

A new species of *Broteochactas* Pocock, 1890 from Brazilian Amazonia (Scorpiones: Chactidae)

Lionel Monod¹ and Wilson R. Lourenço²

¹Muséum d'Histoire naturelle, Route de Malagnou 1, case postale 6434, CH-1211 Genève 6, Switzerland

²Laboratoire de Zoologie (Arthropodes), Muséum national d'Histoire naturelle, 61 rue de Buffon, 75005 Paris, France

Summary

Broteochactas polisi n. sp. is described from Brazilian Amazonia. Various taxonomic placements of some *Broteochactas* species previously assigned to the genus *Hadrurochactas* are pointed out. These species, together with *B. polisi*, are provisionally placed in the "schaumii" species group. The disjunct distribution of this lineage is discussed.

Introduction

The genus *Hadrurochactas* was established by Pocock (1893) for the species *Hadrurochactas sclateri* Pocock, 1893, from Guyana. Subsequently, Kraepelin (1894, 1899) synonymized *H. sclateri* with *Chactas schaumii* Karsch, 1880, which he placed first in *Hadrurochactas* (Kraepelin, 1894) but later in the genus *Broteochactas* Pocock, 1890 (Kraepelin, 1899). 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, González-Sponga (1978) resurrected the genus *Hadrurochactas*, an opinion which he maintained in later publications (González-Sponga, 1984, 1996). Lourenço (1983) temporarily accepted González-Sponga's opinion because of the scarcity of material available. In two subsequent papers Lourenço (1986, 1988) revoked his decision and considered *Hadrurochactas* (and also genera *Auyantepuia* González-Sponga, 1978, *Taurepania* González-Sponga, 1978, and *Vachoniochactas* González-Sponga, 1978) a species group within *Broteochactas*. Francke & Boos (1986) confirmed the placement of *Auyantepuia* as a synonym of *Broteochactas*.

Finally, Lourenço (1994a) separated *Vachoniochactas* as a valid genus.

In his review of the Chactidae, Sissom (1990) accepted the decisions of Lourenço (1986, 1988), by suggesting in his key that *Vachoniochactas* should be separated from *Broteochactas*. In a recent publication, Sissom (2000) treated both *Hadrurochactas* and *Taurepania* as valid genera. *Broteochactas brejo* Lourenço, 1988, and *B. mapuera* Lourenço, 1988, two species described in the *B. schaumii* species group, remained listed under the genus *Broteochactas*. These frequent changes in taxonomic position reflect the complexity of the genus *Broteochactas*.

The species belonging to the genus *Broteochactas* are characterized by: (1) ventral aspect of palpal patella with 7 trichobothria; (2) dentate margins of pedipalp chela fingers with 6/7 slightly oblique granular rows; (3) spiracles oval or round; (4) tarsi with setae. These features allow to separate *Broteochactas* from the related genera of Chactidae (see Lourenço, 1998).

Several species groups can be outlined within the genus *Broteochactas*, on the basis of shared morphological characters (shape of pedipalp chela and metasomal segments). The species formerly associated with *Hadrurochactas* are characterized

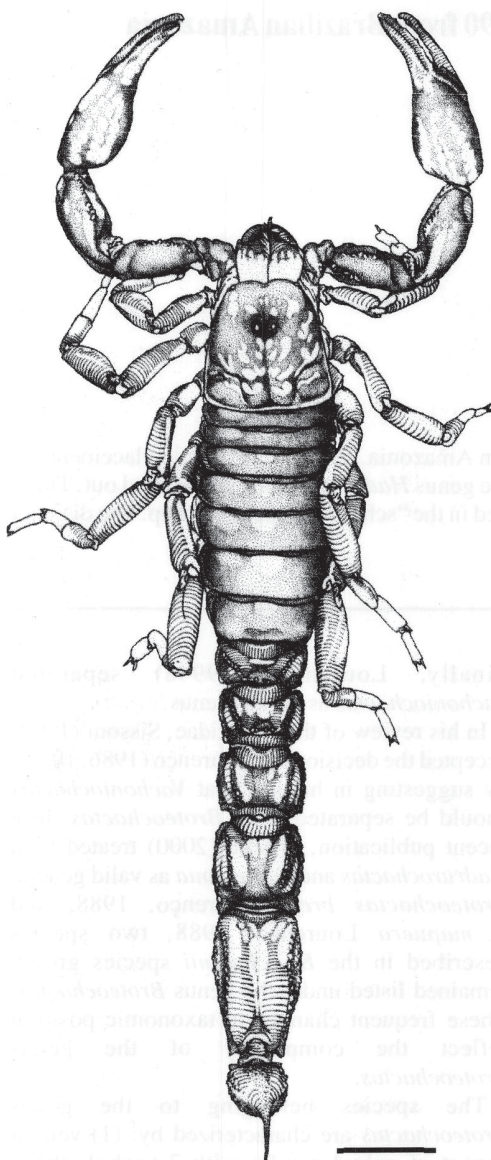


Fig. 1: *Broteochactas polisi* n. sp., female holotype. Scale bar = 2 mm.

by rounded chelae (with fingers almost as long as the hand), by strongly flattened metasomal segments (wider than high) and by an elongated telson which has ventral carina composed of robust spines. These characters are common for at least

five species: *B. brejo*, *B. mapuera*, *B. odoardo* (González-Sponga, 1996), *B. polisi* n. sp. and *B. schaumii*, which are here placed in the "schaumii" group.

The decision to consider *Hadrurochactas* as a species group of *Broteochactas* is, however, only preliminary. During the course of his Ph.D. program, the first author will attempt to reach a more well-founded decision by using molecular methods.

A new species is described below from Brazilian Amazonia, which extends the known distributional range of the species group to Western Amazonia.

Methods

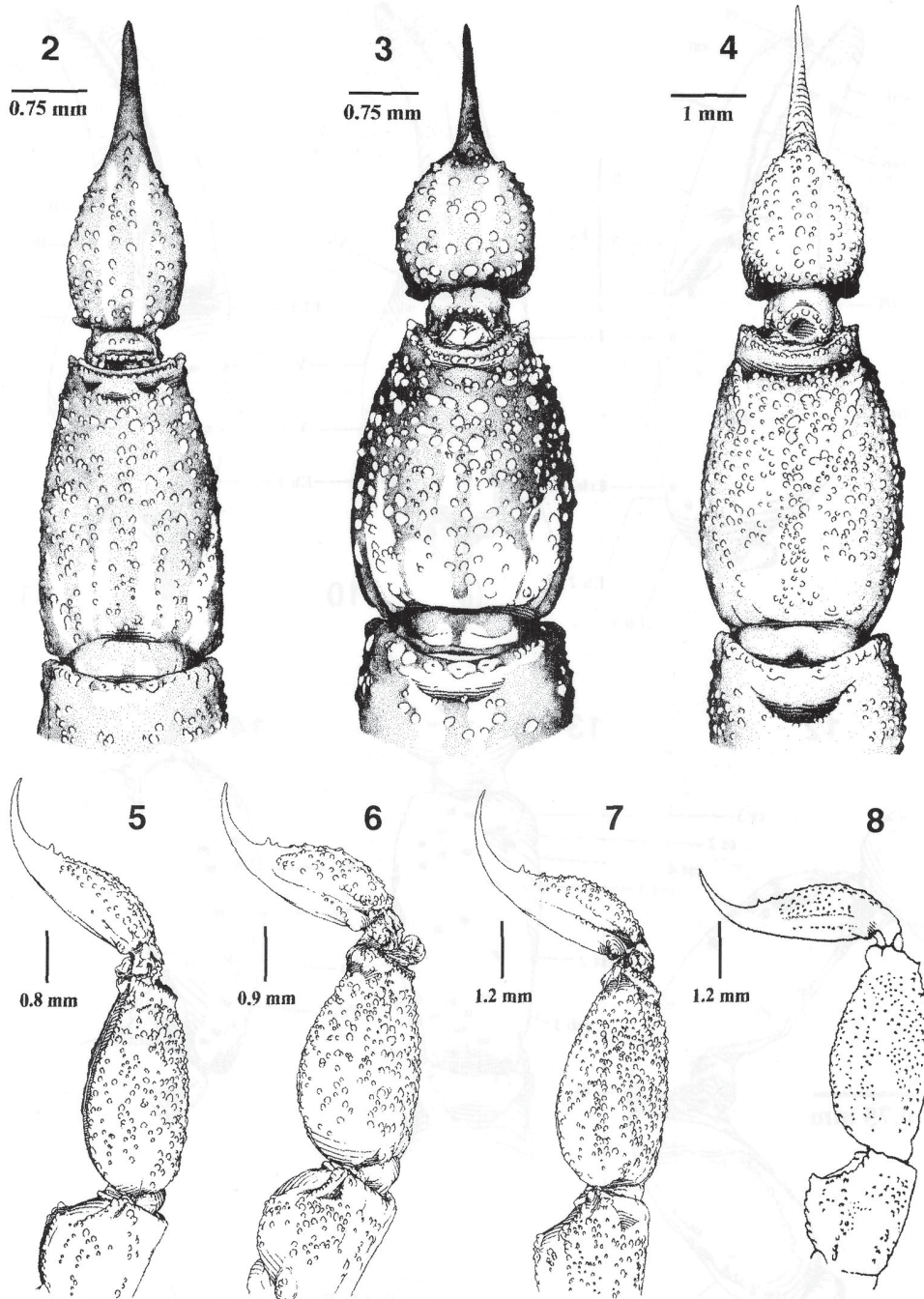
All measurements are in mm. D = depth, L = length, W = width

Broteochactas polisi, new species (Figs. 1, 5, 9–16)

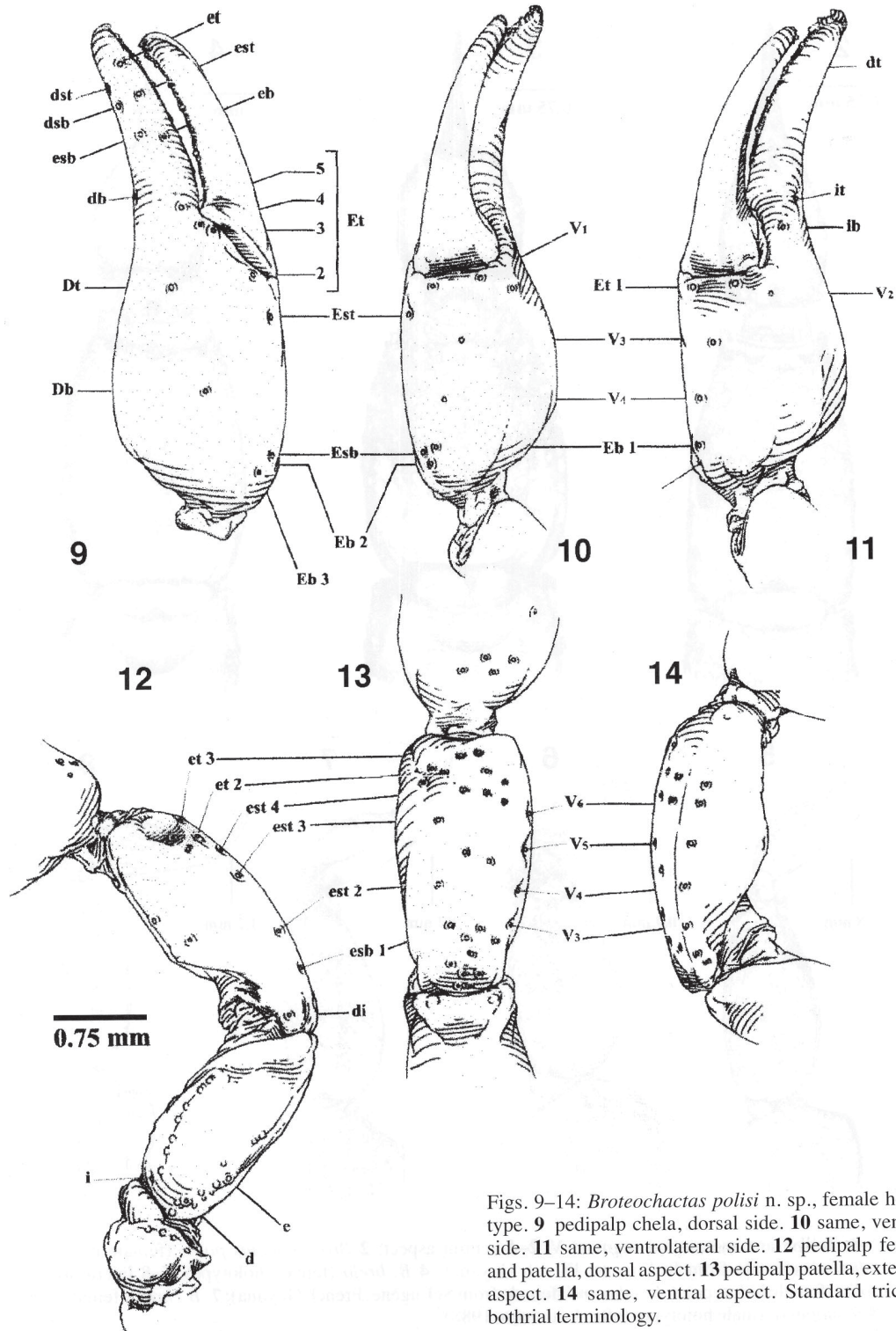
Etymology: Patronym in honour of Dr Gary A. Polis, University of California, Davis, tragically deceased during a field trip, in recognition of his important contribution to the study of scorpion ecology.

Material: ♀ holotype, deposited in the Instituto Nacional de Pesquisas da Amazonia, Manaus, Brazil; Brazil, Amazonas, 43 road-km N of Manaus, Campinas field station, 02°30'W, 60°08'S, "whitesand degraded forest" (as given on the label), 14 March 1998, S. I. Golovach. Comparative material: *B. brejo*: ♀ holotype; Brazil, Ceará, Maranguape Mts, W. M. Mann, Stanford Expedition. *B. schaumii*: 25 ♂♂, 2 ♀♀; French Guyana, St Eugène research station, on the Courcibo stream (a tributary of the Sinnamary River), 53°03'37"W, 4°51'52"N, J.-C. de Massary.

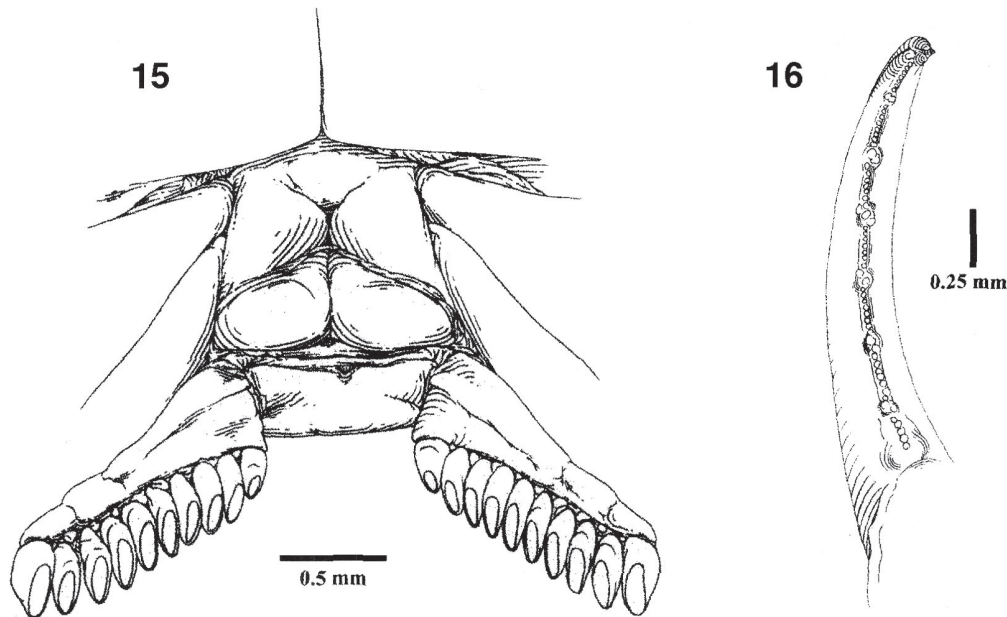
Diagnosis: *Broteochactas polisi* can readily be distinguished from the other species of the "schaumii" species group by the following combination of characters: (1) prosoma smooth, without granulation; (2) tergites smooth with some slightly roughened areas; (3) metasomal segment V narrow (Figs. 2, 5); (4) ventral surface of metasomal segment V sparsely granular (Fig. 2); (5) ventral side of telson with medium-sized spine-like granules (Fig. 5); (6) pectines with 10–10 teeth (Fig. 15).



Figs. 2-8: Telson and metasomal segment V. 2-4 ventral aspect; 2 *Broteochactas polisi* (female holotype); 3 *B. schaumii* (female from St Eugène, French Guyana); 4 *B. brejo* (female holotype). 5-8 lateral aspect; 5 *B. polisi* (female holotype); 6 *B. schaumii* (female from St Eugène, French Guyana); 7 *B. brejo* (female holotype); 8 *B. mapuera* (male holotype) (after Lourenço, 1988).



Figs. 9–14: *Broteochactas polisi* n. sp., female holotype. **9** pedipalp chela, dorsal side. **10** same, ventral side. **11** same, ventrolateral side. **12** pedipalp femur and patella, dorsal aspect. **13** pedipalp patella, external aspect. **14** same, ventral aspect. Standard trichobothrial terminology.



Figs. 15–16: *Broteochactas polisi* n. sp., female holotype. **15** pectines and genital operculum. **16** edge of movable finger of pedipalp chela.

Description (based on female holotype): Coloration. Body generally dark brown with light spots (yellow to light brown). Prosoma black, with several brown spots. Mesosoma: tergites black, with a yellow longitudinal median stripe; sternites I–II entirely yellowish, sternites III–V yellowish, with black spots on lateral margins; coxapophysis and genital operculum yellowish; sternum yellowish with brown spots; pectines pale yellow. Metasoma: all segments black, with longitudinal light brown spots on ventral side; dorsal side dark, slightly lighter than the ventral aspect, with numerous orange spots; vesicle black, with 2 longitudinal red-brown stripes on ventral side, dorsal side light brown; aculeus dark red-brown. Chelicerae: yellowish with some variegated brown spots; fingers brown. Pedipalps: femur black, ventral aspect yellowish; patella black with red-brown spots, ventral aspect yellowish; chela red-brown with a darker variegation, ventral aspect yellowish. Legs black with few brown stripes, basitarsus and tarsus yellowish.

Morphology. Carapace smooth, without granulation; anterior margin with a weak notch; carinae

absent; all furrows weakly pronounced; postero-median furrow finely granular; median ocular tubercle distinctly anterior to the center of the carapace; two pairs of small lateral eyes. Mesosoma. All tergites smooth with some slightly roughened areas; tergites IV–VI with a few indistinct granules on the posterior margin; tergite VII with four vestigial carinae which carry granules on the posterior half; posterior half of tergite VII finely granular, with some interspersed bigger granules. Venter. Genital operculum longitudinally divided, each half with a roughly triangular shape; pectines with 10–10 teeth (Fig. 15), fulcra vestigial; all sternites smooth with rounded stigmata, carinae absent, surface of sternite V slightly roughened laterally and posteriorly. Metasoma. Dorsal carinae granular on segments I–IV, absent on segment V; dorso-lateral carinae granular on all segment; ventrolateral carinae weakly pronounced in segments I–III and carrying a few granules in their posterior halves; ventrolateral carinae absent on segments IV–V; ventral carinae absent on all segments; dorsal surface smooth to slightly roughened on all segments; lateral surfaces finely

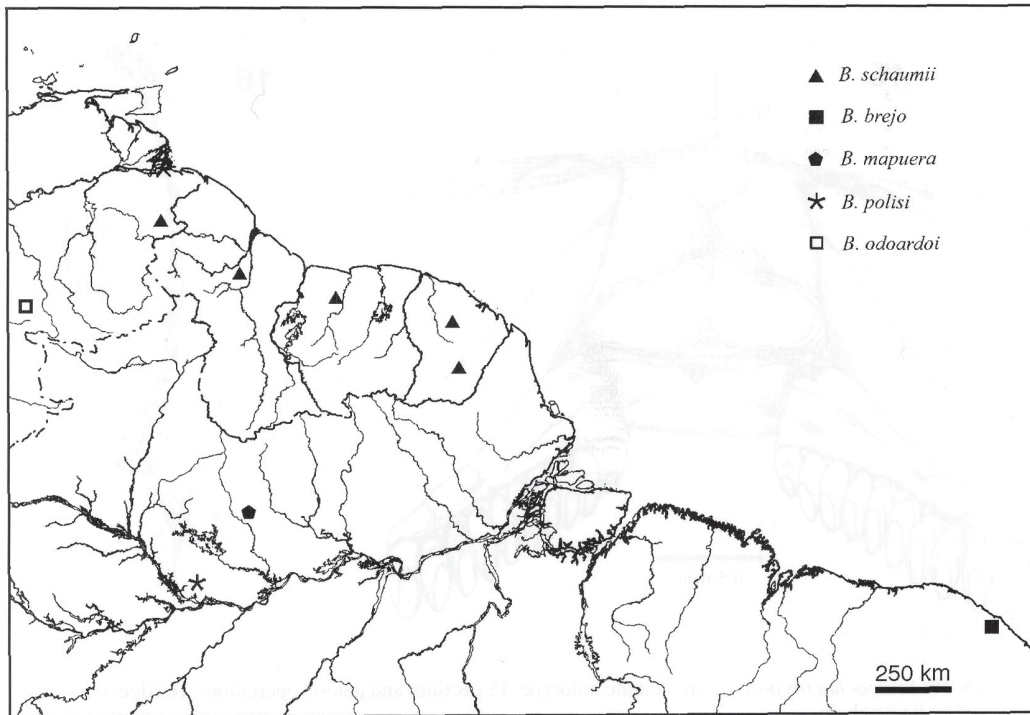


Fig. 17: Map showing the localities of the *B. schaumii* group species in northern Brazil and eastern Guyana.

granular with a few interspersed bigger granules on segments I–IV, slightly roughened on segment V; ventral surfaces slightly roughened on all segments, with spine-like granules on segments IV–V. Telson thin and elongated, with three zones with spine-like granules on ventral side (Fig. 5), separated by two smooth longitudinal stripes of lighter coloration, dorsal side smooth, aculeus relatively short, subaculear tubercle preceded by four small spines. Cheliceral dentition characteristic of the family Chactidae (see Vachon, 1963). Pedipalps smooth; femur pentacarinat, with almost completely vestigial carinae, dorsal carinae with scattered granules in the proximal half; patella and chela without distinct carinae; movable finger with seven granular rows. Trichobothria of type C (Figs. 9–14); neobothriotaxy (see Vachon, 1974); chela with a total of 26 trichobothria; patella with 34, femur with 3. Legs: tarsi III and IV with two rows of irregularly arranged setae.

Measurements. Total L 21; carapace L 2.8, anterior W 1.6, posterior W 2.7; metasomal segment I L 1.2, W 1.8; metasomal segment V L 3.0,

W 1.8, D 1.5; vesicle W 1.1, D 0.9; pedipalp femur L 2.0, W 0.8, patella L 2.3, W 0.9, chela L 4.1, W 1.3, D 1.2, movable finger L 2.2.

Male: unknown.

Relationships: The female holotype of *B. brejo* differs by the following characters: (1) prosoma smooth and slightly punctated; (2) tergites granular; (3) metasomal segment V wide and rounded; (4) ventral surface of metasomal segment V with a dense granulation (Figs. 4, 7).

B. schaumii differs by its metasomal segment V being more rounded and bulky. In females, the ventral surface of the metasomal segment V carries a fine granulation with plenty of large spine-like granules, the ventral side of the telson has large spine-like granules (Figs. 3, 6), and the pectines usually possess 9–9 teeth. In males, the ventral surface of the metasomal segment V is finely granular with a few interspersed bigger granules, the ventral side of telson is almost smooth with just a few reduced granules, and the pectines have 10–11 teeth.

Judging from the original description by Lourenço (1988), some differences between *B. mapuera* and *B. polisi* can be pointed out. In *B. mapuera* the prosoma and tergites are finely granular and slightly roughened and the dorsal surface of metasomal segment V carries a dense granulation (Fig. 8). The holotype male has 11-11 pectinal teeth and the paratype female, 10-10.

B. odoardi is distinguished by possessing only 7-7 pectinal teeth.

Zoogeography: the disjunct distribution of the "schaumii" species group in forest formations

Several interesting examples of genera and species groups with a discontinuous distribution are found among scorpions restricted to savannas or rainforests. In the "schaumii" species group, close relationships exist between species in the Amazon rainforest and species found in outlying forest islands ("Brejos") surrounded by xerophytic formations such as the Brazilian Caatingas. These Brejos hills are covered by forest, because their elevation causes the rising humid air to cool, so that condensation and consequent precipitation take place (Andrade-Lima, 1982).

The "schaumii" species group is, like other chactid scorpion taxa, almost exclusively restricted to forests. The only known exception in this family is *Chactas keyserlingi* Pocock, 1893, from dry unforested mountains in Colombia. The "schaumii" group was believed to be distributed only in Guyana (in the sense of the "Guayana lowland floristic province" as defined by Mori, 1991), and represented by two species: *B. schaumii* and *B. odoardi*. Recently, however, two new species of this group have been described from elsewhere (Fig. 17). The first, *B. mapuera*, found in the contact zone between Amazonia and Guayana, south of the Serra do Tumucumaque (State of Pará, Brazil), is considered to be a sibling species of *B. schaumii*. The second, *B. brejo*, is the first species of the family Chactidae found outside the known (mainly Guiano–Amazon) range of this group in South America. The latter species was found in a Brejo formation near Maranguape, in the State of Ceará, Brazil. The site is a small hill covered with forest and totally isolated by xeric Caatingas. This example provides strong evidence for a past connection between the Amazon and the Atlantic

forests (Lourenço, 1994b), as already indicated by Bigarella & Andrade-Lima (1982).

Acknowledgements

We are very grateful to Dr Peter Schwendinger, Muséum d'Histoire naturelle Geneva, and Victor Fet, Marshall University, for kindly reviewing the manuscript.

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