

CONFIRMATION OF *TITYUS CONFLUENS* BORELLI, 1899 (SCORPIONES, BUTHIDAE) IN BRAZIL AND DESCRIPTION OF A NEW SUBSPECIES FROM THE STATE OF MATO GROSSO DO SUL

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Abstract: Confirmation is provided of *Tityus confluens* Borelli (Scorpiones, Buthidae) in Brazil. A new subspecies, *Tityus confluens bodoquena* ssp. n., is described on the basis of two female specimens collected in the 'Pitangueiras' cave in the region of Bonito, Serra da Bodoquena, State of Mato Grosso do Sul, Brazil. Comments on the taxonomic position of the new subspecies and on aspects of the environmental characteristics of the Pantanal/Serra da Bodoquena formations are also added.

Key words: Scorpiones, Buthidae, *Tityus confluens bodoquena*, ssp. n., Pantanal, Mato Grosso do Sul, Brazil.

Confirmación de la presencia de *Tityus confluens* Borelli, 1899 (Scorpiones, Buthidae) en Brasil y descripción de una nueva subespecie del estado de Mato Grosso do Sul

Resumen: Se confirma la presencia de *Tityus confluens* Borelli (Scorpiones, Buthidae) en Brasil. Se describe una nueva subespecie, *Tityus confluens bodoquena* ssp. n., en base a dos especímenes hembras colectados en la cueva 'Pitangueiras' en la región de Bonito, Serra da Bodoquena, Estado de Mato Grosso do Sul, Brasil. Se comentan tanto la posición taxonómica de la nueva subespecie como aspectos del medio característico de la formación Pantanal/Serra da Bodoquena.

Palabras clave: Scorpiones, Buthidae, *Tityus confluens bodoquena*, ssp. n., Pantanal, Mato Grosso do Sul, Brasil.

Introduction

Based on the study of two female specimens, *Tityus confluens* was described by Borelli (1899) as a subspecies of *Tityus trivittatus* Kraepelin. One of the specimens came from Caiza, Bolivian Chaco, and the second from the Mission de San Francisco in the high Pilcomayo. Both sites are situated in Bolivia. The status of *Tityus trivittatus confluens* remained unchanged in the monographic work of Mello-Leitão (1945). Subsequently, Maury (1974) published a more complete study of this subspecies, based largely on additional material. In this work he arrived at the conclusion that *T. confluens* was a good species, quite distinct from *Tityus trivittatus*. Maury's decision of 1974 was confirmed by Lourenço (1980).

Tityus confluens is a typical element of the Chaco formation. It is present both in Bolivia and Paraguay (Ziegler & Lourenço, 2002). In his publication of 1974, Maury indicated a single locality for *Tityus confluens* in Brazil, namely Porto Murinho, on the border with Paraguay. In his paper he emphasised the possibility of the mislabelling of some localities, particularly those in Brazil. For this reason, *Tityus confluens* was not included as a member of the Brazilian scorpion fauna in the synthesis published by Lourenço (2002).

The recent discovery of two *Tityus* specimens in caves in the region of Bonito, Serra da Bodoquena in the State of Mato Grosso do Sul, confirms the presence of *Tityus*

confluens in Brazil. The specimens from Bonito, however, show marked morphometric differences from the female holotype of *Tityus confluens confluens*. For this reason, we here propose a new subspecies, *Tityus confluens bodoquena* ssp. n. The taxonomic position of this new subspecies, and some of the environmental characteristics of the type locality are discussed.

Tityus confluens bodoquena new subspecies (Figs. 1-9)

DIAGNOSIS: Scorpion of medium size, 52-53 mm in total length. Coloration yellowish, with the carapace and tergites blackish brown. Granulation moderate throughout the body. Fixed and movable fingers of pedipalps with 16/17 rows of granules. Carapace, pedipalp and metasomal carinae complete. Pectinal tooth count in females, 23-24.

RELATIONSHIPS: The new subspecies is distinct from the typical form, in possessing quite different morphometric values, in particular those of the appendages (see Table I). Moreover, *T. confluens confluens* is a typical element of the Chaco formation, whereas *T. confluens bodoquena* was found inside a cave. The elongation of the body and appendages in *T. confluens bodoquena* could suggest a preliminary process of adaptation to cave life.

TYPE MATERIAL: Brazil, State of Mato Grosso do Sul, Serra da Bodoquena, Bonito (Cave Pintagueras), VI/2003 (B. C. Cabral). Female holotype deposited in the Department of Zoology, University of Brasilia, Brazil. Female paratype, deposited in the Muséum National d'Histoire Naturelle, Paris, France.

ETYMOLOGY. **Subspecific** name makes reference to the 'Serra da Bodoquena' region where the new subspecies was found.

DESCRIPTION: Based on holotype and paratype (females).

Coloration. Basically yellowish. Prosoma: carapace blackish brown on the anterior and lateral regions; regions behind the ocular tubercle and lateral eyes yellowish; eyes strongly marked with black pigment. Mesosoma: tergites I-VI blackish brown; tergite VII yellowish with a single spot over the median carina. Metasoma: all segments yellowish; vesicle: yellowish; extremity of aculeus darker than vesicle. Venter yellowish. Chelicerae yellowish with variegated dark pigmentation; fingers dark brown; teeth reddish. Pedipalps and legs yellowish, without any diffuse spots.

Morphology. Carapace moderately to strongly granular; anterior margin with a median concavity. Anterior median and posterior median carinae moderately developed. All furrows moderately deep. Median ocular tubercle anterior to the centre of the carapace. Three pairs of lateral eyes. Sternum triangular. Mesosoma: tergites moderately granular. Median carina moderate to strong on all tergites. Tergite VII pentacarinata. Venter: genital operculum wider than long. Pectines: pectinal tooth count 24-24 (holotype) – 23-23 (paratype); basal middle lamellae of the pectines not dilated. Sternites smooth and with moderately elongated spiracles; VI without keels; VII with 4 moderately developed carinae. Metasoma: segments I-II with ten carinae; segments III-IV with eight carinae; segment V with five carinae. Intercarinal spaces moderately to weakly granular. Telson with vestigial granulation on ventral and lateral surfaces and with a moderately long and curved aculeus; subaculear tooth strong and spinoid, with two dorsal teeth. Cheliceral dentition characteristic of the family Buthidae; ventral teeth on movable finger reduced (cf. Vachon, 1963); ventral aspect of both fingers and manus densely covered with long setae. Pedipalps: femur pentacarinata; patella and chela with eight carinae; all carinae moderately to strongly developed; entire surface weakly granular. Fixed and movable fingers with 16/17 oblique rows of granules. Trichobothriotaxy; orthobothriotaxy A- α (alpha) (Vachon, 1974, 1975). Legs: tarsus with numerous short fine setae ventrally.

Characteristics of the Pantanal and of the Bodoquena Plateau

The Pantanal region comprises an alluvial area of 150 000 km² in the upper Paraguay basin of central-western Brazil. It is one of the largest tropical wetland ecosystems in the world. The region has a seasonal climate with three to four dry months. During the rainy season, from November to April, precipitation is 1000-1400 mm. The average annual temperature is 25° C with maxima around 40° C during the

Table I. Morphometric values (in mm) of the female holotypes of *Tityus confluens confluens* (from Maury, 1974) and *Tityus confluens bodoquena* ssp. n.

	<i>Tityus confluens</i>	
	<i>confluens</i>	<i>bodoquena</i>
Total length	53.0	53.0
Carapace:		
- length	5.5	6.4
- anterior width	-	4.2
- posterior width	6.0	6.8
Metasomal segment I:		
- length	3.5	4.4
- width	-	2.9
Metasomal segment V:		
- length	6.5	7.2
- width	-	2.7
- depth	-	2.6
Vesicle:		
- width	1.5	2.2
- depth	2.0	2.2
Pedipalp:		
- Femur length	-	7.5
- Femur width	-	1.7
- Patella length	-	8.2
- Patella width	-	2.3
- Chela length	11.0	13.1
- Chela width	2.0	2.1
- Chela depth	-	2.0
Movable finger:		
- length	-	8.7

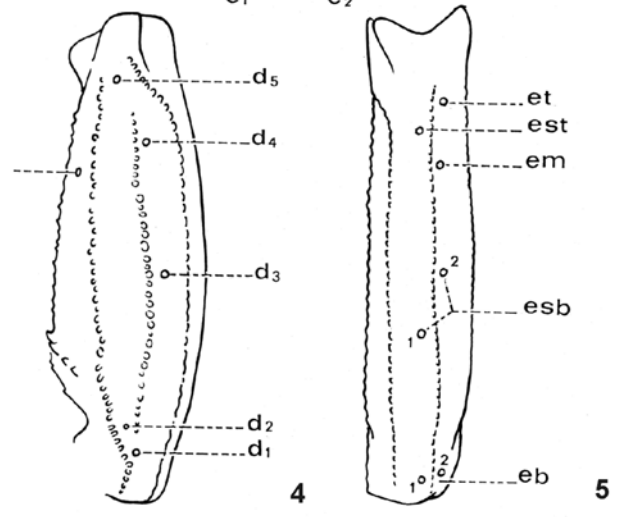
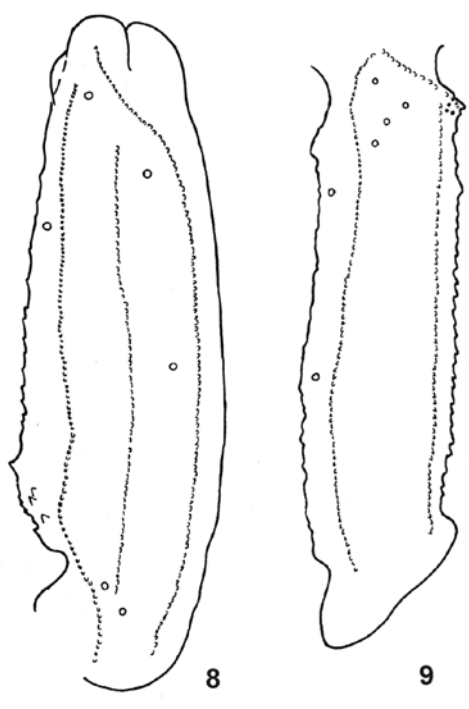
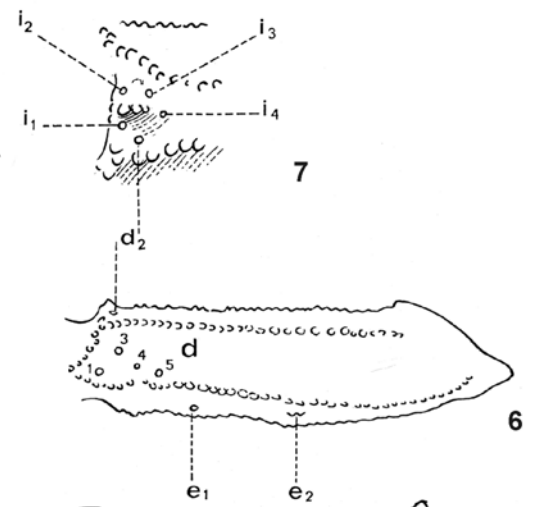
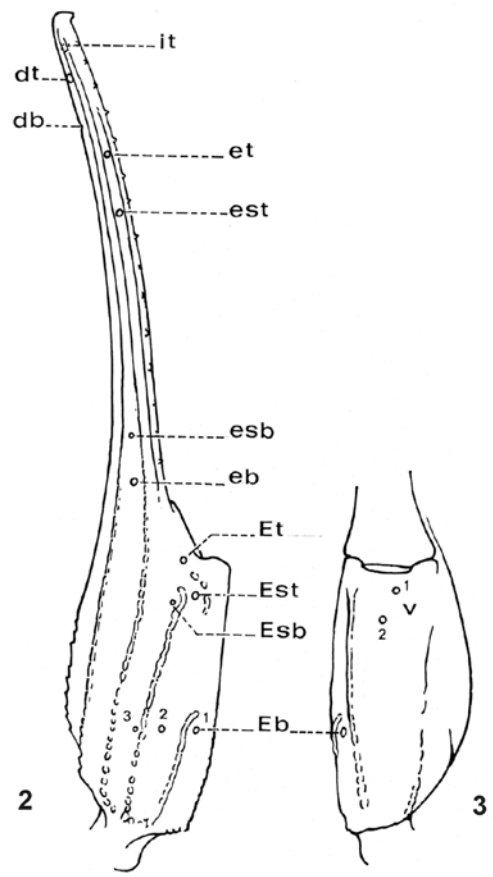
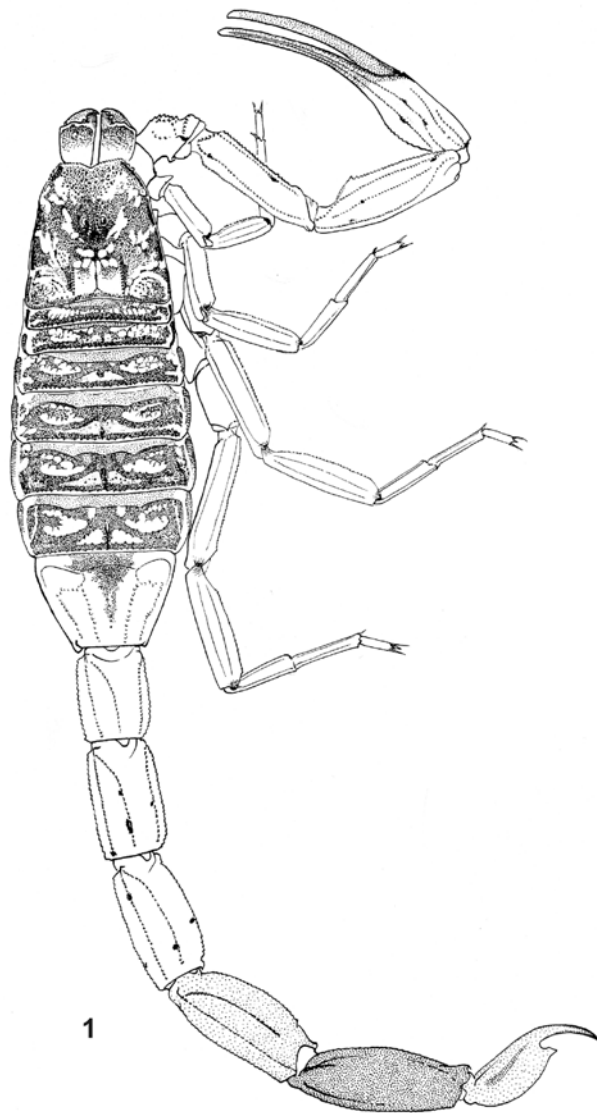
dry season. According to Eiten (1982), the Pantanal region is a complex of many vegetation types. A large proportion of these are inundated each year. The configuration of the area results in its isolation from surrounding formations, and endemics can be expected to occur in the region.

In contrast, the region of the Bodoquena Plateau, although situated within the geomorphological region of the Pantanal, has quite different environmental characteristics when compared to those of the lowlands of the Pantanal Plane. The first important difference is altitude. The lowlands of the Pantanal Plane are situated at altitudes of 85 m, whereas those of the Bodoquena Plateau range from 450 to 650 m. The yearly inundations observed in the Pantanal Plane do not occur in the Bodoquena Plateau, which is covered by a more dense vegetation cover, mainly composed of forests on calcareous soils.

The scorpions collected in the "Pintagueras" Cave in the area of Bonito, were found not too far from the entrance. Other Arachnids have already been reported from this Cave (Gnaspini & Trajano, 1994; Gonçalves *et al.*, 2001).

Figs. 1-7. *Tityus confluens confluens*. Female holotype. **1.** Habitus. Female holotype. **2-7:** Trichobothrial pattern. **2-3.** Chela, dorso-external and ventral aspects. **4-5.** Patella, dorsal and external aspects. **6-7.** Femur, dorsal and internal aspects (after Lourenço, 1980).

Figs. 8-9. *Tityus confluens bodoquena* ssp. n. Female holotype. Patella and femur, dorsal aspect. Showing trichobothria.



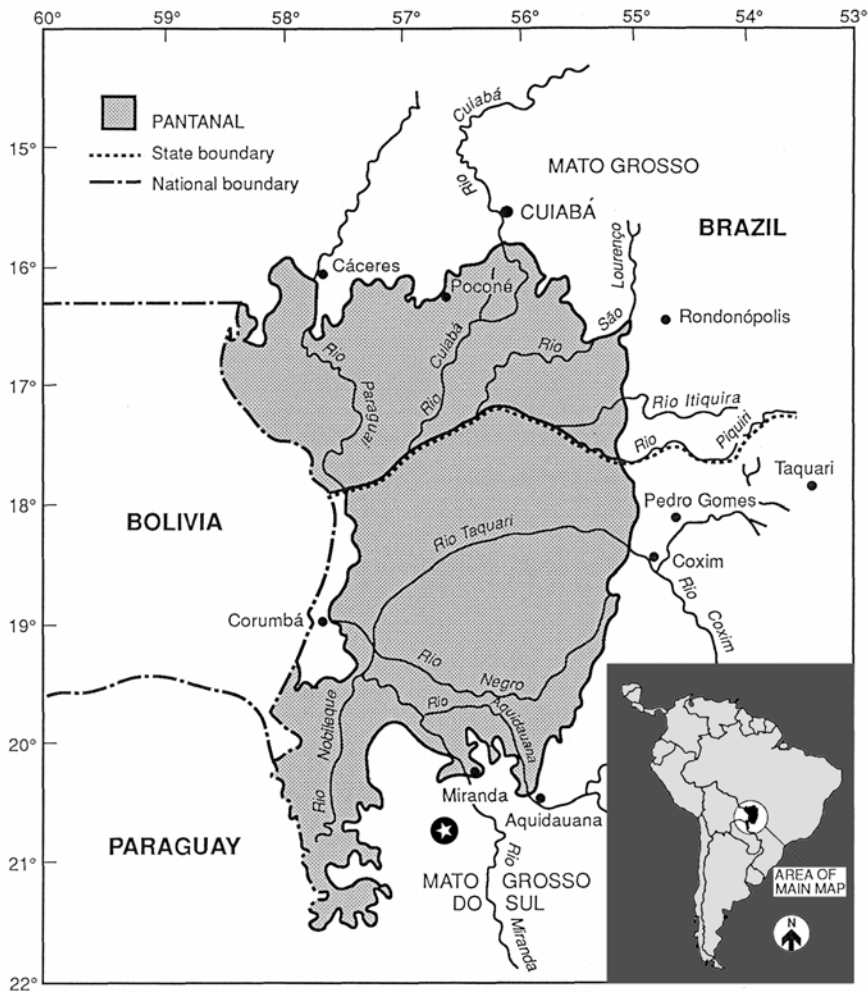


Fig. 10. Map showing the ‘Pantanal’ of Mato Grosso and the type-locality of the new subspecies in the ‘Serra da Bodoquena’ (k).

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