

Pseudoscorpions (Pseudoscorpiones) of the genus *Cordylochernes* (Chernetidae) from Brazil

D. van den Tooren

Tooren, D. van den. Pseudoscorpions (Pseudoscorpiones) of the genus *Cordylochernes* (Chernetidae) from Brazil.

Zool. Med. Leiden 78 (16), 27.viii.2004: 275-289, figs 1-7.— ISSN 0024-0672.

D. van den Tooren, Van de Geerstraat 6, 4021 BX Maurik.

Key words: Chernetidae; *Cordylochernes scorpoides*; Brazil.

Cordylochernes scorpoides (Linnaeus, 1758) (Pseudoscorpiones: Chernetidae) is redescribed and illustrated.

Introduction

In this contribution attention is paid to a population of the phoretic South American pseudoscorpion *Cordylochernes scorpoides* (Linnaeus, 1758), found under the elytra of a single cerambycid beetle, the harlequin beetle, *Acrocinus longimanus* (Linnaeus, 1758). The significance of this phenomenon is according to Zeh & Zeh (1992a: 47, 1992b: 135) to enhance the dispersal of the species, while there are also indications that "large male *C. scorpoides* defend beetles abdomen as strategic sites for intercepting and inseminating dispersing females". The usually numerous phoretic parasitic mites present at the beetle serve according to Beier (1948: 456, 470) as food for the pseudoscorpions, a condition that in the long run would have led to the occurrence of the species in all tropical and subtropical South American forests, but this phagophily hypothesis is not supported by both investigators mentioned. Their study of *C. scorpoides* has demonstrated that "the primary habitat of this pseudoscorpion is decaying trees in the families *Moraceae* and *Apocynaceae*". All life stages of the species were found here, as contrasted with the adult beetle-riding animals, where a nymphal stage never has been taken. Also the pseudoscorpions studied in this paper are adults: six males and seven females.

The material was collected in Ubatuba, "Etat de São Paulo, Brésil" in January 1971 by a fellow-worker (Mr Montouchet) of the "Departemento Saude do Estado de São Paulo" and consigned to the late Dr P. Wagenaar Hummelinck (formerly State University of Utrecht). *Cordylochernes scorpoides* proves to be an extremely variable species. It led Beier (1932b: 100-103) to synonymize four South American species earlier by him described in the same genus with *C. scorpoides* (Beier, 1948: 470). The variability concerns, besides differences in size, above all protuberances on the various palpal segments, especially a remarkable cone-like projection on the inner face of the male patella and a curved male movable chelal finger causing a gaping chela. Add to this that these sexual modifications are larger in large than in small males and in males larger than in females. Moreover the male palp is proportionally stouter than the female palp and also much larger.

The material is deposited in the National Museum of Natural History, Leiden.

Methods

No modifications have taken place since my previous papers (van den Tooren, 2002a, b). The pseudoscorpions mentioned in this paper have been studied from solid slides. Measurements are in mm; station numbers, ratios and counts with mean values in italics, number of specimens and aberrant data in parentheses.

L= length, W= width, D= depth, T= tactile seta, pt= pseudo-tactile seta. Abbreviations used to indicate trichobothria of palpal fingers (Chamberlin, 1931: 138): movable finger (exterior surface): t= terminal, st= subterminal, sb= subbasal, b= basal; fixed finger (exterior surface): et= exterior terminal, est= exterior subterminal, esb= exterior subbasal, eb= exterior basal; fixed finger (interior surface): it= interior terminal, ist= interior subterminal, isb= interior subbasal, ib= interior basal.

Systematics

Family Chernetidae Menge, 1855

Diagnosis (after Chamberlin, 1931: 208, 241).— Homotarsate. Metatarsus absent. Carapace with either 2 true eyes or none. Femoral articulation of leg I and II of a distinctly different type than that of III and IV (heterofemorate). Cheliceral flagellum of 2 to 4 blades. Basal and subbasal cheliceral setae distinctly shorter than interior and laminal seta and never truly clavate. Venom apparatus in chelal movable finger only. At least a few accessory teeth on both chelal fingers. Tergites longitudinally divided.

Subfamily "Lamprochernetinae" Beier, 1932

Diagnosis (after Beier, 1932b: 81).— Posterior margin of carapace straight or a little rounded, not protruding angular around midline. Chaetae on body and pedipalps long and acute. Femur, patella and hand with pseudo-tactile setae. Tactile seta on tarsus of leg IV close to proximal end.

Genus *Cordylochernes* Beier, 1932

Diagnosis (after Beier, 1932b: 82; and Mahnert & Adis, 2002: 374).— Claws of legs simple, without ventral spine. Trichobothrium *it* of fixed finger closer to fingertip than distance between *ist* and *isb*.

Legs slender, length/depth ratio of tibia and tarsus of leg IV over 5. Carapace finely granulated.

Male palpal patella on the innerface thickened by a cone-like projection.

Cordylochernes scorpioides (Linnaeus, 1758)

From the seven synonyms given by Beier (1948: 470) only the first and last one are mentioned here:

Acarus brasiliensis Linnaeus, 1758: 616, nr. 8.

Cordylochernes brasiliensis Beier, 1932a: 265; 1932b: 102-103.

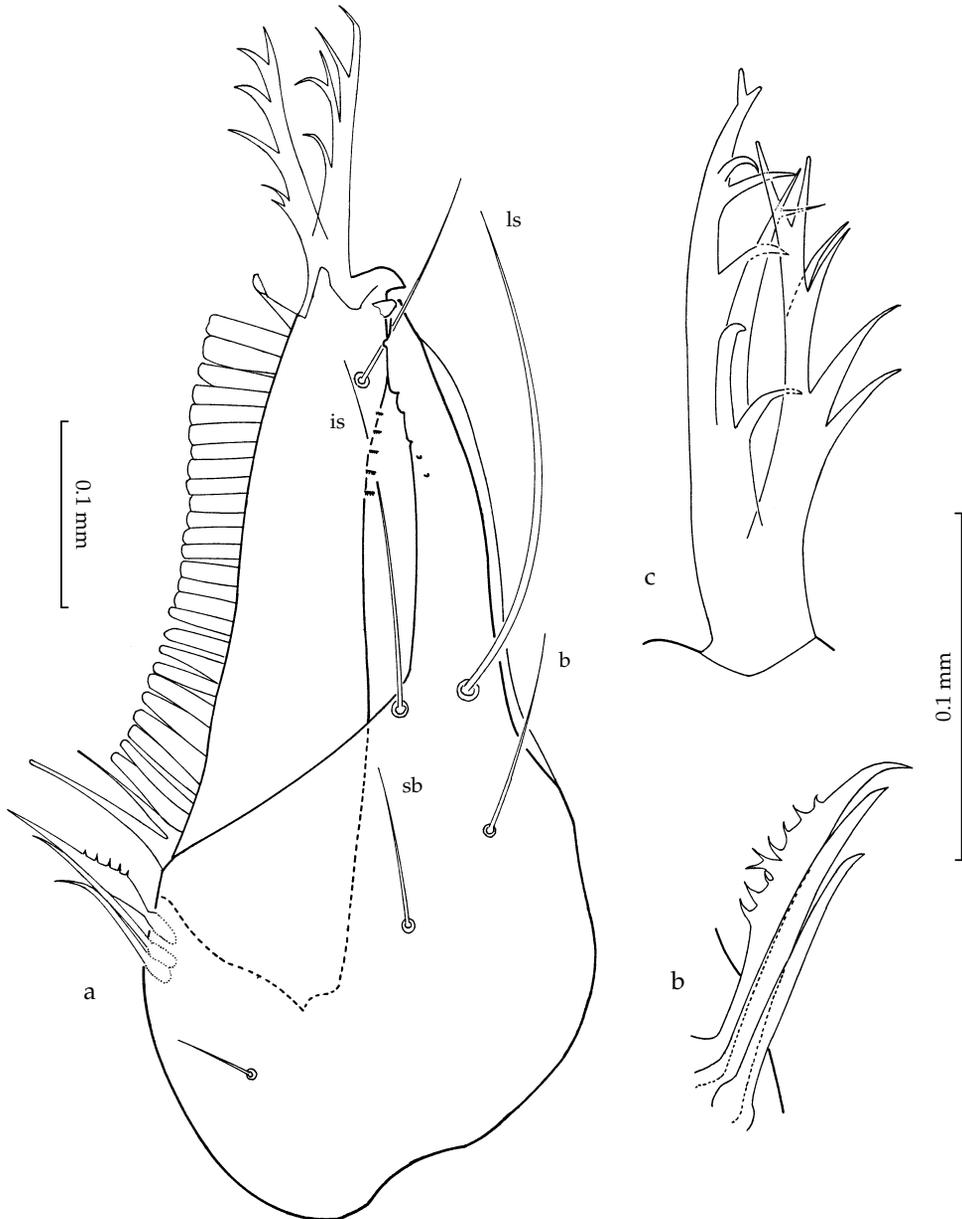


Fig. 1. *Cordylochernes scorpioides* (Linnaeus) from Brazil : (a) outer aspect of male left chelicera (no. 8) (b= basal seta, sb= sub-basal seta, is= interior seta, and ls= laminal seta); (b) inner aspect of flagellum of female right chelicera (no. 4); (c) inner aspect of galea of female right cheliceral movable finger (no. 4).

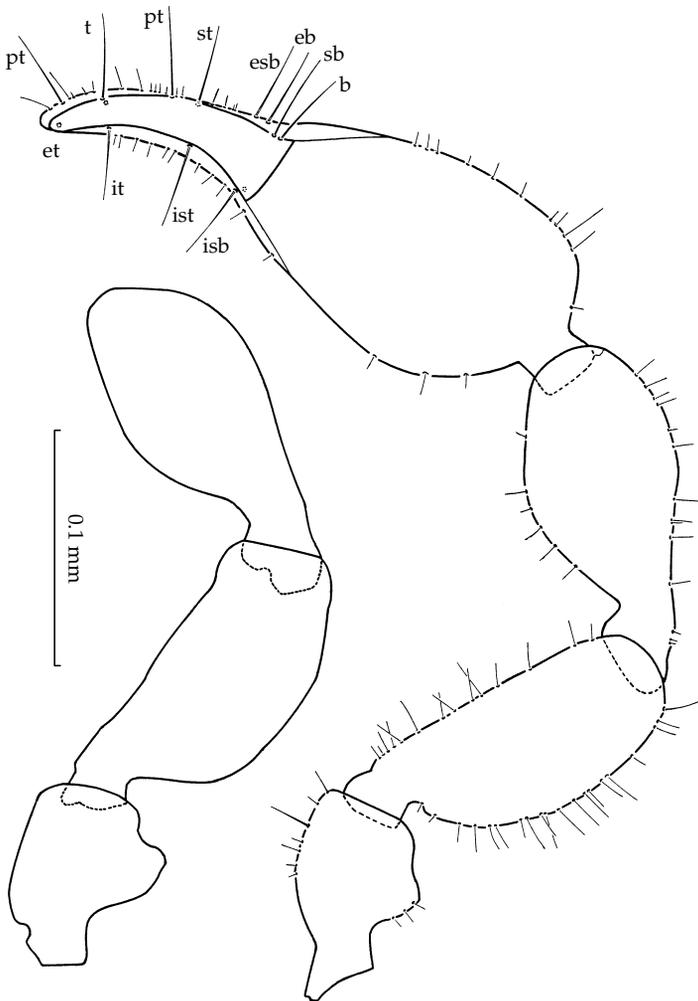


Fig. 2. *Cordylochernes scorpioides* (Linnaeus) from Brazil (no. 7): ventral aspect of male left pedipalp and dorsal aspect of trochanter, femur and patella of right pedipalp of the same animal showing different shape.

Material.— **Brazil**, “Etat de São Paulo”, Ubatuba, i.1971: 6 ♂♂ and 7 ♀♀, collected under the elytra of one single specimen of the large cerambycid beetle *Acrocinus longimanus*.

However of the material studied only proportions of palpal femur, patella and chela (with pedicel), body length of male and movable finger length of both sexes fall more or less within the ranges given by Beier, but the range of the L/W ratio of the male palpal hand (with pedicel) is larger (1.5-2.0 versus 1.4-1.6) as is the average body length of the females (4.4-5.5 mm versus 3.5-4.5 mm). Apparently the species is even still much more variable than Beier ascertained.

Diagnosis according to Beier (1932b: 100).— *Cordylochernes scorpioides* can be separated from *C. costaricensis* Beier, 1932 from Costa Rica by the L/W ratio of its palpal chela (with pedicel): in ♂ up to 2.4 versus 2.5, in ♀ up to 2.8 versus 3.2, and by the L/W ratio of its palpal patella: in ♂ up to 2.2 versus more than 2.2, in ♀ up to 2.3 versus 2.8. From the South African *C. octentoctus* (Balzan, 1891) it would differ by the L/W ratio of the male palpal femur: 2.2 versus 2.4, and moreover in the length of the male palpal femur: about 1.3 mm versus 1.7 mm. Concerning this last species Vachon (1942: 182, 184) considers it unlikely on account of biogeographic reasons that *C. octentoctus* originates from South Africa as all known species of the genus *Cordylochernes* occur in Central and South America. Besides it becomes evident that this species is very related to the South American species *C. nodulimanus* (Tomösvary, 1882). It's therefore Vachon suggests to declare *C. octentoctus* to an uncertain species.

A full description of the material studied is given below:

Description.— Male. Description based on 6 specimens (figs. 1a, 2, 4a, 5a, 7a).

Carapace and pedipalps scarlet orange; abdomen legs and chelicerae palish orange.

Body L 3.82-4.12-4.43.

Carapace: L 1.31-1.38-1.48, greatest W 1.17-1.265-1.36, L/W 1.01-1.09-1.14; anterior margin with two medial setae and on each side one lateral seta, posterior margin with 8-10.2-13 setae; on face two distinct transverse furrows forming a smooth median disc that separates a weakly granulated ocular disc supplied with numerous obscure small setae, and a smooth posterior disc with a small number of simple acute setae; only one pair of eye spots present.

Abdomen: chaetotaxy, tergites 1-XI: (15-15.8-22): (11-16.0-19): (14-15.3-17): (14-15.5-16): (11-14.7-17): (14-15.7-18): (14-16.0-20): (14-16.2-18): (12-14,3-16): (12-13.2-15): (T10T-T12.7T-T14T) (3); sternites IV-XI: (10-13.5-20): (18-20.2-22): (20-21.3-24): (20-20.6-23): (19-20.5-23): (16-17.8-20): (13-14.8-18): (T9T-T11.1T-T13T). Tergites (I-2.8-IV) - (IX-9.7-X) and sternites (III-3.8-IV) -X longitudinally divided.

Chelicera (fig. 1a): 0.48-0.50-0.53 / 0.23-0.26-0.30, L/W 1.87-1.97-2.13; movable finger L 0.32-0.35-0.385; galea: ultimate L 0.14-0.17-0.19, main stalk two-branched from about basal fourth of galea length, interior branch (stouter than exterior branch) with 5-6-7 lateral rami (3) or with 2 short terminal rami and 4.5 or 6 lateral rami (3), exterior branch with 2-4.75-6 lateral rami (4) or with 2 long terminal rami and 5 lateral rami (1) or with 2 short terminal rami and 2 lateral rami (1). All terminal and lateral rami are of different length. Movable finger with conical subapical lobe, terminal tooth originating from 2 basal lateral wings; serrula exterior with 23-26.5-28 ligulate blades; serrula interior composed of about 11 ligulate blades at its lower end forming a velum by basal fusion, and 6 smaller more or less rounded and not fused apical blades which are strongly dentated along the posterior margin, in particular most apical longer and smaller blade turning forward is provided with 6 prominent thorny teeth along its posterior margin; flagellum consists of 3 spine-like setae, anteriormost one flattened (sword-shaped), furnished with 11 tiny thorns along anterior margin in distal 3/5, 0.12-0.14-0.17 long (4), middle one 0.10 long (1) and posteriormost one 0.065 long (1); lamina exterior present; inner margin of fixed finger with 7-8-10 small retroconical teeth.

Chaetotaxy: exterior, basal, subbasal and galeal seta distinctly shorter than interior and laminal seta.

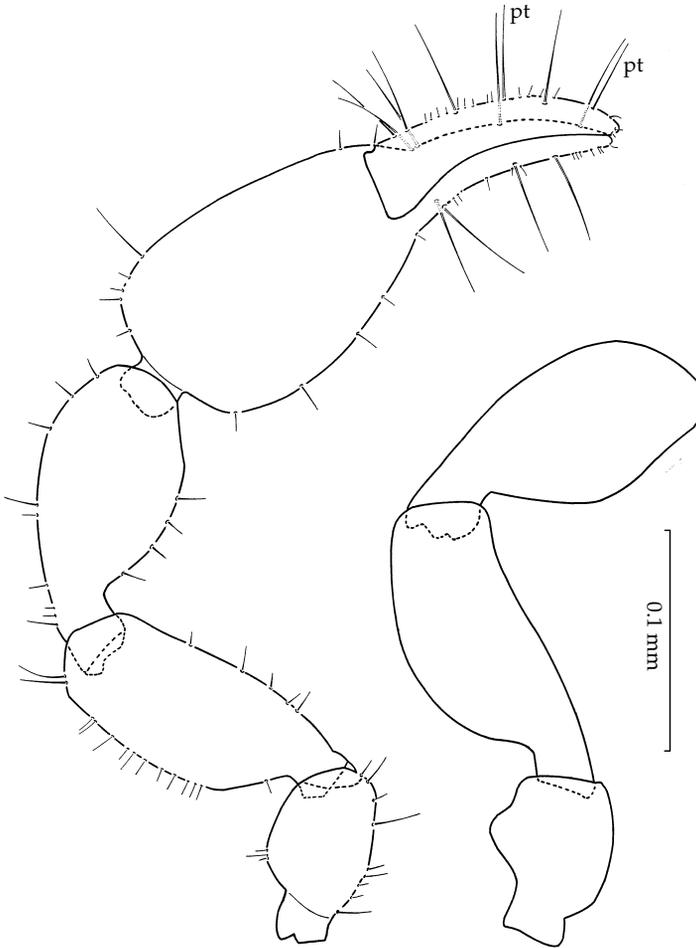


Fig. 3. *Cordylochernes scorpioides* (Linnaeus) from Brazil (no. 3): ventral aspect of female right pedipalp and ventral aspect of trochanter, femur and patella of left pedipalp of the same animal to show difference in shape.

Pedipalp (figs. 2, 4a): trochanter 0.76-0.83-0.89 / 0.45-0.51-0.58, L/W 1.53-1.68-1.735; femur 1.19-1.24-1.31 / 0.51-0.55-0.58, L/W 2.16-2.27-2.35; patella 1.27-1.35-1.49 / 0.56-0.61-0.645, L/W 2.12-2.235-2.31; chela without pedicel 2.05-2.21-2.45 / 0.76-0.84-0.96, L/W 2.35-2.63-2.79; chela with pedicel 2.24-2.36-2.61 / 0.76-0.84-0.96, L/W 2.49-2.82-2.94; hand without pedicel 1.17-1.28-1.54 / 0.84-0.95-1.07, L/D 1.25-1.35-1.43; hand without pedicel 1.35-1.49-1.725 / D same, L/D 1.45-1.58-1.725; movable finger L 0.98-1.045-1.115, i.e. 0.68-0.82-0.88 \times L. hand without pedicel, and 0.605-0.71-0.77 \times L. hand with pedicel.

Fixed finger with about 49-55.30-60 small roundish marginal teeth, only clearly cuspidate in distal part of row, 12-15-18 prominent conical lateral accessory teeth, and 8-10.30-12 smaller and more or less obtuse conical medial accessory teeth, often limited

to distal half of finger; *et* 0.105-0.12-0.13, *est* 0.40-0.45-0.48, *it* 0.23-0.245-0.26 and *ist* 0.44-0.46-0.49 from base apical tooth on outside curve, *isb*, *ib*, *esb* and *eb* in basal third of finger length, *esb* and *eb* at a distance of about 1/4 areolar diameter; 1 pseudo-tactile seta takes its rise 0.43-0.46-0.49 from base apical tooth on outside curve, i.e. on about same level as *ist*, areola of both usually distally touching.

Movable finger with about 49-56.83-63 marginal teeth like those of fixed finger, 6-7.67-10 prominent conical medial accessory teeth, predominantly in distal part of finger, and 14-16.33-19 smaller and more or less obtuse conical lateral accessory teeth. *t* 0.32-0.335-0.35 and *st* 0.68-0.71-0.75 from base apical tooth on outside curve, *sb* and *b* at a distance of about 1 areolar diameter, situated close to finger base; 2 pseudo-tactile setae are present, arising respectively 0.12-0.16-0.18 and 0.52-0.56-0.62 from base apical tooth on outside curve, i.e. about half-way *et* and fingertip, and somewhat proximal to level of nodus ramosus, closer to *st* than to *t*; nodus ramosus 0.44-0.47-0.51 from base apical tooth on outside curve, venom reservoir(s) large and extending to finger base.

First leg (fig. 5a): trochanter 0.28-0.31-0.34 / 0.19-0.23-0.25, L/D 1.19-1.36-1.61; femur 0.35-0.39-0.42 / 0.245-0.27-0.30, L/D 1.35-1.41-1.47; patella 0.72-0.76-0.83 / 0.24-0.26-0.275, L/D 2.82-2.94-3.02; femur+patella 0.85-0.93-1.01 / 0.27-0.28-0.31, L/D 3.07-3.26-3.47; tibia 0.72-0.775-0.84 / 0.16-0.17-0.18, L/D 4.32-4.54-4.92; tarsus 0.50-0.57-0.625 / 0.11-0.12-0.13, L/D 4.38-4.73-5.12; L claws 0.09-0.10-0.11; arolium L from base claws 0.05-0.07-0.08, and 0.55-0.705-0.83 × L claws.

Fourth leg (fig. 5b): trochanter 0.41-0.51-0.58 / 0.23-0.27-0.30, L/D 1.60-1.89-2.16; femur 0.415-0.44-0.46 / 0.27-0.30-0.32, L/D 1.34-1.46-1.61; patella 0.89-0.95-1.045 / 0.31-0.34-0.37, L/D 2.53-2.76-2.95; femur+patella 1.14-1.22-1.33 / 0.31-0.34-0.37, L/D 3.25-3.55-3.78; tibia 1.03-1.08-1.17 / 0.185-0.20-0.21, L/D 5.41-5.56-5.76; tarsus 0.63-0.70-0.75 / 0.13-0.14-0.15, L/D 4.68-5.12-5.34, L claws 0.11-0.13-0.14; arolium L from base claws 0.07-0.09-0.105, and 0.58-0.70-0.81 × L claws. Tactile seta on exterior lateral margin of tibia 0.15-0.16-0.175 from base.

Chaetotaxy of male genital area (fig. 7a): (6-13.3-18) on face anterior operculum; (6-9.5-14) along anterior margin of anterior lip; (9-10.6-13) on posterior lip (5); (8-10.7-12) on face posterior operculum.

Female.— Description based on 7 specimens (figs. 1b-c, 3, 4b, 6, 7b). Colour as in male, less stouter segments of pedipalps.

Body L 4.38-4.88-5.46.

Carapace: L 1.26-1.37-1.48, greatest W 1.27-1.40-1.595, L/W 0.92-0.975-1.03; setae on face and along anterior margin as in male, posterior margin with 8-12.7-15 setae, 1 pair of eye spots present.

Abdomen: chaetotaxy, tergites I-XI: (14-16.9-20): (13-15.7-19): (12-15.6-18): (12-15.1-16): (12-15.6-20): (14-16.9-20): (14-16.4-23): (14-16.0-20): (12-14.0-16): (10-12.7-16): (T8-10.4-14T); sternites IV-XI: (8-10.9-16): (16-19.6-22): (16-20.1-22): (21-22.3-25): (18-21.4-24): (16-17.1-20): (12-15.0-18): (T7-9.9-13T). Tergites (I-1.7-IV) and sternites IV-X longitudinally divided.

Chelicera (figs. 1b-c): L 0.49-0.51-0.55 / 0.23-0.25-0.27, L/W 1.89-1.99-2.15; movable finger L 0.36-0.38-0.42; galea: ultimate L 0.14-0.18-0.21, main stalk two-branched from about basal fourth of galea length, interior branch somewhat stouter than exterior branch (sometimes more or less bipartite from about halfway its length) with 5-5.7-7 lateral rami, or with 2 short terminal rami and 5 or 6 lateral rami, of which one or two

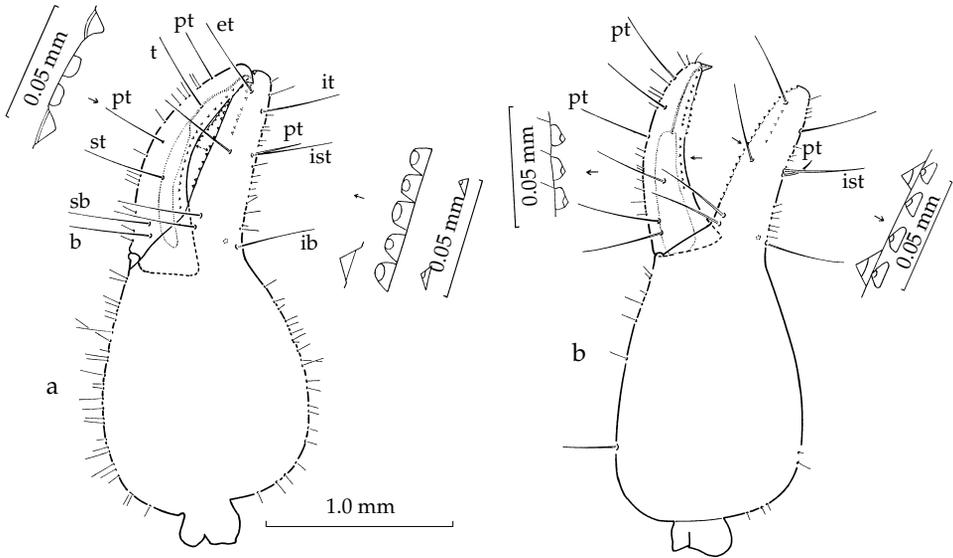


Fig. 4. *Cordylocheres scorpioides* (Linnaeus) from Brazil: (a) extero-lateral aspect of male left chela (no. 7); (b) extero-lateral aspect of female left chela (no. 4).

terminally can be branched again in 2 sub-rami, exterior branch with (4-4.7-6) lateral rami (3) or with 2-4 short terminal rami and 1-3 lateral rami, of which 2 of these can be branched again in 2 terminal sub-rami. All lateral rami are of different length. Movable finger with subapical lobe as in male; serrula exterior with 25-25.7-28 ligulate blades, most proximal blade spiny and about 2 times as long as remaining blades; serrula interior as in male; flagellum composed of 3 spine-like setae, shape anterior-most one about as in male, 0.11-0.13-0.19 long, provided at anterior margin in distal three fourth with 5-10 tiny thorns (5), middle one 0.13 long (1) with 3 thiny thorns at anterior margin near distal end (1), and posteriormost one 0.09 long (1); lamina extensor present; inner margin of fixed finger with 6-7.29-8 small retroconical teeth.

Pedipalp (figs. 2, 4b): trochanter 0.65-0.76-0.81 / 0.39-0.48-0.515, L/W 1.48-1.60-1.77; femur 0.98-1.225-1.305 / 0.45-0.52-0.56, L/W 2.15-2.32-2.37; patella 1.09-1.31-1.42 / 0.50-0.58-0.64, L/W 2.20-2.26-2.34; chela without pedicel 1.90-2.17-2.44 / 0.67-0.80-0.92, L/W 2.65-2.72-2.83; chela with pedicel 2.02-2.32-2.59 / 0.67-0.80-0.92, L/W 2.82-2.90-3.0; hand without pedicel 1.10-1.285-1.42 / 0.82-0.91-1.10, L/D 1.27-1.49-1.61; hand with pedicel 1.26-1.45-1.60 / same, L/D 1.46-1.68-1.84; movable finger L 0.82-0.93-1.11, i.e. 0.68-0.77-0.83 \times L hand without pedicel, and 0.60-0.68-0.75 \times L hand with pedicel.

Fixed finger with about 53-55.5-60 marginal teeth (6) of same shape as in male, 12-14.6-19 prominent conical lateral accessory teeth, and 6-7.14-10 medial accessory teeth of same shape as in male; *et* 0.11-0.125-0.14, *est* 0.38-0.45-0.51, *it* 0.21-0.24-0.26 and *ist* 0.38-0.44-0.47 from base apical tooth on outside curve, location of *isb*, *ib*, *esb* and *eb* about as in male; 1 pseudo-tactile seta 0.38-0.435-0.49 from base apical tooth on outside curve, i.e. on about same level as in male.

Movable finger with about 51-53.2-55 marginal teeth, very like those of fixed finger, 3-5.29-7 prominent conical medium accessory teeth in distal part of finger, and 11-



Fig. 5. *Cordylochernes scorpoides* (Linnaeus) from Brazil (no. 6): (a) anterior aspect of male left leg I; (b) anterior aspect of male left leg IV.

13.86-18 lateral accessory teeth like those in male. t 0.29-0.32-0.33 and st 0.55-0.64-0.67 from base apical tooth on outside curve, location of sb and b as in male; pseudo-tactile setae respectively 0.16-0.17-0.18 and 0.45-0.51-0.54 from base apical tooth on outside curve, i.e. located with respect to level et , nodus ramosus and fingertip about as in male; nodus ramosus 0.36-0.40-0.425 from base apical tooth on outside curve, venom reservoir(s) as in male.

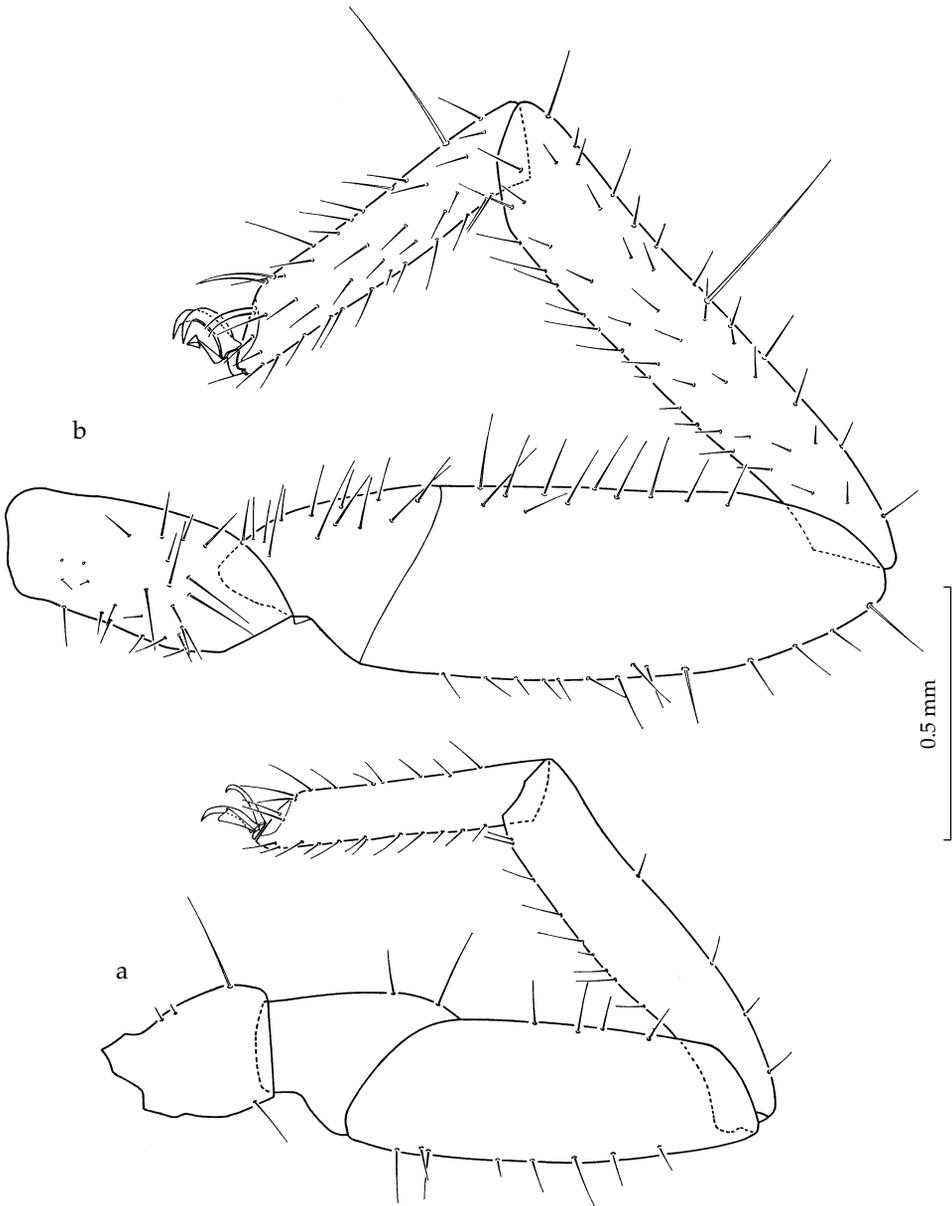


Fig. 6. *Cordylochernes scorpioides* (Linnaeus) from Brazil (no. 4): anterior aspect of female left leg I; (b) posterior aspect of female left leg IV.

First leg (fig. 6a): trochanter 0.25-0.28-0.31 / 0.20-0.23-0.25, L/D 1.17-1.24-1.32; femur 0.33-0.38-0.39 / 0.22-0.26-0.28, L/D 1.37-1.43-1.52; patella 0.66-0.766-0.83 / 0.22-0.25-0.28, L/D 2.91-3.05-3.14; femur+patella 0.91-0.92-1.00 / 0.25-0.275-0.305, L/D 3.25-3.36-3.68; tibia 0.64-0.755-0.84 / 0.145-0.16-0.175, L/D 4.42-4.74-5.07; tarsus 0.45-0.55-

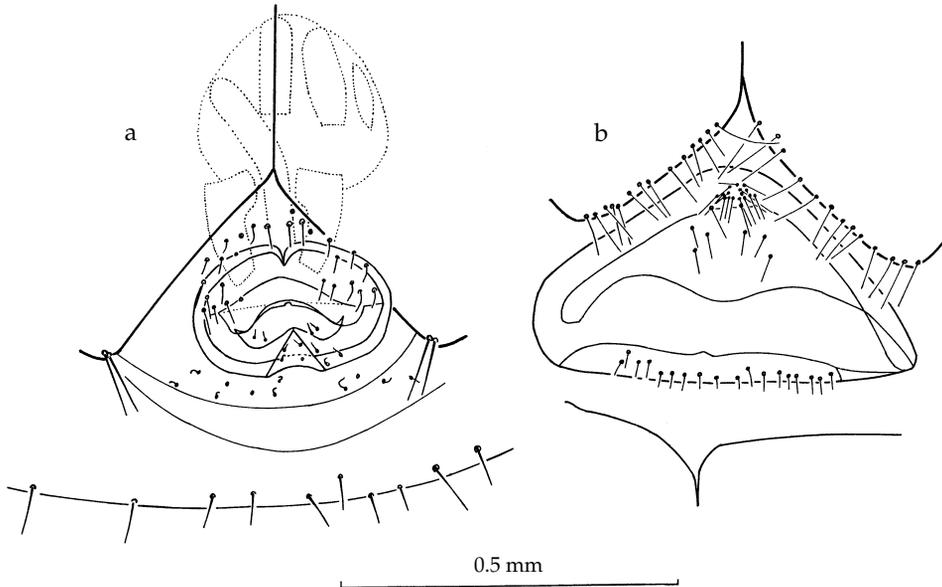


Fig. 7. *Cordylocheres scorpioides* (Linnaeus) from Brazil: (a) chaetotaxy of male genital area (no, 4).

0.61 / 0.10-0.12-0.12, L/D 4.01-4.68-5.03; L claws 0.09-0.10-0.11; arolium L from base claws 0.04-0.07-0.09, and 0.48-0.56-0.71 \times L claws (6).

Fourth leg (fig. 6b): trochanter 0.52-0.55-0.605 / 0.23-0.26-0.28, L/D 1.84-2.12-2.43; femur 0.39-0.44-0.47 / 0.27-0.30-0.33, L/D 1.40-1.47-1.54; patella 0.85-0.96-1.045 / 0.29-0.35-0.38, L/D 2.60-2.76-2.94; femur+patella 1.09-1.23-1.32 / 0.30-0.35-0.38, L/D 3.44-3.48-3.63; tibia 0.925-1.065-1.18 / 0.16-0.19-0.21, L/D 5.29-5.44-5.80; tarsus 0.62-0.71-0.77 / 0.13-0.14-0.14, L/D 4.76-5.11-5.52; L claws 0.12-0.13-0.14; arolium L from base claws 0.09-0.10-0.13, and 0.67-0.735-0.80 \times L claws (6). Tactile seta on exterior lateral margin of tibia 0.13-0.16-0.17 from base.

Chaetotaxy of female genital area (fig. 7b): a medial cluster of 9-11.3-15 small setae on anterior operculum, 6-7.0-8 setae on face of anterior lip, and 12-17.4-22 tiny setae in a more or less straight line on face of posterior operculum. Cribriform plates difficult to observe, but probably present a medial medium-sized angular plate. Spermatecae were not perceptible.

Remarks

Except for different genitalia and on the average a larger body in females (L ♀: 4.88, L ♂: 4.12) and greater maximum width of carapace in females (W ♀: 1.40, W ♂: 1.265), no further sexual differences could be found in the material studied. Differences in shape on the palpal segments were not really measurable. Also differences in palpal and pedal proportions could not be proved. However a clear difference in shape between some of the corresponding basal segments in both pedipalps of the same animal appears to be of frequent occurrence (figs 1-2).

It is not clear to the present writer on which grounds Beier (1974: 899), identified 15 ♂♂ and 11 ♀♀ from Southern Brazil out of the collections of the "Museum d'histoire naturelle" in Genova, as "*Cordylochernes scorpioides* (Linné) ssp. *brasiliensis* Beier", without giving a description of the subspecies. Also Harvey (1991: 566) includes this subspecies in his "Catalogue of the Pseudoscorpionida" and date it from 1974, without commenting its status.

Acknowledgement

I wish to thank Dr W.B. Muchmore (Department of Biology, University of Rochester, U.S.A.) for his most valuable suggestions and constructive criticism; his cooperation is highly appreciated.

References

- Beier, M., 1932a. Zur Kenntnis der Lamprochernetinae (Pseudoscorp.).— Zool. Anz. 97: 258-267.
- Beier, M., 1932b. Pseudoscorpionida II. Subord. C. Cheliferinea.— Das Tierreich 58: i-xxi + 1-294, figs. 1-300.
- Beier, M., 1948. Phoresie und Phagophilie bei Pseudoscorpionen.— Österr. Zool. Z. 1: 441-497, figs. 1-22.
- Beier, M., 1974. Brasilianische Pseudoscorpione aus dem Museum in Genf.— Rev. suisse Zool. 81 (4): 899-909, figs. 1-7.
- Chamberlin, J.C., 1931. The arachnid order Chelonethida.— Stanford Univ. Publ. (Univ. Ser.) 7: 1-284, figs 1-71.
- Linnaeus, C., 1758. Systema naturae, per regna tri naturae secundum classes, ordines, genera, species, cum characteribus, differentiis, synonymis, locis, 10th ed. 1: 1-823. Holmiae.
- Harvey, M.S., 1991. Catalogue of the Pseudoscorpionida: 1-626.— Manchester.
- Mahnert, V. & Adis, J., 2002. 4.6 Pseudoscorpiones.— Amazonian Arachnida and Myriapoda: 367-380.
- Tooren, D. van den, 2000a. Pseudoscorpions (Pseudoscorpiones: Olpiidae) of the genus *Apolpium* from Venezuela, and the genera *Pachyolpium*, *Leptolpium* gen. nov. and *Serianus* from Curaçao, Aruba and Bonaire.— Zool. Med. Leiden 76 (15): 141-192, figs. 1-34.
- Tooren, D. van den, 2000b. Pseudoscorpions of the genera *Pachyolpium*, *Novohorus* and *Amblyolpium* (Pseudoscorpione: Olpiidae) from St. Eustatius (Statia), St. Martin (Sint Maarten) and Anguilla (Lesser Antilles, Leeward group.— Zool. Med. Leiden 76 (8): 451-472, figs. 1-9.
- Vachon, M., 1942. A propos du *Cordylochernes octentoctus* Balzan (Pseudoscorpions).— Bull. Mus. Hist. nat. Paris (2)14 (3): 181-184m figs. 1-4., 2e s., t. XIV, no. 3: 181-184, figs. 1-4.
- Zeh, D.W. & Zeh, J.A., 1992a. On the function of harlequin beetle-riding in the pseudoscorpion, *Cordylochernes scorpioides* (Pseudoscorpionida: Chernetidae).— Arachn. 20: 47-51.
- Zeh, D.W. & Zeh, J.A., 1992b. Dispersal-generated sexual selection in a beetle-riding pseudoscorpion.— Behav. Ecol. Sociobiol. 30: 135-142.

Received: 1.ix.2003; revised: 23.i.2004

Accepted: 12.iii.2004

Edited: C. van Achterberg