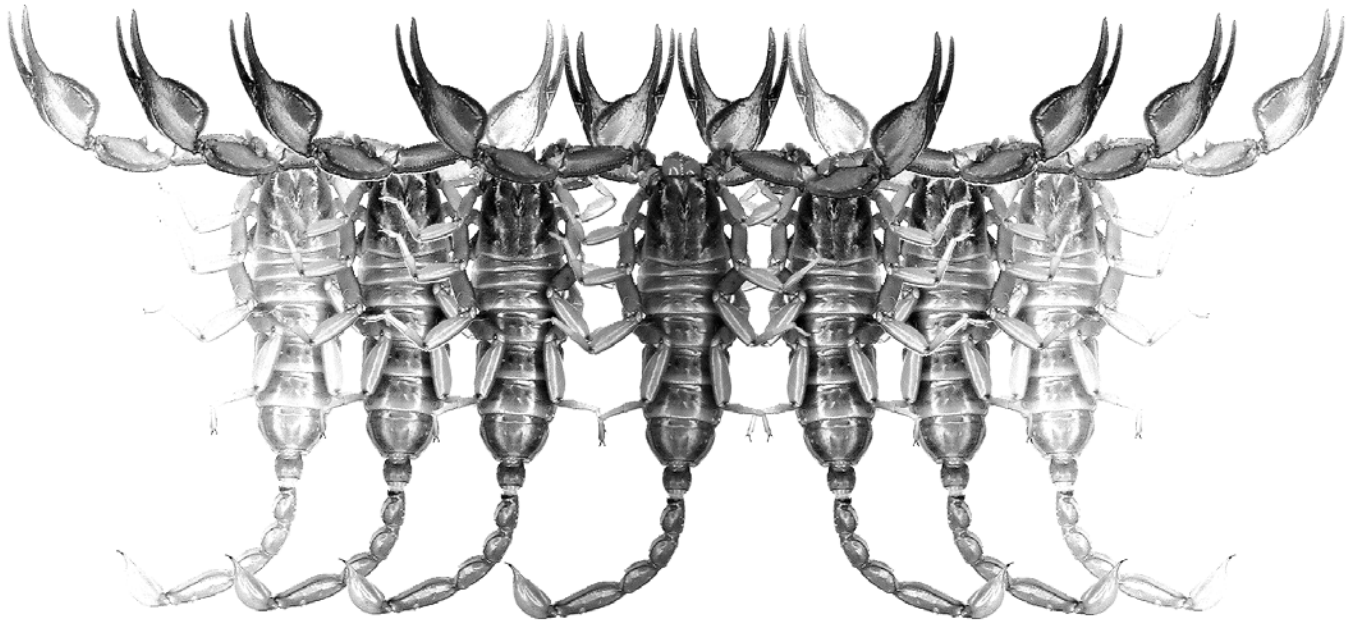


Euscorpius

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**The True Identity of *Scorpio (Atreus) obscurus* Gervais, 1843
(Scorpiones, Buthidae)**

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- **ZISP**, Zoological Institute, Russian Academy of Sciences, St. Petersburg, Russia
- **WAM**, Western Australian Museum, Perth, Australia
- **NTNU**, Norwegian University of Science and Technology, Trondheim, Norway

The true identity of *Scorpio (Atreus) obscurus* Gervais, 1843 (Scorpiones, Buthidae)

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Summary

The true identity of the scorpion *Scorpio (Atreus) obscurus* Gervais, 1843 is discussed based on new data. The original type material was recently discovered in the collections of the Muséum national d'Histoire naturelle in Paris, which confirms that this old species, originally described by Gervais based on two female specimens from French Guiana, does indeed belong to the genus *Tityus* C. L. Koch, 1836. Furthermore, an analysis of all morphological characteristics of *Tityus (Atreus) obscurus* verifies its position as a senior synonym of both *Tityus paraensis* Kraepelin, 1896 and *Tityus cambridgei* Pocock, 1897. In this paper, we designate the two female syntypes of *Scorpio (Atreus) obscurus* as a female lectotype and a female paralectotype for *Tityus (Atreus) obscurus* (Gervais, 1843), and synonymize *Tityus paraensis* Kraepelin, 1896 with *Tityus obscurus* (Gervais, 1843).

Historical Introduction

Scorpio (Atreus) obscurus was briefly described along with several other species by Gervais (1843) based on specimens collected in French Guiana by Mr. Leschenault and Mr. Doumerc and deposited in the collections of the Muséum national d'Histoire naturelle, Paris (MNHNP). The actual type locality has been a point of confusion, primarily because Gervais also made reference to other specimens: one from Mexico bought by him from Mr. Parzudacki, and others sent by Mr. Justin Goudot from Colombia (Gervais, 1843, 1844a, 1844b). In a later publication in which the species *Scorpio (Atreus) obscurus* was finally illustrated, Gervais (1859) indicates “Nouvelle-Grenade” as a possible locality record, which from 1830 to 1858 was the Republic of New Granada, a region comprised of current day Columbia, Panama, and small portions of adjacent countries. However, the specimens from Mexico, Colombia, or “Nouvelle-Grenade” examined by Gervais (1859) were misidentified and belong not to *T. obscurus*, but to other species of *Tityus* or even to the genus *Centruroides* (Lourenço, 1984).

Scorpio (Atreus) obscurus was subsequently ignored by other authors, probably because the species was poorly described, and because of the imprecision of its type locality. Moreover, the original type material, deposited in the MNHNP, was treated as misleading or lost by the subsequent authors (Kraepelin, 1896, 1899; Pocock, 1897a, 1897b). Kraepelin (1896) described

Tityus paraensis from the state of Pará in the Brazilian Amazon (currently the senior synonym of *Scorpio obscurus*; Fet & Lowe, 2000: 253). A year later, Pocock (1897a) described *Tityus cambridgei*, also from the state of Pará in Brazil, and currently the junior synonym of *Tityus paraensis* Kraepelin, 1896 (see Lourenço, 1984; Fet & Lowe, 2000). Pocock (1897b) gave several comments on the names *T. obscurus* and *T. forcipula*, this last species also described by Gervais (1843). Finally, in his scorpion volume of “Das Tierreich”, Kraepelin (1899) consider both of these species as valid, but places *Scorpio obscurus* Gervais in the synonymy of *Tityus cambridgei*, with, however, a question mark. Shortly after his description of *Tityus cambridgei*, Pocock published another paper about several species of the genus *Tityus* (Pocock, 1897b), in which he discussed the restoration of the names *Tityus obscurus* and *T. forcipula*. *Scorpio (Atreus) forcipula* was described by Gervais (1843), based on one specimen from “Amérique” without any other locality data. Gervais (1843, 1844a, 1844b) indicated, however, that some specimens in the collection of Mr. Justin Goudot showed that the original country of this species was Colombia: “Les collections du Muséum en possède un individu originaire d’Amérique. Les collections de M. Justin Goudot nous ont appris que sa patrie est la Colombie” (Translation from French: “The collections of the Museum have one specimen from America. From the collections of Mr. Justin Goudot we learned that its country of origin is Colombia”).

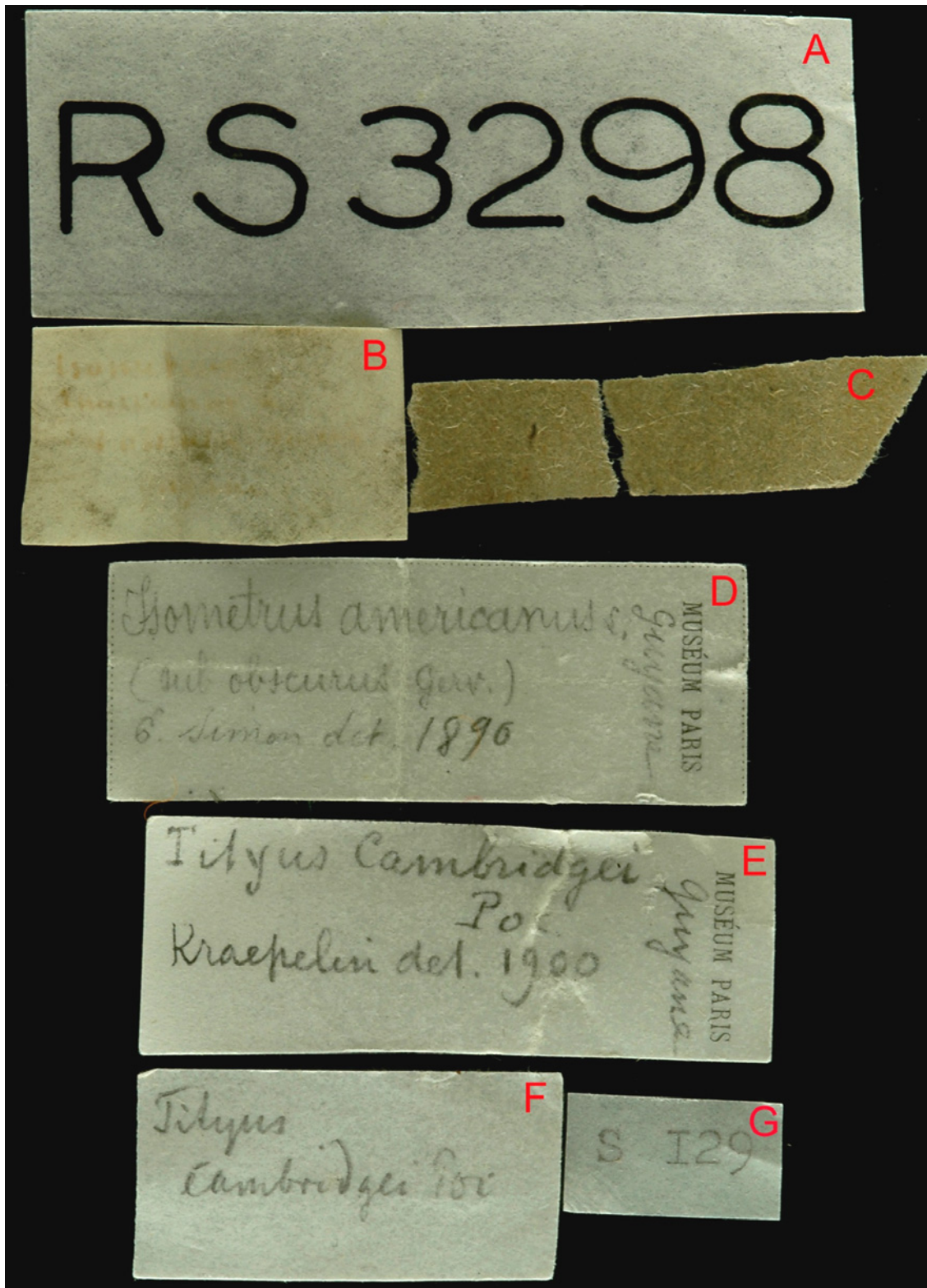


Figure 1: Photograph of six labels found in the vial with the type specimens of *Tityus (Atreus) obscurus*. **A**, a label with the registration number. **B**, a label written by E. Simon, and an exact copy of **C**, a totally faded label written by Gervais. The label written by Simon (**B**) is also very much faded, but can yet be observed under UV light. **D** and **E** are labels written during the period when the Laboratory of Arthropods in MNHNP was directed by Prof. Gravier, and when E. Simon was still alive (around 1917–1924). Until 1917, arachnids were in Simon's personal collection. These are copies of labels left by both Simon (dated 1890) and Kraepelin (dated 1900). **F**, a label written by M. Vachon, without a precise date, most likely during the 1960s. **G**, a small label, probably a copy of some old Simon's registration number.

Pocock (1897b), in his clarification about the identity of *Tityus forcipula*, stated that “this species was based upon specimens, of unknown locality, in the Paris Museum and upon one obtained by M. Goudot in Colombia”. He also indicated that the specimen obtained by Goudot and deposited in the collection of the British Museum (now Natural History Museum), could be regarded as the type, as Gervais evidently intended should be the case (cf. Gervais, 1844b). This statement of Pocock is, however, erroneous since it contradicts the exact words of Gervais (1844b): “*De Colombie, par M. Justin Goudot. Il existait déjà à la collection du Muséum, mais sans designation de pays*” (Translation from French: “From Colombia, by Mr. Justin Goudot. It existed already in the collection of the Museum, but without the designation of a country.”) Justin Goudot was a commercial arthropod dealer who collected many specimens in Colombia, and probably also sold some to the British Museum. Paul Gervais was a “Research fellow” in the MNHN, and by no means he could have made a decision to deposit types in the British Museum.

In his revision of the species of the *Tityus forcipula* complex, Lourenço (1984) was able to examine Goudot’s specimen of *Tityus forcipula* deposited in the British Museum (BMNH-1846.20, 1 male holotype from Colombia). Since the original specimens of Gervais could not be located in the MNHNP, Lourenço (1984) suggested that the Goudot specimen should be considered the holotype of *Tityus forcipula* (Gervais, 1843). In the “*Catalog of the Scorpions of the World*”, Fet & Lowe (2000: 253; under *Tityus paraensis*) suggested that the two female syntypes of *Scorpio (Atreus) obscurus* from Cayenne in French Guiana could be deposited in the British Museum. This opinion was based on Pocock (1897b).

In his comments about *T. obscurus*, Pocock (1897b), first of all, clearly distinguished *T. forcipula* from Colombia and *T. obscurus* from Cayenne in French Guiana. He claimed to be in the dark as to the true nature of *T. obscurus*, but admitted, however, that the characters of this species agreed most nearly with those of *Tityus cambridgei* described by himself from Pará in Brazil.

In his survey of scorpions of French Guiana, Lourenço (1983a) clearly stated that *Scorpio obscurus* most certainly corresponds to *Tityus cambridgei*. However, in the absence of the original type material of *S. obscurus* no final taxonomic decision was made. The subject came to discussion again in Lourenço (1988), but no definitive conclusion was made in the absence of the original type material. Fet & Lowe (2000: 254) indicated that this issue requires further investigation.

Most of the original specimens (types) used by Gervais (1841, 1843, 1844a, 1844b) for his descriptions could not be located in the MNHNP. Some, however,

still are present in the collection, such as *Scorpio (Atreus) margaritatus* Gervais, 1841 = *Centruroides margaritatus* (Gervais) (Sissom & Lourenço, 1987) or *Scorpio (Androctonus) madagascariensis* Gervais, 1843 = *Grosphus madagascariensis* (Gervais) (Lourenço, 1996). Moreover, taking in account the importance and the age of the scorpion collection in the MNHNP, some old types may still exist but are “flooded” by the great total volume of the collection. The collection was compiled in part by Eugene Simon and in particular by Max Vachon, estimated to be almost 9,000 jars, which can contain from one to more than 50 specimens; consequently, the total volume could be estimated as 40,000 to 50,000 specimens. From time to time, old types are still rediscovered within the Paris collection.

Results

At present, a very exhaustive survey of the type collection of the MNHNP is being conducted by both authors. All specimens labelled as types are coordinated with the original publications to confirm their identity. In the same way, many specimens not labelled as types, but suspect of being part of the material used in old descriptions, are being investigated in case any are actually unlabelled types.

By using this procedure, we located two specimens within the historical collection that shed light on the true identity of *S. (Atreus) obscurus*; one adult female and one juvenile female, in the same vial. These were registered under the number MNHN-RS-3298. Several labels were inside the vial (Fig. 1):

- One totally faded in alcohol and only observable under UV light, with the word “*obscurus*”. This label most certainly is written by Gervais, but no date or locality could be identified.
- A second one, also partially faded in alcohol, written by Simon. This is in fact a copy of the label written by Gervais.
- A third label, which says “Guyane; *Isometrus americanus* (sub *obscurus* Gerv.), E. Simon det., 1890”.
- A fourth label, which says “Guyane; *Tityus cambridgei* Po., Kraepelin det. 1900”. The third and fourth labels have been written during the period when the Laboratory of Arthropods was directed by Prof. Gravier, and when Simon was still alive (between 1917-1924). These are copies of the information left by both Simon (1890) and Kraepelin (1900). It is well known that K. Kraepelin visited the Paris Muséum in 1900, and published its scorpion list soon after



Figure 2: Female lectotype of *Tityus (Atreus) obscurus*, dorsal aspect.

- that (Kraepelin, 1901; *T. cambridgei* listed on p. 269).
- A fifth label, which says only “*Tityus cambridgei* Poc.”, and obviously is written in Vachon’s hand.
- Finally, a sixth small label was present with the indication “S 129”. We suspected that this label has something to do with the inventory numbers of Simon’s collection.

Both specimens are strongly faded in alcohol, and have lost most of the characteristic blackish coloration. The state of morphological preservation is, however more than satisfactory. The adult female has the meta-

soma dislocated from the mesosoma and right pecten is slightly damaged, but pectinal tooth count can be calculated without difficulties. The smaller specimen, also a female, but a juvenile is totally intact (Figs. 2–5).

The morphometric values indicated by Gervais (1843, 1844a) are (in mm): “*Longueur totale (total length)*, 0,075; *queue seule (metasoma)*, 0,040; *article terminal (metasomal segment V)*, 0,009 en longueur (length), 0,004 en largeur (width); *le pénultième (metasomal segment IV)*, 0,007 en longueur (length)”. Gervais also indicated pectinal tooth count of 22 and this number is illustrated in his paper of 1859 (Gervais, 1859).



Figure 3: Female lectotype of *Tityus (Atreus) obscurus*, details of ventral aspect showing coxapophyses, sternum, genital operculum, pectines, and sternites III to V.

Our measurements of the adult female gave the following results: Total length, 72.2 mm without the chelicerae or 75.7 with the chelicerae. We suspect that Gervais's measurement did include the length of the chelicerae. Metasoma length 42.6 mm, including the telson. We do not know if Gervais's measurement included the aculeus. Metasomal segment V; length 8.8, width 3.8 and depth 3.8 mm. Metasomal segment IV; length 7.2. Pectinal tooth count in the adult female was 22-22.

We consider these two specimens to be Gervais's syntypes that originated from Cayenne in French Guiana (Gervais, 1843), although the labels only say "Guyane" (= French Guiana). We therefore designate the adult female and juvenile female as the lectotype and paralectotype of *Scorpio (Atreus) obscurus* (Gervais, 1843), respectively.

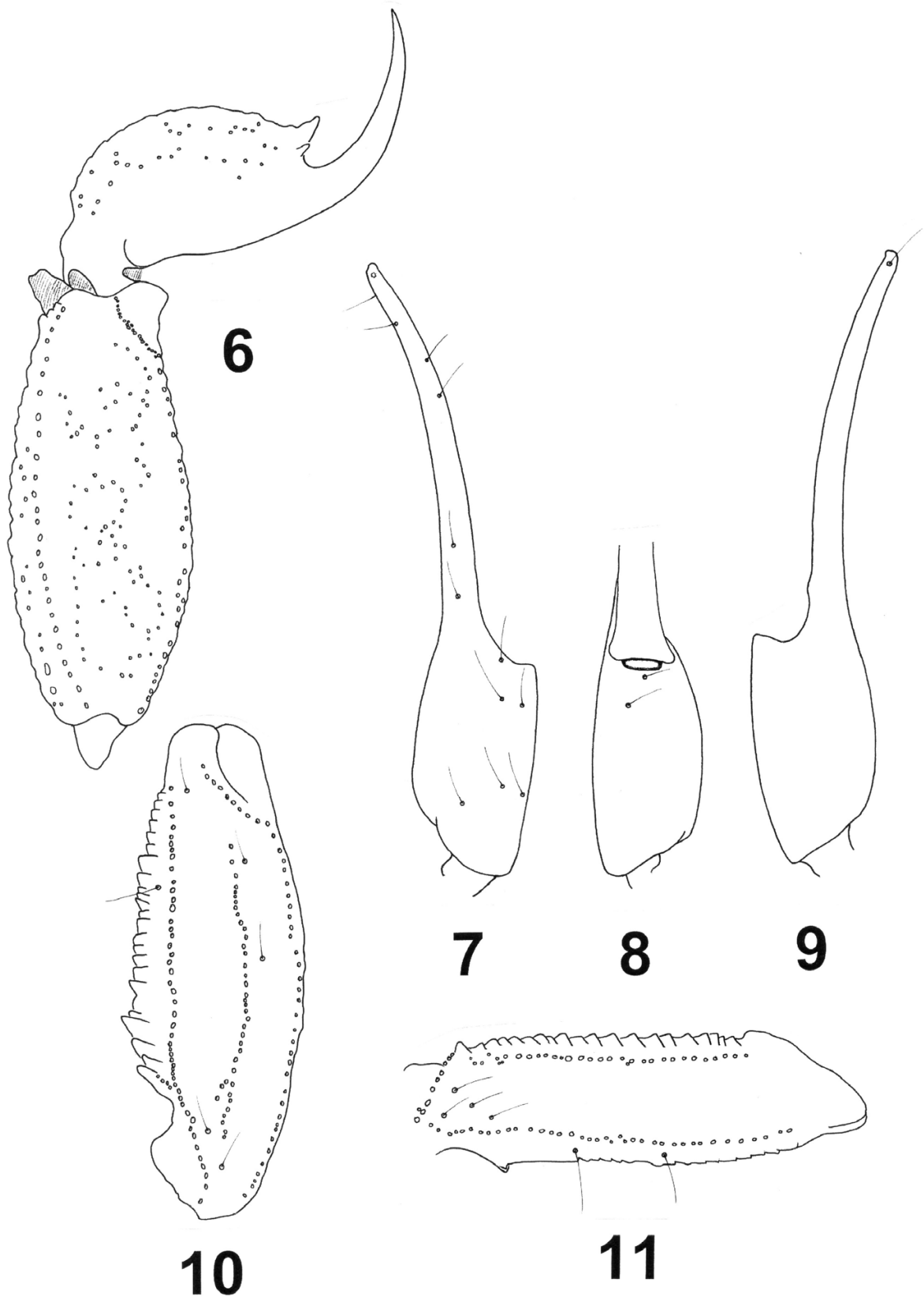
The measurements listed above and other characters such as the dentate margins of fixed and movable fingers of pedipalp chela with 15–17 denticle rows are also totally in accordance with the available diagnoses for *Tityus paraensis* Kraepelin, 1896 and *Tityus cambridgei*

Pocock, 1897 (see Lourenço, 1983a, 2002a, 2002b). Although the name *Tityus cambridgei* has been more frequently used than that of its synonym *Tityus paraensis*, not only by natural history experts, but also by toxin experts, the name *Tityus paraensis* clearly has priority over *T. cambridgei* (Fet & Lowe, 2000: 254). Nevertheless, with our present clarification of the true identity of *Scorpio (Atreus) obscurus* = *Tityus (Atreus) obscurus*, we suggest the revalidation of the species *Tityus obscurus* (Gervais, 1843), which corresponds to the populations of large blackish *Tityus*, distributed from Suriname and French Guiana to the states of Amapá and Pará in Brazil (Lourenço, 1983a, 2002a, 2002b, 2007; Lourenço et al., 2000; Lourenço & Qi, 2007).

Therefore, *Tityus paraensis* Kraepelin, 1896, **syn. n.**, is synonymized here with *Tityus obscurus* (Gervais, 1843). The following species names: *Tityus cambridgei* Pocock, 1897, *Tityus amazonicus* Giltay, 1928, *Tityus wernerii* Mello-Leitão, 1931, and *Tityus sampaioiocrulsi* Mello-Leitão, 1931, are confirmed here as junior synonyms of *Tityus obscurus* (Gervais, 1843).



Figures 4–5: Female paralectotype of *Tityus (Atreus) obscurus*, dorsal and ventral aspects.



Figures 6–11: Female lectotype of *Tityus (Atreus) obscurus*. **6.** Metasomal segment V and telson, lateral aspect. **7–11.** Trichobothrial pattern. **7–9.** Chela, dorsoexternal, ventral and internal aspects. **10.** Patella, dorsal aspect. **11.** Femur, dorsal aspect.

Diagnosis

Tityus (Atreus) obscurus (Gervais, 1843)

Large scorpions, from 85 to 100 mm in total length. General coloration uniformly blackish, with only some pale zones on the sternites. In most cases the juvenile instars of these large blackish species of *Tityus* are yellowish or reddish-yellow, with very numerous variegated spots. These spots are not visible in the adults as a result of the very marked sclerification of the cuticle (Lourenço, 1983b; Lourenço & Cloudsley-Thompson, 1996).

Metasomal segments I to V and telson uniformly blackish; with 10-10-8-8-5 carinae. Dentate margins of pedipalp-chela fixed and movable fingers with 15–17 oblique rows of granules. A strong spinoid subaculear tooth present. This can be moderate in size or almost totally absent in very large specimens. Pectines with 18 to 22 teeth; the basal middle lamellae strongly dilated in females. *Tityus obscurus* shows very strong sexual dimorphism. Male pedipalps are longer and more slender than those of the females (Lourenço, 1983a, 2002a, 2002b).

For more detailed description and keys, see Lourenço (1983, 2002a, 2002b).

Distribution: Suriname, French Guiana, and the States of Amapá and Pará in Brazil. Reported or suggested distribution in Ecuador, Guyana, Panama, and Venezuela (Fet & Lowe, 2000: 254) is not confirmed by reliable specimens. The presence of this species in Guyana could yet be confirmed; however, references to Ecuador, Colombia, and Panama most certainly correspond to misidentifications of *Tityus asthenes* Pocock, 1893 (Lourenço, 1988). The reference to Venezuela certainly is a misidentification of an unclear related species of the subgenus *Atreus* (Lourenço, 2006).

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