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ONE MORE NEW SPECIES OF *ANANTERIS* THORELL, 1891 (SCORPIONES: BUTHIDAE) FROM THE CERRADOS OF THE FEDERAL DISTRICT IN BRAZIL

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Abstract: One more new species of the genus *Ananteris* Thorell is described from open field formations (cerrados) of the Federal District, in central Brazil. The description of this new species provides further evidence about some biogeographic patterns of distribution shown by most *Ananteris* species: the species are highly endemic and can inhabit in sympatry with other species of the genus. Moreover, morphological patterns suggest the existence of vicariant species, as already observed in other buthid genera.
Key words: Scorpiones, Buthidae, *Ananteris*, new species, cerrados, Brazil.

Otra especie nueva de *Ananteris* Thorell, 1891 (Scorpiones: Buthidae) de Los cerrados del Distrito Federal de Brasil
Resumen: Se describe otra especie nueva del género *Ananteris* Thorell de formaciones de campo abierto (cerrados) del Distrito Federal, en el centro de Brasil. La descripción de esta nueva especie aporta más evidencia sobre algunos patrones biogeográficos de distribución presentados por la mayoría de las especies de *Ananteris*: las especies son altamente endémicas y pueden habitar en simpatría con otras especies del género. Además, los patrones morfológicos sugieren la existencia de especies vicariantes, como ya se ha observado en otros géneros bútidos.
Palabras clave: Scorpiones, Buthidae, *Ananteris*, especie nueva, cerrados, Brasil.

Taxonomy / Taxonomía: *Ananteris obscura* **sp. n.**

Introduction

In several recent publications (e.g. Lourenço, 2015; Lourenço & Motta, 2019; Lourenço *et al*., 2020a) attention was called to the fact that the genus *Ananteris*, created by Thorell (1891) remained inconspicuous with only three known species for almost a century. The number of species knew a significant growing mainly after the revision published by Lourenço (1982) and a recent synopsis proposed by Dupré (2020) suggests 92 described species up to 2020. With such numbers, *Ananteris* occupies the third rank among scorpion genera, being only surpassed by genera *Centruroides* Marx (95 species) and *Tityus* C. L. Koch (220 species) species. The validity of some species could be questioned, in particular among those described from Venezuela by González-Sponga (2006). This country holds on its own about half of the known species. Nevertheless, the biogeographic patterns of distribution presented by a majority of *Ananteris* species seem to support this concentration in some limited zones of distribution. The species are highly endemic and can be observed in sympatry with other species of the genus (Lourenço, 1982; Lourenço & Motta, 2019). Convergent morphological patterns also suggest the possible existence of vicariant species, a model already observed for other buthid genera such as *Grosphus* Simon in Madagascar (Lourenço *et al*., 2020b).

In this note one new species is described from open field formations (Cerrados) of the Federal District in Brazil (Fig. 1). Previously only one species was reported from this region, namely *Ananteris balzanii* Thorell. The very wide range of distribution presented by Lourenço (1982), for this species was subsequently amended and largely reduced, being limited to some Central regions of Brazil, Paraguay and possibly Argentina (Lourenço, 2020).

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), morphological terminology mostly follows Vachon (1952) and Hjelle (1990), and chelicerae dentition follows Vachon (1963).

Taxonomic treatment

Family **Buthidae** C. L. Koch, 1837

Genus ***Ananteris*** Thorell, 1891

***Ananteris obscura* sp. n.** (Figs. 2–9)

TYPE MATERIAL. Brazil, Federal District, Fazenda Agua Limpa (15º57'16" S, 47°55'43" W), alt. 1125 m, collected under a termite mound of *Silvestritermes euamignathus*, (Silvestri), Campos-Cerrados formations (Fig. 1), 20/IX/2018 (Paulo C. Motta *et al*.). Female-holotype (9092) deposited in the Zoological collections of the Universidade de Brasilia, Brazil.

ETYMOLOGY. The specific name refers to the very dark coloration of the new species.

DIAGNOSIS. Species of large size when compared with the average size of the other species of the genus; female with 31.7 mm in total length (see measurements after the description). General coloration intense dark brown over body, including the lateral pleura; appendages heavily dark brown; legs with conspicuous yellow surfaces; chelicerae yellow



1a



1b

Fig. 1. Campo Cerrado formation, Brazil. **1a**. Typical vegetation in the Fazenda Agua Limpa, type locality of the new species. **Fig. 1b.** Termite mound of *Silvestritermes euamignathus* (Silvestri). Natural micro-habitat of the new species.

with a global variegated pigmentation. Pedipalps moderately long and slender; fixed and movable fingers of pedipalps with 6–6 rows of granules; the first row on fixed finger represented by only 2–3 granules; female pectines with respectively 15–16 teeth. Carapace, tergites and metasomal segments strongly granulated; telson intensely granulated with spinoid granules on the ventral carina. Trichobothrial pattern distinct with femur trichobothria $\mathbf{i}_1$ displaced on the dorsal surface, $\mathbf{e}_1$ distal in relation to $\mathbf{d}_5$; patella trichobothria $\mathbf{esb}_{1,2}$ at the same level.

DESCRIPTION BASED ON FEMALE HOLOTYPE

Coloration. The general coloration is dark-brown marked with yellow spots; lateral pleura strongly pigmented. Prosoma: carapace dark brown with some yellow spots on its entire surface; eyes surrounded by black pigment. Mesosoma dark-brown with conspicuous confluent yellow spots. Metasomal segments I to V dark reddish-yellow; all segments marked with dark brown spots; spots more intensely marked on segments IV and V. Vesicle reddish-yellow with ventral carina darker and some marbled zones laterally; base of the aculeus reddish-yellow with a red tip. Venter yellow to reddish-yellow; sternites with brownish spots laterally, more conspicuous on VII. Chelicerae dark yellow with heavy reticular dark brown spots; fingers dark brown with reddish teeth. Pedipalps dark brown with yellow spots; chela with dark yellow fingers. Legs yellow, with strongly marked brownish spots.

Morphology. Carapace with an intense granulation; anterior margin not emarginated with a minute central convexity. Anterior median superciliary and posterior median carinae weak. All furrows moderate to weak. Median ocular tubercle distinctly anterior to the centre of the carapace; median eyes large and separated by approximately one ocular diameter. Three pairs of lateral eyes. Sternum subpentagonal. Mesosoma: tergites with an intense granulation. Median carina moderate in all tergites. Tergite VII pentacarinate and somewhat less granulate. Venter: genital operculum divided longitudinally, each plate more or less oval in shape. Pectines: pectinal tooth count 15–16 in female; basal middle lamellae of the pectines not dilated; fulcra absent. Sternites almost smooth; spiracles weakly elongate; setation moderately strong; sternite VII with weakly marked carinae and some granulations. Metasomal segment I with 10 carinae, strongly crenulate. Segments II to IV with 8 carinae, strongly crenulate. Intercarinal spaces strongly granular. Segment V slightly rounded with 5 carinae. Telson moderately elongated and with a strongly marked granulation; ventral carina strongly marked with some spinoid granules; aculeus short and weakly curved; subaculear tooth strong and spinoid. Cheliceral dentition characteristic of the family Buthidae (Vachon 1963); fixed finger with two strong basal teeth; movable finger with two well marked basal teeth; ventral aspect of both finger and manus with dense, long setae. Pedipalps: femur pentacarinate; patella and chela with weak carinae; internal face of patella with 5–6 minute spinoid granules; all faces weakly granular. Fixed and movable fingers with 6–6 almost linear rows of granules; the extremity of fixed finger represented by 2–3 granules; two small external and one internal accessory granule present at the base of each row; three conspicuous granules in the extremity of the fingers; Trichobothriotaxy; orthobothriotaxy A-β (Vachon 1974, 1975). Trichobothrial pattern distinct with femur trichobothria $\mathbf{i}_1$ displaced on the dorsal surface, $\mathbf{e}_1$ distal in relation to $\mathbf{d}_5$; patella $\mathbf{esb}_{1,2}$ at the same level. Legs: tarsus with very numerous fine median setae ventrally. Tibial spurs strongly developed on legs III and IV.

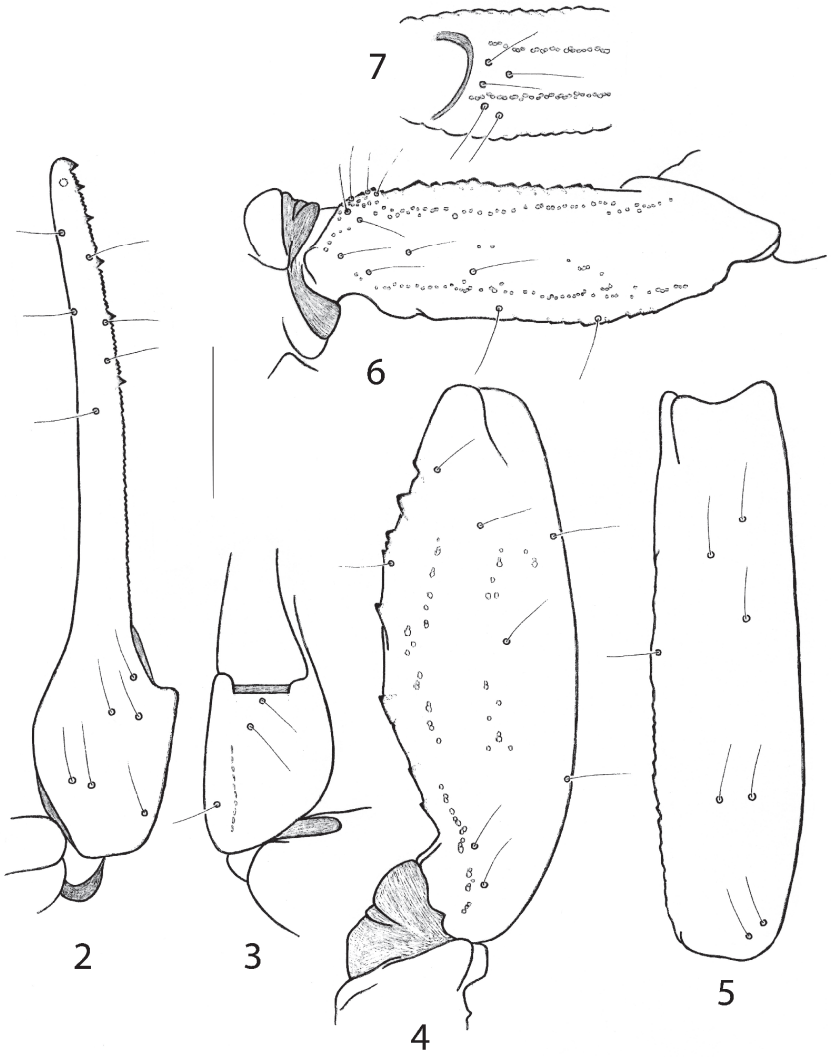


Fig. 2–7. *Ananteris obscura* **sp. n.** Female holotype. Trichobothrial pattern. **2–3**. Chela, dorso-external and ventral aspects. **4–5**. Patella, dorsal and external aspects. **6–7**. Femur, dorsal and internal aspects (scale = 1 mm).

COMPARATIVE MORPHOMETRIC VALUES of one female of *Ananteris balzanii* from Urucum (Brazil) and the female holotype of *Ananteris obscura* **n. sp.**
Total length (in mm) including the telson, 25.5/31.7. Carapace: length 2.9/3.4; anterior width 1.9/2.3; posterior width 3.0/3.8. Mesosoma length: 7.2/9.7. Metasomal segments. I: length 1.7/2.1, width 1.8/2.2; II: length 1.8/2.2, width 1.6/2.0; III: length 2.1/2.4, width 1.6/2.0; IV: length 2.6/3.2, width 1.5/1.9; V: length, 3.7/4.7, width 1.5/1.8, depth 1.5/1.8. Telson length 3.5/4.0; vesicle: width 0.9/1.2, depth 0.9/1.0. Pedipalp: femur length 2.6/3.2, width 0.7/1.0; patella length 3.0/3.8, width 1.0/1.3; chela length 3.7/4.7, width 0.6/0.9, depth 0.7/0.8. Movable finger length 2.7/3.6.

RELATIONSHIPS. *A. obscura* n. sp. appears to be related to *A. balzanii* Thorell, described from the state of Mato Grosso, Brazil (see Lourenço, 2020), but in particular to *Ananteris infuscata* Lourenço, Giupponi & Leguin, 2013 (Lourenço *et al*., 2013, Fig. 10), described from a cave in the state of Minas Gerais, Brazil. *Ananteris infuscata* and the new species may represent vicariant species (Fig. 17). The new species can be distinguished from the other two by a number of features: (i) a different pattern of pigmentation, with spots more intensely marked, including on the lateral pleura, (ii) carapace, tergites and metasomal segments strongly granulated; telson intensely granulated with spinoid granules on the ventral carina, (iii) first row of granules on fixed finger represented by only 2–3 granules; (iv) the position of some trichobothria are clearly distinct; femur tricobothria $\mathbf{i_1}$ displaced on the dorsal surface, $\mathbf{e_1}$ distal in relation to d_5; patella $\mathbf{esb_{1,2}}$ at the same level (Figs. 11–16).

Conclusions

The continuous advancement in the knowledge of the genus *Ananteris* and in particular on some of its patterns of geographical distribution clearly leads to some conclusions. (I) Many if not most species present highly endemic patterns of distribution. (II) The presence of sympatric species of *Ananteris* in a reduced area of distribution appears as more common than previously suspected (Lourenço, 1982; Lourenço & Motta, 2019; this study). (III) The very wide range of distribution previously attributed to species such as *A. balzanii* (Lourenço, 1982) was subsequently amended and largely reduced, being presently limited to much more reduced areas. These misidentifications revealed to correspond to vicariant species, as already observed in other buthid genera (Lourenço *et al*., 2020b), including elements of the Ananterinae, such as *Tityobuthus* Pocock (Lourenço *et al*., 2020c). (IV) The *Ananteris* and the Ananterinae in general correspond to an ancient lineage of buthid scorpions. They presently show a Gondwanian model of distribution but certainly knew even broader ranges of distribution as it is attested by several Baltic Amber fossils clearly associated to the Anan-

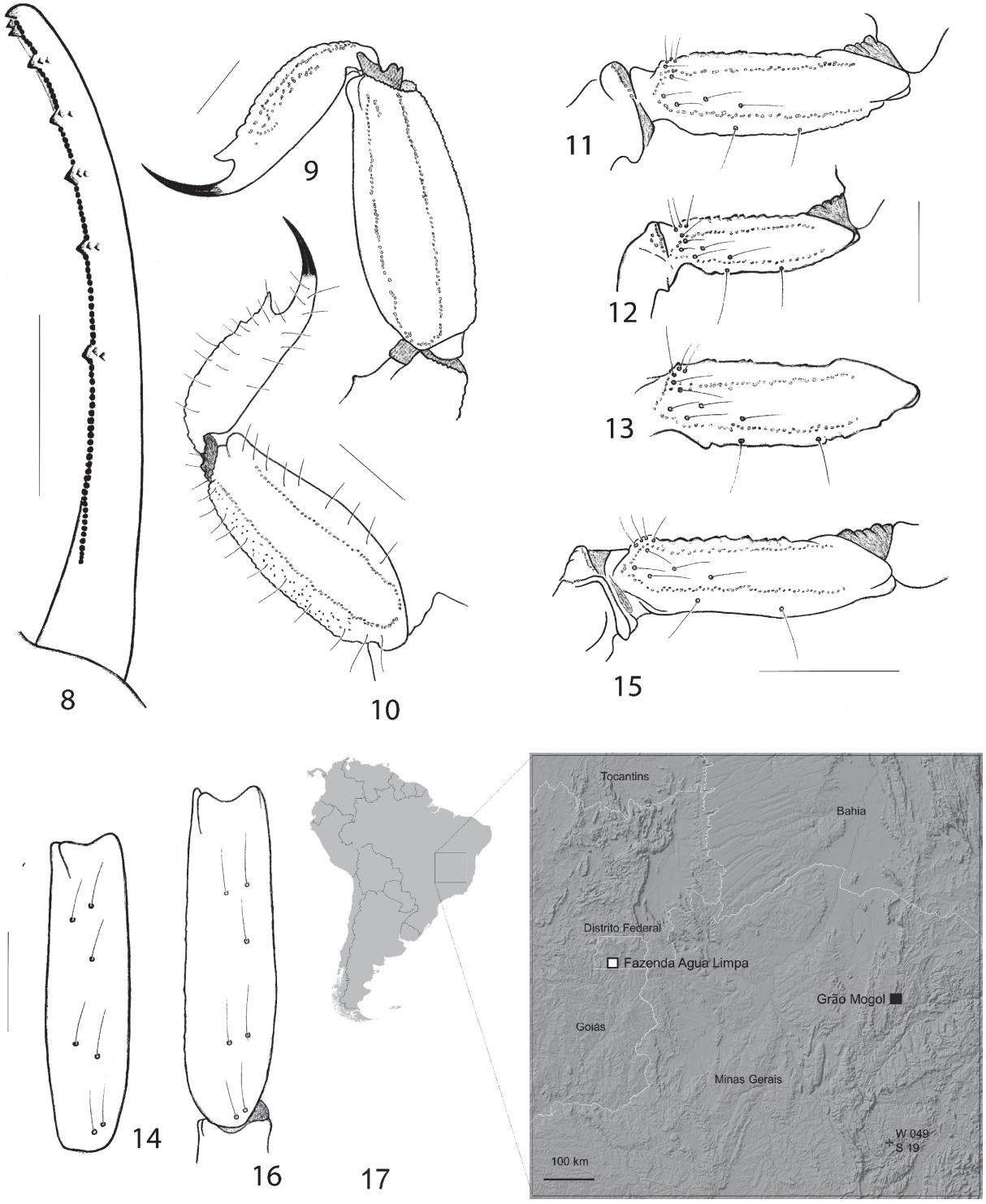


Fig. 8–9. *Ananteris obscura* **sp. n.**, female holotype. **Fig. 10**. *Ananteris infuscata*, female paratype. **8**. Cutting edge of movable finger with rows of granules. **9–10**. Metasomal segment V and telson, lateral aspect (scales = 1 mm). **Fig. 11–16.** Comparative trichobothrial patterns of *A. balzanii* (**11–14**) and *A. infuscata* (**15–16**). 11–13 and 15, femur dorsal aspect; 14 and 16 patella external aspect. 11. Female, Federal District. 12–13. Male and female, Urucum. 14. Female Urucum. 15–16. Female Grão Mogol (scales = 1 mm). **Fig. 17.** Map of the Central region of Brazil showing the type localities of *Ananteris obscura* **sp. n.** (Fazenda Agua Limpa) and *Ananteris infuscata* (Grão Mogol).

terinae (Lourenço, 2009). Fossils elements also associated to the Ananterinae have recently be detected in much older Burmite Amber dated from Early Cretaceous This is the case of *Archaeoananteroides maderai* Lourenço, 2016, family Buthidae (Lourenço & Velten, 2016).

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