

Millipedes in the Collection of the AMCS. III. *Reddellobus troglobius*, n. gen., n. sp., an Unusual Troglobite from Puebla, Mexico, and Other Records of the Family Spirobolellidae (Order Spirobolida, Class Diplopoda)

by

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During the past several years, members of the Association for Mexican Cave Studies have made some surprising additions to the knowledge of the invertebrate fauna of Mexico. None of their finds is more exciting than the species described here, a millipede much larger than the nearest epigean relative in an order outstanding for its scarcity of troglomorphic adaptations. The absence of ocelli and the reduction of body pigment in the known epigean typhlobolellids suggest that they are deep humus dwellers preadapted for cave life.

Family Spirobolellidae
Subfamily Typhlobolellinae

Typhlobolellinae Hoffman, 1969, p. 184.

Characterized by the combination of somatic characters, unique in the order Spirobolida, including the slender body, absence of ocelli, stink glands beginning on segment 3, and the sympleurotergal bridge behind the metasterna.

Genera — *Typhlobolellus* Hoffman, 1969, known by the type species and *T. fortinus* Shear, 1973; *Ergene* Chamberlin, 1943 and *Reddellobus*, n. gen., both monotypic; and possibly *Morelene* Chamberlin, 1943 (Shear, 1973 b), also monotypic.

Range — Mexican states of San Luis Potosí, Tamaulipas, Vera Cruz, Puebla, and possibly Morelos.

Genus *Reddellobus*, new

Type species — *Reddellobus troglobius*, n.sp., by monotypy.

Spiroboloids resembling *Ergene* in having a duplomentum and numerous body setae; differing in the adaptations to cave life, absence of macrosetae on the legs, and position and development of the mesial basal sclerite of the phallopods.

This genus is named for James R. Reddell, of the AMCS, in recognition of his leadership, diligence, and efficiency in promoting the knowledge of the cave fauna of Mexico. The gender of the name is masculine.

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Reddelobus troglobius, new species (Figs. 1-5)

Holotype — Adult male, gonopods not removed, body broken. Greatest body width, 2.7 mm, about 0.3 mm less than height, length about 65 mm, segments probably 84. Body is slender, slightly moniliform, general appearance much more lysioptetalloid or cambaloid (for example, the divided mentum and setose metazonites!) than spiroboloid. Color in preservative yellow-gray over most of body and dark gray-brown over ventral surface and legs, several anterior segments and head. Color darkens on drying.

Head smooth, facial setae in two vertical rows, 3 + 3 clypeal setae. No ocelli. Gnathomentum lacks separate cardines, mentum is bowed forward and hinged, as in *Ergene setosus*. Antennae are long, slender, reaching back to segment 7, with a sensory area on distal surface of article 6 and four terminal sensory cones.

Collum and metasomites bear numerous short, acute setae. Setae thin out below stink pores and are either absent or scarce on ventral surface of body rings. Anal segment and legless hind segments are thickly setose on all surfaces.

Collum narrowed and rounded on ventral angles, margined along anteroventral edge, and lightly striate on ventral ends. Body segments are divided by distinct line into prosomites and metasomites. Prosomites are smooth, shining, asetose, and well exposed only on middle four-fifths of body segments. Metasomites are finely striate longitudinally below pores. Stink glands begin on segment 3 and continue through last body segment; openings are minute, placed about middle of metasomites, and area around them is slightly swollen. At hind end, metasomites are only slightly telescoped within preceding segments.

Anal valves have mesial margins thin and slightly raised. Apex of anal tergite is thin, broadly angular, and closely applied to anal valves, which exceed it. Caudal margin of anal scale is almost straight.

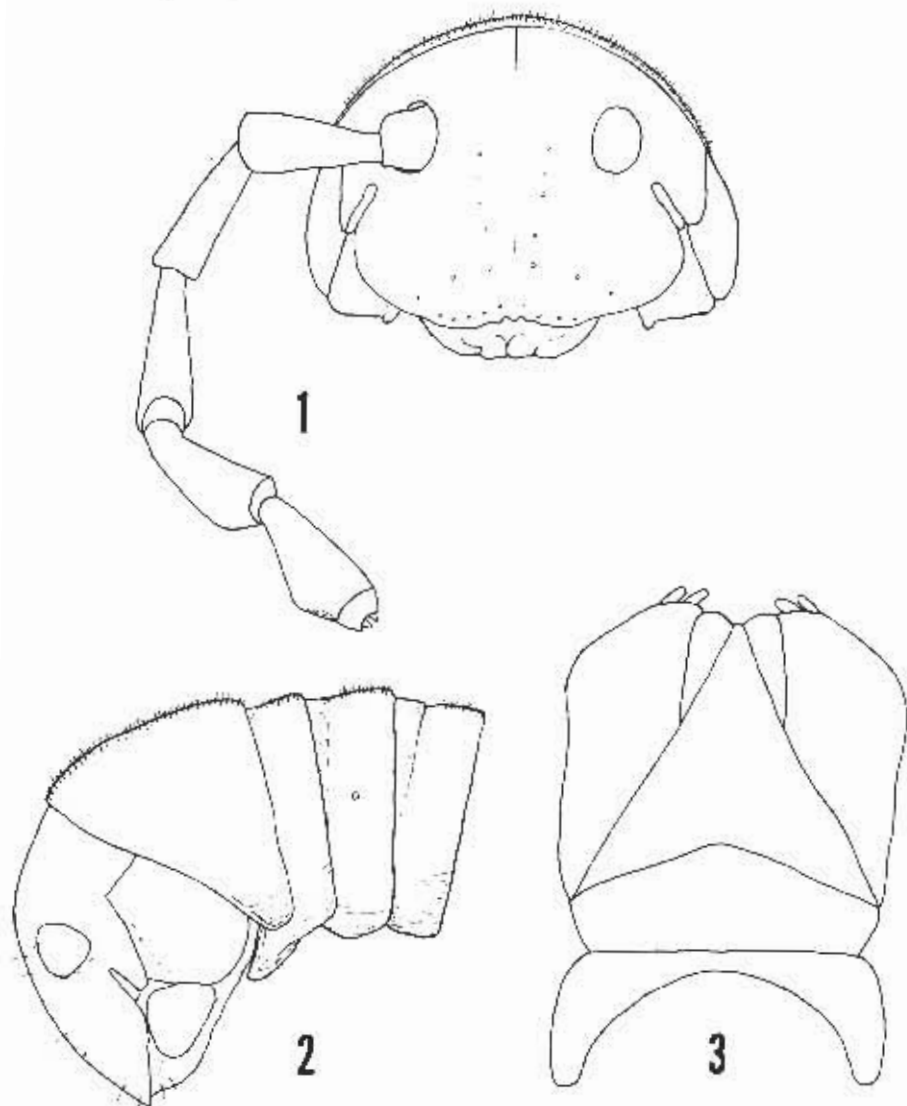
Pleurosternal structure is as described by Hoffman (1969) for *Typhlobotellus whiteheadi*. Legs are slender, about 3.4 mm long, extending well beyond sides of body when viewed from above. Legs 1 and 2 are a little thickened. No legs bear lobes or specially modified setae. Ventral setae on middle body legs are relatively abundant, about 5-8-13-9-7-11. Tarsal claws are acute, elongated, a little curved.

Gonopodal opening is broad V-shape, its middle margin thickened and extending below body surface. Caudal margin of body ring 7 is broadly concave behind gonopodal opening. *In situ* apices of phallopods and coxites are contiguous and visible.

Gonopods are lightly chitinized, as compared with other spiroboloids. Sternum of coleopods is arched and produced mesiad in a narrow spatulate process which is a little shorter than lateral pieces. Coxae are cleft mesially, allowing them to almost completely enclose sternal process and touch in midline. Apex of coxa is narrowly angular. Apex of telopodite is blunter and slightly wider than apex of coxite, and like *E. setosus* apex is not twisted. Phallopods project between apices of coxites, their apical threads overlapping. On caudal surface, coxae are connected by a supple U-shape band; phallopods are lightly contiguous at base but probably are not connected. Sternal apodeme is longer than coxal apodeme. Apodeme of phallopod is

longer than sternal apodeme and directed dorsad and slightly ectad and caudad.

Phallopods are flat, largely membranous, with two weak basal sclerites. No trace of a suture is between thicker coxal region and telopodite, nor is there a bladder. A short seminal groove is on coxal region at mesial edge of telopodite. One basal sclerite is long, thin, horizontal, and articulates with apodeme. The other sclerite is



Figs. 1-3. *Reddellobus troglobius*, n.sp. 1. Head and antenna, setae omitted except on collum. 2. Head and first four segments, setae omitted except on dorsal margin. 3. Gnathochilarium. Drawn from a topoparatype.

shorter, bordering the oblique mesial margin of coxal region; it is probably homologous with the mesial, salient, strongly chitinated sclerite in *E. setosus*. On mesial margin of telopodite are two long thin membranes, the anterior one deeply fringed. At apex of telopodite are two threadlike pieces, each bearing minute spines distad. *Variations* — Width of ♂ paratypes 2.4 – 3.0 mm, segments 71 – 76. Width of ♀ paratypes 3.2 – 3.7 mm, segments 75 – 89. Maximum length about 95 mm.

Type locality, holotype, and topoparatypes — Grutas de Jonotla, 3700 ft el, 7 km SW of Cuetzalan, Puebla, Mexico; 2 ♂, of which one is holotype, 3 ♀; 27 Dec. 1973, James R. Reddell, Roy Jameson, David McKenzie, and William Elliott, collectors. *Other localities and paratypes* — Cueva Xochitl, 3300 ft el, 3 km SE of Xochitl, 1 ♂ 2♀, immatures, 30 Dec. 1973, James Reddell, collector; Cueva de la Barranca, 8 km SW of Cuetzalan, 2 ♂, immatures, 25 Dec. 1973, D. McKenzie, collector; Octimaxal Sur n. 2, 4150 ft el, 3 km SSW of Cuetzalan, immatures, 27 Dec. 1973, D. McKenzie, R. Jameson, collectors. Determination of females and immatures from last two caves is tentative, pending study of adult males from these caves.

Range — Limestone caves in Sierra Madre Oriental, all within a radius of 4 km and SW of Cuetzalan in northern Puebla (Davis, 1974; Reddell, 1974). James Reddell (*in litt.*) reported: "Collecting was generally very poor in the Cuetzalan area of Puebla... The surface has been under complete cultivation or pasture-land for uncountable periods of time and I found almost nothing living outside of caves." At least ten other species of millipedes, troglobitic and epigean, all in previously known genera, were collected in the four caves occupied by *R. troglobius*.

Deposition — Holotype (adult ♂), ♀ paratype, USNM; ♂ and ♀ paratypes, Zoology Museum, Texas Tech University; remaining paratypes, author's collection.

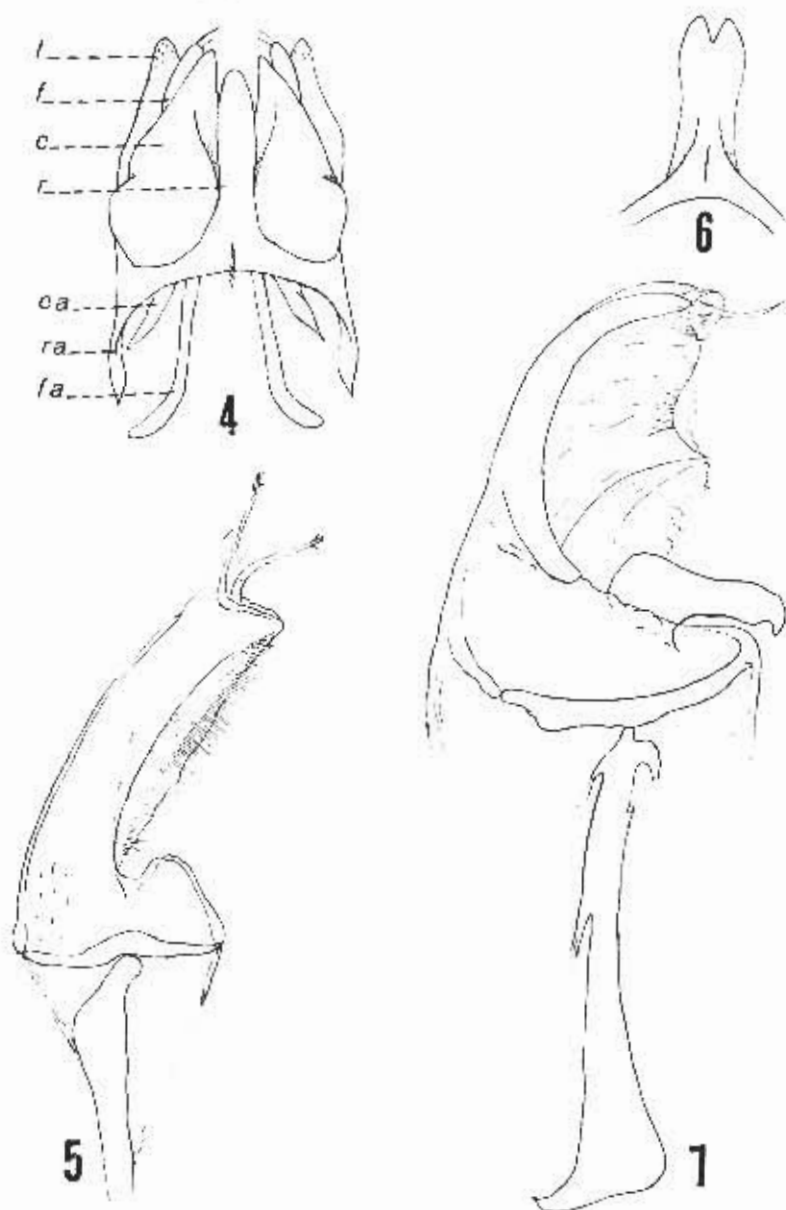
Ergene setosus Chamberlin (Figs. 6, 7)

Ergene setosus Chamberlin, 1943, p. 5, figs. 3,4. Causey, 1971, p. 271. Shear, 1973 b, p. 43.

The specimens previously reported from Tamaulipas and San Luis Potosi (Causey, 1971) are from epigean collections. This species shares the following characters with *Reddellobus troglobius*: mentum is divided, collum and metazonites are thickly setose; pregonopodal legs lack lobes, claws are acute and slightly curved, and coleopods are similar. It differs somatically in the strong, retrorsely hooked macroseta on dorsal surface of femur of legs of posterior three-fourths of body of both sexes, antennae extend back to segment 3, and body is much smaller. It differs from *R. troglobius* in the following conspicuous sexual characters: sternal process of coeleopods is notched apically and broadened in middle, and basal sclerites of phallopods are stronger, especially mesial one, which is horizontally salient and beaklike. Apex of beaklike sclerite is slightly contiguous with homologue.

Typhlobolellus sp.

A depigmented female collected at Tuxpan, Vera Cruz, 12 June 1954 has a body width of 1.2 mm and 48 segments, of which the last three are legless. Prefemurs and



Figs. 4-7. Gonopods of *Reddellohus troglolobius* n.sp., *Ergene setosus* Chamberlin. 4. *R. troglolobius*, gonopods, anterior view with pieces pushed apart apically; *r*-sternal process, *m*-sternal apodeme, *c*-coxa, *ca*-coxal apodeme, *t*-telopodite of coleopod, *f*-telopodite of phallopod, *fa*-apodeme of phallopod. 5. *R. troglolobius*, left phallopod, anterior view. 6. *Ergene setosus*, sternal process of coleopods. 7. *E. setosus*, right phallopod, posterior view. Figures 4 and 5 were drawn from a topoparatype and 6 and 7 from a topotype.

femurs of legs bear macrosetae on dorsal surface as in *T. whiteheadi* Hoffman, 1969.

SUMMARY

Reddellobus troglobius, n. gen., n. sp., a typhlobolellid in caves in the Sierra Madre Oriental of Puebla, Mexico, resembles *Ergene setosus* in the diplomentum and setose metatergites and differs in the troglobitic adaptations, sexual characters, and much greater size.

RESUME

Reddellobus troglobius, n.gen., n.sp., Typhlobolellide des grottes de la Sierra Madre Oriental à Puebla (Mexique) se rapproche de *Ergene setosus* par son diplomentum et ses métatergites pileux, mais en diffère par ses adaptations à la vie troglobie, ses caractères sexuels et sa taille beaucoup plus grande.

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