

**A CAVERNICOLOUS SPECIES OF THE GENUS *ANELPISTINA*  
(ZYGENTOMA: NICOLETIIDAE) FROM SAN SEBASTIAN CAVE,  
OAXACA, MEXICO**

LUIS ESPINASA AND ADRIANA FISHER

Natural Sciences Department, Shenandoah University, 1460 University Drive,  
Winchester, VA 22601, U.S.A. (e-mail: lespinas@su.edu)

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**Abstract.**—*Anelpistina acanthocrus*, n. sp. (Insecta: Zygentoma: Nicoletiidae) from a cave in Oaxaca, Mexico, is described. The new troglobitic species differs from other described species by the presence of pegs or spines on the legs.

**Key Words:** Nicoletiidae, new species, cave, Mexico

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The subfamily Cubacubaninae (Insecta: Zygentoma: Nicoletiidae) is distributed throughout the New World (Mendes 1988). Within this subfamily, individuals of the genus *Anelpistina* Silvestri, 1905, are characterized by the presence of 1 + 1 articulated submedian appendages on urosternum IV in adult males and/or a deep point of insertion of parameres in urosternum IX with the internal face of the coxal processes with macrochaetae more or less sclerotized (Espinasa 1999). However, the monophyly of the group has recently been questioned (Espinasa 2005).

Of the 14 species assigned to *Anelpistina*, six inhabit caves, but only *A. puertoricensis* Espinasa and Baker Alpheis, 2003 and *A. decui* (Wygodzinsky and Hollinger 1977) (see Espinasa 1999 for genus reassignment) have the elongated appendages and body of truly cave-adapted Nicoletiids. The new species described here also shares these adaptive characteristics and probably is a troglobite.

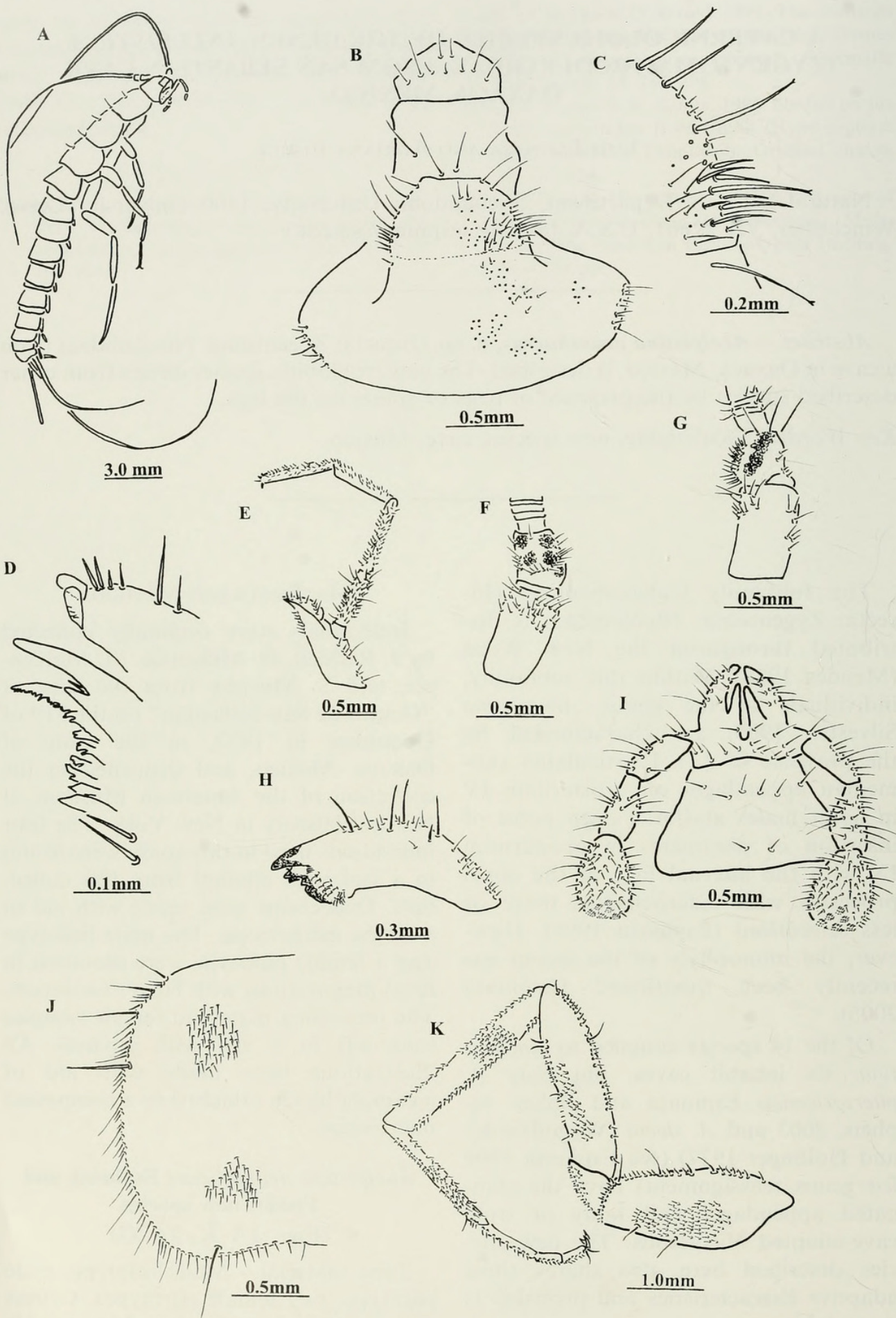
**MATERIALS AND METHODS**

Individuals were originally collected by J. Reddell, D. McKenzie, M. McKenzie, and S. Murphy from the cave of "Grutas de San Sebastian" on the 31<sup>st</sup> of December in 1972, in the state of Oaxaca, Mexico, and deposited in the collection of the American Museum of Natural History in New York. The four individuals used in this study were found in a vial with ethanol from this collection. Dissections were made with aid of a stereo microscope. The male holotype and a female paratype were mounted in fixed preparations with Hoyer's solution. The remaining male and female samples were left in a vial with ethanol. All illustrations were made with aid of a camera lucida attached to a compound microscope.

***Anelpistina acanthocrus* Espinasa and  
Fisher, new species  
(Figs. 1A–K, 2A–G)**

Type material.—Male holotype, male paratype, two female paratypes. Grutas de San Sebastian, Oaxaca, Mexico. 31-







12-72. J. Reddell, D. McKenzie, M. McKenzie, and S. Murphy cols. Deposited in the American Museum of Natural History, New York, NY.

Description.—Maximum body length 16 mm. Maximum conserved length of antenna 18 mm, although broken. Caudal appendages also broken. Body proportions as in Fig. 1A. General color light yellow to white.

Head with macrochaetae and microchaetae as shown in Figs. 1B–C, with approximately 8 + 8 macrochaetae on border of insertion of antenna. Basal article of antenna in  $2/3$  as long as first article and with unicellular glands on ventral surface, clustered approximately in four groups and with a row of microchaetae bordering them in form of a “U” (Fig. 1F). On outside lateral border an extra longitudinal row of four undefined clusters (Fig. 1G). Female basal articles of antenna simple.

Mouthparts very long, maxilla as shown in Fig. 1E. Ultimate article of maxillary palp approximately equal in length to penultimate article. Apex of galea with two conules of different widths (Fig. 1D). Two teeth on lacinia plus a third thin hyaline one in between them. Labial palp as in Fig. 1I, apical article slightly longer than wide and slightly longer than penultimate article. Penultimate article with not too prominent bulge containing two macrochaetae. Labium and first article of labial palp with macrochaetae. Mandible chaetotaxy as in Fig. 1H, with approximately five macrochaetae.

Mesonotum with approximately four macrochaetae on lateral borders apart from several setae of varied sizes (Fig. 1J). Legs elongate as shown in

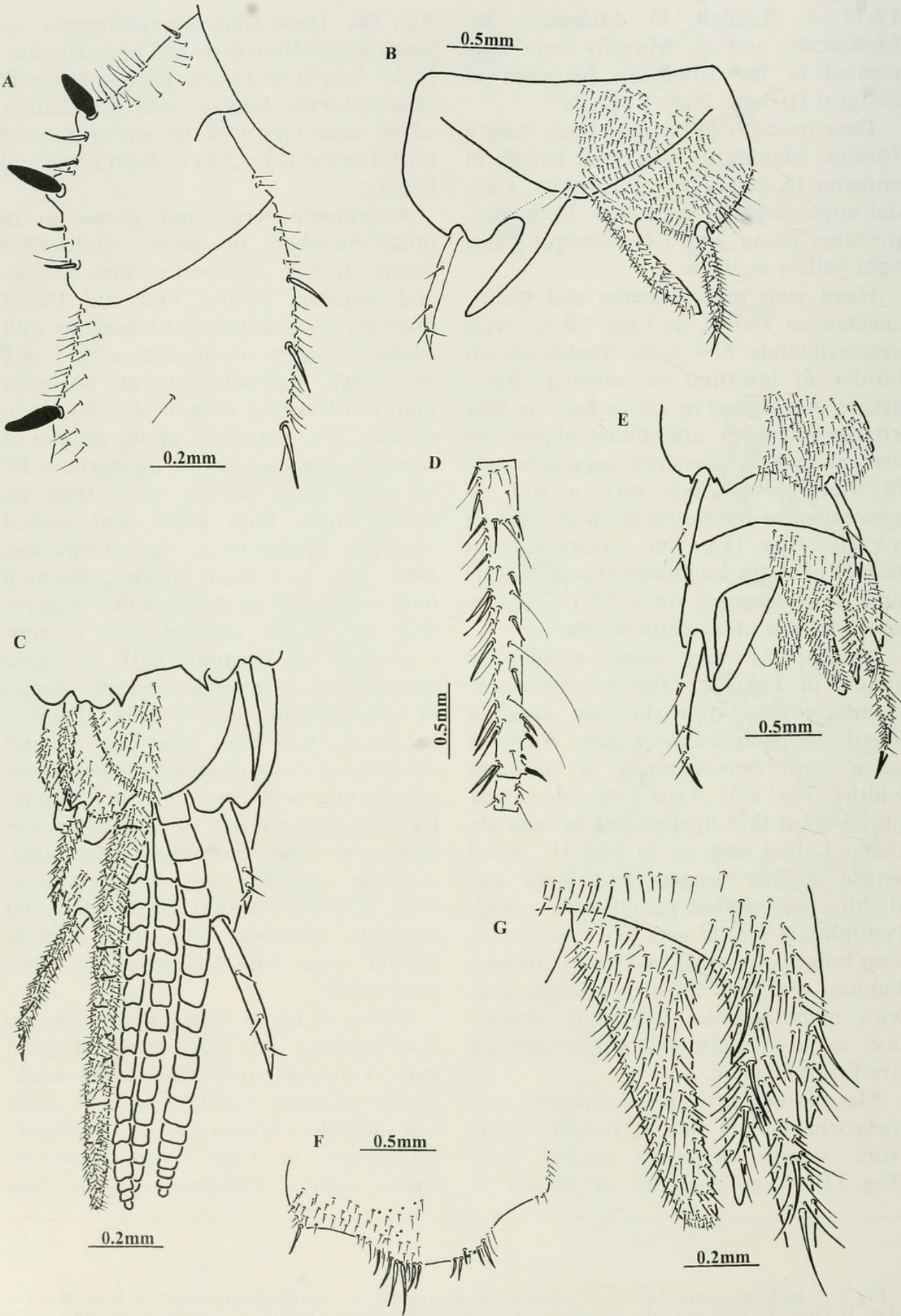
Fig. 1K. Hind tibia approximately six times longer than wide and approximately  $3/4$  length of tarsus. Claws relatively long and with elongate setae. Trochanter of the second leg with two spines inserted on tubercles (Fig. 2A) in both male and female.

Abdominal terga and sterna as in other members of genus. Abdominal sterna II–VII subdivided into coxites and sternites. Sterna VIII and IX of male entire. Chaetotaxy of sternites with median portion of sternites with 2 + 2 sublateral macrochaetae at posterior hind borders, but without 1 + 1 macrochaetae near suture at about middle of segment. Appendages of urosternum IV of adult male narrow, more than six times longer than wider and curved outward, similar to *A. ruckeri* Silvestri, 1905, but very much shorter, reaching only two thirds of stylet of this segment (Fig. 2B). Apex pointed, but without a hook. Urosternum VIII of male emarginate on posterior margin, angles of emargination pointed (Fig. 2E). Urosternum IX of male as in Figs. 2E and 2G without a row of sensory cones. Point of insertion of parameres in urosternum IX deep, internal face of coxal processes spiniform and extremely elongated, reaching almost apex of parameres (Fig. 2G). Urosternum IX centrally and on coxal processes with some slightly thicker setae, but otherwise not more sclerotized.

Stylets IX larger than others, with two macrochaetae and an extra subapical pair. Terminal spine with small teeth. Stylets without modifications in male and female. Urotergite X shallowly emarginate in both sexes, posterior angles with 2 + 2 macrochaetae and

Fig. 1. *Anelpistina acanthocrus*. A, Adult male paratype. B–K, Adult male holotype. A, Body proportions. B, Head. C, Macrochaetae on border of insertion of antenna. D, Apex of maxilla. E, Maxilla. F–G, Pedicellus. H, Mandible. I, Labium. J, Mesonotum. K, Hind leg.







a few relatively strong setae, length of inner macrochaetae almost equal to distance between them (Fig. 2F).

Penis and parameres as shown in Figs 2E and 2G. Parameres attaining slightly less than  $\frac{1}{2}$  length of stylets IX in adult. Parameres subtriangular and slightly pointed: wide basally and narrow at the apex. Subgenital plate of female rounded to parabolic (Fig. 2C). Ovipositor in adult females surpassing apex of stylets IX by  $\frac{3}{4}$  length of stylets (Fig. 2C). Gonapophyses with approximately 19 articles.

Cercus of adult male with a longer than wide basal article sometimes followed by a wider than long, then a very long article bearing numerous spines, followed by numerous short articles of simple chaetotaxy. Spines on inner surface consist of a strong, subacute one inserted on a tubercle, a very small one, and a long, acute and slightly curved one also inserted on a tubercle (Fig. 2D). Female cercus simple.

Postembryonic development.—Mostly unknown; all samples ranged only within 15 mm to 16 mm. As with other species, younger individuals may have a reduction of secondary sexual characters. It is also likely that in larger males, the appendages of urosternite IV may be larger.

Distribution.—Known only from the type locality.

Etymology.—From the Greek *akantha* = spine, and the Latin *crus* = leg (nominative singular). In reference to the spines or pegs in the legs of both males and females.

Remarks.—Espinasa and Baker Alpheis (2001) subdivided *Anelpistina* based

on the morphology of the appendages of urosternum IV (Fig. 2B) of the adult males into the following groups: a) species that lack the appendages (*A. decui* and *A. inappendicata* Espinasa, 1999); b) species with simple appendages of medium size, their length being slightly longer than the length of urosternum IV and less than five times longer than wide (*A. anophthalma* Bilimek, 1867, *A. wheeleri* Silvestri, 1905, *A. miranda* Silvestri, 1912, *A. boneti* Wygodzinsky, 1946, *A. bolivari* Wygodzinsky, 1946, *A. cuaxilotla* Espinasa, 1999 and *A. puertoricensis*); c) species that in addition to the appendages, have two projections on either side of insertion of stylets (*A. weyrauchi* Wygodzinsky, 1959 and *A. ariasae* Espinasa, 2005); d) species with very long, simple appendages, their length being approximately equal to twice the length of urosternum IV and more than six times longer than wide (*A. ruckeri*, *A. carrizalensis* Wygodzinsky, 1946 and *A. doradoi* Espinasa and Baker Alpheis, 2001).

The new species does not belong to any of the aforementioned groups because, although its appendages have a similar appearance to those of the last group (six times longer than wide), they are extremely short and do not surpass the apex of the stylets (Fig. 2B). Beside the morphology of the appendages of urosternum IV, adult males can be differentiated from all other species within the genus by the appearance of the genital area, in particular the internal face of the coxal processes which are spiniform and extremely elongated, reaching almost to the apex of the parameres (Fig. 2G), and by the tro-

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Fig. 2. *Anelpistina acanthocrus*. A–B, D–G, Adult male holotype. C, Female paratype. A, Trochanter of the second leg with spines inserted on tubercles. B, Urosternum IV. C, Ovipositor and subgenital plate. D, Cercus (spines on inner surface are shown in dark on the lower-right portion of the figure); E, Male genital area. F, Urotergite X. G, Urosternum IX, coxal process and paramere.



chanter of the second leg with two spines inserted on tubercles (Fig. 2A).

Females usually are more difficult to differentiate within the genus because the change in ovipositor length during post-embryonic development might create confusion. In the new species the presence of two spines on the trochanter of the second leg makes it easy to differentiate from all other species described. The presence of spines or pegs of this kind on any part of the body is typically restricted to adult males. It is interesting that what typically constitutes male sexual secondary characters is also found in females in this new species.

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