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TYPHLOCHACTAS MITCHELLI, A NEW SPECIES OF EYELESS, MONTANE FOREST LITTER SCORPION FROM NORTHEASTERN OAXACA, MEXICO (CHACTIDAE, SUPERSTITIONINAE, TYPHLOCHACTINI)

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ABSTRACT

Typhlochactas mitchelli, new species, is described from Cerro Ocote, near Tenango, Oaxaca, Mexico. This is the second species of *Typhlochactas* discovered in montane forest litter. Based on its cheliceral dentition, *T. mitchelli* is most closely related to the other forest litter species, *T. sylvestris* Mitchell & Peck, also from Oaxaca.

INTRODUCTION

The first eyeless scorpion from montane forest litter was discovered along the east slopes of the outer range of the Sistema Montañoso Poblano Oaxaqueño near Valle Nacional, Oaxaca by Dr. Stewart B. Peck in May of 1971 (Mitchell and Peck 1977). This discovery was highly significant because it was the first species of the genus *Typhlochactas* (all of which are eyeless, depigmented scorpions) collected outside the cave environment. *Typhlochactas* now consists of four species: *T. rhodesi* Mitchell from La Cueva de la Mina in Tamaulipas; *T. reddelli* Mitchell from La Cueva del Ojo de Agua de Tlilapan in Veracruz; *T. sylvestris* Mitchell and Peck from montane forest litter in Oaxaca; and *T. cavicola* Francke from La Cueva del Vandalismo in Tamaulipas (Mitchell 1968; Mitchell and Peck 1977; Francke 1986). A fifth species, *T. elliotti* Mitchell from El Sotano de Yerbaniz in San Luis Potosí, has been transferred to a separate genus, *Sotanochactas* (Mitchell 1971; Francke 1986).

It is the purpose here to describe another species of this remarkable genus, the second one from montane forest litter. It is most closely related to *T. sylvestris*, the other forest litter species, but differs from it in a number of significant features. The new species was collected on Cerro Ocote near Tenango, Oaxaca along the northeastern edge of the Sistema Montañoso Poblano Oaxaqueño.

Typhlochactas mitchelli, new species
Figs. 1-14

Type data.—Holotype male, paratype male, and subadult paratype female taken from Cerro Ocote, 5 mi S Tenango, Oaxaca, México in April 1987 (A.

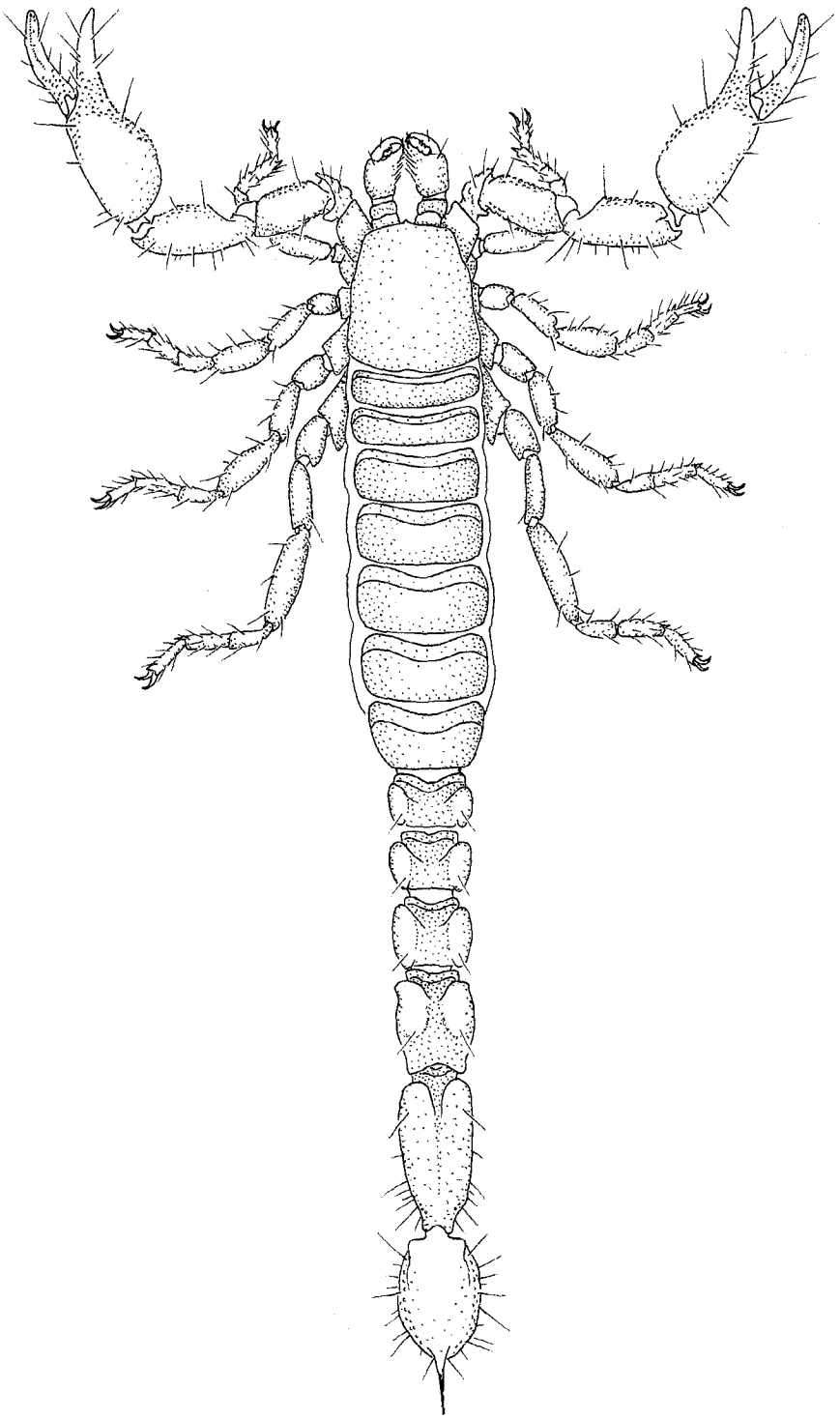
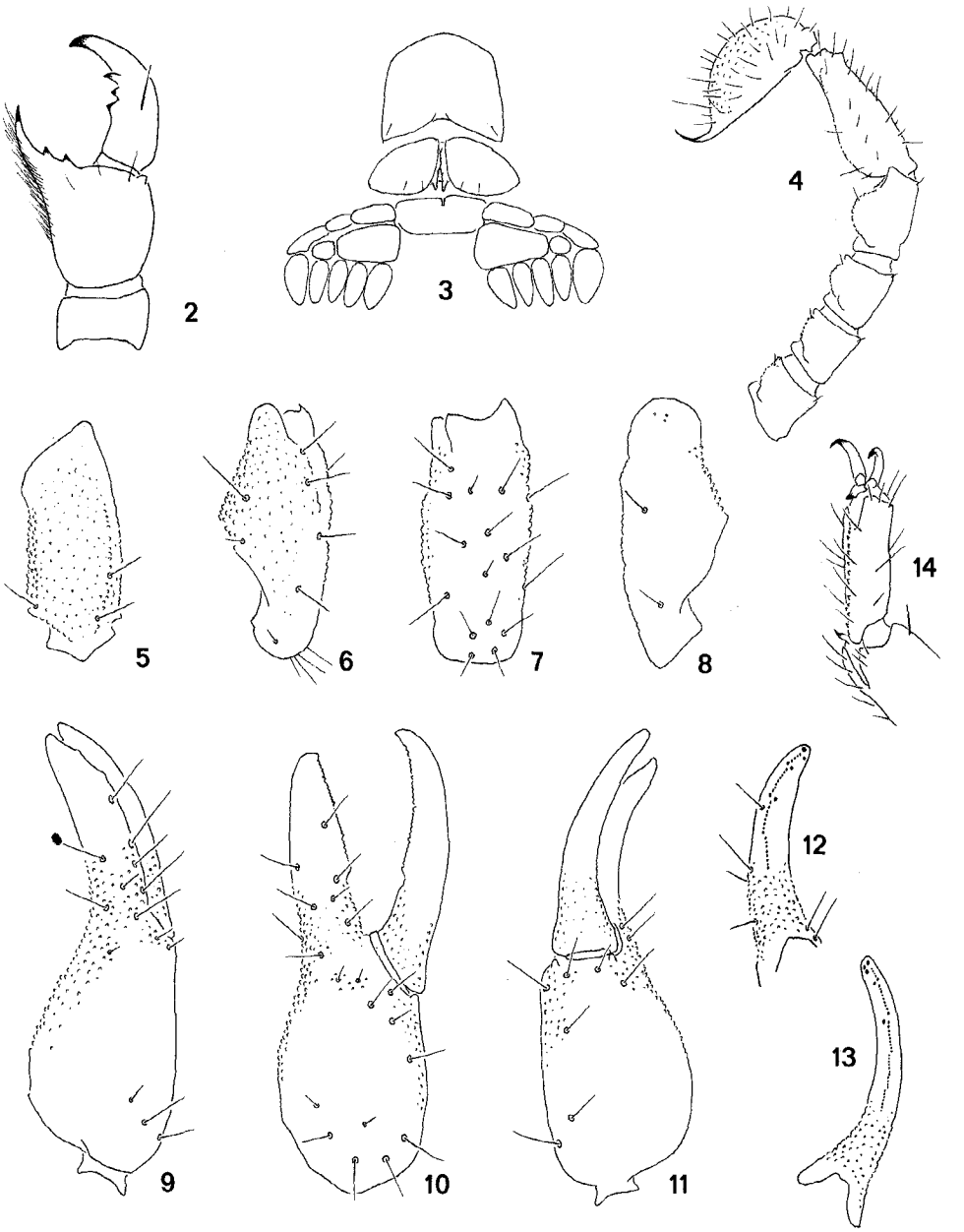


Fig. 1.—Dorsal view of holotype male of *Typhlochactas mitchelli*, new species.



Figs. 2-14.—External morphology of holotype male of *Typhlochactas mitchelli*, new species: 2, dorsal aspect of right chelicera; 3, ventral aspect of sternum, genital operculi, and pectines; 4, lateral aspect of metasoma and telson; 5, dorsal aspect of pedipalp femur; 6, dorsal aspect of pedipalp tibia; 7, external aspect of pedipalp tibia; 8, ventral aspect of pedipalp tibia; 9, dorsal aspect of pedipalp chela; 10, external aspect of pedipalp chela; 11, ventral aspect of pedipalp chela; 12, inner margin of pedipalp chela fixed finger, showing placement of trichobothria and dentition; 13, inner margin of pedipalp chela movable finger, showing dentition; 14, retrolateral aspect of tarsomere II of left leg IV.

Grubbs, A. Cressler, P. Smith). Holotype male, paratype male, and paratype subadult female deposited in the American Museum of Natural History, New York.

Etymology.—The specific epithet is a patronym honoring Dr. Robert W. Mitchell of Texas Tech University, who inspired my initial interest in arachnids, for his contributions to Mexican scorpiology and biospeleology.

Distribution.—Known only from the type locality.

Diagnosis.—Adult males 8.49-8.99 mm long. Eyeless. Color pale yellow brown, except for posterior mesosomal segments and metasoma, which are light orange brown. Carapace, tergites, and metasoma sparsely to moderately finely granular; pedipalps more coarsely granular. Metasomal segment V slightly longer than carapace and about 1.85 times longer than wide. Cheliceral fixed finger with only three teeth; basal and medial teeth not combined into a compound tooth. Movable finger with four teeth: distal internal, distal external, medial, and basal. Pedipalps: trichobothrial pattern typical of genus (Mitchell and Peck 1977); chela relatively robust with palm length/width ratio 1.71-1.73; chela fingers shorter than carapace; fixed finger of chela with four slightly oblique rows of granules on dentate margin, restricted to distal two-thirds of finger; movable finger with five such rows. Legs armed with prolateral pedal spurs; ventral aspect of tarsomere II with median row of minute spinules flanked by three to four pairs of relatively stout setae.

Description.—Based on adult males; measurements of these two males are given in Table 1.

Coloration: Prosoma and first six mesosomal segments pale yellow brown; mesosomal segment VII (tergite and sternite) slightly darker than preceding segments. Pectines whitish. Metasoma uniformly light orange brown. Telson pale yellow brown; aculeus orange brown. Chelicerae and legs pale yellow. Pedipalps uniformly pale yellow brown, slightly darker than body.

Prosoma: Carapace (Fig. 1) subquadrate; length slightly greater than posterior width. Weakly sclerotized; surface sparsely, finely granular with a few small setae. Anterior margin weakly convex, with very subtle median projection. Median longitudinal furrow essentially obsolete. Median and lateral eyes absent; ocular tubercle absent. Sternum smooth, subquadrate: anterior margin gently convex, posterior margin concave, lateral margins diverging distally; small posteromedial depression present.

Mesosoma: Tergites I-VII weakly sclerotized, acarinate; pre-tergites smooth; post-tergites moderately finely granular. Genital operculum (Fig. 3) subelliptical, completely divided longitudinally; genital papillae well developed. Pectines (Fig. 3): more or less unsclerotized, with three marginal lamellae, two middle lamellae, and five pectinal teeth. Proximal middle lamella much larger than second. Pectinal lamellae and basal portion of teeth moderately covered with fine whitish microchaetes; distal third of pectinal teeth with conspicuous, dense, peg sensillae. Sternites III-VII smooth, sparsely setose; stigmata small, circular.

Metasoma (Fig. 4): Segments I-III wider than long; V 1.82-1.85 times longer than wide. Segments I-IV: Dorsolateral carinae on I-IV very faint, indicated by a few small distal granules; other carinae obsolete. Dorsal and lateral surfaces with moderately dense, fine granulation; ventral surfaces smooth to sparsely, finely granular; setation of first four segments sparse. Segment V: distinctly longer than carapace; dorsolateral carinae faint, granular throughout; other carinae obsolete.

Table 1.—Measurements in mm and pectinal tooth counts of the holotype and paratype males of *Typhlochactas mitchelli*, n. sp.

	Holotype Male	Paratype Male
Total length	8.99	8.49
Carapace length	1.17	1.14
Mesosoma length	2.66	2.43
Metasoma length	3.61	3.46
length/width I	0.45/0.73	0.45/0.74
length/width II	0.52/0.68	0.50/0.67
length/width III	0.55/0.69	0.55/0.67
length/width IV	0.80/0.71	0.72/0.65
length/width V	1.29/0.71	1.24/0.67
Telson length	1.55	1.46
Vesicle length/width/depth	1.17/0.73/0.59	1.05/0.70/0.55
Aculeus length	0.38	0.41
Pedipalp length	3.43	3.27
Femur length/width	0.85/0.35	0.82/0.33
Tibia length/width	0.98/0.39	0.90/0.38
Chela length/width/depth	1.60/0.52/0.55	1.55/0.51/0.55
Palm length	0.90	0.87
Fixed finger length	0.70	0.68
Movable finger length	0.92	0.90
Pectinal tooth count	5-5	5-5

Setation moderate, with most setae on ventral aspect. All surfaces with moderately dense, fine granulation. Dorsal surface with narrow median longitudinal furrow anteriorly and rounded, shallow depression posteriorly. Sum of metasomal I-V lengths 3.04-3.09 times greater than carapace length.

Telson (Fig. 4): Vesicle flattened dorsally, moderately globose ventrally; telson as wide as first metasomal segment, wider than segments II-V. Lateral and ventral aspects of vesicle with moderately dense, fine granulation; about 20 pairs of setae. Aculeus very slender and strongly curved.

Chelicerae: Fixed finger (Fig. 2) with only three individual teeth (distal, median, and basal). Movable finger (Fig. 2) with four teeth: distal internal tooth large, distinctly separated from others; distal external, medial, and basal teeth situated close together at midfinger; medial tooth smaller than either distal external or basal teeth. Distinct serrula present on ventrodistal two-thirds of movable finger. Dense array of long, thin setae present on medial and ventral surfaces of fixed finger; a few longer hairlike setae situated on ventral aspect of movable finger (proximal to serrula).

Pedipalps: Femur (Fig. 5) with faint dorsoexternal carina present only on basal one-third; other carinae obsolete. All surfaces moderately granular. Orthobothriotaxia C (Vachon 1974). Tibia (Figs. 6-8): carinae essentially obsolete, surfaces uniformly moderately granular. Orthobothriotaxia C (Vachon 1974); trichobothria *db* and *dt* petite; trichobothrium v_2 located on external aspect (Fig. 7). Chela (Figs. 9-13): manus slightly swollen, with palm length/chela width ratio of 1.71-1.73; carinae essentially obsolete, but dorsal margin well supplied with coarser granules. All other surfaces moderately to densely granular. Fixed finger (Fig. 12) granular basally, with four slightly oblique rows of denticles limited to distal two-thirds of inner margin; basal row shortest; only three inner accessory granules paired with terminal denticle and enlarged granules of the two apical

rows. Movable finger (Fig. 13) granular basally, with five slightly oblique rows of denticles limited to distal two-thirds of inner margin; basal row short, about as long as apical row; four inner accessory granules paired with the terminal denticle and enlarged granules of two apicalmost rows. Movable finger as long as palm, but distinctly shorter than carapace or metasoma V; fixed finger length/carapace length ratio of 0.60. Orthobothriotaxia C (Vachon 1974); trichobothria *ib* and *it* situated just basal to junction of fixed finger and manus (Figs. 11-12); trichobothria *Db, Esb, Et4, Et5,* and *esb* petite (Fig. 10).

Legs: All segments moderately setose. No tibial spurs; only a single pedal spur located on prolateral aspect in arthrodial membrane between tarsomeres I and II (Fig. 14). Ventral aspect of tarsomere II (Fig. 14) with three to four pairs of setae flanking a median row of tiny spinules. Unguis moderately developed, weakly curved; dactyl (median claw) moderate.

Variation.—There was no significant variation in the two male specimens. The subadult female was much paler in coloration, being more or less uniformly cream-colored. This specimen also retains vestigial rows of granules extending to near the base of the pedipalp chela fixed and movable fingers; therefore, it has five rows on the fixed finger and six rows on the movable finger. There are no enlarged basal granules or inner accessory granules on the fourth row on the fixed finger or on the fifth row of the movable finger. This information may indicate that reduction of the number of rows of granules as found in the adults occurs at the maturation molt. In addition, the cuticular surfaces were consistently less granular than in the males. The female also had a malformed right pectine with the two proximal pectinal teeth fused at the base.

Comparisons.—*Typhlochactas mitchelli* differs from the other species of *Typhlochactas* by having only four rows of denticles on the chela fixed finger and only five on the movable finger. Further, these rows of denticles do not extend the full length of the fingers as in the other species.

Typhlochactas mitchelli is most similar to *T. sylvestris* Mitchell and Peck, also from montane forest litter in Oaxaca, México. Both of these species have only three individual teeth on the cheliceral fixed finger, a hypothesized synapomorphy (there are four teeth on the fixed finger in other *Typhlochactas*). There are three external teeth on the cheliceral movable finger in *T. mitchelli* and three or four in *T. sylvestris* (resulting from asymmetry in the holotype). However, the configuration of the teeth is quite different in the two species; the distal tooth in *T. sylvestris* is quite large compared to the others and more closely associated with the distal external tooth, rather than with the other external teeth as in *T. mitchelli* (Fig. 2).

Typhlochactas mitchelli also differs from *T. sylvestris* in the more highly developed granulation of its tergites, metasoma, and pedipalps. The ventral aspect of tarsomere II bears a median spinule row in *T. mitchelli*, but not in *T. sylvestris*. There are also distinct differences in morphometrics: in *T. mitchelli*, (1) the metasoma is proportionately longer, with the sum of metasomal I-V lengths/carapace length 3.04-3.09 (not 2.51) and metasoma V length/carapace length 1.09-1.10 (not 0.99); (2) chela fixed finger length/carapace length is 0.60 (not 0.72); and (3) chela palm length/chela width is 1.71-1.73 (not 1.48).

Comments: *Typhlochactas mitchelli* and *T. sylvestris* are certainly the two smallest described scorpion species in the world. The total length of *T. mitchelli* ranges from 8.49-8.99 mm; that of the holotype (and only known specimen) of *T.*

sylvestris is reported to be 11.05 mm. However, examination of Mitchell and Peck's (1977) table of measurements indicates a disproportionately large mesosomal length measurement, and it is apparent that the authors must have taken a single measurement of the mesosoma (rather than taking the sum of the lengths of the individual segments, as was done here). The intersegmental membranes stretch during preservation, and the degree of stretching will vary with the specimen. Without remeasuring the individual mesosomal tergites of *T. sylvestris*, it is difficult to say which of the two species is actually smaller; the carapace of *T. mitchelli* is shorter, but its metasoma and telson are larger. However, taking a single mesosomal measurement of the two adults of *T. mitchelli* results in total lengths of 9.46 and 9.90 mm, so *T. mitchelli* might be the smaller of the two and, therefore, the smallest known scorpion.

Francke's (1981) cladogram depicting the phylogeny of the Superstitioninae is not greatly modified by the addition of *T. mitchelli*. *Typhlochactas mitchelli* is added at the terminal branch as the sister species of *T. sylvestris*; the synapomorphy justifying their relationship is the joint possession of three teeth on the cheliceral fixed finger. Reduction of the number of granular rows on the chela fingers and the unique configuration of the dorsal teeth of the cheliceral movable finger are autapomorphic characters for *T. mitchelli*.

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