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# THE CAVERNICOLOUS FAUNA OF HAWAIIAN LAVA TUBES, 4. TWO NEW BLIND *OLIARUS*[1] (Fulgoroidea : Cixiidae)

By R. G. Fennah[2]

*Abstract:* Two new species of *Oliarus*, *O. polyphemus* (Hawaii I.) and *O. priola* (Maui I.), are described from material collected in lava tubes. In both species, the adults are unpigmented and devoid of functional eyes and ocelli. The vertex is extremely short, the tegmina are brachypterous and the wings reduced; in the pretarsus the arolium is vestigial. Differences in the structural pattern of the male genitalia indicate that adaptation to a cavernicolous existence has developed independently in each island.

Through the great kindness of Mr F. G. Howarth of Bishop Museum, I have been able to examine series of adult and nymphal Cixiids collected at various distances inside lava-tubes in Hawaii and Maui. Two species, both referable to the genus *Oliarus*, and new to science, were found to be present, and are described below.

## Genus **Oliarus** Stål

*Oliarus* Stål 1862, *Berl. Ent. Zeit.* 6: 306.

Type-species: *Cixius walkeri* Stål (1859).

**Oliarus polyphemus** Fennah, new species Fig. 1-11.

♂♀. All sclerites of body thin, unpigmented. Head in dorsal view much broader than long, and narrower than pronotum. Vertex with occipital portion well developed, almost vertical, transversely carinate anteriorly, inter-ocular part of vertex, as found in normal adults of macropterous species, greatly reduced, much broader than long, and smoothly and teeply declivous into frons, anterior margin not clearly defined, a pair of oblique carinae arising near posterolateral angles, converging distad and meeting at apparent apex of head as seen in dorsal view; no transverse carina or fossette present at apex of head. Frons viewed perpendicularly to frontoclypeal suture as broad as long at sides, in profile strongly convex, lateral margins rather foliaceous, produced anterolaterally, median carina simple, fine and rather weak, median ocellus absent, frontoclypeal suture strongly arcuate, obscure, rostrum surpassing post-trochanters, antennae with basal segment short, ring-like, second segment ovoid, broader than first, and covered with a felt of microtrichia, ocelli non-functional, obscure, eyes apparently absent though represented by a few small unpigmented facets when viewed in slide mounts. Pronotum with median carina present as a ridge narrowing distad, lateral carinae absent; mesonotum quinquecarinate, tegulae present; legs relatively long and slender, post-tibiae usually with a single

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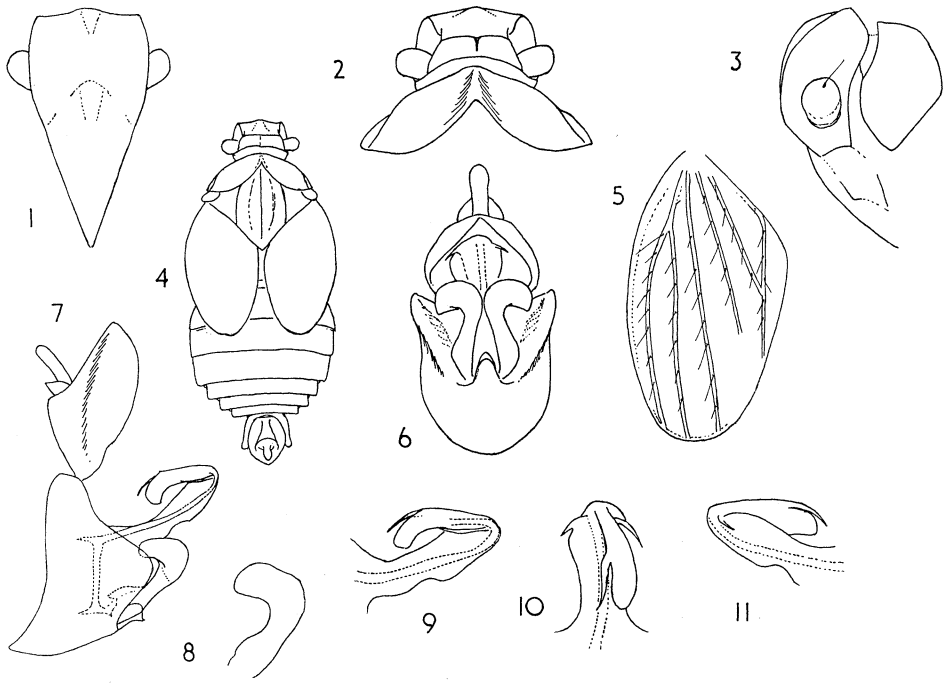


Fig. 1-11. *Oliarus polyphemus* n. sp.: 1, frons and clypeus; 2, head and pronotum, dorsal view; 3, head in profile; 4, adult ♂, dorsal view; 5, tegmen; 6, ♂ genitalia, posteroventral view; 7, ♂ genitalia, left side; 8, genital style, posterolateral view; 9, aedeagus, left side; 10, aedeagus, dorsal view; 11, aedeagus, right side.

small spine laterally, rarely with more, but more often with none, six spines apically, basal metatarsal segment with four teeth, second segment with three teeth, pretarsal claws slender, not much diverging, arolia minute. Tegmina brachypterous, scarcely attaining fifth abdominal tergite, costal margin shallowly convex, apical margin more strongly so, apical and anal angles not clearly defined, venation simple, with only longitudinal veins present, Sc+R and M with inconstant distal furcation, or none, veins sparsely setose. Wings reduced to a scale. Abdomen more or less cylindrical, rather like that of larva.

Creamy-white, sclerites of head and thorax pale yellow, often with darker granules.

♂. Anal segment rather short, ovate in dorsal view, lateral margins meeting almost in a point apically. Pygofer moderately long, dorsolateral angles moderately produced, broadly rounded, medioventral process deeply convex, almost pyriform, as long as broad at base, produced dorsad longitudinally on its inner surface in a broad ridge. Aedeagus with a short slender spine on right at apex, directed laterad, a longer spine at same level on left, directed laterocephalad, flagellum with a slender spine on upper margin slightly distad of middle, directed cephalad; ventral margin of aedeagus in side view shallowly excavate near base. Genital styles moderately long, in posterior view slightly tapering distad in basal two-thirds, curved laterad through 90 degrees and expanding in distal third.

♀. Anal segment small, short, about as broad as long, in dorsal view almost circular; pregenital sternite with posterior margin shallowly convex, but very shallowly emarginate at middle. Ovipositor with first, second and third valvulae relatively short, and of equal length. Ceriferous

plate present.

♂, length 3.2–3.6 mm. ♀, length, 3.7–5.0 mm.

Holotype ♂ (BISHOP 9796), HAWAIIAN IS. : Hawaii I., Hawaii Volcanoes National Park, Kipuka Puaulu, 1140 m, Bird Park Cave, dark zone, 3.VII.1971, F. G. Howarth, in Bishop Museum.

Paratypes, 1 nymph, with same data as holotype; 13 ♂♂, 3 ♀♀, 2 nymphs, Kaumana Cave, Hawaii, 290 m, 90–210 m inside, dark zone, 21.VII.1971, F. G. Howarth; 3 ♂♂, 7 ♀♀, 10 nymphs, Kazumura Cave, Hawaii, 400 m, 60–210 m inside, dark zone, 25.VII.1971, F. G. Howarth and W. Gagné; 1 ♂, 6 nymphs, Bird Park Cave, final room, 90 m inside cave, 20.VII.1971, F. G. Howarth.

The male genitalic characters of this species suggest that it is a member of the group of *O. inaequalis* Giffard that has become adapted for a wholly underground existence. Most of the external modifications are negative, such as loss of functional eyes and ocelli, and concomitant reduction of the vertex, brachyptery of the tegmina and loss of wings, reduction of post-tibial spines and metatarsal teeth, loss of bodily pigmentation and reduction in thickness of sclerites. One positive change, however, is to be found in the pretarsus, which has become solely a clinging organ and consists of a pair of relatively long spines, slender even at the base, and only slightly diverging from each other, and with a mere vestige of an arolium between them basally. In unmodified species of *Oliarus* the tarsal claws of the adult are widely divergent, much thickened basally, and the arolium is in the form of a large pad almost as long as the claws.

**Oliarus priola** Fennah, new species Fig. 12–16.

♂. Bodily form, size and coloration closely similar to that of *O. polyphemus*.

♂. Anal segment of male short, broadly rounded in dorsal view, with lateral margins con-

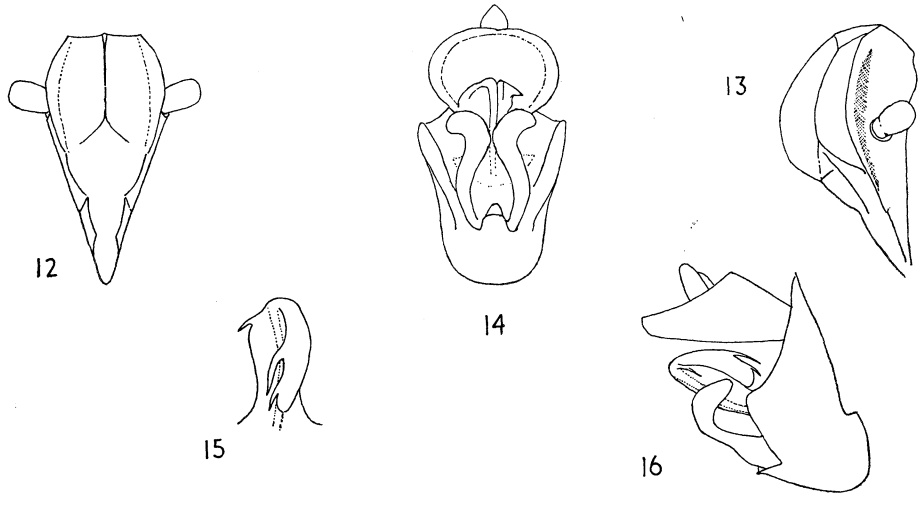


Fig. 12–16. *Oliarus priola* n. sp. : 12, frons and clypeus ; 13, head, anterolateral view ; 14, ♂ genitalia, posteroventral view ; 15, aedeagus, dorsal view ; 16, ♂ genitalia, right side.

fluent with apical margin, and not meeting to form a point apically. Pygofer moderately long, dorsolateral angles moderately produced, broadly rounded, medioventral process about as long as broad, broadly rounded at apex, produced dorsad longitudinally on its inner surface in a broad ridge. Aedeagus with a short slender spine on right at apex, directed laterad, no spine on left side, flagellum with a very stout spinose process on dorsal margin at middle, directed cephalad and markedly separated from dorsal margin, and a small spine dorsally at apex, ventral margin of aedeagus in side view not at all excavate. Genital styles rather long, in posterior view shallowly sigmoid, gradually widening distad and curved laterad distally.

♂, length, 3.5 mm.

Holotype ♂ (BISHOP 9797), HAWAIIAN IS.: Maui I., Hana, Holoinawawai Stream Cave, 290 m, 14.XII.1971, F. G. Howarth, in Bishop Museum.

Paratypes, 8 nymphs, with same data as holotype.

This species is separable from *O. polyphemus* by the form of the male genitalia. The anal segment, as seen in dorsal view, is more nearly circular; the aedeagus lacks the apical spine on the left side, and has an additional spine on the flagellum, as well as having the mid-flagellar spinose process lying well separated from the dorsal margin; and the genital styles are relatively longer and less strongly curved laterad distally.

The absence of the left apical spine is apparently uncommon in Hawaiian *Oliarus:* it occurs in *O. tarai* Kirkaldy which, however, differs from *O. priola* in the presence of an excavation in the lower margin of the aedeagus as seen in side view.