

ARTÍCULO:

**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**

**Wilson R. Lourenço**

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

**Evellyn C. Bruehmueller Ramos**

Departamento de Biologia, Universidade Federal de Mato Grosso do Sul, Campo Grande, MS, Brazil: viva@brturbo.com

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**Grupo Ibérico de Aracnología (GIA)**  
Grupo de trabajo en Aracnología de la Sociedad Entomológica Aragonesa (SEA)

Avda. Radio Juventud, 37  
50012 Zaragoza (ESPAÑA)  
Tef. 976 324415  
Fax. 976 535697  
C-elect.: amelic@telefonica.net  
Director: A. Melic

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ARTÍCULO:

## 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

Wilson R. Lourenço & Evellyn C. Bruehmueller Ramos

### Abstract:

New considerations on the taxonomy, geographical range and distribution of the scorpion *Tityus magnimanus* Pocock, 1897 are discussed in this paper. This species, which belongs to the '*Tityus asthenes*' group is associated with the *Tityus androcottoides* subgroup. It was described from Brazil without any precise locality being given. We now suggest that it does not in fact occur in Brazil, but is more probably restricted to Venezuela. A new species of *Tityus* Koch from the State of Roraima, Brazil is also described. It is the first genuine element of the *Tityus androcottoides* subgroup to be found in that country.

**Key words:** Scorpiones, Buthidae, *Tityus magnimanus*, Roraima, Brazil.

**Taxonomy:** *Tityus elizabethae* sp. n.

### Nuevas consideraciones sobre el estatus de *Tityus magnimanus* Pocock, 1897 (Scorpiones: Buthidae) y descripción de una nueva especie de *Tityus* del estado de Roraima, Brasil

### Resumen:

Se discuten nuevas consideraciones sobre la taxonomía, rango geográfico y distribución del escorpión *Tityus magnimanus* Pocock, 1897. Esta especie, perteneciente al grupo de '*Tityus asthenes*' se asocia con el subgrupo de *Tityus androcottoides*. Se describió de Brasil sin precisar localidad concreta. Se sugiere ahora que la especie no está presente en Brasil y está restringida a Venezuela. Se describe una nueva especie de *Tityus* Koch del Estado de Roraima, Brasil, que constituye el primer elemento genuino del subgrupo *Tityus androcottoides* encontrado en ese país.

**Palabras clave:** Scorpiones, Buthidae, *Tityus magnimanus*, Roraima, Brasil.

**Taxonomía:** *Tityus elizabethae* sp. n.

### Introduction

The genus *Tityus* is the most speciose of all scorpion genera, with almost 150 known species. There is a constant increase in the number of known species and new species are being described every year. In order to facilitate the identification of such a large number of species in the same genus, many attempts have been made to divide *Tityus* into groups of species. The number of these groups has shown considerable variation during the last century, comprising from three to sometimes 12 groups according to their authors (e.g. Kraepelin, 1899; Mello-Leitão, 1939, 1945). In more recent studies, Lourenço (e.g., 1992, 1997 a-b, 2000) retained only three groups of species, namely the '*Tityus clathratus*' group, the '*Tityus bahiensis*' group and the '*Tityus asthenes*' group. Even more recently, Lourenço and Pézier (2002) proposed a fourth '*Tityus adisi*' group to accommodate two small species endemic to the Amazonian forest canopy.

The status of the species of both the '*Tityus clathratus*' and the '*Tityus bahiensis*' groups is more or less clear, but the status of the '*Tityus asthenes*' group still requires further analysis (Lourenço, in preparation). The composition of the '*Tityus asthenes*' group, which had long appeared to be stable, began to change with the description of several new species (e.g. Lourenço, 1997 a-b, 2002a). Moreover, one precise definition of some 'sub-groups', such as the one composed of species associated with *Tityus androcottoides*, is still needed.

Among the species of the '*Tityus asthenes*' group present in Brazil (Lourenço, 2002b) only one can be associated with *Tityus androcottoides*. This is *Tityus magnimanus* Pocock, 1897a, species described from Brazil without any precise information being given as to its type locality.

We suggest that a possible error may exist regarding the presence of this species in Brazil. Its distribution is probably located in and limited to Venezuela. A new species of *Tityus* Koch is also described here from the State of Roraima, Brazil. It represents the first true element of the *Tityus androcottoides* subgroup to be recorded from that country.

### Historical aspects about the discovery and the description of *Tityus magnimanus* Pocock, 1897

As already explained, Lourenço (1987), *Tityus magnimanus* was described by Pocock (1897a) based on two specimens, an adult male and a juvenile female. According to Pocock (1897a) these had been presented by E. E. Austen. Indeed, in another paper published in the same year, Pocock (1897b) described several new species which had in fact been collected by E. E. Austen and F. Pickard Cambridge during their trip on the Steamship 'Faraday' in the Lower Amazons. All the species described or reported in the Pocock's (1897b) paper (*Tityus cambridgei*, *Tityus metuendus*, *Tityus silvestris*, *Brotochactas parvulus* and *Brotheas gervaisii*) were collected from precise localities in Brazil, and have subsequently been found again in Brazilian Amazonia. In contrast, *Tityus magnimanus* was described with the single word 'Brazil' given as its type locality. It has never again been found in Brazilian Amazonia. In his monograph, Mello-Leitão (1945) indicated the island of Marajó in the delta of the Amazon, State of Pará in Brazil, as being the type locality of *T. magnimanus*, but without any justification.

Lourenço (1987), incorrectly suggested that the types of *T. magnimanus* had probably been collected in the upper Amazon basin. This argument was supported mainly by the fact that the only specimens corresponding to *T. magnimanus* examined by him had been collected in Venezuela. However, the trip of the 'Faraday' in the Lower Amazonia was precisely reported by E. E. Austen, and all the collecting localities have been documented (see next section).

In the present study, several other points have been investigated:

1. In his (1897a) paper, Pocock wrote that of the specimens contained in the collection of the British Museum, many fresh examples had been acquired since 1889 and 1893.
2. In addition to the type specimens studied, Lourenço (1987), makes reference to four males and six females (MNHN-RS-0809) collected in 'Provincia Falcon', Venezuela. This material was previously registered in the personal collection of Eugène Simon, under N° 9903. Further investigations of the field notes of E. Simon, revealed that the specimens had been collected by Simon himself at 'San Esteban, Provincia Falcon', Venezuela in March 1888. Simon made a field trip to Venezuela in 1887-1888 (Fage, 1924; Berland, 1925).
3. The types of *Tityus magnimanus* deposited in the Natural History Museum, London, are labelled as follows: BMNH-1891.8.31.1 and BMNH-1891.8.31.2 (Figs. 1-2). Dr. Paul D. Hillyard, Curator of Arachnida in the Department of Entomology, The Natural History Museum, has the following explanation of this code: "1891 means the year of registration and this may or may not be the year of collection. 8 and 31 means August 31th". There are two specimens as indicated by the numbers 1 and 2 after the codes (see also Judson, 1997, pp 5-6).

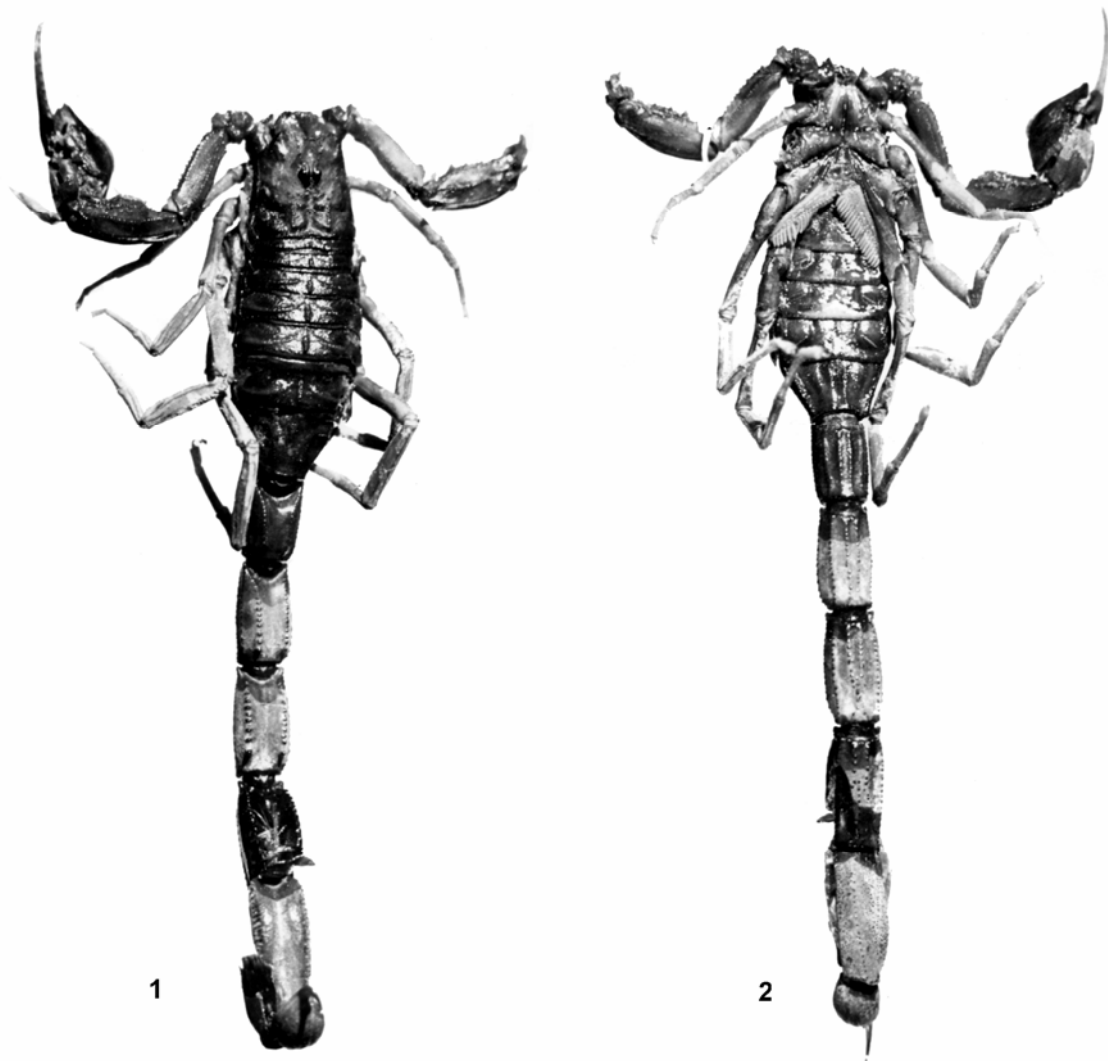
This explanation proves that the type material of *T. magnimanus* was collected before or at least no later than 1891. This excludes any possibility that the specimens had been collected by E. E. Austen during his trip to the Lower Amazon in Brazil, because this took place between the autumn of 1895 and March 1896.

In conclusion, we now suggest that some error, almost certainly of mislabelling, took place with the type material of *T. magnimanus*. This species does not occur in Brazil, and its range of distribution is apparently limited to the North of Venezuela (Lourenço, 1987, 1997b). As already suggested by Lourenço (1987), González-Sponga (1984, 1996) does not include *T. magnimanus* in the scorpion fauna of Venezuela. However, the species *Tityus falconensis* González-Sponga, 1974, described from the 'Provincia Falcon', definitely corresponds to *T. magnimanus*.

### The trip of E. E. Austen to the Brazilian Amazonia. Reported by Austen (1896) with comments by N. Papavero (1973) (Chapter XXIII)

"In the autumn (of 1895) Mr. Alexander Siemens, of the firm Messrs. Siemens, Bros. & Co., Limited, of Woolwich, being about to proceed to the Amazon in command of an expedition for the purpose of laying (sic laying) a telegraph-cable from Pará (Belém) to Manaus, and having been much interested by the perusal of the well-known works of Bates and Wallace on the fauna of this particular region of the South American continent, thought that the expedition would afford an excellent opportunity in increasing the national collections. Mr. Siemens accordingly made a most public-spirited offer to the Trustees of the British Museum to the effect that, should they desire to avail themselves of the opportunity, he would be pleased to take on board the ship, the Cable S. S. 'Faraday', a member of the Museum staff in order to make collections, at the various localities in the river with which telegraphic connections would have to be effected. Needless to say, the Trustees accepted the offer in the spirit in which it was made, and through the kindness of Sir Wm. Flower I was selected to represent the Museum, the Trustees granting me the necessary leave of absence. Subsequently, in order that the Museum might benefit to the fullest possible extent. Mr. Siemens consented to take a second naturalist, in the person of Mr. F. O. Pickard Cambridge, who, by the boundless enthusiasm and untiring energy with which he threw himself into the labour of collecting, more than justified the selection."

According to Papavero (1973), this is the way Austen's report on his Amazonian expedition begins. The man that the Trustees had selected to go to Brazil, Ernest Edward Austen, 'Major Austen', was born in London on 19 October 1867. He studied at Rugby and Heidelberg (Germany) and became a member of the British Museum staff in 1889. After his return from Brazil, he took part in a Tropical Medicine Expedition to Sierra Leone in 1899. In 1927 he was appointed head of the Entomological Department of the British Museum.



**Figs. 1-2.** *Tityus magnimanus*. Male holotype, dorsal and ventral aspects. Total length 63 mm. To notice the poorly preservation of the specimen.

According to his narrative: “The ‘Faraday’, a vessel of 5,000 tons, sailed from Gravesand on December 13, 1895, and reached Pará (Belém) on Jan. 4, 1896, after calling on the way at St. Vincent, in the Cape Verde Is., where we had a most enjoyable day’s collecting on Dec. 26.”

“...The ‘Faraday’ remained at anchor in the *Pará River*, about two miles below the city, from Jan. 4th until the 10th. We were thus enabled to collect for several days in a clearing in the forest about three-quarters of a mile from our anchorage, besides paying what was unfortunately, a very hurried visit to the Pará Museum. This institution (...) under the energetic supervision of the present Director, Dr. E. A. Goeldi (...) would do credit to any European city....”

“On Jan. 10th we left Pará for the Amazon, laying out cable as we went, and on Jan. 13th reached Breves a small town in the great island of Marajó, situated near the commencement of the network of narrow channels which connect the *Pará River* with the *Amazon*. At Breves we had a day’s collecting, considerably troubled by uncertainty as to the hour at which the ship would

proceed on her way. On the afternoon of the following (sic following) day (Jan. 14th) we ran aground on a mudbank at the western end of a channel known as the *Paraná de Buyussu (Furo Buiuçu)*, and remained there hard and fast until Jan. 20th, when we were towed off, only to run aground again on the following (sic following) day in almost the same place, so that we did not get away finally until high-tide on the morning of Jan. 22nd. This delay, however annoying from a cable-laying point of view, was to a naturalist anything but unwelcome, and we turned it to good account. No further mishaps occurred on the upward voyage, and we reached Manaus (Manaus), our destination, at the mouth of the *Rio Negro*, about 1,000 miles from Pará (Belém), on Feb. 8th, after calling on our way at Gurupá, Monte Alegre, Santarém, Óbidos, Parintins, and Itacoatiara. At each of these places we had from one to two days collecting, according to the time occupied by the cable operations, with the exception of Santarém, where we remained for four days and a half. We left Manaus on the downward voyage on Feb. 15th, preceded (sic preceded) two days earlier by Mr. Pickard Cambridge, who had decided to

return to Santarém in order to stay a fortnight in the forest some nine miles inland from that town, at a cottage which had been most kindly placed at our disposal by Mr. Wallace, an American trader. After due consideration I had decided to remain with the ship, in order to visit the localities by dividing our forces. On the downward voyage we ran aground in mid-stream near Monte Alegre. And remained there for four days before getting off. Unfortunately I was suffering at the time from a swollen foot, and being scarcely able to walk I was unable to profit by this delay. After another day's collecting at Gurupa, we reached Macapa (in the Territory of Amapá), on the northern shore on Feb. 24. and I was enabled to collect for a day at the locality which, so far as I am aware, had not been visited before by a European naturalist. Thence, after calling at Chaves, in the island of Marajó, and again at Breves, we returned to somewhere near our old anchorage in the *Pará River* on March 5th. and the expedition was nearly at an end. Connections, however, still had to be made with a few places in the vicinity of Pará (Belém), and, as it was expected that these operations would take at least a fortnight, I resolved to avail myself of an opportunity which occurred on the following day of going to stay for some time at Mosqueiro, a little place seventeen miles below Pará (Belém) on the same shore, in order to make the utmost of the time that still remained for collecting. I remained there until March 16th. when the 'Fadary' arrived, and I returned on her to our anchorage below Pará (Belém). During the second half of my stay at Mosqueiro work was much interfered with by rain. Mr. Pickard Cambridge who had already returned from Santarém, now rejoined the ship, and the next few days were occupied mainly in preparations for the homeward voyage. We sailed from Pará at 6 P. M. on March 24th, and reached Gravesand on the morning of April 14th."

### Description of a new species

*Tityus elizabethae* sp. n. (Figs. 3-15)

**TYPE MATERIAL.** Holotype female: Brazil, State of Roraima, Marco Brasil Venezuela N° 8 (BV8), Pacaraima on the border between Brazil and Venezuela (N. Almeida leg), VII/1984 (Savannah of Guyanas formation, 900 m). Arboreal savannah which belongs to the Mount Roraima complex (between 04° 48' to 05° 16' N and 60° 05' to 60° 44' W).

**ETYMOLOGY:** Patronym is in honor of Dr. Elizabeth Franklin of the INPA, Manaus who arranged facilities for the visit of the senior author to Amazonia in 2002.

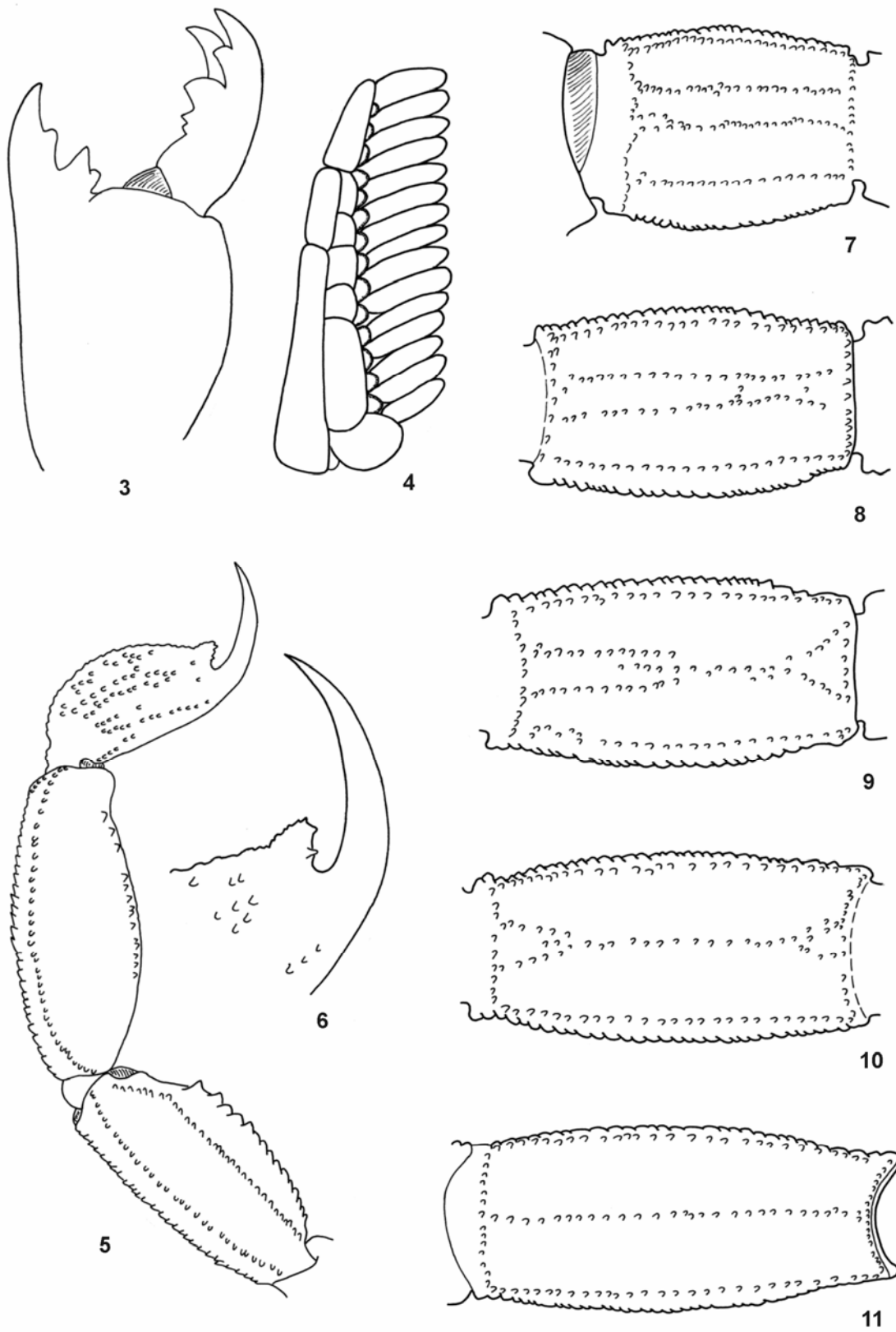
**DIAGNOSIS:** A moderate to large species when compared with the average size of the other species in the genus (70.2 mm in total length; see Table I). General pattern of pigmentation reddish to dark reddish overall. Basal middle lamella of female pectines strongly dilated. Subaculear tooth strongly rhomboidal. Pectinal tooth count 15-16. Fixed and movable fingers of the pedipalp with 15/16 oblique rows of granules. Ventral carinae of metasomal segments II to IV partly or largely fused forming a Y-shape configuration. This is the second

species of *Tityus* presenting this kind of Y-shape configuration to have been described from Brazilian Amazonia, but the first to be confirmed to a precise type locality. It is possibly an endemic to the Savannah of the Guyanas formations.

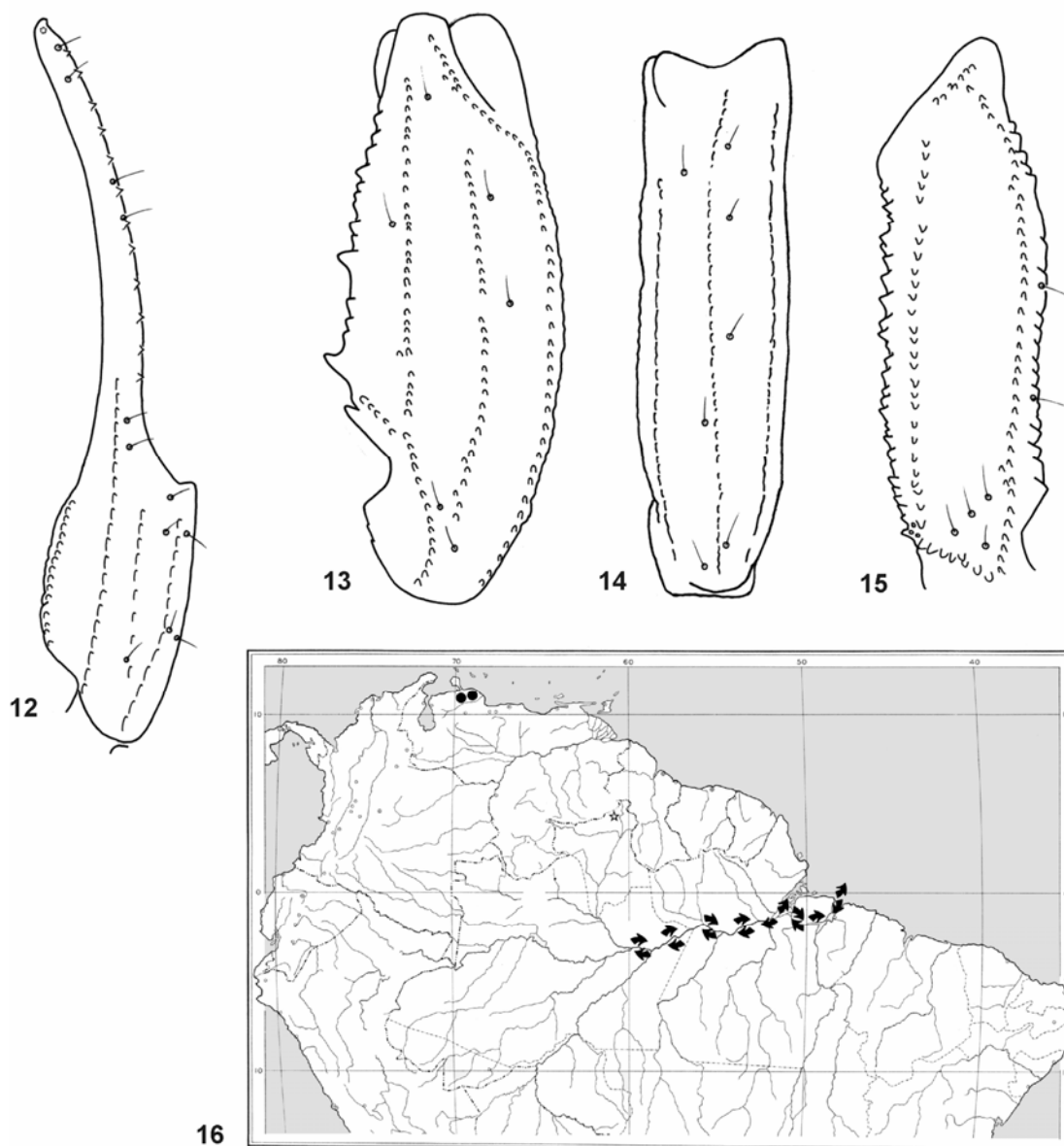
**DESCRIPTION (BASED ON FEMALE HOLOTYPE). Measurements** in Table I. **Coloration.** Basically reddish to dark reddish overall. Prosoma: carapace reddish with some dark zones on the lateral and posterior edges. Mesosoma: tergites reddish with one transversal darker stripe on the posterior edge of tergites I-VI. Metasoma: segments I to III reddish; IV dark reddish; V dark reddish with some blackish regions. Vesicle: dark reddish. Venter reddish yellow; sternites VI-VII dark reddish; pectines pale yellow. Chelicerae yellowish with a dark thread; fingers dark. Pedipalps: reddish; fingers slightly darker with the extremities yellowish. Legs reddish with some diffuse fuscous spots; tarsi yellowish.

**Morphology.** Carapace moderately to strongly granular; anterior margin with a moderate concavity. Anterior median superciliary and posterior median carinae moderate. All furrows moderately deep. Median ocular tubercle distinctly anterior to centre of the carapace. Eyes separated by more than one ocular diameter. Three pairs of lateral eyes. Sternum subtriangular. Mesosoma: tergites moderately to strongly granular. Median carina moderate in all tergites. Tergite VII pentacarinat. Venter: genital operculum divided longitudinally; each half with a semi-triangular shape. Pectines: pectinal tooth count 15-16; basal middle lamellae of the pectines strongly dilated. Sternites moderately granular with elongate spiracles; VII with four carinae. Metasoma: segment I with 10 carinae, crenulate; segment II with eight carinae, crenulate; the ventral partially fused on the distal third; segment III with 10 carinae, crenulate; the ventral fused on distal half, forming a Y shape configuration; segment IV with 7/8 carinae, crenulate; the ventral fused over 4/5 of the total length; segment V with 5 carinae, crenulate. Dorsal carinae on segments II to IV with one or two strong spinoid granules. Lateral inframedian carinae on segment I complete, strongly crenulate; on II represented by only four distal granules; absent from III and IV. Ventrolateral carinae strong, crenulate. Ventral submedian carinae strongly crenulate. Intercarinal spaces moderately granular. Segment V with dorsolateral, ventrolateral and ventromedian carinae strong, crenulate. Lateral intercarinal spaces moderately granular. Telson, strongly granular, with a moderately long but strongly curved aculeus. Dorsal surface smooth; ventral surface strongly granular; subaculear tooth strongly rhomboidal. 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 pentacarinat; patella with seven carinae; chela with eight carinae; all faces moderately granular. Fixed and movable fingers with 15/16 oblique rows of granules. Trichobothriotaxy; orthobothriotaxy A- $\alpha$  (Vachon, 1974, 1975). Legs: tarsus with numerous short fine setae ventrally.

No paratypes.



**Figs. 3- 11.** *Tityus elizabethae* sp. n. Female holotype. 3. Chelicera. 4. Pecten. 5. Metasomal segments IV-V and telson, lateral aspect. 6. Detail of aculeus and subaculear tooth. 7-11. Metasomal segments I to V, ventral aspect.



**Fig.s 12-15.** *Tityus elizabethae* sp. n. Female holotype. Trichobothrial pattern. **12.** Chela, dorso-external aspect. **13-14.** Patella, dorsal and external aspects. **15.** Femur, dorsal aspect.

**Fig. 16.** Map of the Northern South America showing: The route of the Steamship 'Faraday' during her trip in Amazonia (arrows). The site in Venezuela where *Tityus magnimanus* can be found (black circles). 3. The type locality of *Tityus elizabethae* sp. n. in Brazil (white star).

**RELATIONSHIPS.** From its general morphology, the new species belongs to the '*Tityus asthenes*' group of species (and to the '*Tityus androcottoides*' subgroup). Because of its morphological features but also because of a nearby area of distribution, it can be associated with *Tityus venamensis* Gonzalez-Sponga, 1981 described from Cerro Venamo in Venezuela. Although the study of the type material of *T. venamensis* is not possible, a careful examination of its description allows us to distinguished the two species by the following characters:

**a.** The new species has a reddish coloration overall, whereas in *T. venamensis* the general coloration is blackish.

**b.** The overall size of the new species is much larger than that of *T. venamensis*.

**c.** The basal middle lamella of the pectines is strongly dilated in the new species whereas, in *T. venamensis*, this dilatation looks as though it is weak to moderate. This character, however, is not clearly described by Gonzalez-Sponga (1981), and the illustrations (Figs. 55-56) he presented are obscure.

**d.** The subaculear tooth is strongly rhomboidal in the new species, whereas in *T. venamensis* it tends to be more to spinoid.

**Table I. Measurements (in mm) of *Tityus elizabethae* sp. n. and of the female paratype of *Tityus venamensis* (data after Gonzalez-Sponga, 1981)**

<i>Tityus</i>	<i>elizabethae</i>	<i>venamensis</i>
Total length	70.2	51.2
Carapace:		
- length	7.2	6.0
- anterior width	5.2	3.5
- posterior width	7.9	5.7
Metasomal segment I:		
- length	5.4	4.3
- width	4.2	3.0
Metasomal segment V:		
- length	8.9	6.7
- width	3.8	2.8
- depth	3.6	-
Telson		
length	7.4	6.0
Vesicle:		
- width	2.9	2.5
- depth	2.9	2.5
Pedipalp:		
- Femur length	7.8	6.0
- Femur width	2.3	-
- Patella length	8.5	6.4
- Patella width	2.9	-
- Chela length	14.4	4.5+7.6=12.1
- Chela width	2.6	2.0
- Chela depth	2.4	2.2
Movable finger		
- length	9.9	7.7

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