

LOULUCORIS, A NEW GENUS, AND TWO NEW SPECIES OF ENDEMIC HAWAIIAN PLANT BUG (HETEROPTERA: MIRIDAE: ORTHOTYLINAE)

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Abstract.—The new endemic Hawaiian orthotyline genus *Loulucoris*, is diagnosed and described to accommodate two new species: *Loulucoris kidoi*, the type species of the genus, associated with the fan palm, *Pritchardia* (Arecaceae), on the island of Hawai'i, and *Loulucoris cinygmiscus* from the island of O'ahu.

Key Words: Insecta, Miridae, plant bug, Hawaii

The Hawaiian plant bug fauna (Heteroptera: Miridae) is remarkable in the unusual autapomorphies displayed by the endemic genera, and in its overall species richness. Although a handful of new species have been added in recent years (Carvalho 1952, Carvalho and Usinger 1960, Gagne 1968, Asquith 1993), the fauna is still largely undescribed and the Miridae certainly represent the most speciose group of Heteroptera in Hawai'i (Howarth 1990). The tribal and generic placement of Hawaiian taxa, however, is still largely based on the dated works of Kirkaldy (1902, 1904) and Zimmerman (1948b), with minor reassessments by Carvalho (1957–1960) and Schuh (1974).

The subfamily Orthotylinae in Hawai'i is presently represented by the endemic genera *Sarona* Kirkaldy, *Kalania* Kirkaldy, *Sulamita* Kirkaldy, *Pseudoclerada* Kirkaldy, *Nesidiorches* Kirkaldy, and endemic species in the widespread genus *Orthotylus* Fieber. In this paper I describe a new endemic genus and two new species in the subfamily Orthotylinae. Terminology of the genitalia follows that of Slater (1950) and Asquith (1991). Types and paratypes are deposited in the Bishop Museum, Honolulu (BPBM),

and the American Museum of Natural History, New York (AMNH).

This paper is dedicated to José Carvalho in honor of his unequalled knowledge and productivity in the taxonomy of the Miridae.

***Loulucoris* Asquith, NEW GENUS**

Diagnosis.—Recognized by its delicate form (Fig. 1); vertical, triangular head with subpedunculate eyes (Figs. 2, 3); shallow, median longitudinal sulcus and short transverse carina on vertex; weakly flattened postero-lateral margins of pronotum; reddish spot on the cuneus.

Description.—*Male*: Macropterous; general coloration greenish yellow to pale brown; dorsal surface smooth to faintly shagreened, shining; dorsal vestiture with moderately long, inclined, dark setae; abdominal venter with long, pale setae. *Head*: Triangular in frontal view (Fig. 2), vertical (Fig. 3), width greater than height; vertex slightly concave, dorsal texture shagreened, with shallow, wide, median longitudinal sulcus and short indistinct transverse carina; carina separating anterior shagreened surface from posterior polished area; three or four

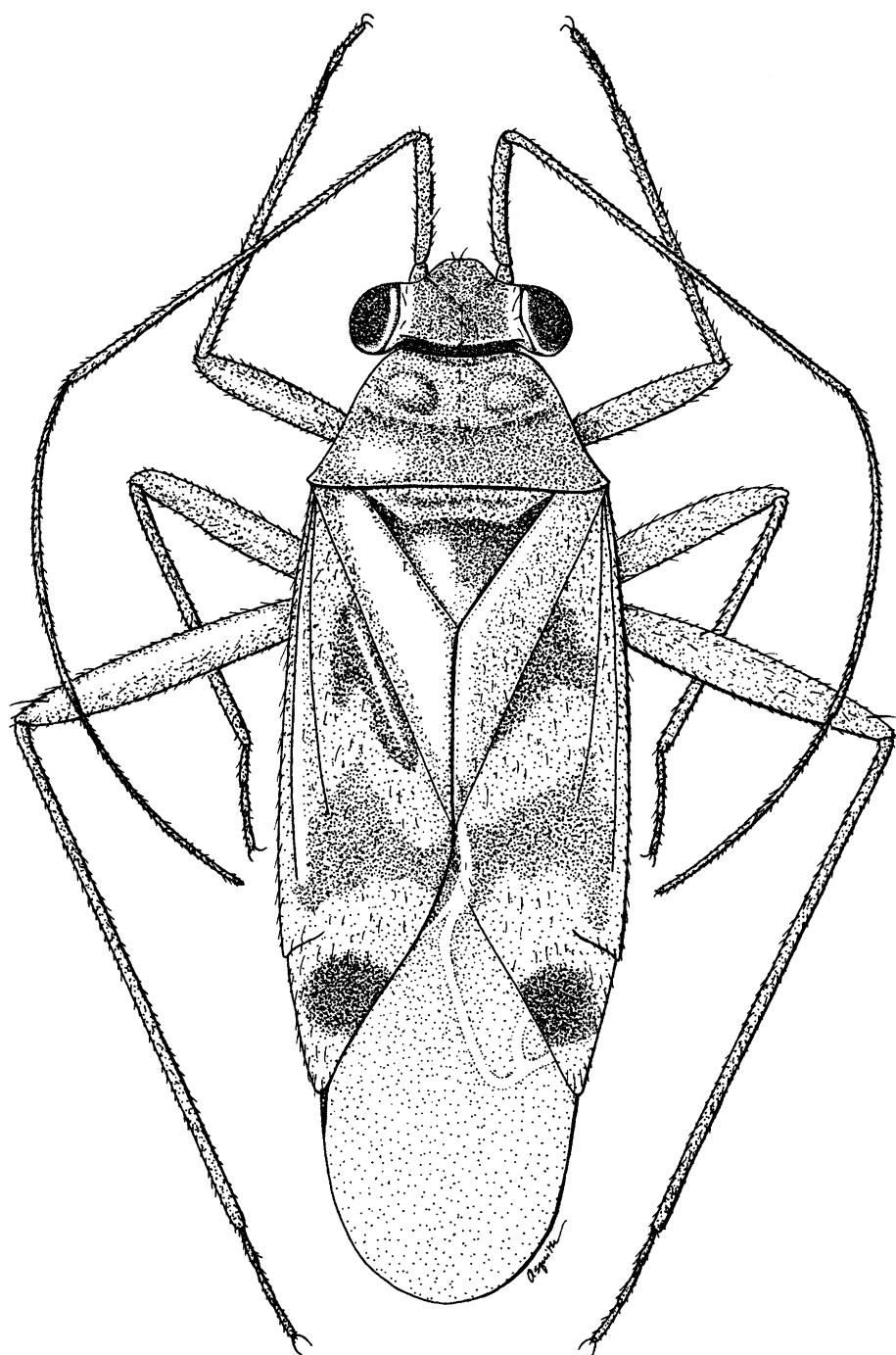


Fig. 1. *Loulucoris kidoi*, male dorsal habitus male.

erect, black setae along inner margin of eyes; frons prominent, extending only slightly anterior of antennal fossae, anterior surface highly polished; tylus flat, vertical, slightly depressed at junction with frons; juga vertical, flat, triangular; lora vertical, flat, rectangular; eyes subpedunculate, extending above vertex and occupying half of head height in lateral view, produced posteriad well past occiput, weakly emarginate along posteroventral margins; antennae inserted at lower third of eyes, fossa separated from eyes by one third its diameter; antennal segment I weakly expanded basally, length slightly longer than width of vertex, with three or four erect, bristlelike setae on medial surface, all surfaces sparsely covered with short, inclined, dark setae; segment II linear, with short, inclined setae; segments III and IV linear, with short, inclined setae interspersed among longer, suberect setae. *Pronotum*: Trapezoidal in dorsal view, wider than long; flat to weakly sloping transversely; anterior margin straight; lateral margins straight to weakly sinuous, posterior halves weakly but thickly carinate; anterior angles broadly rounded; posterior angles sharp; posterior margin broadly and shallowly concave; calli weakly convex, reaching lateral and anterior margins, separated medially by shallow sulcus; mesoscutum broadly exposed, length one third of scutellum length; scutellum flat to weakly convex; metathoracic scent gland as in Fig. 4. *Hemelytra*: Subhyaline, subparallel sided, widest at middle; claval vein elevated for entire length; radial vein elevated along basal half; cuneus twice as long as broad, with a large reddish spot occupying most of surface; membrane lightly suffused with fuscous, more heavily on distal half; inner cell of membrane longer than length of cuneus but not extending past distal margin of cuneus. *Legs*: Color greenish yellow; femora slightly flattened, tapered distally and basally, with short, inclined, dark setae; fore femora with row of longer, erect, bristlelike setae on ventral surface; tibiae with short,

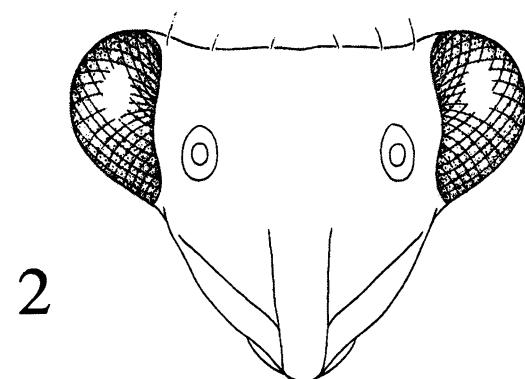


Fig. 2. *Loulucoris kidoi*, anterior view of head.

inclined, simple setae; meso- and metatibiae with additional longer, semierect setae and several rows of minute spinulae; each tarsal segment slightly longer than segment immediately basad; claws strongly curved, thickened basally, pulvilli small, distal margins angulate, parempodia convergent (Fig. 5).

Genitalia (Fig. 6): Genital capsule moderately large, broadly conical in ventral view, only slightly wider than long; and two anteromedially directed flanges supporting the parameres; aperture vertical, large, subcircular. Left paramere short, L-shaped; with dorsomedially curved ventral process. Right paramere elongate, narrow, strongly curved medially. Vesica with one or two long, thick sclerotized spiculae.

Female: Macropterous. Similar to male in color, vestiture, and structure except slightly broader. *Genitalia* (Fig. 7): Sclerotized rings small, widely separated; lateral sclerotized area folded dorsomesally. Posterior wall consisting of a single saddle-shaped structure (J structure of Slater 1950) with lateral margins strongly folded ventromesally (K structure of Slater 1950).

Etymology.—From the Hawaiian word, *loulu* (fan palm) and the Greek, *coris* (bug); referring to the host plant of the type species; gender masculine.

Type species.—*Loulucoris kidoi*, new species.

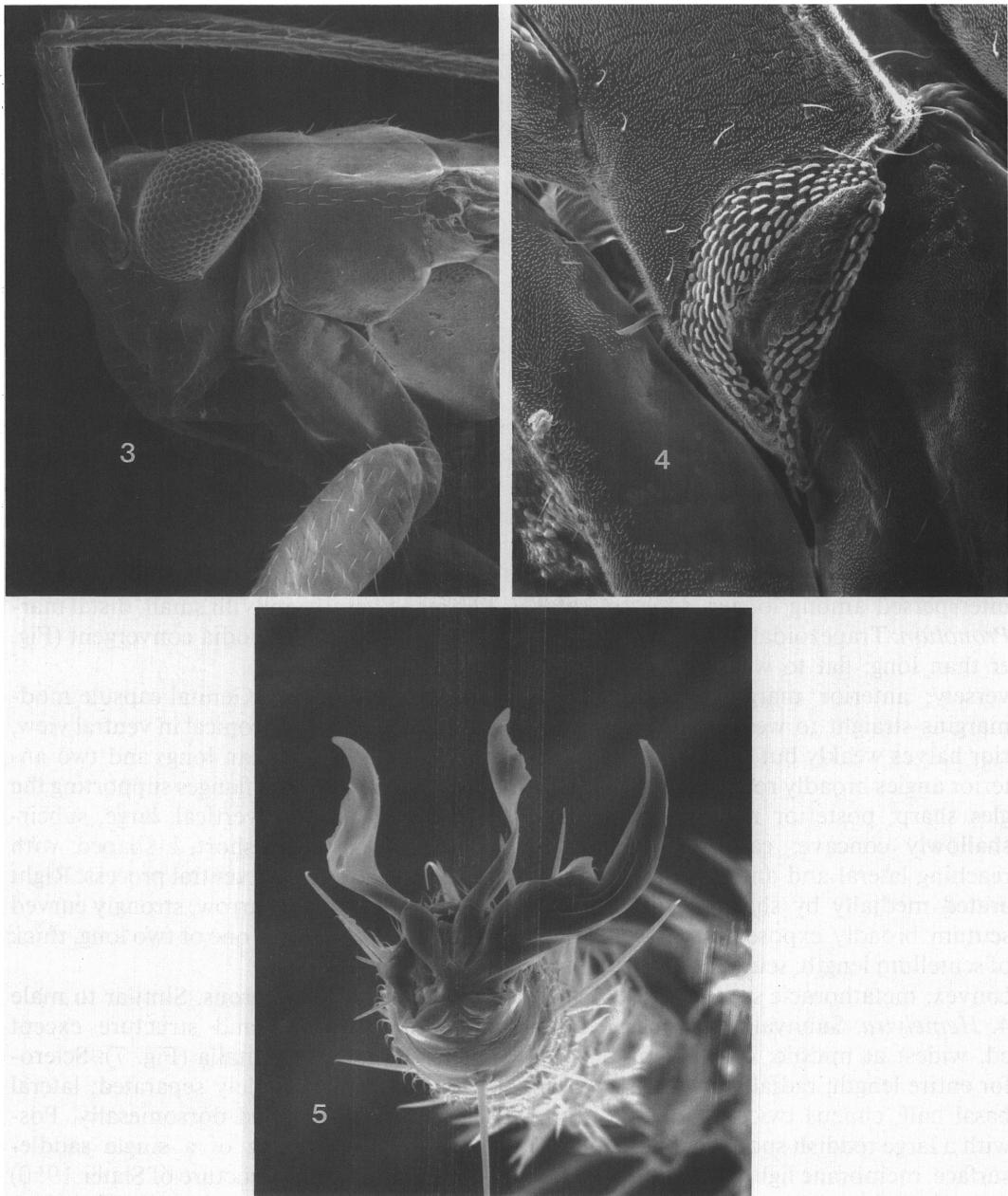


Fig. 3-5. *Loulucoris kidoi*. 3, Lateral view of head; 4, Ostiole and evaporative area of metathoracic scent gland; 5, Pretarsus, left claw missing.

Distribution.—Hawaiian Islands.

Discussion.—*Loulucoris* is not known to occur outside Hawai'i and it is not similar to any of the other endemic Hawaiian Or-

thotylini (Zimmerman 1948b, Schuh 1974). In general habitus it is somewhat similar to *Cyrtorhinus* Fieber, that is represented in Hawai'i by the introduced *C. fulvus* Knight

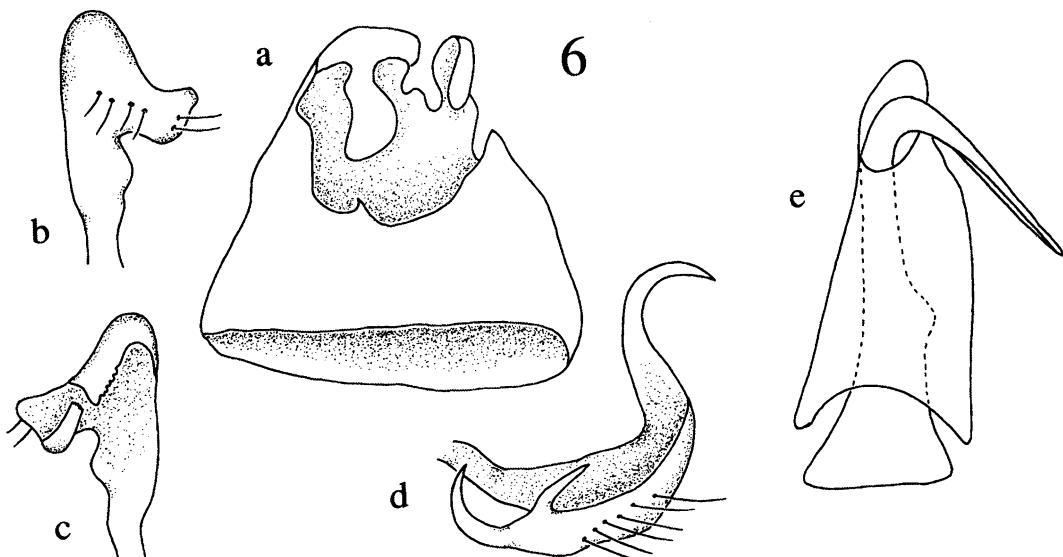


Fig. 6. a-e. Male genitalia of *Loulucoris kidoi*. a, Genital capsule, dorsal view; b, left paramere, lateral view; c, left paramere, medial view; d, right paramere, posterior view; e, theca and spicula, dorsal view.

and *C. lividipennis* Reuter. *Loulucoris* is easily distinguished from *Cyrtorhinus* by its triangular and vertical head. The strongly bent and thickened tarsal claws in *Loulucoris*, compared to the narrow, weakly curved claws of *Cyrtorhinus* (Carvalho and Southwood 1955), also suggest that the two taxa are not closely related.

Loulucoris appears to be related to species from the Indo-Pacific presently placed in the genus *Zanchius* Distant. These species also display the delicate body form; vertical head; narrow, apically furcate right paramere, and the medially folded, apicodorsal angle of the left paramere found in *Loulucoris*. The Pacific *Zanchius* species, including *Zanchius carolinensis* Carvalho, *Z. fragilis* Usinger, *Z. piperi* Usinger, and several undescribed species, also have thickened spiculae on the vesicae. Members of the genus *Zanchius*; however, and the "Zanchius group" of genera, lack sclerotized spiculae (Schuh 1974). The presence of vesical spiculae in *Loulucoris* and the Indo-Pacific "Zanchius" place them in the "Orthotylus group" of genera as defined by Schuh (1974).

A more extensive analysis of characters will be required to define strict synapomorphies that unite *Loulucoris* and the Pacific "Zanchius" species.

Loulucoris differs from the Indo-Pacific "Zanchius" by its subpedunculate and posteriorly produced eyes, and the median longitudinal sulcus. The flattened lateral pronotal margins and posterior carina on the vertex are found in some but not all species of Pacific "Zanchius." In addition, both species of *Loulucoris* have a distinct reddish spot in the middle of the cuneus, which I have not seen in any Pacific "Zanchius" species.

The relationships and biogeographic origins of several of the endemic Hawaiian mirid genera like *Sulamita* Kirkaldy, *Pseudoclerada* Kirkaldy and *Kalania* Kirkaldy may remain obscure because of highly autapomorphic fascies. *Loulucoris*, however, if shown to be clearly united with the Pacific "Zanchius" species, would be another confirmed Indo-Pacific derivative in the Hawaiian mirid fauna, along with *Opuna sharpianus* (Kirkaldy) (Schuh 1984).

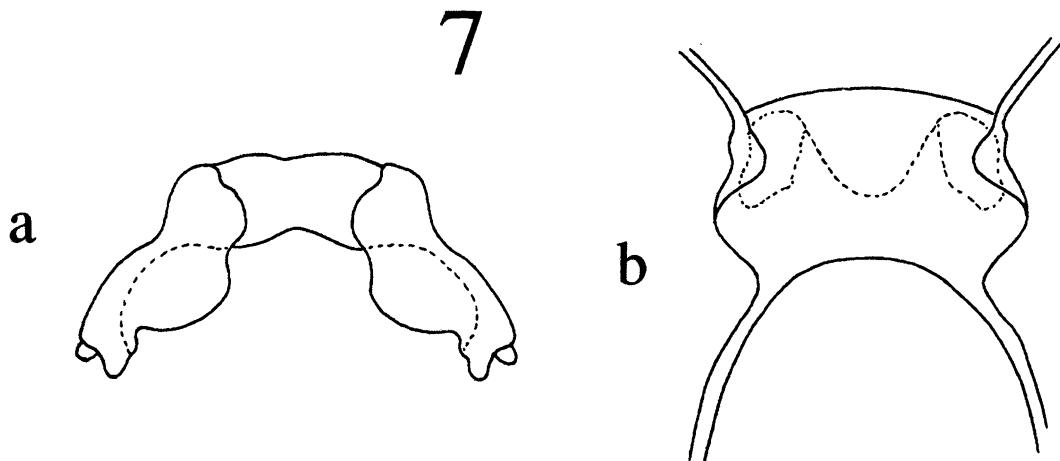


Fig. 7. a–b. Female genitalia of *Loulucoris kidoi*. a, posterior wall, anterior view; b, posterior wall, posterior view.

***Loulucoris Kidoi* Asquith,
NEW SPECIES**

Diagnosis.—Distinguished from the other known species by its overall darker coloration; short, acuminate tergal process on the right dorsolateral margin of the male genital capsule; the erect, basal process of the right paramere; found only on the island of Hawai'i.

Description.—*Male* ($n = 6$): Length 3.18–3.31 mm; pale greenish yellow coloration, dorsal vestiture with inclined, dark setae. *Head*: Width 0.73–0.74 mm; vertex 0.39–0.41 mm; head brown, vertex and area bordering eyes paler, three or four erect, black setae along medial border of eyes; dorsal surface shagreened, anterior area of frons polished; tylus, and juga pale yellow, surfaces polished, lora yellow distally, red on basal half; antennal segment I 0.46–0.54 mm, greenish yellow; segment II 1.47–1.52 mm, greenish yellow basally, yellowish brown distally; segment III 1.25–1.35 mm, yellowish brown; segment IV 0.60–0.64 mm, yellowish brown; rostrum reaching or just surpassing mesocoxae, color yellow, apex black. *Pronotum*: Length 0.32–0.35 mm, posterior width 0.83–0.88 mm; uniformly brown, occasionally darker at middle of

posterior disk; mesoscutum brown; scutellum brown, apex pale; dorsal half of thoracic pleura dark reddish brown; venter pale greenish yellow. *Hemelytra*: General coloration greenish yellow, suffused with large areas of brown on clavus, and basal and distal areas of corium; cuneus greenish yellow with large, reddish spot; membrane slightly suffused with fuscous, less so basally. *Legs*: Coxae and trochanters yellow; femora, tibiae and tarsi uniformly greenish yellow. *Genitalia*: Dorsal margin of genital capsule with short, acuminate tergal process on right side; posteroventral margin with deep socket for left paramere; supporting flange for right paramere broadly spatulate (Fig. 6a). Left paramere with broad area of apicodorsal edge serrate and folded medially (Fig. 6c). Right paramere narrow, elongate, evenly curved medially, apex narrowed, acuminate and curved dorsally (Fig. 6d), with large, erect, distally recurved process near base; smaller, basally recurved, dorsal process near apex. A single, thick spicula present, strongly recurved basally, spatulate distally (Fig. 6e).

Female ($n = 4$): Macropterous. Color and size similar to male, except usually darker and slightly longer and wider; length 3.40–3.46 mm; width of head across eyes 0.75–

0.76 mm; width of vertex 0.43–0.44 mm; antennal segment I 0.47–0.48 mm; segment II 1.40–1.48 mm; segment III 1.38 mm; segment IV 0.45–0.47 mm; length of pronotum 0.35–0.37 mm; posterior width of pronotum 0.87–0.90 mm.

Etymology.—Named for my colleague and good friend Michael Kido, University of Hawaii, Kauai Research Center, who first collected specimens of this species.

Holotype ♂, HAWAIIAN ISLANDS: HA-WAI'I: Stainback Hwy., 2.VIII.1991, ex *Pritchardia* sp., (A. Asquith & M. Kido). (BPBM). **Paratypes.** 8 ♂, 2♀ HAWAIIAN ISLANDS: HAWAI'I: Stainback Hwy., 2.VIII.1991, ex *Pritchardia* sp., (A. Asquith & M. Kido). (BPBM, AMNH). **Additional specimens:** Same data as type series, 1 ♂, 2 ♀, all dissected, 2 nymphs (BPBM).

The type series was collected from attached but dead leaves of *Pritchardia beccariana* Rock. Adults and nymphs were found deep in the leaf folds in association with psocids, although predation was not observed.

***Loulucoris cinygmiscus* Asquith,
NEW SPECIES**

Diagnosis.—Distinguished from *Loulucoris kidoi* by its paler coloration; a red, dorsomedial, longitudinal stripe on the head of males; a large tergal process on the left dorsolateral margin of the male genital capsule, and the absence of the erect basal process on the right paramere; found only on the island of O'ahu.

Description (n = 1).—Male: Length 3.35 mm; pale, straw yellow coloration, dorsal vestiture with inclined, pale setae. **Head:** Width 0.70 mm; vertex 0.38 mm; head yellow, median sulcus reddish brown, erect setae bordering eyes gold to brown; dorsal surface shagreened, anterior surfaces polished; tylus, lora, juga pale yellow, surfaces highly polished; antennal segment I 0.48 mm, pale yellow; segment II 1.33 mm, pale yellow, slightly darker on distal half (antennal segments III and IV missing from specimen);

rostrum reaching to mesocoxae, yellow, apex fuscous. **Pronotum:** Length 0.36 mm, posterior width 0.85 mm; pale yellow, anterior angles reddish brown; mesoscutum and scutellum straw yellow, apex of scutellum cream; ventral margins of thoracic pleura reddish brown; venter yellow. **Hemelytra:** General coloration pale, brownish yellow, weakly suffused with pale brown basally on clavus and corium; cuneus pale yellow with large reddish spot; membrane translucent. **Legs:** All segments uniformly yellow. **Genitalia:** Dorsal margin of genital capsule with long, stout tergal process on left side; posteroventral margin entire, socket for left paramere absent; supporting flange for right paramere erect, narrowed, and recurved apically (Fig. 8a). Right paramere narrow, elongate, apex bifurcate, with two, narrowed, acuminate arms; basal process absent (Fig. 8c). Left paramere with folded area of apicodorsal angle small, serrate (Fig. 8b). Vesica with two elongate spiculae, ventral spicula weakly sinuate and flattened distally (Fig. 8d).

Female (n = 1): Macropterous. Size similar to male. General coloration yellow, tinged with green; reddish areas on thoracic pleura indistinct; lacking longitudinal reddish stripe on vertex. Length 3.61 mm; width of head 0.73 mm; vertex 0.39 mm; antennal segment I 3.61 mm; segment II 1.26 mm; segment III 1.09 mm; segment IV 0.70 mm.

Etymology.—From the Greek, *cinygm* (phantom), referring to the few occasions this species has revealed itself to collectors.

Holotype ♂, HAWAIIAN ISLANDS: O'AHU: Castle Trail, 2000 ft., 28.XI.1937, Beating, (E. C. Zimmerman). (BPBM). **Paratype** ♀, HAWAIIAN ISLANDS: O'AHU: Waikane, 22.X.1947, (E. C. Zimmerman). **Additional specimens:** HAWAIIAN ISLANDS: O'AHU: Halawa Valley, 11.I.1994, ex. *Pritchardia*, (A. Asquith) 1 ♂, 2 nymphs, (BPBM).

An endemic genus with species found only on O'ahu and Hawai'i would be an unusual pattern within the Hawaiian insect fauna

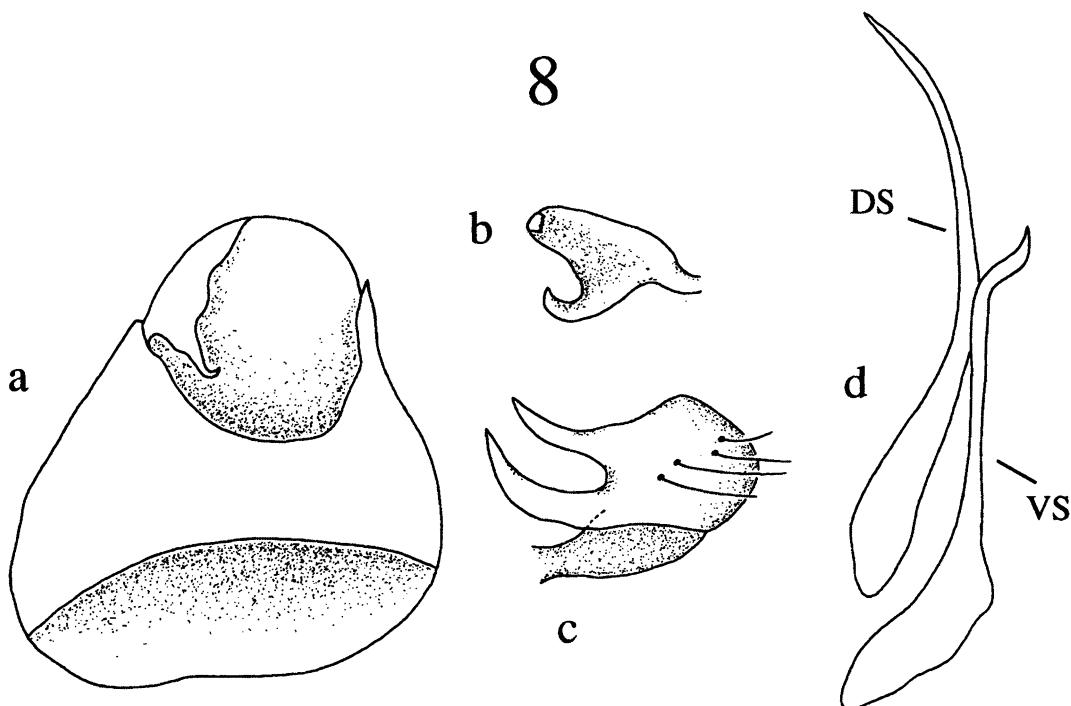


Fig. 8. a-d. *Loulucoris cinygmiscus*, male genitalia. a, genital capsule, dorsal view; b, left paramere, medial view; c, right paramere, posterior view; d, vesical spiculae. (DS = dorsal spicula, VS = ventral spicula.)

(Zimmerman 1948a); therefore, it is highly likely that there are additional species of *Loulucoris* on other islands. With the both of the known species collected exclusively from *Pritchardia*, the fidelity of *Loulucoris* to fan palms seems likely. The genus *Pritchardia* (Arecaceae) is restricted to tropical Pacific islands, with 19 endemic Hawaiian species (Wagner et al. 1990). The Pacific "Zanchius" species have not been recorded from palms, but are known from *Marattia* (Marattiaceae), *Piper* (Piperaceae), *Cyrtandra* (Gesneriaceae) and *Ficus* (Moraceae). *Pritchardia* hosts several other endemic Hawaiian insects with various degrees of association. The psyllid genus *Megatrioza* Crawford, for example, is restricted to fan palms in Hawai'i (Uchida and Beardsley 1988), while *Nesodryas swezeyi* Zimmerman (Homoptera: Delphacidae) occurs on *Pritchardia* on Hawai'i and *Nesodryas frey-*

cinetiae Kirkaldy (Pandanaceae) is associated with *Freycinetia arborea* Gaud. on O'ahu (Zimmerman 1948c).

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