

FURTHER CONSIDERATIONS ON THE GENUS *TROGLOTAYOSICUS* LOURENÇO, 1981 (SCORPIONES: TROGLOTAYOSICIDAE OR *INCERTAE SEDIS*)

Wilson R. Lourenço

Département de Systématique et Evolution, USM 0602, Section Arthropodes (Arachnologie), Muséum national d'Histoire naturelle, CP 053, 61 rue Buffon 75005 Paris, France – arachne@mnhn.fr

Abstract: A revised diagnosis is proposed for the genus *Troglotayosicus* Lourenço, 1981. This enigmatic group of scorpions is tentatively placed in the family Troglotayosicidae. On account of the paucity of material, however, it should be considered as *incertae sedis* until more specimens are known. The study of pectine structure with the use of scanning electron microscopy allows some comparative results between *T. vachoni*, the type species of *Troglotayosicus*, and several chactid and superstitionid species.

Key words: Scorpiones, *incertae sedis*, *Troglotayosicus*, troglobitic scorpions, pectines, Los Tayos, Ecuador.

Consideraciones adicionales sobre el género *Troglotayosicus* Lourenço, 1981 (Scorpiones: Troglotayosicidae o *Incertae sedis*)

Resumen: Se propone un diagnóstico revisado para el género *Troglotayosicus* Lourenço, 1981. Este enigmático grupo de escorpiones se encuadra provisionalmente en la familia Troglotayosicidae. Debido a la escasez de material, sin embargo, debería considerarse como *incertae sedis* hasta que se conozcan más especímenes. El estudio de la estructura pectinal mediante microscopio electrónico de barrido permite hacer ciertas comparaciones entre *T. vachoni*, la especie típica de *Troglotayosicus*, y varias especies cáctidas y superstitionidas.

Palabras clave: Scorpiones, *incertae sedis*, *Troglotayosicus*, escorpiones troglobios, pectinas, Los Tayos, Ecuador.

Introduction

The genus *Troglotayosicus* was described by Lourenço (1981) on the basis of a single female specimen collected in the Cave of Los Tayos in the Amazon region of Ecuador. This troglobitic scorpion was tentatively placed in the family Chactidae, but with doubts expressed in the taxonomic comments accompanying the original description. Subsequently, in a paper concerning various aspects of panbiogeography, disrupted patterns of distribution and the notion of relict families, the genus *Troglotayosicus* was transferred to a new family Troglotayosidae (later corrected to Troglotayosicidae by Fet & Sissom, 2000). In this study *Troglotayosicus* was grouped with another enigmatic genus, *Belisarius* Simon.

Although the family Troglotayosicidae was accepted and listed in the 'Catalog of the Scorpions of the World' (Fet & Sissom, 2000), it rapidly became a polemic in studies by different authors and was finally synonymised with the family Superstitioniidae Stahnke, by Soleglad and Fet (2003). In a more recent study, Prendini and Wheeler (2005) re-established the family Troglotayosicidae (new rank), re-opening the controversy about this subject.

The frequent changes proposed by different authors attest to the difficulty of defining enigmatic groups such as the one represented by the genus *Troglotayosicus*. In fact, most discussions were based entirely on theory since the only known specimen of *Troglotayosicus* has been examined exclusively by Lourenço (1981). Subsequent authors only had access to the information in the original description. The fact that the female holotype is the only known specimen and males remain unknown renders any deeper taxonomic analysis problematical. I therefore suggest that

Troglotayosicus should be considered as *incertae sedis* until further specimens become available.

The aim of this paper is not to re-open the controversy about the classification and precise taxonomic position of the genus *Troglotayosicus*, but rather to bring some new comparative elements mainly based on the structure of the peg sensillae of the pectines. These data were obtained some years ago, before all the disagreements over the type specimen of *Troglotayosicus vachoni*, but have not been published until now.

Revised diagnosis for the genus *Troglotayosicus* Lourenço, 1981

TYPE SPECIES: *Troglotayosicus vachoni* Lourenço, 1981 (Fig. 1-16)

TYPE MATERIAL: 1 female holotype, Ecuador, Los Tayos (78° 12'W, 3° 10'S). Main cave, Los Tayos, sta. 35, under stones at edge of dry stream bed; dark zone, 16/VII/1976 (LTE-201). Deposited in the Muséum national d'Histoire naturelle, Paris.

DIAGNOSIS. Scorpions moderate to small in size, measuring 31 mm in total length (see Table I). General coloration brownish to reddish-brown; only the venter is slightly paler, with the pectines and genital operculum pale yellow; some carinae and granulations may show some blackish pigments. Although *T. vachoni* is a true troglobitic species, the regression of pigmentation is negligible. Carapace: Anterior margin with a weak convexity (Fig. 5). Median eyes absent; two pairs of lateral eyes; the eyes of the first pair about double the size of the eyes of the second pair. Spiracles very small

Table I. Morphometric values (in mm) of female holotype of *Troglotayosicus vachoni*

Total length		31.4
Carapace:	- length	3.9
	- anterior width	2.6
	- posterior width	3.9
Mesosoma length		10.0
Metasoma total length		17.5
Metasomal segment I	- length	2.1
	- width	2.9
Metasomal segment II:	- length	2.1
	- width	2.9
Metasomal segment III	- length	2.4
	- width	2.9
Metasomal segment IV:	- length	2.6
	- width	2.7
Metasomal segment V:	- length	4.1
	- width	2.6
	- depth	2.7
Telson length		4.2
Vesicle:	- length	2.5
	- width	1.7
	- depth	1.2
Aculeus length		1.7
Pedipalp total length		12.1
Femur	- length	2.6
	- width	1.1
Patella	- length	3.6
	- width	1.4
Chela	- length	5.9
	- width	1.9
	- depth	1.7
Movable finger length		2.7

and round. Sternum pentagonal wider than long. Pectines very small and without fulcra (Fig. 4). Chelicera: movable finger with two subdistal and one basal tooth; a serrula present on the ventral aspect of the movable finger (Figs. 2-3) (Vachon, 1963). Tarsi with strong setation laterally and with spinoid setae on the central region (Fig. 6). Granulation over the dentate margins of the pedipalp-chela finger disposed in a linear row of smaller granules divided by seven large granules (Figs. 8-9). Trichobothriotaxy: orthobothriotaxic (Figs. 10-16): Patella with 13 external and three ventral trichobothria; trichobothrium V_3 slightly displaced over the external aspect. Trichobothria Dt and ET_5 of the chela also displaced to the base of the external face of the fixed finger (Vachon, 1974).

Comparative results of the study of pectine structures, using scanning electron microscopy for some chactid scorpion, *T. vachoni* and *Troglocormus willis* Francke, 1981

The general morphology of pectines, in several species of chactid scorpions, is similar, but differences can be noticed (Figs. 17, 21, 24). The size of the pectine teeth can vary between different species. The pectines of *Chactas reticulatus* Kraepelin, 1912 have larger teeth in relation to the marginal and median lamellae (Fig. 17) than in the other species studied, and both lamellae are particularly strongly developed in *Brotheas gervaisii* Pocock, 1893, *Broteochoactas delicatus* (Karsch, 1879), *Hadrurochoactas schaumii* (Karsch, 1880) and *Teuthraustes amazonicus* (Simon, 1880) (Fig. 21, 24, 27, 38). The surface covered with peg sensillae on each tooth, is similar in most chactid species with the

exception of *Chactas reticulatus* in which there is a much more dense surface covering of peg sensillae (Figs. 18). The individual peg size varies little among the species, even though the total size of each is rather different. In most cases the individual pegs of chactid scorpions are cylindrical except in *C. reticulatus* where they are flattened, spatular and less cylindrical (Figs. 20, 23, 26).

Comparison with two non-chactid species, *Troglotayosicus vachoni* and *Troglocormus willis*, showed also some interesting differences. The pectines of both *T. vachoni* (Fig. 41) and *T. willis* (Fig. 35) are similar in size, but they have quite different shapes. The number of pectinal teeth is considerably more reduced in *T. vachoni*, while in *T. willis* fulcra are present. Marginal and median lamellae are also much more developed in *T. willis*.

The surface covered with peg sensillae on each tooth in both *T. vachoni* and *T. willis* (Figs. 36, 42) is equivalent, and similar to that of some chactid species (Figs. 28, 39). The individual pegs of *T. vachoni* and *T. willis* are superficially similar, but are less cylindrical and more bottle-shaped than those of the chactids (Figs. 37, 43, 44). The individual peg size in *T. vachoni* is particularly small, even though the total body size is similar to that of the other species considered (Fig. 43, 44).

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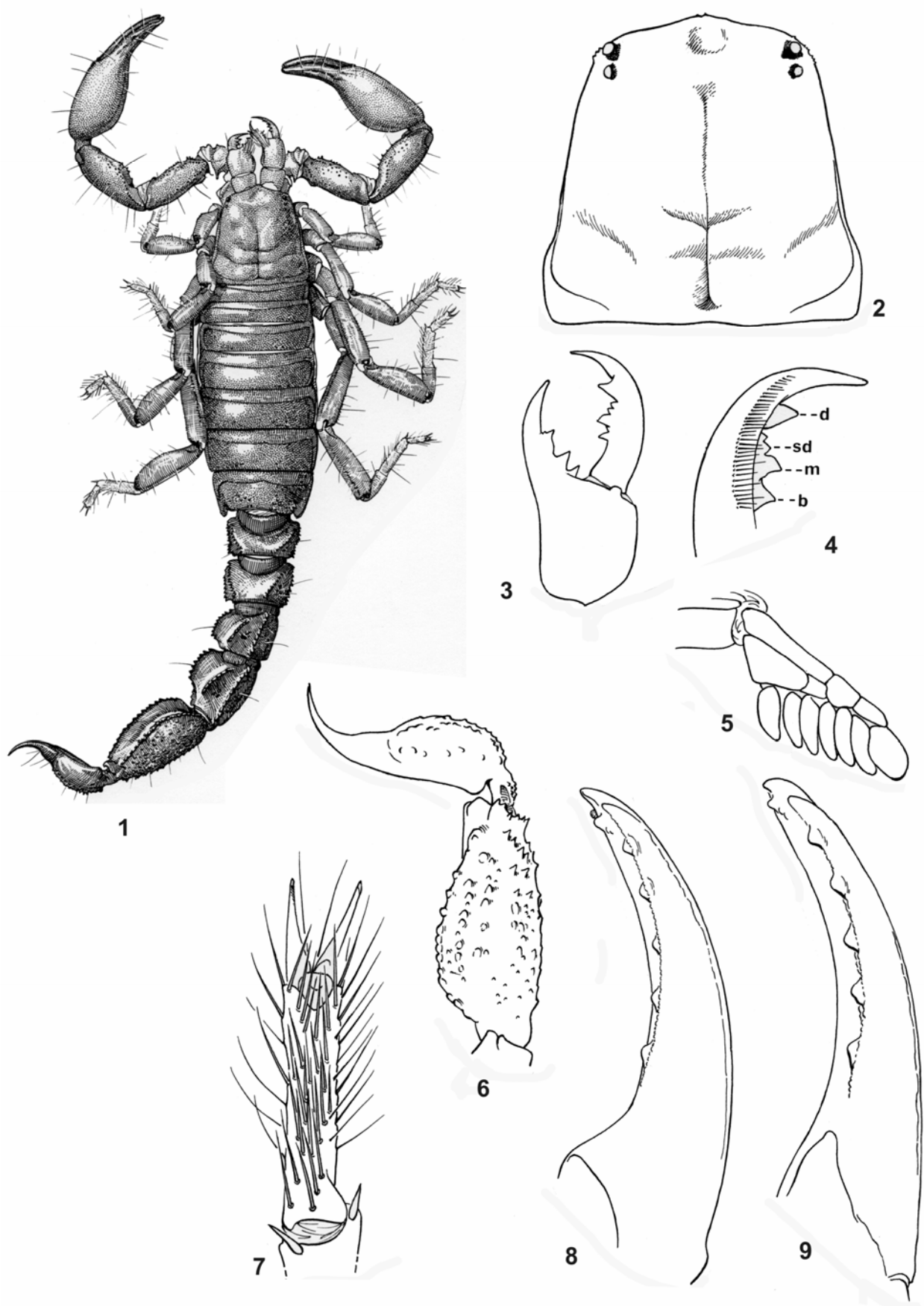
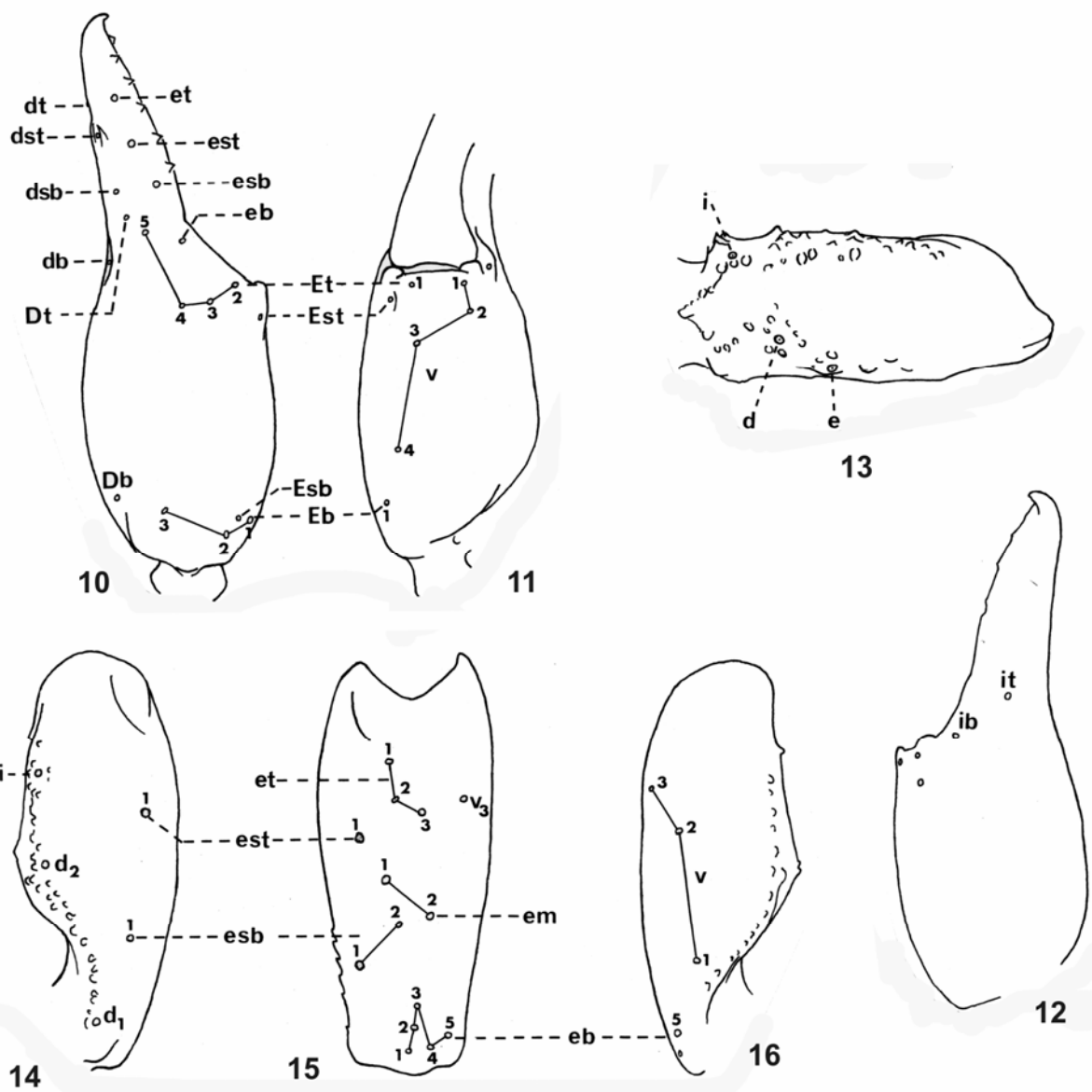


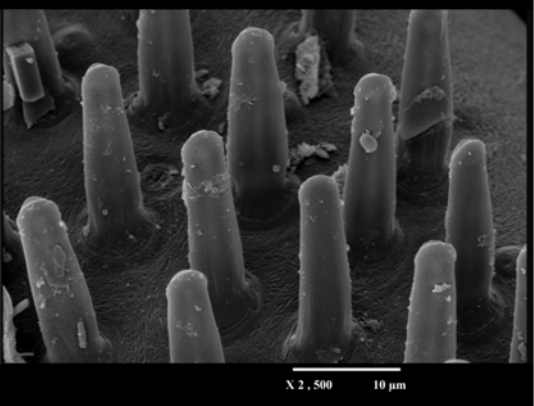
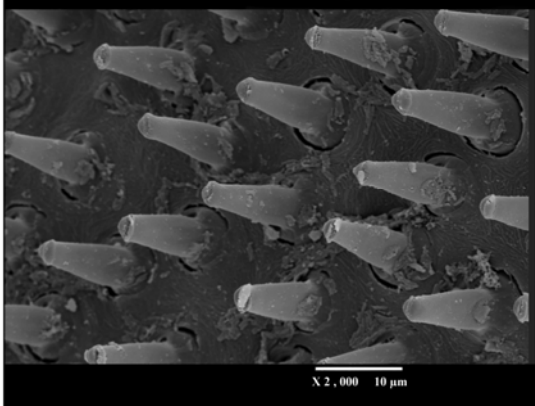
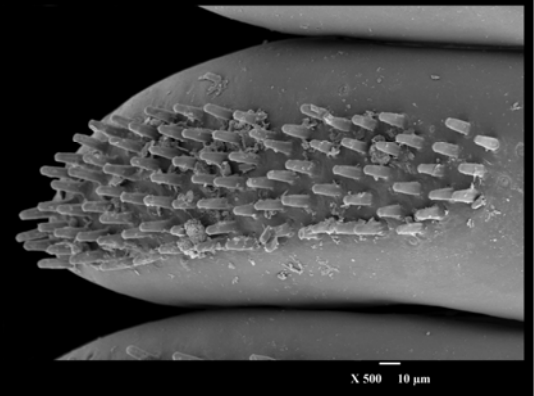
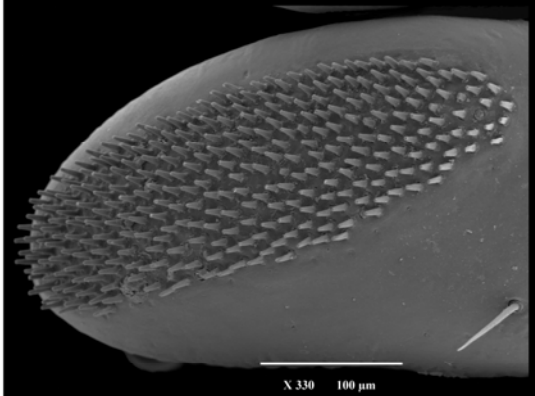
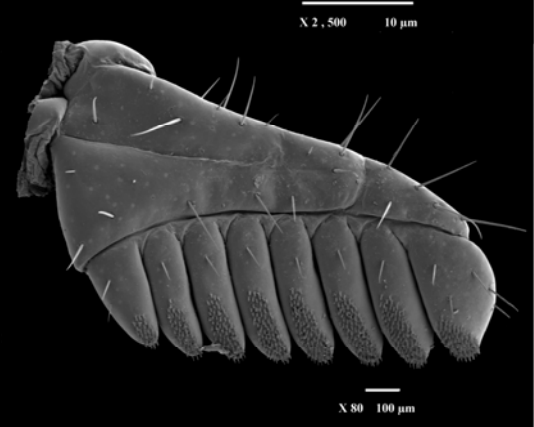
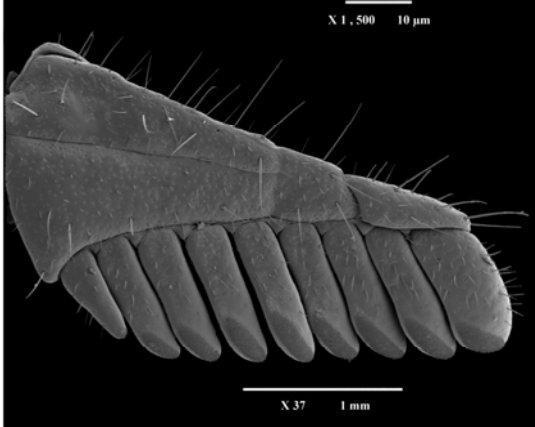
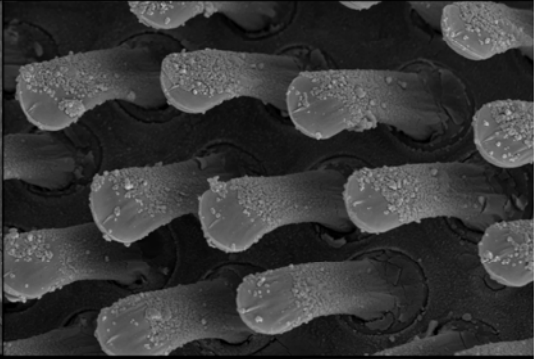
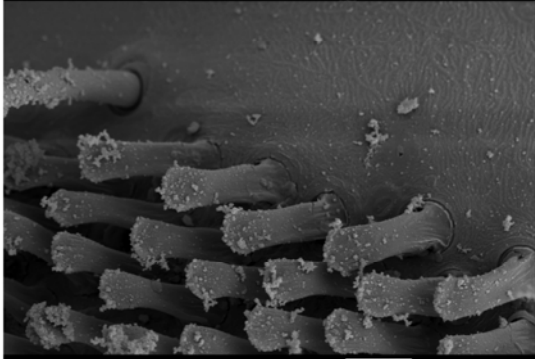
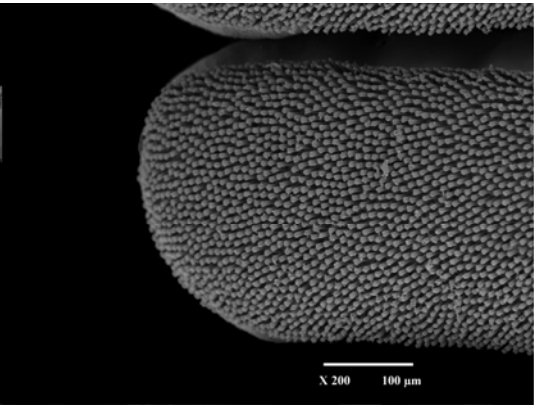
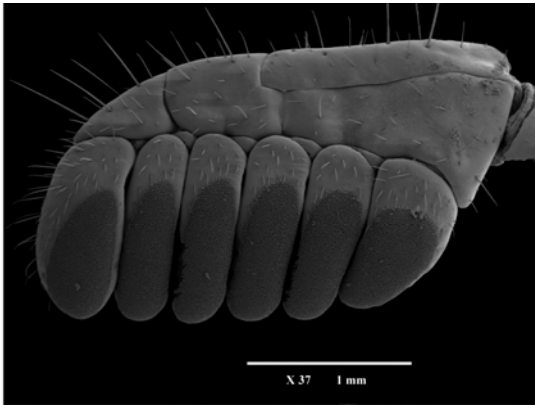
Fig. 1-9. *Troglotayosicus vachoni*, female holotype. 1. Habitus. 2. Chelicera, dorsal aspect. 3. Movable finger of chelicerae with serrula in detail. 4. Pecten. 5. Carapace. 6. Tarsi with setation. 7. Metasomal segment V and telson lateral aspect. 8-9. Disposition of granulation over the dentate margins of the pedipalp-chela movable finger, in two different angles.

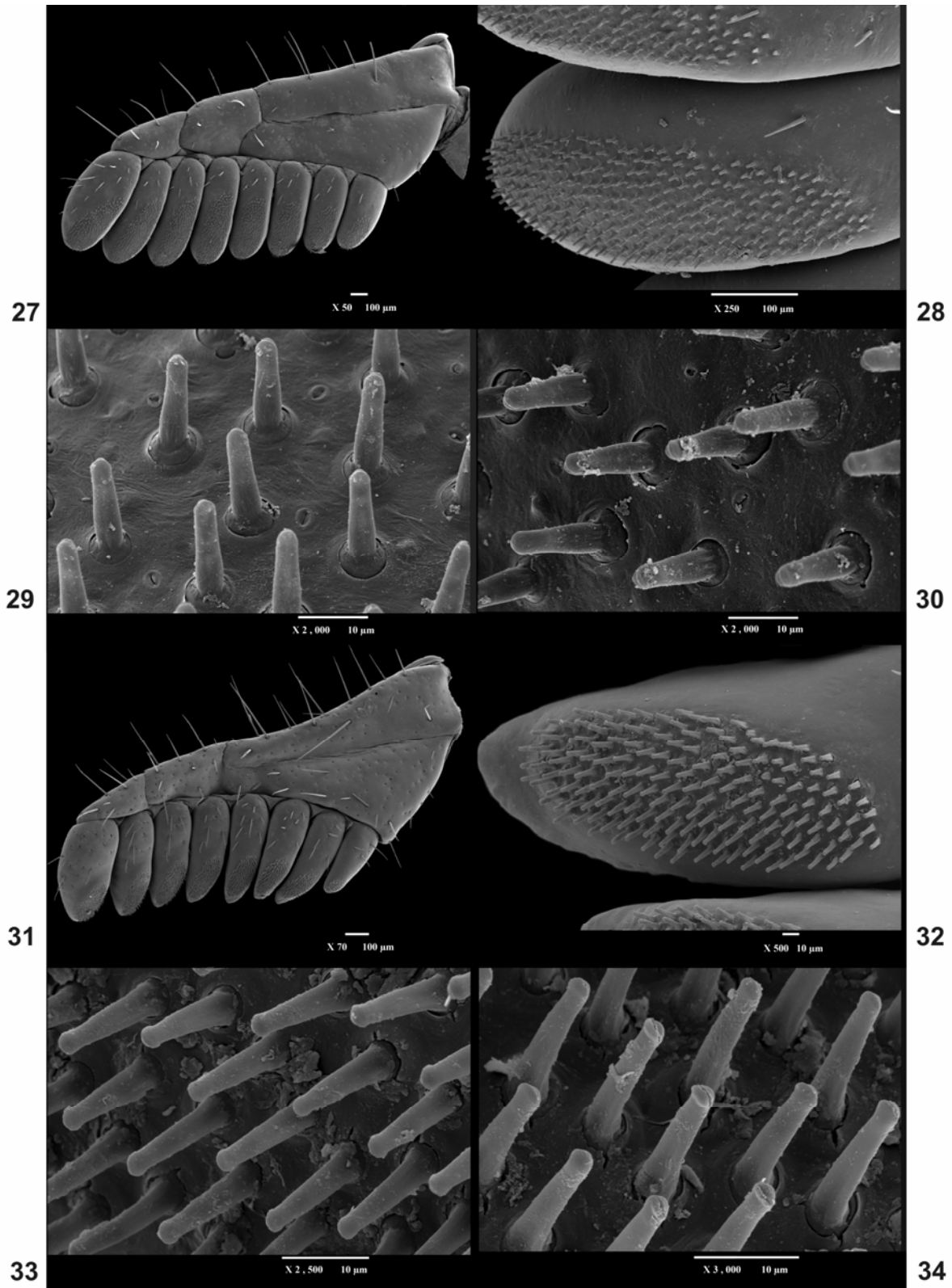


Figs. 10-16. *Troglotayosicus vachoni*, female holotype. Trichobothrial pattern. **10-12.** Chela, internal, dorso-external and ventral aspects. **13.** Femur, dorsal aspect. **14-16.** Patella, dorsal, external and ventral aspects.

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Figs. 17-20. *Chactas reticulatus*. **17.** Female pecten, global view. **18.** Microstructure of peg sensillae on teeth. **19-20.** Peg sensilla in detail. **Figs. 21-23.** *Brotheas gervaisii*. **21.** Female pecten, global view. **22.** Microstructure of peg sensillae on tooth. **23.** Peg sensilla in detail. **Fig. 24-26.** *Broteochactas delicatus*. **24.** Female pecten, global view. **25.** Microstructure of peg sensillae on tooth. **26.** Peg sensilla in detail.





Figs. 27-30. *Teuthraustes amazonicus*. 27. Female pecten, global view. 28. Microstructure of peg sensillae on tooth. 29-30. Peg sensilla in detail. **Figs. 31-34.** *Chactopsis amazonica*. 31. Female pecten, global view. 32. Microstructure of peg sensillae on teeth. 33-34. Peg sensilla in detail.

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Figs. 35-37. *Troglocormus willis*. 35. Female pecten, global view. 36. Microstructure of peg sensillae on tooth. 37. Peg sensilla in detail. **38-40.** *Hadrurochactas schaumii*. 38. Female pecten, global view. 39. Microstructure of peg sensillae on tooth. 40. Peg sensilla in detail. **Figs. 41-44.** *Troglotayosicus vachoni*. 41. Female pecten, global view. 42. Microstructure of peg sensillae on teeth. 43-44. Peg sensilla in detail.

