Boletín Sociedad Entomológica Aragonesa, nº **43** (2008) : 75–79.

DESCRIPTION OF *TITYUS* (*ATREUS*) *NEBLINA* SP. N. (SCORPIONES, BUTHIDAE), FROM THE 'PARQUE NACIONAL DO PICO DA NEBLINA', IN BRAZIL/VENEZUELA, WITH COMMENTS ON SOME RELATED SPECIES

Wilson R. Lourenço

Muséum national d'Histoire naturelle, Département de Systématique et Evolution, Section Arthropodes (Arachnologie), CP 053, 57 rue Cuvier 75005 Paris, France – arachne@mnhn.fr

Abstract: Several scorpions belonging to a new species of the genus *Tityus* C. L. Koch, 1836 were collected alive, by a group of biologists, in the summer of 2001-2002 in the Parque Nacional do Pico da Neblina, on the border between Brazil and Venezuela. The scorpions have been kept alive in a laboratory since 2002 and are the subject of a detailed study on their life cycle and reproductive biology. The new species belongs to the subgenus *Atreus* Gervais, 1843 and to the 'Tityus androcottoides' subgroup.
Key words: Scorpiones, Buthidae, *Tityus neblina* **sp. n.**, Pico da Neblina, Brazil/Venezuela.

Descripción de *Tityus* (*Atreus*) *neblina* sp. n. (Scorpiones, Buthidae), del 'Parque Nacional do Pico da Neblina', en Brazil/Venezuela, con comentarios sobre otras especies próximas
Resumen: Diversos escorpiones pertenecientes a una nueva especie del género *Tityus* C.L. Koch, 1836 fueron colectados vivos por un grupo de biólogos en el verano de 2001-2002 en el Parque Nacional do Pico da Neblina, en la frontera entre Brasil y Venezuela. Se ha mantenido vivos a los escorpiones en laboratorio desde 2002, y son objeto de un estudio detallado sobre su ciclo vital y biología reproductiva. La nueva especie pertenece al subgénero *Atreus* Gervais, 1843 y al subgrupo de *Tityus androcottoides*.
Palabras clave: Scorpiones, Buthidae, *Tityus neblina* **sp. n.**, Pico da Neblina, Brasil/Venezuela.

Taxonomy/Taxonomía: *Tityus* (*Atreus*) *neblina* **sp. n.**

Introduction

During a field trip to Venezuela during the southern hemisphere summer of 2001-2002 a group of biologists, with the help of local Indians, collected several living scorpions in the 'Parque Nacional do Pico da Neblina', which is located in the border between Brazil and Venezuela. Most of the scorpions belong to a new species of the genus *Tityus* C. L. Koch (Family Buthidae), and have been maintained alive in laboratory conditions since 2002. These are the subject of intensive ongoing biological studies on their life cycles and reproductive biology (Lourenço, 2008). This new species, which belongs to the subgenus *Atreus* Gervais, 1843 and to the 'Tityus androcottoides' subgroup, is described here for the first time.

Considerations regarding the division of the genus *Tityus* into subgenera, and also about the distribution of the species of the 'Tityus androcottoides' subgroup in Brazil, Ecuador and Venezuela, have recently been discussed (Lourenço, 2006, 2007a; Lourenço & Ramos, 2004). The reader can refer to these publications for further details.

Methods

Illustrations and measurements were produced using a Wild M5 stereo-microscope with a drawing tube and an ocular micrometer. Measurements follow Stahnke (1970) and are given in mm. Trichobothrial notations follow Vachon (1974), while morphological terminology mostly follows Vachon (1952) and Hjelle (1990).

Description of the new species

***Tityus* (*Atreus*) *neblina* sp. n. Fig. 1-11, 14.**

TYPE MATERIAL. Brazil-Venezuela, 'Parque Nacional do Pico da Neblina', 850-2200 m alt. Male holotype, 1 male and 2 female paratypes, collected by local Indians (A. Gomez leg.), XI/2001-I/2002. Holotype and two paratypes deposited in the Muséum national d'Histoire naturelle, Paris. One paratype also deposited in the'Museu Nacional, Rio de Janeiro, Brazil.

ETYMOLOGY: The name of the type locality - 'Pico da Neblina' - (neblina means fog in Spanish and Portuguese) is placed in apposition to the generic name.

DIAGNOSIS: A moderate species when compared with the average size of other species in the subgenus *Atreus*: males and females up to 46-53 mm in total length (see Table I). General pattern of pigmentation reddish-yellow to reddish-brown overall. Basal middle lamella of female pectines dilated, but inconspicuous when compared with that of several other species of the subgenus *Atreus*. Subaculear tooth short and moderately spinoid. Pectinal tooth count 19-21 in males and 19-20 in females. Fixed and movable fingers of the pedipalp with 13/14 oblique rows of granules. Ventral carinae of metasomal segments II to IV partly or largely fused, forming a Y-shape configuration. This is the first species of *Tityus* (subgenus *Atreus*) presenting this kind of Y-shape configuration to have been described from the 'Imeri -- Pico da Neblina' region, but the third to be confirmed in Amazonia. It is possibly an endemic element to the 'Imeri -- Pico da Neblina' region (Lourenço, 1994).

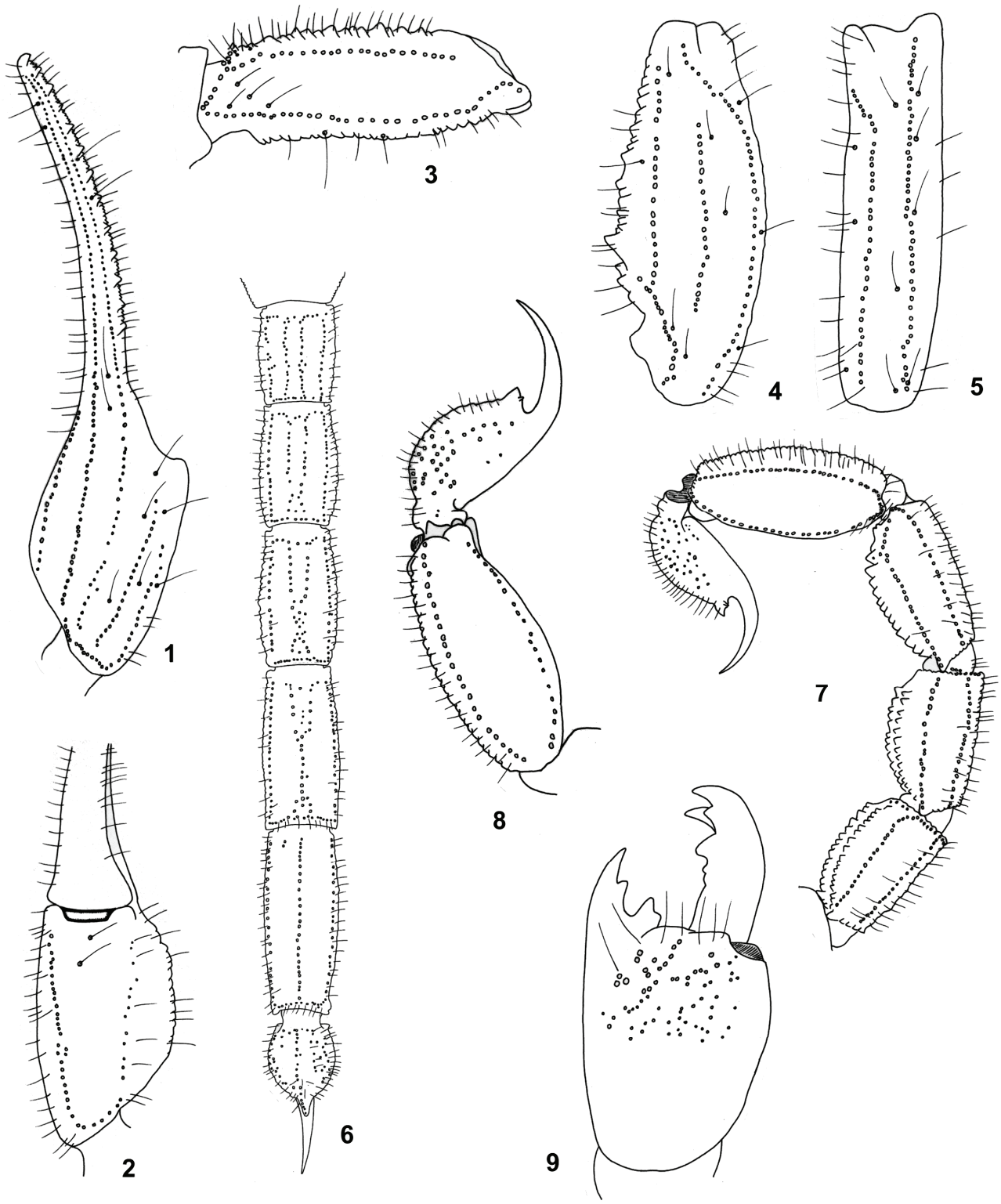


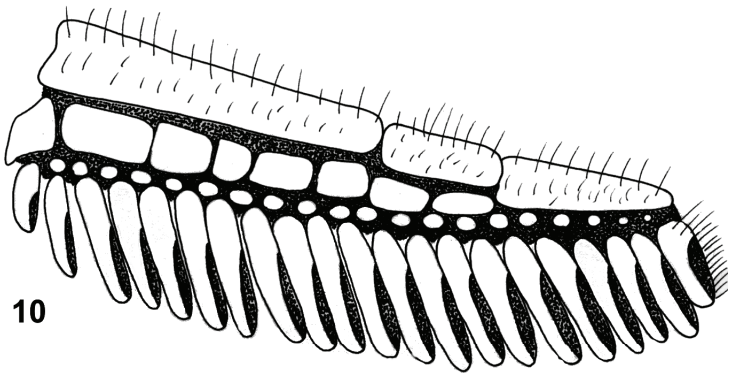
Fig. 1-9. *Tityus neblina* sp. n. Male holotype. Trichobothrial pattern. **1-2.** Chela, dorso-external and ventral aspects. **3.** Femur, dorsal aspect. **4-5.** Patella, dorsal and external aspects. **6-9.** Male holotype and female paratype. **6.** Metasomal segments I to V and telson ventral aspect, showing carination (male). **7.** Metasomal segments II-V and telson, lateral aspect (male). **8.** Metasomal segment V and telson, lateral aspect (female paratype). **9.** Chelicera, dorsal aspect (male).

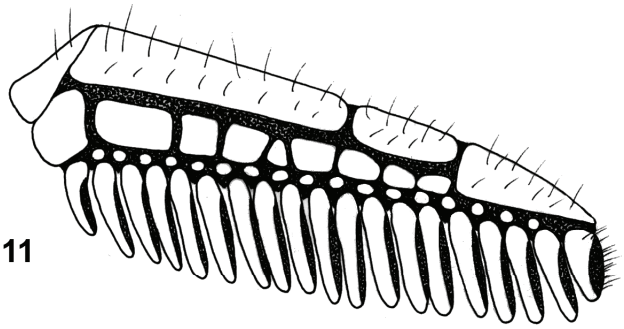
DESCRIPTION BASED ON MALE HOLOTYPE AND FEMALE PARATYPE.

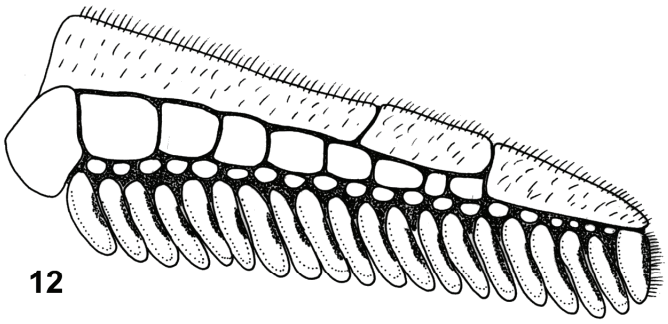
Measurements in Table I.

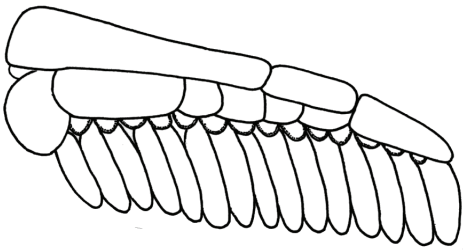
Coloration. Basically reddish-yellow to reddish-brown overall. Prosoma: carapace reddish-yellow with some dark pigment on the carinae. Mesosoma: tergites reddish-yellow with one darker transverse stripe on the posterior edge of tergites I-VI. Metasoma: segments I to III reddish-yellow; IV and V dark reddish with some blackish regions. Vesicle: dark reddish; aculeus yellow at the base and dark reddish at the tip. Venter yellow to reddish-yellow; sternites with dark zones on lateral and posterior edges; sternite V with a white

Fig. 10-13. Pectines, showing different shape and size of basal middle lamella. **10-11.** *Tityus neblina* sp. n., male holotype and female paratype. **12.** *Tityus ythieri*, female. **13.** *Tityus elizabethae*, female.









zone on posterior edge; pectines pale yellow. Chelicerae yellowish with a dark thread; fingers yellowish with dark reddish teeth. Pedipalps: reddish-yellow; fingers dark, almost blackish with the extremities yellowish. Legs yellowish with some diffuse fuscous spots.

Morphology. Carapace moderately to weakly granular; anterior margin with a moderate concavity. Anterior median superciliary and posterior median carinae moderate to weak. All furrows moderately deep. Median ocular tubercle distinctly anterior to centre of carapace. Eyes separated by more than one ocular diameter. Three pairs of lateral eyes. Sternum subtriangular. Mesosoma: tergites moderately granular. Median carina moderate in all tergites. Tergite VII pentacarinate. Venter: genital operculum divided longitudinally; each half with a semi-oval shape. Pectines: pectinal tooth count 21-19 in male holotype (19-20 in male, 20-20 and 19-20 in female paratypes); basal middle lamellae of the pectines inconspicuous dilated in the female. Sternites smooth with elongate spiracles; VII with four carinae. Metasoma: segment I with ten carinae, crenulate; segment II with eight carinae, crenulate; the ventral partially fused on the distal third; segment III with eight carinae, crenulate; the ventral fused on distal half, forming a Y shape configuration; segment IV with seven/eight carinae, crenulate; the ventral fused over 2/3 of the total length; segment V with five carinae, crenulate. Dorsal carinae on segments III and IV with one to three strong spinoid granules. Lateral inframedian carinae on segment I complete, strongly crenulate; absent from II to IV. Ventrolateral carinae strong, crenulate. Ventral submedian carinae strongly crenulate. Intercarinal spaces weakly granular. Segment V with dorsolateral, ventrolateral and ventromedian carinae strong, crenulate. Lateral intercarinal spaces moderately to weakly granular; carinae and granulations less marked in males. Telson, weakly granular, with a moderately long but strongly curved aculeus. Dorsal surface smooth; ventral surface moderately granular in females, but less marked in males; subaculear tooth short and moderately spinoid. Cheliceral dentition characteristic of the family Buthidae (Vachon, 1963); movable finger with two well formed basal teeth; ventral aspect of both fingers and manus with long dense setae. Pedipalps: femur pentacarinate; patella with seven carinae; chela with nine carinae; all faces weakly granular. Fixed and movable fingers with 13/14 oblique rows of granules. Trichobothriotaxy; orthobothriotaxy A-α (alpha) (Vachon, 1974, 1975). Legs: tarsus with numerous short fine setae ventrally.

RELATIONSHIPS. Its general morphology indicates that the new species belongs to the 'Tityus androcottoides' subgroup. Based on some of its morphological features and also on the closest area of distribution, it can be associated with *Tityus elizabethae* Lourenço & Ramos, 2004, a species described from the nearby State of Roraima on the border

Table I. Measurements (in mm) of the male holotype and female paratype of *Tityus neblina* sp. n. and male paratype and female holotype of *Tityus ythieri*, female holotype of *T. elizabethae* and male and female of *Tityus magnimanus*.

	Tityus						
	neblina sp. n.		*ythieri*		*elizabethae*	*magnimanus*	
	♂	♀	♂	♀	♀	♂	♀
Total length:	46.1	52.5	49.7	59.6	70.2	67.5	69.7
Carapace:							
length	5.5	6.0	5.4	6.7	7.2	6.8	6.9
anterior width	3.8	4.2	3.8	4.8	5.2	5.2	5.2
posterior width	5.6	6.4	5.8	7.6	7.9	7.6	7.8
Metasoma, segment I.							
length	3.6	4.1	4.1	4.5	5.4	5.0	4.6
width	2.8	3.2	2.9	3.8	4.2	3.9	4.3
Metasoma, segment V.							
length	6.7	6.8	7.2	7.6	8.9	8.5	8.1
width	3.0	3.0	3.2	3.7	3.8	4.2	4.3
depth	2.9	2.8	3.2	3.6	3.6	4.1	4.0
Vesicle:							
width	2.2	2.3	2.4	2.8	2.9	3.1	3.0
depth	2.1	2.2	2.2	2.7	2.9	3.0	3.0
Femur:							
length	5.3	5.6	5.6	6.4	7.8	7.5	7.3
width	1.7	1.8	1.7	2.2	2.3	2.3	2.3
Patella:							
length	6.0	6.3	6.2	7.3	8.5	8.2	8.1
width	2.3	2.5	2.2	2.9	2.9	3.2	3.3
Chela:							
length	10.6	11.1	10.7	12.8	14.4	15.6	14.9
width	2.4	2.2	2.7	2.9	2.6	4.1	3.3
depth	2.3	2.1	2.6	2.7	2.4	3.6	3.0
Movable finger:							
length	6.9	7.6	6.9	8.6	9.9	9.2	9.7

with Venezuela. The two species can, however, be distinguished from each other by the following characters:
(i) A smaller overall size of *T. neblina* sp. n. than *T. elizabethae*, (ii) a paler reddish-yellow coloration almost overall, (iii) the basal middle lamella of the pectines is less dilated in the new species than it is in *T. elizabethae*, (iv) the subacular tooth is spinoid and short in the new species whereas, in *T. elizabethae*, it is strongly rhomboidal, (v) pectinal tooth count shows 17-21 teeth in the new species against 15-16 in *T. elizabethae*, (vi) dorsal carinae of metasomal segments III and IV have 1 to 3 spinoid granules in the new species whereas, in *T. elizabethae* these granules are weakly developed.

Finally, the habitat in which each species lives is quite distinct: Savannah of the Guianas for *T. elizabethae* and altitudinal rainforest for the new species.

GEOGRAPHICAL DISTRIBUTION: possibly endemic to the 'Pico da Neblina' (see Lourenço, 1994).

TAXONOMIC NOTES

1. In previous papers (Lourenço, 1987, 2007a; Lourenço & Ramos, 2004), it was suggested that *Tityus magnimanus* Pocock, 1897 most certainly represented a senior synonym of *Tityus falconensis* González-Sponga, 1974. In two recent papers (Lourenço, 2007a; Lourenço & Ramos, 2004), these authors clearly suggested that the original type locality – Brazil – indicated for *T. magnimanus* was the result of some kind of error, almost certainly of mislabelling. In fact, this species does not occur in Brazil, but has a range of distribution limited to the North of Venezuela (Lourenço, 2007a). If this species was ignored by González-Sponga (1984, 1996) it's simply because it was misidentified with *T. falconensis*. A reanalysis of the specimens of *T. magnimanus* already studied from Venezuela (Lourenço, 1987), with others identified by Lourenço (2007b) as *T. falconensis*, demonstrates that both species have no significant morphological differences. Consequently, *T. falconensis* is placed here as a junior synonym of *T. magnimanus*.

2. The type material used in the description of *T. ythieri* was collected in Ecuador. The subsequent citation of this species, in a large table about litter sizes (Lourenço, 2007c), as being from Peru was a transcription error. *T. ythieri* and *T. falconensis* (now *T. magnimanus*) have a totally allopatric range of distribution. Data from their reproductive biology also attest that major differences exist between these two species for litter size. Litter size in *T. ythieri* ranges from 13 to 25 and averages 17, whereas in *T. magnimanus* litter size ranges from 28 to 42 and averages 34 (Lourenço unpublished). Litter size is also different between *T. ythieri* and *T. neblina* sp. n. In this last species values range from 6 to 15 and average 12.

Acknowledgements

I am very grateful to Prof. John L. Cloudsley-Thompson, London for comments on the manuscript.

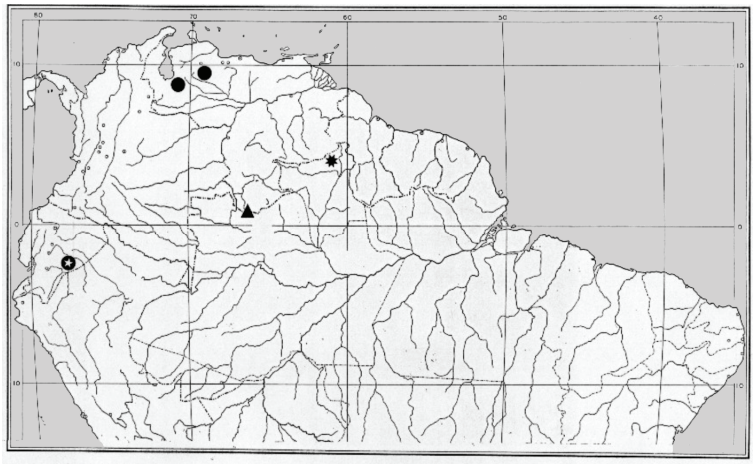


Fig. 14. Map of the Northern South America showing: The sites in Venezuela where *Tityus magnimanus* can be found (black circle). The type locality of *Tityus elizabethae* (black star). The type locality of *Tityus ythieri* (black circle with white star). The type locality of *Tityus neblina* sp. n. (black triangle).

References

González-Sponga, M. A. 1984. *Escorpiones de Venezuela*. Cuadernos Lagoven, Caracas, 128 pp.

González-Sponga, M. A. 1996. *Guía para identificar escorpiones de Venezuela*. Cuadernos Lagoven, Caracas, 204 pp.

Hjelle, J. T. 1990. Anatomy and morphology. Pp. 9-63, *In*: Polis, G. A. (ed.). *The Biology of Scorpions*. Stanford Univ. Press, Stanford: 587 pp.

Lourenço, W. R. 1987. Considerações sistemáticas sobre *Tityus magnimanus* Pocock, 1897 (Scorpiones, Buthidae) e espécies associadas. *Revista brasileira de Biologia*, **47**(4): 565-572.

Lourenço, W. R. 1994. Scorpion biogeographic patterns as evidence for a Neblina-São Gabriel endemic center in Brazilian Amazonia. *Revista de la Academia Colombiana de Ciemcias Exatas, Físicas y Naturales*, **19**(72): 181-185.

Lourenço, W. R. 2006. Nouvelle proposition de découpage sous-générique du genre *Tityus* C. L. Koch, 1836 (Scorpiones, Buthidae). *Boletin de la Sociedad Entomologica Aragonesa*, **39**: 55-67.

Lourenço, W. R. 2007a. A new species of *Tityus* C. L. Koch, 1836 from Ecuador: the first element of the '*Tityus androcottoides*' subgroup for this country. *Entomologische Mitteilungen aus dem Zoologischen Museum Hamburg*, **14** (176): 375-385.

Lourenço, W. R. 2007b. Further additions to the scorpion fauna of the Guayana region of South America. *Revue suisse de Zoologie*, **114**(3): 513-519.

Lourenço, W. R. 2007c. Litter size in micro-buthoid scorpions (Chelicerata, Scorpiones). *Boletin de la Sociedad Entomológica Aragonesa*, **40**: 473-477.

Lourenço, W. R. 2008. Parthenogenesis in scorpions: Some history - new data. *Journal of Venomous Animals and Toxins including Tropical Diseases*, **14**(1): 19-44.

Lourenço, W. R. & Ramos, E. C. B. 2004. New considerations on the status of *Tityus magnimanus* Pocock, 1897 (Scorpiones Buthidae), and description of a new species of *Tityus* from the State of Roraima, Brazil. *Revista Ibérica de Aracnología*, **10**: 285-291.

Stahnke, H. L. 1970. Scorpion nomenclature and mensuration. *Entomological News*, **81**: 297-316.

Vachon, M. 1952. *Etudes sur les scorpions.* Publications de l'Institut Pasteur d'Algérie, 482pp. Alger.

Vachon, M. 1963. De l'utilité, en systématique, d'une nomenclature des dents des chélicères chez les Scorpions. *Bulletin du Muséum national d'Histoire naturelle*, 2e sér., **35**(2): 161-166.

Vachon, M. 1974. Etude des caractères utilisés pour classer les familles et les genres de Scorpions (Arachnides). 1. La trichobothriotaxie en arachnologie. Sigles trichobothriaux et types de trichobothriotaxie chez les Scorpions. *Bulletin du Muséum national d'Histoire naturelle*, 3è sér., n° **140**, Zool. 104: 857-958.

Vachon, M. 1975. Sur l'utilisation de la trichobothriotaxie du bras des pédipalpes des Scorpions (Arachnides) dans le classement des genres de la famille des Buthidae Simon. *Comptes Rendus des Séances de l'Académie des Sciences*, **281** (D): 1597-1599.