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The third confirmed record of the scorpion genus
Chactas Gervais, 1844 (Scorpiones: Chactidae)
from Ecuador, with description of a new species
from the Amazonian Province of Morona Santiago

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(with 11 figures)

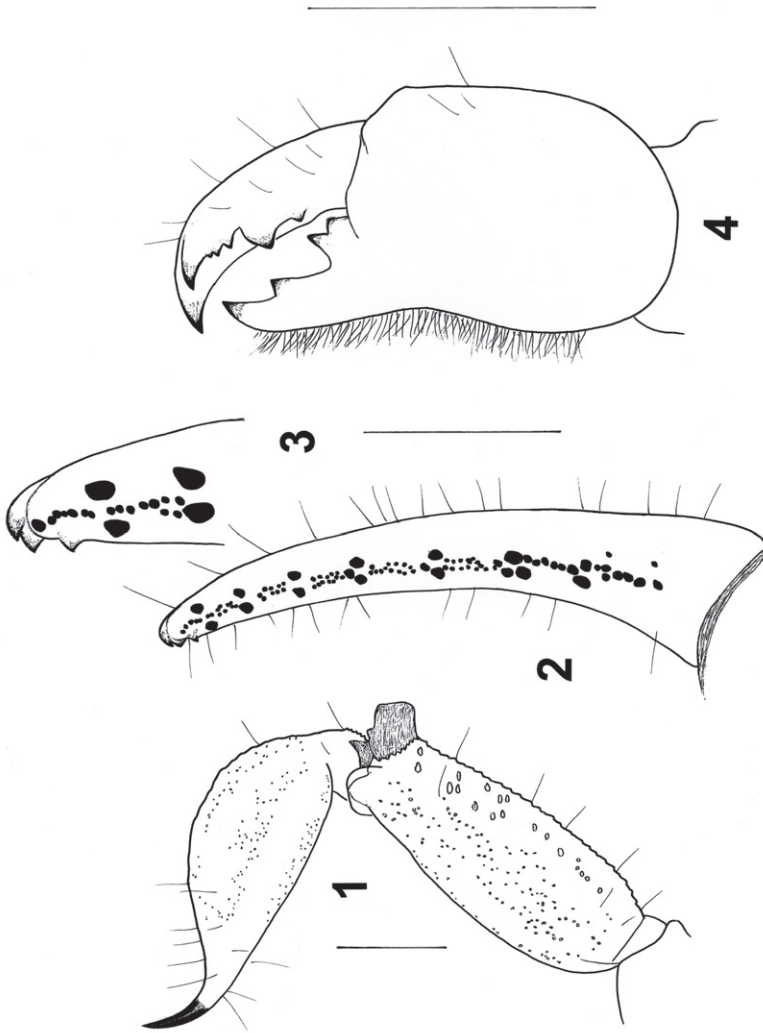
Abstract

A new species, *Chactas yaupi* sp. n., is described from the Province of Morona Santiago in Ecuadorian Amazonia. This is the third confirmed record of the genus *Chactas* Gervais from Ecuador. The geographical pattern of distribution of the genus *Chactas* is discussed. Comments are also addressed about the remarkable diversity and high level of endemic elements of the Ecuadorian fauna.

Keywords: Scorpiones, *Chactas*, new species, Ecuador, Amazon region, Province of Morona Santiago.

Introduction

As outlined in a recent paper (Lourenço 2014), the taxonomy of the genus *Chactas* Gervais, 1844 can be considered complex and even confused. The genus *Chactas* was originally created by Gervais (1844) for the species *Chactas vanbenedenii* Gervais, 1844 to which he indicated Colombia as the original locality. The current morphological diagnosis of species within the genus *Chactas* can be considered as rather difficult, mainly because several species are extremely similar. This most certainly led subsequent authors to



Figs 1-4. *Chactas yaupi* sp. n., female holotype. **1.** Metasomal segments V and telson, lateral aspect. **2.** Disposition of granulation over the dentate margins of the pedipalp-chela movable finger. **3.** Extremity of the finger in detail. **4.** Chelicera, dorsal aspect (scale bars = 2 mm).

indicate, for example, the presence of *C. vanbenedenii* in many localities of Colombia and Venezuela (Mello-Leitão 1945, González-Sponga 1996). Most of these records, however, have been based on misidentified specimens. For further details on the classification of the genus *Chactas* readers can refer to Lourenço (2014).

The pattern of distribution of the genus *Chactas* suggests a centre of dispersion in Colombia (Lourenço, 1997), and most of the known species have been described from this country. Moreover, in continental South America, they are known from Venezuela (Gonzales-Sponga 1996) and isolated cases have been reported from Brazil and Peru (Lourenço *et al.* 2005, Lourenço & Dastych 2001). Members of the genus are also known from Costa Rica, Panama and the Island of Trinidad (Sissom 2000).

The first species described from Ecuador, *Chactas camposi* Mello-Leitão, 1939 was reported without any indication of a locality (Mello-Leitão 1939). Subsequently, the same author (Mello-Leitão 1945) suggested Guayaquil as type locality. For a long time, the status of this species remained enigmatic (Lourenço 1997), but was later clarified by Ochoa & Pinto da Rocha (2012). These authors finally located the type specimen in the Museu Nacional at Rio de Janeiro and clearly demonstrated that the species actually belongs to the genus *Teuthraustes* Simon, 1878.

Similarly, the status of another dubious species, *Chactas rubrolineatus* Simon, 1880, was recently clarified by Lourenço & Leguin (2014). The type specimen of *C. rubrolineatus* was considered lost or at least mislead for a very long period of time. Intense research in the collections of the Muséum national d'Histoire naturelle in Paris, resulted in the location of the female type specimen. A precise diagnosis of this species and several elements from the personal notes of E. Simon allowed two conclusions: *Chactas rubrolineatus* is a valid species and, Rio Içá, the type locality is not located in Ecuador but rather in Brazil (Lourenço & Leguin 2014).

Consequently, only two species *Chactas mahnerti* Lourenço, 1995 and *Chactas moreti* Lourenço, 2014 can be confirmed as present in Ecuador (Lourenço 1995, 2014). In this note, a third species of *Chactas* is described from the Amazonian Province of Morona Santiago.

Methods

Illustrations and measurements were made with the aid of a Wild M5 stereo-microscope equipped with a drawing tube (camera lucida) and an ocular micrometer. Measurements follow Stahnke (1970) and are given in mm. Trichobothrial notations follow Vachon (1974) and morphological terminology mostly follows Hjelle (1990).

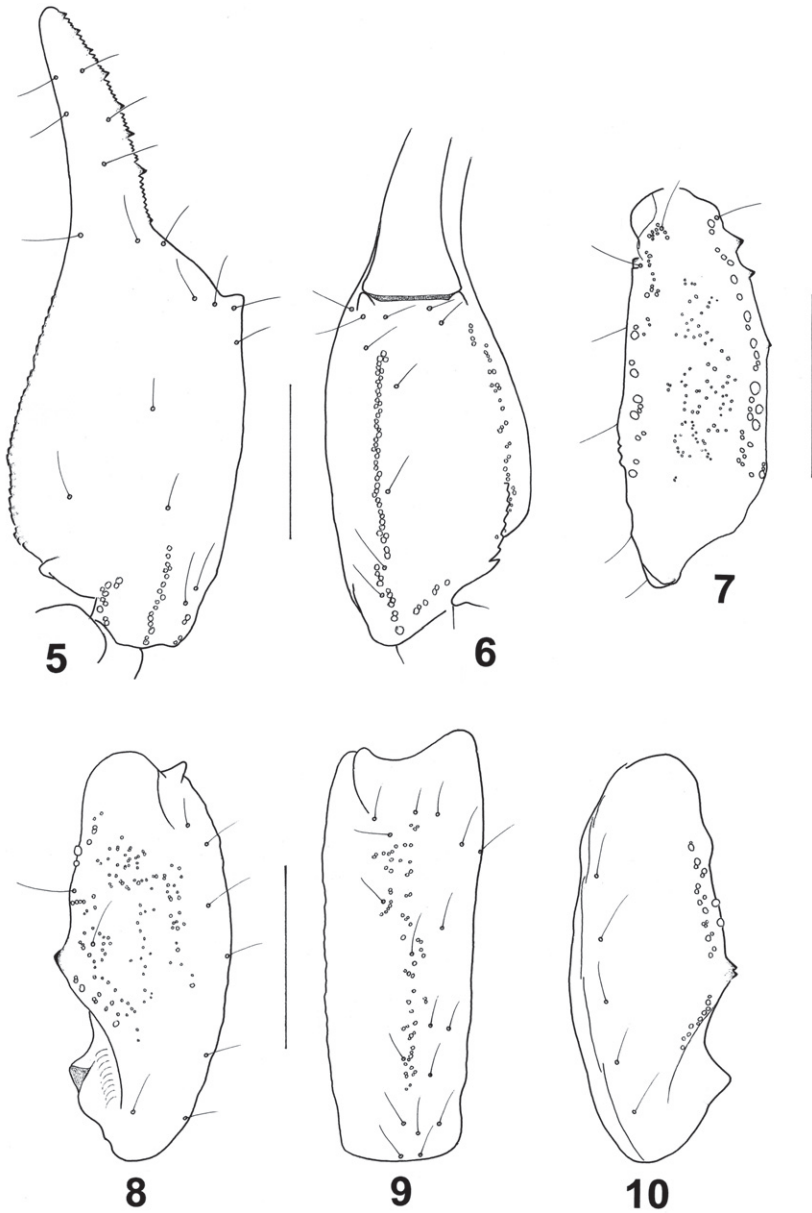
Taxonomic treatment

Family Chactidae Pocock, 1893

Genus *Chactas* Gervais, 1844

Chactas yaupi sp. n.
(Figs 1-10)

TYPE MATERIAL: Holotype (♀) and paratype (♀). Ecuador, Province of Morona Santiago, N of Yaupi, between Yaupi and Morona, July 1976 (British Expedition; col-



Figs 5-10. *Chactas yaupi* sp. n., female holotype. Trichobothrial pattern. **5-6.** Chela, dorso-external and ventral aspects. **7.** Femur, dorsal aspect. **8-10.** Patella, dorsal, external and ventral aspects (scale bar = 3 mm).

lected by local Indians). Rainforest, under rotten log. Holotype (ZMH Acc. No. A23/14) deposited in the Zoologisches Museum Hamburg; paratype deposited in the Muséum national d'Histoire naturelle, Paris.

ETYMOLOGY: The specific name is placed in apposition to the generic name and refers to the locality, Yaupi, where the new species was collected.

DIAGNOSIS. Moderate in size with the female holotype being 45.7 mm in total length and 46.1 mm for the female paratype. Coloration brown to dark brown, except for the venter and legs which are reddish-yellow; chela-hand reddish. Body and appendages very weakly granulated or smooth; carapace and tergites with minute punctation. Pectines with 8-8 teeth in female holotype and 8-9 in female paratype (values for males are unknown but may be estimated between 9 and 10 teeth). Trichobothrial pattern type *C* neobothriotaxic 'majorante'. Chela with 4 ventral trichobothria; patella with 5 ventral and 17 external trichobothria.

RELATIONSHIPS. The new species can be distinguished from others in the genus *Chactas*, and in particular from *Chactas mahnerti* Lourenço, 1995 and *Chactas moreti* Lourenço, 2014, also distributed in Ecuador, by the following features: (i) a distinct pattern of coloration, brown to dark brown, whereas *C. mahnerti* is overall reddish-yellow to reddish-brown and *C. moreti* is overall blackish-brown, (ii) a similar global size but with distinct morphometric values - see measurements after the description, (iii) metasomal segment V and vesicle are moderately granulated in the new species, (iv) anterior margin of carapace is concave in the new species, (v) the position of several trichobothria are distinct in the new species (Figs 5-10). Refer also to Lourenço (2014).

DESCRIPTION based on holotype and paratype.

C o l o r a t i o n. Generally brown to dark brown. **P r o s o m a:** carapace dark brown. Tergites brown to dark brown, paler than the carapace and with a central longitudinal yellowish stripe. **M e t a s o m a l** segments dark brown, with blackish zones over carinae; vesicle brown. **C h e l i c e r a e** yellow with diffused variegated blackish-brown spots; fingers uniformly dense and blackish; some teeth are reddish. **P e d i p a l p s** dark brown; femur darker than patella; patella dark brown; chela hand reddish; fingers blackish. **L e g s** reddish-yellow. Venter and sternites reddish with some yellowish zones; pectines and genital operculum yellow.

MORPHOLOGY. Anterior margin of c a r a p a c e with a weak to moderate concavity; lustrous and acarinate, with minute punctation around median eyes; furrows shallow. Sternum pentagonal, wider than long. Tergites acarinate, smooth and shiny with punctations. Pectinal tooth count 8-8 (holotype) 8-9 (paratype), fulcra absent. Sternites smooth and shiny without punctations, VII acarinate; spiracles moderate in size and round in shape. **M e t a s o m a l** segments with a lustrous tegument; dorsal carinae weak to moderate on all segments; latero-dorsal carinae vestigial on segments I to IV; other carinae absent; segment V with small spinoid granulations on ventral aspect;

vesicle moderately to weakly granulated. *P e d i p a l p s*: Femur with dorsal internal, dorsal external and ventral internal carinae moderately to strongly marked; ventral external carina absent; dorsal face with granulations; ventral face smooth; internal face with spinoid granules. Patella almost smooth and lustrous, with some granulations behind dorso-internal carina; dorsal internal and ventral internal carinae moderate; ventral external carinae weak to vestigial; other carinae absent. Chela lustrous; ventral median and dorsal internal carinae weak; other carinae vestigial or absent; internal face with a few weak granules, other faces smooth. Dentate margins on movable and fixed fingers with a median denticle row composed of 7-8 groups of granules. *C h e l i - c e r a e* with the dentition typical of the family Chactidae (Vachon 1963), and with intense setation ventrally. Trichobothriotaxy type C; neobothriotaxic 'majorante' (Vachon 1974); chela with 4 ventral trichobothria; patella with 5 ventral and 17 external trichobothria. Ventral surface of tarsus in legs III and IV with a median series of small spines and 5-6 external and internal setae.

Comparative morphometric values (in mm) of female holotype of *Chactas yaupi* sp. n., female non-type of *Chactas mahnerti* and female paratype of *Chactas moreti*, respectively (from Lourenço 2014). Total length (including telson) 45.7/45.4/40.6. Carapace: length 6.8/6.8/6.0; anterior width 4.0/4.4/4.2; posterior width 6.9/7.1/6.4. Mesosoma length 13.6/14.7/12.4. Metasomal segment I: length 2.3/2.5/2.3, width 3.2/2.9/3.0; II: length 2.8/2.7/2.5, width 2.8/2.7/2.5; III: length 3.0/3.1/2.6, width 2.7/2.6/2.4; IV: length 4.0/3.4/3.3, width 2.5/2.5/2.3; V: length 6.3/5.9/5.6, width 2.6/2.4/2.3, depth



Fig 11. Records of the genus *Chactas* in Ecuador: *C. mahnerti* Lourenço (black circles), *C. moreti* Lourenço (black circle with white star), *C. yaupi* sp. n. (white star).

2.4/2.1/1.9. Telson length 6.9/6.3/5.9. Vesicle: width 2.6/2.4/2.3, depth 2.3/2.2/1.8. Pedipalp length 26.3/24/1/21.4: femur length 6.7/6.1/5.3, width 2.1/2.3/1.9; patella length 6.7/6.2/5.3, width 2.6/2.6/2.2; chela length 12.9/11.8/10.8, width 3.5/3.6/3.4, depth 3.4/3.6/3.0; movable finger length 6.4/6.0/5.4.

Diversity of the Ecuadorian scorpion fauna

Lourenço (1994) suggested that one of the areas exhibiting the highest alpha-diversity for scorpions in the world ranged from Southern Colombia, Ecuador, the Northeast region of Peru, and the Upper Amazon region of Brazil. Despite several previous studies on the Ecuadorian scorpion fauna (e.g. Lourenço 1988, 1995, 2014, Lourenço & Ythier 2013), many gaps still remain in the knowledge of this scorpion community.

The scorpion fauna of Ecuador is characterized by an outstanding concentration of species belonging to such genera as *Ananteris* Thorell, 1891, *Tityus* C. L. Koch, 1836, *Teuthraustes* Simon, 1878 and *Chactas* Gervais, 1844. Within each genus, the species show to be closely related. The speciation pattern of the scorpions corresponds to the explosive model proposed by Gentry (1992) for plants of the genus *Gasteranthus* which have a similar range of distribution in this same area. The proposed mechanism operating process is associated with some type of genetic transilience associated with genetic drift in small founder populations, a process also postulated for Hawaiian *Drosophila* (Gentry 1992).

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