

## NEW SPECIES OF CHACTIDAE (SCORPIONES) FROM THE UPPER RIO NEGRO IN BRAZILIAN AMAZONIA

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**Abstract:** Four new species of chactid scorpions belonging to the genera *Broteochoactas* Pocock, 1893, *Brotheas* C. L. Koch, 1837, *Teuthraustes* Simon, 1878 and *Chactopsis* Kraepelin, 1912 are described from a single location in the upper Rio Negro region, Brazilian Amazonia. These descriptions provide further confirmation of the high biodiversity and the important level of endemism found in the upper Rio Negro and in the Imeri endemic centre.

**Key words:** Scorpiones, new species, Chactidae, Brazil, Amazonia, upper Rio Negro, Imeri endemic centre.

### Especies nuevas de Chactidae (Scorpiones) del curso alto del río Negro, en la Amazonia brasileña

**Resumen:** Se describen cuatro especies nuevas de escorpiones cáctidos de los géneros *Broteochoactas* Pocock, 1893, *Brotheas* C. L. Koch, 1837, *Teuthraustes* Simon, 1878 y *Chactopsis* Kraepelin, 1912 de una sola localidad situada en el curso alto del río Rio Negro, en la Amazonia brasileña. Estas descripciones proporcionan nuevas pruebas sobre el alto nivel de biodiversidad y el importante nivel de endemismos del curso alto del río Negro y el centro de endemismos de Imeri.

**Palabras clave:** Scorpiones, Chactidae, especies nuevas, Brasil, Amazonia, curso alto del río Negro, centro de endemismos de Imeri.

**Taxonomy / Taxonomía:** *Broteochoactas niemeyerae* sp. n., *Brotheas caramaschii* sp. n.,  
*Teuthraustes newaribe* sp. n., *Chactopsis yanomami* sp. n.

## Introduction

In recent publications (Lourenço, 1994, 2005), evidence based on the biodiversity and biogeographic patterns of scorpions has been proposed in support of the hypothesis that the upper Rio Negro is one of the most important endemic regions of occidental Amazonia. In fact, because of their low vagility, scorpions have frequently been used as biogeographic tools (Lourenço, 1996).

The Rio Negro region includes a large area of North-western Brazilian Amazonia, as well as parts of Venezuelan and Colombian Amazonia (Prance, 1973, 1982; Lourenço, 1986, 1994). The extreme complexity of diversity and endemism in the middle and upper Rio Negro area has already been discussed by Steyermark (1979) and Prance (1982).

As previously explained by Lourenço (2005) the different regions within the Amazon basin, the Rio Negro, was among the last to attract the attention of investigators because most of the pioneer work in Amazonia was carried out along the Amazon and Solimões rivers, in some cases up to Peru (Papavero, 1971, 1973). In so far as scorpions are concerned, only in recent decades has more intensive collecting been made in the Rio Negro region. Nevertheless, this has resulted in several new discoveries and descriptions. A preliminary synthesis proposed by Lourenço (1994), indicated at least two families, six genera and 14 species of scorpions, with a total of 93% of endemic species, in the upper Rio Negro region. Also important are the discoveries and descriptions by Gonzalez-Sponga (1996) of new species on the Venezuelan portion of Imeri-Neblina endemic centre. More recently new

elements were described from central and upper Rio Negro (Lourenço, 1997a, b, 2005; Lourenço & Fé, 2003; Lourenço & Molteni Machado, 2004).

In this note, four new species of chactid scorpions belonging to the genera *Broteochoactas* Pocock, 1893, *Brotheas* C. L. Koch, 1837, *Teuthraustes* Simon, 1878 and *Chactopsis* Kraepelin, 1912 are described from the county of 'Barcelos' (Barcelos – Santa Isabel do Rio Negro), in the upper Rio Negro on the border of Brazilian and Venezuelan Amazonia. These new descriptions provide new evidence of the very high biodiversity and the important level of endemism in the upper Rio Negro and in the Imeri endemic centre. The genus *Chactopsis* is maintained in the family Chactidae for the reasons already discussed in Lourenço (2003).

## Description of the area

The site where the new scorpions have been collected is located nearby the Pico 31 de Março. This last one is located in the vicinity of the 'Pico da Neblina'. Both, Pico da Neblina and Pico 31 de Março correspond to the first and second highest altitudes in Brazil. These forms part of the 'Sierra Imeri' which belongs to the Roraima formation. Neblina and 31 de Março are located on the border of Brazilian and Venezuelan Amazonia. According to Brown (1982), these areas are characterized by two major types of vegetation: rich, dense forests on rolling terrain, and cloud or montane forests. The annual rainfall in this area ranges from 3000 to 4000 mm.

## Methods

Illustrations and measurements were made using a Wild M8 stereo-microscope with a drawing tube and an ocular micrometer. Measurements follow those of Stahnke (1970) and are given in mm. Trichobothrial notations are those developed by Vachon (1974) and the morphological terminology mostly follows that of Vachon (1952) and Hjelle (1990).

Variation of morphometric values is not proposed because some of the paratypes identifiable as males or females are not fully developed. Consequently the average values could be biased.

Some characteristics of the carapace such as the number of lateral eyes or position of median eyes are, in many cases redundant. Consequently, these are not cited in the description of the new species and are mainly diagnostic at the genus level.

## Taxonomic treatment

### Family CHACTIDAE Pocock, 1893

#### *Broteochactas niemeyerae* sp. n.

Fig. 1-13, 53.

**MATERIAL:** Brazil, Amazonas, Municipio de Barcelos, Acampamento base a 2 km N da missão Marari (01°12'26.4" N – 64°47'18.1" W), 1350 m, 29/IV/2004 (U. Caramaschi & H. De Niemeyer coll.). Male holotype; 2 males, 2 females, 5 juvenile paratypes. Type material deposited in the Museu Nacional, Rio de Janeiro; one male and one female paratypes deposited in the Museum national d'Histoire naturelle, Paris.

**ETYMOLOGY:** The species name is a patronym in honor of Helyanne De Niemeyer.

**DIAGNOSE:** Moderate to large scorpions, 38 to 42 mm in total length. Coloration dark reddish to almost blackish. Body and appendages strongly granulated. Carapace, tergites and sternites with a very intense setation. Pectines with 8-8 teeth in males and 5-6 in females. Trichobothrial pattern of type C neobothriotaxic 'majorante'.

**RELATIONSHIPS:** The new species can be distinguished from others in the genus *Broteochactas* and in particular from *Broteochactas bariensis* Gonzalez-Sponga, 1991 and *Broteochactas neblinensis* Gonzalez-Sponga, 1991 which occurs in the nearby region of Estado Amazonas in Venezuela, by the following features: (i) carapace, tergites, sternites, and metasomal segments strongly granulated (ii) overall size smaller (iii) larger number of pectinal teeth.

**DESCRIPTION** (based on holotype and paratypes).

**Coloration:** Basically dark reddish to almost blackish. Pro-soma: carapace dark brown. Tergites reddish-brown to dark brown, slightly paler than carapace. Metasomal segments blackish-brown, with darker zones over carinae; vesicle blackish-brown with the aculeus reddish. Chelicerae reddish-yellow, with diffuse variegated blackish spots; fingers reddish-yellow. Pedipalps blackish-brown; extremity of the fingers reddish. Legs reddish-yellow. Venter and sternites reddish-brown; teeth of pectines paler than sternites.

**Morphology:** Carapace strongly granulated; furrows moderately marked. Sternum pentagonal, wider than long. Tergites moderately to strongly granulated; granulations become more

marked from tergites I to VII. Carapace, tergites and sternites with a very intense setation. Pectinal tooth count 8-8 (6-5), fulcra absent. Sternites with minute granulations better marked on VII which is acarinate. Metasomal segments I to III wider than long; IV and V longer than wide; metasomal tegument strongly granulated; segment V with spinoid granulations ventrally. Carinae on segments I-V moderately to strongly developed; ventral carina present on segments I and II, better marked on segments III-IV. Vesicle strongly granulated. Pedipalps: femur with dorsal internal, dorsal external, ventral internal and ventral external carinae moderately to strongly marked; dorsal aspect with strong granulations; ventral aspect with minute granulations; internal aspect weakly granular. Patella moderately granular; dorsal internal, ventral internal, ventral external and external carinae moderate to weak. Chela strongly granular; ventral and dorsal median carina moderately to strongly developed; other carinae moderately to weakly marked; internal aspect with a few moderate granules. Dentate margins on movable and fixed fingers with 6 rows of granules. Chelicerae with a dentition typical of the family Chactidae (Vachon, 1963), and with dense setation ventrally and internally. Trichobothriotaxy of type C; neobothriotaxic 'majorante' (Vachon, 1974).

**Morphometric** values of the male holotype and female paratype. Total length excluding the vesicle, 39.6/41.0. Carapace: length, 6.0/6.0; anterior width, 3.6/3.7; posterior width, 6.2/6.6. Metasomal segments. I: length, 2.6/2.5; width, 4.4/4.2; V: length, 6.5/6.0; width, 3.6/3.3; depth, 2.8/2.5. Vesicle: width, 2.9/2.2; depth, 2.2/1.8. Pedipalp: femur length, 4.0/4.0, width, 2.2/2.1; patella length, 4.8/5.0, width, 2.2/2.2; chela length, 8.8/9.5, width, 3.4/3.6, depth, 3.6/3.8; movable finger length, 4.8/5.2.

#### *Brotheas caramaschii* sp. n.

Fig. 14-26, 53.

**MATERIAL:** Brazil, Amazonas, Municipio de Barcelos, Acampamento base a 2 km N da missão Marari (01°12'26.4" N – 64°47'18.1" W), 1350 m, 29/IV/2004 (U. Caramaschi & H. De Niemeyer coll.). Female holotype; 1 female paratype. Holotype deposited in the Museu Nacional, Rio de Janeiro; paratype deposited in the Museum national d'histoire naturelle, Paris.

**ETYMOLOGY:** The species name is a patronym in honor of Ulisses Caramaschi.

**DIAGNOSE:** Scorpions moderate to large in size, 52 mm in total length. Coloration reddish-brown to blackish-brown, except for the chelicerae and sternites III to V which are reddish-yellow. Carapace, tergites VI-VII, metasomal segments and telson weakly granulated; sternites I to V almost smooth, with minute punctations. Pectines with 8-8 teeth in females. Trichobothrial pattern type C neobothriotaxic 'majorante'.

**RELATIONSHIPS:** *Brotheas caramaschii* sp. n., like other species of the genus *Brotheas* possess moderately to strongly developed carinae on the metasomal segments, and spinoid granules on the ventral surface of segment V. The new species can be distinguished from others in the genus *Brotheas* and in particular from *Brotheas jourdani* Lourenço, 1997 which is also distributed in the Imeri endemic centre, by the following features: (i) carapace, tergites VI-VII, metasomal

segments and telson, strongly granulated, (ii) ventral carinae on metasomal segments I-II present and strongly marked.

DESCRIPTION (based on holotype and paratype).

**Coloration:** Basically reddish-brown to blackish-brown. Prosoma: carapace blackish-brown. Tergites reddish-brown. Metasomal segments reddish-brown, with blackish zones over the carinae; vesicle reddish-brown; aculeus reddish-yellow at the base and blackish at the tip. Chelicerae reddish-yellow, with vestigial diffused variegated brownish spots; fingers uniformly dense reddish colour. Pedipalps blackish-brown. Legs reddish-brown. Venter and sternites reddish with some yellowish zones; pectines and genital operculum reddish-yellow.

**Morphology:** Carapace strongly granulated; furrows moderate to strong. Sternum pentagonal, wider than long. Tergites acarinate; I to V smooth and shiny with small punctations; a few granulations are present on the distal portion of VI; VII strongly granulated. Pectinal tooth count 8-8, fulcra absent. Sternites smooth and shiny, VII acarinate with some granulations. Metasomal segments III to V longer than wide; metasomal tegument strongly granular, including on dorsal surface; segment V with spinoid granulations ventrally. Carinae in segments I-V moderate to strong; ventral carina present on segments I-II; vesicle strongly granulated. Pedipalps: Femur with dorsal internal, dorsal external and ventral internal carinae strongly marked; ventral external carina weakly marked; dorsal and ventral faces with moderately marked granulations; internal face moderately granular. Patella smooth and lustrous; dorsal internal, ventral internal, ventral external and external carinae weak; other carinae vestigial. Chela lustrous; ventral median carina moderate; other carinae vestigial or absent; internal face with several moderate granules, other faces smooth. Dentate margins on movable and fixed fingers composed of 6 rows of granules. Chelicerae with the dentition typical of the family Chactidae (Vachon, 1963), and with intense setation ventrally and internally. Trichobothriotaxy type C; neobothriotaxic 'majorante' (Vachon, 1974).

**Morphometric** values (in mm) of the female holotype. Total length excluding the vesicle, 51.9. Carapace: length, 8.5; anterior width, 5.5; posterior width, 8.7. Metasomal segments. I: length, 3.2; width, 5.0; V: length, 9.2; width, 3.9; depth, 3.2. Vesicle: width, 3.4; depth, 2.9. Pedipalp: femur length, 6.2, width, 2.6; patella length, 7.2, width, 3.1; chela length, 14.2, width, 5.3, depth, 5.6; movable finger length, 7.8.

***Teuthraustes newaribe* sp. n.**

Fig. 27-39, 53.

**MATERIAL:** Brazil, Amazonas, Municipio de Barcelos, Acampamento base a 2 km N da missão Marari (01°12'26.4" N – 64°47'18.1" W), 1350 m, 29/IV/2004 (U. Caramaschi & H. De Niemeyer coll.). Male holotype; 6 males, 2 females paratypes. Type material deposited in the Museu Nacional, Rio de Janeiro; one male and one female paratypes deposited in the Museum national d'histoire naturelle, Paris.

**ETYMOLOGY:** Species name refers to mischievous entities called *nê waribê* or *nê waripê*, who bring disease and death in the Yanomami folklore.

**DIAGNOSE:** Small to moderate scorpions, 26 to 29 mm in total length. Coloration reddish-yellow to reddish-brown. Body and appendages weakly granulated or smooth, with minute

punctuation. Pectines with 8-9 teeth in males and females. Fixed and movable fingers of chela with 5 rows of granules in males and 5-6 rows in females. Trichobothrial pattern of type C neobothriotaxic 'majorante'.

**RELATIONSHIPS:** The new species can be distinguished from others in the genus *Teuthraustes* and in particular from *Teuthraustes lisei* Lourenço, 1994 which is also distributed in the Imeri endemic centre, by the following features: (i) fixed and movable fingers of chela with 5 rows of granules in males and 5-6 rows in females, (ii) overall size smaller, (iii) vesicle strongly granulated.

DESCRIPTION (based on male holotype and paratypes).

**Coloration:** Basically reddish-yellow to reddish-brown. Prosoma: carapace reddish-brown. Tergites reddish-brown, slightly paler than carapace, with one longitudinal yellowish strip. Metasomal segments reddish, with darker zones over carinae; vesicle reddish-yellow with the aculeus dark brown. Chelicerae yellowish, with some diffuse variegated blackish spots; fingers reddish-yellow. Pedipalps reddish; femur and patella darker than chela. Legs yellowish with diffused dark spots. Venter and sternites reddish-yellow to yellowish; pectines and genital operculum paler than sternites.

**Morphology:** Carapace with some minute granulations on the anterior edge in males; lustrous, acarinate and with dense minute punctuation in females; furrows shallow. Sternum pentagonal, wider than long. Tergites acarinate, with punctations in males, smooth and shiny in females. Pectinal tooth count 9-8 in male, 9-9 in female, fulcra absent. Sternites punctuated in male, smooth and shiny in female; VII acarinate. Metasomal segments IV and V longer than wide; metasomal tegument almost lustrous with only a few small granulations and a few punctuations; segment V with spinoid granulations ventrally. Carinae on segments I-V moderately developed; ventral carina absent from segments I to IV. Pedipalps: femur with dorsal internal, dorsal external and ventral internal carinae moderately marked; ventral external carina absent; dorsal aspect with minute granulations; ventral and internal aspects smooth. Patella smooth with vestigial carinae. Chela smooth and acarinate; internal aspect with a few small granules. Dentate margins on movable and fixed fingers with 5 rows of granules in males and 5-6 rows in females. Chelicerae with a dentition typical of the family Chactidae (Vachon, 1963), and with dense setation ventrally and internally. Trichobothriotaxy of type C; neobothriotaxic 'majorante' (Vachon, 1974).

**Morphometric** values of the male holotype and female paratype. Total length excluding the vesicle, 25.7/28.5. Carapace: length, 4.1/4.6; anterior width, 2.8/3.2; posterior width, 4.2/4.8. Metasomal segments. I: length, 1.5/1.6; width, 2.8/3.2; V: length, 4.4/4.3; width, 2.3/2.6; depth, 1.9/2.1. Vesicle: width, 1.9/2.0; depth, 1.3/1.3. Pedipalp: femur length, 2.7/3.2, width, 1.2/1.3; patella length, 3.2/3.7, width, 1.3/1.5; chela length, 5.8/6.8, width, 2.3/2.5, depth, 2.8/3.5; movable finger length, 3.0/3.7.

***Chactopsis yanomami* sp. n.**

Fig. 40-52, 53.

**MATERIAL:** Brazil, Amazonas, Municipio de Barcelos, Acampamento base a 2 km N da missão Marari (01°12'26.4" N – 64°47'18.1" W), 1350 m, 29/IV/2004 (U. Caramaschi & H. De Niemeyer coll.). Male holotype; 10 males, 4 females para-

types. Type material deposited in the Museu Nacional, Rio de Janeiro; one male and one female paratypes deposited in the Museum national d'histoire naturelle, Paris.

**ETYMOLOGY:** Species name is a tribute to the Yanomami people, who inhabit the region of the type locality.

**DIAGNOSE.** Small to moderate scorpions, 27 to 34 mm in total length. Coloration reddish-yellow to reddish-brown. Body and appendages weakly to moderately granulated. Pectines with 9-10 teeth in females and 12-13 in males. Trichobothrial pattern of type C neobothriotaxic 'majorante'.

**RELATIONSHIPS:** The new species can be distinguished from others in the genus *Chactopsis* and in particular from *Chactopsis coriaceo* Gonzalez-Sponga, 1991 which occurs in the nearby region of Estado Amazonas in Venezuela, by the following features: (i) overall size smaller, (ii) larger number of pectinal teeth.

**DESCRIPTION** (based on holotype and paratypes).

**Coloration:** Basically reddish-yellow to reddish-brown. Pro-soma: carapace reddish-brown. Tergites reddish-brown, with dark confluent bands on the posterior edge. Metasomal segments I to IV reddish-brown to blackish, with darker zones over carinae; metasomal segment V and vesicle blackish; aculeus reddish-yellow. Chelicerae reddish-yellow, with diffuse variegated blackish spots; fingers uniformly reddish-yellow. Pedipalps reddish with darker zones over the carinae. Legs reddish-yellow to yellow. Venter and sternites reddish-yellow to yellow; pectines and genital operculum paler than sternites.

**Morphology:** Carapace intensely granulated in males, with minute punctations in females; almost acarinate; furrows shallow. Sternum pentagonal, wider than long. Tergites acarinate, excepted for VII which shows 4 carinae; with minute granulations present in males, almost smooth and shiny in females. Pectinal tooth count 12-13 in male 9-10 in female, fulcra absent. Sternites smooth with minute punctations; VII acarinate. Metasomal segments IV and V longer than wide;

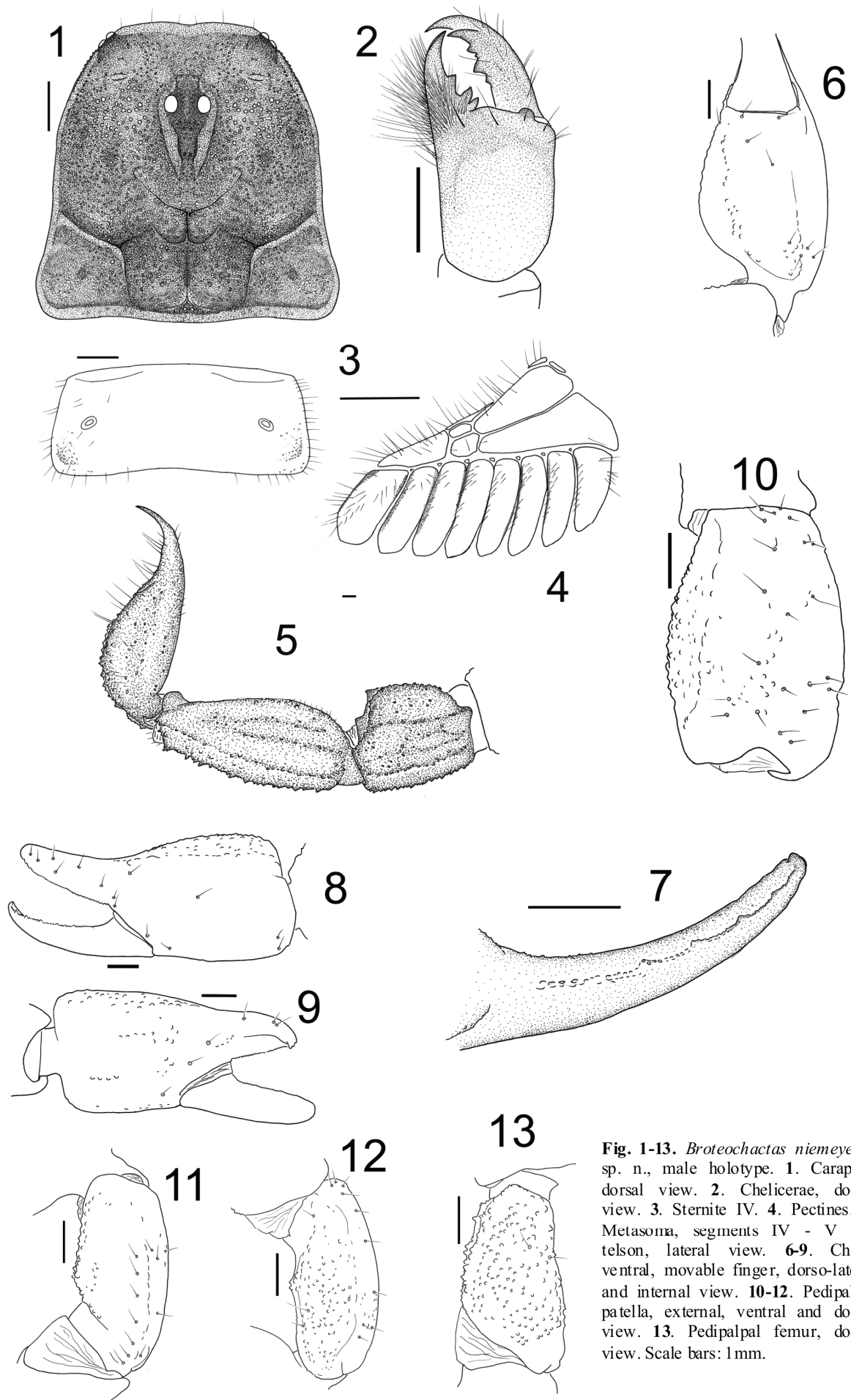
metasomal tegument almost lustrous with only a few granulations and several punctations; segment V with small spinoid granulations ventrally. Carinae on segments I-V moderately developed; ventral carina absent from segment I, vestigial on II, weakly marked on segments III-IV. Pedipalps: femur with dorsal internal, dorsal external and ventral internal carinae moderately marked; ventral external carina absent; dorsal aspect with minute granulations; ventral and internal aspects weakly granular. Patella with minute granulations; dorsal internal, ventral internal, ventral external and external carinae weak; other carinae weak to vestigial. Chela with minute granulations; ventral and dorsal median carina vestigial; internal aspect with a few moderate granules. Dentate margins on movable and fixed fingers with numerous denticles loosely arranged in four longitudinal rows. Chelicerae with a dentition typical of the family Chactidae (Vachon, 1963), and with dense setation ventrally and internally. Trichobothriotaxy of type C; neobothriotaxic 'majorante' (Vachon, 1974).

**Morphometric** values of the male holotype and female paratype. Total length excluding the vesicle, 27.6/33.7. Carapace: length, 4.1/5.0; anterior width, 2.6/3.4; posterior width, 4.2/5.5. Metasomal segments. I: length, 1.8/2.0; width, 2.6/3.3; V: length, 5.4/6.1; width, 2.5/3.0; depth, 2.3/2.5. Vesicle: width, 2.0/2.2; depth, 1.5/1.9. Pedipalp: femur length, 3.9/4.3, width, 1.3/1.5; patella length, 4.7/5.8, width, 1.5/2.1; chela length, 6.9/8.4, width, 1.4/1.9, depth, 1.3/1.8; movable finger length, 4.5/5.7.

#### Acknowledgements

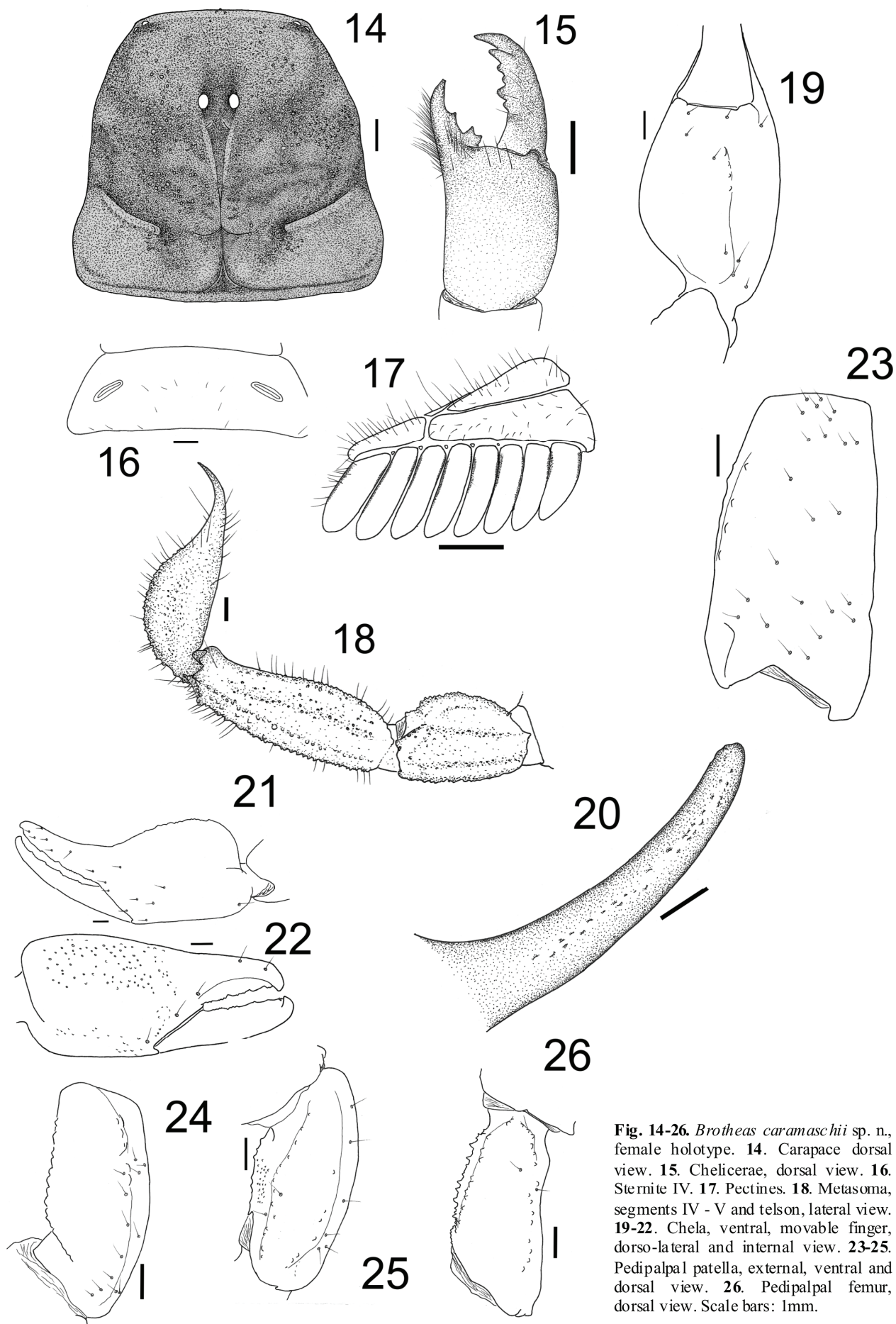
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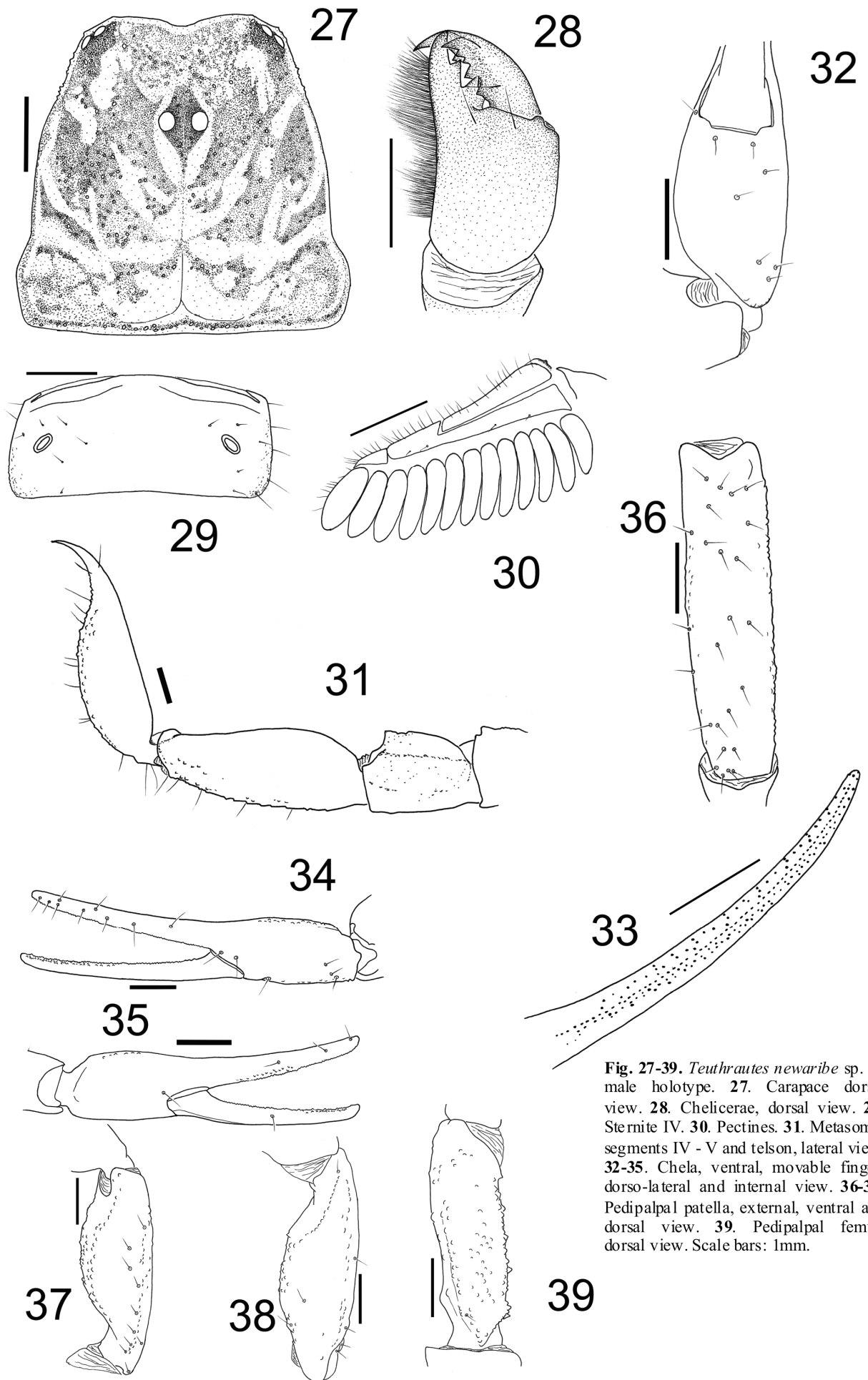


**Fig. 1-13.** *Broteochactas niemeyerae* sp. n., male holotype. 1. Carapace dorsal view. 2. Chelicerae, dorsal view. 3. Sternite IV. 4. Pectines. 5. Metasoma, segments IV - V and telson, lateral view. 6-9. Chela, ventral, movable finger, dorso-lateral and internal view. 10-12. Pedipalpal patella, external, ventral and dorsal view. 13. Pedipalpal femur, dorsal view. Scale bars: 1mm.

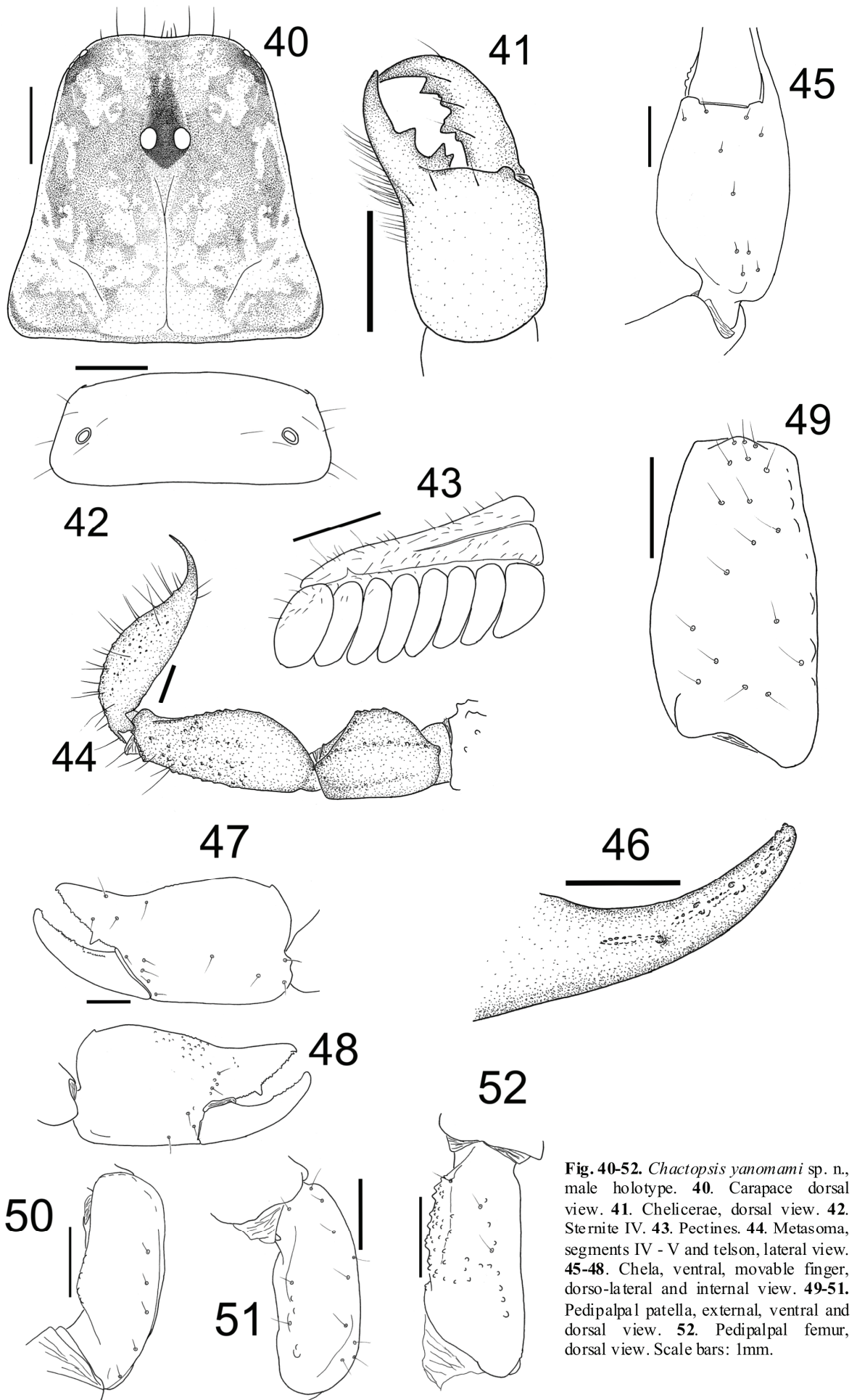




**Fig. 14-26.** *Brotheas caramaschii* sp. n., female holotype. 14. Carapace dorsal view. 15. Chelicerae, dorsal view. 16. Sternite IV. 17. Pectines. 18. Metasoma, segments IV - V and telson, lateral view. 19-22. Chela, ventral, movable finger, dorso-lateral and internal view. 23-25. Pedipalpal patella, external, ventral and dorsal view. 26. Pedipalpal femur, dorsal view. Scale bars: 1mm.

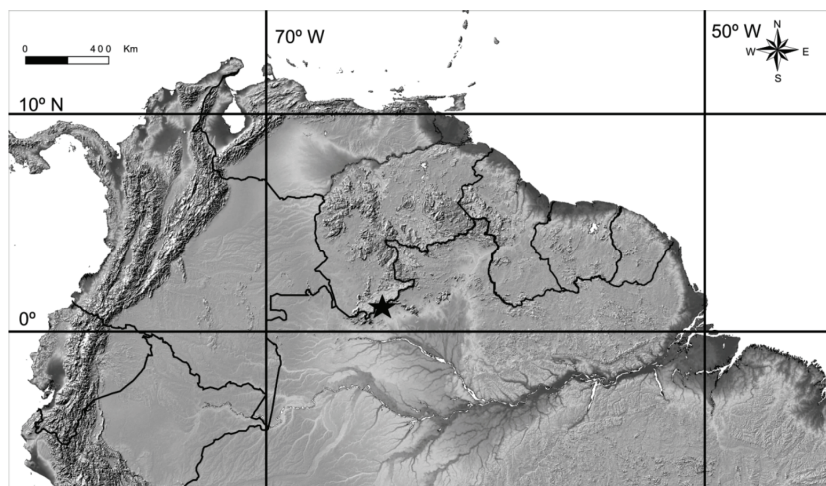


**Fig. 27-39.** *Teuthrautes newaribe* sp. n., male holotype. 27. Carapace dorsal view. 28. Chelicerae, dorsal view. 29. Sternite IV. 30. Pectines. 31. Metasoma, segments IV - V and telson, lateral view. 32-35. Chela, ventral, movable finger, dorso-lateral and internal view. 36-38. Pedipalpal patella, external, ventral and dorsal view. 39. Pedipalpal femur, dorsal view. Scale bars: 1mm.



**Fig. 40-52.** *Chactopsis yanomami* sp. n., male holotype. 40. Carapace dorsal view. 41. Chelicerae, dorsal view. 42. Sternite IV. 43. Pectines. 44. Metasoma, segments IV - V and telson, lateral view. 45-48. Chela, ventral, movable finger, dorso-lateral and internal view. 49-51. Pedipalpal patella, external, ventral and dorsal view. 52. Pedipalpal femur, dorsal view. Scale bars: 1mm.





**Fig. 53.** Map of Amazonia showing the type locality of the new species described for the genera *Broteochoctas*, *Brotheas*, *Teuthraustes* and *Chactopsis*. Scale bar: 400 km.

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