

THE CAVERNICOLOUS FAUNA OF HAWAIIAN LAVA TUBES

11. A troglobitic pseudoscorpion (Pseudoscorpionida: Chthoniidae)¹

By William B. Muchmore²

Abstract: A new troglobitic chthoniid, *Tyrannochthonius howarthi*, is described from Petroglyph Cave on the island of Hawaii. It is placed provisionally in the genus *Tyrannochthonius*.

Among a large collection of pseudoscorpions belonging to the Bishop Museum were 2 troglobitic chthoniids collected by F. G. Howarth in Petroglyph Cave, Hawaii Island. These are the first known cavernicolous pseudoscorpions in the Hawaiian Islands. These specimens have many characteristics of *Tyrannochthonius* Chamberlin and are placed provisionally in that genus, though they also share important characters with the genera *Troglochthonius* Beier and *Paraliochthonius* Beier.

Tyrannochthonius howarthi Muchmore, new species

FIG. 1-5

Diagnosis. A member of the tribe *Tyrannochthoniini* Chamberlin (1962), with 2 eyes, attenuated appendages, and 3 large, spine-like setae on the medial side of the palpal chela.

Description. ♀: Pale tan in color. Carapace slightly longer than broad, narrowed posteriorly; surface smooth; 2 small, corneate eyes; epistome small, triangular, slightly serrate, with 2 setae flanking base (FIG. 1); chaetotaxy d4d-4-4-2-2 = 18, most setae heavy, long and gently curved, the dwarf setae (d) located anterior and ventral to eyes. Abdomen typical; pleural membranes finely granulate; tergal chaetotaxy of holotype 2:2:3:4:4:4:4:4:6:T2T:0 (paratype 2:2:2:3:4:4:4:-); sternal chaetotaxy 8:(3)8(3):(4)6(3):6:7:7:6:6:6:0:2, setae on anterior genital operculum arranged as shown in FIG. 2. Chelicera about as long as carapace, 2.2× as long as broad; hand with 5 setae; flagellum of 8 pinnate setae, the distal one gently curved; fixed finger with 9-10 teeth, distal one largest; movable finger with 9-11 small teeth; no galeal elevation; galeal seta slightly distal to middle of finger; serrula exterior of 20 blades. Palps long and slender (FIG. 3); femur 1.6-1.65 and chela 2.2-2.3× as long as carapace; trochanter 1.8-1.85, femur 6.3-6.5, tibia 2.2-2.35, and chela 6.6-6.7× as long as broad; hand 2.45-2.5× as long as deep; movable finger 1.75-1.8× as long as hand. Surfaces of palpal segments smooth; setae generally long and prominent; 2 large, heavy spine-like setae on medial side of base of fixed chelal finger and one similar but smaller seta on base of movable finger (FIG. 3); trichobothria as shown in FIG. 4; movable chelal finger with 27-28 marginal teeth, mostly tall and sharp, but becoming low and triangular proximally; fixed finger with 28-30 similar teeth, and without an accessory denticle; both fingers with occasional, very small denticles between the larger teeth; movable finger with a small sensillum near dental row between trichobothria *sb* and *b*, but nearer to *sb*. Legs generally typical; apex of coxa I with small rounded projection; coxal chaetotaxy 2-2-1:3-0:2-2-CS:2-3:2-3; setae on apex of palpal coxa subequal, lateral one gently s-shaped; a row of 9-11 terminally incised coxal spines (CS) on each coxa II (FIG. 5); leg IV with entire femur 4.6-4.7 and tibia 6.5× as long as deep; legs III and IV with many long, stout setae, and tactile setae on tibia, metatarsus and telotarsus.

Measurements (mm). Body length 1.4-1.6. Carapace length 0.41-0.47. Chelicera 0.415-0.45 by 0.185-

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2. Department of Biology, University of Rochester, Rochester, New York, 14627, USA.

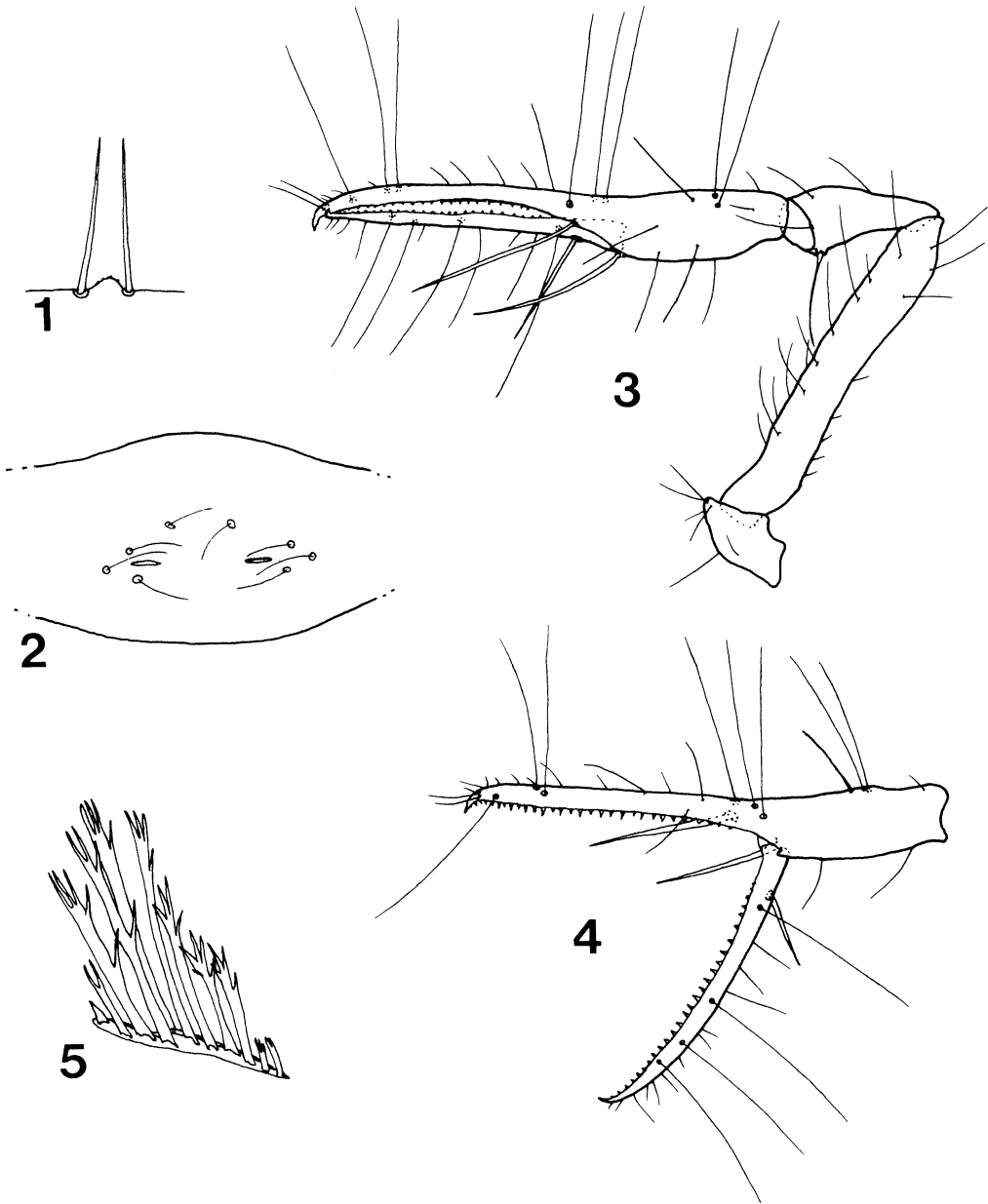


FIG. 1-5. *Tyrannochthonius howarthi*: 1, epistome and flanking setae; 2, anterior genital operculum of ♀; 3, right palp, dorsomedial view of chela; 4, left chela, lateral view; 5, coxal spines from right coxa II.

0.21. Palpal femur 0.68–0.755 by 0.105–0.12; tibia 0.29–0.32 by 0.13–0.135; chela 0.96–1.035 by 0.145–0.155; hand 0.355–0.38 by 0.14–0.155; movable finger 0.64–0.665 long. Leg IV: entire femur 0.73–0.78 by 0.155–0.17; tibia 0.49–0.52 by 0.075–0.08.

♂. Unknown.

Type data. Known only from the type locality. Holotype ♀ (BISHOP 11,335) (WM 4794.01001) and paratype ♀, HAWAIIAN IS: Hawaii I: Hawaii Volcanoes Natl. Park, 700 m, Petroglyph Cave, dark zone, 13.VII.1976, F. G. Howarth. Types in the Bishop Museum, Honolulu.

Etymology. The new species is named for F. G. Howarth, who collected these first-known troglobitic pseudoscorpions in the Hawaiian Islands.

Remarks. The new species is placed provisionally in the genus *Tyrannochthonius* though it bears many resemblances to representatives of *Troglochthonius* (see Beier 1939, 1963; Helversen 1968). *Troglochthonius mirabilis* Beier and *T. doratodactylus* Helversen (each known only from a single female) are from caves in the Mediterranean region (Yugoslavia and Sardinia, respectively). As it is inconceivable that representatives of the same strongly cave-adapted genus could be found halfway round the world from one another, the similarities between the Hawaiian form and *Troglochthonius* species must be due to phenotypic convergence during adaptation to the cave environment. Very likely the enlarged medial setae on the chela serve the same purposes in the new species as in *Troglochthonius*. In my opinion, contrary to that of Helversen (1968, p. 63), the main function of the large, spine-like setae is to assist the chelal fingers in the capture of food. As is illustrated in Helversen's fig. 4 (p. 62), the apposed chelae of such design make an admirable trap for grasping and holding prey against the chelicerae. This idea is perhaps strengthened by the fact that in *T. howarthi* none of the trichobothria is directed medially, as is reported for *T. doratodactylus*. It is quite possible that the spine-like setae are innervated, as Helversen suggests, but it is difficult to imagine any special sensory function of such gross structures.

Helversen has suggested that *Troglochthonius* species have been derived from *Paraliochthonius* ancestors, in which the palpal chela also bears spine-like setae, even though the animals are epigeal. It is possible that *T. howarthi* has been derived similarly but independently from some Pacific area *Paraliochthonius* (see Muchmore 1967, 1972). On the other hand, the Hawaiian form is in several ways more like typical *Tyrannochthonius* than *Paraliochthonius*, in spite of its possession of more than 1 spine-like seta on the chela; this is particularly evident in respect to the epistome and flanking setae, the coxal spines, the chelal teeth, and the flagellum.

Precise placement of the species will have to await a better understanding of the many Pacific area species which have been placed in *Tyrannochthonius*, *Paraliochthonius* and *Morikawia*; it appears quite possible that it actually belongs to a presently unrecognized group (genus or subgenus) with a wide distribution in the Pacific.

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