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ROBUSTOCHELES INFERNALIS SP. N. (ACARINA: ACTINEDIDA:  
RHAGIDIIDAE) FROM CUEVA DEL DIABLO, VERACRUZ, MÉXICO

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**Abstract:** *Robustocheles infernalis* is described as a new species and its taxonomic position is discussed.

INTRODUCTION

During the course of a 1973 biospeleological expedition to southern México, James REDELL and Stewart MURPHY briefly visited Cueva del Diablo. This cave is frequented by people from the nearby cities of Ciudad Mendoza and Orizaba, Veracruz. The cave entrance is on a ledge, Balcon del Diablo, which is at the top of a precipitous 15 m climb on the side of a mountain overlooking Ojo Zarco, a karst spring. The cave is 250 to 300 m long and contains passageways up to 10 m wide and 15 m high. The fauna collected by the two speleologists included rhagidiid mites, which we describe here; a troglomorphic schizomid, *Schizomus lanceolatus* ROWLAND; a troglomorphic pseudoscorpion, *Typhloroncus* sp. n.; a troglomorphic spider, *Psilochorus* sp. n.; campodeid diplurans; psocids, *Psyllipsocus ramburii* SELYS-LONGCHAMPS; collembolans, *Pseudosinella* sp.; and staphylinid beetles, Aleocharinae genus et species and *Belonuchus* sp. (J. REDELL, pers. comm.). These species represent a fairly typical cave fauna for México. However, this is only the second known report of rhagidiids from México. *Rhagidia trisetata* ELLIOTT and STRANDTMANN, 1971, is known from Sótano de la Tinaia, San Luis Potosí, approximately 400 km northwest of Cueva del Diablo.

*Robustocheles (R.) infernalis* sp. n.

Fig. 1

Diagnosis: 3 setae on trochanter IV; 4 rhagidial setae tandem in rhagidial organ I; long, slender, dorsodistal, rhagidial seta on tibia I and spiniform solenidion in common insertion pit.

Description: 1 ♂ and 1 ♀ examined. Length of body 900, 1 000  $\mu\text{m}$ , ratio of leg I length to body: 1.29, 1.16.

Dorsum (data in  $\mu\text{m}$ ): internal verticals 56, external verticals 66, filiform trichobothria 116, scapulars 143, internal humerals 52, external humerals 140, dorsals I 56, dorsals II 63, internal lumbar 84, other chaetotaxy torn off.

Venter: epimeral formula 3-1-5-3, trochanteral formula 1-1-2-3. 6 pairs of pro-genital and 5 pairs of paragenital setae. Progenital lip 100  $\mu\text{m}$  long.

Gnathosoma: hypostome broadly oval, internal malae spiniform, external ones membranous, length to breadth ratio: 1.14. Chelicerae with robust shears typical for *Robustocheles*, both cheliceral setae inserted before joint of digitus mobilis with finely serrate inner margin. Length of chelicera 217, 210  $\mu\text{m}$ ; breadth 77, 84  $\mu\text{m}$ ; length of digitus mobilis 84, 77  $\mu\text{m}$ ; length of proximal and distal cheliceral setae 24, 21 and 32  $\mu\text{m}$ , respectively; distance between bases of these setae 31  $\mu\text{m}$ . Ratio of chelicera length to breadth: 2.81, 2.50; length of digitus mobilis to that of chelicera: 0.38, 0.36; length of digitus mobilis to chelicera breadth: 1.09, 0.91.

Terminal palpal segment oval, with 10 ciliated setae and 1 erect spiniform solenidion, length to breadth ratio: 2.88, 2.45.

Tarsus I slender, gently rounded forward, length to breadth ratio: 6.09, 5.83. Slender empodium overlapping claws, clawlets not observed.

Rhagidial organ I consists of 4 rhagidial setae tandem in common insertion pit. Stellate seta between first and second proximal rhagidial setae. Rhagidial organ II consists of 3 tandem rhagidial setae in common insertion pit, spiniform seta proximal.

Solenidia: Tibia I with exceptionally long, slender, dorsodistal rhagidial seta and spiniform solenidion in common insertion pit. Genu I with 1 distoventral solenidion. Tibia II with 1 cryptic, dorsodistal solenidion lying in shallow depression, and with usual dorsodistal lanceolate seta in deep depression with broad terminal pore. Genu II with 1 distoventral solenidion. Tibia III with 1 minute dorsoproximal solenidion; genu III with 1 dorsoproximal solenidion. Tibia IV with 1 dorsoproximal solenidion. No other solenidia observed.

Material examined: 1 ♂ holotype, 1 ♀ paratype, Cueva del Diablo, approx. 1 310 m elevation, 3 km SW of Ciudad Mendoza, Veracruz, México, 7 March 1973, J. Reddell and S. Murphy leg., coll. U. S. Nat. Mus. Nat. Hist., Washington, D. C.

Differential diagnosis: *Robustocheles (R.) infernalis* sp. n. differs from the other representatives of the genus with all the diagnostic characters given above.

Discussion: The species *R. (R.) infernalis* sp. n. could be closely related to

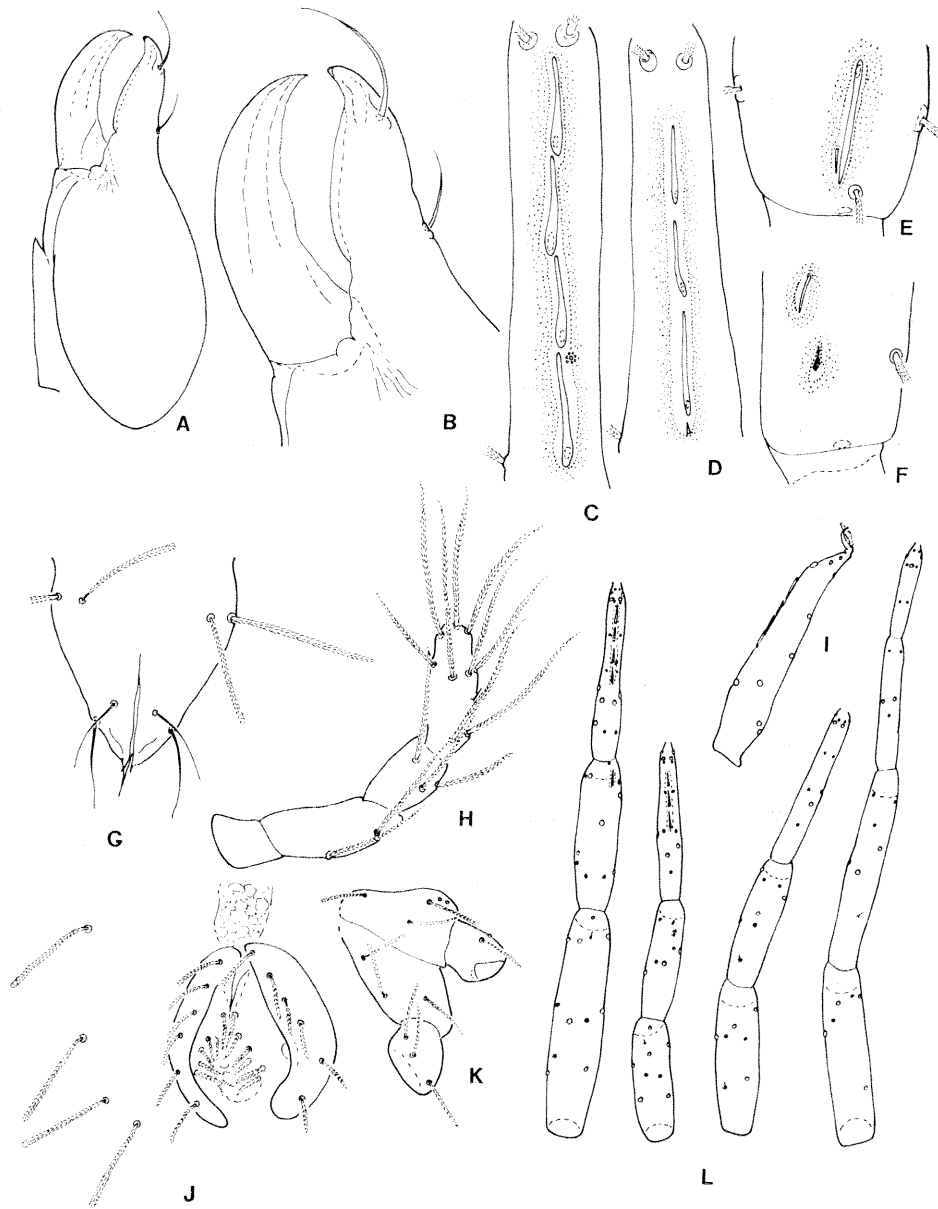


Fig. 1. *Robustocheles (R.) infernalis*. A - chelicera, B - cheliceral shears, C - rhagidial organ I, D - rhagidial organ II, E - dorsodistal rhagidial seta and solenidion on tibia I, F - dorsodistal lanceolate seta and solenidion on tibia II, G - hypostome, H - pedipalpus, I - tarsus I in profile, J - genital region in male, K - epimeral and trochanteral chaetotaxy of legs III, and IV, L - location of solenidia and setae on legs I-IV.

*Rhagidia trisetata* ELLIOTT and STRANDTMANN, 1971. Unfortunately, the type and only specimen of *R. trisetata* could not be found at the U. S. National Museum of Natural History or in the private collection of R. W. Strandtmann. Since we have not been able to examine the type, its generic status remains obscure (cf. ZACHARDA, 1980). However, the original description of *R. trisetata* is detailed enough to distinguish this species from *R. infernalis* sp. n.

	<i>R. infernalis</i>	<i>R. trisetata</i>
length of body	900–1 000 $\mu\text{m}$	650 $\mu\text{m}$
epimeral formula	3-1-5-3	3-1-6-3
pairs of progenital setae	6	5
digitus mobilis	serrate	without serration
proximal cheliceral setae	not reaching basis of distal chelic. seta	just reaching
solenidion of terminal palpal segment	spiniform, erect	recumbent in slight depression
rhagidial setae in rhagidial organ I	tandem in common insertion pit	oblique, separated
stellate seta	between 1st and 2nd proximal rhagidial setae	between 1st and 2nd distal rhagidial setae
spiniform seta in rhagidial organ II	present	absent

The number of 3 ciliated setae on trochanter IV is rare, but not unique in Rhagidiidae (cf. *Foveacheles titanica* ZACHARDA and ELLIOTT, in litt.). Therefore we consider *R. (R.) infernalis* a new species. Its generic status quite corresponds with the diagnosis of the genus *Robustocheles*. No distinct troglomorphisms (ZACHARDA, 1979). The species is named for its association with the subterranean world.

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## REFERENCES

- ELLIOTT, W. R., and R. W. STRANDTMANN, 1971: New locality records for Rhagidia from Mexican and American caves. *J. Kans. Ent. Soc.* 44, 4: 468—475.
- ZACHARDA, M., 1979: The evaluation of the morphological characters in Rhagidiidae. In: J. G. RODRIGUEZ: Recent Advances in Acarology, Vol. II, pp. 509—514, Acad. Press, New York, San Francisco, London.
- ZACHARDA, M., 1980: Soil mites of the family Rhagidiidae (Actinedida: Eupodoidea). Morphology, systematics, ecology. *Acta Univ. Carol.-Biol.* 1978: 489—785.
- ZACHARDA, M., and W. R. ELLIOTT, 1985: New species of the family Rhagidiidae (Acarina: Actinedida: Eupodoidea) from California caves. *Acta Univ. Carol.-Biol.* 1981: 463—475.

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