

TWO NEW *MICROVELIA* FROM CRABHOLES IN COSTA RICA
(Hemiptera: Veliidae)

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ABSTRACT: *Microvelia inquilina*, n. sp. and *Microvelia chanita*, n. sp. are described from the Pacific Coast of Costa Rica. These two species, along with another Costa Rican species, *M. oraria* Drake (crab unrecorded), are found inhabiting land crab burrows made by *Cardisoma crassum* and *Ucides occidentalis* respectively, but the nature of the association is unknown.

The two *Microvelia* described below were found inhabiting crabholes on the Pacific Coast of Costa Rica. Previously, *Microvelia oraria* was the only veliid known from crabholes and was described from an Atlantic Coast locality in Costa Rica by Drake (1952).

Because veliids are poorly known in the Neotropical region, it is hazardous to surmise that crabholes are the sole habitat of these new species. Yet one of them, *inquilina*, has reduced eyes similar to the bromeliad-inhabiting species *laesslei* Drake and Hussey. Compared to normal pond and stream species, the ommatidia are larger but with only about half as many. For example, *Microvelia pulchella* Westwood (a pond dweller) has an interocular space to eye width ratio (I/W) of 2.43, whereas in *inquilina* and *laesslei* I/W is 3.40 and 3.34 respectively. Small eyes may be an adaptation to specialized container habitats such as bromeliads and crabholes offer.

The material upon which these species are based was made available by the junior author and Dr. Donald B. Bright, California State College, Fullerton, from their collections in connection with a general study of the biology of land crabs and their burrow associates (LCBA), a project conducted with the support of grants from the American Philosophical Society.

All specimens were taken from samples of water extracted from deep within land crab burrows with a simple bottle pump fixed with an intake hose of one-half inch inside diameter. The bugs are hygrophobic and readily come to the surface of water taken with the pump. The construction and use of the device itself (small type mosquito pump) is described by Belkin et al. (1965:70-71).

Both species were taken in the same locality and general habitat. However, their specific microhabitats are very different. *Microvelia chanita* was found in only a single burrow, that of a full-grown crab, *Cardisoma crassum*. The collectors observed that this crab typically constructs its burrows just above the highest high tide line where they are never (or rarely) flooded but receive ground water most of the year directly from the sea or from some

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other proximate water body. In the present case the burrow was located only a few feet from a fresh water seepage pond which was separated from the sea by a slight rise and a distance of approximately 100 meters. At the time of the collection the level of free water was depressed below the burrow mouth, and the water was brackish (NaCl 2020 ppm). The bugs were observed in and about the crabhole but most were collected with the mosquito pump. None were seen on the surface of the nearby pond, but they might have occurred there also. It is possible that the presence of these water bugs at this site was simply accidental, the species being normally adapted to living on open pools as is true of most of its relatives.

From the reduced eyes of *inquilina*, which may be a morphological trait associated with life in a container habitat (see above), behavior, and that it was collected repeatedly from crabholes (LCBA 526 represents a pooled sample of 25 burrows of the crab, *Ucides occidentalis*, all siphoned with the bottle pump), this species is more likely than *chanita* to be a normal inhabitant of this specialized microhabitat. *Ucides occidentalis*, unlike *C. crassum*, constructs its burrows at a low elevation where they are partially or completely flooded by daily high tides or at least annual spring tides. This poses the additional question: if its niche is destroyed for a portion of the day or year, does this species become a littoral dweller, invade the burrows of other crabs, or utilize a resistant stage (egg?) to pass this critical period? Extensive collecting in the type locality of *inquilina* in the season of high tides has yielded no specimens from *C. crassum* holes.

Microvelia inquilina Polhemus and Hogue, new species

DESCRIPTION

Apterous male, adult:

Size.—Very small, short, broad; length 1.15 mm; width 0.44 mm.

Coloration and vestiture.—Ground color black to blackish brown. Grey pruinose on areas as follows: fore part of head; connexivum, and much of abdominal dorsum, lateral portions of tergite 2; all but median area on tergite 3; median third of tergite 6; broad triangular area of tergite 7; all of genital segment 1 dorsally. Pronotum broadly testaceous, blackish brown laterally beyond middle of eyes. Apex of abdominal tergite 6 and genital segments brown, latter lighter ventrally; underparts of head and rostrum testaceous. Legs and antenna yellowish to yellow brown. Entire body covered with short, semi-erect pubescence.

Head.—Length .28 mm; width (including eyes) .40 mm; interocular space .25 mm. Vertex strongly convex; eyes small, with about 50 ommatidia. Antennal formula; segments I-IV, 8:7:16:18; segments 1 stout, segment 2 less stout, segments 3 and 4 slender; all segments clothed with long hairs. Rostrum reaching past front coxae.

Thorax.—Proportional lengths, pronotum/mesonotum: 6/4. Width across humeri .57 mm. Posterior margins of pronotum, mesonotum straight; metanotum with angles broadly exposed, length .13 mm; mesonotum with small pits

behind posterolateral angles of pronotum, widely separated (.35 mm); dorsal surface of thorax feebly convex.

Legs short, stout, covered with pale hairs, longer on tibia; fore tibia with short comb. Measurements of legs as follows:

	Femur	Tibia	Tarsal 1	Tarsal 2
Anterior	.37 mm	.27	.17	—
Middle	.42	.33	.07	.13
Posterior	.42	.45	.08	.13

Abdomen.—Proportional lengths, abdominal tergites I-VII, 7:5:5:3:3:5:9; first genital segment protruding from tergite 7 by .10 mm, rounded apically; connexiva moderately broad (.10 mm), slightly raised; entire abdomen broad, tapering slightly posteriorly, lateral margins of connexiva more sharply rounded along tergites 6-7. Venter of abdomen broadly raised medially, extending onto ventrite 5, which is produced slightly medio-caudad and emarginate; ventrite 6 similarly but more strongly produced and emarginate, excavate on midline; ventrite 7 not raised medially; broadly, roundly and deeply excavate medially forming a semicircular depression opening caudad. Genital segment 1 roundly emarginate ventrally; segment 2 swollen, not extending beyond tip of segment 1; parameres visible, hooklike, extending caudad and upward along grooves on the posterolateral margins of genital segment 1 (Fig. 1 F).

Apterous female, adult:

Very similar to male, except connexivum almost vertical, abdominal venter unmodified, body somewhat more robust; length 1.33 mm; width 0.65 mm.

MATERIAL

Holotype ♂, Allotype ♀, and Paratypes 6 ♂♂, 7 ♀♀, Costa Rica, Puntarenas Province, Boca de Barranca, 9-11 Feb. 1969, Hogue and Bright, LCBA 526, ex. crabhole *Ucides occidentalis*. The holotype, allotype and seven paratypes are deposited in the collections of the Natural History Museum of Los Angeles County. Six paratypes are in the Polhemus collection.

DIAGNOSIS

The color, extremely small size, larger proportional length of head vs. remainder of body ($17/52 = .328$), small eyes, long antenna and modification of the male venter distinguish this species from all other *Microvelia*. *Microvelia laesslei* Drake and Hussey and *Microvelia distanti* Lundblad, with which *inquilina* would most likely be confused, are both larger (*laesslei* ♂ 2.28 mm, ♀ 2.3 mm; *distanti* ♂ 1.9 mm, ♀ 2.3 mm). Neither of them has ventrite 5 produced or ventrite 6 excavated medially, and their heads are proportionally smaller than *inquilina* (length of head/remainder of body: *distanti*, $35/155 = .226$; *laesslei*, $45/185 = .243$). Additionally, the color-

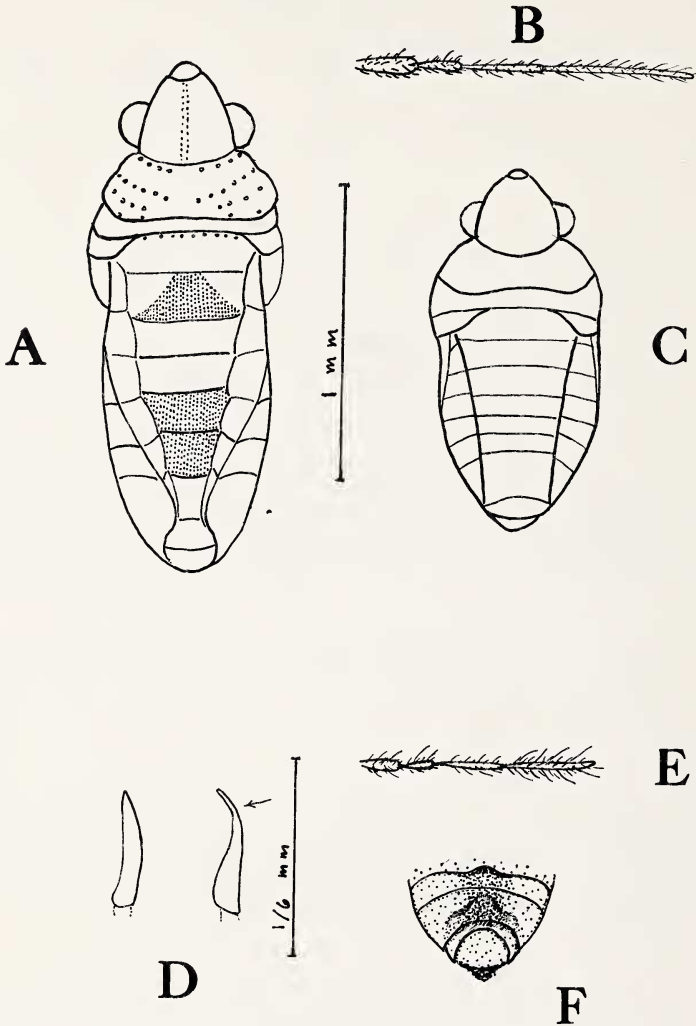


FIGURE 1. A-B: *Microvelia chanita*, new species. A, female, dorsal view; B, antenna. C-F: *Microvelia inquilina*, new species. C, male, dorsal view; D, male paramere, dorsal (left) and lateral (right) views; E, antenna; F, male, apical abdominal segments, ventral view.

tion is different, *distanti* being deep brown with the first two tergites pruinose and the first three connexiva flavous forming a light transverse band, and *laesslei* being deep brown with a rufous pronotum and white wing pads in the micropterous form (apterous form not known). In both of these species the pronotum covers the mesonotum, whereas in *inquilina* the mesonotum is broadly exposed. The eyes in *distanti* are not reduced significantly in relation to the head as in *inquilina*.

Microvelia chanita Polhemus and Hogue, new species

DESCRIPTION

Apterous female, adult:

Size.—Small, subfusiform. Length, 1.77 mm; width, 0.72 mm.

Coloration and vestiture.—Ground color brown; grey pruinose on fore part of head, collar, median wedge on abdominal tergite 2, all of tergites 5 and 6; anterior lobe of pronotum white pruinose; median area of head and pronotum, most of mesonotum and tergite 1, posterior part of each connexival segment yellowish; venter ochraceous, midventral areas, midlateral spots brownish; antenna ochraceous to brownish; legs leucine to ochraceous, dorsally and apically brownish; underparts of head and rostrum ochraceous.

Head.—Length .37 mm, width (including eyes) .43 mm, interocular space .28 mm. Vertex strongly convex; eyes of moderate size; antennal formula I-IV, 13:10:16:29; segment 1 stout, 2 less stout, 3-4 slender; all segments clothed with recumbent hairs of length equal to diameter of segment 2, and scattered longer hairs. Rostrum reaching beyond fore coxae.

Thorax.—Proportional lengths, pronotum/mesonotum: 11/3; midline lengths, anterior pronotal lobe/posterior pronotal lobe: 5/6. Width across metanotal angles .72 mm; collar marked by a row of widely spaced pits; lobes of pronotum separated by a row of deep pits, interrupted medially, as is transverse row of pits on caudal lobe; caudal margins of pronotum and mesonotum slightly concave; metanotal angles narrowly exposed, length .83 mm (from postero-lateral angle of mesonotum); mesonotum broadly excavate under posterolateral margins of pronotum; lateral margins of thorax set with semi-long, curved, bristly hairs; dorsal surface slightly convex, pronotum depressed below level of mesonotum; propleura depressed along caudal margin.

Legs of moderate length, covered with short pale hairs, longer on under surface of femora; measurements of legs as follows:

	Femur	Tibia	Tarsal 1	Tarsal 2
Anterior	.47 mm	.40	.23	—
Middle	.52	.43	.12	.15
Posterior	.52	.62	.13	.17

Fore tibia slightly flattened and widened apically, narrowing abruptly just before apex.

Abdomen.—Proportional lengths of abdominal tergites I-VIII, 9:8:8:8:9:9:8:6. Connexiva moderately broad, semi-erect along tergite 1 to vertical at apex; set with bristly hairs at apex. Venter broadly rounded, feebly flattened medially, clothed with decumbent hairs visible from above. Shape as in figure 1 A.

Male: Unknown.

MATERIAL

Holotype ♀ and 8 ♀♀ Paratypes, Costa Rica, Puntarenas Prov., Boca de Barranca, 8 August 1967, Hogue and Bright, LCBA 158, ex. crabhole *Cardisoma crassum*. Deposited in the collection of the Natural History Museum of Los Angeles County. Three paratypes are in the Polhemus collection.

DIAGNOSIS

Microvelia chanita belongs to the *albonotata* group including *albonotata* Champion, *mimula* White, *tateiana* Drake, *quieta* Drake, *novana* Drake, *cubana* Drake and *portoricensis* Drake. This group, not previously recognized, is comprised of those small species (circa 2 mm) which have the pronotum of medium length, having two distinct lobes separated by a depressed transverse line of pits, but leaving much of the mesonotum exposed. The ratio of midline length of pronotum/mesonotum in this group varies from $12/7 = 1.73$ (*tateiana*) to $11/3 = 3.67$ (*chanita*).

The primary distinguishing characteristics of *chanita* are extremely long fourth antennal segment combined with a relatively short thorax (measured on dorsal midline, thorax/head: $15/25$). *M. albonotata*, the only other species with very long fourth antennal segments, has thorax/head: $25/28$. Additionally, *chanita* has narrow apical abdominal tergites, a character state shared within the *albonotata* group only by *M. portoricensis*.

RESUMEN

Microvelia inquilina, sp. nov., y *Microvelia chanita*, sp. nov., de la costa pacífica de Costa Rica son descritos. Estas dos especies, con otra de Costa Rica, *M. oraria* Drake (cangrejo no conocido), se encuentran habitando las cuevas de cangrejos terrestres construidas por *Cardisoma crassum* y *Ucides occidentalis*, respectivamente, pero la naturaleza de la asociación no es conocida.

LITERATURE CITED

- DRAKE, C. J. 1952. Two new *Microvelia* Westwood (Hemiptera: Veliidae). Bull. Brooklyn Ent. Soc. 47(1):13-15.
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