to the 3050 m (10,000 ft) summit of Haleakala on East Maui (*haleakala* n. sp.). On Kauai and Oahu, *Sarona* species are typically found in wet to mesic forests, whereas on the younger islands they can be found in dry forest, alpine stony desert, and young lava flows. Some species such as *adonias* have been collected throughout the year, whereas others such as *akoko* n. sp. are found only during summer months.

When disturbed, many species of *Sarona* display a characteristic jumping behavior interspersed with very short, erratic flights. This behavior varies among species, however, such that *Sarona kukona* n. sp. and *saltator* n. sp. on Kauai are so active as to be difficult to aspirate from a beating sheet, compared to *myoporicola* n. sp. on Hawaii which is almost sedentary. On Kauai and Oahu, individuals are typically not found in large numbers, whereas on the younger islands long series can sometimes be collected from a single plant. Gagné (1979, 1981) concluded that along with two species of *Oceanides* (Lygaeidae), *Sarona adonias* is the most abundant native insect on the forest tree *Metrosideros* on windward Hawaii.

Species of *Sarona* are primarily, if not exclusively phytophagous. I have observed nymphs and adults of *saltator* n. sp. and *mokihana* n. sp. feeding on the underside of leaves near the mid rib, and frequently moving along branches and leaf petioles. In contrast to some species of *Nesiomiris* and *Orthotylus* Fieber (pers. obs.) in Hawaii, I have never observed *Sarona* to cause stippling or yellowing of the host plant leaves, even when large numbers are present.

Sarona is known from 19 species of plants in 12 families (Table 1). They are very host specific, and I have no record of a species breeding on more than one species of plant. Host-plant association is one of the most important areas for future research on *Sarona.* For example, we have confirmed host records for less than half of the eleven species occurring on Oahu.

At least six monophyletic species groups can be recognized (Asquith, 1995), but relationships among these groups are ambiguous. Primitive taxa form either unresolved basal polytomes or equivocally supported clades on Kauai or Oahu, with at least four species groups having dispersed down the island chain reaching Hawaii. The general pattern of evolution that has given rise to most extant species of *Sarona*, appears to be one

of colonization from older to younger islands, with subsequent sympatric, host plant-mediated speciation within the newly colonized island (Asquith, 1995).

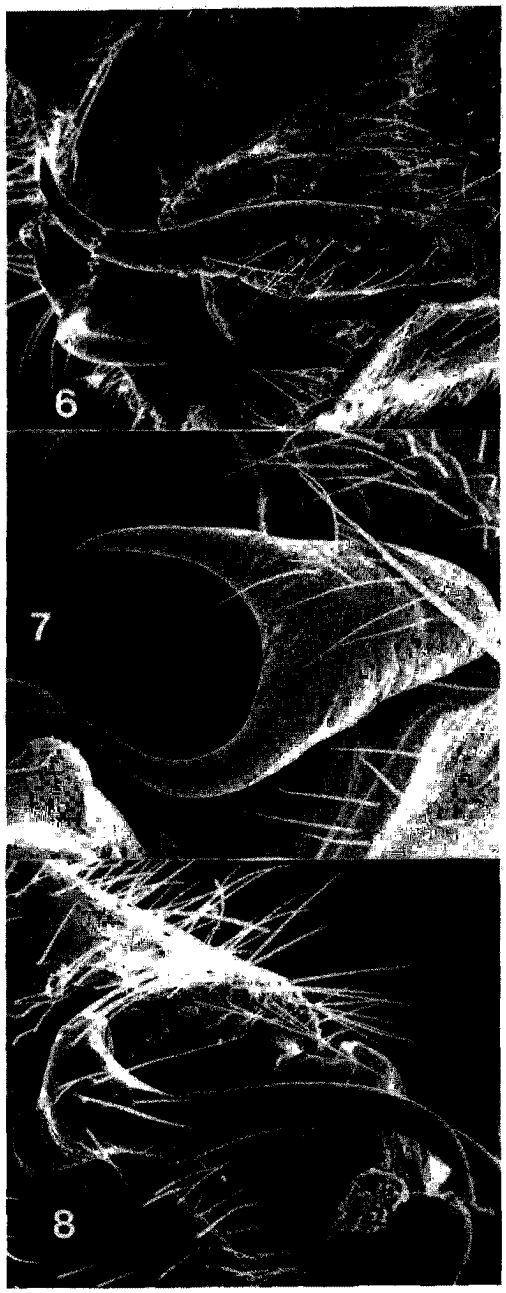
SPECIES RECOGNITION: The characters which are most useful in distinguishing species vary among islands, although the vesical spiculae are always unique but they require dissection. The right paramere is usually the most useful character and takes one of two general shapes; elongate and cylindrical (Fig. 6), with (Fig. 24d) or without a basal arm; or C- or L-shaped (Fig. 7). The shape of the right paramere is almost always diagnostic, particularly for species on Kauai and Oahu, where only *kaala* n. sp. and *lissochorium* n. sp. have right parameres that might be confused (Figs. 38a, 47a). On Hawaii, however, several species have right parameres that are almost identical (Figs. 34a, 41a, 49a, 52a). The left paramere is less variable among species, and generally of less value in identification (Fig. 8). Occasionally, however, the left paramere is highly modified and diagnostic, as when the basal angle is produced as an erect process (Figs. 44b, 48b).

Generally, any one species of *Sarona* varies little in size, so that size can be a useful character, particularly when the species is unusually large (> 3.0 mm) or small (< 2.0 mm). The length of antennal segment II relative to the width of the head is also diagnostic for some species. Two other characters that are more subtle, but useful when the extremes are compared is the angle of the head, which varies from an oblique, 45° angle, to almost vertical, and the length of the rostrum which may reach to between the meso- and metacoxae, or well onto the abdomen.

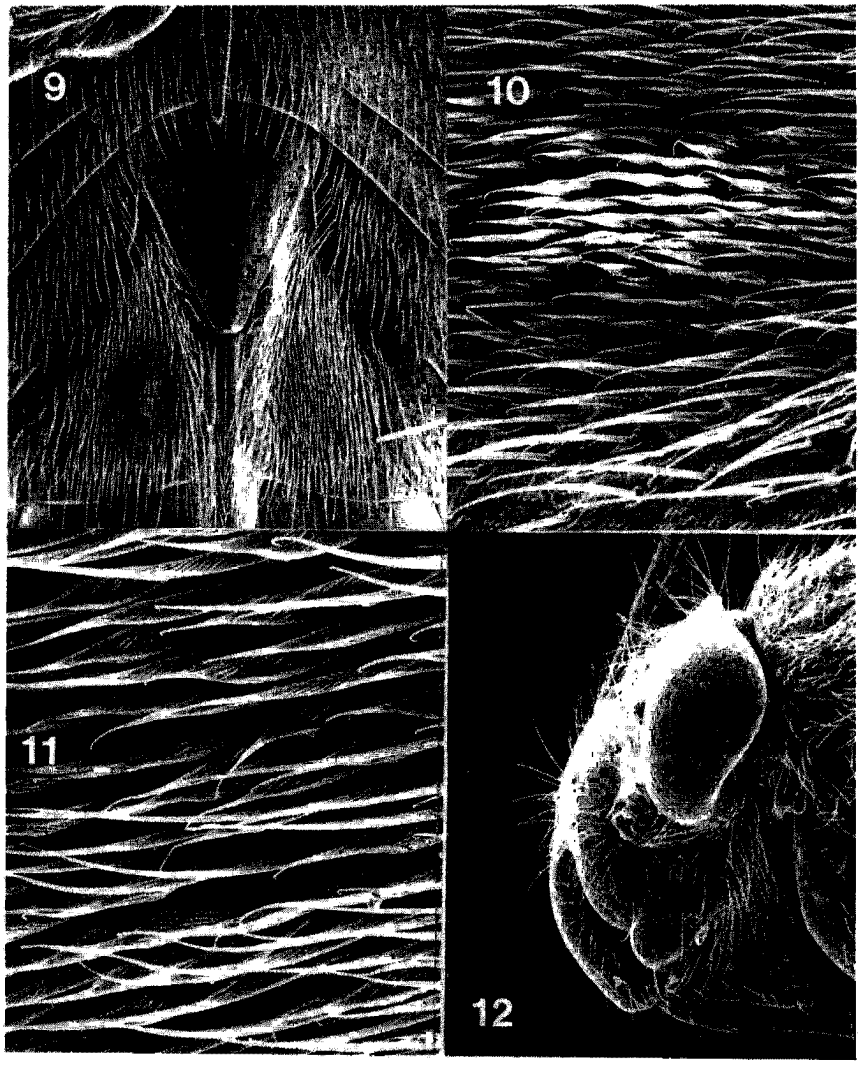
With the exception of Hawaii, each island has at least one species that is easily recognized by the presence of sericeous, silvery setae. The simple dorsal pubescence also varies in density, length, and inclination, and is sometimes diagnostic, such as the long, erect setae of *palolo* n. sp. on Oahu. The females of at least three species have patches of modified, scale-like setae bordering the base of the ovipositor (Figs. 9–11). Several aspects of color are also very useful characters for identification. The general coloration can be variable within a species, but entirely yellow species usually lack any reddish brown color on the pleura and sterna. The apex of the scutellum is often yellowish brown, even in castaneous species, but is sometimes diagnostic when it is a contrasting white color, as in *oahuensis* n. sp. Antennal color pattern, although never unique, is sometimes useful for separating species.

GENERIC RELATIONSHIPS: Kirkaldy (1902) originally placed *Sarona* in the subfamily Mirinae (including Reuter's (1875) Capsaria). Zimmerman (1948) recognized the genus as belonging to the Orthotylinae, but placed it in the tribe Halticini based on the enlarged metafemora and its resemblance to the halticine genus *Strongylocoris* Blanchard. Carvalho (1952b, 1955, 1958) retained *Sarona* in the Halticini, and *Sarona* was one of the few orthotyline genera that Schuh (1974) did not reassess.

Sarona clearly belongs in the tribe Orthotylini based on the presence of K structures in the female genitalia (Fig. 15). It can be further placed in the "*Orthotylus* group" of genera (Schuh, 1974) by the presence of the long, sclerotized spicula of the male vesica (Figs. 13, 14). I propose that the sister group of *Sarona* is *Slaterocoris* Wagner + *Scalponotatus* Kelton (Fig. 16). These three genera all share the following synapomorphies: 1) dorsal surface shiny, rugulose punctate; 2) posterior margins of eyes straight and contiguous with the posterior margin of the vertex; 3) hemelytra posterior to cuneal fracture moderately to strongly deflexed; 4) abdomen short and broad; 5) a single spicula present on vesica, and 6) at least the apex of female K structure modified as a sclerotized process. Although I had no specimens available for dissection, the genus *Lopidella* Knight also has



Figs. 6–8. Scanning electron micrographs of *Sarona* characters. **6**, *S. myoporicola* n. sp., lateral view of right paramere. **7**, *S. adonias*, lateral view of right paramere. **8**, *S. adonias*, lateral view of left paramere. Abbreviations: da = dorsal arm; va = ventral arm; bag = basal angle.



Figs. 9–12. Scanning electron micrographs of *Sarona* and *Slaterocoris* characters. **9–11**, *Sarona hiiaka* n. sp., modified setae bordering the base of the ovipositor. **12**, *Slaterocoris* sp., lateral view of head.

a punctate pronotum and its parameres resemble those of *Slaterocoris* and *Scalponotatus*.

Sarona displays the following apomorphies not found in *Slaterocoris* and *Scalponotatus*: 7) tylus flat basally, and not greatly protruding from surrounding areas (Figs. 4, 12); 8) frons broadly and weakly convex; 9) posterior surface of head strongly concave; 10) posterior margin of vertex and eyes contacting and obscuring anterior mar-

gin of pronotum; 11) gena extremely short and narrow; 12) pronotum two times as wide as long, rather than quadrate; 13) metafemora enlarged; 14) abdomen somewhat flattened dorsoventrally; 15) base of vesical spicula strongly recurved (Figs. 13, 14); 16) vesical spicula concave ventrally, partially enclosing ductus (Figs. 13, 14); 17) sclerotized process distinct for entire length of female K structure and digitiform apically (Fig. 15). Although not a unique autapomorphy, *Sarona* also differs from *Slaterocoris* and *Scalponotatus* by having lost alary polymorphism.

Slaterocoris and *Scalponotatus* are united as sister taxa by the following synapomorphies: 17) distal half of spicula strongly recurved; 18) apex of female K structure modified as a short, acuminate and weakly sclerotized process (Fig. 15); 19) hemelytra always shiny black. One character that conflicts with this hypothesis of relationships is the minutely shagreened sculpturing of the dorsal surface, which Kelton (1969) used to distinguish *Scalponotatus* from *Slaterocoris*. This sculpturing occurs in some but not all species of *Sarona*, which suggests that it is a pleisiomorphic character that has been lost independently in *Slaterocoris* and some *Sarona*, but its distribution needs to be examined in other genera such as *Lopidella*.

Determining the sister group to *Slaterocoris* + *Scalponotatus* + *Sarona*, herein referred to as the *Slaterocoris* group, lies beyond the scope of this study. The position and shape of the tergal processes in the *Slaterocoris* group appear similar to many other North American genera, and are not unique as in *Pseudopsallus* Van Duzee (Stonedahl & Schwartz, 1986). This group does share some informative characters in common with other genera however. I interpret the single spicula in this group as the right ventral spicula of Southwood (1953), with the basidorsal arm of *Slaterocoris* and *Scalponotatus*, and the dorsal flange of *Sarona* homologous with the dorsal spicula found in other orthotyline genera (Asquith, 1991; Stonedahl & Schwartz, 1986). If a full complement of vesical spiculae is pleisiomorphic, as suggested by Asquith (1991), then the *Slaterocoris* group has lost the left ventral spicula. This loss is also seen in *Melanotrichus* Reuter, *Ilnacorella* Knight, and *Brooksetta* Kelton (Asquith, 1991).

Some homologous structures of the right paramere discussed by Asquith (1991) are also evident in the *Slaterocoris* group. A basal process or arm is present in at least some species of all three genera. The apical bifurcation and development is also homologous to that seen in other genera (Asquith, 1991). It is interesting, however, that if the plesiomorphic shape of the right paramere is more or less rectangular, than the dorsal and ventral apical development forming a C-shaped paramere has occurred independently in all the genera of the *Slaterocoris* group, *Lopidea* Uhler, *Orthotylus* , and perhaps other genera.

Some species in all three genera of the *Slaterocoris* group have modified setae. Stonedahl and Schwartz (1986) divided the orthotyline scale-like setae into two categories; the slightly flattened, sericeous, narrowly lanceolate setae with converging ridges is the type found in the *Slaterocoris* group (Figs. 2, 3), *Dichaetocoris* Knight and *Oaxacocoris* Schwartz & Stonedahl. Determining if this setal type defines a distinct group within the Orthotylini, as suggested by Stonedahl & Schwartz (1986), will require a more extensive character analysis.

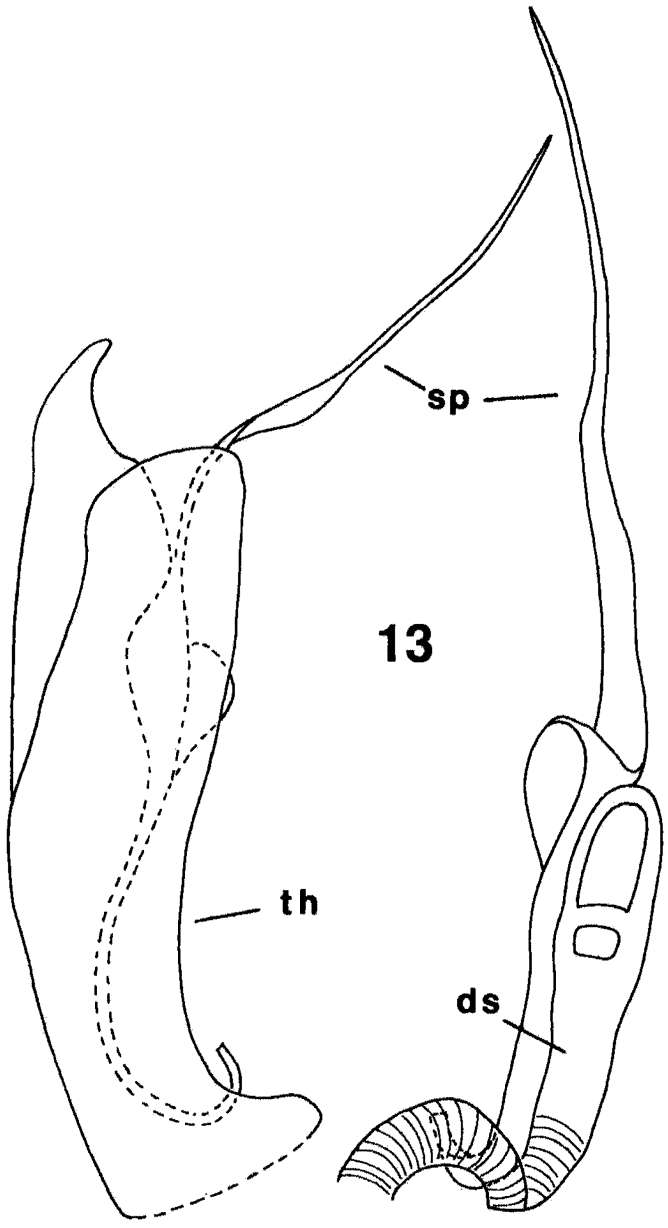


Fig. 13. *Sarona saltator* n. sp., vesica. Abbreviations: th = theca; sp = spicula; ds = ductus seminis.

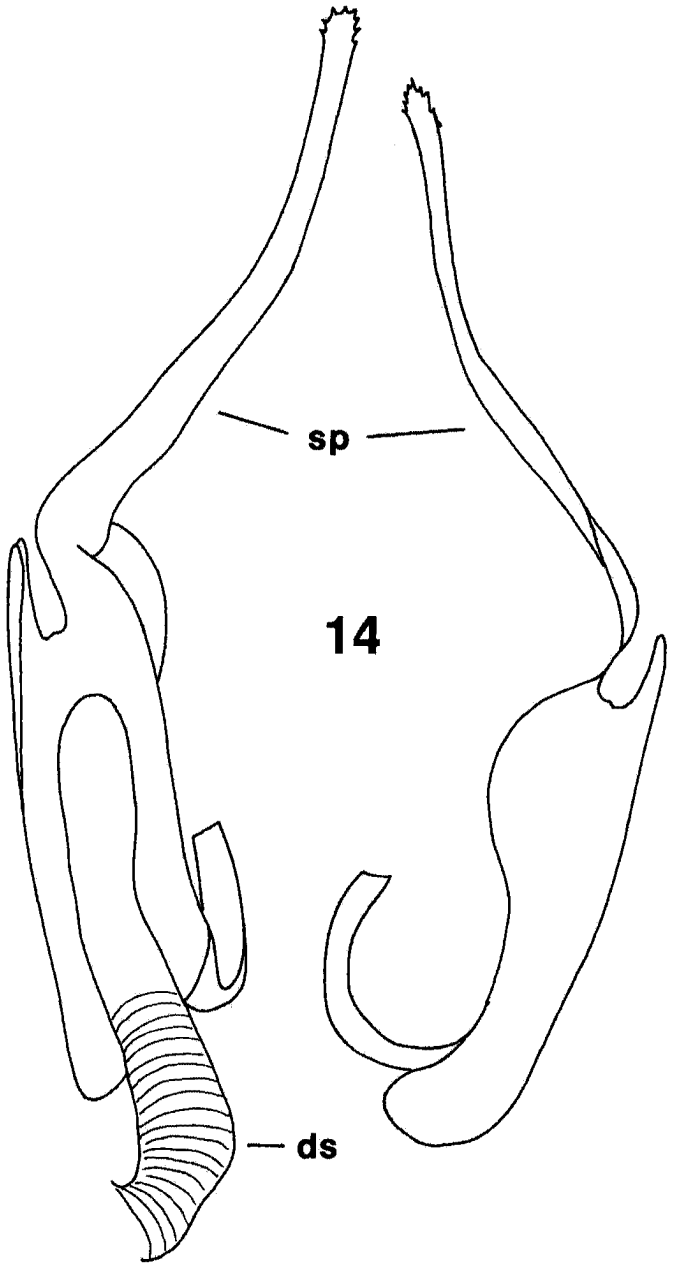


Fig. 14. *Sarona adonias*, vesica. Abbreviations: th = theca; sp = spicula; ds = ductus seminis.

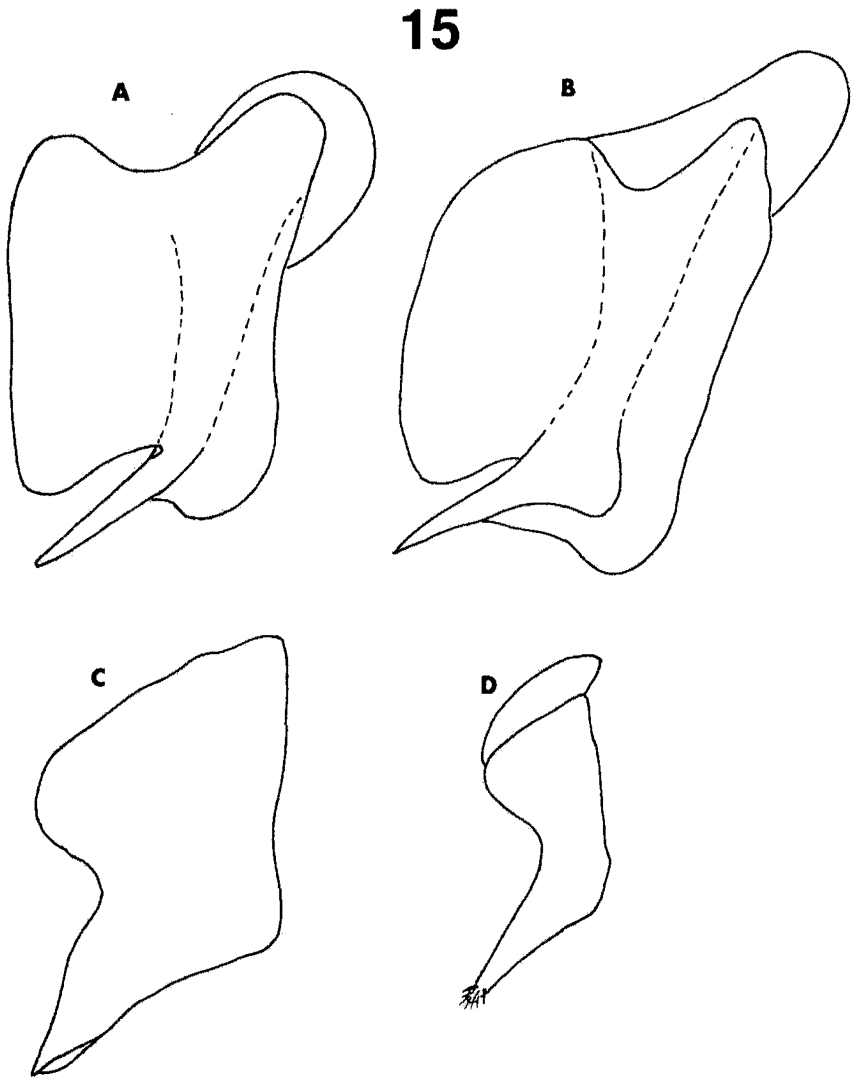


Fig. 15. K-structures of female genitalia. **A.** *Sarona kaala* n. sp. **B.** *Sarona adonias*. **C.***Slaterocoris sp*. **D.** *Scalponotatus mexicanus* Kelton.

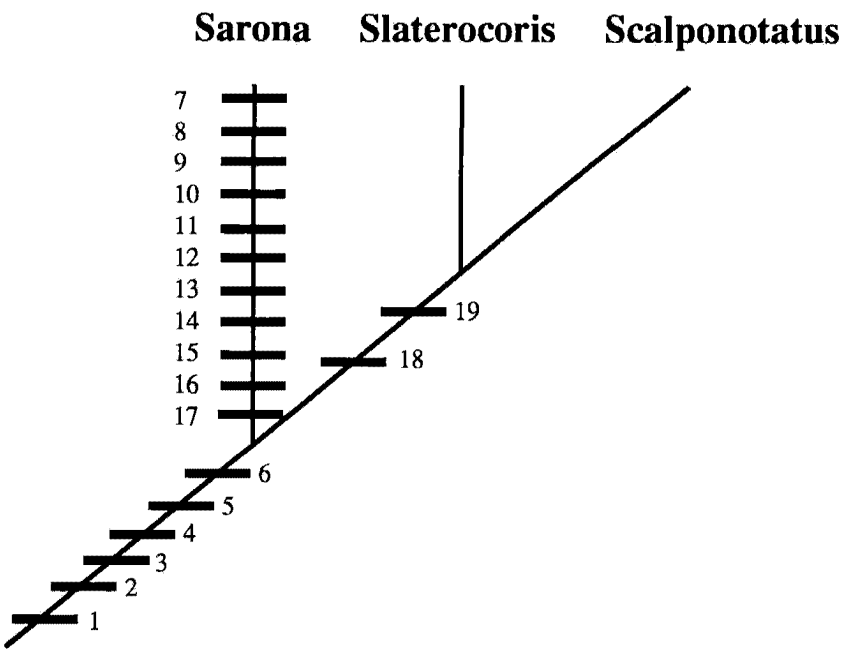


Fig. 16. Cladogram depicting relationships among members of the *Slaterocoris*-group of genera. Numbers refer to characters discussed in the text.

KEY TO MALES OF *SARONA* BY ISLAND

KAUAI

1. Dorsum with both simple and sericeous, silvery setae; coloration black and yellow; genitalia as in Fig. 25; (on *Zanthoxylum)* ..... ***annae*, new species**
– Dorsum with simple setae only; coloration other than black and yellow; genitalia not as above 2
2. Pleura and sterna uniform yellow, yellowish brown or green, never with dark reddish brown or fuscous coloration; posteroventral margin of genital capsule acuminate (Figs. 44c, 45c, 51c) 3
– Pleura and sterna uniform reddish brown to fuscous, or at least with some reddish brown markings; posteroventral margin of genital capsule broadly or narrowly rounded, never acuminate 5
3. Color lime green or brownish green; apex of rostrum reaching onto abdomen; genitalia as in Fig. 44; (on *Melicope barbigera*) ..... ***kukona*, new species**
– Color yellow to yellowish brown; apex of rostrum not, or just surpassing metacoxae; genitalia not as above 4
4. Right paramere strongly abbreviated (Fig. 51a); basal angle of left paramere not developed (Fig. 51b); tergal process absent (Fig. 51c); (on *Melicope anisata*) .... ***mokihana*, new species**

– Right paramere C-shaped, ventral arm elongate and curved dorsally (Fig. 45a); basal angle of left paramere strongly developed as an erect process (Fig. 45b); tergal process present (Fig. 45c); (on *Claoxylon sandwicense*) ..... ***laka*, new species**

5. Sterna, pleura, and abdomen uniform reddish brown to black; apex of right paramere entire (Figs. 23a, 59a) 6
– Sterna, pleura, and abdomen bicolored, reddish brown and yellow; apex of right paramere bifurcate (Figs. 36a, 48a) 7

6. Very small species, tylus-cuneus length < 2.0 mm; apex or distal one fourth of antennal segment II fuscous (Fig. 103); right paramere with apex curved dorsally (Fig. 23a); (on *Chamaesyce celastroides*) ..... ***akoko*, new species**
– Larger species, tylus-cuneus length > 2.0 mm; antennal segment II infuscated on distal third (Fig. 139); right paramere with apex curved mesoventrally (Fig. 59a); (on *Melicope clusiifolia*) ..... ***saltator*, new species**

7. Right paramere widest at middle, dorsal arm of apical bifurcation shorter than ventral arm (Fig. 48a); basal angle of left paramere well developed as a process (Fig. 48b); tergal process situated medially (Fig. 48c) ..... ***makua*, new species**
– Right paramere sinuous, dorsal arm of apical bifurcation longer than ventral arm (Fig. 36a); basal angle of left paramere poorly developed (Fig. 36b); tergal process situated laterally (Fig. 36c); (on *Melicope clusiifolia*) ..... ***hiiaka*, new species**

Oahu

1. Dorsum with both simple and sericeous, silvery setae; coloration black and yellow; antennal segment II distinctly enlarged (Fig. 134); genitalia as in figure 54; (on *Neraudia melastomifolia*) ..... ***oloa*, new species**
– Dorsum with simple setae only; coloration other than black and yellow; antennal segment II not enlarged; genitalia not as above 2

2. Species predominantly yellow or yellowish brown, pleura and mesosternum never reddish brown or fuscous 3
– Species predominantly reddish brown; if dorsum yellowish or mottled (*hie* n. sp.), then pleura and mesosternum always reddish brown to fuscous 4

3. Dorsum with long, erect, pale setae; genitalia as in Fig. 55 ... ***palolo*, new species**
– Dorsum with short, decumbent setae, genitalia as in Fig. 60 .. ***usingeri*, new species**

4. Right paramere C- or L-shaped (Figs. 42a, 43a, 53a) 5
– Right paramere elongate (Figs. 32a, 35a, 38a, 47a) 8

5. Scutellum and mesoscutum distinctly bicolored; mesoscutum dark, reddish brown medially, pale yellow laterally; scutellum castaneous proximally, distal third white; distal third of antennal segment II fuscous; genitalia as in figure 53 (on *Melicope*) ..... ***oahuensis*, new species**
– Scutellum and mesoscutum uniform in color; apex of scutellum occasionally paler than proximal half, but never a strongly contrasting white; only distal fourth of antennal segment II fuscous (Figs. 122, 123, 141) 6

6. Right paramere very large, C-shaped, ventral arm elongate, usually contacting and conforming to inner surface of posteroventral margin of genital capsule (Fig. 61a); tergal process very long, apex serrate and recurved laterally (Fig. 61c) ..... ***xanthostelma*, new species**

– Right paramere C- or L-shaped, but ventral arm not elongate and conforming to inner surface of posteroventral margin of genital capsule (Figs. 42a, 43a); tergal process short, apex not serrate (Figs. 42c, 43c) 7

7. Right paramere distinctly C-shaped, ventral and dorsal arms of equal length (Fig. 43a); genital capsule with two tergal processes, one on each side of midline (Fig. 43c) ..... ***kuaana*, new species**

– Right paramere more L-shaped, ventral arm much longer than dorsal arm (Fig. 42a); single tergal process present near lateral margin (Fig. 42c) .. ***kohana*, new species**

8. Very small species, tylus-cuneus length < 2.0 mm; dorsal coloration uniform yellowish brown; right paramere short, not reaching more than half way across genital capsule (Fig. 32a); (on *Korthalsella camplanata* growing on *Acacia koa*) ..... ***gagnei*, new species**

– Larger species, tylus-cuneus length > 2.0 mm; dorsal coloration yellowish brown with dark brown mottling, or uniform, dark reddish brown; right paramere elongate, reaching across most or all of genital capsule (Figs. 35a, 38a, 47a) 9

9. Dorsal coloration light yellowish brown, with darker brown mottling; apex of right paramere bifurcate (Fig. 35a); only apex of antennal segment II fuscous (Fig. 115); tergal process oriented posteriorly (Fig. 35c); (on *Melicope*) ..... ***hie*, new species**

– Dorsal coloration dark reddish brown; apex of right paramere not bifurcate (Figs. 38a, 47a); distal 1/4 to 1/3 of antennal segment II fuscous (Figs. 118, 127); tergal process oriented medially (Figs. 38c, 47c); (on *Broussaisia arguta*) 10

10. Genital capsule with two tergal processes; right tergal process elongate, oriented medially, reaching to left tergal process (Fig. 47c) .... ***lissochorium*, new species**

– Genital capsule with a single, short, tergal process on right side of midline (Fig. 38c) ..... ***kaala*, new species**

MAUI

1. Dorsum with both simple, and sericeous, silvery setae; antennal segment II distinctly enlarged, length less than head width 2

– Dorsum with simple setae only; antennal segment II not enlarged, length greater than head width 4

2. Simple setae on dorsum long and erect; basal arm of right paramere thick, not serrate (Fig. 33a); head uniform castaneous; (at high elevations on East Maui; on *Dubautia menziesii*) ..... ***haleakala*, new species**

Simple setae on dorsum short, and inclined to decumbent; basal arm of right paramere narrow, serrate (Figs. 50d, 58d); head castaneous to black with at least lateral areas of frons and vertex yellow; (on *Pipturus)* 3

3. Very small species, tylus-cuneus length < 2.0 mm; right paramere abbreviated (Fig. 58a) ..... ***pusilla*, new species**

– Larger species, tylus-cuneus length > 2.0 mm; right paramere elongate, tapered (Fig. 50a) ..... ***maui*, new species**

4. Right paramere elongate, linear (Figs. 29a, 39a, 40a) 5

– Right paramere C-shaped (Figs. 22a, 30a) 7

5. Right paramere with a small, acuminate protuberance on the ventrolateral margin (Fig. 39a); tergal process vestigial (Fig. 39c) ..... ***kanaka*, new species**

– Right paramere without protuberance; if slight protuberance present, it is rounded, not acuminate (Fig. 40a); tergal process well developed (Figs. 29c, 40c) 6

6. A short, yellow stripe present between calli; apex of scutellum and lateral margins of pronotum usually with extensive yellow; ratio antennal segment II-head width ≤ 1.15; basal angle of left paramere not developed (Fig. 40b) .... ***kane*, new species**

– Area between calli usually reddish brown; if area between calli yellow, then yellow not extending posterior of calli as a short stripe; lateral margins of pronotum, and scutellum usually reddish brown; if anterolateral margins of pronotum yellow, then yellow not extending to posterior angles; ratio antennal segment II-head width ≥ 1.20; basal angle of left paramere weakly developed (Fig. 29b); (on *Nestigis sandwicensis*) ..... ***beardsleyi*, new species**

7. Dorsal arm of right paramere curved dorsally (Fig. 30a); coxae yellow to yellowish brown; genital capsule with a single, short, tergal process near right lateral margin (Fig. 30c) ..... ***dakine*, new species**

– Dorsal arm of right paramere straight or curved ventrally (Fig. 22a); coxae castaneous to black; genital capsule with two, short, tergal processes, one on either side of midline (Fig. 22c); (on *Metrosideros polymorpha*) ..... ***adonias*** Kirkaldy

Molokai

1. Very small species, tylus-cuneus length ≤ 2.0 mm; dorsum with both simple, and sericeous, silvery setae; antennal segment II distinctly enlarged (Fig. 106); (on *Pipturus)* ..... ***antennata*, new species**

– Larger species, tylus-cuneus length ≥ 2.5 mm; dorsum with simple setae only; antennal segment II not enlarged (Figs. 102, 137) 2

2. Basal arm of right paramere curved dorsally, dorsal arm as long as main body of paramere (Fig. 22a); coxae castaneous to black; genital capsule with two, short, tergal processes, one on either side of midline (Fig. 22c); (on *Metrosideros polymorpha*) ..... ***adonias*** Kirkaldy

– Basal arm of right paramere straight, dorsal arm shorter than main body of paramere (Fig. 57a); coxae yellow to yellowish brown; tergal process reduced to a dentate, lateral margin of genital capsule (Fig. 57c) ..... ***pookoi*, new species**

Lanai

1. Very small species, tylus-cuneus length < 2.0 mm; dorsum with both simple and sericeous, silvery setae; antennal segment II distinctly enlarged (Fig. 126); (on *Pipturus*) ..... ***lanaiensis*, new species**

– Larger species, tylus-cuneus length > 2.0 mm; dorsum with simple setae only; antennal segment II not enlarged (Figs. 102, 107, 108) 2

2. Very large species, tylus-cuneus length > 3.0 mm; right paramere C-shaped (Fig. 22a); genital capsule with two, short, tergal processes, one on either side of midline (Fig. 22c); (on *Metrosideros polymorpha*) ..... ***adonias*** Kirkaldy

– Smaller species, tylus-cuneus length < 3.0 mm; right paramere elongate, tapered (Figs. 27a,28a); a single tergal process near lateral margin of genital capsule (Figs. 27c, 28c) 3

3. Right paramere very long, reaching left margin of genital capsule (Fig. 27a); ventral surface of left paramere concave, apex not abruptly curved ventrally (Fig. 27b); ratio antennal segment II-head width > 1.10; (on *Ilex anamola*) .... ***aula*, new species**
– Right paramere shorter, not reaching left margin of genital capsule (Fig. 28a); apex of left paramere distinctly curved ventrally; ratio antennal segment II-head width < 1.10; (on *Nestigis sandwicensis*) ..... ***azophila*, new species**

HAWAII

1. Very large species, tylus-cuneus length > 3.0 mm; right paramere C-shaped (Fig. 22a); genital capsule with two, short, tergal processes, one on either side of midline (Fig. 22c); (on *Metrosideros polymorpha*) ..... ***adonias*** Kirkaldy
– Smaller species, tylus-cuneus length < 2.6 mm; right paramere elongate (Figs. 37a, 41a, 52a) 2
2. Tibiae without dark spots at bases of spines; ventroapical surface of right paramere at least weakly serrate (Fig. 56a); tergal process long, arising medially, recurved, oriented posteriorly (Fig. 56c); (on *Pittosporum*) ..... ***pittospori*, new species**
– Tibiae with dark spots at bases of spines; ventroapical surface of right paramere entire (Figs. 24a, 37a, 52a); tergal process short, arising laterally (Figs. 37c, 52c), or absent (Fig. 31c); if longer and arising medially, then curved so it is oriented medially (Fig. 24c) 3
3. Left paramere very short, ventral surface not obviously concave (Fig. 24b); right paramere with basal arm arising from medial surface (Fig. 24a); large tergal process arising medially (Fig. 24c); (on *Melicope*) ..... ***alani*, new species**
– Left paramere longer, ventral surface distinctly concave (Figs. 37b, 41b, 52b); right paramere without basal arm (Figs. 37a, 41a, 52a); tergal process absent (Fig. 31c) or reduced to a dentate, lateral angle (Figs. 49c, 52c) 4
4. Very small species, tylus-cuneus length < 2.0 mm; predominantly yellowish brown in color; genitalia as in Fig. 37 ..... ***iki*, new species**
Larger species, tylus-cuneus length > 2.0 mm; color usually reddish brown; if color yellowish, then right paramere very short (Fig. 31a) 5
5. Dorsal coloration yellow to light yellowish brown; some infuscation present at apex of cuneus, and on membrane, but pleura and sterna uniform yellow; right paramere very short (Fig. 31a); tergal process absent (Fig. 31c); (on *Korthalsella* growing on *Acacia koa*) ..... ***flavidorsum*, new species**
– Dorsal coloration dark reddish brown to black; pleura and sterna always infuscated; right paramere elongate, tapered (Figs. 41a, 49a, 52a); tergal process present as a dentate, lateral angle of genital capsule (Figs. 41c, 49c, 52c) 6
6. Length of antennal segment II less than head width; dorsal coloration uniform castaneous, apex of scutellum only rarely yellowish brown; genitalia as in Fig. 41; (on *Dubautia*) ..... ***kau*, new species**
– Length of antennal segment II greater than or equal to head width; apex of scutellum usually pale or yellowish brown; if apex of scutellum yellowish brown, then antennal segment II clearly longer than head width 7
7. Tylus-cuneus length usually > 2.35 mm; dorsal coloration uniform dark castaneous; apex of scutellum occasionally yellowish brown, but never pale and conspicuously contrasting with rest of scutellum; femora predominantly reddish brown, yellow

coloration, if present, restricted to very apex or base of femur; genitalia as in Fig. 52; (on *Myoporum sandwicense*) ..... ***myoporicola*, new species**

– Tylus-cuneus length usually < 2.35 mm; dorsal coloration reddish and yellowish brown; apex of scutellum usually pale, conspicuously contrasting with rest of scutellum; femora clearly bicolored, yellow proximally and distally, reddish brown at middle 8

8. Rostrum not surpassing metacoxae; distal half of right paramere strongly curved medially (Fig. 49a); (on *Pipturus*) ..... ***mamaki*, new species**

– Rostrum just surpassing metacoxae; distal half of right paramere longer and less curved medially (Fig. 34a); (on *Myrsine*) ..... ***hamakua*, new species**

Sarona adonias Kirkaldy Figs. 22, 62, 102

Sarona adonias Kirkaldy, 1902:142. Zimmerman, 1949:201; Carvalho, 1952:74; Carvalho, 1958:31; Gagné, 1979:56-82; Gagné, 1981:118-126.

Diagnosis. Occurs on the islands of Hawaii, Maui, Molokai and Lanai. Recognized by its large size (tylus-cuneus length > 3.0 mm) and symmetric, C-shaped right paramere (Fig. 22a). On Maui, the sympatric species *Sarona dakine* n. sp. also has a C-shaped right paramere, but the dorsal arm is recurved basally and the ventral arm is much shorter than in *adonias*.

Description. MALE. Large species, tylus-cuneus length 3.05-3.26 mm; pronotal width 1.72-1.80 mm. Head moderately vertical; frons flat; tylus flat, sharply curved distally; jugum width equal to tylus width; antennal segment I reaching past apex of tylus. Antennal segment II-head width ratio 1.15. Apex of rostrum surpassing metacoxae.

Dorsal surface densely covered with long, decumbent, simple, pale setae. Dorsal coloration variable, from yellowish brown to almost black; posterior and lateral margins of pronotum, lateral angles of mesoscutum, and apex of scutellum usually lighter than other areas. Head castaneous; vertex and frons lighter, yellowish brown; apex of tylus and buccula often infuscated. Antennae yellowish brown; distal half of segment II fuscous (Fig. 102). Venter yellowish brown to dark castaneous; ventral and posterior margins of thoracic pleura pale. Legs yellowish brown to dark castaneous; apices of femora, and tibiae lighter.

Right paramere symmetrically C-shaped; dorsal and ventral arms roughly equal in size (Fig. 22a). Left paramere with basal angle weakly developed (Fig. 22b). Dorsal margin of genital capsule with two, short tergal processes on either side of midline (Fig. 22c). Spicula elongate and weakly sinuous, apex variably expanded and serrate; apex of flange digitiform (Fig. 62).

FEMALE. Tylus-cuneus length 3.35-3.61 mm; width of pronotum 1.80-1.97 mm. Antennal segment II-head width ratio 1.05-1.10. Exhibiting same color variation as male, but typically lighter; basal half of antennal segment IV light colored (Fig. 102).

Type material. A holotype was not designated in the original description of this species. The Natural History Museum, London (BMNH) contains two specimens that probably represent syntypes, although neither one has locality data provided in the original description. One specimen bears the following label data: Label 1, '*Sarona adonias* Kirk. Type ' (handwritten); Label 2, '23' (handwritten); Label 3 (grey colored), 'Figured specimen'; Label 4, 'Sandwich Is. 1913-323'. The second specimen has only labels 3 and 4. The '1913-323' Label 4 represents the date and BMNH accession number for when these specimens were incorporated into the BMNH collection.

Other specimens examined. MOLOKAI: 1M, 2F, Kawela Gulch, 1068–1144 m, 18–22.III.1966 (C.M. Yoshimoto) (BPBM); 1F, Kawela Gulch, 1068–1144 m, 8.VII.1968 (D. Tsuda) (BPBM); 5M, 8F, Kawela Gulch, 1068–1144 m, 8–10.VII.1968, ex *Metrosideros* (W.C.

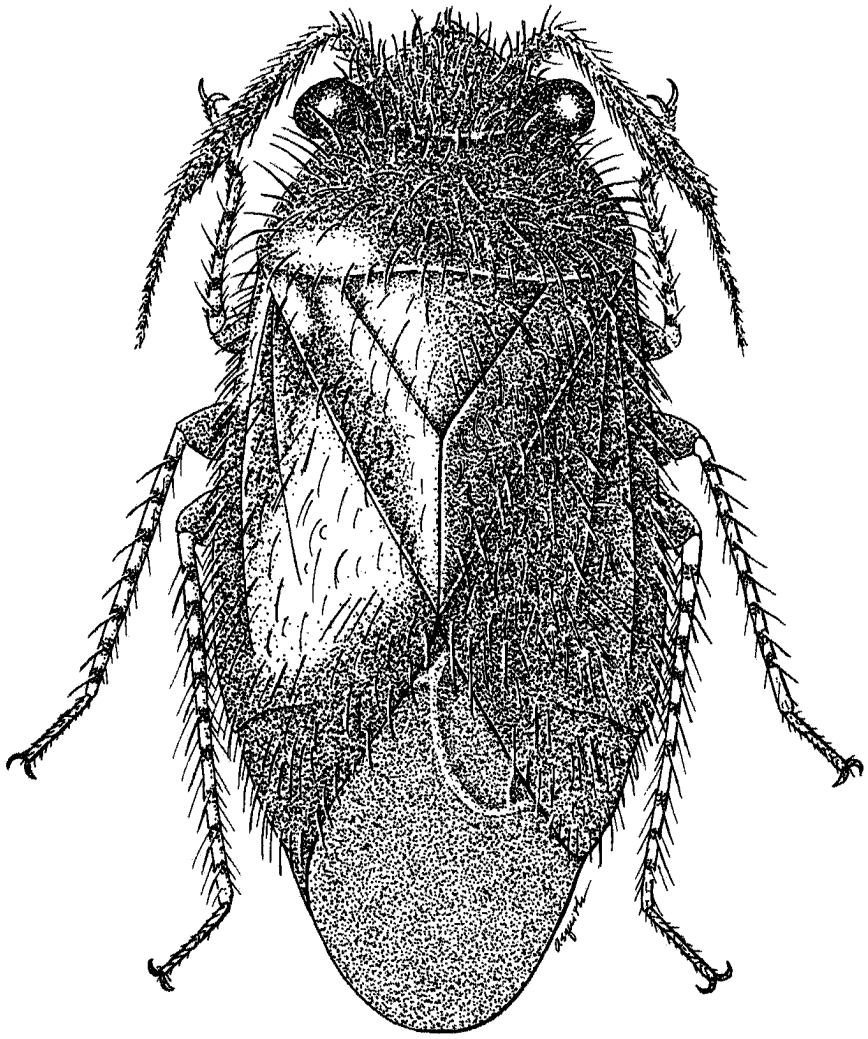


Fig. 17. *Sarona haleakala* n. sp., dorsal habitus.

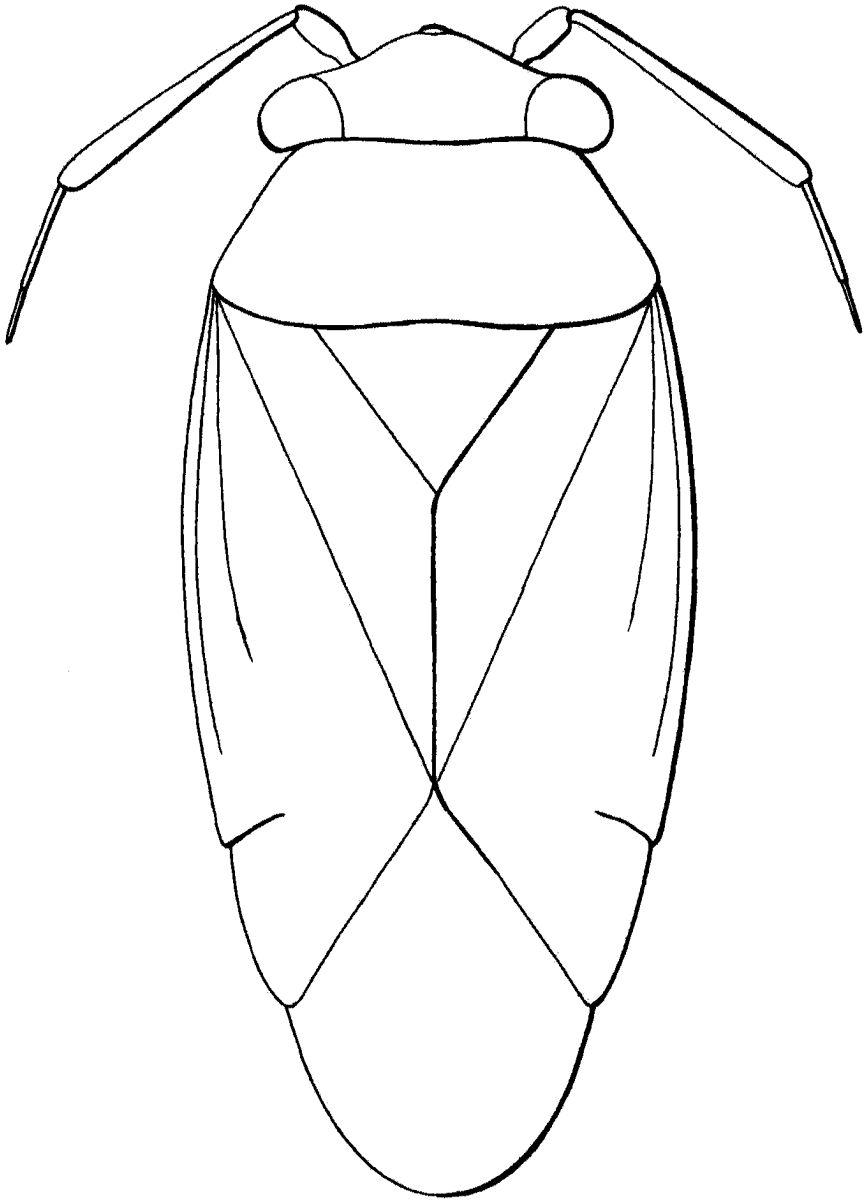


Fig. 18. *Sarona haleakala* n. sp., long winged form.

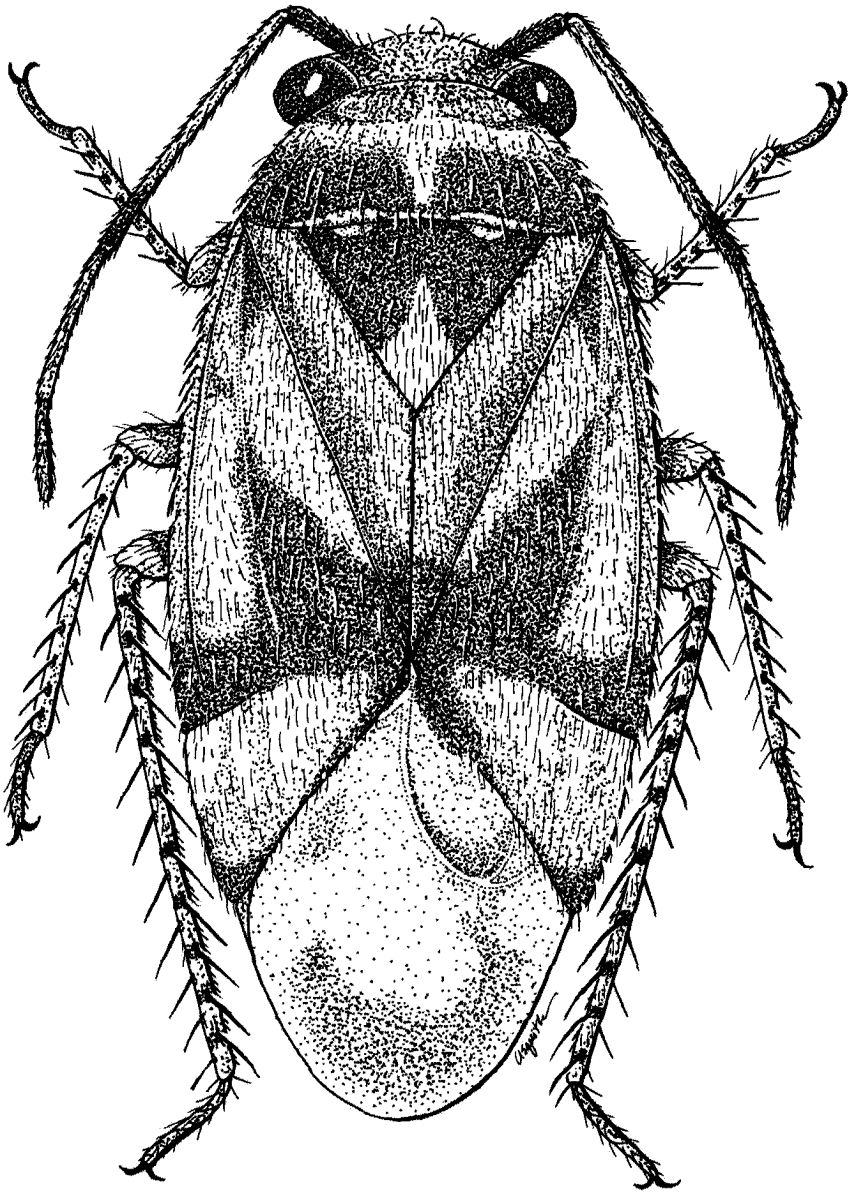


Fig. 19. *Sarona mamaki* n. sp., dorsal habitus.

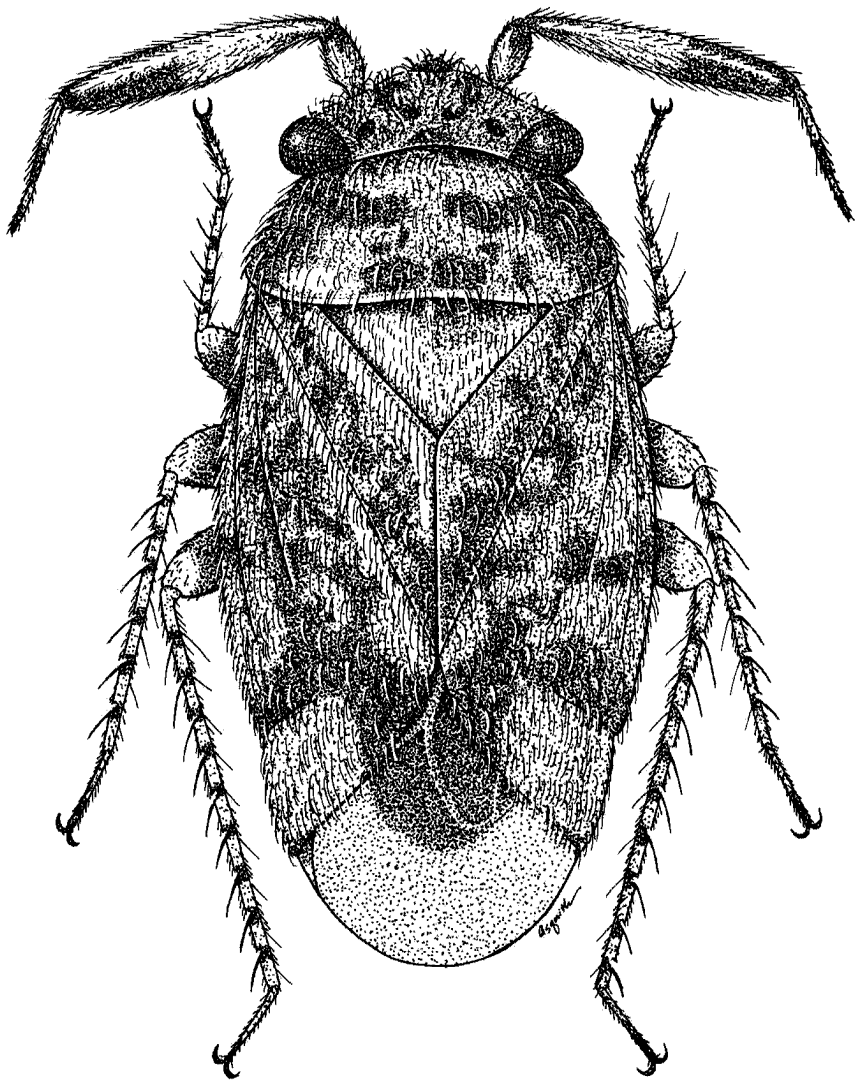


Fig. 20. *Sarona oloa* n. sp., dorsal habitus.

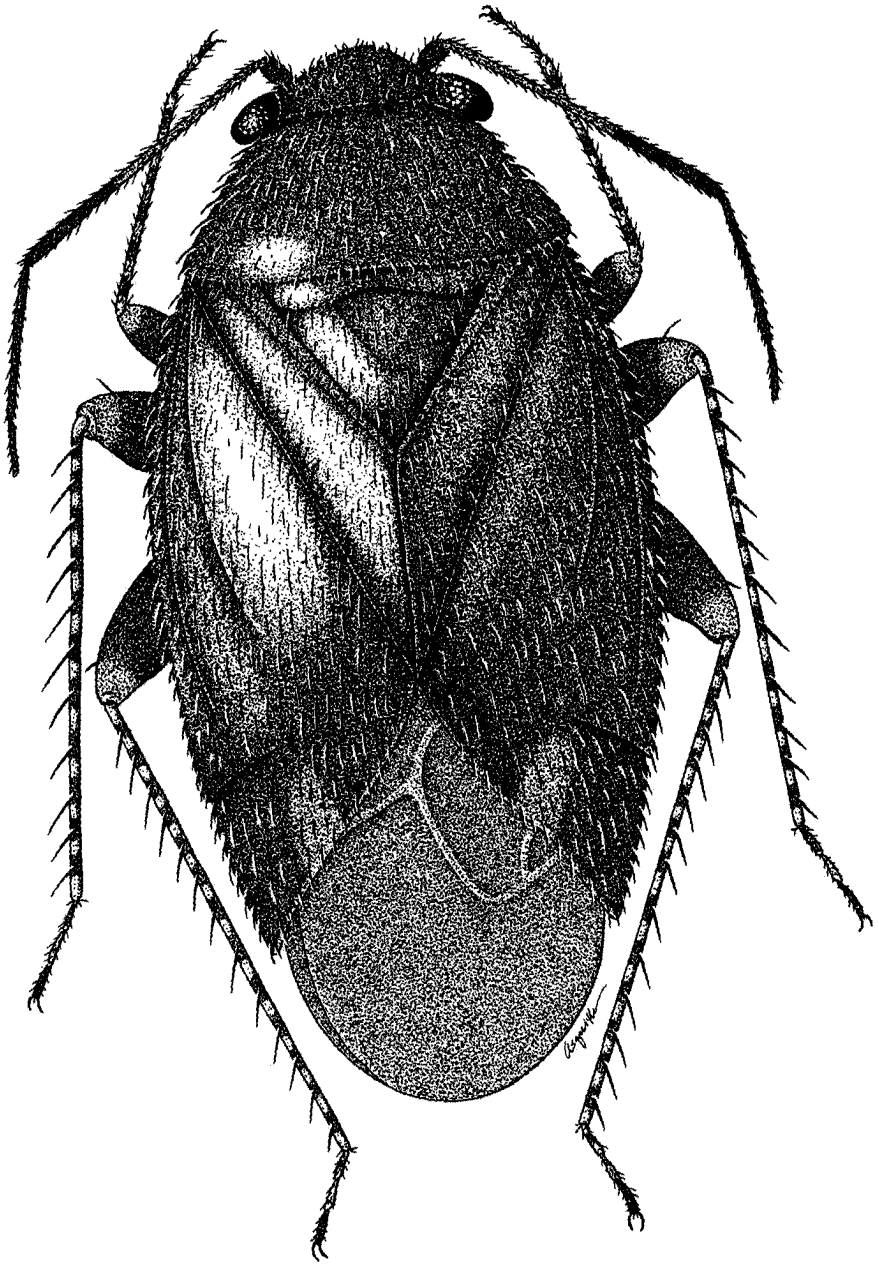


Fig. 21. *Sarona saltator* n. sp., dorsal habitus

Table 1. Island distributions and host plants of *Sarona* species. K = Kauai; O = Oahu; Mo = Molokai; Ma = Maui; EMa = East Maui; L = Lanai; H = Hawaii; ? indicates a questionable or unconfirmed host.

Species	Island	Host Plant	Family
adonias	H,Ma, L,Mo	*Metrosideros polymorpha*	Myrtaceae
mamaki	H	*Pipturus*	Urticaceae
iki	H	—	—
myoporicola	H	*Myoporum sandwicense*	Myoporaceae
hamakua	H	*Myrsine*	Myrsinaceae
kau	H	*Dubautia*	Asteraceae
pittospori	H	*Pittosporum*	Pittosporaceae
flavidorsum	H	*Korthalsella*	Viscaceae
alani	H	*Melicope*	Rutaceae
haleakala	EMa	*Dubautia menziesii*	Asteraceae
pusilla	Ma	*Pipturus*	Urticaceae
maui	EMa	*Pipturus*	Urticaceae
beardsleyi	Ma	*Nestigis sandwicensis*	Oleaceae
dakine	EMa	*Melicope* ?	Rutaceae
kanaka	EMa	*Cheirodendron* ?	Araliaceae
kane	EMa	*Myrsine* ?	Myrsinaceae
aula	L	*Ilex anamola*	Aquifoliaceae
azophila	L	*Nestigis sandwicensis*	Oleaceae
lanaiensis	L	*Pipturus*	Urticaceae
antennata	Mo	*Pipturus*	Urticaceae
pookoi	Mo	—	—
kaala	O	*Broussaisia arguta*	Hydrangeaceae
oloa	O	*Neraudia melastomifolia*	Urticaceae
kuaana	O	*Metrosideros* ?	Myrtaceae
xanthostelma	O	—	—
oahuensis	O	*Melicope*	Rutaceae
kohana	O	—	—
usingeri	O	*Claoxylon sandwicense* ?	Euphorbiaceae
palolo	O	—	—
gagnei	O	*Korthalsella camplanata*	Viscaceae
lissochorium	O	*Broussaisia* ?	Hydrangeaceae
hie	O	*Melicope anisata*	Rutaceae
makua	K	—	—
hiiaka	K	*Melicope clusiifolia*	Rutaceae
annae	K	*Zanthoxylum*	Rutaceae
saltator	K	*Melicope clusiifolia*	Rutaceae
akoko	K	*Chamaesyce sandwicense*	Euphorbiaceae
laka	K	*Claoxylon sandwicense*	Euphorbiaceae
kukona	K	*Melicope barbigera*	Rutaceae

Gagné) (BPBM); 5M, 1F, Kamakou Reserve, Puu Kolekole cabin, 24.VIII.1991, at UV light (A. Asquith) (BPBM); 3M, 3F, Kamakou Reserve, Sandalwood Pit, 23.VIII.1991, ex *Metrosideros polymorpha* (Asquith) (BPBM); 2M, Puu Kolekole, 1180 m, 14.I.1974 (S.L. Montgomery) (BPBM); 18M, 8F, above Waikolu Valley, 1400 m, 20.IV–2.V.1955, ex *Metrosideros* (J.L. Gressitt) (BPBM); 1M, 1F, above Waikolu Valley, 1400 m, 29.IV.1955 (E.J. Ford Jr.) (BPBM); 4M, 7F, Sandalwood Measuring Pit, 1065 m, 9.VII.1968, ex *Metrosideros* (Gagné) (BPBM); 1F, Mapulehua Punaula, 5.VIII.1936 (R.L. Usinger) (HDA); 1M, W end of Hanalilolilo Trail, 1070 m, 7.I.1981 (Gagné) (BPBM). MAUI: 1F, West Maui, Haeleloau, Puu Kukui Trail, 1068–1373 m (3500–4500 ft), 25.VIII.1965, ex *Metrosideros* (P.D. Ashlock) (BPBM); 4M, 3F, West Maui, Hanaula, 10.XI.1991, ex *Metrosideros polymorpha* (Asquith & J. Strazanac) (BPBM); 8M, 5F, Haleakala, edge of forest near Kauoou ? Pali, 1770 m (5800 ft), 19.X.1919, ex ohia lehua (BPBM); 1F, Haleakala Crater, Paliku, 22.VII.1965, ex fern (Yoshimoto) (BPBM); 1F, Haleakala, Ukulele Pipa ?, 1525 m (5000 ft), 12.X.1919, ex *Metrosideros polymorpha* (BPBM); 1M, Haleakala Crater, Paliku & Kaupo Trail, 1678-1983 m (5500–6500 ft), 21.VII.1965 (T. Suman) (BPBM); 1M, Haleakala, near Hauele ?, 12.X.1919, ex ohia lehua (BPBM); 3F, Kaulalewelewe - Puu Kukui Trail, 915–1037 m, 8.VIII.1968, ex *Metrosideros* (Gagné) (BPBM); 1F, Kaulalewelewe - Puu Kukui Trail, West Maui, 915-1037 m (3,000–3400 ft), 24–27.X.1966 (Yoshimoto) (BPBM); 1F, Kipahulu Valley, Camp 3 to rim, 1980-2260 m, 21–25.VIII.1967 (N. Wilson) (BPBM); 1M, Manawainui, Kipahulu Forest Reserve, Healani 13, 1373 m (4500 ft), 17.VI.1976, ex *Metrosideros* (R.S. Villegas) (BPBM); 1M, Nahiku, VIII (N.L.H. Krauss) (HDA); 1M, 5F, West Maui, Puu Kukui, malaise trap, 900 m, 9.IX.1971 (J.L. Gressitt) (BPBM); 1M, Ukulele, 1586 m (5200 ft), 5.IV.1970 (Gagné) (BPBM); 4M, 5F, West Maui Mts, rain forest along Puu Kukui trl, 1350 m, 13.V.1992 (D.A. Polhemus) (BPBM); 1M,Waikamoi Stream, 24.XII.1968 (Gagné) (BPBM); 1F, Waikamoi, Koolau State Forest, 915 m (3000 ft), III.1968, ex *Scaevola* (Krauss) (HDA). LANAI: 1M, Lanaihale, 915 m (3000 ft), 12.VII.1968 (Gagné) (BPBM); 1M, Lanaihale, 29–30.XI.1935 (Usinger) (HDA); 1M, Lanaihale, 1007 m (3300 ft), 25.III.1966 (J.W. Beardsley) (UH); 2F, Lanai Mts, 29.X.1947 (W.M. Giffard) (HDA); 1M, 1F, 610 m (2000 ft), 17.X.1907 (Giffard) (BPBM). HAWAII: 1F, halfway between Hilo & Pohakuloa, 1000 m, 30.XII.1967 (Gressitt) (BPBM); 1M, 1F, Hilo Forest Reserve, 671 m (2200 ft), 30.VI.1966, (Beardsley) (BPBM); 1M, 2F, Kau, aa flows, 1220 m (4000 ft), 27.VII.1918 (Giffard) (BPBM); 1F, Kau desert, Kilauea, 1155 m (3800 ft), 13.IX.1919, ex ohia (D.T. Fullaway) (BPBM); 1F, Kahuku Ranch, 915 m (3000 ft), VII.1953 (D.E. Hardy) (UH); 1F, Kilauea, Waiakea Forest Reserve, 1740 m, 18.III.1961 (L.W. Quate) (BPBM); 2M, 1F, Kilauea, Lumber Camp, 1220 m (4000 ft), 4.VII.1918 (Giffard) (BPBM); 1M, 3F, Kilauea, 29 miles, 1220 m (4000 ft), 21.VIII.1917, ex *Metrosideros polymorpha* (Giffard) (BPBM); 1M, 5F, Kilauea, 1220 m (4000 ft), 8.IX.1919, ex ohia (Fullaway) (BPBM); 1M, Kilauea, Hawaii Volcanoes, 29 mi, light trap, 21.VIII.1958 (Beardsley) (BPBM); 5M, 5F, Kilauea, 29 miles (30), 29.VIII.1917 (Giffard) (BPBM); 1F, Kilauea, 14.X.1929, ex ohia leuha (Swezey) (BPBM); 1M, Kilauea, 12.VII.1934, ex *Metrosideros* (Swezey) (BPBM); 2M, 3F, Kilauea, 18.VIII.1935, ex lehua (Usinger) (BPBM); 5M, 3F, Kilauea, 1220 m (4000 ft), 14.I.1917 (Giffard) (BPBM); 1F, Kilauea, VIII.1958 (Beardsley) (UH); 1M, Kilauea, 6.VIII.1919, ex ohia lehua (Krauss) (HDA); 2M, 1F, Kilauea, 14–18.IV.1944 (Krauss) (HDA); 8M, 2F, Kilauea, light trap, 12-23.VIII.1958 (Beardsley) (BPBM); 2F, Kilauea, 1220 m (4000 ft), 27.VI.1925 (Giffard) (BPBM); 1M, 2F, Kilauea-Kau, 1220 m (4000 ft), 22.VI.1966, ex *Metrosideros* (Beardsley) (BPBM); 1M, Kilauea, Bird Park, VIII.1952 (H.A. Bess) (UH); 1M, Kilauea Forest Reserve, IBP site, malaise trap, 1586 m, 21–28.XII.1970 (J.L. Gressitt & W.C. Gangé) (BPBM); 2M, 2F, Kilauea, 27.VI.1919, ex ohia lehua (Swezey) (BPBM); 1M, 1F, Kohala Mts, behind Kamuela, 1068 m (3500 ft), 29.VI.1966 (Beardsley) (BPBM); 1F, Nauhi Gulch, 1525-1830 m (5000–6000 ft), 10.X.1931, ex ohia lehua (Swezey & Williams) (BPBM); 2M, 29 mi, Olaa, VII.1927 (Giffard) (BPBM); 1F, Pahala, 17.II.1916 (Swezey) (BPBM); 1M, Saddle Road, 1525 m (5000 ft), 15.V.1959 (S. Kimoto) (BPBM); 1F, kipuka on Saddle Road, 19.5 mi W of Hilo, 30.XI.1968 (Gagné) (BPBM); 1F, Hawaii Volcanoes Natl Pk, Namakanipaio, 15.VI.1968 (R.W. Strandtman) (BPBM); 1F, Hawaii Volcanoes Natl Pk, Kilauea Iki, 28.VII.1991, ex *Metrosideros polymorpha* (Asquith) (BPBM); 1M, Upper Waiakea Forest Reserve, XII.1950 (Krauss) (HDA).

Host plant. *Metrosideros polymorpha* Gaud. (Myrtaceae).

Remarks. *Sarona adonias* is the only species known from more than one island, and exhibits slight variation among islands. In specimens from Maui Nui the second antennal segment is slightly longer than in Hawaii populations and the apex of the spicula is reduced and only weakly serrate (Fig. 62b). Maui Nui specimens also usually have the dorsal arm of the right paramere more strongly curved than Hawaii specimens.

Gagné (1979, 1981) discussed the host specificity and elevational distribution of *adonias* on Hawaii. He concluded that along with two species of *Oceanides* (Lygaeidae), *adonias* was the most abundant native insect on *Metrosideros* on windward Hawaii. This is the most frequently collected species of *Sarona*, and is common from subalpine habitats at 2135 m (7000 ft), to closed canopy wet rainforest, and open mesic ohia forest at 610 m (2000 ft). It has been collected during every month of the year but 70% of the records are from June to October.

Kirkaldy (1902) did not discuss the derivation of the name *adonias*, but it is obvious that the name is a feminine construction of the Greek, *adonis* (beautiful). It is also possible that Kirkaldy was aware of the following mythological connection. In Greek mythology, Adonis, after being mortally wounded by a boar, was turned into a flower by the goddess Venus. In Hawaiian legend, the goddess Pele courted a young man who turned her down because he already loved another woman. In scorn, Pele turned the man into the wood, and his lover into the flower of *Metrosideros polymorpha*, the host plant of *Sarona adonias*.

Sarona akoko Asquith, **new species** Figs. 23, 63, 103

Diagnosis. Occurs only on the island of Kauai. Recognized by its small size (tylus-cuneus length < 2.0 mm), and uniform reddish brown coloration. All other Kauai species are greater than 2.0 mm in tylus-cuneus length; *Sarona laka* n. sp. approaches *akoko* in size, but this species never has extensive brown color on the venter or legs as in *akoko*.

Description. MALE. Very small species, tylus-cuneus length 1.87–1.91 mm; pronotal width 1.13–1.17 mm. Head strongly vertical; frons weakly convex; tylus flat to weakly convex, moderately curved distally; jugum width equal to tylus width; antennal segment I just surpassing apex of tylus. Antennal segment II-head width ratio 0.98–1.01. Apex of rostrum not or just reaching metacoxae.

Dorsal surface densely covered with short, decumbent, yellowish brown, simple setae. Dorsal coloration uniform yellowish brown to reddish brown. Head yellowish to reddish brown; sutures and apex of tylus usually infuscated. Antennal segment I reddish brown; segment II yellow, apex infuscated; segments III and IV fuscous (Fig. 103). Venter reddish brown; ventral and posterior margins of pleura, and posterior half of peritreme pale. Coxae and femora dark, reddish brown, apices yellow; tibiae yellow.

Right paramere short, bifurcate apically; ventral arm of bifurcation long, curved dorsally; dorsally arm of bifurcation a short, rounded protuberance (Fig. 23a); basal arm absent. Left paramere short, curved for entire length; basal angle strongly developed as erect process (Fig. 23b). Tergal process narrow, straight, arising from near lateral margin of genital capsule, oriented mesally (Fig. 23c). Spicula elongate, very narrow; strongly sinuous; apex of flange broad, but not developed (Fig. 103).

FEMALE. Tylus-cuneus length 1.90–2.06 mm; pronotal width 1.27–1.28 mm. Antennal segment II-head width ratio 0.89–0.92. Coloration lighter than male; light yellow to yellowish brown; distal areas of corium and cuneus usually brown; antennae as in Fig. 103.

Type material. Holotype M, KAUAI: Poomau Canyon Lookout Trail, 1037 m, 25.VIII.1970, ex *Euphorbia multiformis* (W.C. Gagné) (BPBM). 7M, 8F paratypes, same data as holotype (BPBM).

Other specimens examined. KAUAI: 1M, 3F, Hoary Head Mts, 122 m (400 ft), 29.VIII.1970,

ex *Euphorbia* (W.C. Gagné) (BPBM); 1M, 1F, Kokee, 15.VIII.1961 (R.L. Usinger) (BPBM); 1F, Kumuwela, 27.VI.1932, ex *Euphorbia* (O.H. Swezey) (HDA); 1M, Nualolo, 24.VIII.1921, ex *Euphorbia* (Swezey) (HDA).

Host plant. *Chamaesyce celastroides* (Boiss.) (Euphorbiaceae).

Remarks. This species is found in mesic to dry forests on the south and west slopes of the Alakai Plateau, and at low elevations in the Haupu Range and Kalalau Valley. It is the only species that has been collected away from the central massif on Kauai, or from elevations lower than 610 m (2000 ft).

The collection record for this species on *Chamaesyce* (*Euphorbia*) *multiformis* must have involved a misidentification of *Chamaesyce celastroides*, since *C. multiformis* is not known to occur on Kauai (Wagner et al, 1990).

Etymology. Named for the Hawaiian term for its host plant, *akoko*.

Sarona alani Asquith, **new species** Figs. 24, 64, 104

Diagnosis. Occurs only on the island of Hawaii. Color similar to *Sarona mamaki* n. sp. and *pittospori* n. sp., but both these species at least occasionally have the apex of the scutellum pale, which is never the case in *alani*. The base of antennal segment II in *alani* is much narrower than the distal half when compared to other Hawaii species. Females can easily be recognized by the modified patch of setae on either side of the base of the ovipositor.

Description. MALE. Moderate sized species, tylus-cuneus length 1.90–2.18 mm; pronotal width 1.00–1.27 mm. Head moderately vertical; frons flat to weakly convex; tylus flat, weakly curved distally; jugum width subequal to tylus width; antennal segment I surpassing apex of tylus. Antennal segment II-head width ratio 0.95–1.03. Apex of tylus reaching or just surpassing metacoxae.

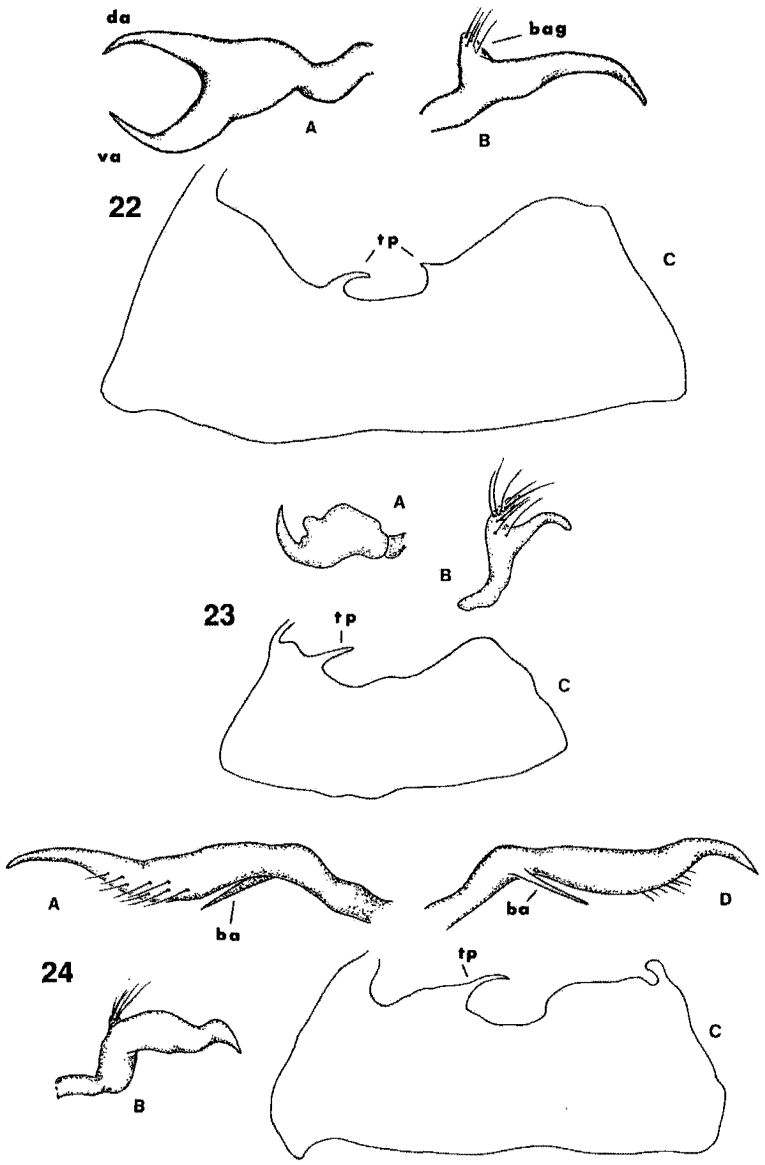
Dorsal surface densely covered with short, decumbent, simple, yellowish setae. Dorsal coloration dark yellow to yellowish brown; middle of cuneus, posterior and lateral margins of pronotum paler yellow. Head yellowish brown to castaneous; posterior aspect of vertex frequently paler yellow. Antennae yellowish brown; ventral surface of segment I, distal quarter of segment II, and segments III and IV infuscated (Fig. 104). Venter yellowish brown; propleura, and posterior margins of meso- and metapleura paler yellow. Legs dark yellow; coxae and metafemora variably suffused with brown.

Right paramere cylindrical, tapered distally and weakly curved ventrally (Fig. 24a); basal arm present, straight, narrow, mesoventrally oriented (Fig. 24d). Left paramere short, thick; basal angle weakly developed, but distinctly narrow and cylindrical (Fig. 24b). Tergal process arising from just right of midline, oriented mesally (Fig. 24c). Spicula unusual in that entire distal half is absent, reduced to a straight, dentate margin; apex of flange weakly digitiform (Fig. 64).

FEMALE. Tylus-cuneus length 1.90–2.30 mm; pronotal width 1.11–1.40 mm. Antennal segment II-head width ratio 0.88–0.95. Coloration dark yellow; membrane fuscous. Apex of antennal segment II, and segments III and IV fuscous (Fig. 104). A patch of black, flattened setae present on either side of ovipositor.

Type material. Holotype M, HAWAII: Kilauea, dry forest, 1220 m (4000 ft), 6.VII.1918 (W.M. Giffard) (BPBM). 12M, 22F paratypes, same data as holotype (BPBM).

Other specimens examined. HAWAII: 1M, Kauku, #4, Kau, 11.I.1917 (W.M. Giffard & F. Muir) (BPBM); 3M, Kilauea, dry forest, 1220 m (4000 ft), 1.VIII.1911 (Giffard) (BPBM); 3M, 1F, Kilauea, dry forest, 1220 m (4000 ft), 30.I.1918 (Giffard) (BPBM); 2M, Kilauea, sweeping, XII.1952 (J.L. Gressitt) (BPBM); 1M, 1F, Kilauea, dry forest, 1220 m (4000 ft), 16.VII.1918 (Giffard) (BPBM); 1F, Kilauea, dry forest, 1220 m (4000 ft), 9.I.1919 (Giffard) (BPBM); 2M, Kilauea, 26.VI.1917, ex *Pelea* (O.H. Swezey) (HDA); 1M, 3F, Kilauea, Kipuka Puaulu, 9.X.1929, ex *Pelea* (Swezey) (BPBM); 1M, 4F, Kilauea, 18.VIII.1935, ex alani (R.L. Usinger) (BPBM); 2M, 2F, Kilauea, #4, 1220 m (4000 ft), 11.I.1917 (Giffard & Muir) (BPBM); 2M, 2F, Kilauea, Kipuka Puaulu, 26.VI.1934, ex *Pelea* (Swezey) (HDA); 2M, Puaulu, 14.I.1971, ex *Pelea* (W.C. Gagné) (BPBM).



Figs. 22–24. *Sarona* male genitalia. **Fig. 22.** *S. adonias* Kirkaldy, male genitalia. **A**, Right paramere, lateral view. **B**, left paramere, lateral view. **C**, Genital capsule, dorsal view. Abbreviations: da = dorsal arm; va = ventral arm; bag = basal angle; tp = tergal process. **Fig. 23.** *S. akoko*, n. sp., male genitalia. **A**, Right paramere, lateral view. **B**, left paramere, lateral view. **C**, Genital capsule, dorsal view. Abbreviations: tp = tergal process. **Fig. 24.** *S. alani*, n. sp., male genitalia. **A**, Right paramere, lateral view. **B**, Left paramere, lateral view. **C**, Genital capsule, dorsal view. **D**, Right paramere, medial view. Abbreviations: tp = tergal process, ba = basal arm.

Host plant. *Melicope* (= *Pelea*) sp. (Rutaceae).

Remarks. The particular species of *Melicope* on which *Sarona alani* occurs is not known. Most of the collection records for *alani* are in areas of dry forest, where *Melicope hawaiensis* (Wawra) and *M. radiata* (St. John) are most common. This species is known only from the southeast side of Hawaii island.

Etymology. Named for the Hawaiian term for its host plant, *alani*.

Sarona annae Asquith, **new species** Figs. 25, 65, 105

Diagnosis. Occurs only on the island of Kauai. Recognized by its black and yellow dorsal coloration, two types of dorsal pubescence, and its C- or U-shaped right paramere (Fig. 25a). Distinguished from species with sericeous setae occuring on other islands, such as *oloa* n. sp. and *antennata* n. sp., by its larger size, cylindrical rather than enlarged second antennal segment, and the absence of a tergal process (Fig. 25c).

Description. MALE. Moderate sized species, tylus-cuneus length 2.52 mm; pronotal width 1.39 mm. Head obliquely angled; frons broad but strongly convex; tylus moderately convex, strongly curved distally; jugum width less than or equal to tylus width; antennal segment I just surpassing apex of tylus. Antennal segment II-head width 1.13 mm. Apex of rostrum reaching or just surpassing metacoxae.

Dorsal surface sparsely covered with long, erect, pale to brown, simple setae, and densely covered with short, decumbent, silvery, sericeous setae. Dorsal coloration dark castaneous to black; apex of scutellum, and lateral and posterior margins of pronotum yellow. Head yellow; two small spots near medial borders of eyes, and two broad, longitudinal stripes on frons fuscous; tylus and lora fuscous. Antennal segment I dark brown; segment II yellow, distal third fuscous; segments III and IV yellow proximally, fuscous distally (Fig. 105). Venter dark, yellowish brown to castaneous; ventral and posterior margins of pleura yellow. Coxae and femora yellow, mottled with brown, mottling on femora coalescing into basal and distal bands; tibiae yellow.

Right paramere short, narrow, distal half strongly tapered and curved dorsally; basal arm short, erect, acuminate, arising from dorsal margin of paramere (Fig. 25a). Left paramere large, thick, weakly curved; basal angle weakly developed (Fig. 25b). Tergal process absent (Fig. 25c). Spicula elongate, very narrow, sinuous; apex of flange not developed (Fig. 65).

FEMALE. Tylus-cuneus length 2.83–3.05 mm; pronotal width 1.48–1.57 mm. Antennal segment II-head width ratio 1.08–1.12. Coloration lighter than male; posterior disk of pronotum predominantly yellow; calli black. Venter pale yellow. Femora with distinct, black spots. Antennal segment II fuscous only on distal fourth (Fig. 105).

Type material. Holotype M, KAUAI: Mohihi, 17.VIII.1925, ex *Zanthoxylum* (O.H. Swezey) (dissected) (BPBM). 2F paratypes, KAUAI: Kokee, Water Tank Road, 22.VI.1991, ex *Zanthoxylum* (A. Asquith) (BPBM).

Other specimens examined. KAUAI: 2F, Kokee Road, 1220 m (4000 ft), 25.VIII.1982, light trap (J. Takara) (UH); 2F, Kokee Road, 1220 m (4000 ft), 6.VII.1982, malaise trap (Takara) (UH); 1F, Kumuwela, 1.VII.1932, ex *Zanthoxylum* (O.H. Swezey) (HDA).

Host plant. *Zanthoxylum* sp. (Rutaceae).

Remarks. This species is found in mesic forests in the western Alakai Plateau.

Etymology. Named in honor of my wife Anna, for her encouragement and technical contributions to my taxonomic studies.

Sarona antennata Asquith, **new species** Figs. 26, 66, 106

Diagnosis. Occurs only on the island of Molokai. Easily distinguished from other Molokai species by its fusiform second antennal segment (Fig. 106) and two types of dorsal pubescence. Distinguished from similar allopatric species, *pusilla* n. sp. and *lanaien-*

sis n. sp. by the unabbreviated apex of the right paramere (Fig. 26a), and from *maui* n. sp. by its smaller size (< or equal to 2.0 mm), and the shorter, thicker basal arm of the right paramere (Fig. 26d).

Description. MALE. Small species, tylus-cuneus length 1.47–2.04 mm; pronotal width 1.01–1.17 mm. Head obliquely angled; frons flat to weakly convex; tylus flat, sharply curved distally; jugum width less than or equal to tylus width; antennal segment I surpassing apex of tylus; antennal segment II distinctly fusiform. Antennal segment II-head width ratio 0.86–0.88. Apex of rostrum just surpassing metacoxae.

Dorsal surface covered with short, inclined, yellowish to brown, simple setae, and short, decumbent, silvery, sericeous setae. Dorsal coloration uniform castaneous to black; proximal half of cuneus, middle of corium, apex of scutellum, short, diffuse midstripe on pronotum, and lateral margins of pronotum occasionally yellow. Head yellow; lateral areas of frons, two spots on lateral aspects of vertex, tylus, and lora variably infuscated. Antennae yellowish brown to dark reddish brown; segments II and III infuscated distally; proximal halves of segments III and IV yellow (Fig. 106). Venter reddish brown; most of thoracic pleura castaneous to black; posterior and lateral margins white. Legs yellowish brown to reddish brown; apices of femora, and all of tibiae lighter.

Right paramere short, evenly and sharply tapered distally (Fig. 26a); basal arm well developed, dentate, oriented medially (Fig. 26d). Left paramere short, narrow, weakly curved distally; basal angle poorly developed (Fig. 26b). Tergal process short, narrow, oriented mesally; short, secondary process present on left side of genital capsule (Fig. 26c). Spicula short, strongly abbreviated distally; apex of flange not developed (Fig. 66).

FEMALE. Tylus-cuneus length 2.00–2.14 mm; pronotal width 1.10–1.27 mm. Antennal segment II-head width ratio 0.82–0.90. Much lighter than male; dorsal coloration light, yellowish brown; base of scutellum and clavus suffused with brown. Antennae lighter than male; basal half of segments III and IV pale yellow (Fig. 106). Venter and legs yellow.

Type material. Holotype M, MOLOKAI: Kawela Gulch, 935 m, 14.VII.1971, ex *Pipturus* (W.C. Gagné) (BPBM). 6M, 4F paratypes, same data as holotype (BPBM).

Other specimens examined. MOLOKAI: 1M, Kainalu, 915 m (3000 ft), 28.VII.1927, ex *Pipturus* (O.H. Swezey) (BPBM): 3M, 2F, Kamakou Reserve, Kawela Stream, 24.VIII.1991, ex *Pipturus* (A. Asquith) (BPBM); 1M, Kamiloloa, 976 m (3200 ft), 20.XII.1925, ex *Pipturus* (E.H. Bryan Jr.) (BPBM); 1F, Makakupaia, 1068 m (3500 ft), 21.VI.1928 (A.M. Adamson) (BPBM); 3M, above Waikolu Valley, 1400 m, 1.V.1955, ex *Pipturus* (E.J. Ford, Jr.) (HDA); 8M, 9F, Kawela Gulch, 1068–1144 m, 8–10.VII.1968, ex *Pipturus* (W.C. Gagné) (BPBM); 8M, 5F, Mapulehu Punaula, 15.VIII.1936 (R.L. Usinger) (BPBM) (HDA).

Host plant. *Pipturus albidus* (Hook. & Arnott) (Urticaceae).

Remarks. This species inhabits mid-elevation mesic gulches of southeast Molokai.

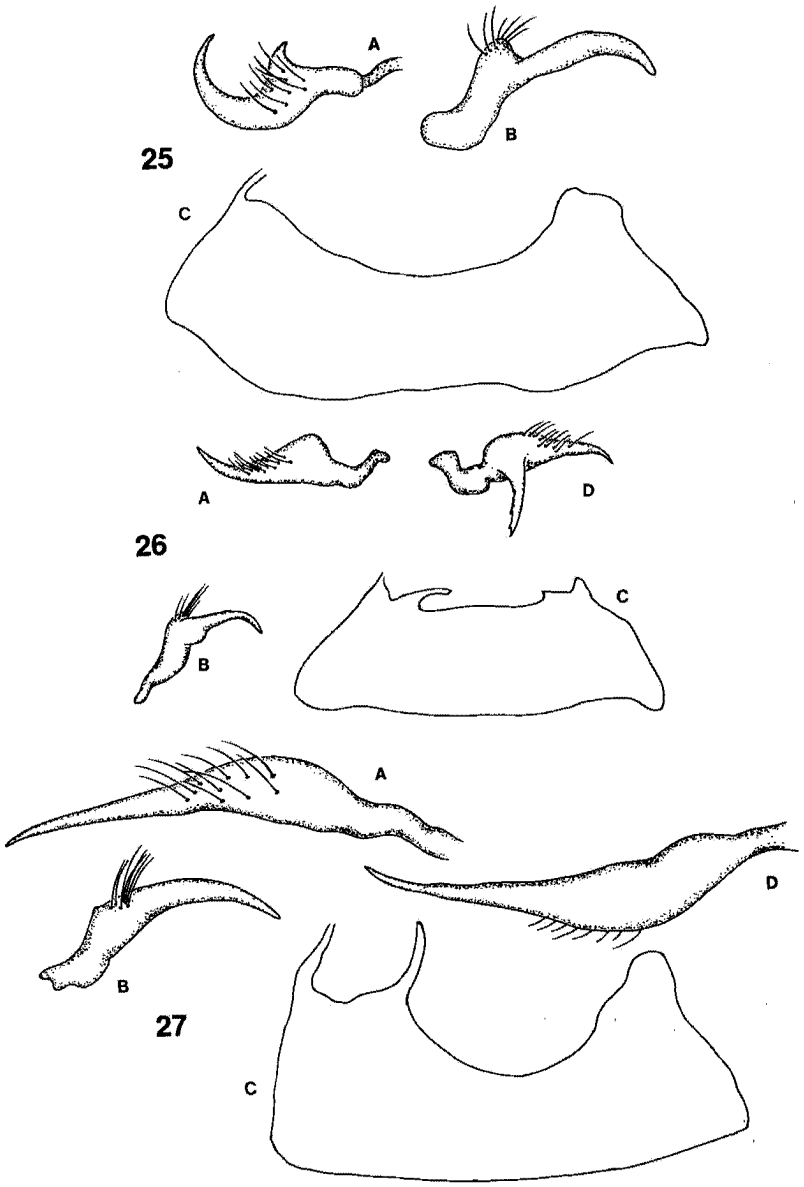
Etymology. Named for its distinctly enlarged second antennal segment.

Sarona aula Asquith, **new species** Figs. 27, 67, 107

Diagnosis. Occurs only on the island of Lanai. Similar to *Sarona azophila* n. sp. and *adonias* in its size and coloration. Distinguished from *adonias* by its smaller size (< 2.5 mm) and its long, cylindrical right paramere. Distinguished from *azophila* n. sp. by its long rostrum, which reaches well past the metacoxae, and by its long right paramere (Fig. 27a), which is longer than the width of the genital capsule.

Description. MALE. Moderate sized, tylus-cuneus length 2.18–2.43 mm; pronotal width 1.25–1.31 mm. Head strongly vertical; frons moderately convex; tylus weakly convex, weakly curved distally; jugum width equal to tylus width; antennal segment I surpassing apex of tylus. Antennal segment II-head width ratio 1.12–1.18. Apex of rostrum greatly surpassing metacoxae, reaching well on to abdomen.

Dorsal surface densely covered with moderately long, inclined, yellowish brown, simple setae.



Figs. 25–27. *Sarona* male genitalia. **Fig. 25.** *S. annae*, n. sp., male genitalia. **A**, Right paramere, lateral view. **B**, Left paramere, lateral view. **C**, Genital capsule, dorsal view. **Fig. 26.** *S. antennata*, n. sp., male genitalia. **A**, Right paramere, lateral view. **B**, Left paramere, lateral view. **C**, Genital capsule, dorsal view. **D**, Right paramere, medial view. **Fig. 27.** *S. aula*, n. sp., male genitalia. **A**, Right paramere, lateral view. **B**, Left paramere, lateral view. **C**, Genital capsule, dorsal view. **D**, Right paramere, dorsal view.

Dorsal coloration uniform castaneous to light reddish brown; apex of scutellum yellowish brown. Head reddish brown; vertex and medial borders of eyes occasionally yellowish. Antennae reddish brown; proximal half of segment II, and base of segment III lighter (Fig. 107). Venter reddish brown; ventral and posterior margins of thoracic pleura pale or white. Legs reddish brown; apices of femora, and tibiae yellowish brown.

Right paramere cylindrical, elongate, longer than width of genital capsule, evenly tapered distally (Fig. 27a); basal arm absent (Fig. 27d). Left paramere short, thick, weakly and evenly curved distally; basal angle not developed (Fig. 27b). Tergal process long, arising at almost a right angle from posterior margin of genital capsule (Fig. 27c). Spicula elongate, abruptly narrowed distally; apex of flange short, broadly convex (Fig. 67).

FEMALE. Tylus-cuneus length 2.48–2.61 mm; pronotal width 1.28–1.40 mm. Antennal segment II-head width ratio 1.01–1.14. General coloration greenish yellow; proximal half of cuneus, apex of scutellum, and variable length midstripe on anterior pronotum yellow. Apex of antennal segment II infuscated (Fig. 107).

Type material. Holotype M, LANAI: Lanaihale, 915 m (3000 ft), 12.VII.1968, ex *Ilex anomala* (W.C. Gagné) (BPBM). 6M, 5F paratypes, same data as holotype (BPBM).

Other specimens examined. LANAI: 1M, Lanaihale, 914 m, 6.VII.1971, ex *Tetraplasandra melandra* (W.C. Gagné) (BPBM).

Host plant. *Ilex anomala* Hook. & Arnott (Aquifoliaceae).

Etymology. Named from the Hawaiian, *aula* (reddish, brownish), in reference to its reddish brown coloration.

Sarona azophila Asquith, **new species** Figs. 28, 68, 108

Diagnosis. Occurs only on the island of Lanai. Similar to *Sarona aula* and *adonias* in its size and coloration. Distinguished from *adonias* by its smaller size (< 2.6 mm) and its cylindrical right paramere (Fig. 28a). Distinguished from *aula* by its shorter rostrum, which does not reach past the metacoxae, and by its shorter right paramere, which is shorter than the width of the genital capsule.

Description. MALE. Moderate sized species, tylus-cuneus length 2.26–2.56 mm; pronotal width 1.30–1.59 mm. Head strongly vertical; frons flat to weakly convex; tylus flat, weakly curved distally; jugum width equal to tylus width; antennal segment I surpassing apex of tylus. Antennal segment II-head width ratio 1.03–1.09. Apex of rostrum just reaching metacoxae.

Dorsal surface densely covered with moderately long, decumbent, yellowish brown, simple setae. Dorsal coloration reddish brown to yellowish brown; apex of cuneus lightly infuscated; apex of scutellum yellowish. Head yellow to reddish brown; lateral areas of frons darker; apex of tylus, and lora variably infuscated. Antennae yellow to yellowish brown; proximal half of segment II lighter; apex of segment II, and distal half of segment III infuscated (Fig. 108). Venter yellowish brown; thoracic pleura dark brown, posterior margins white. Legs yellowish brown; dorsal surfaces of femora darker brown; tibiae yellow.

Right paramere straight, cylindrical, weakly tapered distally; basal arm absent (Fig. 28a). Left paramere long, narrow, strongly curved distally; basal angle weakly developed (Fig. 28b). Tergal process short, narrow, arising at almost a right angle from posterior margin of genital capsule (Fig. 28c). Spicula elongate, abruptly narrowed distally; apex of flange short, broadly convex (Fig. 68).

FEMALE. Tylus-cuneus length 2.41–2.61 mm; pronotal width 1.48–1.61 mm. Antennal segment II-head width ratio 0.95–1.01. General coloration dark greenish yellow; apex of cuneus weakly infuscated. Base of antennal segment III yellow (Fig. 108).

Type material. Holotype M, LANAI: Lanaihale, 305 m (1000 ft), 4.I.1962, ex *Osmanthus* (D.E. Hardy) (BPBM). 15M, 10F paratypes, same data as holotype (UH, BPBM).

Other specimens examined. LANAI: 1F, Lanai, 29–30.XI.1935, ex *Osmanthus* (R.L. Usinger) (BPBM); 1F, Lanai, 610 m (2000 ft), 7.X.1907 (W.M. Giffard) (BPBM); 1M, Lanaí Mts, 1.XI.1947

(N.L.H. Krauss) (HDA); 2M, Lanai Mts, 29.X.1947 (Krauss) (HDA); 6M, 2F, Lanaihale, 1006 m (3300 ft), 25.III.1966 (J.W. Beardsley) (UH); 9M, 2F, Lanaihale, 915 m (3000 ft), 4.I.1962, ex *Osmanthus* (Beardsley) (HDA).

Host plant. *Nestigis* (= *Osmanthus*) *sandwicensis* (A. Gray) Degener, I. Degener & L. Johnson (Oleaceae).

Remarks. This species may be seasonal, as it has been collected only from October to March.

Etymology. Named from the Greek, *azaleos* (dry) and *philos* (loving), in reference to the dry habitats where this species is found.

Sarona beardsleyi Asquith, **new species** Figs. 29, 69, 109

Diagnosis. Occurs only on the island of Maui. Similar to *kane* n. sp. and *kanaka* n. sp. in its size and coloration. *Sarona beardsleyi* never has a yellow, middorsal stripe on the pronotum as do the former species. *Sarona beardsleyi* has an antennal segment II-head width ratio < 1.15, compared to *kane* n. sp. and *kanaka* n. sp. with ratios > 1.2. Also distinguished from these species by its abruptly narrowed right paramere, and the absence of a protuberance along the ventral margin (Fig. 29a).

Description. MALE. Moderate sized species, tylus-cuneus length 2.31–2.44 mm; pronotal width 1.38–1.44 mm. Head strongly vertical; frons flat; tylus flat, weakly curved distally; jugum width equal to tylus width; antennal segment I greatly surpassing apex of tylus. Antennal segment II-head width ratio 1.09–1.14. Apex of rostrum just reaching metacoxae.

Dorsal surface densely covered with long, decumbent, pale, simple setae. Dorsal coloration uniform light brown; apex of scutellum, calli and lateral margins of pronotum frequently yellowish. Head dark, yellowish brown; lateral areas of frons, tylus and lora infuscated. Antennal segment I reddish brown; proximal half of segment II yellowish brown, distal half fuscous; segments III and IV brown, base of segment III yellowish (Fig. 109). Venter yellowish brown to fuscous; posterior margins of thoracic pleura pale. Legs yellowish brown to reddish brown.

Right paramere cylindrical, elongate, abruptly narrowed and acuminate distally (Fig. 29a). Left paramere evenly curved distally; basal angle weakly developed, oriented medially (Fig. 29b). Tergal process evenly tapered, oriented at right angle to posterior margin of genital capsule (Fig. 29c). Spicula large, slightly reduced and narrowed distally; apex of flange flat (Fig. 69).

FEMALE. Tylus-cuneus length 2.52–2.61 mm; pronotal width 1.44–1.51 mm. Antennal segment II-head width ratio 0.96–1.09. Lighter than male; dorsal coloration dark, dirty yellow; area of corium bordering membrane, and apices of cuneus, clavus and costa suffused with brown. Only apex of antennal segment II infuscated; segment III yellow basally (Fig. 109).

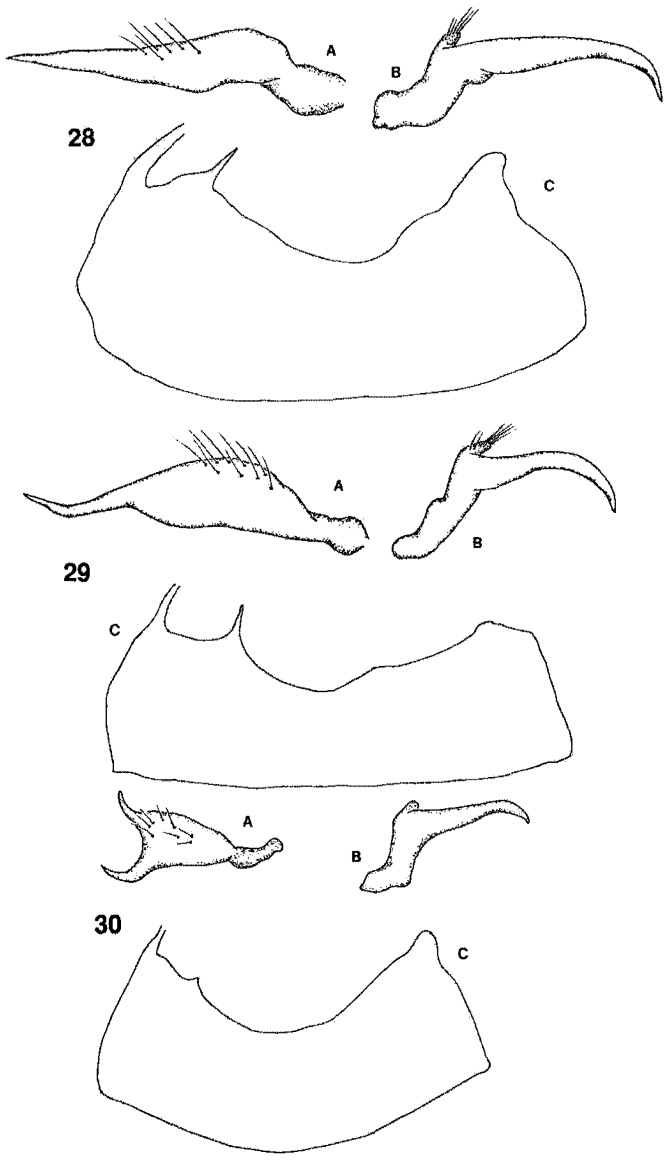
Type material. Holotype M, MAUI: Auwahi, 1129 m (3700 ft), 20.VI.1965, ex *Osmanthus* (J.W. Beardsley) (BPBM). 18M, 12F paratypes, same data as holotype (UH, BPBM).

Other specimens examined. MAUI: 1M, Auwahi, 1129 m (3700 ft), 20.VIII.1965, ex *Osmanthus* (J.W. Beardsley) (UH); 2M, 2F, Auwahi, 1129 m (3700 ft), 20.VII.1965, ex *Osmanthus* (Beardsley) (UH); 8M, 2F, Auwahi, 1129 m (3700 ft) 17.VI.1965, ex *Osmanthus* (Beardsley) (UH); 16M, 9F, Auwahi, 1129 m (3700 ft), 20.VII.1965 (C.M. Yoshimoto) (BPBM); 3M, 1F, Auwahi, 1068 m (3500 ft), 4.IV.1970, ex *Osmanthus* (E.F. Drake) (BPBM); 2M, 2F, Auwahi, 18.IV.1967, ex *Osmanthus* (N.L.H. Krauss) (BPBM).

Host plant. *Nestigis* (= *Osmanthus*) *sandwicensis* (A. Gray) Degener, I. Degener & L. Johnson (Oleaceae).

Remarks. This species is known only from leeward East Maui, and has been collected from April to August.

Etymology. Named for John W. Beardsley, in honor of his many contributions to Hawaiian entomology.



Figs. 28–30. *Sarona* male genitalia. **Fig. 28.** *S. azophila*, n. sp., male genitalia. **A**, Right paramere, lateral view. **B**, Left paramere, lateral view. **C**, Genital capsule, dorsal view. **Fig. 29.** *S. beardsleyi*, n. sp., male genitalia. **A**, Right paramere, lateral view. **B**, Left paramere, lateral view. **C**, Genital capsule, dorsal view. **Fig. 30.** *S. dakine*, n. sp., male genitalia. **A**, Right paramere, lateral view. **B**, Left paramere, lateral view. **C**, Genital capsule, dorsal view.

Sarona dakine Asquith, **new species** Figs. 30, 70, 110

Diagnosis. Occurs on East and West Maui. Similar to *beardsleyi*, *kane* n. sp. and *kanaka* n. sp. in its size and coloration. Distinguished from these species by its C-shaped right paramere (Fig. 30a). *Sarona adonias* also has a C-shaped right paramere, but it is much larger (> 3.0 mm) and never has the lateral margins of pronotum yellow as in *dakine*.

Description. MALE. Moderate sized species, tylus-cuneus length 2.61–2.86 mm; pronotal width 1.36–1.48 mm. Head weakly vertical; posterior margin of head weakly carinate; frons moderately convex; tylus convex, weakly curved distally; jugum width less than tylus width; antennal segment I surpassing apex of tylus. Antennal segment II-head width ratio 1.14–1.22. Apex of rostrum reaching or just surpassing metacoxae.

Dorsal surface sparsely covered with moderately long, decumbent, yellow, simple setae. Dorsal coloration variable; generally yellowish brown to dark brown; basal halves of cuneus, costa, clavus and corium variably yellow; apex of scutellum, lateral angles of mesoscutum, anterior and lateral margins of pronotum, and short, anterior midstripe on pronotum yellow. Head light brown to yellow; tylus and apex of juga dark brown. Antennae dark brown; proximal half of segment II and base of segment III yellow (Fig. 110). Venter yellowish to reddish brown; posterior margins of thoracic pleura lighter. Coxae yellowish brown to brown; femora castaneous, apices of femora, and tibiae yellowish brown.

Right paramere C-shaped; dorsal arm recurved medially (Fig. 30a). Left paramere thick; basal angle weakly developed (Fig. 30b). Tergal process reduced to a short, broad tooth (Fig. 30c) Spicula slightly sinuous distally and sharply acuminate apically; apex of flange weakly convex (Fig. 70).

FEMALE. Tylus-cuneus length 2.60–2.79 mm; pronotal width 1.03–1.18 mm. Antennal segment II-head width ratio 1.03–1.18. Much lighter than male; dorsum mottled yellow and dark brown. Venter and legs yellow; bases of pleura and coxae, and distal bands on femora brown. Antennal segment II yellow proximally (Fig. 110).

Type material. Holotype M, MAUI: West Maui mountains, rain forest along Puu Kukui trail, 1350 m, 13.V.1992 (D.A. Polhemus) (BPBM). 5M, 10F paratypes, same data as holotype (BPBM).

Other specimens examined. MAUI: 1M, Koolau Forest Reserve, 5000 ft, 8.VIII.1975, ex *Urera* (W.C. Gagné) (BPBM); 1M, 1F, E Maui, Koolau Forest Reserve, 1737 m, 3.VIII.1973, sweeping (Gagné) (BPBM); 1F, E Maui, Koolau Forest Reserve, 1585 m, 8.VIII.1975, ex *Pelea clusiifolia* (Gagné) (BPBM); 1M, Mahinahina, 21.VI.1932 (N.L.H. Krauss) (HDA); 1M, 1F, Puu Kukui, 1525 m (5000 ft), 18.II.1970 (Gagné) (BPBM).

Host plant. Unknown.

Remarks. This species has been collected on *Urera* sp. and *Melicope clusiifolia* (A. Gray), but these are not confirmed breeding records. *Sarona dakine* is found in mesic to wet forest habitats.

Etymology. Named from the colloquial island term, *dakine* (this kind, or that kind).

Sarona flavidorsum Asquith, **new species** Figs. 31, 71, 111

Diagnosis. Occurs only on the island of Hawaii. Recognized by its uniform yellow coloration. The sympatric *Sarona iki* n. sp. is also pale yellow in color but can be distinguished by the brown bands on the femora, the infuscated distal third of antennal segment II, and the rostrum surpassing the metacoxae.

Description. MALE. Small species, tylus-cuneus length 2.14–2.18 mm; pronotal width 1.26–1.30 mm. Head strongly vertical; frons flat; tylus flat, weakly curved distally; jugum width less than tylus width; antennal segment I surpassing apex of tylus. Antennal segment II-head width ratio 1.02–1.06. Rostrum just reaching metacoxae.

Dorsal surface densely covered with short, inclined, simple, golden setae. General coloration yellow; distomedial area of corium and apex of cuneus fuscous; base of membrane, and veins usually infuscated. Head entirely yellow; antennal segment I yellow, weakly infuscated ventrally; segment II yellow, fuscous on distal 1/4; segments III–IV fuscous (Fig. 111). Venter and legs uniform yellow.

Right paramere short, strongly tapered distally (Fig. 31a). Left paramere short, evenly curved and tapered; basal angle weakly developed (Fig. 31b). Tergal process absent (Fig. 31c). Spicula very short, basal curvature reduced; flange smooth, not angled distally (Fig. 71).

FEMALE. Tylus-cuneus length 2.35–2.5 mm; pronotal width 1.37–1.51 mm; antennal segment II-head width ratio 0.88–0.98. Coloration same as male; antennal segment III occasionally yellow basally (Fig. 111).

Type material. Holotype M, HAWAII: Koaia Sanctuary near Waimea, 16.V.1971, ex *Korthalsella platycaula* (J.W. Beardsley) (BPBM). 3M, 14F paratypes, same data as holotype (BPBM).

Other specimens examined. HAWAII: 4M, 6F, Kawaihae Uka, 3.III.1952, ex *Acacia koaia* (C.J. Davis) (HDA); 6F, South Kohala District, gulch near Puu Kawaiwai, 914 m, 21.IV.1972, ex *Korthalsella* (W.C. Gagné) (BPBM).

Host plant. *Korthalsella* sp. (Viscaceae)

Remarks. Although one record notes that *Sarona flavidorsum* was collected on *Korthalsella platycaula* (Tiegh.) Engl., this particular species does not occur on the island of Hawaii (Wagner et al, 1990). *Sarona flavidorsum* is only known from the leeward slopes of the Kohala Mountains.

Etymology. Named for its uniform yellow coloration.

Sarona gagnei Asquith, **new species** Figs. 32, 72, 112

Diagnosis. Occurs only on the island of Oahu. Recognized by its small size (< 2.0 mm), its uniform dark yellow coloration, and its strongly reduced parameres (Fig. 32a-b). Similar to other small, yellow Oahu species including, *hie* n. sp., *palolo* n. sp. and *usingeri* n. sp. *Sarona gagnei* lacks the mottled dorsal coloration of *hie* n. sp., and the erect dorsal setae of *palolo* n. sp. Distinguished from *Sarona usingeri* n. sp. by antennal segment II being infuscated only at the apex rather than along its distal third (Fig. 112), and by the rostrum reaching only the mesocoxae or just beyond.

Description. MALE. Very small species, tylus-cuneus length 1.66–1.77 mm; pronotal width 1.03–1.11 mm. Head strongly vertical; frons flat; tylus flat, strongly but smoothly curved distally; jugum width greater than tylus width; antennal segment I just surpassing apex of tylus. Antennal segment II-head width ratio 1.05–1.09. Apex of rostrum reaching mesocoxae or just beyond.

Dorsal surface densely covered with short, decumbent, yellow to yellowish brown, simple setae. Dorsal coloration uniform yellow, tinged with brown; membrane and posteromedial areas of corium infuscated. Head yellow to yellowish brown; margins of tylus and lora fuscous. Antennal segments I and II yellow, segment I ventrally and segment II apically fuscous; segments III and IV fuscous, segment III yellow basally (Fig. 112). Venter yellow; thoracic pleura frequently yellowish brown, margins pale. Legs yellow; coxae and femora tinged with brown.

Right paramere very short, strongly tapered distally, weakly curved medially; basal arm absent (Fig. 32a). Left paramere straight, only weakly curved ventrally; basal angle weakly developed (Fig. 32b). Tergal process reduced to a slightly raised, serrate margin (Fig. 32c). Spicula short, straight, abruptly acuminate apically; apex of flange reduced to a short, rounded tuberosity (Fig. 72).

FEMALE. Tylus-cuneus length 1.19–1.27 mm; pronotal width 0.87–0.93 mm. Antennal segment II-head width ratio 0.98–0.99. Similar to male but lighter yellow in color; antennae as in figure 112.

Type material. Holotype M, OAHU: Aiea Ridge Trail, 488 m, 10.VIII.1980, ex *Korthalsella complanata* (W.C. Gagné & P. Kores) (BPBM). 8M, 6F paratypes, same data as holotype (BPBM).

Other specimens examined. OAHU: 1M, Poamoho, 12.III.1960 (S. Quate) (BPBM).

Host plant. *Korthalsella complanata* (Tiegh.) Engl. (Viscaceae).

Remarks. This species is known only from wet to mesic ridges in the leeward Koolau Mountains.

Etymology. Named for Wayne C. Gagné, in honor of his remarkable efforts in collecting Hawaiian Miridae.

Sarona haleakala Asquith, **new species** Figs. 17, 18, 33, 73, 113

Diagnosis. Occurs only on East Maui. Similar to *maui* n. sp. and *pusilla* n. sp. in its fusiform second antennal segment (Fig. 113) and two types of pubescence. Distinguished from these species by the erect, rather than decumbent, simple setae on the dorsum, obliquely angled head, short tergal process (Fig. 33c), and lack of teeth on the basal arm of the left paramere (Fig. 33d).

Description. MALE. Small species (Fig. 17), tylus-cuneus length 2.18–2.26 mm; pronotal width 1.23–1.31 mm. Head obliquely angled; frons strongly and broadly convex; tylus convex, strongly curved distally; jugum width equal to tylus width; antennal segment I surpassing apex of tylus; antennal segment II distinctly fusiform. Antennal segment II-head width ratio 0.71–0.89. Apex of rostrum reaching but not surpassing metacoxae.

Dorsal surface covered with long, erect, pale, simple setae, and decumbent, pale, sericeous setae (Figs. 2-3). Dorsal coloration uniform castaneous; apex of scutellum occasionally yellowish brown. Head castaneous; posterior aspect of vertex and medial borders of eyes occasionally yellow. Antennae light reddish brown; apices of segments II and III infuscated; proximal half of segment III, and all of segment IV yellow to yellowish brown (Fig. 113). Venter light reddish brown; ventral and posterior margins of thoracic pleura white. Legs light, reddish brown; tibiae yellowish brown.

Right paramere short, strongly acuminate distally and weakly curved medially (Fig. 33a); basal arm well developed, entire, oriented medially (Fig. 33d). Left paramere almost straight, only weakly recurved apically; basal angle narrowly cylindrical (Fig. 33b). Tergal process short, very thick, arising from near lateral margin of genital capsule (Fig. 33c). Spicula short, evenly tapered distally; apex of flange not developed (Fig. 73).

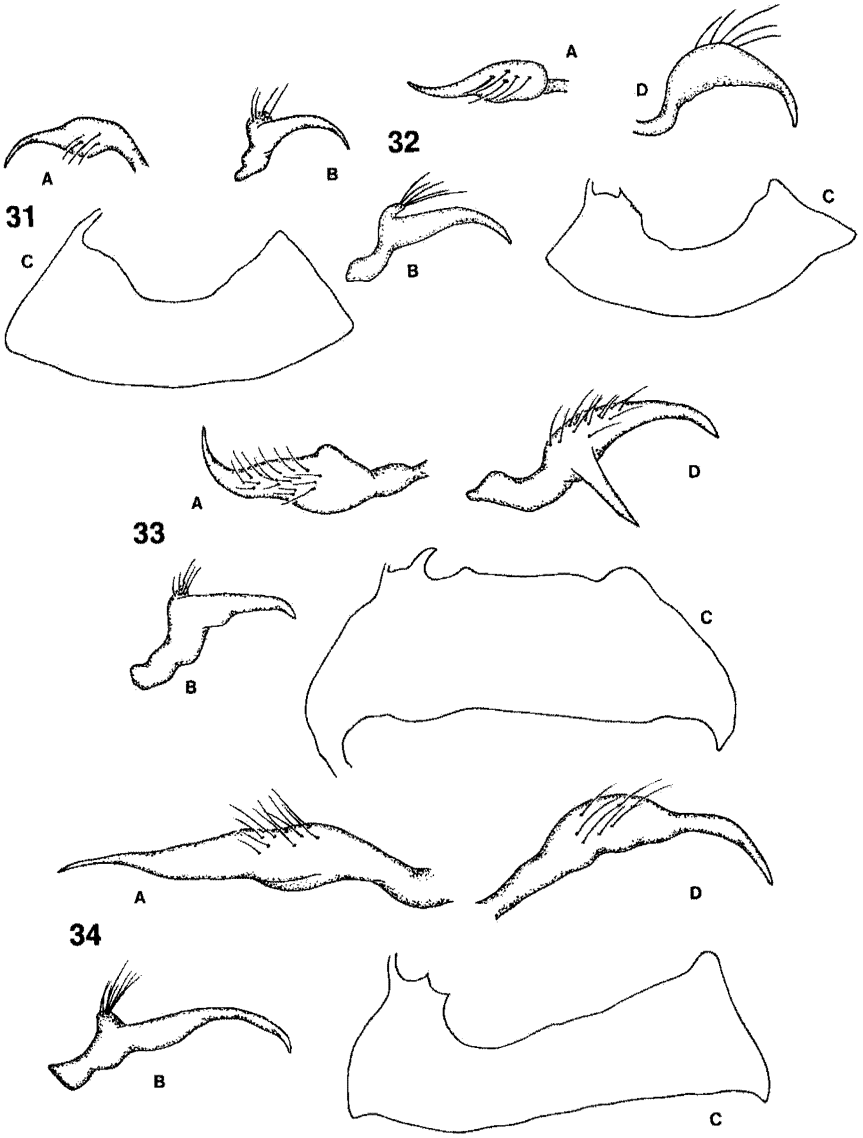
FEMALE. Tylus-cuneus length 2.24–2.70 mm; pronotal width 1.25–1.46 mm. Antennal segment II-head width ratio 0.62–0.80. Color similar to male, slightly lighter. Apex only of antennal segment III infuscated (Fig. 113).

Type material. Holotype M, MAUI: W side of Mt Haleakala, Halemanu Trail, 2400 m, 7.VIII.1968, ex *Dubautia menziesii* (W.C. Gagné) (BPBM). 7M, 9F paratypes, same data as holotype (BPBM).

Other specimens examined. MAUI: 8M, 3F, Haleakala, crest of crater, 2440 m (8000 ft), 21.X.1919, ex *Railliardia menziesii* (P.H.Timberlake) (BPBM) (HDA); 10M, 6F, Haleakala, N of Puu Nianiau, 1769 m (5800 ft), 18.X.1919, ex *Railliardia* (Timberlake) (BPBM) (HDA); 1M, 1F, Haleakala, summit, 9.XI.1964, ex *Railliardia* (J.W. Beardsley) (HDA); 3M, 2F, Haleakala, edge of forest near Keaunui ?, 1769 m (5800 ft), 22.X.1919, ex *Railliardia* (Timberlake) (BPBM); 4M, 4F, Haleakala, telescope area, 23.VIII.1965, ex *Railliardia* (R.L. Usinger) (BPBM); 2M, 1F, Haleakala, summit, 9.I.1956, ex *Railliardia* (Beardsley) (HDA); 1M, Haleakala, summit, 18.VIII.1929, ex *Railliardia* (R.R. White) (HDA); 6M, 15F, Haleakala, summit, 17.VIII.1929, ex *Railliardia* (O.H. Swezey) (HDA); 11M, 8F, Haleakala, 2440 m (8000 ft), 23.VII.1956, ex *Railliardia* (Usinger) (BPBM); 1M, Haleakala, X.1951 (H.A. Bess) (BPBM); 2M, 2F, East Maui, Koolau Forest Reserve, 2042 m, 8.VIII.1975, ex *Dubautia* cf *coriacea* (Gagné) (BPBM); 3M, Ukulele, 9.VII.1919, ex *Gouldia* (Timberlake) (HDA).

Host plant. *Dubautia* (= *Railliardia*) *menziesii* (A. Gray) D. Keck (Asteraceae).

Remarks. This species is restricted to elevations above 1500 m on East Maui. *Sarona haleakala* may be seasonal, as it has only been collected from July to January.



Figs. 31–34. *Sarona* male genitalia. **Fig. 31.** *S. flavidorsum*, n. sp., male genitalia. **A**, Right paramere, lateral view. **B**, Left paramere, lateral view. **C**, Genital capsule, dorsal view. **Fig. 32.** *S. gagnei*, n. sp., male genitalia. **A**, Right paramere, lateral view. **B**, Left paramere, lateral view. **C**, Genital capsule, dorsal view. **D**, Right paramere, dorsal view. **Fig. 33.** *S. haleakala*, n. sp., male genitalia. **A**, Right paramere, lateral view. **B**, Left paramere, lateral view. **C**, Genital capsule, dorsal view. **D**, Right paramere, dorsomedial view. **Fig. 34.** *S. hamakua*, n. sp., male genitalia. **A**, Right paramere, lateral view. **B**, Left paramere, lateral view. **C**, Genital capsule, dorsal view. **D**, Right paramere, dorsal view.

Populations from lower elevations have distinctly longer hemelytra (Fig. 18). I have also observed this pattern of elevational alary polymorphism in the dicyphine *Cyrtopeltis hawaiiensis* Kirkaldy on East Maui.

Etymology. Named for the type locality, Haleakala.

Sarona hamakua Asquith, **new species** Figs. 34, 74, 114

Diagnosis. Occurs only on the island of Hawaii. Almost identical in form and color to *Sarona mamaki* n. sp., also on Hawaii island. *Sarona hamakua* usually has a longer rostrum, reaching well past the metacoxae, but it can only be distinguished with certainty by the male genitalia. In *hamakua* the right paramere is longer and less curved distally (Fig. 34a); the left paramere is longer and narrower (Fig. 34b), and the tergal process is situated more laterally (Fig. 34c) than in *mamaki* n. sp.

Description. MALE. Moderate sized species, tylus-cuneus length 2.00–2.28 mm; pronotal width 1.20–1.40 mm. Head strongly vertical; frons flat to weakly convex; tylus flat, weakly and smoothly curved distally; jugum width equal to tylus width; antennal segment I reaching well past apex of tylus. Antennal segment II-head width ratio 1.06–1.20. Apex of rostrum just or greatly surpassing metacoxae.

Dorsal surface densely covered with long, decumbent, pale, simple setae. Dorsal coloration castaneous; cuneus, apex of scutellum, anterior and posterior margins of pronotum, and short mid-stripe on pronotum frequently dark yellow. Head castaneous; posterior margin of vertex, and juga occasionally yellowish; apex of tylus usually infuscated. Antennae yellowish brown; dorsal surface of segment I, base and distal half of segment II, and distal half of segment III fuscous (Fig. 114). Venter castaneous; margins of thoracic pleura, and peritreme pale. Legs yellowish brown to dark castaneous; apices of coxae, apices and bases of femora, and tibiae yellow.

Right paramere linear, cylindrical, evenly tapered distally, and weakly curved mesally (Fig. 34a). Left paramere with distal half evenly and smoothly curved; basal angle weakly developed (Fig. 34b). Tergal process reduced to two short teeth, arising from lateral aspect of dorsal margin of genital capsule (Fig. 34c). Spicula short, strongly tapered distally; apex of flange produced as a short, acuminate process (Fig. 74).

FEMALE. Tylus-cuneus length 2.5 mm; pronotal width 1.48 mm. Antennal segment II-head width ratio 1.06. Coloration lighter than male; dorsum suffused with yellow on corium and anterior aspect of pronotum. Head yellowish brown; apex of tylus and area around antennal fossa brown. Venter yellowish brown. Femora without transverse, brown bands. Antennae lighter than male (Fig. 114).

Type material. Holotype M, HAWAII: Upper Hamakua Ditch Trail, 15.VIII.1935, ex *Broussaisia* (R.L. Usinger) (BPBM).

Other specimens examined. HAWAII: 1M, Upper Hamakua Ditch Trail, 2.X.1929, ex *Pipturus* (O.H. Swezey) (HDA); 1M, 1F, Kilauea Iki, Rim Trail, 3800 ft, 23.VI.1966 (J.W. Beardsley) (BPBM); 1M, Kilauea, light trap, 12.VIII.1958 (Beardsley) (BPBM); 1M, Upper Hamakua Ditch Trail, 15.VIII.1935, ex *Broussaisia* (R.L. Usinger) (HDA); 2M, 1F, 1 nymph, Hawaii Volcanoes National Park, 11.III.91, ex *Myrsine* (B. Peck) (BPBM).

Host plant. *Myrsine* sp. (Myrsinaceae).

Remarks. This species is very similar to *Sarona mamaki* n. sp. from which it can be reliably distinguished only by examination of the male genitalia. *Sarona mamaki* n. sp. is restricted to *Pipturus*, while *hamakua* occurs on *Myrsine* and possibly *Broussaisia arguta*. This species is known from windward areas of the Kohala Mountains, Mauna Kea, Mauna Loa and Kilauea.

Etymology. Named for the type locality, the Hamakua Ditch Trail, a prominent collecting site on the island of the island of Hawaii.

Sarona hie Asquith, **new species** Figs. 35, 75, 115

Diagnosis. Occurs only on the island of Oahu. Recognized by its small size, pale yellow coloration with light brown mottling, distinctly arcuate hemelytral margins, and three tergal processes (Fig. 35c). On Oahu, *usingeri* n. sp. is similar in size, but is darker yellow in color with no mottling, it has straight hemelytral margins, and short, reduced parameres. *Sarona oloa* n .sp. also has slightly mottled coloring, but this species has two types of pubescence and a distinctly enlarged second antennal segment.

Description. MALE. Small species, tylus-cuneus length 2.07–2.15 mm; pronotal width 1.22–1.25 mm. Lateral margins of hemelytra distinctly arcuate. Head strongly vertical; frons flat; tylus weakly convex, sharply curved distally; jugum width less than tylus width; antennal segment I just surpassing apex of tylus. Antennal segment II-head width ratio 1.07–1.17. Apex of rostrum just surpassing metacoxae.

Dorsal surface densely covered with moderately long, inclined to erect, pale, simple setae. Dorsal coloration pale, greenish yellow, with light brown mottling; apex of scutellum, and weak midstripe on pronotum lighter. Head greenish yellow; apex of tylus and lora darker. Antennae yellow; basal half of segment I, apex of segment II, and distal halves of segments III and IV infuscated (Fig. 115). Venter greenish yellow; margins of thoracic pleura, and all of peritreme white. Legs greenish yellow; femora with indications of dark, transverse bands distally.

Right paramere elongate, cylindrical, weakly tapered distally, apex furcate, basal arm absent (Fig. 35a). Left paramere narrow, weakly curved ventrally; basal angle not developed (Fig. 35b). Three tergal processes present; right tergal process extremely large, oriented posteriorly, apex expanded; middle process a short, narrow tooth, oriented towards the right lateral margin of the genital capsule; left process short, narrow, acuminate, oriented towards left lateral margin, but distally recurved (Fig. 35c). Spicula elongate, sinuous, evenly tapered distally; apex of flange developed as an elongate arm, two-thirds the length of main arm (Fig. 75).

FEMALE. Tylus-cuneus length 2.18 mm; pronotal width 1.27 mm. Antennal segment II-head width ratio 1.05–1.10. Dorsal coloration and antennae similar to male (Fig. 115).

Type material. Holotype M, OAHU: Palikea, 30.VI.1935, ex *Pelea* (O.H. Swezey) (BPBM). 1F paratype, same data as holotype (BPBM).

Other specimens examined. OAHU: 1M, Halawa, 17.XII.1922, ex *Pelea* (O.H. Swezey) (HDA); 1F, Palikea, 18.VI.1938, ex *Pelea* (Swezey) (HDA).

Host plant. Although there are no confirmed breeding records for this species, all known specimens were collected on *Melicope* sp., which is likely the host plant.

Remarks. This species is known from both the Koolau and the Waianae mountain ranges.

Etymology. From the Hawaiian, *hie* (attractive, distinguished), referring to the unusual color pattern of this species.

Sarona hiiaka Asquith, **new species** Figs. 36, 76, 116

Diagnosis. Occurs only on the island of Kauai. Recognized by its elongate form, yellow coloration with brown markings when present, and its sinuous right paramere, with a strongly recurved, bifurcate apex (Fig. 36a). Distinguished from other uniform yellow species such as *mokihana* n. sp. and *laka* n. sp. by the brown coloration always present on the thoracic pleura. Yellow and brown specimens can be distinguished from *makua* n. sp. by the shorter, more decumbent dorsal setae, the lateral placement of the tergal process (Fig. 36c), and the undeveloped basal angle of the left paramere (Fig. 36b).

Description. MALE. Moderate-sized species, tylus-cuneus length 2.30–2.61 mm; pronotal width 1.21–1.44 mm. Head moderately vertical; frons moderately convex; tylus flat to weakly convex, very weakly curved distally; jugum width equal to tylus width; antennal segment I surpassing

apex of tylus. Antennal segment II-head width ratio 1.08–1.16 mm. Apex of rostrum just surpassing metacoxae.

Dorsal surface densely covered with short, decumbent, yellowish, simple setae. Dorsal coloration yellow to light yellowish brown; distal areas of clavus, corium and cuneus usually suffused with brown; posterior pronotal disk occasionally suffused with brown. Head yellow; frons suffused with brown; sutures and apex of tylus usually infuscated. Antennal segment I yellow to yellowish brown, ventral surface and base brown; segment II yellow, apex fuscous; segments III and IV brown to fuscous, base of segment III yellow (Fig. 116). Venter yellow to yellowish brown; mesosternum castaneous; dorsal margins of thoracic pleura and anterior half of peritreme brown, posterior half of peritreme pale. Coxae and femora yellow, femora frequently with indistinct brown bands distally; tibiae yellow to yellowish white.

Right paramere sinuous, bifurcate apically; dorsal bifurcation strongly curved dorsally (Fig. 36a); basal arm absent. Left paramere narrow, strongly curved distally; basal angle weakly developed (Fig. 36b). Tergal process arising from near right lateral margin of genital capsule, oriented mesally (Fig. 36c). Spicula elongate, very narrow, strongly sinuous; apex of flange not developed (Fig. 76).

FEMALE. Tylus-cuneus length 2.31–2.71 mm; pronotal width 1.17–1.49 mm. Antennal segment II-head width ratio 1.05–1.14. Coloration lighter than male; brown areas usually not as extensive when present. Large, circular patches of black, scale-like setae present on genital capsule bordering ovipositor (Figs. 9-11). Antennae similar to male (Fig. 116).

Type material. Holotype M, KAUAI: Hono O Na Pali NARS, below Pihea Peak, 26.IV.1992, ex *Melicope clusiifolia* (A. Asquith) (BPBM); 4M, 5F paratypes, same data as holotype (BPBM).

Other specimens examined. KAUAI: 2M, 6F, Alakai Swamp Trail, Waineke Swamp, 1062 m, 22-25.VII.1968, ex *Pelea* (W.C. Gagné) (BPBM); 2M, 2F, Alakai Swamp Trail, 10.V.1991, ex *Pelea* (A. Asquith) (BPBM); 1M, 4F, Kaunuohua Ridge, 22.VII.1937, beating (E.C. Zimmerman) (HDA); 11M, 11F, 1 nymph, Waikoko (Blue Hole), 18.VIII.1992, ex *Melicope* sp. (Asquith) (BPBM).

Host plant. *Melicope* (= *Pelea*) *clusiifolia* (A. Gray) T. Hartley & B. Stone (Rutaceae).

Remarks. This species is found in wet to mesic forests on the Alakai Plateau and the eastern base of Mt Waialeale. *Sarona hiiaka* was occasionally recovered from methyl eugenol-baited bucket traps used for Oriental fruit fly (*Bactrocera dorsalis* (Hendel)) detection and control. Methyl eugenol is a known constituent of at least one species of *Melicope* (Scheueer & Hudgins, 1964).

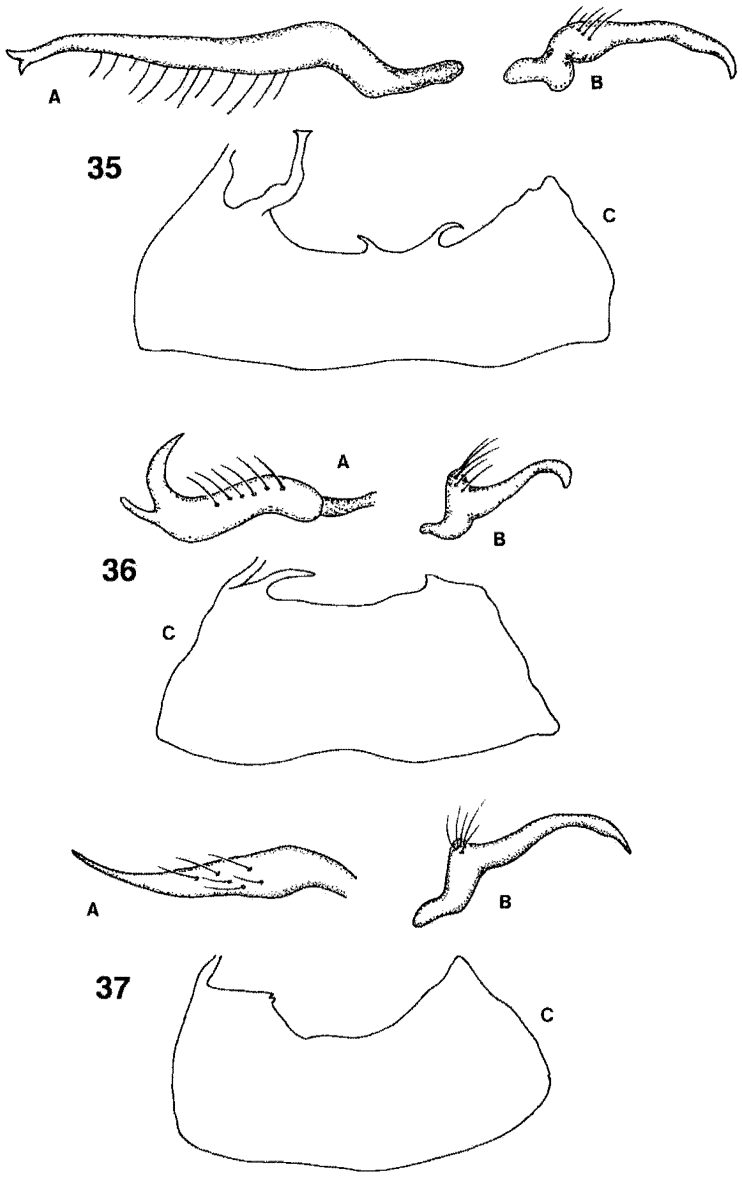
Etymology. Named for *Hiiaka*, the sister of the goddess *Pele* in Hawaiian mythology.

Sarona iki Asquith, **new species** Figs. 37, 77, 117

Diagnosis. Occurs only on the island of Hawaii. Recognized by its small size (< 2.0 mm) and predominantly yellow coloration. *Sarona iki* can be distinguished from the other yellow species on Hawaii, *flavidorsum*, by the pale apex of its scutellum; the scutellum of *flavidorsum* is always yellow.

Description. MALE. Very small species, tylus-cuneus length 1.75 mm; pronotal width 1.06 mm. Head moderately vertical; frons flat to weakly convex; tylus weakly convex, weakly and smoothly curved distally; jugum width subequal to tylus width; antennal segment I reaching but not surpassing apex of tylus; antennal segment II-head width ratio 1.00. Apex of rostrum just surpassing metacoxae.

Dorsal surface densely covered with short, inclined, simple, yellowish setae. Dorsal coloration yellow; apex of cuneus, distal third of corium, base of membrane, scutellum, and anterior half of pronotum suffused with brown; apex of scutellum white. Head dark yellow; vertex and apex of tylus suffused with brown. Antennae yellow; apex of segment II, distal half of segment III, and segment IV infuscated (Fig. 117). Venter yellow to yellowish brown; metathoracic pleura pale. Legs yellow; coxae and broad, transverse band on femora brown.



Figs. 35–37. *Sarona* male genitalia. **Fig. 35.** *S. hie*, n. sp., male genitalia. **A**, Right paramere, lateral view. **B**, Left paramere, lateral view. **C**, Genital capsule, dorsal view. **Fig. 36.** *S. hiiaka*, n. sp., male genitalia. **A**, Right paramere, lateral view. **B**, Left paramere, lateral view. **C**, Genital capsule, dorsal view. **Fig. 37.** *S. iki*, n. sp., male genitalia. **A**, Right paramere, lateral view. **B**, Left paramere, lateral view. **C**, Genital capsule, dorsal view.

Right paramere cylindrical, evenly but strongly acuminate distally, weakly curved mesally (Fig. 37a). Left paramere with a weak swelling preapically; basal angle weakly developed (Fig. 37b). Tergal process reduced to two short teeth (Fig. 37c). Spicula short, strongly tapered distally; apex of flange acuminate (Fig. 77).

FEMALE. Tylus-cuneus length 1.70–1.91 mm; pronotal width 1.07–1.18 mm. Antennal segment II-head width ratio 0.98–1.02. Same color as male, including antennae (Fig. 117).

Type material. Holotype M, HAWAII: Niulii, 19.V.1917 (O.H. Swezey) (BPBM). 3F, paratypes, same data as holotype (HDA and BPBM).

Host plant. Unknown.

Remarks. This species is known only from the windward slopes of the Kohala Mountains.

Etymology. Named from the Hawaiian term, *iki* (small); in reference to the unusually small size of this species.

Sarona kaala Asquith, **new species** Figs. 38, 78, 118

Diagnosis. Occurs only on the island of Oahu. Recognized by its short, sparse, dorsal vestiture, uniform pale yellow ventral coloration, and long, tapered right paramere (Fig. 38a). Similar to *lissochorium* n. sp. in its size, coloration, and right paramere; distinguished from this species by its single tergal process, and short, thick left paramere (Fig. 38b).

Description. MALE. Moderate sized species, tylus-cuneus length 2.30–2.61 mm; pronotal width 1.32–1.40 mm. Head moderately vertical; frons moderately convex; tylus weakly convex, weakly curved distally; jugum width greater than or equal to tylus width; antennal segment I surpassing apex of tylus. Antennal segment II-head width ratio 1.04–1.11. Apex of rostrum reaching metacoxae.

Dorsal surface sparsely covered with short, decumbent, yellow, simple setae. Dorsal coloration light to dark, reddish brown; calli lighter; apex of scutellum pale yellow. Head castaneous to reddish yellow; medial borders of eyes lighter, juga weakly infuscated. Antennae brown; proximal two-thirds of segment II and base of segment III yellow (Fig. 118). Thoracic pleura and lateral aspect of abdomen reddish brown, remainder of venter uniform pale yellow. Legs pale yellow; femora with variable, transverse, brown bands distally.

Right paramere elongate, cylindrical, strongly tapered distally; erect basal arm present on dorsal margin (Figs. 38a, d). Left paramere thick, apex strongly acuminate; basal angle weakly developed (Fig. 38b). Tergal process very short, oriented mesally (Fig. 38c). Spicula elongate, thick, sinuous; apex of flange developed as a short, tapered arm (Fig. 78).

FEMALE. Tylus-cuneus length 2.51–2.70 mm; pronotal width 1.38–1.51 mm. Antennal segment II-head width ratio 1.01–1.09. Dorsal coloration uniform pale to reddish yellow; membrane frequently infuscated. Antennae similar to male; segment I entirely yellow (Fig. 118).

Type material. Holotype M, OAHU: Mt Kaala, summit, 28.IV.1991, ex *Broussaisia arguta* (A. Asquith) (BPBM); 12M, 6F paratypes, same data as holotype (BPBM).

Other specimens examined. OAHU: 1M, Kaluanui, 22.II.1931, ex *Broussaisia* (O.H. Swezey) (HDA); 1M, Manoa, 26.III.1944 (N.L.H. Krauss) (BPBM); 7M, 7F, Mt Kaala, 1200 m, 18.VII.1968 (W.C. Gagné) (BPBM); 1M, Niu (Swezey) (HDA); 1F, Palolo, 25.VI.1921, ex *Broussaisia* (Swezey) (BPBM); 1F, Poamoho Trail, 5.IV.1936, ex *Broussaisia* (R.L. Usinger) (BPBM); 1M, 1F, Pupukea Trail, 8.III.1932 (O. Bryant) (HDA).

Host plant. *Broussaisia arguta* Gaud. (Hydrangeaceae).

Remarks. This species is found in wet forests in both the Koolau and the Waianae mountain ranges.

Etymology. Named for the type locality, Mt Kaala on the island of Oahu.

Sarona kanaka Asquith, **new species** Figs. 39, 76, 119

Diagnosis. Occurs only on the island of Maui. Similar to *Sarona beardsleyi* and *Sarona kane* n. sp. in its size and coloration. Distinguished from *Sarona beardsleyi* by the yellow coloration between the calli, and its antennal segment II-head width ratio > 1.2. *Sarona kanaka* can be distinguished confidently from *Sarona kane* n. sp. only by the male genitalia. The right paramere is evenly narrowed distally and possesses a sharp ventral tooth (Fig. 39a); the left paramere is evenly narrowed distally (Fig. 39b), and the tergal process is only half as long as in *Sarona kane* n. sp. (Fig. 39c).

Description. MALE. Moderate sized species, tylus-cuneus length 2.39–2.40 mm; pronotal width 1.36–1.39 mm. Head strongly vertical; frons flat to weakly convex; tylus flat, weakly curved distally; jugum width less than or equal to tylus width; antennal segment I surpassing apex of tylus. Antennal segment II-head width ratio 1.27–1.28. Apex of rostrum reaching or just surpassing metacoxae.

Dorsal surface densely covered with long, decumbent, pale, simple setae. Dorsal coloration uniform reddish brown; apex of scutellum, area between calli, and anterolateral angles of pronotum yellow. Head yellowish brown; lateral areas of frons, tylus, and lora fuscous. Antennae uniform reddish brown; proximal half of segment II lighter (Fig. 119). Venter yellowish brown to brown; posterior margins of thoracic pleura pale. Legs yellowish brown to reddish brown; apices of coxae, and bases and apices of femora yellow.

Right paramere cylindrical, evenly tapered distally and weakly curved medially; a small, ventral tooth present near middle of paramere (Fig. 39a). Left paramere evenly curved and tapered distally; basal angle not developed (Fig. 39b). Tergal process reduced to short tooth, oriented mesally (Fig. 39c). Spicula strongly reduced distally; apex of flange narrowly convex (Fig. 79).

FEMALE. Tylus-cuneus length 2.52 mm; pronotal width 1.41 mm. Antennal segment II-head width ratio 1.21. Lighter than male; predominantly light, dirty yellow, suffused with brown. Venter and legs yellow. Basal half of antennal segment II yellow (Fig. 119).

Type material. Holotype M, MAUI: E Maui, Koolau Forest Reserve, 1585 m, 8.VIII.1975, ex *Cheirodendron trigynium* (W.C. Gagné) (BPBM). 1M, 1F paratypes, same data as holotype (BPBM).

Host plant. Unknown.

Remarks. Although this species was collected on *Cheirodendron*, this is not a confirmed breeding host.

Etymology. Named for the Hawaiian term *kanaka* (servant, laborer).

Sarona kane Asquith, **new species** Figs. 40, 80, 120

Diagnosis. Occurs only on the eastern portion of the island of Maui. Similar to *Sarona beardsleyi* and *Sarona kanaka* in its size and coloration. Distinguished from *Sarona beardsleyi* by its short, yellow, middorsal stripe on the pronotum, and its antennal segment II-head width ratio > 1.2. *Sarona kane* can be distinguished confidently from *Sarona kanaka* only by the male genitalia. In *kane* the right paramere is thicker distally and lacks a sharp ventral tooth (Fig. 40a); the left paramere is thick apically (Fig. 40b), and the tergal process is twice as long as in *kanaka* (Fig. 40c).

Description. MALE. Moderate sized species, tylus-cuneus length 2.46–2.65 mm; pronotal width 1.42–1.44 mm. Head moderately vertical; frons flat to weakly convex; tylus flat, weakly curved distally; jugum width greater than or equal to tylus width; antennal segment I surpassing apex of tylus. Antennal segment II-head width ratio 1.21–1.32. Apex of rostrum reaching metacoxae.

Dorsal surface densely covered with long, decumbent, yellowish brown, simple setae. Dorsal coloration uniform reddish brown; apex of scutellum, short midstripe on anterior pronotum, and lateral margins of pronotum yellow. Head reddish brown; medial area of vertex and medial areas bordering eyes yellowish; tylus infuscated. Antennae uniform reddish brown; proximal half of segment

II lighter (Fig. 120). Venter reddish brown; posterior margins of thoracic pleura yellow. Legs uniform reddish brown; tibiae slightly lighter.

Right paramere cylindrical, evenly tapered distally, weakly curved dorsomedially; a small ventral protuberance present near middle of paramere (Fig. 40a). Left paramere weakly enlarged preapically; basal angle not developed (Fig. 40b). Tergal process short, straight, apex emarginate (Fig. 40c). Spicula slightly reduced, very narrow distally; apex of flange weakly and broadly convex (Fig. 80).

FEMALE. Tylus-cuneus length 2.7 mm; pronotal width 1.56 mm. Antennal segment II-head width ratio 1.14. Lighter than male;
predominantly yellow, suffused with brown. Head yellow; frons with two large brown spots. Basal half of antennal segment II yellow.

Type material. Holotype M, MAUI: E Maui, near Puu Luau, 27.IV.1945, ex *Myrsine* (E.C. Zimmerman) (BPBM).

Other specimens examined. MAUI: 1M, E Maui, near Puu Luau, 27.IV.1945, ex *Myrsine* (E.C. Zimmerman) (HDA); 1M, 1F, E Maui, near Puu Luau, 1678 m (5500 ft), 28.IV.1945, ex *Suttonia* (E.C. Zimmerman) (HDA).

Host plant. Unknown.

Remarks. This species has been collected on *Myrsine* twice, but this plant has yet to be confirmed as a breeding host.

Etymology. Named for *Kane*, a god of Hawaiian mythology.

Sarona kau Asquith, **new species** Figs. 41, 81, 121

Diagnosis. Occurs only on the island of Hawaii. Distinguished by its uniform dark coloration, with the apex of the scutellum occasionally light castaneous, but never pale as in other Hawaii species. Also recognized by the distinctly arcuate lateral margins of the hemelytra, as in *pittospori* n. sp., and the short anntenal segment II, which is always much shorter than the width of the head.

Description. MALE. Small species, tylus-cuneus length 2.30–2.50 mm; pronotal width 1.37–1.45 mm. Head weakly vertical; frons distinctly convex; tylus convex laterally, only weakly curved distally; jugum width less than or equal to tylus width; antennal segment I reaching but not surpassing apex of tylus. Antennal segment II-head width ratio 0.82–0.91. Apex of rostrum reaching or just surpassing metacoxae. Margins of hemelytra distinctly arcuate.

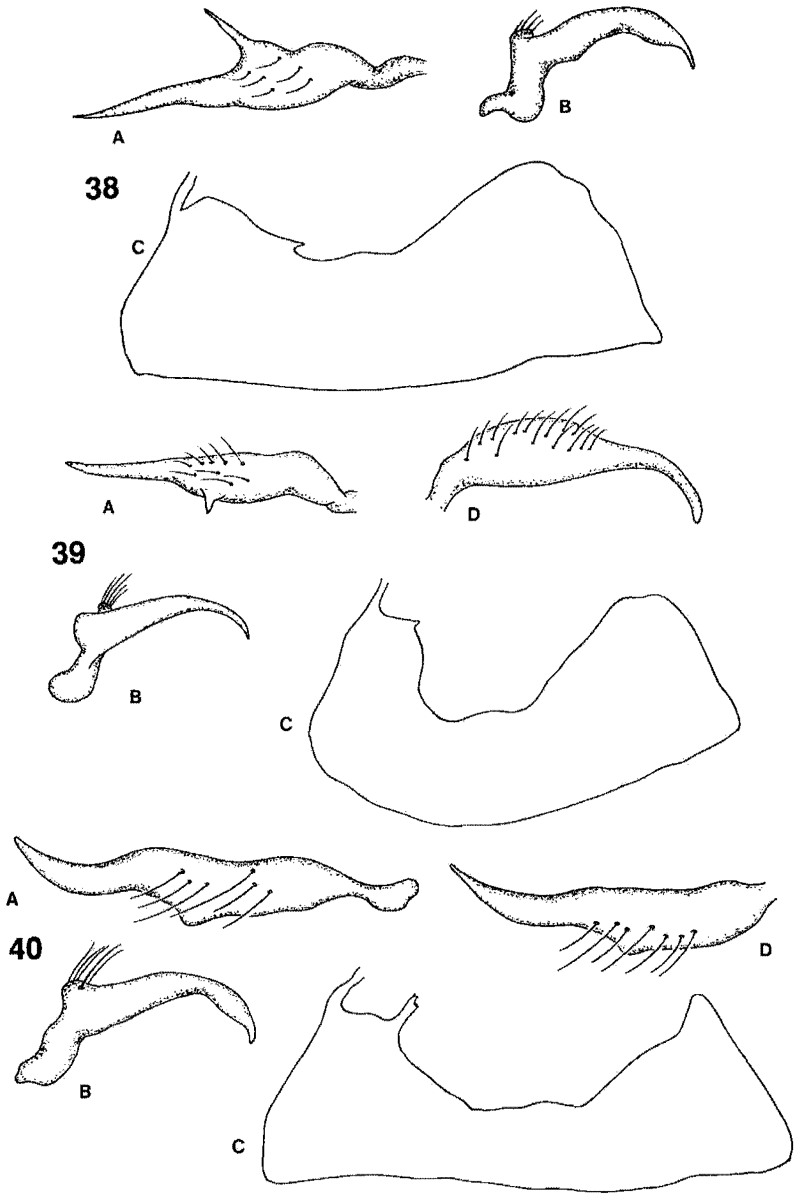
Dorsal surface densely covered with short, inclined, brown, simple setae. Dorsal coloration uniform dark castaneous to black; apex of scutellum occasionally light castaneous. Head castaneous to black; antennal segment I castaneous to black; antennal segment II yellow, basal and distal thirds infuscated; segments III and IV fuscous (Fig. 121). Venter brown to black; ventral margins of thoracic pleura occasionally light. Coxae castaneous to fuscous; trochanters yellowish brown; femora yellow with broad, transverse, brown band at middle, band occasionally expanded to cover most of femur; tibiae yellow to yellowish brown.

Right paramere cylindrical, evenly tapered distally, weakly curved medially (Fig. 41a). Left paramere enlarged preapically; basal angle weakly developed (Fig. 41b). Tergal process reduced to two short teeth (Fig. 41c). Spicula short, strongly tapered distally; apex of flange acuminate (Fig. 81).

FEMALE. Tylus-cuneus length 2.44–2.61 mm; pronotal width 1.37–1.50 mm. Antennal segment II-head width ratio 0.83–0.87. Color similar to male; vertex frequently yellowish brown; base of antennal segment II yellow (Fig. 121).

Type material. Holotype M, HAWAII: Nauhi Gulch, 2135-2593 m (7000-8500 ft), 3.X.1931, ex *Railliardia* (O.H. Swezey) (BPBM). 3M, 5F paratypes, same data as holotype (BPBM).

Other specimens examined. HAWAII: 1M (Koebele) (BPBM); 1M, 1F, Kau, aa flows, 1096 m (3600 ft), 24.VII.1913 (W.M. Giffard) (BPBM); 1F, Kahuku #4, Kau, 11.I.1917 (Giffard) (BPBM); 3M, 3F, Kau, aa flows, 1096 m (3600 ft), 13.VII.1912 (Giffard) (BPBM); 4F, Kau, aa



Figs. 38–40. *Sarona* male genitalia. **Fig. 38.** *S. kaala*, n. sp., male genitalia. **A**, Right paramere, lateral view. **B**, Left paramere, lateral view. **C**, Genital capsule, dorsal view. **Fig. 39.** *S. kanaka*, n. sp., male genitalia. **A**, Right paramere, lateral view. **B**, Left paramere, lateral view. **C**, Genital capsule, dorsal view. **D**, Right paramere, dorsal view. **Fig. 40.** *S. kane*, n. sp., male genitalia. **A**, Right paramere, lateral view. **B**, Left paramere, lateral view. **C**, Genital capsule, dorsal view. **D**, Right paramere, dorsal view.

flows, 1220 m (4000 ft), 27.VII.1918 (Giffard) (BPBM); 1F, Kilauea, 12.I.1917 (Giffard) (BPBM); 1M, Kilauea, 1220 m (4000 ft), 2.VII.1920 (Giffard) (BPBM); 9M, 6F, Kilauea, 28.VI.1934, ex *Railliardia* (O.H. Swezey) (BPBM); 1M, 2F, Kilauea, Kau desert, 1159 m (3800 ft), 13.IX.1919 (Giffard) (BPBM); 1M, Pohakuloa, 2440 m (8000 ft), 16.I.1975 (S.L. Montgomery) (BPBM).

Host plant. *Dubautia* sp. (Asteraceae).

Remarks. This species breeds on one or more species of *Dubautia* in the *Railliardia* section of the genus (Wagner et al., 1990), probably *D. ciliolata* (DC) D. Keck. This plant occurs in dry shrublands and lava flows, the same habitat from which most collections of *Sarona kau* have come. This species is known from windward Mauna Kea, the Kau region in the lee of Mauna Loa, and the saddle area between the volcanoes.

Etymology. Named for the Kau district of the island of Hawaii.

Sarona kohana Asquith, **new species** Figs. 42, 82, 122

Diagnosis. Occurs only on the island of Oahu. Recognized by its small, C- or L-shaped right paramere (Fig. 42a), and uniform yellow head. Most similar to *oahuensis* n. sp. in paramere structure; distinguished from this species by the blunt arms of the right paramere (Fig. 42a), and well developed tergal process (Fig. 42c).

Description. MALE. Moderate sized species, tylus-cuneus length 2.30 mm; pronotal width 1.32 mm. Head weakly vertical; frons weakly convex; tylus flat, strongly curved distally; jugum width greater than or equal to tylus width; antennal segment I surpassing apex of tylus. Antennal segment II-head width ratio 0.97. Apex of rostrum just reaching metacoxae.

Dorsal surface densely covered with short, decumbent, yellowish brown, simple setae. Dorsal coloration uniform light, reddish brown; calli yellow. Head uniform yellow; apices of tylus and lora reddish brown. Antennae reddish yellow; apex of segment II infuscated (Fig. 122). Venter reddish brown; margins of thoracic pleura yellowish white. Legs light, reddish or yellowish brown; coxae yellow.

Right paramere small, C- or L-shaped; ventral arm much larger than dorsal arm (Fig. 42a). Left paramere sinuous; apex evenly tapered; basal angle not developed (Fig. 42b). Tergal process strongly developed; apex blunt; oriented posteromesally (Fig. 42c). Spicula elongate, weakly sinuous, expanded and serrate preapically, apex strongly tapered; apex of flange well developed as a thick, digitiform arm (Fig. 82).

FEMALE. Unknown.

Type material. Holotype M, OAHU: Kahana, 8.II.1931 (O.H. Swezey) (BPBM).

Host plant. Unknown.

Remarks. This species is known only from the windward Koolau Mountains.

Etymology. From the Hawaiian, *kohana* (alone), referring to the single known specimen of this species.

Sarona kuaana Asquith, **new species** Figs. 43, 83, 123

Diagnosis. Occurs only on the island of Oahu. Recognized by its large, C-shaped right paramere. Similar to *xanthostelma* n. sp. and *adonias* in its large, C-shaped right paramere. Distinguished from *xanthostelma* n. sp. by its more symmetric right paramere, with arms of equal length (Fig. 43a), its short, right tergal process (Fig. 43c), and more obliquely angled head. *Sarona adonias* also has a larger right tergal process, more linear left paramere, and lacks the tuberosity on the lateral margin of the right paramere found in *kuaana* (Fig. 43a).

Description. MALE. Large species, tylus-cuneus length 2.61 mm; pronotal width 1.46 mm. Head weakly vertical; frons broad, weakly convex; tylus convex, moderately curved distally; jugum width greater than or equal to tylus width; antennal segment I surpassing apex of tylus. Antennal seg-

ment II-head width ratio 1.08. Apex of rostrum surpassing metacoxae.

Dorsal surface covered with moderately long, decumbent, pale, simple setae. Dorsal coloration uniform light reddish brown; apex of scutellum lighter. Head uniform yellow; apex of tylus and lora slightly darker. Antennae yellow; segment II infuscated distally (Fig. 123). Venter dark reddish brown; margins of thoracic pleura white. Legs yellowish brown; coxae yellow.

Right paramere large, symmetrically C-shaped; arms of equal length; a short tuberosity present on lateral margin (Fig. 43a). Left paramere evenly curved and tapered distally; basal angle not developed (Fig. 43b). Two tergal processes present; both processes short, broad teeth, oriented mesally (Fig. 43c). Spicula elongate, sinuous, strap-like, a large tooth present preapically; apex of flange developed as a short, digitiform process (Fig. 83).

FEMALE. Unknown.

Type material. Holotype M, OAHU: Waianae Mts, VII.1955 (E.J. Ford Jr.) (BPBM).

Host plant. Unknown.

Etymology. From the Hawaiian, *kuaana* (older sibling), referring to the probable relationship of this species to *adonias*.

Sarona kukona Asquith, **new species** Figs. 44, 84, 124

Diagnosis. Occurs only on the island of Kauai. Recognized by its uniform pale green, or light, yellowish green coloration, acuminate posteroventral margin of the genital capsule (Fig. 44c), and its large right paramere (Fig. 44a), which reaches across the opening of the genital capsule. No other species on Kauai displays the distinct pale green color of *kukona*. *Sarona mokihana* n. sp. also has the posteroventral margin of the genital capsule strongly acuminate, but this species is always yellow, and has a short, strongly abbreviated right paramere.

Description. MALE. Small species, tylus-cuneus length 2.18–2.22 mm; pronotal width 1.21–1.27 mm. Head weakly to moderately vertical; frons moderately to strongly convex; tylus weakly convex, straight to weakly curved distally; jugum width greater than or equal to tylus width; antennal segment I just surpassing apex of tylus. Antennal segment II-head width ratio 0.98–1.07. Apex of rostrum surpassing metacoxae.

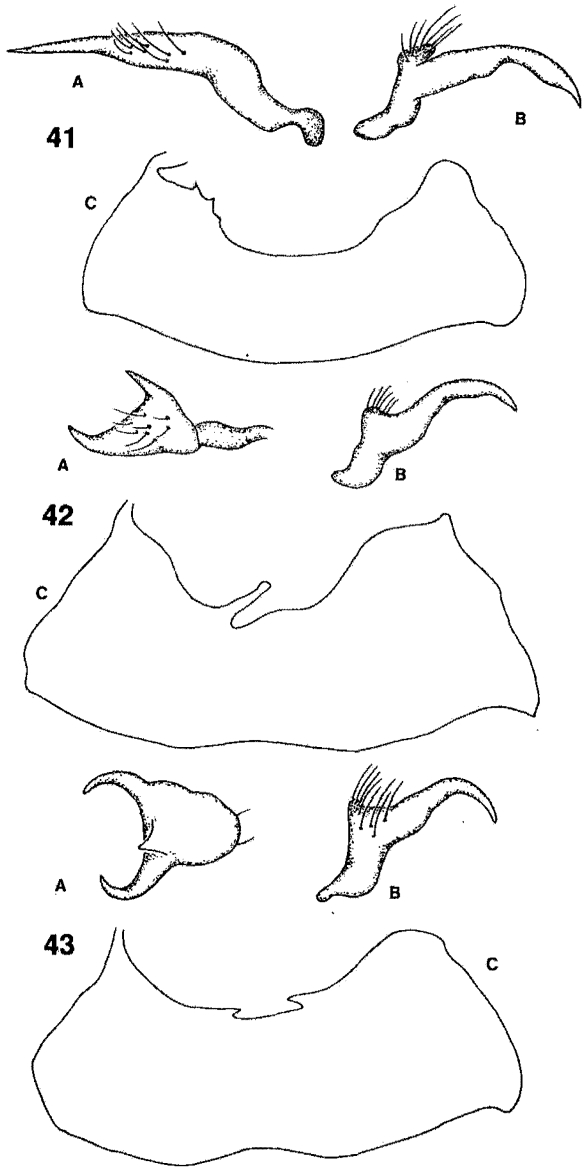
Dorsal surface densely covered with short to moderate length, inclined, yellowish, simple setae. Dorsal coloration uniform pale green to yellowish green; scutellum paler than rest of dorsum; membrane infuscated, particularly basally. Head yellowish green to brown. Antennal segment I green to yellowish green, darker ventrally; segment II green to yellowish green, fuscous apically; segments III and IV light fuscous (Fig. 124). Venter yellow to yellowish green; peritreme pale. Legs yellow; apices of coxae often pale; femora occasionally indistinctly spotted; tibiae yellowish white.

Right paramere elongate, reaching across opening of genital capsule, sinuous, apex bifurcate; dorsal arm of bifurcation long, tapered, curved ventrally; ventral arm of bifurcation short, acuminate (Fig. 44a); basal arm absent. Left paramere short, strongly curved distally; basal angle strongly developed into erect, curved process (Fig. 44b). Tergal process long, straight, oriented posteromesally (Fig. 44c). Spicula elongate, flattened, weakly sinuous; serrate preapically, apex strongly narrowed; apex of flange not developed (Fig. 84).

FEMALE. Tylus-cuneus length 2.26–2.85 mm; pronotal width 1.23–1.30 mm. Antennal segment II-head width ratio 0.96–1.00 mm. Dorsal coloration always pale green, occasionally tinged with yellow. Antennae as in figure 124.

Type material. Holotype M, KAUAI: Kokee, Nualolo Trail, 27.IV.1991, ex *Melicope barbigera* (A. Asquith) (BPBM). 3M, 3F paratypes, same data as holotype (BPBM).

Other specimens examined. KAUAI: 1M, Alakai Swamp, Pihea Trail, 1200 m, 22.VI.1980, ex *Pelea barbigera* (W.C. Gagné) (BPBM); 3F, Awaawapuhi, 15.I.1992, ex *Melicope barbigera* (A. Asquith) (BPBM); 1F, Kaunuohua Ridge, Kokee State Park, 1068 m (3500 ft), VIII.1970, ex *Pelea*



Figs. 41–43. *Sarona* male genitalia. **Fig. 41.** *S. kau*, n. sp., male genitalia. **A**, Right paramere, lateral view. **B**, Left paramere, lateral view. **C**, Genital capsule, dorsal view. **Fig. 42.** *S. kohana*, n. sp., male genitalia. **A**, Right paramere, lateral view. **B**, Left paramere, lateral view. **C**, Genital capsule, dorsal view. **Fig. 43.** *S. kuaana*, n. sp., male genitalia. **A**, Right paramere, lateral view. **B**, left paramere, lateral view. **C**, Genital capsule, dorsal view.

(BPBM); 1M, 1F, Kokee, 9.VI.1919 (H.T. Osborn) (HDA); 1M, 1F, 4–6.VIII.1961 (Maa, Miyatake & Yoshimoto) (BPBM).

Host plant. *Melicope (= Pelea) barbigera* A. Gray (Rutaceae).

Remarks. This species is found in mesic to dry forests of the western Alakai Plateau. It is extremely active when disturbed, constantly jumping and taking short flights.

Etymology. From the Hawaiian, *kukona* (unfriendly), in reference to how this species avoids cooperating with collectors. Also in reference to Kukona, an ancient king of Kauai.

Sarona laka Asquith, **new species** Figs. 45, 85, 125

Diagnosis. Occurs only on the island of Kauai. Recognized by its uniform yellow or yellowish brown coloration, strongly vertical head, and C-shaped right paramere (Fig. 45a). *Sarona hiiaka* and *mokihana* n. spp. are also predominantly yellow in coloration; *hiiaka* differs from *laka* in always having brown on the thoracic pleura and light brown bands on the femora, and an elongate, sinuous right paramere; *mokihana* n. sp. has a shorter antennal segment II, the rostrum does not reach past the metacoxae, and the right paramere is strongly abbreviated.

Description. MALE. Small species, tylus-cuneus length 2.12–2.27 mm; pronotal width 1.30–1.42 mm. Head strongly vertical; frons flat; tylus flat, weakly curved distally; jugum width equal to tylus width; antennal segment I just surpassing apex of tylus; antennal segment II-head width ratio 1.04–1.14. Apex of rostrum just surpassing metacoxae.

Dorsal surface densely covered with short, inclined, yellow to brown, simple setae. Dorsal coloration uniform yellow to yellowish brown; cuneal fracture, apex of cuneus, and most of membrane infuscated. Head yellow to yellowish brown; vertex and sutures occasionally weakly infuscated. Antennal segment I yellow to dark brown, ventral surface always brown; segment II yellow, distal fourth fuscous; segments III and IV brown to fuscous, base of segment III yellow (Fig. 125). Venter uniform yellow; peritreme pale; abdomen tinged with brown. Coxae and femora yellow; tibiae yellowish white.

Right paramere C-shaped; ventral arm narrow, strongly curved dorsally; basal arm short, acuminate, oriented posteriorly (Fig. 45a). Left paramere narrow, only weakly curved distally; basal angle strongly developed as curved, digitiform process (Fig. 45b). Tergal process a short tooth, oriented mesally (Fig. 45c). Spicula elongate, very narrow, straight; apex of flange not developed (Fig. 85).

FEMALE. Tylus-cuneus length 2.27–2.60 mm; pronotal width 1.33–1.55 mm. Antennal segment II-head width ratio 0.98–1.00. Coloration similar to male.

Type material. Holotype M, KAUAI: Nualolo Trail, 27.IV.1991, ex *Claoxylon sandwicense* (A. Asquith) (BPBM). 5M, 1F paratypes, same data as holotype (BPBM).

Other specimens examined. KAUAI: 1F, Kokee, Awaawapuhi Trail, 22.VI.1991, ex *Claoxylon sandwicense* (A. Asquith) (BPBM); 1F, Kokee, Awaawapuhi Trail, 22.VI.1991, ex *Claoxylon sandwicense* (Asquith) (BPBM); 1F, 1 nymph, Kokee, Awaawapuhi Trail, 15.I.1992, ex *Claoxylon sandwicense* (Asquith) (BPBM); 2M, 1 nymph, Kokee (D.E. Hardy) (UH); 3F, Milolii Trail, 30.VIII.1959, ex *Claoxylon* (J.W. Beardsley) (BPBM); 1F, Nualolo Trail, 18.VII.1932, ex *Claoxylon* (O.H. Swezey) (HDA); 3M, 1F, Nualolo Trail, 22.VI.1992, ex *Claoxylon sandwicense* (Asquith) (BPBM); 1M, 4F, Nualolo Trail, 20.VI.1932, ex *Claoxylon* (Swezey) (HDA).

Host plant. *Claoxylon sandwicense* Mull. Arg. (Euphorbiaceae).

Remarks. This species is found in mesic forests along the western slopes of the Alakai Plateau.

Etymology. Named for *Laka*, the forest and hula deity of Hawaiian mythology.

Sarona lanaiensis Asquith, **new species** Figs. 46, 86, 126

Diagnosis. Occurs only on the island of Lanai. Easily distinguished from other Lanai species by its small size (< 2.0 mm), fusiform second antennal segment (Fig. 126), and two types of dorsal pubescence. Distinguished from similar allopatric species, *maui* n. sp. and *antennata,* by the abbreviated apex of the right paramere (Fig. 46a), and from *pusilla* n. sp. by its shorter and thicker parameres (Figs. 46a, b), and longer, more mesally oriented tergal process (Fig. 46c).

Description. MALE. Small species, tylus-cuneus length 1.76 mm; pronotal width 1.06 mm. Head moderately vertical; frons weakly convex; tylus weakly convex, weakly curved distally; jugum width equal to tylus width; antennal segment I surpassing apex of tylus; antennal segment II distinctly fusiform. Antennal segment II-head width ratio 0.8–0.86. Apex of rostrum reaching or just surpassing metacoxae.

Dorsal surface covered with short, inclined, light brown, simple setae, and short, decumbent, pale, sericeous setae. Dorsal coloration uniform dark castaneous to black; apex of scutellum, and lateral margins of pronotum dark yellowish brown. Head dark reddish brown; posterior aspect of vertex, medial borders of eyes, and juga yellow; small lateral spots on frons and apex of tylus fuscous. Antennae yellowish brown to reddish brown; segments II and III infuscated distally; proximal halves of segments III and IV yellow (Fig. 126). Venter dark reddish brown; posterior and ventral margins of thoracic pleura white. Legs reddish brown; apices of femora, and all of tibiae dark yellow.

Right paramere short, abbreviated distally, ending in short nipple-like process (Fig. 46a); basal arm well developed, dentate, oriented medially (Figs. 46d, e). Left paramere short, thick, weakly curved distally; basal angle poorly developed (Fig. 46b). Tergal process short, narrow, oriented mesally; short secondary process present on left side of genital capsule (Fig. 46c). Spicula short, strongly abbreviated distally; apex of flange not developed (Fig. 86).

FEMALE. Tylus-cuneus length 1.79–1.94 mm; pronotal width 1.07–1.12 mm. Antennal segment II-head width ratio 0.80–0.86. Dorsal coloration light yellowish brown to reddish brown; base of scutellum and occasionally calli fuscous; apex and lateral margins of scutellum, and lateral margins of pronotum yellow. Head yellow with lateral, fuscous spots on frons. Antennae similar to but lighter than male (Fig. 126).

Type material. Holotype M, LANAI: Lanaihale, 700 m, 7.VI.1971, ex *Pipturus* (W.C. Gagné) (BPBM). 2M, 1F paratypes, same data as holotype (BPBM).

Host plant. *Pipturus albidus* (Hook. & Arnott) (Urticaceae).

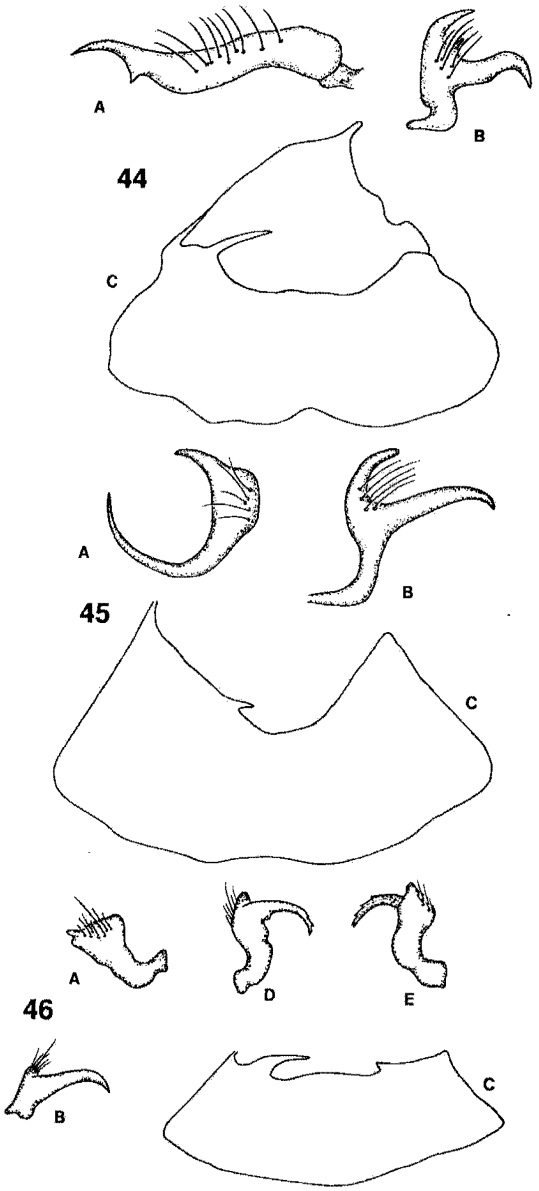
Etymology. Named for Lanai, the island on which it is found.

Sarona lissochorium Asquith, **new species** Figs. 47, 87, 127

Diagnosis. Occurs only on the island of Oahu. Recognized by its short, sparse, dorsal vestiture, uniform pale yellow ventral coloration, and long, tapered right paramere (Fig. 47a). Similar to *kaala* in its size, coloration, and right paramere; distinguished from this species by its two tergal processes, with the right process extraordinarily long (Fig. 47c), and its long, narrow left paramere (Fig. 47b).

Description. MALE. Moderate sized species, tylus-cuneus length 2.39–2.50 mm; pronotal width 1.29–1.44 mm. Head moderately vertical; frons moderately convex; tylus weakly convex, weakly curved distally; jugum width greater than or equal to tylus width; antennal segment I surpassing apex of tylus. Antennal segment II-head width ratio 1.04–1.11. Apex of rostrum reaching metacoxae.

Dorsal surface sparsely covered with short, decumbent, yellow, simple setae. Dorsal coloration light to dark reddish brown; calli lighter; apex of scutellum pale yellow. Head castaneous to reddish yellow; medial borders of eyes lighter; juga weakly infuscated. Antennae brown; proximal two thirds of segment II and base of segment III yellow (Fig. 127). Thoracic pleura and lateral aspect of abdomen reddish brown, remainder of venter uniform pale yellow. Legs pale yellow; femora with variable, transverse, brown bands distally.



Figs. 44–46. *Sarona* male genitalia. **Fig. 44.** *S. kukona*, n. sp., male genitalia. **A**, Right paramere, lateral view. **B**, Left paramere, lateral view. **C**, Genital capsule, dorsal view. **Fig. 45.** *S. laka*, n. sp., male genitalia. **A**, Right paramere, lateral view. **B**, Left paramere, lateral view. **C**, Genital capsule, dorsal view. **Fig. 46.** *S. lanaiensis*, n. sp., male genitalia. **A**, Right paramere, lateral view. **B**, Left paramere, lateral view. **C**, Genital capsule, dorsal view. **D**, Right paramere, dorsal view, **E**, Right paramere, apical view.

Right paramere elongate, cylindrical, strongly tapered distally (Fig. 47a); erect basal arm present on medial margin (Fig. 47d). Left paramere narrow, apex strongly curved ventrally; basal angle developed as a short, cylindrical process (Fig. 47b). Two tergal processes present; right process narrow, elongate, reaching to left process; left process short, strongly acuminate, oriented mesally (Fig. 47c). Spicula elongate, flattened, sinuous, apex minutely dentate; apex of flange developed as a short, tapered arm (Fig. 87).

FEMALE. Unknown.

Type material. Holotype M, OAHU: Konahuanui, 790–915 m (2600-3000 ft), 9.V.1943, beating shrubbery (E.C. Zimmerman) (BPBM). 1M Paratype, OAHU: Palolo, 25.VI.1921, ex *Broussaisia* (O.H. Swezey) (BPBM).

Other specimens examined. OAHU: 1M, Puu Kalena ?, 29.XII.1938 (O.H. Swezey) (BPBM).

Host plant. Although one specimen of *lissochorium* was collected from *Broussaisia arguta*, this is not a confirmed breeding host.

Remarks. This species is known from both the Koolau and the Waianae mountain ranges.

Etymology. From the Greek, *lissos* (smooth) and *chorium* (skin), in reference to the smooth, shiny appearance of this species.

Sarona makua Asquith, **new species** Figs. 48, 88, 128

Diagnosis. Occurs only on the island of Kauai. Recognized by its elongate, laterally flattened right paramere (Fig. 48a). *Sarona hiiaka* is the only other species on Kauai with a yellow and brown pattern of dorsal coloration; *makua* differs from *hiiaka* in its more erect dorsal setae, medially placed tergal process, and the strongly developed basal angle of the left paramere (Fig. 48b). Teneral specimens of *Sarona saltator* n. sp. may occasionally be bicolored, but always have at least the pronotum castaneous, and this species also has a strongly vertical head.

Description. MALE. Moderate sized species, tylus-cuneus length 2.48 mm; pronotal width 1.28–1.38 mm. Head moderately vertical; frons moderately convex; tylus flat to weakly convex, very weakly curved distally; jugum width less than or equal to tylus width; antennal segment I surpassing apex of tylus. Antennal segment II-head width ratio 1.19. Apex of rostrum surpassing metacoxae, reaching abdomen.

Dorsal surface densely covered with moderately long, inclined, yellow, simple setae. Dorsal coloration yellow to yellowish brown; distal areas of embolium, clavus, and corium, and apex of cuneus dark brown; membrane with veins and distal half infuscated. Head yellowish brown; medial border of eyes, apex of tylus, and lora variably infuscated. Antennal segment I yellow dorsally, brown ventrally; segment II yellow, apex infuscated; segments III and IV brown to fuscous, base of segment III yellow (Fig. 128). Venter reddish to yellowish brown; posterior half of peritreme pale; mesosternum castaneous. Coxae and femora yellow to yellowish brown, apices of femora lighter; tibiae yellowish white.

Right paramere elongate, laterally flattened, distal third curved dorsally, apex bifurcate; basal arm absent (Fig. 48a). Left paramere narrow, strongly curved; basal angle strongly developed as a curved, digitiform process (Fig. 48b). Tergal process short, narrow, oriented mesally (Fig. 48c). Spicula elongate, weakly sinuous, expanded and serrate preapically; apex of flange weakly developed (Fig. 88).

FEMALE. Unknown.

Type material. Holotype M, KAUAI: Kokee, Alakai Swamp Trail, VI–VIII.1992, ex methyl eugenol trap / 24.VIII (A. Asquith) (BPBM).

Other specimens examined. KAUAI: 1M, Kokee, 22–25.VII.1968, at light (W.C.Gagné) (BPBM).

Host plant. Unknown.

Remarks. This species is found in wet to mesic forests on the Alakai Plateau. The similarity of *makua* to other Kauai species that breed on *Melicope*, and the fact that *makua*, *mokihana* and *hiiaka* have all been recovered from methyl eugenol traps, a constituent of at least some *Melicope* species, suggests that the host plant of *makua* is probably a species of *Melicope*.

Etymology. From the Hawaiian, *makua* (progenitor), in reference to what I believe are pleisiomorphic genitalic characters of this species.

Sarona mamaki Asquith, **new species** Figs. 19, 49, 89, 129

Diagnosis. Occurs only on the island of Hawaii. Distinguished from all Hawaii species except *Sarona pittospori* n. sp. and *hamakua* by the ivory white apex of the scutellum, and the mid-dorsal stripe on the pronotum (Fig. 19). Distinguished from *pittospori* n. sp. by the brown color of antennal segment I, and the presence of dark spots at the bases of the tibial spines. Many other species, such as *myoporicola* n. sp., also have the apex of the scutellum pale, but the color is yellow or yellowish brown, never white. This species can be confidently distinguished from *hamakua* only by the male genitalia (Fig. 49).

Description. MALE. Moderate sized species, tylus-cuneus length 2.13–2.39 mm; pronotal width 1.27–1.40 mm. Head moderately vertical; frons and tylus weakly convex; tylus weakly curved distally; jugum width less than tylus width; antennal segment II-head width ratio 1.01–1.08. Apex of rostrum just surpassing metacoxae.

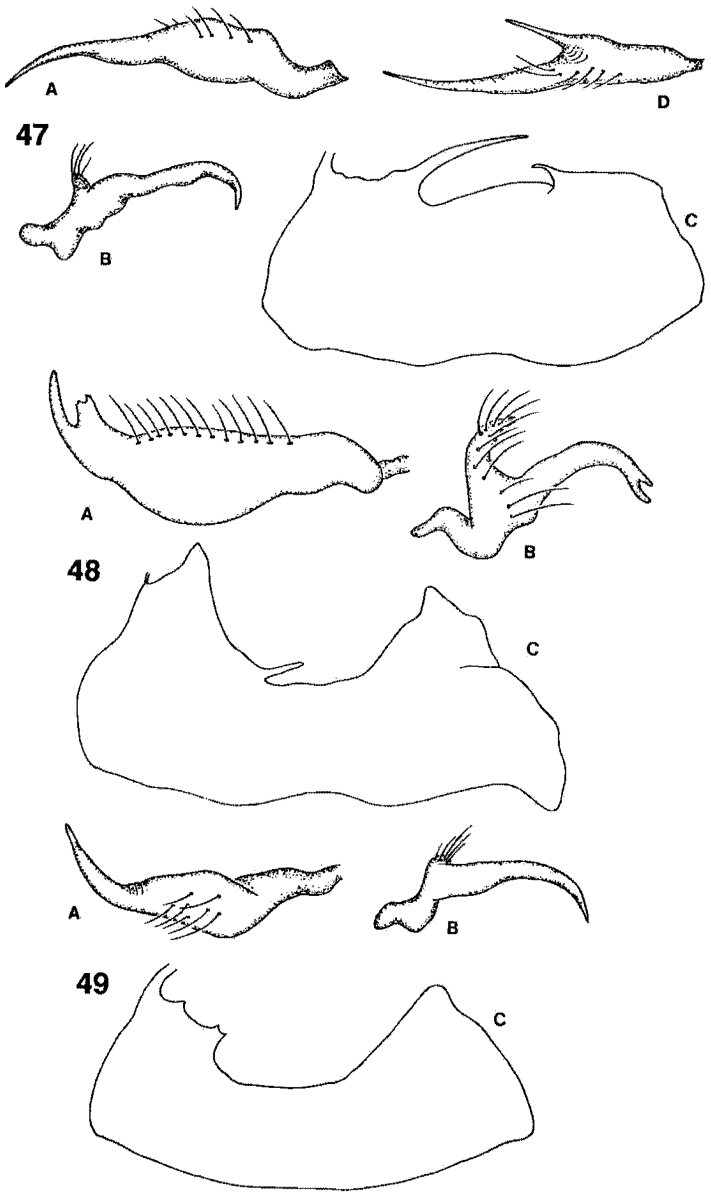
Dorsal surface densely covered with long, decumbent, pale, simple setae. General coloration castaneous. Dark forms with dorsum uniform dark castaneous to fuscous; yellowish brown spot between calli; apex of scutellum ivory white. Lighter forms castaneous; mid-dorsal stripe on pronotum, basal half of corium, basal two thirds of cuneus, and lateral and posterior margins of cuneus yellow; distal third of scutellum white. Head castaneous; posterior margin of vertex, medial borders of eyes, and midstripe on frons frequently yellow; juga, gena and bucculae usually yellow. Antennae fuscous; middle third of segment II and base of segment III yellow (Fig. 129). Venter fuscous; margins of thoracic pleura pale. Legs yellowish; coxae, except for apices, and broad, transverse band on all femora brown.

Right paramere strongly tapered distally, distal half weakly curved medially (Fig. 49a). Left paramere with distal half evenly and smoothly curved; basal angle weakly developed and oriented mesally (Fig. 49b). Tergal process reduced to two short teeth (Fig. 49c). Spicula shortened and strongly tapered distally; apex of flange produced as a short, acuminate process (Fig. 89).

FEMALE. Tylus-cuneus length 2.30–2.61 mm; pronotal width 1.33–1.49 mm. Antennal segment II-head width ratio 0.93–1.03. Coloration lighter than male; head, clavus, and venter largely yellow to yellowish brown; base of antennal segment II not infuscated (Fig. 129).

Type material. Holotype M, HAWAII: Volcanoes National Park, Bird Park, 30.VII.1991, ex *Pipturus* (A. Asquith) (BPBM). 6M, 9F paratypes, same data as holotype (BPBM).

Other specimens examined. HAWAII: 1M, Hawaii, (Koebele) (BPBM); 2M, 2F Kahuku Ranch, 915 m (3000 ft), VII.1963 (D.E. Hardy) (BPBM); 5M, 3F, Keauohana Forest Reserve, Puna District, 305 m (1000 ft), 23.VI.1966, ex *Metrosideros/Straussia* (J.W. Beardsley) (BPBM); 1M, Kilauea, IV.14.1944 (N.L.H. Krauss) (HDA); 1F, Kilauea, 1220 m (4000 ft), 30.I.1918 (W.M. Giffard) (BPBM); 3M, 6F, Kilauea, dry forest, 1220 m (4000 ft), 6.VII.1918 (W.M. Giffard) (BPBM); 3M, 2F, Kilauea, Lumber Camp, 1220 m (4000 ft), 4.VII.1918 (W.M. Giffard) (BPBM); 1M, 1F, Kilauea, Bird Park, 20.VIII.1958, ex *Pipturus* (J.W. Beardsley) (BPBM); 1M, Kilauea, Bird Park, VII.1953 (D.E. Hardy) (UH); 4M, 4F, Kilauea, 19.VII.1935 (R.L. Usinger) (BPBM); 6M, 4F, Kilauea, 1220 m (4000 ft), 14.I.1917 (W.M. Giffard) (BPBM); 2M, 1F, Kilauea, 30 miles, 29.VIII.1917, ex *Metrosideros polymorpha* (W.M. Giffard) (BPBM); 4M, 1F, Kilauea, 29 miles, 1220 m (4000 ft), 21.VIII.1917, ex *Broussaisia pellucida* (W.M. Giffard) (BPBM); 2M, 6F, Kilauea,



Figs. 47–49. *Sarona* male genitalia. **Fig. 47.** *S. lissochorium*, n. sp., male genitalia. **A**, Right paramere, lateral view. **B**, Left paramere, lateral view. **C**, Genital capsule, dorsal view. **D**, Right paramere, dorsal view. **Fig. 48.** *S. makua*, n. sp., male genitalia. **A**, Right paramere, lateral view. **B**, Left paramere, lateral view. **C**, Genital capsule, dorsal view. **Fig. 49.** *S. mamaki*, n. sp., male genitalia. **A**, Right paramere, lateral view. **B**, Left paramere, lateral view. **C**, Genital capsule, dorsal view.

4000 ft, 27.VII.1920 (W.M. Giffard) (BPBM); 4F, Kilauea, 1220 m (4000 ft), 11.I.1917 (W.M. Giffard) (BPBM); 1M, 1F, Kilauea, Crater Rd, 1159 m (3800 ft), 11.IX.1919 (D.T. Fullaway) (BPBM); 5M, 2F, Kipuka Puaulu, 1220 m (4000 ft), 29.XI.1968, ex *Pipturus* (W.C. Gagné) (BPBM); 1M, Kipuka Puaulu, 1220 m (4000 ft), 24.VI.1966, ex *Pipturus* (W.C. Gagné) (BPBM); 10M, 10F, Kipuka Puaulu, 1220 m (4000 ft), 24.VI.1966 (J.W. Beardsley) (BPBM); 2M, Kipuka Puaulu, 6.VI.1947, ex *Pipturus* (O.H. Swezey) (HDA); 4F, Kohala Mts, upper Hamakua Ditch Trail, 4.XII.1968, ex *Pipturus* (W.C. Gagné) (BPBM); 1F, Kohala Mts, Upper Hamakua Ditch Trail, 5.IX.1919, ex *Pipturus* (O.H. Swezey) (HDA); 1M, Kohala Mts, 24.V.1917 (O.H. Swezey) (HDA); 3M, Kulani Rd, 1586 m (5200 ft), VII.1952 (D.E. Hardy) (BPBM); 2M, 1F, Kulani Rd, 29.V.1949, ex *Pipturus* (O.H. Swezey) (HDA); 3F, Kulani Rd, 17.VIII.1952, ex *Pipturus* (E.C. Zimmerman) (BPBM); 1F, Mauna Loa, Truck Trail, 1373 m (4500 ft), 14.VIII.1958, ex *Pipturus* (J.W. Beardsley) (BPBM); 1M, Nauhi Gulch, 1525–1830 m (5000–6000 ft), 2.X.1931, ex ohia lehua (Swezey & Williams) (HDA); 1F, Nauhi Gulch, 1525–1830 m (5000–6000 ft), 3.X.1931, ex *Pipturus* (Swezey & Williams) (BPBM); 1M, Upper Olaa Forest Reserve, VIII.1952 (W.C. Mitchell) (UH); 1M, 1F, Olaa, 25 miles, 915 m (3000 ft), 8.IX.1917 (W.M. Giffard) (BPBM); 1M, Olaa, 23 miles, 702 m (2300 ft), 9.IX.1919 (D.T. Fullaway) (BPBM); 1F, Olaa Forest Reserve, Wright Rd., 26.VI.1978 (BPBM); 4M, 1F, Olaa Forest Reserve, Wright Rd., 4.XII.1968, ex *Pipturus* (W.C. Gagné) (BPBM); 1M, Pohakuloa, 15.VII.1954 (J.W. Beardsley) (HDA); 4M, 3F, Volcanoes National Park, Kilauea Iki, 28.VII.1991, ex *Pipturus* (A. Asquith) (BPBM); 1F, Waiakea, Puu Makaala, near lava tube, 1250 m, 16.VIII.1977 (F.G. Howarth & G.K. Uchida) (BPBM); 3M, Waikoloa Stream, above Waimea, 702 m (3200 ft), 2.XII.1968, ex *Pipturus* (W.C. Gagné) (BPBM).

Host plant. *Pipturus albidus* (Hook. & Arnott) A. Gray (Urticaceae).

Remarks. *Sarona mamaki* exhibits extensive color variation, from solid dark, to very light bicolored individuals. This species is very similar to and sympatric with *hamakua*, but the latter species breeds on *Myrsine*. *Sarona mamaki* has been collected throughout the year, but 75% of collection records are from June to September.

Etymology. Named for the Hawaiian term for its host plant, *mamaki*.

Sarona maui Asquith, **new species** Figs. 50, 90, 130

Diagnosis. Occurs only on East Maui. Similar to *haleakala* and *pusilla* n. sp. in its fusiform second antennal segment, and two types of dorsal pubescence. Distinguished from *haleakala* by its decumbent, rather than erect simple setae on the dorsum, and its more vertically angled head. Distinguished from *pusilla* n. sp. by its larger size (> 2.0 mm), and its entire, unabbreviated distal half of the right paramere (Fig. 50a).

Description. MALE. Small species, tylus-cuneus length 2.06–2.28 mm; pronotal width 1.16–1.27 mm. Head moderately vertical; posterior margin of head weakly carinate; frons weakly and broadly convex; tylus weakly convex, sharply angled distally; jugum width less than tylus width; antennal segment I greatly surpassing apex of tylus; antennal segment II distinctly fusiform. Antennal segment II-head width ratio 0.88–0.94. Apex of rostrum just reaching metacoxae.

Dorsal surface covered with short, inclined, brown, simple setae, and short, decumbent, silvery, sericeous setae. Dorsal coloration uniform dark brown to black. Head yellowish brown to reddish brown; frons and tylus fuscous. Antennae dark brown; segments II and III infuscated distally; proximal halves of segments III and IV yellow to yellowish brown (Fig. 130). Venter castaneous; margins of thoracic pleura, and all of peritreme pale. Legs reddish brown; coxae and femora apically, and all of tibiae yellowish.

Right paramere short, strongly acuminate distally and weakly curved medially (Fig. 50a); basal arm well developed, dentate, oriented medially (Fig. 50d). Left paramere only weakly curved apically; basal angle narrowly cylindrical (Fig. 50b). Tergal process long, narrow, oriented mesally; short secondary process present on left side of genital capsule (Fig. 50c). Spicula short, reduced and

evenly tapered distally; apex of flange not developed (Fig. 90).

FEMALE. Tylus-cuneus length 2.28–2.52 mm; pronotal width 1.04–1.06 mm. Antennal segment II-head width ratio 0.84–0.90. Dorsal coloration yellowish brown; most of scutellum, anterior 1/2 of pronotum and head yellow. Antennae similar to male; basal 1/2 of segment II lighter yellow (Fig. 130).

Type material. Holotype M, MAUI: Waikamoi Stream, 1312 m (4300 ft), 6.VIII.1968, ex *Pipturus* (W.C. Gagné) (BPBM). 22M, 15F paratypes, same data as holotype (BPBM).

Other specimens examined. MAUI: 1M, E Maui, Kipauhlu Valley, Camp 2, 1250 m, 18-20.VIII.1967 (N. Wilson) (BPBM); 2M, 1F, E Maui, Waikamoi Stream, 1220 m (4000 ft), 19.VIII.1965 (C.M. Yoshimoto) (BPBM).

Host plant. *Pipturus* sp. (Urticaceae).

Remarks. This species is known only from East Maui. The related *Pipturus* feeding species, *pusilla* n. sp., also occurs on East Maui, but is known only from drier areas on the south side of the island, whereas *maui* inhabits moist, rainforest habitats.

Etymology. Named for *Maui*, the demigod and trickster of Hawaiian mythology.

Sarona mokihana Asquith, **new species** Figs. 51, 91, 131

Diagnosis. Occurs only on the island of Kauai. Recognized by its uniform yellow coloration, strongly vertical head, and short, abbreviated, right paramere (Fig. 51a). *Sarona hiiaka* and *laka* are also predominantly yellow in coloration; *hiiaka* differs from *mokihana* by always having brown on the thoracic pleura, and light brown bands on the femora, and the rostrum reaching the abdomen; *laka* has a longer antennal segment II, the rostrum reaches past the metacoxae, and the right paramere is distinctly C-shaped.

Description. MALE. Moderate sized species, tylus-cuneus length 2.22–2.32 mm; pronotal width 1.32–1.40 mm. Head strongly vertical; frons flat to weakly convex; tylus flat, weakly curved distally; jugum width less than tylus width; antennal segment I just surpassing apex of tylus. Antennal segment II-head width ratio 1.03–1.08. Apex of rostrum reaching metacoxae.

Dorsal surface densely covered with short, inclined, yellowish brown, simple setae. Dorsal coloration uniform yellow to light yellowish brown; cuneal fracture, apex of cuneus, and most of membrane infuscated. Head uniform yellow to light yellowish brown; sutures occasionally weakly infuscated. Antennal segment I yellow to dark brown, particularly on ventral surface; segment II yellow, distal third fuscous; segments III and IV fuscous (Fig. 131). Venter uniform yellow. Coxae and femora yellow; tibiae yellowish white.

Right paramere short, with ventral arm strongly abbreviated; basal arm sinuous, tapered, oriented dorsomesally (Fig. 51d). Left paramere evenly tapered and curved distally; basal angle oriented medially (Fig. 51b). Posteroventral margin of genital capsule strongly acuminate; tergal process absent (Fig. 51c). Spicula elongate, very narrow; strongly sinuous; apex of flange not developed (Fig. 91).

FEMALE. Tylus-cuneus length 2.39–2.50 mm; pronotal width 1.42–1.45 mm. Antennal segment II-head width ratio 0.96–1.00. Coloration similar to male; antennal segment II fuscous only on distal fourth (Fig. 131).

Type material. Holotype M, KAUAI: Alakai Swamp Trail, 24.V.1991, ex *Pelea anisata* (A. Asquith) (BPBM): 7M, 4F paratypes, same data as holotype (BPBM).

Other specimens examined. KAUAI: 1M, Alakai Swamp Trail, VII–VIII.1991, ex pitfall trap, (A. Asquith) (BPBM); 1M, 1F, Alakai Swamp Trail, 25.VII.1991, ex *Pelea anisata* (Asquith) (BPBM); 1M, Alakai Swamp, Pihea Trail, 1200 m, 22.VI.1980, ex *Pelea barbigera* (W.C. Gagné) (BPBM); 3M, 2F, Alakai Swamp Trail, 10.V.1991, ex *Pelea* (Asquith) (BPBM); 2M, 2F, Kokee, Kawaikoi Stream Trail, 10.VIII.1991, ex *Pelea anisata* (Asquith) (BPBM); 1M, North Alakai Swamp, 22.VII.1968 (P.D. Ashlock) (BPBM); 1M, Kokee, Alakai Trail, 13.X.1990, ex *Pelea* (Asquith) (BPBM); 2M, Kokee St. Pk., Mohihi Rd. Jnct., III–IV.1992, ex malaise trap (Asquith) (BPBM).

Host plant. *Melicope* (= *Pelea*) *anisata* (H. Mann) T. Hartley & B. Stone (Rutaceae).

Remarks. This species is found in wet to mesic forests on the Alakai Plateau. Although the data are not presented, this is one of the more volant species of *Sarona*, as it was frequently caught in Malaise traps. It was also frequently recovered from methyl eugenol-baited bucket traps used for Oriental fruit fly (*Bactrocera dorsalis* (Hendel)) detection and control. Methyl eugenol is a known constituent of its host plant, *Melicope anisata* (Scheueer & Hudgins, 1964).

Etymology. Named for the Hawaiian term for its host plant, *mokihana.*

Sarona myoporicola Asquith, **new species** Figs. 52, 92, 132

Diagnosis. Occurs only on the island of Hawaii. Recognized by its dark castaneous to black coloration. *Sarona kau* is also uniformly dark in color but has distinctly arcuate hemelytral margins, and the second antennal segment is shorter than the width of the head.

Description. MALE. Moderate sized species, tylus-cuneus length 2.39–2.50 mm; pronotal width 1.38–1.50 mm. Head strongly vertical; frons weakly convex laterally; tylus weakly convex laterally, strongly but smoothly curved distally; jugum width less than tylus width; antennal segment I surpassing apex of tylus. Antennal segment II-head width ratio 1.05–1.10. Apex of rostrum reaching or just surpassing metacoxae.

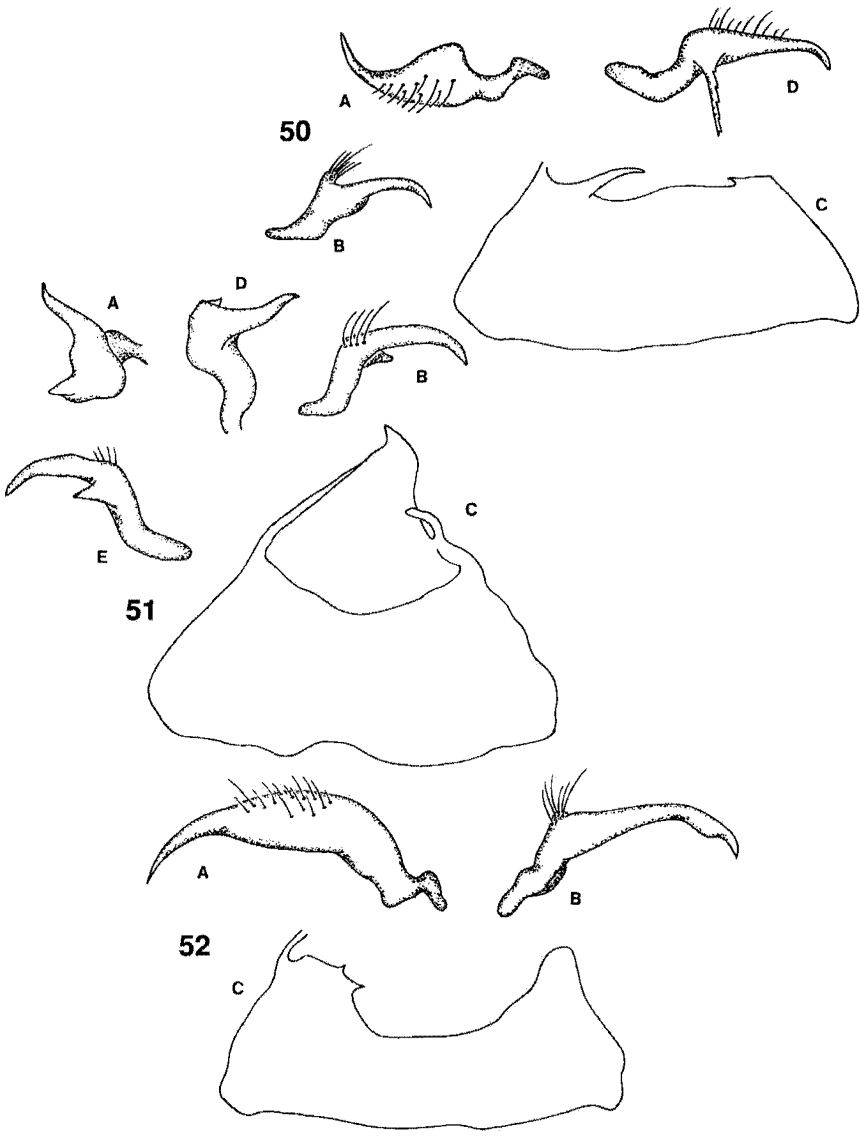
Dorsal surface densely covered with long, decumbent, pale to brown, simple setae. Dorsal coloration uniform dark castaneous to black; apex of scutellum frequently yellowish brown. Head light to dark castaneous; vertex usually lighter; lora and gena yellow to yellowish brown. Antennae fuscous; middle third of segment II occasionally yellow (Fig. 132). Venter castaneous; margins of thoracic pleura pale. Legs yellow, bases of coxae and distal third of femora brown.

Right paramere with distal third strongly but even tapered, weakly curved ventromesally (Fig. 52a). Left paramere with preapical swelling; basal angle weakly developed (Fig. 52b). Tergal process reduced to two short teeth (Fig. 52c). Spicula short, strongly tapered distally; apex of flange weakly produced as a short, rounded process (Fig. 92).

FEMALE. Tylus-cuneus length 2.61–2.78 mm; pronotal width 1.48–1.56 mm. Antennal segment II-head width ratio 0.91–0.98. Color similar to male but lighter; antennal segments II and III infuscated only distally (Fig. 132).

Type material. Holotype M, HAWAII: Mauna Kea, Ahumoa, 2134 m, 9.VII.1980, ex *Myoporum sandwicense* (W.C. Gagné) (BPBM). 19M, 10F paratypes, same data as holotype (BPBM).

Other specimens examined. HAWAII: 14M, 13F, Ahumoa Crater, 1983 m (6500 ft), 21.VI.1966, ex *Myoporum* (J.W. Beardsley) (BPBM); 1F, Mt Hualalai, 27.VI.1966 (Beardsley) (BPBM); 1M, 1F, Mt Hualalai, above Captain Cook, 1220 m (4000 ft), 12.V.1959 (S. Kimoto) (BPBM); 6M, 7F, Hualalai, W side, 1829 m, 26.V.1971, ex *Myoporum* (W.C. Gagné) (BPBM); 1M, 2F, near Humuula 1–3.VII.1946, ex *Myoporum* (E.C. Zimmerman) (HDA); 13M, 14F, Humuula, 31.VII-5.VIII.1935, ex *Myoporum* (R.L. Usinger) (BPBM); 3M, slope above Humuula, 3050 m (10,000 ft), 2.VIII.1935 (Usinger) (BPBM); 3M, 3F Kilauea, 27.VI.1917, ex *Myoporum* (O.H. Swezey) (BPBM); 1F, Kilauea, Kipuka, 5.VII.1934, ex *Myoporum* (Swezey) (BPBM); 2M, 1F, Kilauea, Crater Rd, 1159 m (3800 ft), 11.IX.1919 (W.M. Giffard) (BPBM); 1M, Kilauea, 1220 m (4000 ft), 19.I.1917 (Giffard & F. Muir) (BPBM); 2M, 2F, Kilauea, 29 mi, 28.VIII.1915 (Giffard) (BPBM); 1M, 2F, Kipuka Ki, 4.VI.1947, ex *Myoporum* (Swezey) (HDA); 7M, 6F, west slope of Mauna Kea, near Puu Laalaau, 2315 m, 26.I.1992, ex *Myoporum sandwicense* (D. Preston & D.A. Polhemus) (BPBM); 10M, 14F, Puu Nana, W slope of Mauna Kea, 2440 m (8000 ft), 25.XII.1990, ex *Myoporum sandwicense* (A. Asquith) (BPBM); 26M, 24F, Pohakuloa, 1952 m (6400 ft), 21.VI.1966 (Beardsley) (BPBM); 7M, 13F, Pohakuloa, 1800 m, 1.I.1968, ex *Myoporum* (Gagné) (BPBM); 1M, Pohakuloa, XII.1950 (N.L.H. Krauss) (HDA); 2M, 2F, Saddle Road at Pohakuloa, 1829 m, 10.I.1971, ex *Myoporum* (Gagné) (BPBM); 1M, Saddle Road, 1525 m (5000 ft), 15.V.1959



Figs. 50–52. *Sarona* male genitalia. **Fig. 50.** *S. maui*, n. sp., male genitalia. **A**, Right paramere, lateral view. **B**, Left paramere, lateral view. **C**, Genital capsule, dorsal view. **D**, Right paramere, medial view. **Fig. 51.** *S. mokihana*, n. sp., male genitalia. **A**, Right paramere, lateral view. **B**, Left paramere, lateral view. **C**, Genital capsule, dorsal view. **D**, Right paramere, dorsal view, **E**, Left paramere, medial view. **Fig. 52.** *S. myoporicola*, n. sp., male genitalia. **A**, Right paramere, lateral view. **B**, Left paramere, lateral view. **C**, Genital capsule, dorsal view.

(S. Kimoto) (BPBM); 1M, 1F, Puu Uhuluhulu, 30.VII.1935 (E.H. Bryan) (HDA).

Host plant. *Myoporum sandwicense* A. Gray (Myoporaceae).

Remarks. This species has been collected from 900–3000 m, on Mauna Kea, Mauna Loa and Hualalai. It has been taken throughout the year, but 70% of collection records are from May to August.

Etymology. Named for its host plant *Myoporum sandwicense*.

Sarona oahuensis Asquith, **new species** Figs. 53, 94, 133

Diagnosis. Occurs only on the island of Oahu. Recognized by its small, C- or L-shaped right paramere (Fig. 53a), enlarged and exposed mesoscutum, and its dark scutellum with a conspicuous white apex. Most similar to *kohana* in its small, C-shaped right paramere; distinguished from this species by the sharply acuminate arms of the right paramere (Fig. 53a), strongly reduced tergal process (Fig. 53c), and bicolored scutellum.

Description. MALE. Large species, tylus-cuneus length 2.52 mm; pronotal width 1.48 mm. Head strongly vertical; frons flat; tylus flat, sharply curved distally; jugum width greater than or equal to tylus width; antennal segment I surpassing apex of tylus. Antennal segment II-head width ratio 1.16. Apex of rostrum surpassing metacoxae. Mesoscutum enlarged and conspicuous.

Dorsal surface sparsely covered with short, decumbent, yellow, simple setae. Dorsal coloration variegated; hemelytra light yellowish brown, variably infuscated, from only distal portions to predominantly fuscous; scutellum dark brown, apex, or occasionally medial stripe white; mesoscutum brown medially, yellowish white laterally; pronotum yellow. Head yellow, weakly tinged with red; margins and apices of juga and lora infuscated. Antennae brown; segment I yellow basally and apically; segment II with broad yellow band on basal half; segment III yellow basally (Fig. 133). Venter yellow; thoracic pleura and lateral aspect of abdomen suffused with brown; posterior half of peritreme white. Legs yellow; femora with faint indications of transverse, brown bands distally.

Right paramere small, C-shaped; arms of equal length, apices sharply acuminate; apex of ventral arm curved dorsally (Fig. 53a). Left paramere straight, weakly constricted near middle; apex weakly curved; basal angle poorly developed (Fig. 53b). Tergal process reduced to short tooth (Fig. 53c). Spicula elongate, weakly sinuous, evenly tapered distally; apex of flange well developed as a short, sinuous, acuminate arm (Fig. 94).

FEMALE. Tylus-cuneus length 2.61–2.70 mm; pronotal width 1.50–1.61 mm. Antennal segment II-head width ratio 1.09–1.23. Color similar to male; antennal segment II fuscous at apex only (Fig. 133).

Type material. Holotype M, OAHU: Mt Kaala, 4000 ft, 29.XII.1968, ex *Coprosma* (W.C. Gagné) (BPBM).

Other specimens examined. 1F, Mt Kaala, 1200 m, 18.VIII.1968 (W.C. Gagné) (BPBM); 1F 1 nymph, Mt Kaala, summit, 28.IV.1991, ex *Pelea* sp. (A. Asquith) (BPBM); 1F, Waianae Mountains, Kanehoa Trl., 729m, 3.V.1980, ex *Pelea clusiifolia* (Gagné) (BPBM).

Host plant. *Melicope* (= *Pelea*) sp. (Rutaceae).

Remarks. This species is known only from the Waianae Mountains.

Etymology. Named for the island on which it occurs, Oahu.

Sarona oloa Asquith, **new species** Figs. 20, 54, 93, 134

Diagnosis. Occurs only on the island of Oahu. Distinguished from all other Oahu species by its enlarged second antennal segment (Fig. 20), and two types of dorsal pubescence. Distinguished from similar species on Maui Nui by its large size, and thicker right paramere with an edentate basal arm (Fig. 54a). *Sarona haleakala* also has an edentate basal arm on the right paramere, but is easily distinguished by its uniform coloration, and long, erect, simple setae.

Description. MALE. Moderate sized species, tylus-cuneus length 2.26 mm; pronotal width 1.23 mm. Lateral margins of hemelytra weakly arcuate. Head obliquely angled; frons broad, weakly convex; tylus flat to weakly convex, strongly curved distally; jugum width much less than tylus width; antennal segment I surpassing apex of tylus. Antennal segments I and II distinctly incrassate; antennal segment II-head width ratio 0.98. Apex of rostrum just reaching metacoxae.

Dorsal surface densely covered with short, inclined, yellowish brown, simple setae, and short, decumbent, silvery, sericeous setae. Dorsal coloration dark castaneous to black; broad areas bordering veins on hemelytra, distal half of scutellum, and margins and medial spot on pronotum yellow. Head yellow; medial area of vertex, two spots on medial borders of eyes, and two broad stripes on frons fuscous. Antennal segment I yellow, base and ventral surface fuscous; segment II yellow, distal half infuscated; segments III and IV yellow on basal halves, fuscous on distal halves (Fig. 134). Thoracic pleura castaneous, margins light yellow. Venter yellowish brown. Legs yellow; apices of coxae, and transverse, basal band and apical spots on anterior and posterior surfaces of femora fuscous.

Right paramere short, strongly acuminate distally, weakly curved medially; basal arm well developed, entire, oriented medially (Fig. 54a). Left paramere almost straight, only weakly curved apically; basal angle thick, cylindrical (Fig. 54b). Two tergal processes present; right tergal process well developed, oriented and curved mesally; left process a short, broad tooth (Fig. 54c). Spicula short, straight distally; apex of flange reduced to a smooth, obtuse angle (Fig. 93).

FEMALE. Tylus-cuneus length 2.39–2.48 mm; pronotal width 1.27–1.28 mm. Antennal segment II-head width ratio 0.80–0.89. Broader and lighter in coloration than male; antennae as in Fig. 134.

Type material. Holotype M, OAHU: Waianae Mts, Kaluaa Gulch ?, 700 m, 5.VII.1981, ex *Neraudia melastomifolia* (W.C. Gagné) (BPBM). 4F paratypes, same data as holotype (BPBM).

Host plant. *Neraudia melastomifolia* Gaud. (Urticaceae).

Remarks. This species is known only from the Waianae Mountains.

Etymology. Named for the Hawaiian term for its host plant, *oloa.*

Sarona palolo Asquith, **new species** Figs. 55, 95, 135

Diagnosis. Occurs only on the island of Oahu. Recognized by the long, erect setae on the dorsum, and its long, cylindrical right paramere with a furcate apex (Fig. 55a). *Sarona hie* also has a long, furcate right paramere, but has short, decumbent, dorsal setae, and three tergal processes.

Description. MALE. Small species, tylus-cuneus length 2.18 mm; pronotal width 1.23 mm. Head moderately vertical; frons moderately convex; tylus weakly convex, weakly but abruptly curved distally; jugum width greater than or equal to tylus width; antennal segment I just surpassing apex of tylus. Antennal segment II-head width ratio 1.17. Apex of rostrum just surpassing metacoxae.

Dorsal surface covered with long, semierect to erect, yellowish, simple setae. Dorsal coloration uniform yellow; membrane weakly infuscated, particularly veins. Head uniformly yellow. Antennal segment I yellow, infuscated on distoventral surface; segment II yellow, distal half fuscous; segment III fuscous (Fig. 135). Venter yellow; peritreme white. Legs yellow.

Right paramere long, cylindrical, apex furcate; basal arm long, oriented distomedially (Fig. 55a). Left paramere very short, thick, only weakly curved ventrally; basal angle not developed (Fig. 55b). Tergal process reduced to a broad, rounded protuberance (Fig. 55c) Spicula narrow, elongate, sinuous, unmodified distally; apex of flange developed as a short, thick, digitiform process (Fig. 95).

FEMALE. Tylus-cuneus length 2.41 mm; pronotal width 1.44 mm. Antennal segment II-head width ratio 1.08. Coloration similar to male; antennal segment II fuscous only at extreme apex; segment III yellow basally.

Type material. Holotype M, OAHU: Palolo, 550 m (1800 ft) (D.T. Fullaway) (BPBM).

Other specimens examined. OAHU: 1F, Mt Kaala, 18.V.1920 (O.H. Swezey) (HDA).

Host plant. Unknown.

Remarks. This species is known from both the southern leeward Koolau and the Waianae mountain ranges.

Etymology. Named for locality where the holotype was collected, Palolo.

Sarona pittospori Asquith, **new species** Figs. 56, 96, 136

Diagnosis. Occurs only on the island of Hawaii. Recognized by the arcuate margins of the hemelytra, and the absence of dark spots at the bases of the tibial spines.

Description. MALE. Small species, tylus-cuneus length 1.85–2.15 mm; frontal width 1.16–1.27 mm. Head strongly vertical; frons and tylus convex; tylus weakly and smoothly curved distally; jugum width less than tylus width; antennal segment I just surpassing apex of tylus. Antennal segment II-head width ratio 1.00–1.07. Apex of rostrum reaching well past metacoxae.

Dorsum densely covered with moderately long, decumbent, pale, simple setae. Dorsal coloration castaneous; area between calli, distal third of scutellum, and lateral half of cuneus dark yellow. Head yellowish brown to castaneous; posterior margin of vertex yellow; apices of juga and tylus occasionally yellow. Antennae pale yellow; apices of all segments infuscated (Fig. 136). Venter dark brown; ventral margins of pleura and posterior half of ostiolar peritreme pale. Legs yellow; coxae and broad, transverse band on all femora usually light brown; tibiae lacking dark spots at the bases of spines, spines pale yellow.

Right paramere cylindrical, weakly tapered and ventrally serrate distally (Fig. 56a). Left paramere with preapical swelling; basal angle not developed (Fig. 56b). Genital capsule with a long, curved tergal process just right of midline (Fig. 56c). Spicula shortened and strongly tapered distally; apex of flange produced as a short, rounded process (Fig. 96).

FEMALE. Tylus-cuneus length 2.00–2.25 mm; pronotal width 1.25–1.38 mm. Antennal segment II-head width ratio 0.91–0.99. Coloration lighter than male; dorsum light yellowish brown; disk of pronotum and tylus castaneous; antennal segment II entirely yellow (Fig. 136).

Type material. Holotype M, HAWAII: Honomalino, South Kona District, 670 m, 9.VIII.1981, ex *Pittosporum* (W.C. Gagné) (BPBM). 12M, 5F paratypes, same data as holotype (BPBM).

Other specimens examined. HAWAII: 1M, 8F Puu Waawaa, North Kona, 1129 m (3700 ft), 24–25.VIII.1917 (W.M. Giffard) (BPBM).

Host plant. *Pittosporum* sp. (Pittosporaceae).

Remarks. This species is known only from leeward Hawaii.

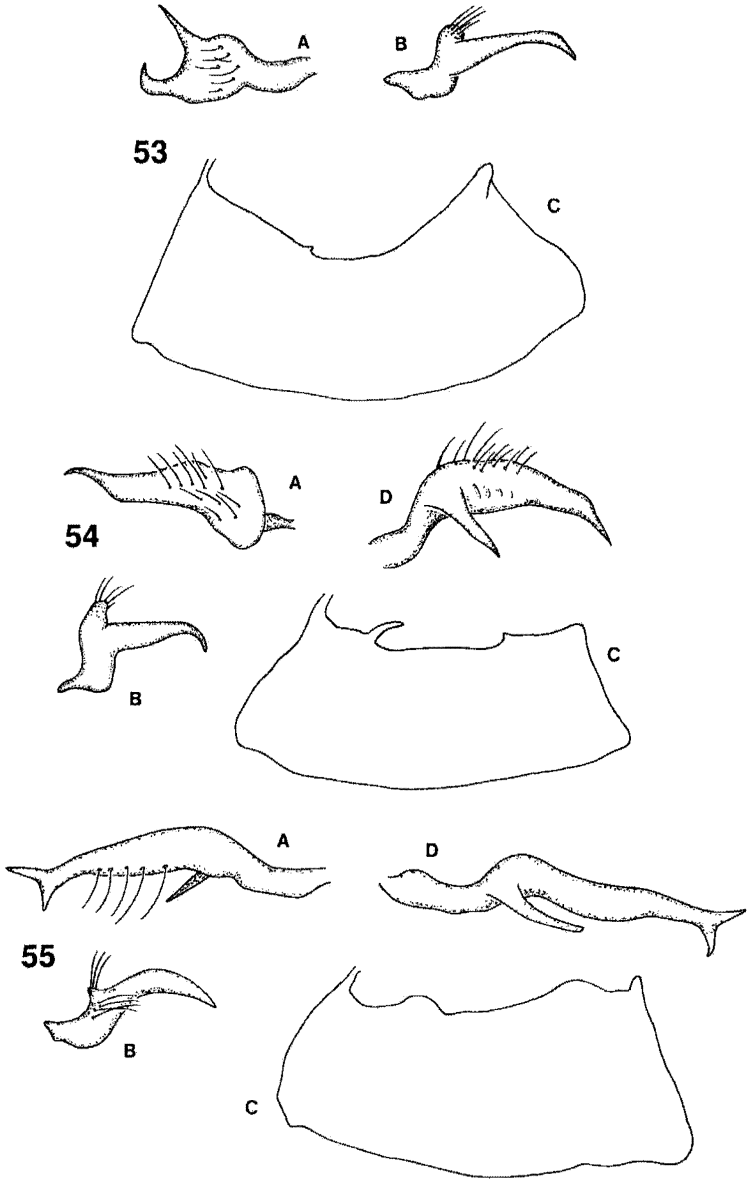
Etymology. Named for the genus of its host plant, *Pittosporum*.

Sarona pookoi Asquith, **new species** Figs. 58, 98, 138

Diagnosis. Occurs only on the island of Molokai. Similar to *Sarona adonias* in its C-shaped right paramere; distinguished from this species by its smaller size (< 3.0 mm), its smaller, narrower right paramere (Fig. 57a), and reduced tergal process (Fig. 57c).

Description. MALE. Moderate sized species, tylus-cuneus length 2.61–2.65 mm; pronotal width 1.44–1.48 mm. Head weakly vertical; posterior margin weakly carinate; frons weakly convex; tylus flat to weakly convex, strongly but smoothly curved distally; jugum width less than or equal to tylus width; antennal segment I surpassing apex of tylus. Antennal segment II-head width ratio 1.16–1.26. Apex of rostrum just surpassing metacoxae.

Dorsal surface sparsely covered with moderately long, decumbent, yellowish, simple setae. Dorsal coloration reddish brown; basal half of cuneus, apex of scutellum, lateral margins of mesoscutum, lateral margins of pronotum, and occasionally midstripe on pronotum yellow. Head reddish brown; posterior margin of vertex, medial borders of eyes, and apex of tylus yellow. Antennal segment I yellowish dorsally, reddish brown ventrally; segment II reddish brown; darker distally, mid-



Figs. 53–55. *Sarona* male genitalia. **Fig. 53.** *S. oahuensis*, n. sp., male genitalia. **A**, Right paramere, lateral view. **B**, Left paramere, lateral view. **C**, Genital capsule, dorsal view. **Fig. 54.** *S. oloa*, n. sp., male genitalia. **A**, Right paramere, lateral view. **B**, Left paramere, lateral view. **C**, Genital capsule, dorsal view. **D**, Right paramere, medial view. **Fig. 55.** *S. palolo*, n. sp., male genitalia. **A**, Right paramere, lateral view. **B**, Left paramere, lateral view. **C**, Genital capsule, dorsal view. **D**, Right paramere, medial view.

dle third yellow; segments III and IV reddish brown; proximal half of segment III yellow (Fig. 137). Venter yellow to reddish brown; posterior margins of thoracic pleura pale. Legs yellow to reddish brown; apices of femora darker; tibiae lighter.

Right paramere short, C-shaped; both arms short, equal in length (Fig. 57a). Left paramere long, narrow, strongly curved distally; basal angle not developed (Fig. 57b). Tergal process reduced to short, dentate bump (Fig. 57c). Spicula reduced and extremely narrowed distally; apex of flange short, narrowly convex, indistinct (Fig. 97).

FEMALE. Unknown.

Type material. Holotype M, MOLOKAI: Kawela Gulch, 1068–1144 m, 8-10.VII.1968 (W.C. Gagné) (BPBM).

Other specimens examined. MOLOKAI: 1M, above Waikolu Valley, 1400 m, 30.IV.1955 (E.J. Ford Jr.) (HDA).

Host plant. Unknown.

Remarks. This species is most similar to *Sarona dakine* on Maui based on the short, C-shaped right paramere, long rostrum and similar coloration.

Etymology. Named from the Hawaiian, *pookoi* (malevolent sorcerer), in reference to the island where it is found, Molokai, being renowned for the practice of black magic.

Sarona pusilla Asquith, **new species** Figs. 58, 98, 138

Diagnosis. Occurs on East and West Maui. Similar to *Sarona haleakala* and *Sarona maui* in its fusiform second antennal segment, and two types of dorsal pubescence. Distinguished from *haleakala* by its inclined, rather than erect, simple setae on the dorsum, and its more vertically angled head. Distinguished from *maui* by its smaller size (<2.0 mm), and the abbreviated, distal half of the right paramere (Fig. 58a).

Description. MALE. Very small species, tylus-cuneus length 1.77–1.90 mm; pronotal width 1.06–1.10 mm. Head strongly vertical; frons moderately convex; tylus convex, sharply and strongly curved distally; jugum width equal to tylus width; antennal segment I greatly surpassing apex of tylus; antennal segment II distinctly fusiform. Antennal segment II-head width ratio 0.88–0.90. Apex of rostrum just surpassing metacoxae.

Dorsal surface covered with short, inclined, light brown, simple setae, and short, decumbent, pale, sericeous setae. Dorsal coloration uniform castaneous to black; apex of scutellum occasionally yellow. Head yellow; two lateral spots on frons, and tylus variably infuscated. Antennae dark brown; segments II and III infuscated distally; proximal halves of segments III and IV yellow (Fig. 138). Venter brown; margins of thoracic pleura cream colored, peritreme pale. Legs reddish brown; apices of femora, and all of tibiae yellowish.

Right paramere short, abbreviated distally (Fig. 58a); basal arm well developed, dentate, oriented medially (Fig. 58d). Left paramere almost straight, only weakly curved distally; basal angle narrowly cylindrical (Fig. 58b). Tergal process short, narrow, oriented mesally; short, secondary process present on left side of genital capsule (Fig. 58c). Spicula short, strongly reduced and evenly tapered distally; apex of flange not developed (Fig. 98).

FEMALE. Tylus-cuneus length 1.75–2.04 mm; pronotal width 1.13–1.19 mm. Antennal segment II-head width ratio 0.81–0.94. Much lighter than male; dorsal coloration yellow, mottled with dark brown. Antennae similar to male; basal half of segment II lighter yellow (Fig. 138). Venter and legs yellow.

Type material. Holotype M, MAUI: E Maui, Kaupo Gap, E side, 1320 m, 21.IV. 1971, ex *Pipturus* (W.C.Gagné)(BPBM). 14M, 11F paratypes, same data as holotype (BPBM).

Other specimens examined. MAUI: 1M, 8F, Auwahi, 27.VIII.1965 (P.D. Ashlock) (BPBM); 1M, ridge above Haelaau ?, 915–1007 m (3000–3300 ft), 21.XII.1928 (E.H. Bryan) (HDA); 2M, 1F, W Maui, Kaulalewelewe-Puu Kukui Trail, 915–1037 m, 8.VIII.1968, ex *Pipturus* (W.C. Gagné)

(BPBM); 3M, 2F, W Maui, Olowalu Canyon, 366 m, 19.IV.1971, ex *Pipturus* (Gagné) (BPBM).

Host plant. *Pipturus* (Urticaceae).

Remarks. This species is known from both East and West Maui. It occurs in more xeric habitats than *Sarona maui*, the related *Pipturus* feeding species on Maui.

Etymology. Named from the Latin, *pusilla* (very small), in reference to its small size.

Sarona saltator Asquith, **new species** Figs. 21, 59, 99, 139

Diagnosis. Occurs only on the island of Kauai. Recognized by its castaneous to black coloration (Fig. 21), strongly vertical head, and elongate, ventrally curved right paramere (Fig. 59a). The only other species on Kauai with similar coloration is *annae*, which can be distinguished by its two types of dorsal pubescence, and obliquely angled head. *Sarona akoko* may occasionally be dark brown in color, but it is much smaller (< 2.0 mm) than *saltator*. Teneral specimens of *saltator* may be yellowish brown and resemble *hiiaka* and *makua* in color; the latter species however, never have the femora predominantly brown as in *saltator*.

Description. MALE. Moderate sized species, tylus-cuneus length 2.27–2.52 mm; pronotal width 1.33–1.48 mm. Head strongly vertical; frons moderately to strongly convex; tylus moderately convex, straight or weakly curved distally; jugum width less than tylus width; antennal segment I just surpassing apex of tylus. Antennal segment II-head width ratio 1.09–1.14. Apex of rostrum just surpassing metacoxae.

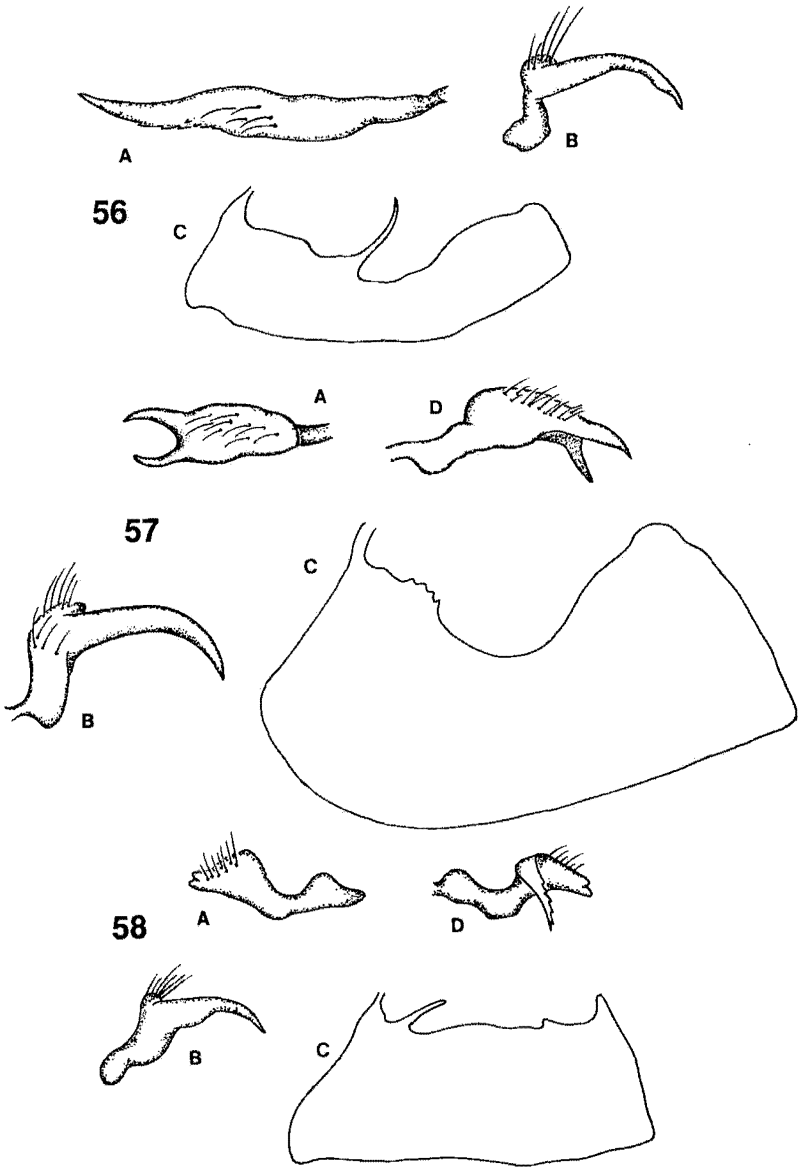
Dorsal surface densely covered with short, inclined, yellow to brown, simple setae. Dorsal coloration uniform brown to black; teneral specimens may be yellowish brown; apex of scutellum and spot on cuneus occasionally pale; membrane infuscated. Head dark yellowish brown to castaneous; tylus usually black. Antennal segment I brown; segment II yellow to yellowish brown, distal 1/4 to third fuscous; segments III–IV fuscous (Fig. 139). Venter yellowish brown to castaneous; posterior margins of thoracic pleura, posterior 1/2 of peritreme, and mesal area of abdomen yellowish. Legs brown to castaneous; apices of coxae, and bases and apices of femora usually yellowish; tibiae yellow.

Right paramere elongate, weakly flattened laterally, apex curved ventrally (Fig. 59a); basal arm absent. Left paramere narrow, strongly curved distally; basal angle strongly developed as a thick, erect process (Fig. 59b). Tergal process long, arising from near lateral margin of genital capsule, apex abruptly bent mesally (Fig. 59c). Spicula elongate, very narrow; strongly sinuous; apex of flange not developed (Fig. 99).

FEMALE. Tylus-cuneus length 2.52–2.80 mm; pronotal width 1.42–1.59 mm. Antennal segment II-head width ratio 1.02–1.08. Coloration lighter than male; yellowish brown to brown; base of scutellum, distal areas of clavus and corium, and apex of cuneus infuscated; midstripe on scutellum, and base of cuneus distinctly lighter than background color. Antennae similar to male (Fig. 139). Patches of flattened, scale-like setae present on either side of ovipositor, but usually not black as in *hiiaka*.

Type material. Holotype M, KAUAI: Waialae Cabin, 30.VI.92, ex *Melicope clusiifolia* (A. Asquith) (BPBM); 5M, 10F paratypes, same data as holotype (BPBM).

Other specimens examined. KAUAI: 1M, 3F, Alakai Swamp Trail, 19.IX.1991, ex *Pelea* (A. Asquith) (BPBM); 1M, Alakai Swamp, 21.VII.1921 (J.W. Beardsley) (BPBM); 1M, Alakai Swamp, Pihea Trail, 1200 m, 22.VI.1980, ex *Pelea barbigera* (W.C. Gagné) (BPBM); 1M, 2F, Alakai Swamp Trail, Waineke Swamp, 1062 m, 22–25.VII.1968 (Gagné) (BPBM); 3M, 3F, Alakai Swamp Trail, 24.V.1991, ex *Pelea clusiifolia* (Asquith) (BPBM); 4M, 5F, Alakai Swamp Trail, 10.V.1991, ex *Pelea* (Asquith) (BPBM); 1F, Kokee, Alakai Swamp Trail, 25.VII.1991, ex *Pelea clusiifolia* (Asquith) (BPBM); 1M, Kaunuohua Ridge, 22.VII.1937, beating (E.C. Zimmerman) (BPBM); 1M, Kawaikoi Trail, 1219 m, 29.VIII.1982, ex *Pelea* (Gagné) (BPBM); 1M, 1F, Kokee, Kawaikoi Stream Trail, 10.VIII.1991, ex *Pelea* (Asquith) (BPBM); 1M, Kokee, 13–17.IX.1965 (Beardsley) (UH); 5M,



Figs. 56–58. *Sarona* male genitalia. **Fig. 56.** *S. pittospori*, n. sp., male genitalia. **A**, Right paramere, lateral view. **B**, Left paramere, lateral view. **C**, Genital capsule, dorsal view. **Fig. 57.** *S. pookoi*, n. sp., male genitalia. **A**, Right paramere, lateral view. **B**, Left paramere, lateral view. **C**, Genital capsule, dorsal view. **D**, Right paramere, dorsomedial view. **Fig. 58.** *S. pusilla*, n. sp., male genitalia. **A**, Right paramere, lateral view. **B**, Left paramere, lateral view. **C**, Genital capsule, dorsal view. **D**, Right paramere, medial view.

2F, Hono o Na Pali NARS, below Pihea Peak, 26.IV.1992, ex *Melicope clusiifolia* (Asquith) (BPBM); 1M, Alakai Swamp Trail, 24.V.1991, ex *Pelea anisata* (Asquith) (BPBM); 2M, 5F, Kokee, Alakai Swamp Trail, 28.VIII.1991, ex *Melicope clusiifolia* (Asquith) (BPBM); 1M, 3F, Kokee, Alakai Swamp Trail, 19.IX.1991, ex *Melicope sp.* (Asquith) (BPBM); 1M, 3F, Kokee, Kawaikoi Stream Trail, 16.IX.1991, ex *Melicope clusiifolia* (Asquith) (BPBM).

Host plant. *Melicope* (= *Pelea*) *clusiifolia* (A. Gray) T. Hartley & B. Stone (Rutaceae).

Remarks. This species is common in wet to mesic forests on the Alakai Plateau. As with *kukona*, this species is extremely active when disturbed, jumping and taking short flights.

Etymology. From the Latin, *saltator* (dancer), in reference to the behavior of this species when disturbed.

Sarona usingeri Asquith, **new species** Figs. 60, 100, 140

Diagnosis. Occurs only on the island of Oahu. Recognized by its small size, dark yellow to light yellowish brown coloration, and its extremely reduced parameres (Figs. 60a, b). Similar to other small yellow species including, *hie*, *palolo*, and *gagnei*. *Sarona usingeri* lacks the mottled dorsal coloration of *hie*, and the erect dorsal setae of *palolo*. Distinguished from *gagnei* by antennal segment II being infuscated along the distal third rather than only at the apex (Fig. 140), and by the rostrum reaching past the metacoxae.

Description. MALE. Small species, tylus-cuneus length 2.04 mm; pronotal width 1.23 mm. Head strongly vertical; frons flat to weakly convex; tylus flat, weakly curved distally; jugum width equal to tylus width; antennal segment I just surpassing apex of tylus. Antennal segment II-head width ratio 1.19. Apex of rostrum reaching past metacoxae.

Dorsal surface sparsely covered with short, inclined, yellowish, simple setae. Dorsal coloration yellow to yellowish brown; weakly infuscated along medial margins of clavus and cuneus; calli lighter yellow. Head uniform yellow. Antennal segment I light yellowish brown; segment II yellow on basal half, fuscous distally; segments III and IV fuscous, segment III yellow basally (Fig. 140). Venter and legs uniform yellow.

Right paramere very short, cylindrical; basal arm absent (Fig. 60a). Left paramere strongly reduced; straight and uniformly narrow distally; apex blunt; basal angle not developed (Fig. 60b). Tergal process absent (Fig. 60c). Spicula short, straight, evenly tapered apically; apex of flange reduced to a broad, obtuse angle (Fig. 100).

FEMALE. Unknown.

Type material. Holotype M, OAHU: Kukuiala ?, 11.IV.1936, ex *Claoxylon* (R.L. Usinger) (BPBM).

Host plant. Unknown.

Remarks. I have been unable to locate the collection locality for this species on maps.

Etymology. Named for Robert Leslie Usinger, in honor of his enormous contributions to our knowledge of Hawaiian Heteroptera.

Sarona xanthostelma Asquith, **new species** Figs. 61, 101, 141

Diagnosis. Occurs only on the island of Oahu. Recognized by its C-shaped right paramere (Fig. 61a), and conspicuous yellow vertex. Similar to *kuaana* and *adonias* in its large, C-shaped right paramere; distinguished from these species, by its more vertical head, longer ventral arm of the right paramere, and extremely large, recurved, serrate right tergal process (Fig. 61c).

Description. MALE. Moderate sized species, tylus-cuneus length 2.24–2.61 mm; pronotal width 1.27–1.45 mm. Lateral margins of pronotum broadly rounded. Head strongly vertical; frons weakly convex; tylus weakly convex, moderately curved distally; jugum width equal to tylus width; antennal segment I surpassing apex of tylus. Antennal segment II-head width ratio 1.05–1.13. Apex of rostrum reaching well past metacoxae onto abdomen.

Dorsal surface densely covered with long, decumbent, pale to brown, simple setae. Dorsal coloration reddish brown; cuneus, apex of scutellum, lateral margin of mesoscutum, and posterior margin of pronotum variably yellow. Head reddish brown; vertex and posterior margin of frons yellow. Antennae yellow to yellowish brown; apex of segment II infuscated (Fig. 141). Venter castaneous; peritreme white. Legs yellowish brown; coxae brown; femora with transverse, brown bands distally.

Right paramere large, C-shaped; ventral arm much larger than dorsal arm (Fig. 61a). Left paramere curved dorsally near middle, diameter uniform, apex abruptly acuminate; basal angle not developed (Fig. 61b). Two tergal processes present; right tergal process extremely large, recurved distally, apex serrate; left process a short, broad tooth, oriented posteriorly (Fig. 61c). Spicula elongate, sinuous, expanded and serrate preapically; apex of flange developed as a short, digitiform process (Fig. 101).

FEMALE. Tylus-cuneus length 2.28 mm; pronotal width 1.29 mm. Antennal segment II-head width ratio 1.05. Dorsal coloration uniform light red. Antennae similar to male (Fig. 141).

Type material. Holotype M, OAHU: Puu Kanehoa, 25.VII.1959, at light (J.W. Beardsley) (BPBM). 1M paratype, same data as holotype (BPBM).

Other specimens examined. OAHU: 1M, Mt Tantalus, VI.1955 (J.W. Beardsley) (HDA); 1M, Poamoho Trail, 460 m (1500 ft), 29.I.1961, (Y. Miyatake) (BPBM); 2M, Poamoho Trail, VI.1955 (E.J. Ford Jr.) (BPBM); 1M, 1F, Puu Kanehoa, 10.VIII.1959, at light (Beardsley) (BPBM); 1M, Waianae Kai Forest Reserve, Kamaileunu Ridge, 787 m, 19.X.1975, at light (W.C. Gagné) (BPBM).

Host plant. Unknown.

Remarks. This species is known from both the Koolau and the Waianae mountain ranges.

Etymology. From the Greek, *xanthos* (yellow) and *stephanos* (crown), in reference to the conspicuous yellow vertex of this species.

ACKNOWLEDGMENTS

Although I never had the opportunity to meet him and share in his rich knowledge of the Hawaiian Miridae, I feel deeply indebted to the late Wayne C. Gagné. Aside from his specimens, host plant information, and geographic sampling, which formed a large part of this study, his enthusiasm, infatuation with the fauna, and indefatigable spirit were with me in this endeavor.

My wife Anna patiently accepted my absences in pursuit of bugs, and kindly lent her talent in illustrating; her contributions were invaluable. Many people shared or tolerated my collecting efforts during this study, foremost among them were John Strazanac, Anna Asquith, Mike Kido, Dan Polhemus, and Toby Schuh. I greatly benefitted from discussions with Frank Howarth and Dan Polhemus about the Hawaiian fauna, and both provided reviews of the manuscript. I thank Gary Stonedahl for examining specimens in the collection of the The Natural History Museum and for reviewing the manuscript.

I thank the following people and institutions for the loan of specimens. Gordon Nishida and Scott Miller, Bernice P. Bishop Museum; Bernarr Kumashiro, Hawaii Department of Agriculture; John W. Beardsley and John Strazanac, University of Hawaii, Manoa. Marilyn Dunlap and Tina Weatherby-Carvalho, Pacific Biomedical Research Center, provided assistance with the scanning electron microscopy work. The Nature Conservancy of Hawaii kindly allowed me access to areas under their management. This

work was partly supported by a University of Hawaii, Research & Training Revolving Fund to the author, a grant from the U.S. Department of Agriculture, and by a Research Centers in Minority Institutions Award RR-03061 to the Biological EM Facility of the University of Hawaii at Manoa. This is paper no. 3831 of the Hawaii Institute of Tropical Agriculture and Human Resources Journal Series.

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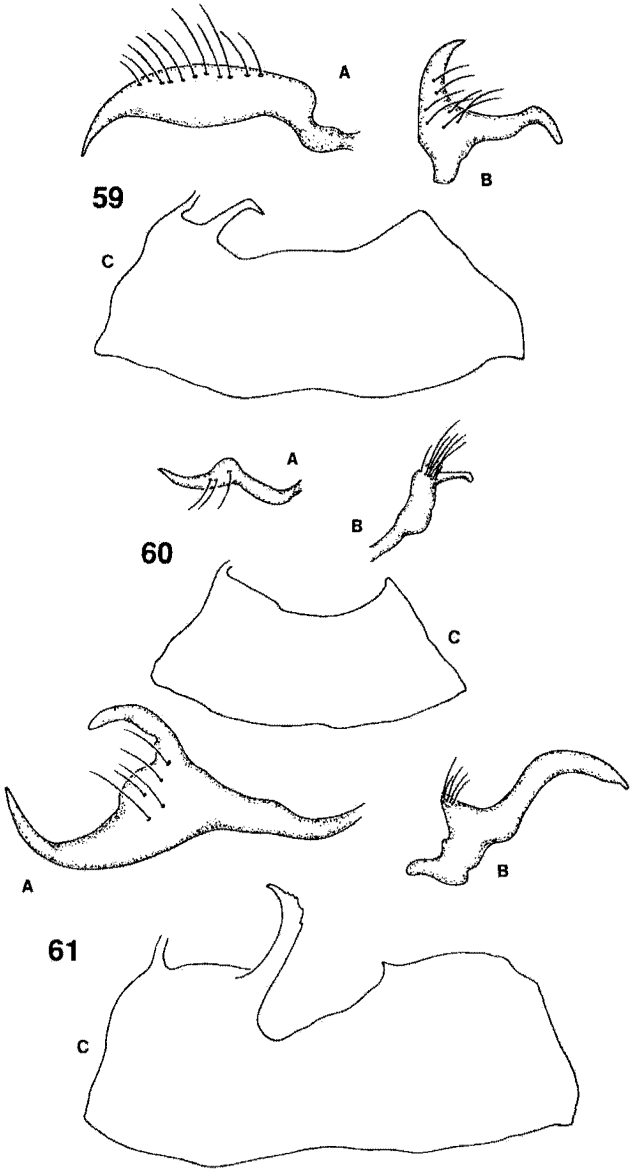
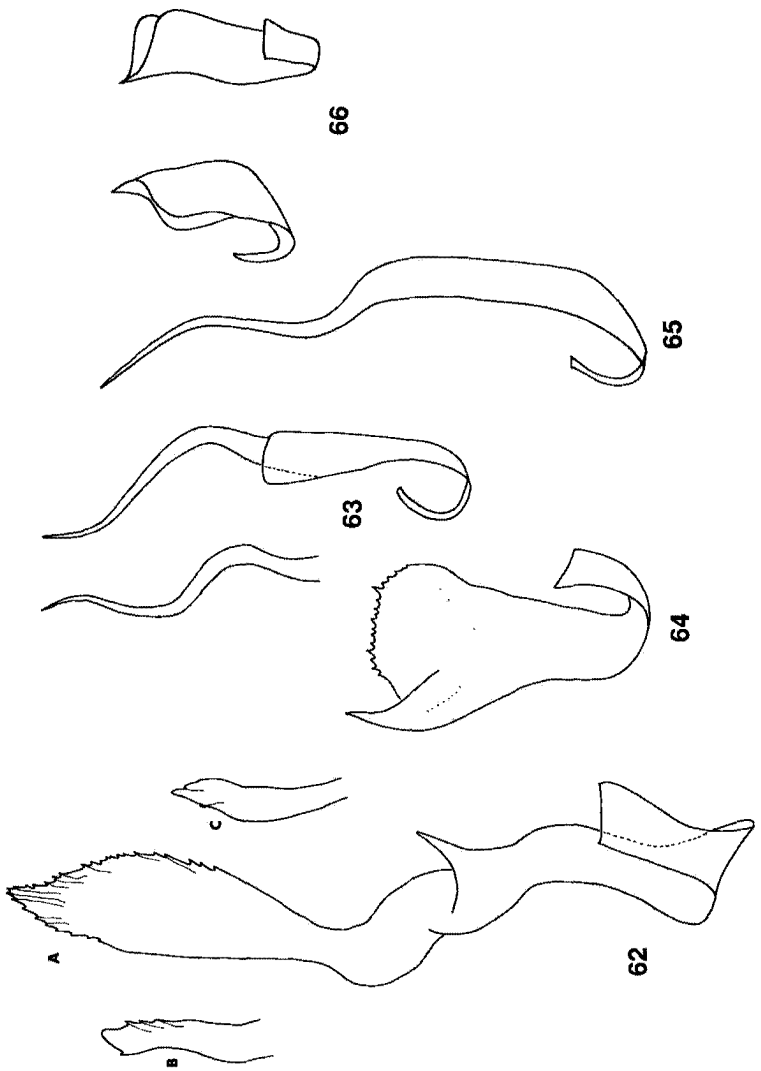
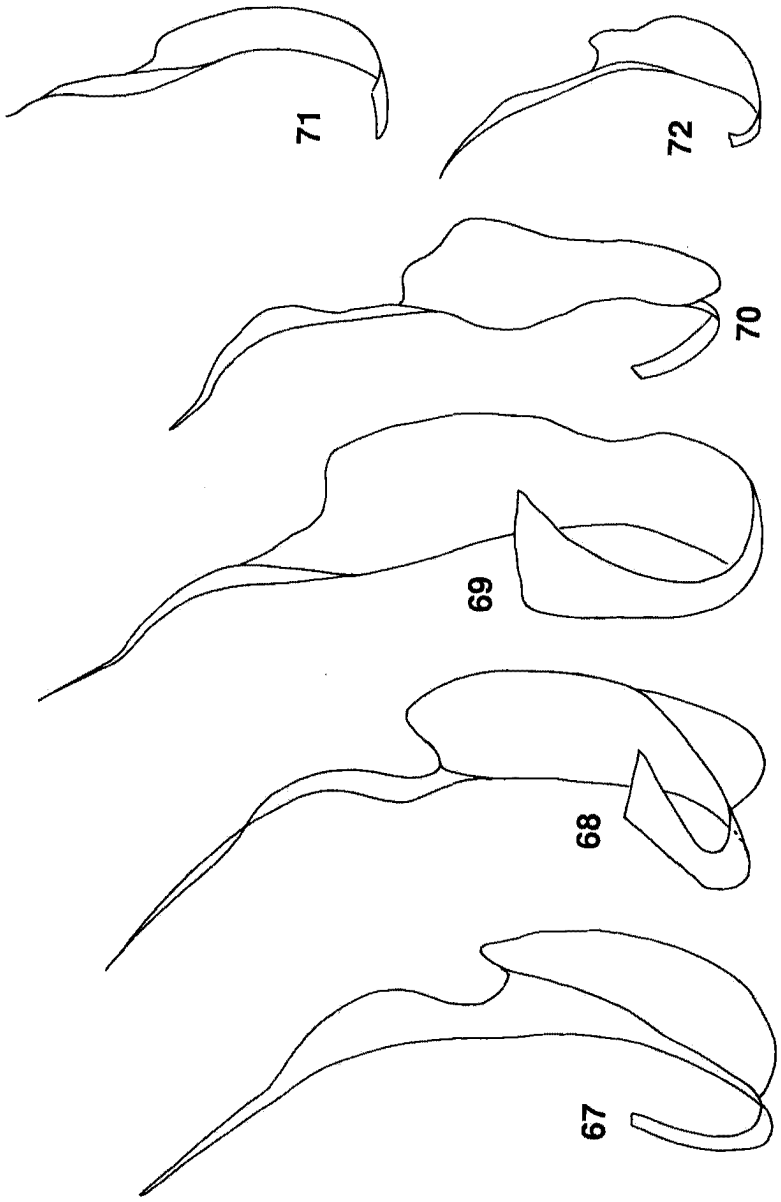


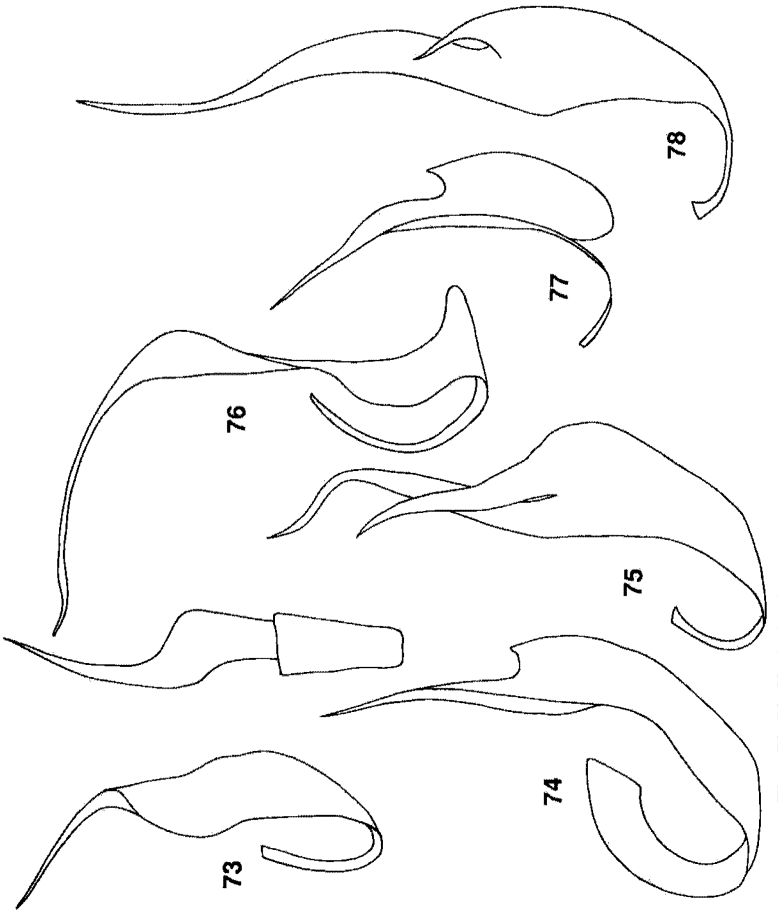
Figs. 59–61. *Sarona* male genitalia. **Fig. 59.** *S. saltator*, n. sp., male genitalia. **A**, Right paramere, lateral view. **B**, Left paramere, lateral view. **C**, Genital capsule, dorsal view. **Fig. 60.** *S. usingeri*, n. sp., male genitalia. **A**, Right paramere, lateral view. **B**, Left paramere, lateral view. **C**, Genital capsule, dorsal view. **Fig. 61.** *S. xanthostelma*, n. sp., male genitalia. **A**, Right paramere, lateral view. **B**, Left paramere, lateral view. **C**, Genital capsule, dorsal view.



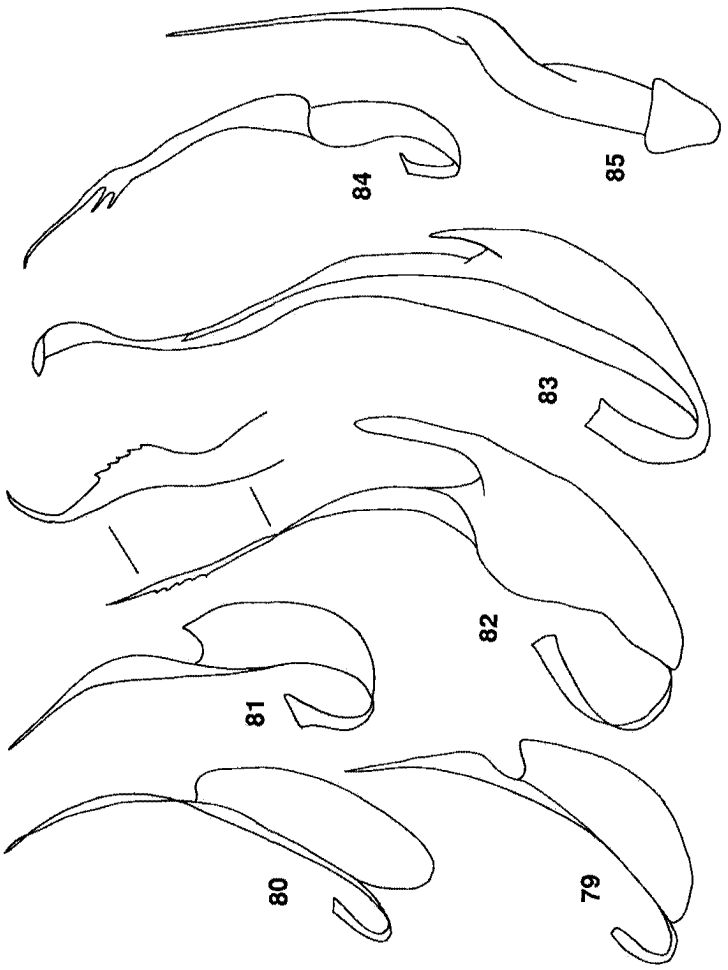
Figs. 62–66. Vesical spiculae of *Sarona* species. **62**, *S. adonias*, **a**: Hawai'i specimen, **b**: Maui specimen, apex of spicula; **c**: Molokai specimen, apex of spicula. **63**, *S. akoko*. **64**, *S. alani*. **65**, *S. annae*. **66**, *S. antennata*.



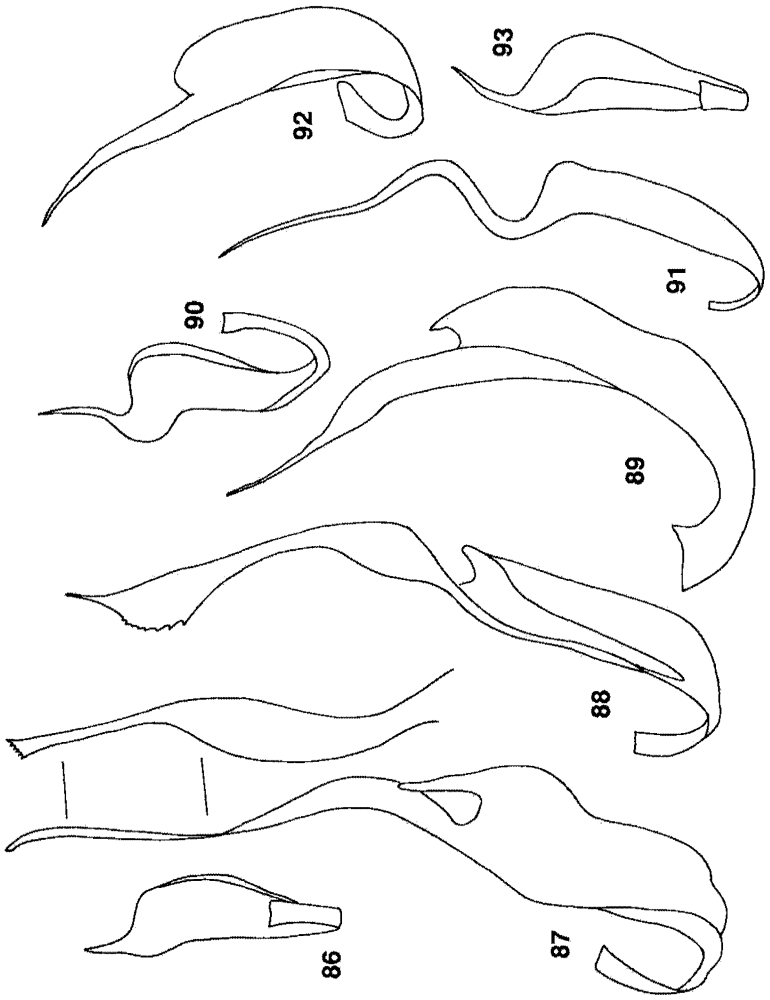
Figs. 67–72. Vesical spiculae of *Sarona* species. **67**, *S. aula*. **68**, *S. azophila*. **69**, *S. beardsleyi*. **70**, *S. dakine*. **71**, *S. flavidorsum*. **72**, *S. gagnei*.



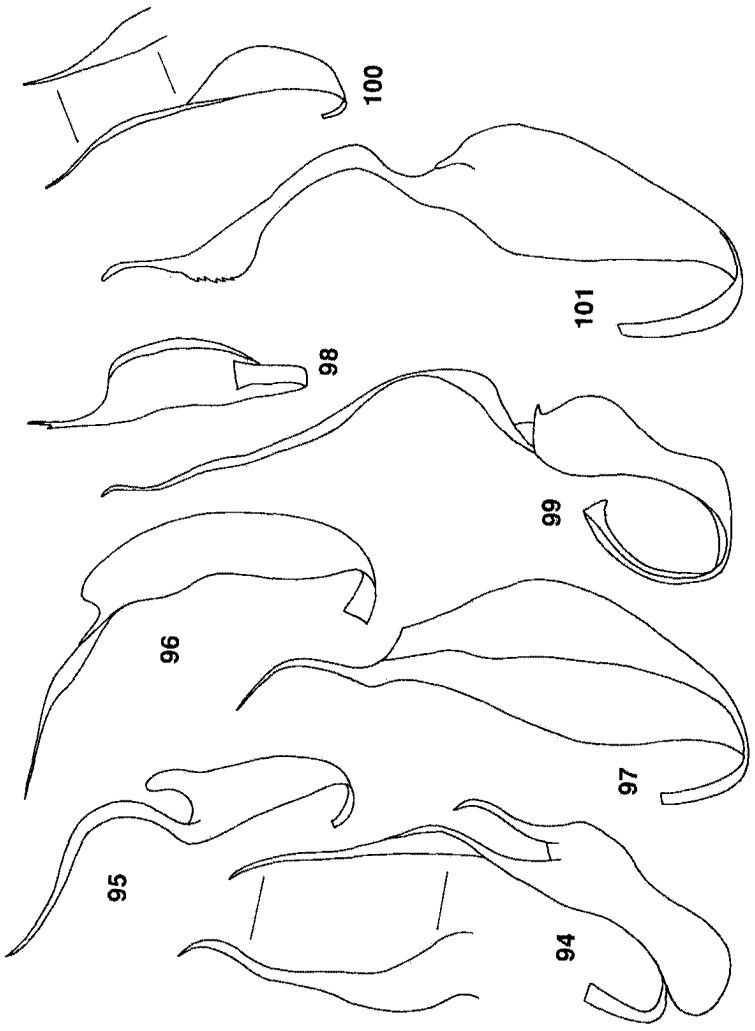
Figs. 73–78. Vesical spiculae of *Sarona* species. **73**, *S. haleakala*. **74**, *S. hamakua*. **75**, *S. hiiaka*. **76**, *S. iki*. **77**, *S. kaala*. **78**, *S. kaala*.



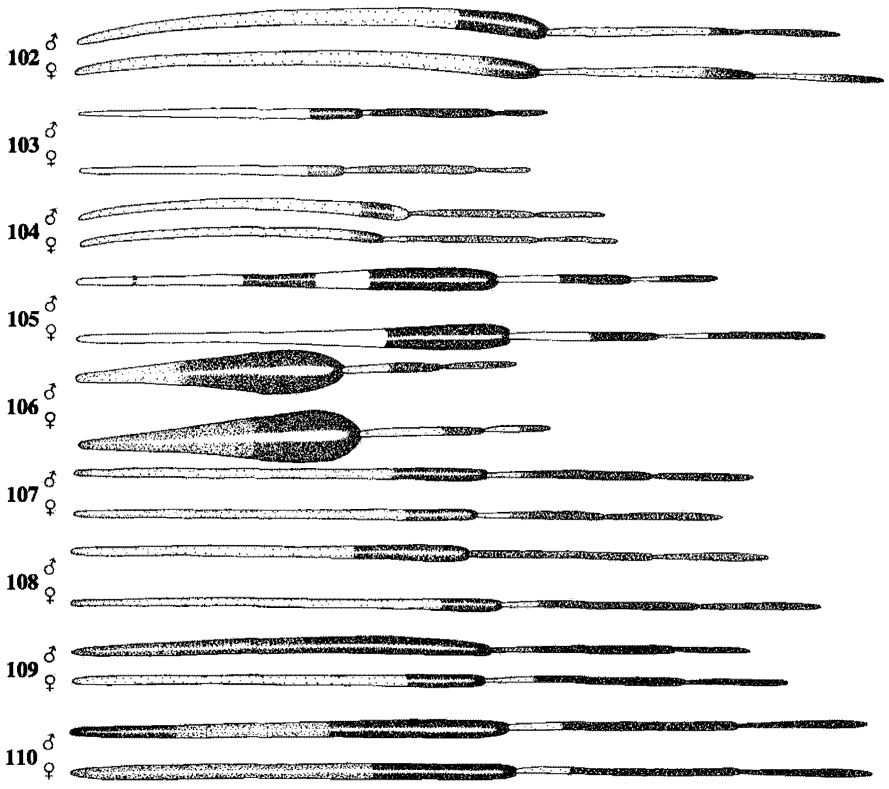
Figs. 79–85. Vesical spiculae of *Sarona* species. **79**, *S. kanaka*. **80**, *S. kane*. **81**, *S. kau*. **82**, *S. kohana*. **83**, *S. kuaana*. **84**, *S. kukona*. **85**, *S. laka*.



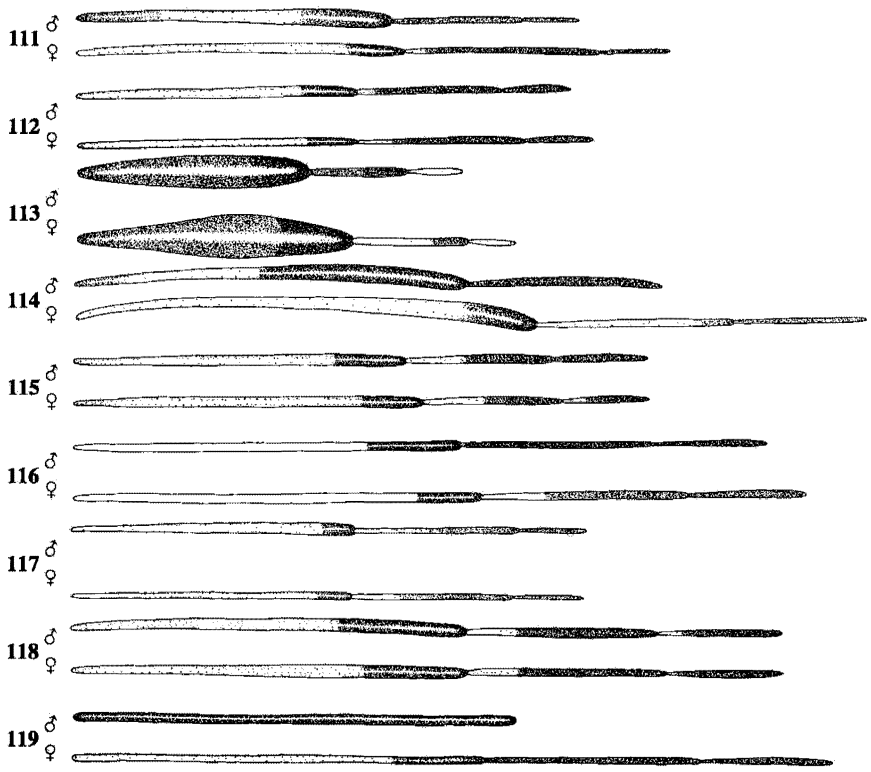
Figs. 86–93. Vesical spiculae of *Sarona* species. **86**, *S. lanaiensis*. **87**, *S. lissochorium*. **88**, *S. makua*. **89**, *S. mamaki*. **90**, *S. maui*. **91**, *S. mokihana*. **92**, *S. myoporicola*. **93**, *S. oloa*.



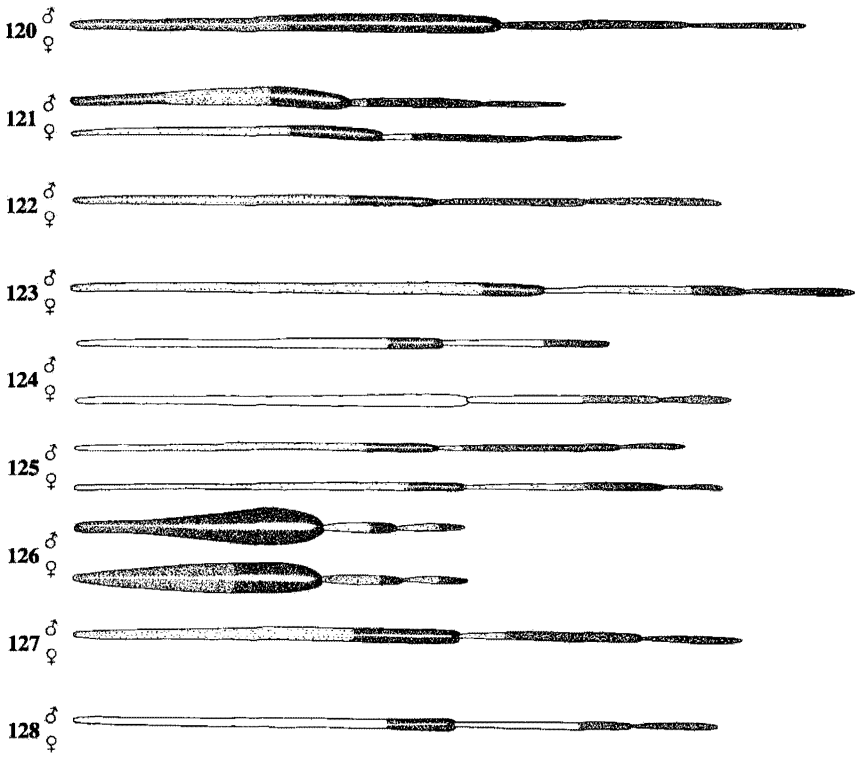
Figs. 94–101. Vesical spiculae of *Sarona* species. **94**, *S. oahuensis*. **95**, *S. palolo*. **96**, *S. pittospori*. **97**, *S. pookoi*. **98**, *S. pusilla*. **99**, *S. saltator*. **100**, *S. usingeri*. **101**, *S. xanthostelma*.



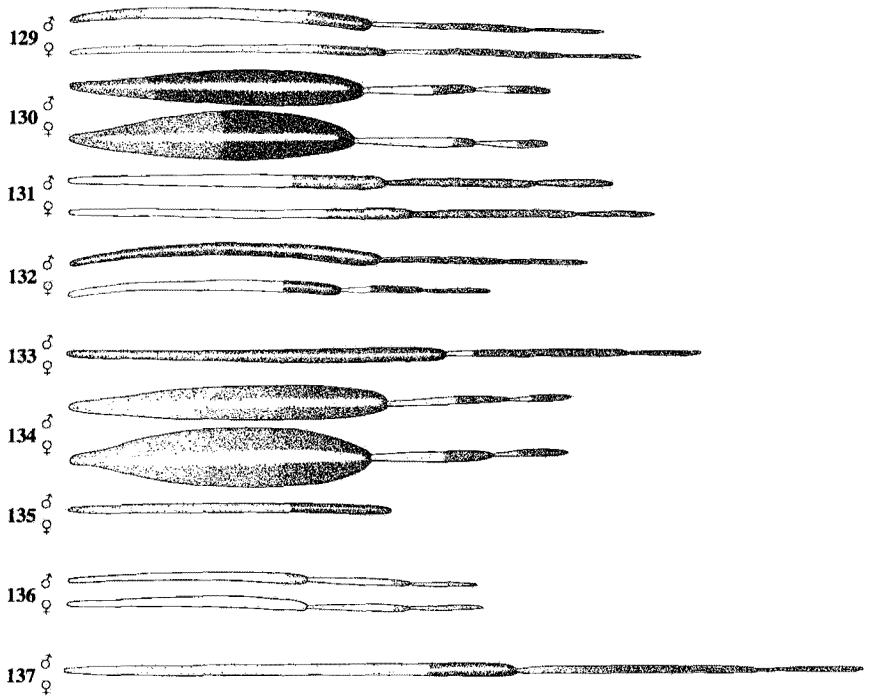
Figs. 102–110. Antennae of *Sarona* species. **102**, *S. adonias*. **103**, *S. akoko*. **104**, *S. alani*. **105**, *S. annae*. **106**, *S. antennata*. **107**, *S. aula*. **108**, *S. azophila*. **109**, *S. beardsleyi*. **110**, *S. dakine*.



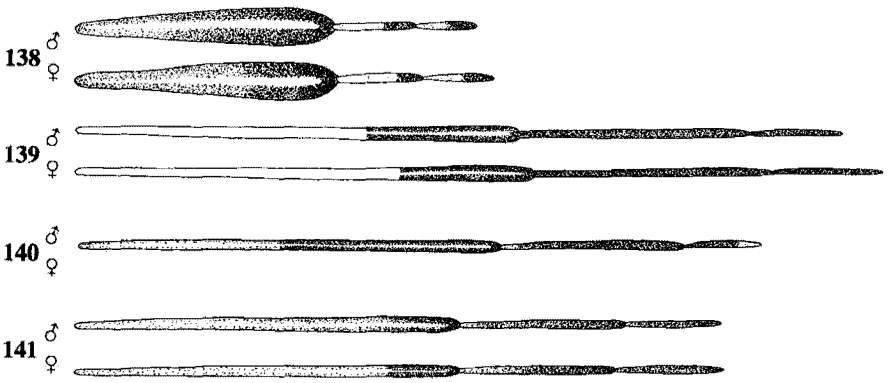
Figs. 111–119. Antennae of *Sarona* species. **111**, *S. flavidorsum*. **112**, *S. gagnei*. **113**, *S. haleakala*. **114**, *S. hamakua*. **115**, *S. hie*. **116**, *S. hiiaka*. **117**, *S. iki*. **118**, *S. kaala*. **119**, *S. kanaka*.



Figs. 120–128. Antennae of *Sarona* species. **120**, *S. kane*. **121**, *S. kau*. **122**, *S. kohana*. **123**, *S. kuaana*. **124**, *S. kukona*. **125**, *S. laka*. **126**, *S. lanaiensis*. **127**, *S. lissochorium*. **128**, *S. makua*.



Figs. 129–137. Antennae of *Sarona* species. **129,** *S. mamaki.* **130,** *S. maui.* **131,** *S. mokihana.* **132,** *S. myoporicola.* **133,** *S. oahuensis.* **134,** *S. oloa.* **135,** *S. palolo.* **136,** *S. pittospori.* **137,** *S. pookoi.*



Figs. 138–141. Antennae of *Sarona* species. **138,** *S. pusilla.* **139,** *S. saltator.* **140,** *S. usingeri.* **141,** *S. xanthostelma.*