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ARTÍCULO:

**Description of a new species of *Tityus* Koch, 1836 (Scorpiones, Buthidae) from the States of Espirito Santo and Rio de Janeiro in Brazil**

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# DESCRIPTION OF A NEW SPECIES OF *TITYUS* KOCH, 1836 (SCORPIONES, BUTHIDAE) FROM THE STATES OF ESPIRITO SANTO AND RIO DE JANEIRO IN BRAZIL

Wilson R. Lourenço &
Alessandro Ponce de Leão Giupponi

**Abstract:**
Description of a new species of *Tityus* (Scorpiones, Buthidae) from the States of Espirito Santo and Rio de Janeiro, Brazil. *Tityus potameis* sp. n., a member of the *Tityus bahiensis* species group, is described on the basis of two male and six female specimens collected at several localities in both States. The geographic distribution of the new species ranges from 'Macaé' in the State of Rio de Janeiro, to 'Parque Duas Bocas' and 'Reserva Biológica Santa Lúcia', in the State of Espirito Santo. Comments on the taxonomic position of the new species and on aspects of the environmental characteristics of the Brazilian Atlantic Forest are also added.
**Key words:** Scorpiones, Buthidae, *Tityus potameis* sp. n., Espirito Santo, Rio de Janeiro, Brazilian Atlantic Forest, Brazil.
**Taxonomy:** *Tityus potameis* sp. n.

**Descripción de una nueva especie de *Tityus* Koch, 1836 (Scorpiones, Buthidae) de los estados de Espirito Santo y Rio de Janeiro, en Brasil**

**Resumen:**
Se describe una nueva especie de *Tityus* (Scorpiones, Buthidae) de los estados de Espirito Santo y Rio de Janeiro, Brasil. *Tityus potameis* sp. n., es miembro del grupo *Tityus bahiensis*, y se describe a partir de dos machos y seis hembras colectados en algunas localidades de ambos estados. La distribución geográfica de la nueva especie comprende desde 'Macaé', en el estado de Rio de Janeiro, hasta 'Parque Duas Bocas' y 'Reserva Biológica Santa Lúcia', en el estado de Espirito Santo. Se incluyen comentarios sobre la posición taxonómica de la nueva especie, así como sobre las caracterísctcias ambientales del Bosque Atlántico Brasileño.
**Palabras clave:** Scorpiones, Buthidae, *Tityus potameis* sp. n., Espirito Santo, Rio de Janeiro, Bosque Atlántico Brasileño, Brasil.
**Taxonomía:** *Tityus potameis* sp. n.

## Introduction

Only a few species of *Tityus* Koch, 1836 inhabit the Brazilian Atlantic Forest. They have been the subject of a few taxonomic studies in the last 20 years (Lourenço, 2002). Noteworthy among them are: *Tityus pusillus* Pocock, 1893, *Tityus anneae* Lourenço, 1997, *Tityus costatus* (Karsch, 1879), *Tityus munozi* Lourenço, 1997 and *Tityus brazilae* Lourenço & Eickstedt, 1984 (Lourenço, 1980, 1982, 1997a,b; Lourenço & Eickested, 1984). Other species such as *Tityus bahiensis* (Perty, 1833), *Tityus serrulatus* Lutz & Mello, 1922 and *Tityus stigmurus* (Thorell 1876) can also be found in the coastal zones of Brazil, but these are not native elements. In fact, they are opportunistic species that have being introduced by human activity in the largely modified zones of the Atlantic Forest (Lourenço & Cloudsley-Thompson, 1996).

In some biogeographical publications, a few patterns of distribution and differentiation have been synthesised (Lourenço, 1986, 1994). It is assumed in these that the scorpion fauna of the Brazilian Atlantic Forest is not known precisely. Several regions within the Brazilian Atlantic Forest have never been the subject of any survey, and only certain areas near to the coastal regions have been intensively surveyed, mainly in connection with scorpionism (Lourenço & Cloudsley-Thompson, 1996; Lourenço *et al*., 1996). This is true in particular for Bahia and Pernambuco. Most parts of these States have been extensively modified and damaged by human activities. The Brazilian Atlantic Forest once occupied about 1 million km$^2$, extending from the State of Rio Grande do Norte to Rio Grande do Sul, in a strip ranging from 10 to 160 km in width. Intense human exploitation has reduced this forest to a few remnant patches, and 66-93% of the original

forest has been destroyed (Mori *et al*., 1981; Lourenço, 2001). Consequently, new species can only be found in these remnant patches.

In the present paper a new species, *Tityus potameis* sp. n., belonging to the *Tityus bahiensis* group, is described based on specimens collected from certain localities in the States of Espirito Santo and Rio de Janeiro, Brazil. The taxonomic position of the new species is discussed.

## Taxonomic treatment

***Tityus potameis* sp. n.** (Figs. 18-27)

**TYPE MATERIAL:** Male holotype. Brazil, State of Espirito, Parque Duas Bocas, Cariacica, XI/2003 (T. G. Souza & M. Milleri Pinto coll.). Deposited in the MNRJ.

Paratypes: Espirito Santo, Reserva Biológica Santa Lúcia, Santa Teresa, 28-30/V/2004 (A.P.L. Giupponi, T.G. Souza & M. Milleri Pinto), 1 male (MNRJ). Sitio do Coronel Alziro, Santa Tereza, I/1997 (A.P.L. Giupponi, T.G. Souza & M. Milleri Pinto), 2 females (MBML); Santa Tereza, 28/VII/1997 (R.L.L. Kollmann), 1 female (MBML). Rio de Janeiro, Macaé, X/2002 (A.P.L. Giupponi), two females (MNRJ & MNHN). MNRJ = Museu Nacional, Rio de Janeiro. MBML = Museu de Biologia Mello-Leitão, Santa Teresa, Espirito Santo. MNHN = Muséum National d'Histoire Naturelle, Paris.

**ETYMOLOGY:** The specific name 'potameis' is based on 'naids' of the Greek mythology which presided over the rivers, in reference to the occurrence of all known specimens of the new species nearby water bodies.

**DIAGNOSIS:** Medium to large scorpions, measuring 50 to 68 mm in total length. Coloration yellowish to reddish yellow, with several weakly marked spots over the carapace, tergites, legs and pedipalps. Granulation moderate to weak all over the body and pedipalps. Male pedipalps very elongated when compared to female pedipalps; This sexual dimorphism is also found in *Tityus brazilae* Lourenço & Eickstedt (see figures 11-16 and 18-26). Fixed and movable fingers of pedipalps with 15/16 rows of granules in both sexes. All carinae on body and appendages complete or almost complete. Pectinal tooth count 21-21 in males and 19-21 in females.

**DESCRIPTION: BASED ON MALE HOLOTYPE**

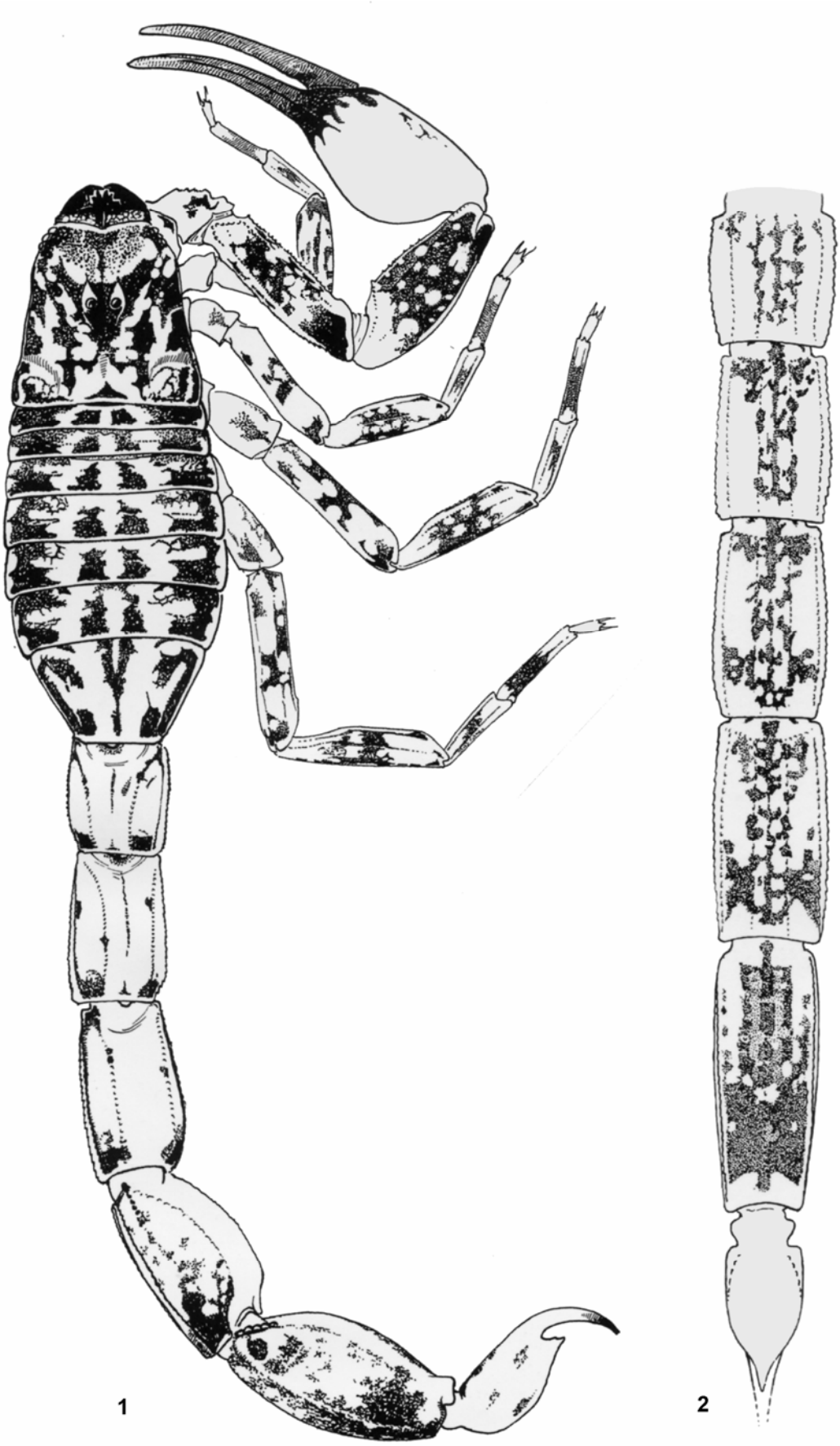
**Coloration**. Basically yellowish to reddish yellow. Prosoma: posterior and lateral regions of the carapace reddish yellow; the anterior region with an inverted triangular brownish spot stretching from the median to the lateral eyes; regions behind the ocular tubercle and lateral eyes reddish yellow; eyes strongly marked with black pigment. Mesosoma: tergites I-VII reddish yellow with three longitudinal strips, weakly marked. Metasoma: segments I to IV reddish; segment V reddish with blackish zones ventrally; very diffused brownish spots on the lateral and ventral surfaces, more intensely marked on III-IV. Vesicle: reddish yellow; extremity of aculeus darker than vesicle, blackish. Venter yellowish to reddish yellow; pectines pale yellow. Chelicerae yellowish with variegated dark pigmentation on the anterior half; fingers reddish with blackish teeth. Pedipalps reddish yellow; legs yellowish; only diffuse spots can be observed on both.

**Morphology**. Carapace moderately to strongly granular; anterior margin almost straight. Anterior median superciliary 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 on all tergites. Tergite VII pentacarinate. Venter: genital operculum wider than long. Pectines: pectinal teeth count 21-21; basal middle lamellae of the pectines not dilated. Sternites with thin granulation and with elongate stigmata; VI with vestigial carinae; VII with four moderately developed carinae. Metasoma: segment I with 10 carinae; segments II-IV with 8 carinae; segment V with 5 carinae. Intercarinal spaces weakly to moderately granular. Telson with vestigial granulation on ventral and lateral surfaces and with a long and strongly curved aculeus; subaculear tooth strong and spinoid, with two dorsal teeth. Cheliceral dentition characteristic of the family Buthidae; ventral teeth on movable finger strongly reduced (Vachon, 1963); ventral aspect of both fingers and of manus densely covered with long setae. Pedipalps: femur pentacarinate; patella with 7 carinae; all carinae moderately to strongly developed; chela with some vestigial carinae; femur and patella weakly granular; chela smooth. Fixed finger with 15 and movable finger with 16 oblique rows of granules. Trichobothriotaxy; orthobothriotaxy A-α-alpha (Vachon, 1974, 1975). Legs: tarsus with numerous short fine setae ventrally.

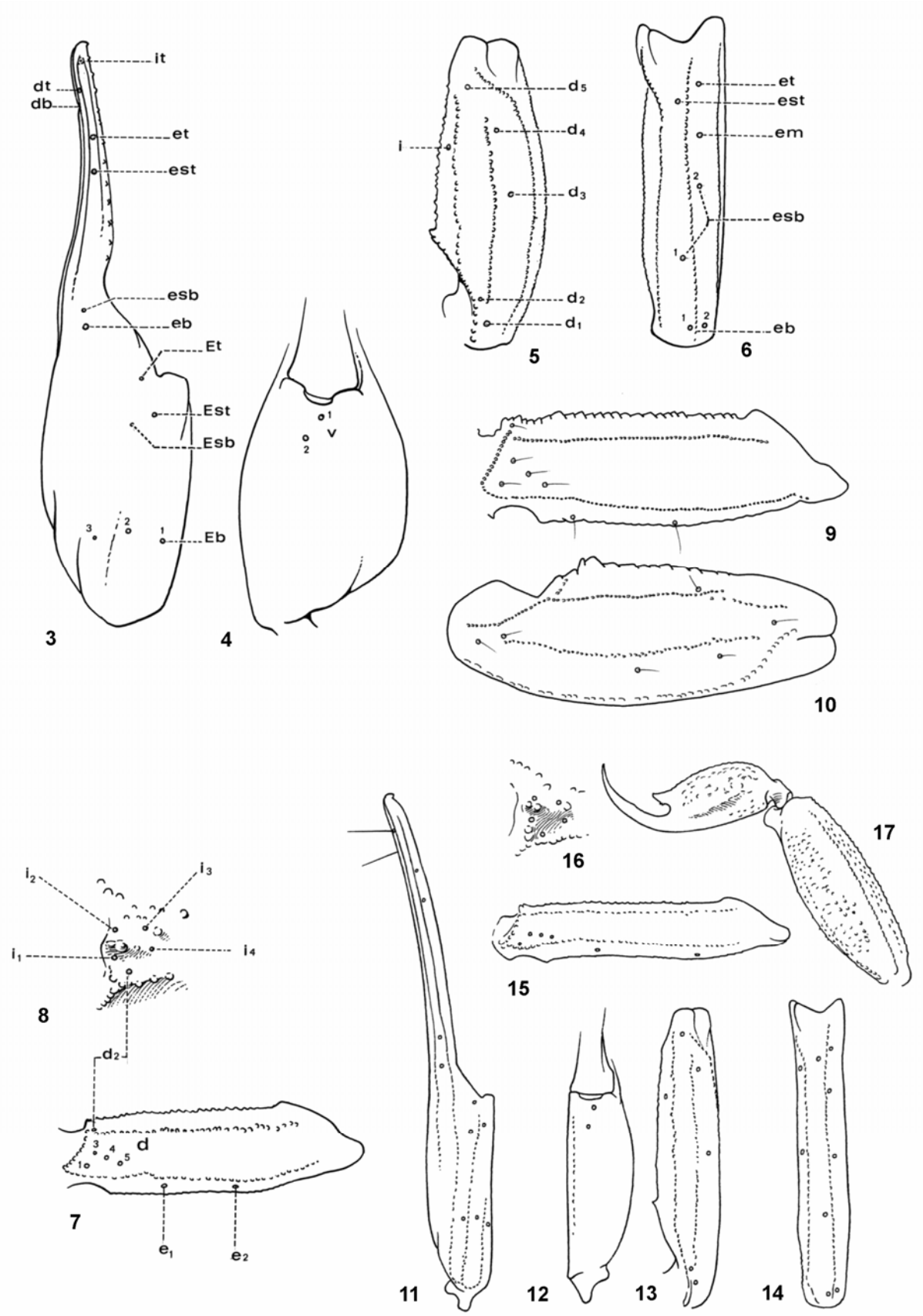
**DESCRIPTION OF ONE FEMALE PARATYPE**

**Coloration**. Basically yellowish. Prosoma: carapace yellowish in the posterior and lateral regions; the anterior region with a brownish inverted triangular spot stretching from the median eyes to the lateral eyes; regions behind the ocular tubercle and lateral eyes yellowish; eyes strongly marked with black pigment. Mesosoma: tergites I-VII yellowish with three longitudinal strips, weakly marked. Metasoma: segments I to V reddish yellow; presence of several brownish spots on the lateral and ventral surfaces, more intensely marked on III-V V. Vesicle: yellowish; extremity of aculeus darker than vesicle. Venter yellowish. Chelicerae yellowish with some variegated dark pigmentation on the anterior half; fingers reddish. Pedipalps and legs yellowish with only diffuse spots.

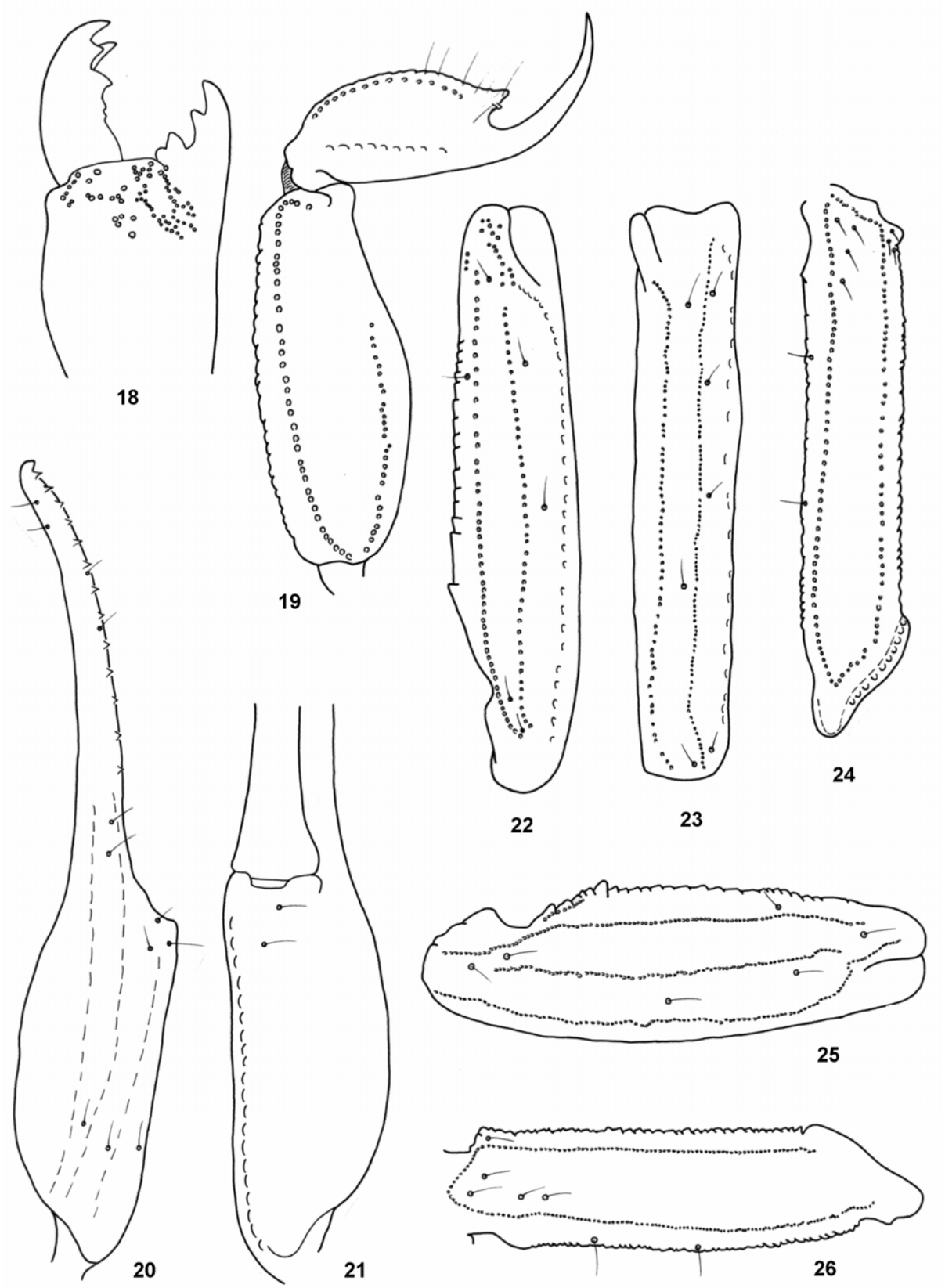
**Morphology**. Carapace moderately to strongly granular; anterior margin almost straight. Anterior median superciliary and posterior median carinae moderately developed. All furrows moderately deep. Median ocular tubercle anterior to the center of the carapace. Three pairs of lateral eyes. Sternum triangular. Mesosoma: tergites moderately granular. Median carina moderate on all tergites. Tergite VII pentacarinate. Venter: genital operculum wider than long. Pectines: pectinal teeth count 19-19; basal middle lamellae of the pectines not




**Figs. 1-2.** *Tityus costatus*, adult male ('trifasciata' form). **1.** Habitus. **2.** Metasoma, ventral aspect (from Lourenço, 1980).




**Figs. 3-10.** *Tityus costatus*, trichobothrial pattern. **3-8.** Male. **9-10.** Female. **3-4.** Chela, dorso-external and ventral aspects. **5-6.** Patella, dorsal and external aspects. **7-8.** Femur, dorsal and internal aspects. **9-10.** Patella and femur, dorsal aspect (figures 3-8 from Lourenço, 1980). **Figs. 11-17.** *Tityus brazilae*, male holotype. **11-16.** Trichobothrial pattern. **11-12.** Chela, dorso-external and ventral aspects. **13-14.** Patella, dorsal and external aspects. **15-16.** Femur, dorsal and internal aspects. **17.** Metasomal segment V and telson, lateral aspect (from Lourenço & Eickestedt, 1984).




**Figs. 18-26.** *Tityus potameis* sp. n. **18-24.** Male holotype. **25-26.** Female paratype. **18.** Chelicera. **19.** Metasomal segment V and telson, lateral aspect. **20-26.** Trichobothrial pattern. **20-21.** Chela dorso-external and ventral aspects. **22-23.** Patella, dorsal and external aspects. **24.** Femur, dorsal aspect. **25.** Patella, dorsal aspect. **26.** Femur, dorsal aspect.

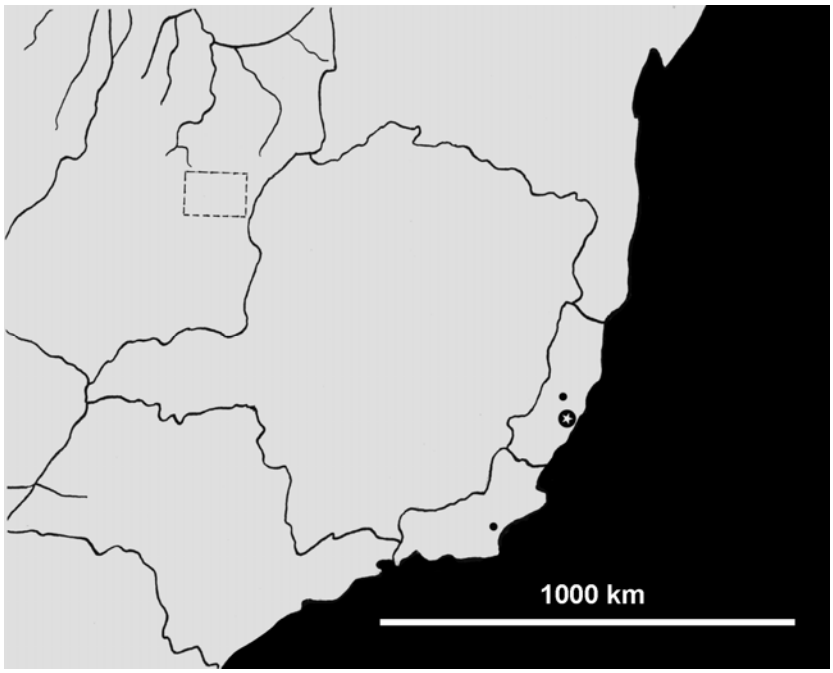



**Fig. 27.** Map of South-East region of Brazil, showing the type locality of *Tityus potameis* sp. n. (black circle with white star), and range of distribution (black circles).

dilated. Sternites with a fine granulation and with elongate stigmata; VI with vestigial carinae; VII with 4 moderately developed carinae. Metasoma: segment I with 10 carinae; segments II-IV with 8 carinae; segment V with 5 carinae. Intercarinal spaces weakly granular. Telson with vestigial granulation on ventral and lateral surfaces and with a long and strongly curved aculeus; subaculear tooth strong and spinoid, with two dorsal teeth. Cheliceral dentition characteristic of the family Buthidae; ventral teeth on movable finger reduced; ventral aspect of both fingers and of manus densely covered with long setae. Pedipalps: femur pentacarinate; patella with 7 carinae; tibia with 9 carinae; all carinae moderately to strongly developed; entire surface weakly granular. Fixed finger with 15 and movable finger with 16 oblique rows of granules. Trichobothriotaxy; orthobothriotaxy A-α-alpha. Legs: tarsus with numerous short fine setae ventrally.

**Table I. Morphometric values (in mm) of male holotype and female (paratype) of *Tityus potameis* sp. n. and of a female of *Tityus costatus* (Comparative values since females are very similar in both species).**

| | *Tityus potameis* sp. n. | | *Tityus costatus* |
|---|---|---|---|
| | Male | Female | Female |
| Total length | 67.9 | 51.1 | 50.1 |
| Carapace: | | | |
| - length | 8.5 | 6.2 | 6.4 |
| - anterior width | 5.9 | 4.4 | 4.7 |
| - posterior width | 8.5 | 6.5 | 7.3 |
| Metasomal segment I: | | | |
| - length | 5.8 | 3.8 | 3.9 |
| - width | 4.2 | 2.9 | 3.4 |
| Metasomal segment V: | | | |
| - length | 10.4 | 6.6 | 7.0 |
| - width | 3.9 | 2.6 | 3.0 |
| - depth | 4.2 | 2.7 | 3.1 |
| Vesicle: | | | |
| - width | 3.2 | 2.1 | 2.2 |
| - depth | 3.0 | 2.2 | 2.3 |
| Pedipalp: | | | |
| - Femur length | 11.6 | 7.2 | 6.4 |
| - Femur width | 2.1 | 1.8 | 2.0 |
| - Patella length | 12.2 | 7.4 | 6.7 |
| - Patella width | 2.7 | 2.2 | 2.6 |
| - Chela length | 19.4 | 12.2 | 12.4 |
| - Chela width | 3.1 | 2.2 | 2.4 |
| - Chela depth | 2.8 | 1.9 | 2.2 |
| Movable finger | | | |
| - length | 11.6 | 7.9 | 8.1 |

### RELATIONSHIPS

The new species *Tityus potameis* sp. n. belongs to the *Tityus bahiensis* species group. In its general pattern of coloration, the new species shows affinities with *Tityus costatus* (Karsch) which is also distributed in the States of Espirito Santo and Rio de Janeiro (Lourenço, 1980; Lourenço & Eickestedt, 1988). The two species can, however, be distinguished by: (i) quite different morphometric values, in particular those of males (see figures 1, 3-8 and 18-26), (ii) a different shape of carapace; the anterior margin is almost straight in *Tityus potameis* sp. n., whereas in *T. costatus* it shows a median concavity, (iii) carapace granulation is stronger in *T. costatus* (iv) the two species have different patterns of pigmentation.

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