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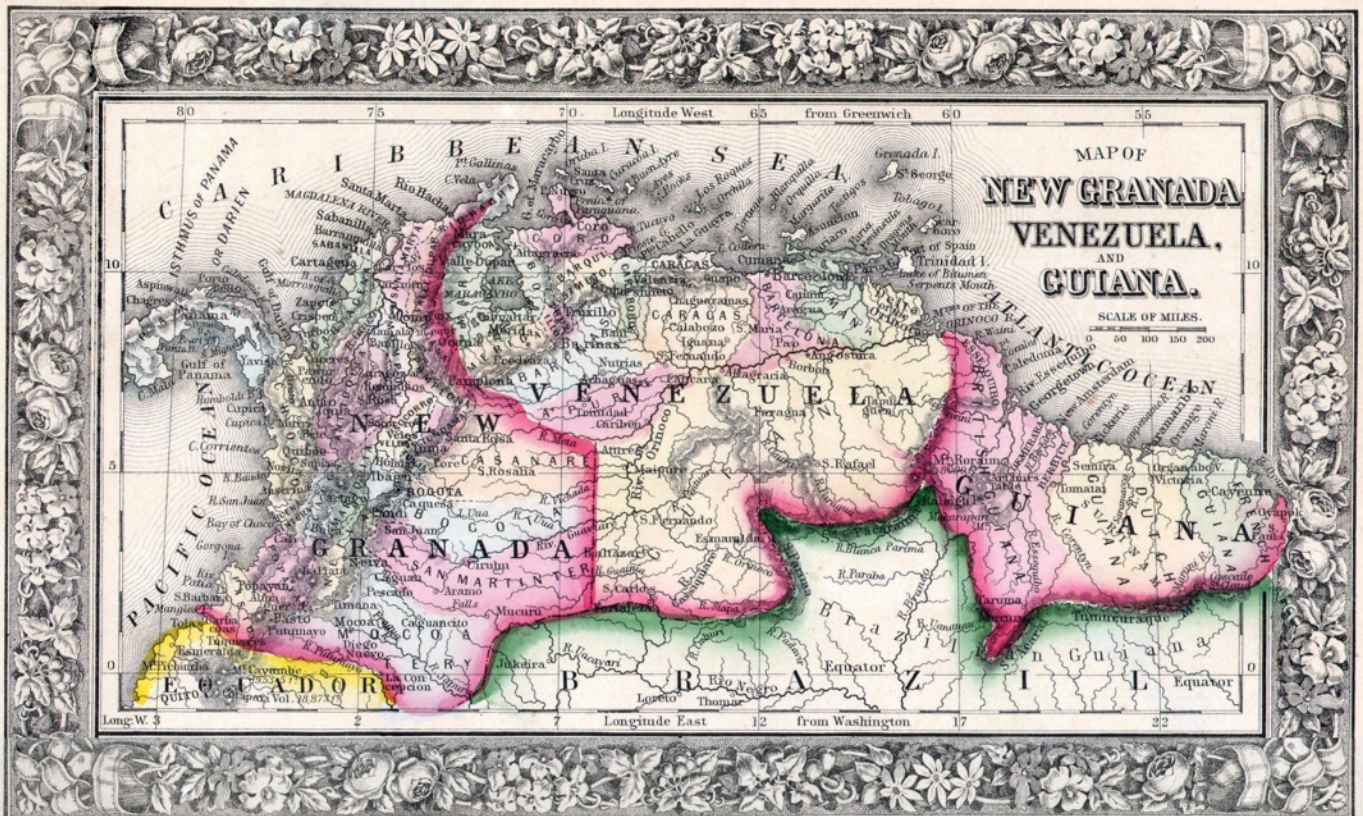
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A new species of *Hadrurochactas* Pocock, 1893 (Scorpiones: Chactidae) from the Mitaraka Massif in French Guiana

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Hadrurochactas;
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new species;
morphology;
inselberg;
Mitaraka;
French Guiana.

Abstract. – A new species belonging to the genus *Hadrurochactas* Pocock, 1893 (family Chactidae Pocock, 1893) is described on the basis of one male specimen collected in southern French Guiana, in the Mitaraka Massif, belonging to the Tumuk Humak Mountains (Serra do Tumucumaque), close to the border between French Guiana and Brazil. *Hadrurochactas tumucumaque* sp. n. represents the third species of *Hadrurochactas* reported from French Guiana and the total number of *Hadrurochactas* species is now raised to nine. The disrupted pattern of distribution of the genus is also discussed.

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Introduction

As noted in previous papers (Lourenço & Monod, 2001; Lourenço, 2010), the genus *Hadrurochactas* was created by Pocock (1893) for the species *Hadrurochactas sclateri*, with Guyana as its type locality, without more precise information (Fig. 14). Subsequently, Kraepelin (1894, 1899) placed *H. sclateri* in synonymy with *Chactas schaumii* Karsch, 1880 which he initially placed in the genus *Hadrurochactas* but later in the genus *Broteochactas* Pocock, 1893. Pocock (1900) accepted the synonymy of *Hadrurochactas* with *Broteochactas* but not that of *H. sclateri* with *H. schaumii*. Mello-Leitão (1945) followed Kraepelin’s decision and cited the type species as *Broteochactas schaumii*. Later however, González-Sponga (1978) resurrected the genus *Hadrurochactas*, a decision that he subsequently maintained (1984, 1996). Lourenço (1983) temporarily accepted González-Sponga’s opinion, giving as his main reason for doing so the scarcity of material available. Subsequently, this decision was changed and *Hadrurochactas* was considered as a “species group” of *Broteochactas* (Lourenço, 1986a, 1988). In his synthesis of chactid scorpions, Sissom (1990) accepted Lourenço’s decision but, in the “Catalog of the Scorpions of The World” (Sissom, 2000) he changed his mind and re-established *Hadrurochactas* as a valid genus. Monod and Lourenço (2001) also retained *Hadrurochactas* as a “species group” of *Broteochactas* but

since this publication, more precise studies of several scorpion groups have led different authors independently to consider *Hadrurochactas* to be a valid genus (Soleglad & Fet, 2003; Prendini & Wheeler, 2005). This decision was followed in the latest two descriptions of *Hadrurochactas* species (Lourenço, 2010; Ythier, 2018).

A new species is described here from the Mitaraka Massif, belonging to the Tumuk Humak Mountains (Serra do Tumucumaque), close to the border between French Guiana and Brazil. This new taxon represents the 9th known species of the genus *Hadrurochactas* and the third one reported from French Guiana.

Material and methods

Illustrations and measurements were produced using a Motic SMZ-171 stereo-microscope with an ocular micrometer. Habitus photographs were made with a Canon EOS RP and Adobe Photoshop software. Map was made using maps-for-free.com and Adobe Photoshop software. Measurements follow Stahnke (1970) and are given in mm. Trichobothrial notations follow Vachon (1974) and morphological terminology mostly follows Hjelle (1990). Specimens studied herein are deposited in the collections of the MNHN (Museum national d’Histoire naturelle, Paris, France) and EYCP (Eric Ythier Private Collection, Romanèche-Thorins, France).

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Taxonomic treatment

Family **Chaetidae** Pocock, 1893

Genus *Hadrurochactas* Pocock, 1893

Composition of the genus *Hadrurochactas* (in order of description)

- *Hadrurochactas schaumii* (Karsch, 1880) (French Guiana, Suriname, Guyana, Venezuela)
- *Hadrurochactas odoardo* González-Sponga, 1985 (Venezuela)
- *Hadrurochactas brejo* (Lourenço, 1988) (Brazil)
- *Hadrurochactas mapuera* (Lourenço, 1988) (Brazil)
- *Hadrurochactas machadoi* González-Sponga, 1993 (Venezuela)
- *Hadrurochactas polisi* (Monod & Lourenço, 2001) (Brazil)
- *Hadrurochactas araripe* Lourenço, 2010 (Brazil)
- *Hadrurochactas cristinae* Ythier, 2018 (French Guiana)
- *Hadrurochactas tumucumaque* **sp. n.** (French Guiana)

Hadrurochactas tumucumaque **sp. n.**

(Fig. 3-10, Tab. 1)

ZooBank: <https://zoobank.org/6E552CB6-D6E1-4DF6-AFCF-A51A362919CA>

Holotype, ♂, French Guiana, Mitaraka Massif, 2.216359 -54.456976, Path D, Plateau, Winkler, MI15-0237-36, APA 973-1, Expedition “La Planète Revisitée”, 23/II/2015-11/III/2015 (J. Orival & F. PetitClerc), deposited in the MNHN.

Comparative material examined

Hadrurochactas schaumii (Karsch, 1880)

French Guiana

- Mana, Angoulême, 2 ♂, 28/IX/2005 (E. Ythier), EYCP (EY0495);
- Cacao, Molokoi path, 1 ♂, 03/XI/2006 (E. Ythier), EYCP (EY0104);
- Saint-Élie, Trinité reserve, 1 ♂, X/2009 (C. Courtial), EYCP (EY0493);
- Roura, Montagne des Chevaux, 2 ♂, 1/XI/2014 (C. Girod), EYCP (EY0490);
- Mana, Laussat, 2 ♂, 01/X/2015 (EcoFog), EYCP (EY0102);
- Sinnamary, Petit-Saut dam, 1 ♂, II/2022 (B. Bascoules), EYCP (EY0391);
- Remire-Montjoly, Rorota path, 1 ♂, 04/VIII/2022 (E. Ythier), EYCP (EY0392).

Hadrurochactas cristinae Ythier, 2018

French Guiana

- Roura, Stoupan, 1 ♂ holotype, 2017 (Q. Uriot & S. Uriot), MNHN-RS-RS9171 (MNHN).

Hadrurochactas mapuera (Lourenço, 1988)

Brazil

- Para, region of Mapuera river, 1 ♂ holotype, 23/II/1986 (E. Baracuxi), MNHN.

Etymology. – The specific name is placed in apposition to the generic name and refers to the Tumuk Humak Mountains (Serra do Tumucumaque) where is located the Mitaraka Massif, the location in which the new species was collected (Fig. 15).

Diagnosis. – Scorpion of medium size when compared to other known species of the genus, reaching a total length of 20.4 mm for the male holotype (see morphometric values after the description). Coloration yellowish brown, densely spotted on the carapace, the tergites and the appendages. Mesosoma yellowish, densely spotted with confluent brown to dark brown spots, with a yellowish longitudinal median stripe. Chelicerae yellowish. Legs tarsal segments yellowish. Metasomal segment V, telson and chela slender in comparison to the geographically closest species *H. schaumii*, *H. cristinae* and *H. mapuera*

(Tab. 1). Ventral side of telson with two large spinoid granules under the aculeus and smaller size spine-like granules. Pectines with 10-10 teeth in male holotype; female unknown. Trichobothrial pattern of type C, neobothriotaxic (majorante) ‘major neobothriotaxy’.

Description based on male holotype

Coloration. – General coloration yellowish brown, densely spotted on the carapace, the tergites and the appendages. Prosoma yellowish with brownish variegated spots on anterior, lateral and posterior edges; eyes surrounded by black pigment. Mesosoma yellowish, densely spotted with confluent brownish spots, darker on the posterior edge of the tergites; the remaining yellowish coloration forming a confluent longitudinal median stripe. Sternites yellowish, the VII slightly darker; coxapophysis and sternum yellowish; genital operculum yellowish; pectines pale yellow. Metasomal segments reddish yellow with brownish spots. Telson reddish yellow with brownish spots; aculeus reddish. Chelicerae yellowish; fingers yellowish; teeth reddish yellow. Pedipalps reddish yellow with brownish longitudinal stripes on femur, patella and chela. Legs with femur, patella and tibia yellowish with brownish longitudinal stripes; basitarsus and telotarsus yellowish.

Morphology. – Carapace weakly granular to smooth; anterior margin very weakly emarginated; carinae absent; all furrows weakly pronounced; postero-median furrow finely granular; median ocular tubercle distinctly anterior to the centre of the carapace; two pairs of small lateral eyes and a third pair of lateral vestigial eyes in the back of the second pair. All tergites with minute granulation and a few indistinct bigger granules on the posterior margin. Pectinal tooth count 10-10 in male holotype, fulcrum absent. Sternites smooth and shiny except VI and VII which have some minute granulations; spiracles rounded; carinae absent; genital operculum longitudinally divided, each half with a sub-triangular shape. Dorsal carinae moderately granular on metasomal segments I-IV, absent on segment V; dorsolateral carinae moderately granular on all segments; ventrolateral and ventral carinae weakly pronounced or absent on all segments; dorsal surface smooth on all segments; lateral surfaces weakly granular to smooth on all segments; ventral surface smooth on segments I to IV; weakly granular on V. Telson with small-sized spine-like granules and two large spinoid granule under the aculeus; dorsal side smooth; aculeus relatively short and weakly curved. Pedipalp femur pentacarinat, weakly granular; patella and chela with weakly marked to inconspicuous carinae; fixed and movable fingers with seven rows of linear granules. Legs with long thin setae. Cheliceral dentition characteristic of the family Chaetidae (Vachon, 1963). Trichobothriotaxy of type C, neobothriotaxic (majorante) ‘major neobothriotaxy’ (Vachon, 1974).

Morphometric values (mm) of the male holotype.

- **Total length** (including the telson) 20.42.
- **Carapace**
length 2.79;
anterior width 1.72;
posterior width 3.12.
- **Mesosoma**: length 4.51.
- **Metasomal segments**
I: length 1.07, width 2.00, depth 1.63;
II: length 1.35, width 1.86, depth 1.53;
III: length 1.49, width 1.91, depth 1.53;
IV: length 2.19, width 1.95, depth 1.53;
V: length 3.53, width 2.00, depth 1.44.
- **Telson**: length 3.49.
- **Vesicle**: width 1.05, depth 0.74.
- **Pedipalp**
femur length 2.28, width 0.84;
patella length 2.56, width 0.93;
chela length 4.14, width 1.16, depth 1.30.
- **Movable finger**: length 2.37.



Fig. 1-2. *Hadrurochactas tumucumaque* sp. n., ♂ holotype, habitus. 1. Dorsal aspect. 2. Ventral aspect.

Relationships. – In respect to several characters, *H. tumucumaque* sp. n. shows similarities with *H. schaumii*, distributed in French Guiana, Suriname, Guyana and Venezuela (Fig. 13-14). However, it can be readily distinguished notably by the following main features:

(i) metasomal segment V less rounded, narrower with length/width ratio 1.8 (1.4 to 1.6 in ♂ *H. schaumii*; n=10) and thinner with length/depth ratio 2.5 (1.8 to 2.3 in ♂ *H. schaumii*; n=10);

(ii) telson narrower with length/width ratio 3.3 (2.7 to 3.1 in ♂ *H. schaumii*; n=10) and thinner with length/depth ratio 4.7 (3.5 to 4.1 in ♂ *H. schaumii*; n=10);

(iii) chela slender with length/width ratio 3.6 (3.0 to 3.3 in ♂ *H. schaumii*; n=10);

(iv) ventral side of telson with two large spinoid granules under the aculeus and smaller size spine-like granules (one medium to large spinoid granule under the aculeus and smaller size spine-like granules in ♂ *H. schaumii*; n=10);

(v) metasoma with dorsal and dorso-lateral carinae slightly less granular (better marked in ♂ *H. schaumii*; n=10) and granulation generally less marked on body and appendages.

The new species can also be readily distinguished from the two other geographically closest species, *H. cristinae* described from eastern French Guiana and *H. mapuera* described from the region of the Mapuera river (tributary of Trombetas river) in the Amazon basin of Brazil (Fig. 13-14), notably by the following main features:

(i) larger general size than *H. cristinae* with 20.4 mm (18.9 mm in ♂ holotype *H. cristinae*);

(ii) larger pectinal count than *H. cristinae* with 10-10 teeth (9-9 teeth in ♂ holotype *H. cristinae*);

(iii) confluent yellowish longitudinal median stripe on mesosoma (no stripe in ♂ holotype *H. cristinae*) and no darker pigmentation on tarsal segments (diffused brownish pigmentation in ♂ holotype *H. cristinae*);

(iv) metasomal segment V narrower with length/width ratio 1.8 (1.5 in both ♂ holotypes *H. mapuera* and *H. cristinae*) and thinner with length/depth ratio 2.5 (1.7 in ♂ holotype *H. mapuera*, 2.4 in ♂ holotype *H. cristinae*);

(v) telson narrower with length/width ratio 3.3 (2.8 in both ♂ holotypes *H. mapuera* and *H. cristinae*) and thinner with length/depth ratio 4.7 (3.7 in ♂ holotype *H. mapuera*, 4.1 in ♂ holotype *H. cristinae*);

(vi) chela slender with length/width ratio 3.6 (3.1 in ♂ holotype *H. cristinae*, 3.2 in ♂ holotype *H. mapuera*);

(vii) ventral side of telson with two large spinoid granules under the aculeus and smaller size spine-like granules (one medium to large spinoid granule under the aculeus and smaller size spine-like granules in both ♂ holotypes *H. cristinae* and *H. mapuera*);

(viii) metasoma with dorsal and dorso-lateral carinae less granular and ventral surface of segment less granular than in ♂ holotype *H. mapuera*;

(ix) trichobothria on ventral side of pedipalp patella situated at different positions than in *H. cristinae* with V3 equidistant from V2-V4 and V6 closer to V7 (V3 closer to V2 and V6 equidistant from V5-7 in ♂ holotype *H. cristinae*).

Biogeographic considerations: the disrupted pattern of distribution of *Hadrurochactas* species in forest formations of South America

Previous examples of scorpion groups restricted to particular types of vegetation cover in the Neotropical region have been outlined. A typical case is the one presented by the genus *Rhopalurus* Thorell, 1876 (here considered as a single genus), which shows a restricted distribution over open vegetation formations such as the Llanos, Cerrados and Caatingas (Lourenço 1986b, 1994). Other genera such as *Ananteris* Thorell, 1891 (Ananteridae) and *Tityus* C. L. Koch, 1836 (Buthidae) present much broader patterns of distribution, and are present in a large array of vegetation covers.

Contrarily to the Buthidae and Ananteridae, the elements of the family Chactidae are typical of forested formations, and largely present in rainforests, in particular those of the Amazon region and

the Guayana lowland floristic Province as defined by Mori (1991). A singular exception is the model of distribution observed for the species of the genus *Hadrurochactas*. The species of this genus, like the majority of the chactid scorpions, are exclusively restricted to forest formations and their distribution was originally supposed to be limited to the Guayana Province where the group was represented by two species: *Hadrurochactas schaumii* (Karsch) and *Hadrurochactas odoardo* González-Sponga.

Subsequently, new species were described from other regions outside the Guayana Province: *Hadrurochactas mapuera* Lourenço, collected in a forest formation located in a zone of possible contact between Amazonia and Guayana, just to the South of the Tumuk Humak Mountains (Serra do Tumucumaque), in the State of Pará, Brazil and *Hadrurochactas polisi* Monod & Lourenço collected in Central Amazonia. More remarkable was the description of *Hadrurochactas brejo* Lourenço, collected in a 'Brejo' formation in the State of Ceará, Brazil, representing the first chactid element ever found outside of the Guayana-Amazon region (Lourenço, 1988). It seems important to recall that 'Brejos' are inselbergs recovered by humid forested vegetation which in the northeastern regions of Brazil are surrounded by xerophytic formations such as the Caatingas. These inselbergs are covered by forest because their elevation causes humid air to cool, forming consequent condensation leading precipitations to take place (Andrade-Lima, 1982). The subsequent description of *Hadrurochactas araripe* Lourenço, once again from a 'Brejo' formation, confirmed this model of disrupted pattern of distribution presented by the genus *Hadrurochactas*. These two examples of disrupted distribution with isolation of populations in a today globally arid vegetal formation bring support to the theory of a possible past connection between the Amazon and the Atlantic forests (Lourenço, 1994), as strongly suggested by palaeobotanists (Bigarella & Andrade-Lima, 1982). The present description of one more new species from an inselberg equally suggests that these formations play a main role as refugia during past climatic vicissitudes.

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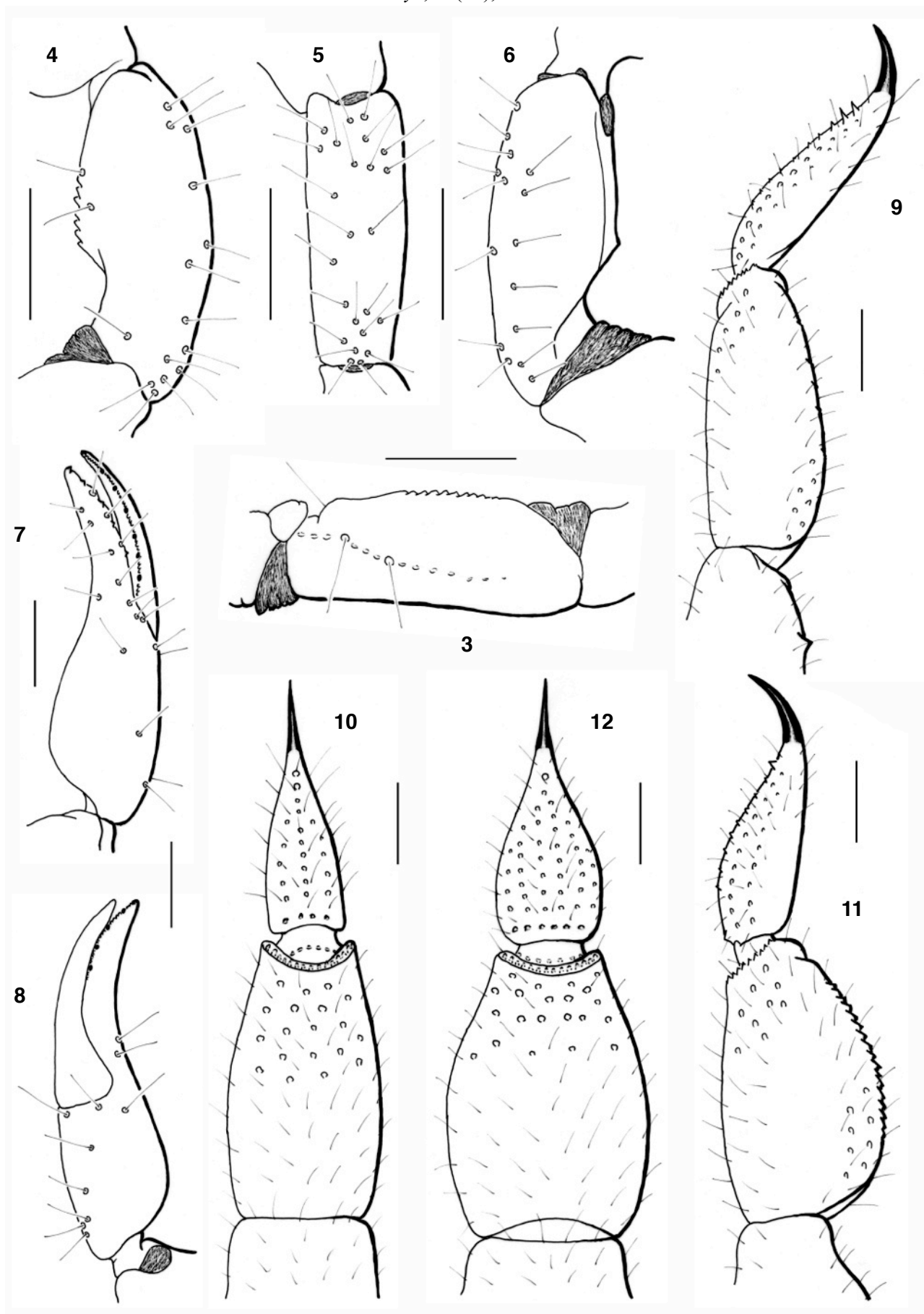


Fig. 3-10. *Hadrurochactas tumucumaque* sp. n., ♂, holotype (Scale bars 1 mm).

3-8. Trichobotrial pattern. 3. Femur, dorsal aspect. 4-6. Patella. 4. Dorsal. 5. External. 6. Ventral. 7-8. Chela. 7. Dorso-external. 8. Ventro-internal. 9-10. Metasomal segment V and telson. 9. Lateral. 10. Ventral.

Fig. 11-12. *Hadrurochactas schaumii*, ♂ from Petit-Saut (Sinnamary, French Guiana) (Scale bars 1 mm).

Metasomal segment V and telson. 11. Lateral. 12. Ventral.

Table. I. Comparative table of total length and selected morphometric ratios of adult ♂ of *Hadrurochactas* specimens examined in this study. Abbreviations: length (L), width (W), depth (D).

	Total L (mm)	Metasomal segment V		Telson		Chela
		L / W	L / D	L / W	L / D	L / W
<i>H. tumucumaque</i> sp. n. (holotype)	20.4	1.8	2.5	3.3	4.7	3.6
<i>H. schaumii</i> (Mana, Angoulême)	22.6	1.6	2.1	2.8	3.9	3.0
<i>H. schaumii</i> (Mana, Angoulême)	23.5	1.5	2.0	2.8	3.8	3.1
<i>H. schaumii</i> (Cacao, Molokoi)	21.1	1.4	2.1	2.8	4.1	3.0
<i>H. schaumii</i> (Saint-Élie, Trinité)	22.5	1.5	2.0	2.8	4.0	3.1
<i>H. schaumii</i> (Roura, Mt. Chevaux)	24.4	1.6	2.0	2.9	3.9	3.1
<i>H. schaumii</i> (Roura, Mt. Chevaux)	23.9	1.6	2.3	3.1	3.9	3.1
<i>H. schaumii</i> (Mana, Laussat)	20.1	1.4	1.8	2.8	3.7	3.1
<i>H. schaumii</i> (Mana, Laussat)	22.4	1.4	1.8	2.8	3.8	3.1
<i>H. schaumii</i> (Sinnamary, Petit-Saut)	20.4	1.4	2.0	2.9	3.5	3.3
<i>H. schaumii</i> (R. Montjoly, Rorota)	21.6	1.4	2.1	2.7	3.6	3.1
<i>H. cristinae</i> (holotype)	18.9	1.5	2.4	2.8	4.1	3.1
<i>H. mapuera</i> (holotype)	20.4	1.5	1.7	2.8	3.7	3.2

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Description. – EY, WL

Article proofreading. – EY, WL

Bibliographic work. – EY, WL

Material study. – EY, WL

Author of the figures. – EY (except Fig. 15 and cover, see Credits)

¹ EY = Ythier E. – WL = Lourenço W. R.

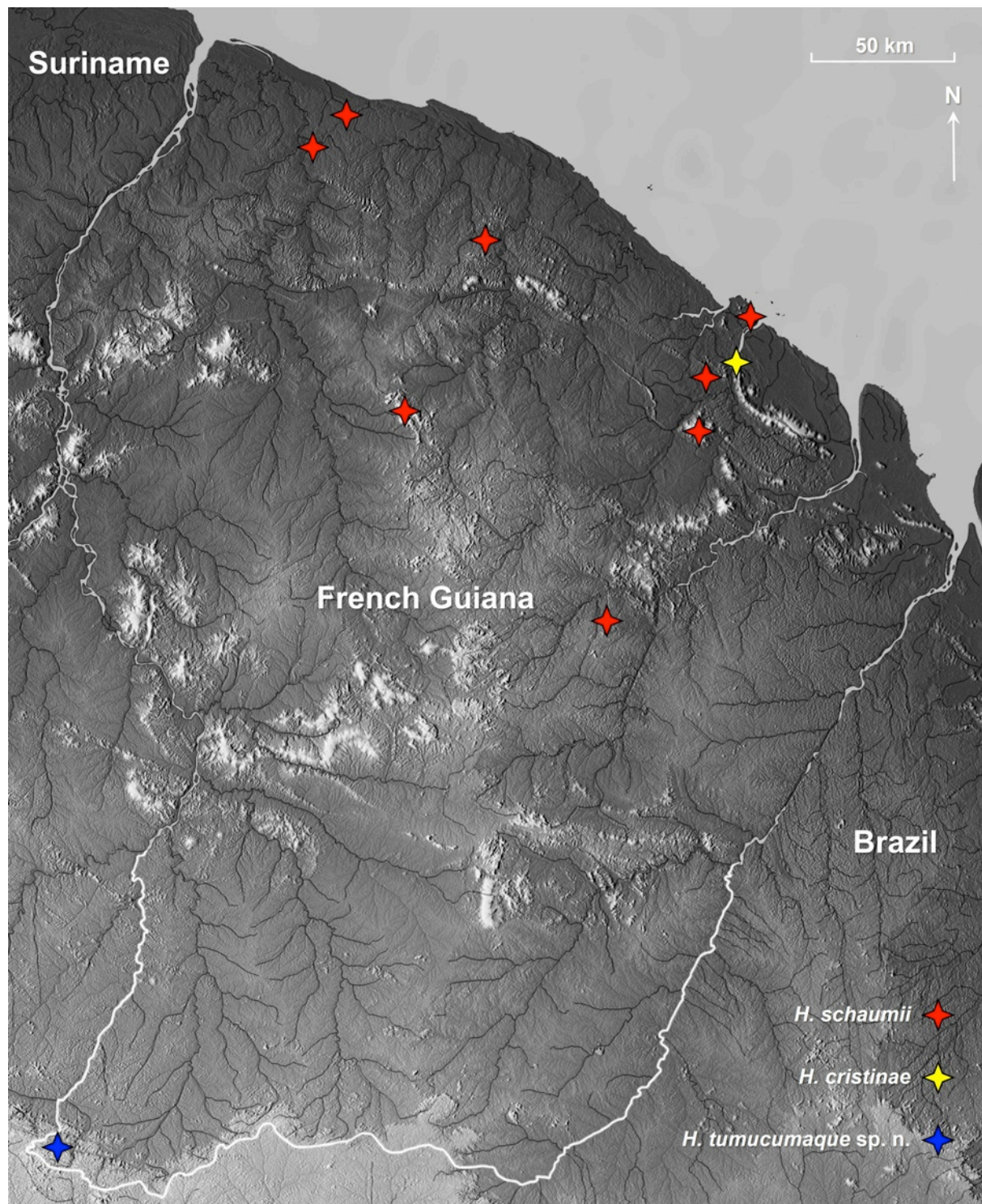


Fig. 13. Topographic map of French Guiana.

Localities of *Hadrurochactas* specimens examined in this study, including the type localities of *H. tumucumaque sp. n.* and *H. cristinae*.

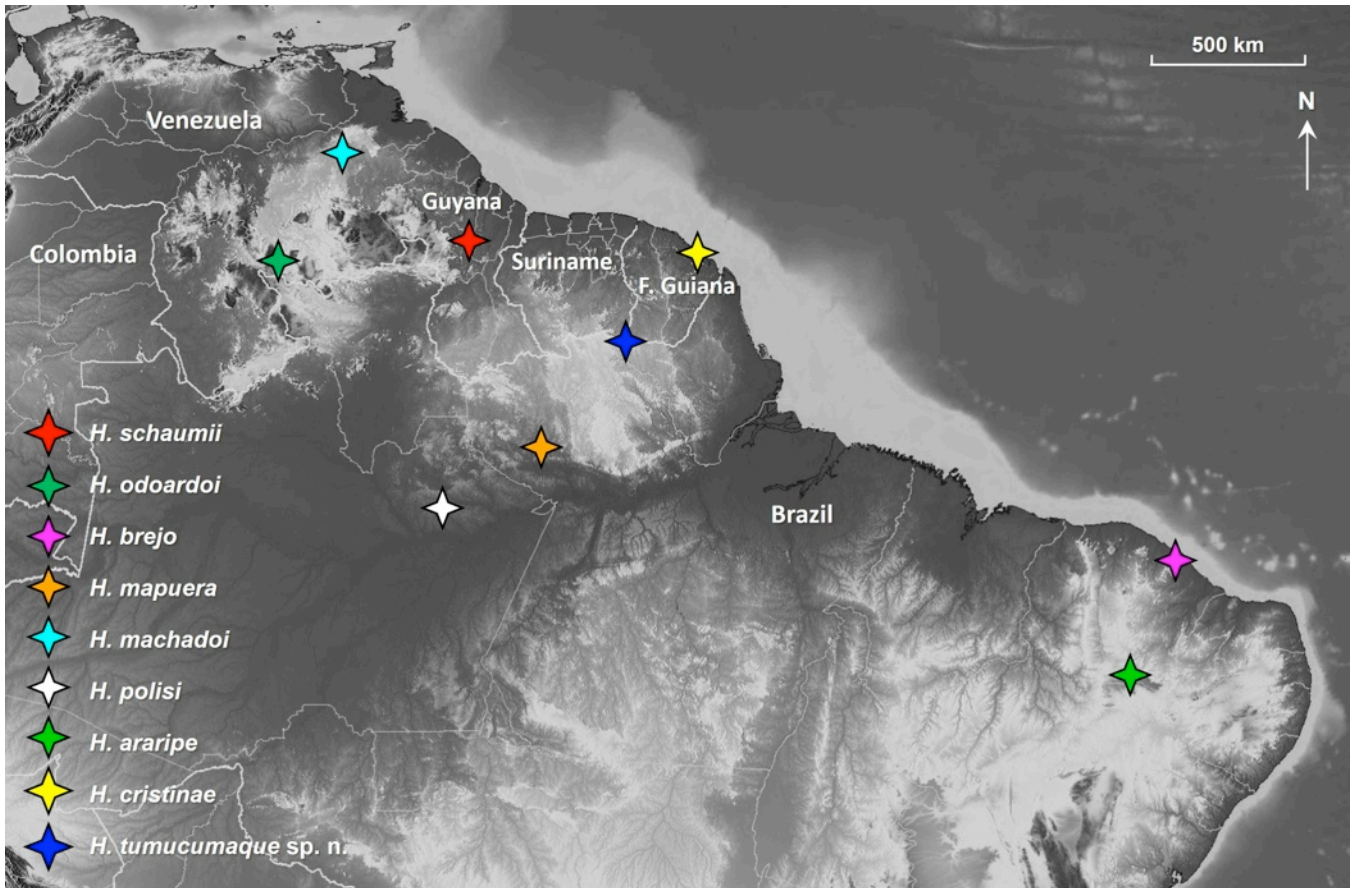


Fig. 14. Topographic map of northern South America.

Approximate type localities of *Hadrurochactas* species (precise locality “Guyana” unclear for *H. schaumii*).



Fig. 15. Mitaraka Massif, in the Tumuk Humak Mountains (Serra do Tumucumaque).

Type locality of *Hadrurochactas tumucumaque* sp. n. (photo: Xavier Desmier).

Résumé

Ythier E. & Lourenço W. R., 2024. – Une nouvelle espèce d'*Hadrurochactas* Pocock, 1893 (Scorpiones: Chactidae) du massif du Mitaraka en Guyane Française. *Faunitaxys*, 12(59): 1 – 9.

Une nouvelle espèce appartenant au genre *Hadrurochactas* Pocock, 1893 (famille Chactidae Pocock, 1893) est décrite sur la base d'un spécimen mâle collecté dans le sud de la Guyane Française, dans le massif du Mitaraka, appartenant à la chaîne des Monts Tumuc-Humac (Serra do Tumucumaque), proche de la frontière entre la Guyane Française et le Brésil. *Hadrurochactas tumucumaque* sp. n. représente la troisième espèce d'*Hadrurochactas* décrite pour la Guyane, et le nombre total d'espèces appartenant au genre *Hadrurochactas* est porté à neuf. Le modèle de répartition disjointe pour ce genre est également discuté.

Mots-clés. – Scorpion, *Hadrurochactas*, *tumucumaque*, taxonomie, description, nouvelle espèce, morphologie, inselberg, Mitaraka, Guyane Française.

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Faunitaxys

Volume 12, Numéro 59, Novembre 2024

SOMMAIRE

Une nouvelle espèce d'*Hadrurochactas* Pocock, 1893 (Scorpiones: Chactidae) du massif du Mitaraka en Guyane Française.

Eric Ythier & Wilson R. Lourenço 1 – 9

CONTENTS

A new species of *Hadrurochactas* Pocock, 1893 (Scorpiones: Chactidae) from the Mitaraka Massif in French Guiana.

Eric Ythier & Wilson R. Lourenço 1 – 9

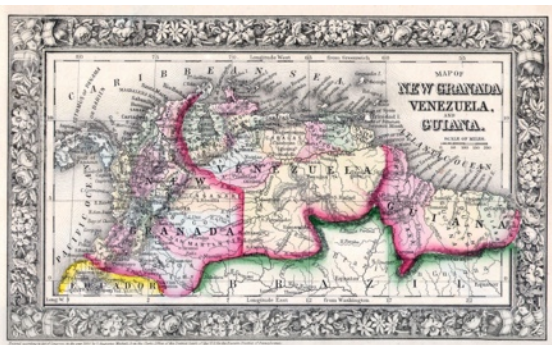


Illustration de la couverture :

Old map of northern South America (1859) showing the Tumuk Humak Mountains (indicated Tumucuraque) in southern Guiana (now Guyana, Suriname and French Guiana) where is located the Mitaraka Massif, type locality of *Hadrurochactas tumucumaque* **sp. n.**

Crédits:

Eric Ythier : Fig. 1-14.

Xavier Desmier : Fig. 15.

Mitchel S. A. / Wikipedia Commons : couverture (modifiée).