Australian Journal of Taxonomy
Open-access, online, rapid taxonomy
https://doi.org/10.54102/ajt

Nesidiochernes fissuricola, a new species of pseudoscorpion (Pseudoscorpiones: Chernetidae) from north-western Australia

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Abstract

The Australasian pseudoscorpion genus *Nesidiochernes* Beier, 1957 currently comprises 14 species, including two from Australia. A third Australian species, *Nesidiochernes fissuricola* sp. nov., is described from the Pilbara region of Western Australia. We provide the first description of the female genitalia and tritonymph for any species of *Nesidiochernes*.

Cite this paper as: Curran MK & Harvey MS (2024). *Nesidiochernes fissuricola*, a new species of pseudoscorpion (Pseudoscorpiones: Chernetidae) from north-western Australia. *Australian Journal of Taxonomy* 78: 1–7. doi: https://doi.org/10.54102/ajt.csnqw

https://zoobank.org/References/E9712A8A-AA1E-4293-9D7D-E085B68E25B2

Introduction

The pseudoscorpion genus *Nesidiochernes* Beier, 1957, was originally described for six species collected from various islands in the western Pacific region (Beier 1957). Since then, a further eight species have been described, including taxa from New Caledonia (Beier 1964), Papua New Guinea (Beier 1965), New Zealand (Beier 1966b, 1969, 1976) and Australia (Beier 1966a, 1975). The ecology of each species is imperfectly known but they have been reported to occur in leaf litter, moss and lichens, or trees and ferns (Beier 1966b, 1969, 1976). Specimens of *Nesidiochernes* are frequently observed in leaf litter and under stones in Australia, particularly in the southern half of the country (MSH, unpublished data). They differ from other Australasian chernetid genera by the combination of a bicoloured carapace with the metazone paler than the prozone and mesozone, lack of a tactile seta on the posterior tarsi and the presence of three blades in the cheliceral rallum.

During field work in the Pilbara region of Western Australia, we found several specimens of a new species of *Nesidiochernes* from the summit of Western Australia's highest peak, Mt Meharry, which is described here.

This paper was submitted on 2 September 2024 and published on 25 November 2024 (2024-11-24T20:39:21.587Z). It was reviewed by Giulio Gardini and an anonymous reviewer, and edited by Kevin Thiele. Mark Harvey is an Editor of the Australian Journal of Taxonomy. He did not at any stage have access to the manuscript while in peer review, and had no influence on its acceptance or handling, as is standard practice for manuscripts submitted by editors. Australian Journal of Taxonomy. ISSN: 2653-4649 (Online).

Methods

The material examined of the new species is lodged in the Western Australian Museum, Perth (WAM). The specimens were studied using temporary slide mounts prepared by immersion of the specimen in lactic acid at room temperature for several hours to days, and mounting them on microscope slides with 10 mm coverslips supported by small sections of 0.25, 0.35 or 0.5 mm diameter nylon fishing line. After study the specimens were rinsed in water and returned to 75% ethanol with the dissected portions placed in 12 × 3 mm glass microvials (BioQuip Products, Inc.). Specimens were examined with a Leica MZ–16A (Wetzlar, Germany) dissecting microscope and a Leica DM500 compound microscope, and illustrated with the aid of a drawing tube attached to the compound microscope. Measurements were taken at the highest possible magnification using an ocular graticule.

Terminology and mensuration mostly follow Chamberlin (1931), with the exception of modifications to the nomenclature of the pedipalps and legs, the terminology of the trichobothria (Harvey 1992), chelicerae (Judson 2007) and faces of the appendages (Harvey et al. 2012). The following abbreviations are used: chelal trichobothria: fixed finger, *eb* - externo-basal trichobothrium; *esb* - externo-subbasal trichobothrium; *est* - externo-subterminal trichobothrium; *et* - externo-terminal trichobothrium; *ib* - interno-basal trichobothrium; *isb* - interno-subbasal trichobothrium; *ist* - interno-subterminal trichobothrium; *it* - interno-terminal trichobothrium; movable finger, *b* - basal trichobothrium; *sb* - subbasal trichobothrium; *st* - subterminal trichobothrium; *t* - terminal trichobothrium; cheliceral setae: *bs* - basal seta; *es* - external seta; *gs* - galeal seta; *is* - interior seta; *ls* - laminal seta; *sbs* - subbasal seta.

Taxonomy

Family Chernetidae Menge, 1855

Subfamily Chernetinae Menge, 1855

Nesidiochernes Beier, 1957

https://zoobank.org/NomenclaturalActs/ef79dbdd-4f99-4837-8081-38931e369e92

Type species

Nesidiochernes maculatus Beier, 1957, by original designation.

Nesidiochernes Beier 1957: 50.

Diagnosis

Nesidiochernes differs from all other chernetid genera by the following combination of characters: carapaceal metazone paler than prozone and mesozone, and with a dark median patch (Figures 5, 8); tarsi of legs III and IV without tactile seta (Figure 18); and rallum with three blades (Figure 13).

Nesidiochernes fissuricola, sp. nov.

Figures 2–21

https://zoobank.org/References/E9712A8A-AA1E-4293-9D7D-E085B68E25B2

Holotype: AUSTRALIA: *Western Australia:* ♂, Mt Meharry, Karijini National Park, 22°58′46.86″S, 118°35′20.29″E, 31 May–1 June 2021, under *Ptilotus obovatus*, B. Durrant, N. Gunawardene, M.S. Harvey, M.K. Curran (WAM T157112).

Paratypes: AUSTRALIA: *Western Australia:* 6 ♂, 2 ♀, 3 tritonymphs, collected with holotype (WAM T153976–153979, T157113–157118).

Diagnosis

Nesidiochernes fissuricola can be differentiated from other species of the genus as follows: from *N. australicus, N. carolinensis, N. carolinensis dybasi*, *N. kuscheli*, *N. maculatus*, *N. palauensis*, *N. tumidimanus* and *N. zealandicus* by the position of trichobothrium *st* which is situated midway between *sb* and *t* (*st* closer to *t* in the other species) and from *N. robustus* which has *st* situated much closer to *sb* than to *t*; from *N. insociabilis* by the presence of trichobothrium *st* (absent in *N. insociabilis*); from *N. australicus*, *N. caledonicus*, *N. carolinensis*, *N. palauensis*, *N. plurisetosus* and *N. tumidimanus* by trichobothrium *isb* being situated midway between *it* and *ist* (Figures 14, 15) (*isb* closer to *it* than *ist* in other species); from *N. carolinensis*, *N. insociabilis*, *N. novaeguineae*, *N. palauensis*, *N. plurisetosus*, *N. robustus*, *N. scutulatus* and *N. tumidimanus* by trichobothrium *est* being situated midway between *it* and *ist* (Figures 14, 15) (*est* closer to *esb* than *et* in other species); and from *N. slateri* by the shape of chelal hand which is broadened posteriorly in *N. fissuricola* (Figure 14) but is uniformly oval in *N. slateri*.

Adults

Colour: most cuticular surfaces dark red-brown; legs yellow-brown (Figures 2–8).

Chelicera: with 6 setae on hand and 1 subdistal seta on movable finger (Figure 10); setae *es*, *ls*, *bs* and *is* acuminate, *sbs′* and *sbs″* dentate; with 2 dorsal lyrifissures and 1 ventral lyrifissure; galea stout with 3 (♂), 5 (♀) distal to subdistal rami (Figures 11, 12); rallum composed of 3 blades, anterior blade dentate, 2 posterior blades smooth (Figure 13); serrula exterior with 14 (♂), 14 (♀) blades; lamina exterior present.

Pedipalp (Figure 14): all surfaces granulate, except for smooth chelal fingers; all segments robust, trochanter 0.30–0.34 (♂, ♀), femur 0.41–0.53 (♂), 0.51–0.54 (♀), patella 0.48–0.54 (♂), 0.51–0.53 (♀), chela (with pedicel) 0.88–0.96 (♂), 0.92–0.97 (♀), chela (without pedicel) 0.89–0.90 (♂), 0.83–0.92 (♀), hand (without pedicel) 1.25–1.42 (♂), 1.46–1.59 (♀) × longer than broad, movable finger 0.38–0.45 (♂), 0.38–0.40 (♀) × longer than hand (without pedicel). Fixed chelal finger with 8 trichobothria, movable chelal finger with 4 trichobothria (Figure 14): *eb* and *esb* situated basally; *est* midway

Figures 1–2. 1, The type locality of *Nesidiochernes fissuricola*, sp. nov. near the summit of Mt Meharry, Western Australia. 2, a female specimen of *Nesidiochernes fissuricola*, sp. nov. (image courtesy of Bradley Durrant).

between *esb* and *et* (especially in lateral view); *ib* and *ist* subbasally; *it* situated midway between *et* and *est*; *isb* situated midway between *ist* and *it*; *t* situated subdistally; *st* situated midway between *sb* and *t*; and *sb* situated much closer to *b* than to *st*. Fixed and movable fingers without pseudotactile setae (Figure 15). Venom apparatus only present in movable chelal finger, venom duct long, terminating in nodus ramosus adjacent to *st*. Fingers not gaping (Figure 15). Chelal teeth juxtadentate, rounded (Figure 16); fixed finger with 30 (♂), 35 (♀) teeth, plus 4 (♂), 7 (♀) retrolateral and 4 (♂), 1 (♀) prolateral accessory teeth; movable finger with 33 (♂), 34 (♀) teeth, with 5 (♂), 7 (♀) retrolateral and 1 (♂), 0 (♀) prolateral accessory teeth; sense spots: fixed chelal finger with 6 (♂), 3 (♀) retrolateral and 7 (♂), 5 (♀) prolateral; movable chelal finger with 5 (♂), 2 (♀) retrolateral and 4 (♂), 1 (♀) prolateral.

Carapace (Figure 8): evenly granulate; 0.59–0.69 (♂), 0.68–0.74 (♀) × longer than broad; with 1 pair of small, very faint eye-spots; with setae arranged: 4 (♂), 4 (♀) near anterior margin; 29 (♂), 24 (♀) in prozone; 18 (♂), 24 (♀) in mesozone; and 8 (♂, ♀) in metazone; with 2 distinct furrows, posterior furrow situated closer to posterior margin of carapace than to anterior furrow; posterior margin straight.

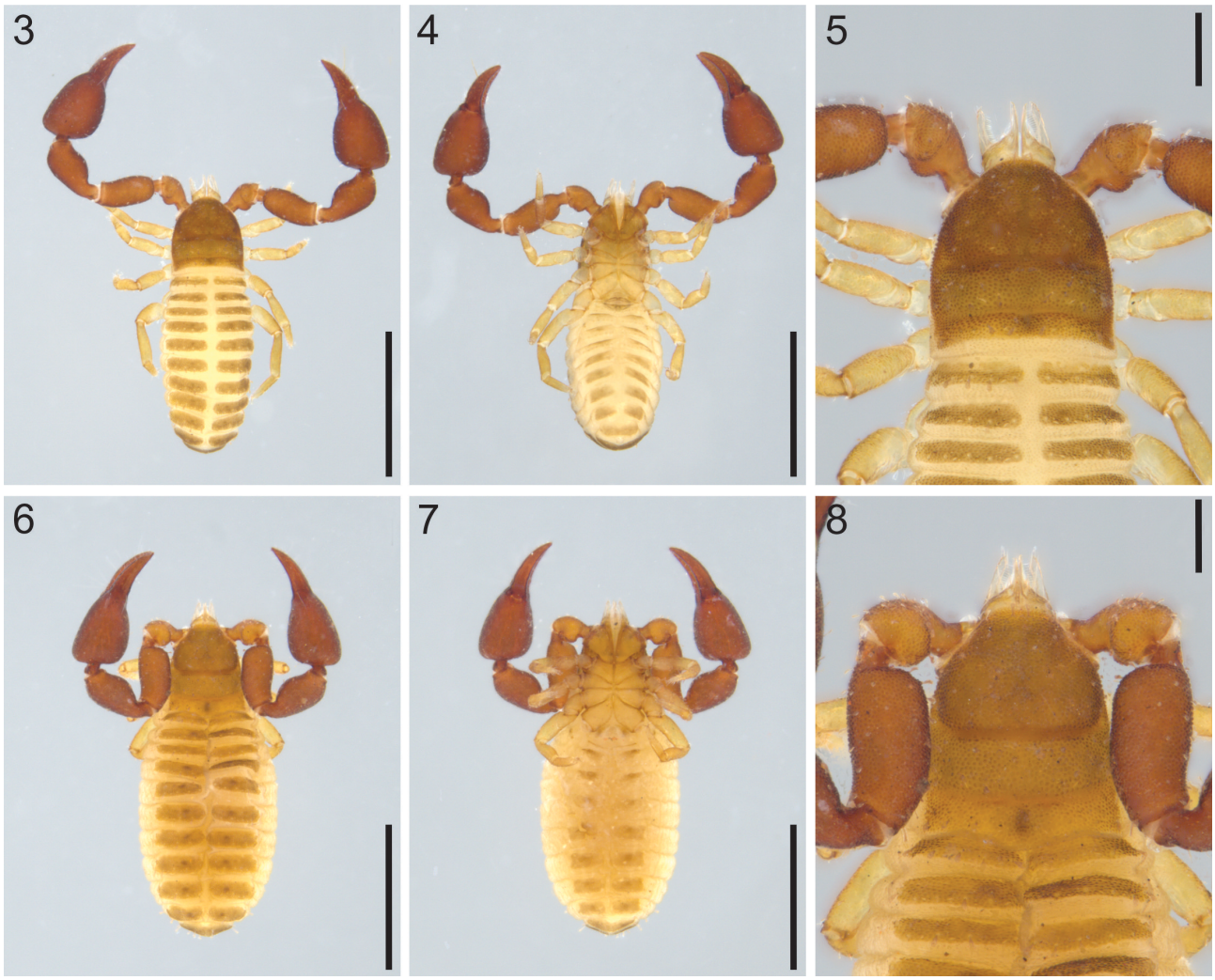
Coxal region: maxillae granulate; dorsolateral region of coxae I–IV granulate, other surfaces smooth; manducatory process somewhat pointed, with 2 apical to subapical acuminate setae, 1 small sub-oral seta, and 20 (♂, ♀) additional setae; median maxillary lyrifissure rounded and situated submedially; posterior maxillary lyrifissure rounded. Chaetotaxy of coxae I–IV: ♂, 12: 11: 13: 23; ♀, 12: 13: 13: 34.

Legs: junction between femora and patellae I and II strongly oblique to long axis; junction between femora and patellae III and IV very angulate; femora III and IV much smaller than patellae III and IV (Figure 18); femur + patella of leg IV 3.54 (♂), 4.72 (♀) × longer than deep (Figure 18); patella and tibia III and IV without pseudotactile setae; tarsi III and IV without tactile seta (Figure 18); tarsi with single raised slit sensillum; subterminal tarsal setae arcuate and acute; claws not modified; arolium slightly shorter than claws.

Abdomen: tergites granulate; tergites I–X and sternites IV–X with medial suture line (Figures 3, 4, 6, 7). Tergal chaetotaxy: ♂, 10: 10: 10: 11: 11: 12: 12: 12: 12: 10: 6: 2; ♀, 12: 11: 12: 14: 14: 12: 12: 13: 14: 10: 5: 2; setae short and dentate. Sternal chaetotaxy: ♂, 25: 13: (2) 8 (2): (2) 12 (2): 14: 12: 11: 11: 12: 7: 2; ♀, 21: (3) 10 (3): (3) 9 (3): 13: 13: 13: 13: 12: 10: 5: 2: 2. Male with setae broadly arranged over sternite II and with setae widely scattered over sternite III (Figure 19); female with setae arranged in inverted-U on sternite II, but without setae on posterior margin, and with setae on posterior margin of sternite III (Figure 20). Pleural membrane wrinkled; without setae.

Genitalia: male of typical chernetid morphology; female with paired spermathecae with a pair of anteriorly directed receptacula and smaller pair of posterior receptacula (Figure 21).

Dimensions (mm): holotype male (WAM T157112), followed by 6 other paratype males (when measured) in parentheses: Body length 2.22 (1.58–2.06). Pedipalps: trochanter 0.340/0.185 (0.300–0.320/0.170–0.210), femur 0.410/0.210 (0.480–0.530/0.205–0.280), patella 0.510/0.290 (0.480–0.520/0.245–0.380), chela (with pedi-



Figures 3–8. *Nesidiochernes fissuricola*, sp. nov.: 3–5, male paratype (WAM T157115): 3, dorsal view; 4, ventral view; 5, cephalothorax, dorsal view; 6–8, female paratype (WAM T157117): 6, dorsal view; 7, ventral view; 8, cephalothorax, dorsal view. Scale lines = 1 mm (Figures 3, 4, 6, 7), 0.2 mm (Figures 5, 8).

cel) 0.960/0.345 (0.880–0.940/0.360–0.400), chela (without pedicel) 0.880 (0.855–0.900), hand (without pedicel) length 0.490 (0.430–0.500), movable finger length 0.385 (0.380–0.450). Carapace 0.690/0.580 (0.585–0.660/0.525–0.550); anterior eye 0.110. Leg IV: femur + patella 0.495/0.140, tibia 0.385/0.095, tarsus 0.300/0.060.

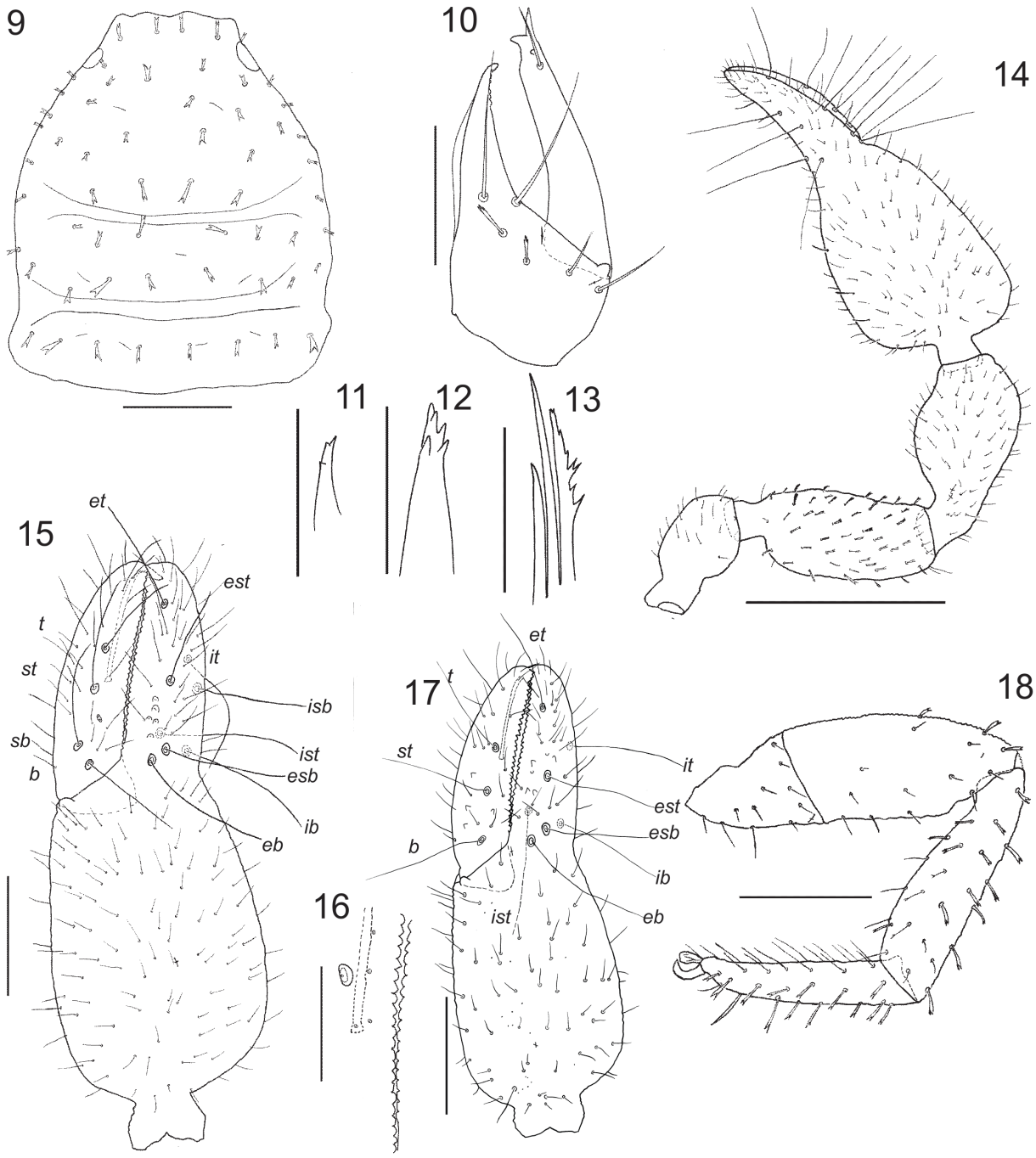
Dimensions (mm): paratype female (WAM T157113), followed by one other paratype female (when measured) in parentheses: Body length 3.18 (2.90). Pedipalps: trochanter 0.300/0.175 (0.340/0.190), femur 0.510/0.200 (0.540/0.225), patella 0.510/0.235 (0.530/0.280), chela (with pedicel) 0.915/0.290 (0.970/0.335), chela (without pedicel) 0.825 (0.920), hand (without pedicel) length 0.460 (0.520), movable finger length 0.380 (0.400). Carapace 0.680/0.530 (0.735/0.580); eye diameter 0.065. Leg IV: femur + patella 0.470/0.100, tibia 0.485/0.080, tarsus 0.295/0.060.

Tritonymph

Colour: most cuticular surfaces pale red-brown; legs yellow-brown.

Chelicera: with 6 setae on hand and 1 subdistal seta on movable finger; setae *es*, *ls* and *is* acuminate, *bs* and *sbs* dentate; galea with 5 distal to subdistal rami; rallum composed of 3 blades, anterior blade dentate, 2 posterior blades smooth.

Pedipalp: all surfaces granulate except fingers; trochanter 2.73, femur 2.42, patella 1.78, chela (with pedicel) 2.71, chela (without pedicel) 2.54, hand (without pedicel) 1.24 × longer than broad, movable finger 0.95 × longer than hand (without pedicel). Fixed chelal finger with 7 trichobothria, movable chelal finger with 3 trichobothria (Figure 16): *eb* and *esb* situated basally; *est* situated midway between *esb* and *et*; *ib* and *ist* subbasally; *it* situated midway between *et* and *est*; *st* situated midway between *b* and *t*. Venom duct long, terminating in nodus ramosus near *t*. Chelal teeth juxtadentate; fixed finger with 28 teeth, plus 2 retrolateral and 1 prolateral accessory teeth; movable finger with 31 teeth, plus 2 retrolateral and 1 prolateral accessory teeth; sense spots absent on both fingers.



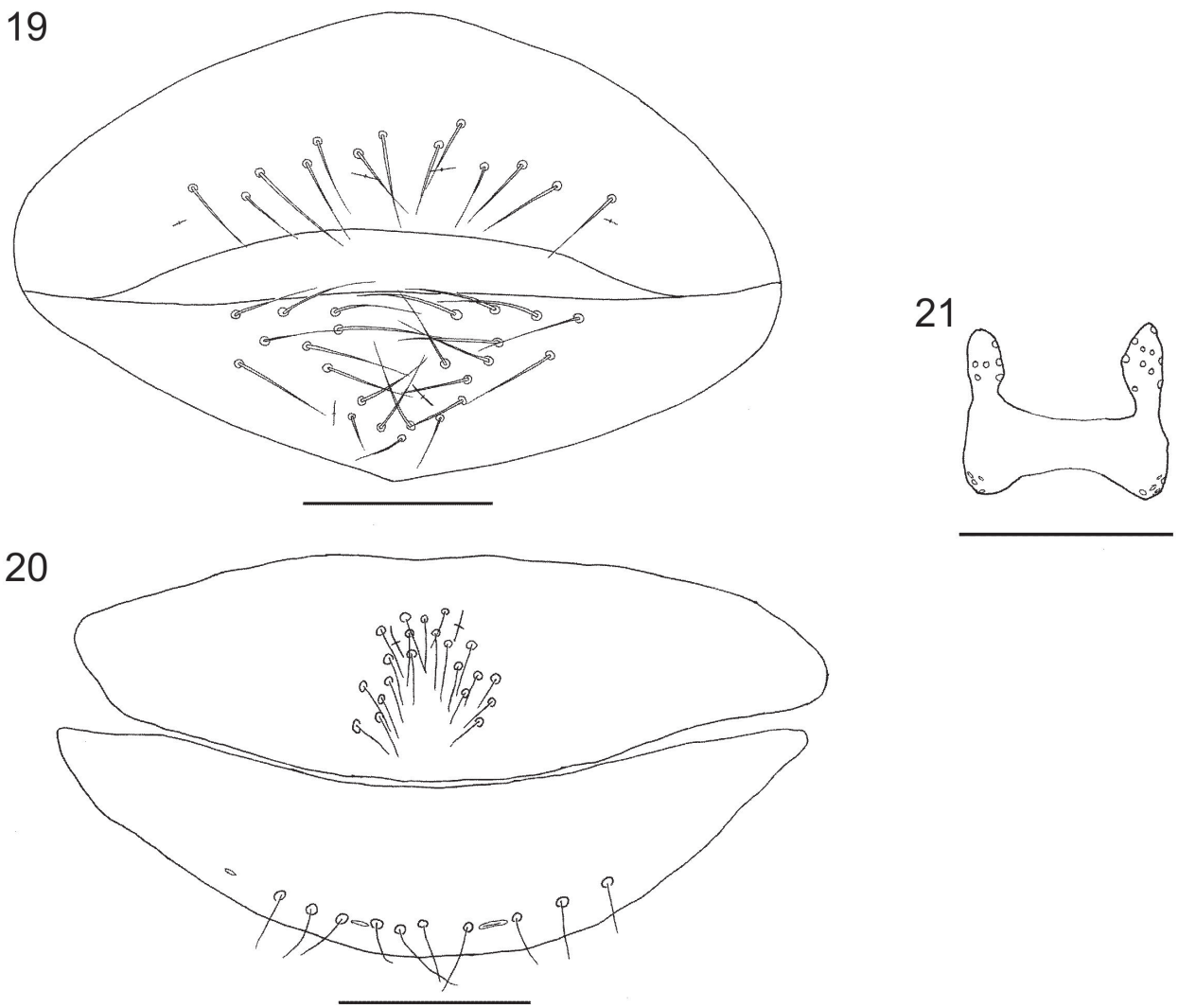
Figures 9–18. *Nesidiochernes fissuricola*, sp. nov., male holotype (WAM T157112), unless stated otherwise: 9, carapace, dorsal view; 10, right chelicera, dorsal view; 11, left galea, lateral view; 12, left galea, lateral view, female paratype (WAM T157113); 13, left rallum, lateral view; 14, right pedipalp, dorsal view; 15, left chela, lateral view; 16, left chelal teeth, lateral view; 17, left chela, lateral view, tritonymph paratype (WAM T157118); 18, left leg IV, lateral view. Scale lines = 0.5 mm (Figure 14), 0.2 mm (Figures 9, 10, 15, 17, 18), 0.05 mm (Figures 11–13).

Carapace: evenly granulate; 1.41 × longer than broad; with 1 pair of small, very faint eye-spots; with setae arranged: 4 near anterior margin; 26 in prozone; 18 in mesozone; and 8 in metazone; with 2 furrows, posterior furrow situated closer to posterior margin of carapace than to anterior furrow; posterior margin straight.

Coxal region: maxillae with 2 apical to sub-apical acuminate setae, 1 small sub-oral seta, and 15 additional setae. Chaetotaxy of coxae I–IV: 9: 9: 10: 13.

Legs: very similar to adults.

Abdomen: tergites granulate; tergites I–X and sternites II–X with median suture line. Tergal chaetotaxy: 8: 9: 10:



Figures 19–21. *Nesidiochernes fissuricola*, sp. nov.: 19, genital sternites, ventral view, male holotype (WAM T157112); 20, genital sternites, ventral view, female paratype (WAM T157113); 21, spermathecae, ventral view, female paratype (WAM T157118). Scale lines = 0.1 mm.

9: 12: 11: 10: 11: 10: 9: 6: 2. Sternal chaetotaxy: 5: (2) 7 (2): (2) 8 (2): 10: 11: 10: 10: 10: 9: 5: 2.

Dimensions (mm): paratype (WAM T157118): Body length 0.99. Pedipalps: trochanter 0.300/0.110, femur 0.435/0.180, patella 0.410/0.230, chela (with pedicel) 0.800/0.295, chela (without pedicel) 0.750, hand (without pedicel) length 0.385, movable finger length 0.365. Carapace 0.620/0.440; anterior eye 0.010.

Remarks

Nesidiochernes fissuricola was collected from leaf litter under cotton bush [*Ptilotus obovatus* (Gaudich.) F.Muell.] in a deep, sheltered cleft situated within 100 m of the summit of Mt Meharry (the tallest mountain in Western Australia at 1,249 m a.s.l.).

Specimens of the genus *Nesidiochernes* have been collected from a wide variety of localities and habitats throughout mainland Australia (see Atlas of Living Australia website, https://bie.ala.org.au/species/https://biodiversity.org.au/afd/taxa/a22eaaee-3e7a-49fc-8b34-837468f97b6b, accessed 13 July 2024). We have compared the specimens of *N. fissuricola* from Mt Meharry with museum samples from other parts of Australia and could not locate any conspecific specimens. Most importantly, this was true for four other collections from the Pilbara region (near Pannawonica, near Mt Sheila, Marillana Creek, and Roy Hill) which comprised at least two different species, highlighting the unrecorded diversity of *Nesidiochernes* in the Pilbara region of Western Australia.

Sequence data

We obtained sequence data for a single specimen (WAM T157117, female) of *N. fissuricola*, which is available under the GenBank accession number: OR653650.

Etymology

The species epithet is an adjective that refers to this species preference for living in fissures or clefts (*fissura*, Latin, crack, cleft, chink; *colus*, Latin, dwelling in, living among) (Brown 1956).

Acknowledgments

MKC is very grateful to Bradley Durrant and Nihara Gunawardene of Biologic Environmental for supporting the field and laboratory work that allowed the collection and description of this species. We thank Bradley Durrant for allowing us to use his image of a living specimen and the Biologic Molecular Team (Joel Huey, Stephanie Floeckner, Liesel Morgan) for the molecular sequencing.

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