

New Species of *Cyrtopeltis* from the Hawaiian Islands with a Revised Key (Hemiptera: Miridae)

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Submitted for publication January, 1960

The genus *Cyrtopeltis* was first reported from Hawaii by Kirkaldy (1902) on the basis of specimens collected by R. C. L. Perkins for the FAUNA HAWAIIENSIS. Having described a perfectly distinct species, *C. hawaiiensis*, from Haleakala Crater, Kirkaldy later (1910) confused the situation by lumping Oahu specimens under the same name. Perkins (1911) corrected this error, describing the Oahu specimens as *C. confusa*. Perkins' material is before us and bears his handwritten notes. From this information it appears: 1. that *C. hawaiiensis* Kirkaldy (represented by a single specimen from Haleakala Crater) is a very distinctive species, possibly even a distinct subgenus, which occurs on Maui; 2. that the specimen from the Waianae coast of Oahu supposed by Perkins to agree "exactly with Kirkaldy's description" is actually very close, if not identical, with *C. confusa*; 3. that *C. confusa* Perkins is a common species on Mt. Tantalus, Oahu.

In 1924, an American species, *Cyrtopeltis modesta* (Distant), was introduced (Swezey, 1924) and has since become a pest of tobacco and tomato (see Tanada and Holdaway, 1954, for excellent summary). Zimmerman (1948) brought together information on the three known species and gave a key to separate them.

Meanwhile, the taxonomic status of genera and subgenera in this section of the Dicyphinae was being debated by authorities elsewhere in the world and the nomenclature of the tomato bugs was complicated by excessive synonymy and bewildering homonymy, not entirely covered by the vacillating Rules passed at successive meetings of the International Commission on Zoological Nomenclature. The latest summary of this situation is by China and Carvalho (1952). According to this the Hawaiian species belong to the subgenus *Engytatus* of *Cyrtopeltis*. *Engytatus* is stated to be "entirely American" and the opinion is expressed that "the Hawaiian species must have been derived from America and not from the West". Unfortunately, China and Carvalho erred in their treatment of the nomenclature of the tomato bug, calling it *luridus* (Gibson) on page 160 and *modesta* (Distant) on the on page 116. Zimmerman (1957) in a supplement to his treatment of the Hemiptera in INSECTS OF HAWAII, gave the corrected names and synonymy for the three Hawaiian species of *Cyrtopeltis*.

The purpose of the present paper is to correct certain errors in the record as detailed above, to add locality and host records on the basis of abundant material collected by Swezey, Timberlake and Usinger, and to describe two new species. A revised key is included in order to place the new species.

Types of the new species are deposited in B. P. Bishop Museum. The holotype and allotype of *hawaiiensis* Kirkaldy are in the British Museum (Natural History): BMNH-655, Sandwich Is. 1913-323. A hololectotype, male, and allolectotype, female, of *C. confusa* Perkins from Mount Tantalus are hereby designated from the original material in Perkins' collection. Since this material was found in the collection of the Hawaiian Sugar Planters' Association Experiment Station the types are deposited there.

DISTRIBUTION AND HOST RECORDS

Interesting anomalies are apparent in the pattern of distribution of the endemic species of *Cyrtopeltis*. For example, no species is known from more than one island (the Molokai record for *hawaiiensis* may represent a new species) and no specimen has ever been collected on the large island of Hawaii. It is difficult to believe that this represents the true state of affairs and it seems probable that specialized collecting on the appropriate host plants will result in additional species that conform more nearly to the usual pattern of endemic insects in the Hawaiian Islands.

The distribution of *C. hawaiiensis* is likely to be of unusual interest. A male and female from 6,000 feet on Haleakala differ slightly in pubescence and strikingly in shape of pygophore from typical examples in Haleakala Crater. Also, specimens from near the summit vary in length of antennal segments. A pair from Molokai may also prove to be different. Because of limited material collected in a haphazard manner without reference to this particular problem, it seems best merely to call attention to the need for further field work on *C. hawaiiensis*.

Early host records for *Cyrtopeltis* included *Gouldia*, *Straussia*, *Touchardia*, and *Dodonaea*, but not one of the several hundred specimens before us, collected over a period of fifty years, is recorded from these hosts. All *C. hawaiiensis* specimens are from *Dubautia* (*Railliardia*), a Composite. *C. confusa* is recorded exclusively from *Cyrtandra cordifolia* (Family Gesneriaceae) and the two new species, *lysismachiae* and *phyllostegiae*, were collected on *Lysimachia* (Family Primulaceae) and *Phyllostegia* (Family Labiatae).

The following field notes on host specificity are quoted from Usinger's Hawaiian notebook: "April 5, 1936. Collected up Poamoho Valley following the C.C.C. trail along the ridge to the left of the Valley. *Cyrtandra cordifolia* was very common. Took the maculated *Cyrtopeltis* on it whenever I tried. Another smaller *Cyrtandra* was seen in a dense thicket and had the characteristic leafhoppers but no *Cyrtopeltis* bugs, showing specificity of insects correlated with plant species.

On *Phyllostegia hirsuta* Benth. took a new species of *Cyrtopeltis* not uncommonly. A single small *Cyrtandra* plant was found amidst the *Phyllostegia* and on it was found *C. confusa* (maculated) showing absolutely no intermixture."

Thus the evidence is strong that the endemic *Cyrtopeltis* are host specific and that they are restricted to plant species which are not closely related. Whether the group is really absent from the Island of Hawaii remains to be proved by future field work.

KEY TO THE HAWAIIAN SPECIES OF CYRTOPELTIS

1. Body color yellow, without a pattern of dark marks on hemelytra and appendages; densely beset with suberect black bristles. Pronotum two and one-half times as wide across humeri as long on mid-line behind collar. Maui: Haleakala, 6,000 feet to the Crater, on *Dubautia* (= *Railiardia*). Molokai: Puu Kole Kole, on *Dubautia* **hawaiiensis** Kirkaldy (1902)
 Body color pale, testaceous, sometimes tinged with green, the hemelytra more or less infuscated on clavus and apices of corium and cuneus and the antennae brown at least on base of first and second segments; beset with finer, usually pale hairs. Pronotum narrower, about twice as wide across humeri as long on mid-line behind collar. 2
2. Eyes very large, each eye equal to or wider than interocular space. Kauai, Oahu, Molokai, Maui, Hawaii. Tomato and tobacco **modesta*** Distant (1884)
 Eyes smaller, distinctly narrower, as seen from above, than interocular space 3
3. Rostrum exceeding apices of hind coxae; cell in membrane six times as long as wide. Oahu, on *Cyrtandra* **confusa** Perkins (1911)
 Rostrum not exceeding apices of hind coxae; membranal cell four times as long as wide. 4
4. Rostrum short, reaching only to apices of front coxae. Kauai, *Lysimachia* **lysimachiae**, n. sp.
 Rostrum longer, reaching nearly to apices of hind coxae. Oahu, *Phyllostegia* **phyllostegiae**, n. sp.

Cyrtopeltis (Engytatus) *phyllostegiae*, new species (figs. 2, 9)

Body slender with costal margins subparallel; pubescence short, pale, and inconspicuous. Color pale testaceous, the hemelytra translucent with clavus more or less infuscated except at base, corium brown along inner apical margins with a discrete brown spot at outer apex, cuneus with a brown spot at inner apex, membrane clear except for vein and immediate surroundings of cell. Collar and

*The gender of *Cyrtopeltis* is clearly feminine as indicated in Fieber's original description (1861).

base of head above yellow. Eyes brown. Antennae with a brown ring at middle of first segment, another at base of second segment, third and fourth segments generally infuscated. Rostrum and tarsi brown at extreme apices. Brown color in extremely pale specimens restricted to apices of coria, cunei, eyes, antennae and apices of rostrum and tarsi.

Male. Head 0.4 mm. wide, slightly longer than wide, 13::12. Eyes 0.083 mm. wide, less than half as wide as interocular space, 2½::7. Sides of head converging behind eyes to collar, postocular distance equal to length of an eye. Antennae two-thirds as long as body, proportion of segments 6½:23:21:11; length of segments 0.216 mm., 0.766 mm., 0.7 mm., 0.366 mm. Rostrum reaching apices of hind coxae, 1.36 mm. long, segments subequal.

Pronotal collar 0.33 mm. wide and 0.06 mm. thick, distinctly swollen. Pronotum half again as wide across humeri as long at middle behind collar, greatest width 0.7 mm. Sides and hind margin concave, disk convex, glabrous, with callosities faintly distinguished by an arcuate line behind and a longitudinal median impression extending back from anterior margin.

Scutellum slightly shorter, 0.33 mm., than wide at base, 0.43 mm. Costal margin of corium 1.26 mm.

Male pygophore and right clasper as figured, outer or terminal branch of pygophore tapering, inner arm slender and bent at apex.

Female. Similar to male but with slightly different antennal proportions, 7:20:18:11. Postocular distance shorter than length of an eye, 2::3½; pronotum slightly more than half again as wide across humeri as long behind collar, 24::14, length of costal margin of corium 1.4 mm.

Length: Male 3.1 mm., female 3.3 mm. (from apex of head to tip of membrane).

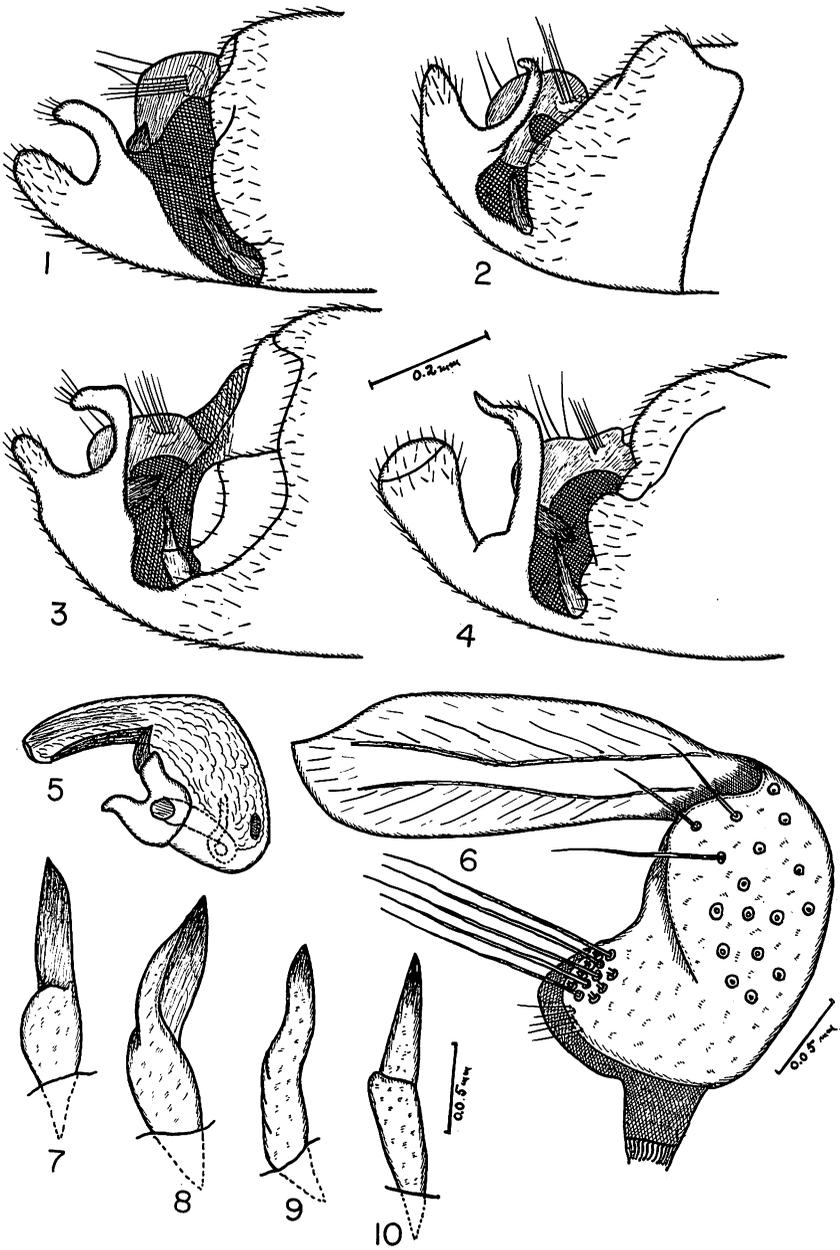
Holotype male, allotype female, and fifteen paratypes: Poamoho Trail, Oahu, April 5, 1936, on *Phyllostegia hirsuta*, R. L. Usinger collector.

Cyrtopeltis (*Engytatus*) *lysimachiae*, new species (figs. 3, 6, 7)

Body slender, costal margins subparallel, pubescence fine, pale, longer at sides of hemelytra than elsewhere. Color uniformly pale testaceous, except for a brown spot at middle of cuneal fracture and another at apex of cuneus. Veins of membrane cell infuscated. Eyes dark brown. Antennae with a brown ring on basal half of first segment, brown at base of second segment and generally but faintly infuscated apical segments. Apex of rostrum and apices of tarsi brown.

Male. Head 0.46 mm. wide, slightly shorter than wide, 13::14, eyes 0.1 mm. wide, seen from above, less than half as wide as interocular space, 3::8. Sides

FIG. 1. *Cyrtopeltis hawaiiensis* Kirkaldy, pygophore; FIG. 2. *C. phyllostegiae*, n. sp. pygophore; FIG. 3. *C. lysimachiae*, n. sp., pygophore; FIG. 4. *C. confusa* Perkins, pygophore; FIG. 5. *C. confusa* Perkins, aedeagus; FIG. 6. *C. lysimachiae*, n. sp. left clasper; FIG. 7. *C. lysimachiae*, n. sp., right clasper; FIG. 8. *C. confusa* Perkins, right clasper; FIG. 9. *C. phyllostegiae*, n. sp. right clasper; FIG. 10. *C. hawaiiensis* Kirkaldy, right clasper. Figures of the pygophore of *C. modesta* (Distant) are given in Carvalho (1947).



of head very briefly converging behind eyes to collar, postocular distance much less than half the length of an eye, $1\frac{1}{2}:5$. Antennae two-thirds as long as body, proportion of segments 9:25:30:14; length of segments 0.3 mm., 0.83 mm., 1.0 mm., 0.46 mm. Rostrum reaching only to apices of front coxae, 0.886 mm. long, proportion of segments 8:6:6:6 $\frac{1}{2}$.

Pronotal collar 0.41 mm. wide and 0.086 mm. thick, swollen and with laterally swollen acetabula on either side visible from above. Pronotum over half again as wide across humeri as long at middle behind collar, $25\frac{1}{2}:14$, greatest width 0.85 mm. Sides and hind margin concave, disk convex, anterior lobe (callosities) swollen and with a faint longitudinal impression.

Scutellum slightly shorter, 0.43 mm., than wide at base, 0.53 mm. Costal margin of corium 1.93 mm.

Male pygophore and right clasper as figured, outer or terminal branch knobbed or enlarged, inner arm slender and hooked.

Female. Similar to male but with antennal proportions 9:21:23:13.

Length: Male 4.0 mm., female 4.2 mm. (from apex of head to tip of membrane).

Holotype male, allotype female, and 16 paratypes: trail from Kokee to Kalalau, Kauai, August 5, 1925, *Lysimachia*, O. H. Swezey collector. Eleven additional paratypes, Kalalau, Kauai, August 20, 1921, *Lysimachia*, O. H. Swezey collector.

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