






## Two new troglobitic species of the pseudoscorpion genus *Anatemnus* (Pseudoscorpiones: Atemnidae) from northwestern Australia

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### Abstract

Two new troglobitic species of the pseudoscorpion genus *Anatemnus* are described from north-western Australia. Both species occur in subterranean environments, with *Anatemnus eminus* sp. nov. found throughout the Pilbara, and *Anatemnus capillatus* sp. nov. collected from a cave on Barrow Island. Both species share morphological features with *Anatemnus subvastus* Alexander, Burger and Harvey, 2014, the first described troglobitic species from the Pilbara bioregion.

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<https://zoobank.org/References/6E97D061-32C2-427C-899B-6BB6D56698D5>

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### Introduction

The Pilbara bioregion of northern Western Australia is a topographically distinct biodiversity hotspot with a unique semi-arid tropical climate (Blockley 1975). Apart from its surface environments, the region also includes a wide range of subterranean habitats that occur within the many mesas and other landforms that occur throughout the area (Guzik et al. 2011). These formations host a range of subterranean fauna including both troglobitic and stygofauna species, which are thought to have originated during the Miocene Epoch when species

began to colonise underground habitats to avoid aridification (Clark et al. 2021). Despite the Pilbara bioregion possessing a globally significant amount of systematic diversity, there are many species that lack formal scientific names and many more that are yet to be discovered (Eberhard et al. 2005). This deficiency in taxonomic clarity is especially true for smaller troglobitic invertebrates such as pseudoscorpions.

Atemnids are globally distributed throughout almost all terrestrial regions, with tropical climates hosting especially high levels diversity (World Pseudoscorpiones Cat-

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alog 2025). The family consists of two subfamilies, Atemninae and Miratemninae, with 14 and six genera respectively (World Pseudoscorpiones Catalog 2025). The genus *Anatemnus* Beier, 1932 is mostly found throughout the Australasian region of the world and is currently represented by 24 species, with only five species known from outside the Australasian region (World Pseudoscorpiones Catalog 2025). In Australia, there are currently only three described species of *Anatemnus*: *A. cavernicola* (Beier, 1976), *A. subvastus* Alexander, Burger & Harvey, 2014 and *A. wongalara* Harvey & Cullen, 2021. *Anatemnus cavernicola* was found in a cave in western New South Wales (Beier 1976), *A. subvastus* occurs in the Pilbara bioregion of Western Australia (Alexander, Burger & Harvey 2014), and *A. wongalara* occurs in the Wongalara Wildlife Sanctuary of the Northern Territory (Harvey & Cullen 2021). This study was designed to provide descriptions of two new troglobitic *Anatemnus* species collected in north-western Australia. For one of them we included molecular sequence data.

## Methods

The specimens included in this study are lodged in the Western Australian Museum, Perth (WAM). Terminology and mensuration mostly follow Chamberlin (1931), with the exception of the nomenclature of the pedipalps, legs and with some minor modifications to the terminology of the trichobothria (Harvey 1992), chelicera (Judson 2007) and faces of the appendages (Harvey et al. 2012).

A total of 16 specimens were examined, including males, females, and nymphs at various life stages. These specimens were collected over an extended period of time through a variety of subterranean sampling methods, including troglofauna traps, burrow excavation, and troglofauna scrapes. Due to the nature of the collection process, not all specimens were in optimal condition for genetic or morphological analysis, limiting the number available for deriving taxonomic conclusions.

Measurements of specimens were taken to the nearest 0.01 millimetres with the dimensions sections showing measurements as length/width, except for the dimensions of leg IV which were displayed as length/depth. Specimens were mounted on a cavity slide and submerged in 75% lactic acid at room temperature for several days to allow for tissue clearing. The coverslip was supported by two pieces of nylon fishing line.

The specimens were studied and imaged with a Leica MZ16A stereomicroscope using the Leica LAS X software and a Leica DM2500 compound microscope. Images were edited and compiled using the GIMP software package (<https://www.gimp.org/>).

We used Polymerase Chain Reactions (PCRs) to amplify a mitochondrial DNA gene (cytochrome c oxidase subunit I [COI]). PCR purification and Sanger bidirectional sequencing was conducted by the Australian Genome

Research Facility (AGRF; Perth). Forward and reverse reads were assembled and edited using the Geneious Prime version 2025.0.3 software package (Biomatters Ltd; <https://www.geneious.com>). Primers were trimmed and sequences were blasted in GenBank to detect possible contaminations. Resulting nucleotide sequences for all taxa are deposited in GenBank (Table 1). The sequences were aligned using the MAFFT version 7.490 (Katoh et al. 2002; Katoh & Standley 2013) plug-in within Geneious with the default settings. The phylogenetic tree was generated with RAXML version 8.2.11 (Stamatakis 2014), and the uncorrected pairwise distances (p-distances) were calculated in Geneious.

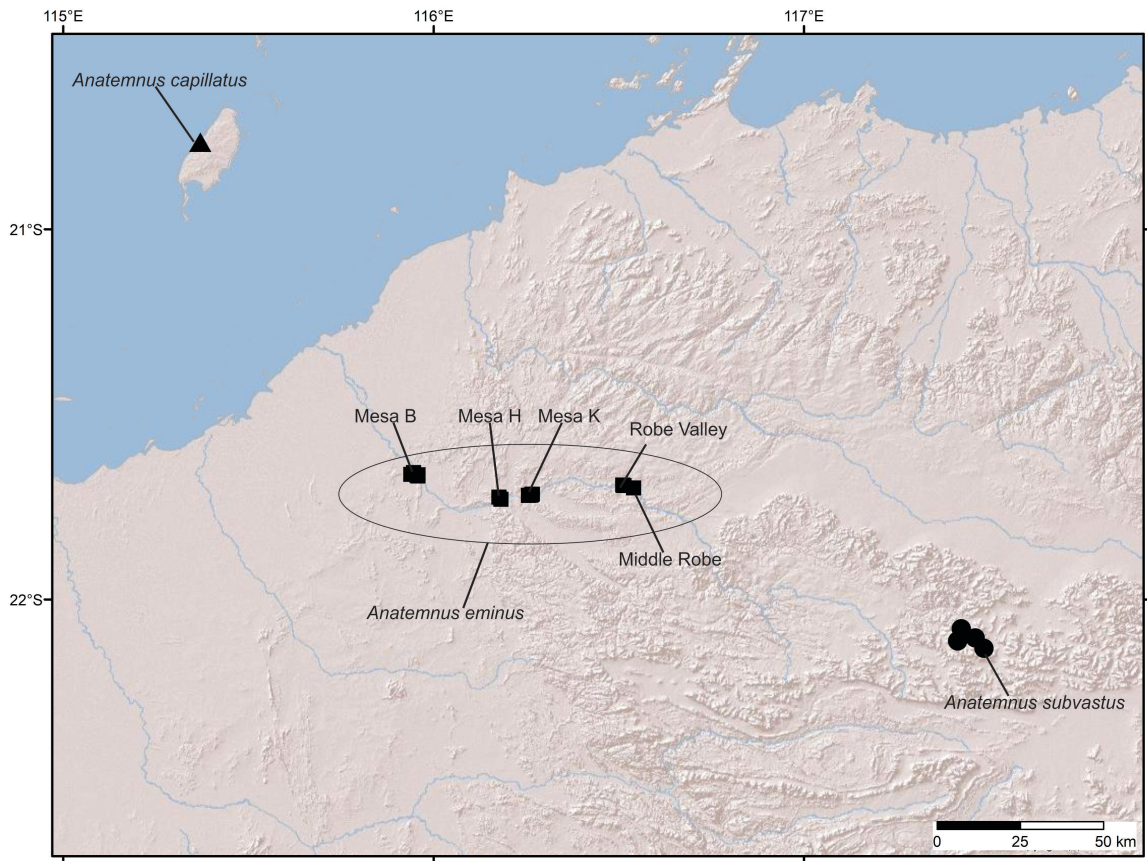
We included seven specimens of *Anatemnus* in the analysis, as well as several other atemnids (Table 1). The tree was rooted on a species of Withiidae (*Rugowithius bulbosus* Harvey, 2015), a representative of the sister family to Atemnidae (Benavides et al. 2019).

## Results

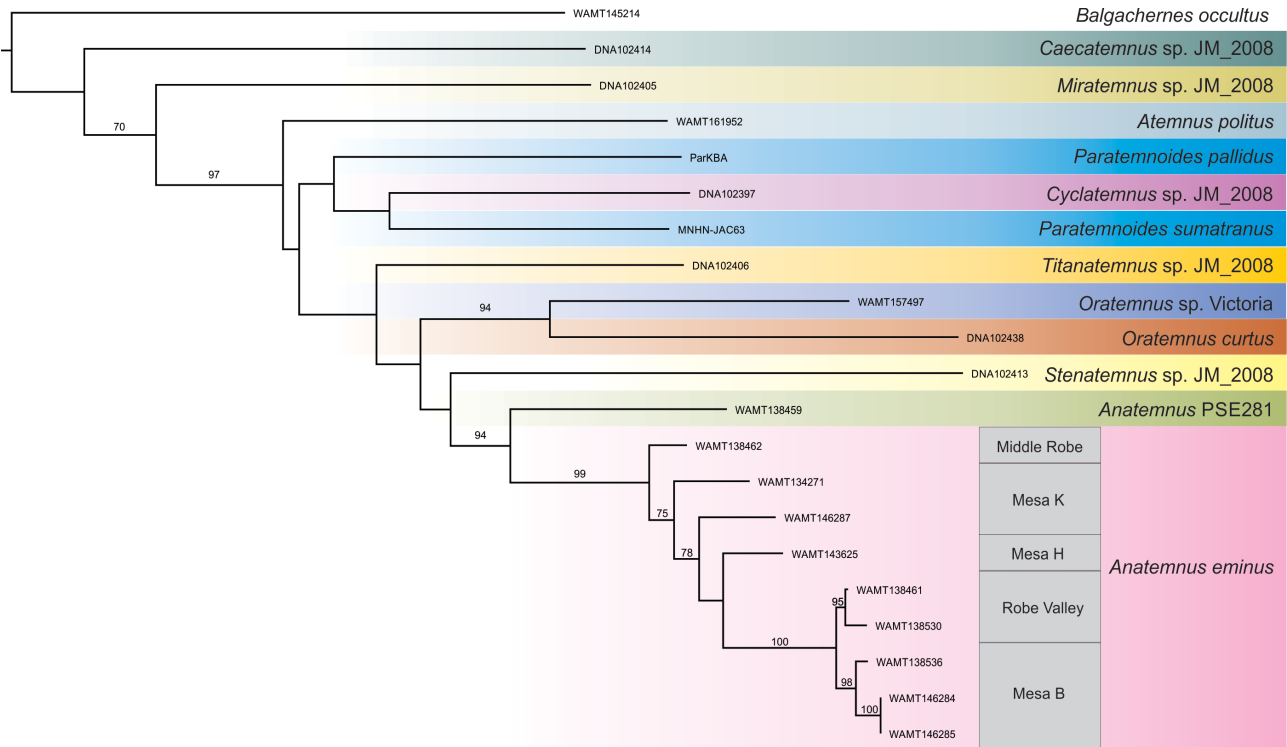
The different populations of *Anatemnus eminus* for which data are available for the mitochondrial gene COI show relatively high divergence levels (Table 1). The three specimens from Mesa B diverge from each other by 1.83%, but differ from the other populations by 2.14-3.66% (Robe Valley, n=2), 8.85-9.16% (Mesa H, n=1), 9.09-9.58% (Mesa K, n=2), and 8.24-8.85% (Middle Robe, n=1). We closely examined these specimens for morphological differences that might indicate the presence of more than one species, but were unsuccessful, and we ascribe the differences to isolation by distance.

The low variability between the Mesa B and Robe Valley populations is difficult to reconcile, as they are situated at opposite ends of the known range of *A. eminus*, ca. 60 km apart. In contrast, the two specimens from Robe Valley are 7.63-8.24% divergent from the specimen from Middle Robe which is only 3 km away. These anomalies are difficult to explain for organisms that have troglomorphic morphological adaptations, such as slightly pale colour and attenuated appendages, so a dispersal hypothesis seems unlikely.

Unfortunately, we lack suitably preserved specimens of *A. subvastus* and *A. capillatus* to include them in the molecular analysis, although we detected a putative new species of *Anatemnus* (*A. sp.* PSE281), that was also collected from the Robe Valley only 2.3 km south-east of the most easterly recorded specimen of *A. eminus* (WAM T138462). This specimen was 14.20-16.18% divergent from *A. eminus* but is a juvenile specimen that cannot be identified with certainty. Although it might represent a distinctive new subterranean species, there is a possibility that the specimen was part of the epigeal or edaphic community and was unintentionally collected using standard subterranean traps that occasionally include surface specimens.



**Fig. 1.** Map of north-western Australia showing distribution of *Anatemnus subvastus* Alexander, Burger and Harvey, 2014, *Anatemnus eminus*, sp. nov. and *Anatemnus capillatus*, sp. nov.



**Fig. 2.** Maximum-likelihood phylogeny of *Anatemnus eminus*, sp. nov., with Bootstrap values over 70% shown.

**Table 1.** Specimens used in the molecular analysis. Only those specimens newly sequenced for this study are provided with depository and locality data.

Species	Registration number	Locality	GenBank Accession number
<b>Family Sternophoridae</b>			
<i>Afrosterophorus</i> sp.	WAM T136720	AUSTRALIA: Western Australia: 11.8 km S. of Roebourne, 20°55'15"S, 117°07'23"E	PV794300
<b>Family Cheliferidae</b>			
<i>Chelifer cancroides</i> (Linnaeus, 1758)	WAM T130755		KT354337
<b>Family Chernetidae</b>			
<i>Balgachernes occultus</i> Harvey, 2018	WAM T145214		PQ476092
<b>Family Withiidae</b>			
<i>Rugowithius bulbosus</i> Harvey, 2015	WAM T145472	AUSTRALIA: Northern Territory: Kakadu National Park, Mangarre Rainforest, 12°25'31"S, 132°57'53"E	PV794312
<b>Family Atemnidae</b>			
<i>Anatemnus eminus</i> , sp. nov.	WAM T134271	AUSTRALIA: Western Australia: Mesa K, 21°42'55"S, 116°16'02"E	PV794305
<i>Anatemnus eminus</i> , sp. nov.	WAM T138461	AUSTRALIA: Western Australia: Robe Valley, 21°41'26.03"S, 116°30'40.86"E	PV794309
<i>Anatemnus eminus</i> , sp. nov.	WAM T138462	AUSTRALIA: Western Australia: Middle Robe, 21°41'53.65"S, 116°32'26.53"E	PV794307
<i>Anatemnus eminus</i> , sp. nov.	WAM T138530	AUSTRALIA: Western Australia: Robe Valley, 21°41'30.81"S, 116°30'51.11"E	PV794310
<i>Anatemnus eminus</i> , sp. nov.	WAM T138536	AUSTRALIA: Western Australia: Mesa B, 21°39'51.28"S, 115°57'21.63"E	PV794301
<i>Anatemnus eminus</i> , sp. nov.	WAM T143625	AUSTRALIA: Western Australia: Mesa H, 21°43'44.24"S, 116°10'56.29"E	PV794304
<i>Anatemnus eminus</i> , sp. nov.	WAM T146284	AUSTRALIA: Western Australia: Mesa B, 21°39'47"S, 115°57'30"E	PV794302
<i>Anatemnus eminus</i> , sp. nov.	WAM T146285	AUSTRALIA: Western Australia: Mesa B, 21°39'47"S, 115°57'30"E	PV794303
<i>Anatemnus eminus</i> , sp. nov.	WAM T146287	AUSTRALIA: Western Australia: Mesa K, 21°43'08"S, 116°15'24"E	PV794306
<i>Anatemnus</i> PSE281	WAM T138459	AUSTRALIA: Western Australia: Robe Valley, 21°42'58.28"S, 116°33'5.75"E	PV794308
<i>Atemnus politus</i> (Simon, 1878)	WAM T161952	SPAIN: Barcelona, Mirador De Ignasi De Lecea, 41°25'03.8"N, 02°09'12.9"E	PV794313
<i>Caecatemnus</i> sp. JM-2008	DNA102414		EU559534
<i>Cyclatemnus</i> sp. JM_2008	DNA102397		EU559528
<i>Miratemnus</i> sp. JM_2008	DNA102405		EU559535
<i>Oratemnus curtus</i> (Beier, 1954)	DNA102438		EU559531
<i>Oratemnus</i> sp. Victoria	WAM T157497	AUSTRALIA: Victoria: Montrose, Singleton Terrace, 37°49'36"S, 145°20'38"E	PV794311
<i>Paratemnoides pallidus</i> (Balzan, 1892)	ParKBA		KU755529
<i>Paratemnoides sumatranus</i> (Beier, 1932)	MNHN-JAC63		JN018204
<i>Stenatemnus</i> sp. JM_2008	DNA102413		EU559529
<i>Titanatemnus</i> sp. JM_2008	DNA102406		EU559530

## Taxonomy

### Family Atemnidae Kishida, 1929

### Subfamily Atemninae Kishida, 1929

### *Anatemnus* Beier, 1932

*Anatemnus* Beier, 1932: 578.

#### Type species

*Chelifer javanus* Thorell, 1883, by original designation.

Species of *Anatemnus* can be recognised from other atemnines by the following combination of characters: carapace without transverse furrow; trichobothria *isb* and *it* widely spaced; trichobothrium *est* situated approximately midway between *esb* and *et*; trichobothrium *st* not very close to *t*; pedicel of the pedipalpal patella not narrowed (Beier 1932).

### *Anatemnus eminus*, sp. nov.

<https://zoobank.org/NomenclaturalActs/65981E4A-BFDE-49B4-94C2-61C0A7ED3735>

**Holotype:** AUSTRALIA: Western Australia: ♀, Mesa B, ca. 38 km W. of Pannawonica, 21°39'47"S, 115°57'30"E, 25 May-17 July 2018, troglafauna trap, J. King, M. Greenham (WAM T146285).

**Table 2.** Pairwise similarity values for *Anatemnus eminus*.

		WAM T138536	WAM T146284	WAM T146285	WAM T138461	WAM T138530	WAM T143625	WAM T146287	WAM T134271	WAM T138462
<i>Anatemnus eminus</i> (Mesa B)	WAM T138536		1.83	1.83	2.14	3.05	8.85	9.58	9.47	8.85
<i>Anatemnus eminus</i> (Mesa B)	WAM T146284	1.83		0	2.75	3.66	9.16	9.09	9.47	8.24
<i>Anatemnus eminus</i> (Mesa B)	WAM T146285	1.83	0		2.75	3.66	9.16	9.09	9.47	8.24
<i>Anatemnus eminus</i> (Robe Valley)	WAM T138461	2.14	2.75	2.75		1.22	7.79	8.77	8.55	7.63
<i>Anatemnus eminus</i> (Robe Valley)	WAM T138530	3.05	3.66	3.66	1.22		8.24	9.42	9.77	8.24
<i>Anatemnus eminus</i> (Mesa H)	WAM T143625	8.85	9.16	9.16	7.79	8.24		6.37	7.18	6.41
<i>Anatemnus eminus</i> (Mesa K)	WAM T146287	9.58	9.09	9.09	8.77	9.42	6.37		6.69	6.53
<i>Anatemnus eminus</i> (Mesa K)	WAM T134271	9.47	9.47	9.47	8.55	9.77	7.18	6.69		5.95
<i>Anatemnus eminus</i> (Middle Robe)	WAM T138462	8.85	8.24	8.24	7.63	8.24	6.41	6.53	5.95	

**Paratype:** AUSTRALIA: *Western Australia*: 1 ♂, Mesa B, ca. 38 km W. of Pannawonica, 21°39'51.28"S, 115°57'21.63"E, 6 August-1 October 2015, troglofauna trap, J. Alexander (WAM T138536).

*Anatemnus eminus* can be distinguished from all epigean species of *Anatemnus* by the elongate appendages and pale colouration (Figure 3). It differs from the three other subterranean species, including *A. capillatus*, by the position of trichobothria *isb*, which is situated much closer to *it* than in other species (Figure 4A).

#### Adults

**Colour:** body light yellow brown, carapace slightly darker than abdomen, legs pale yellow, pedipalps dark red brown, trochanter and femur with paler areas (Figure 3).

**Chelicera:** surface smooth; hand with 4 acuminate setae, movable finger with 1 sub-distal seta; galea elongate with 1 subdistal ramus and 2 distal rami; serrula exterior with 20 (♂), 24 (♀) blades; rallum with 4 blades.

**Pedipalp (Figure 4D):** trochanter elongate and smooth with anterior margin rounded, 1.51-2.00 (♂), 1.61-1.88 (♀) × longer than broad, femur cylindrical and robust, with light granulations on dorsal face; 1.94-2.71 (♂), 2.49-2.61 (♀) × longer than broad; patella rounded, granulations present on dorsal surface, 2.02-2.35 (♂), 2.11-2.60 (♀) × longer than broad; chela: hand subtly rounded, light granulations present on dorsal face on prolateral face, chela (with pedicel) 2.98-3.25 (♂), 3.08-3.53 (♀) × longer than broad, chela (without pedicel) 2.71-3.16 (♂), 2.84-3.15 (♀) × longer than broad, hand (without pedicel) 1.56-1.79 (♂), 1.82-2.02 (♀) × longer than broad, movable finger 0.61-0.76 (♂), 0.50-0.74 (♀) × longer than hand (without pedicel). Fixed finger with 8 trichobothria; movable finger with 4 trichobothria (Figure 4A); *esb* and *eb* situated basally, *esb* situated slightly distal to *eb*, *est* situated closer to *et* than to *esb*, *et* situated distally, *ist* and *ib* situated basally, *sb* situated adjacent to *b*, *st* situated approximately two areolar diameters distal to *sb*, *t* situated midway between *st* and tip of finger. Chelal teeth juxtadentate, fixed finger with 20-26 (♂), 23-27 (♀) teeth, almost equal in size, teeth 1-10 acutely pointed and the rest rounded,

becoming slightly more elongate towards distal tooth, movable finger with 24-30 (♂), 30-32 (♀) teeth, each approximately same size; all teeth rounded and very similar in size. Venom apparatus only present in fixed finger, venom duct terminating in nodus ramosus at level of *it*.

**Cephalothorax:** carapace (Figure 4B) sub-rectangular; with light granulations at anterior margin; anterior margin slightly convex; lateral margins convex; posterior margin straight; 1.13-1.27 (♂), 1.05-1.25 (♀) × longer than broad; with 26 (♀ holotype), 28 (♂ paratype) setae arranged 8: 8: 8: 4 (♂), 6: 8: 8: 4 (♀); 8 (♂), 10 (♀) lyrisfissures present; furrows absent; eyes absent. Chaetotaxy of coxae I-IV: 12-16: 10-16: 10-12: 14-16 (♂), 16-18: 12-16: 8-10: 16-20 (♀).

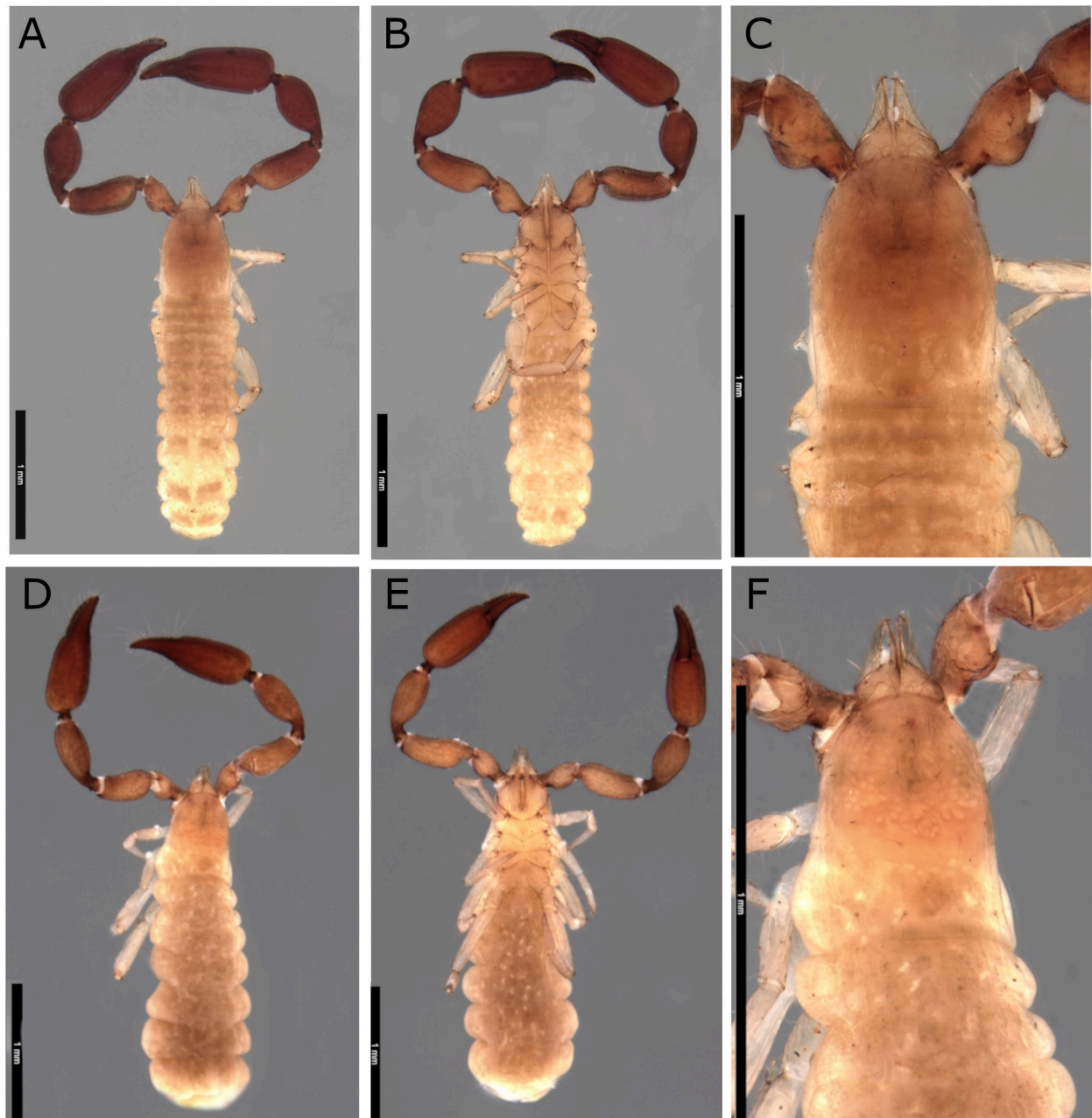
**Legs (Figure 4C):** junction between femora and patellae I and II oblique to long axis; junction between femora and patellae III and IV very angulate; femora III and IV much smaller than patellae III and IV; femur + patella of leg IV 3.34 (♂), 2.95 (♀) × longer than deep; tarsus with basal tactile seta, TS = 0.12 (♂), 0.12 (♀); subterminal tarsal setae arcuate and acute; arolium slightly longer than claws, not divided.

**Abdomen:** tergites straight, not divided; tergal chaetotaxy; 6: 6: 5-6: 6: 6-7: 6: 7-8: 6-8: 6-10: 5-13: 2-12: 2 (♂), 6: 6: 5-6: 4-7: 6-8: 6-9: 6-9: 6-9: 7-10: 8-13: 5-12: 2; (♀) sternal chaetotaxy; 2-4: (4-5) 2-8 (4-5): (2-8) 4-8 (2-8): 8-10: 9-10: 9-10: 8-10: 8-12: 6-12: 4-11: 2 (♂), 0-8: (2-5) 3-8 (2-5): (1-2) 7-9 (1-2): 7-10: 8-10: 8-10: 8-10: 9-10: 8-14: 6-14: 2 (♀).

**Genitalia:** male: dorsal apodeme with long and rounded apex, ejaculatory canal atrium broad, lateral apodemes spherical, lateral rods Y-shaped with rounded apices, hooked branches wide, genital atrium without genital setae; female: with single anteriorly directed spermathecal lobes and 1 pair of small lateral cribriform plates.

**Dimensions (mm):** Female holotype (WAMT146285) followed by other females. Body length (excluding chelicerae): 2.695 (2.750-3.045). Pedipalp: trochanter 0.355/0.220 (0.325-0.410/0.170-0.230), femur 0.625/0.250 (0.510-0.675/0.220-0.275), patella 0.655/0.310





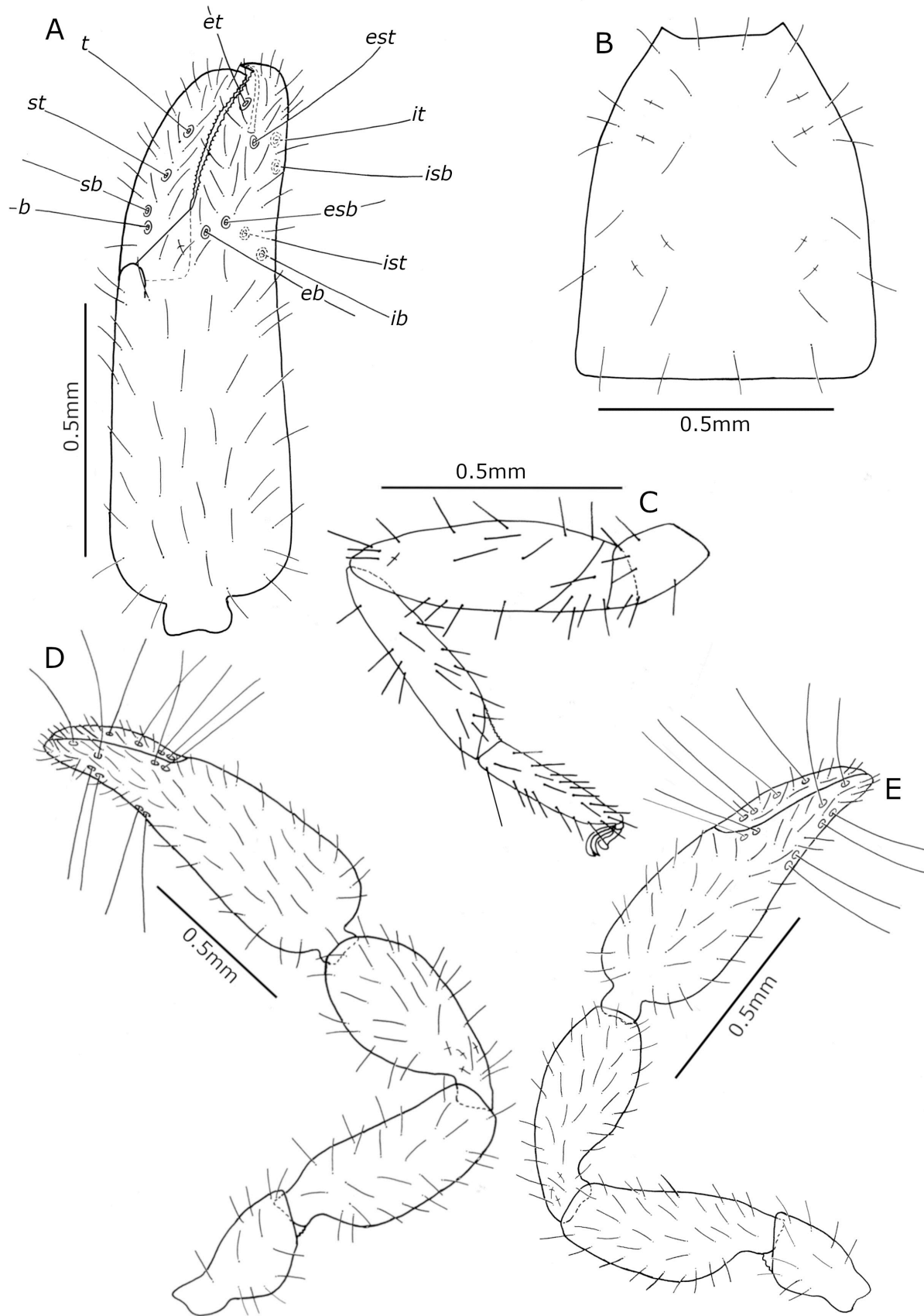
**Fig 3.** *Anatemnus eminus* sp. nov., A - C, holotype female (WAM T146825): A, body, dorsal; B, body, ventral; C, cephalothorax, dorsal; D-F, paratype male (WAM T138536): D, body, dorsal; E, body, ventral; F, cephalothorax, dorsal.

(0.510-0.655/0.210-0.310), chela (with pedicel) 1.095/0.345 (0.925-1.225/0.280-0.355), chela (without pedicel) length 1.030 (0.880-1.045), chelal hand (without pedicel) length 0.660 (0.510-0.665), movable finger length 0.380 (0.310-0.395). Carapace 0.735/0.565 (0.620-0.685/0.510-0.650). Leg IV: femur + patella 0.575/0.195 (0.415-0.660/0.120-0.185), tibia 0.465/0.100 (0.270-0.485/0.090-0.110), tarsus 0.325/0.070 (0.245-0.335/0.050-0.060).

Male paratype (WAMT138536) followed by other males. Body length (excluding chelicerae) 3.260 (2.080-2.315). Pedipalp: trochanter 0.285/0.160 (0.300-0.325/0.160-0.215), femur 0.485/0.210 (0.485-0.575/

0.190-0.260), patella 0.505/0.215 (0.445-0.655/0.220-0.295), chela (with pedicel) 0.845/0.260 (0.785-1.050/0.260-0.355), chela (without pedicel) length 0.810 (0.715-0.950), chelal hand (without pedicel) length 0.465 (0.435-0.610), movable finger length: 0.345 (0.290-0.375). Carapace 0.590/0.465 (0.555-0.755/0.475-0.530). Leg IV: femur + patella 0.485/0.145 (0.425-0.595/0.130-0.200), tibia 0.360/0.090 (0.240-0.415/0.070-0.120), tarsus 0.250/0.060 (0.285-0.325/0.050-0.070).

**Other Material** AUSTRALIA: *Western Australia*: 1 ♀, ca. 17.8 km SW. of Pannawonica, 21°43'23"S, 116°10'36"E, 27 May-13 July 2018, troglofauna trap, J. King, M. Green-



**Fig 4.** *Anatemnus eminus* sp. nov., A-D holotype female (WAM T146285): A, left chela, lateral; B, carapace; C, left leg IV, prolateral; D, right pedipalp, dorsal; E, paratype male (WAM T138536), left pedipalp, dorsal.

ham (WAMT146303); 1 ♂, ca. 17.7 km SW. of Pannawonica, 21°43'44.24"S, 116°10'56.29"E, 10 December 2015, troglofauna trap, D. Keirle, T. Sachse (WAMT143625); 1 ♂, ca. Middle Robe, Robe Valley, ca. 23 km ESE. of Pannawonica, 21°41'53.65"S, 116°32'26.53"E, 6 June-8 August 2015, troglofauna trap, J. Alexander (WAMT138462); 1 ♂, ca. 29 km ESE. of Pannawonica, 21°41'30.81"S, 116°30'51.11"E, 6 August-2 October 2015, troglofauna trap, J. Alexander (WAMT138530); 1 ♀, ca. 11.3 km SW. of Pannawonica, 21°43'08"S, 116°15'24"E, 28 May-15 July 2018, troglofauna trap, J. King, M. Greenham (WAMT131860); 1 ♀, ca. 10.7 km SW. of Pannawonica, 21°43'02"S, 116°15'50"E, 29 May-15 July 2018, troglofauna trap, J. King, M. Greenham (WAMT146295); 1 ♀, ca. 37.7 km WSW. of Pannawonica, 21°39'47"S, 115°57'30"E, 24 May-17 July 2018, troglofauna trap, J. King, M. Greenham (WAMT146284).

### Remarks

*Anatemnus eminus* occurs in subterranean environments throughout the Robe River Valley of the Pilbara bioregion (Figure 1).

### Etymology

The specific epithet refers to the presence of this species in several subterranean environments in the Pilbara bioregion (*eminus*, Latin, aloof, a spear's throw off) (Brown 1956).

### *Anatemnus capillatus*, sp. nov.

<https://zoobank.org/NomenclaturalActs/70818063-33EA-4978-A0A1-850BAFC6DE0A>

**Holotype:** AUSTRALIA: *Western Australia*: 1 ♂, Barrow Island, cave B5, 20°45'53"S, 115°22'14"E, 3 September 1991, W.F. Humphreys, W.H. Butler (WAM T156517).

**Paratypes:** AUSTRALIA: *Western Australia*: 1 ♂, collected with holotype (WAM T170415); 2 ♀, Barrow Island, cave B5, 20°45'53"S, 115°22'14"E, 25 April 1992, W.F. Humphreys, B. Vine (WAM T124436, WAM T170414).

*Anatemnus capillatus* can be distinguished from all epigeal species of *Anatemnus* by the elongate appendages and pale colouration (Figures 5, 6). It differs from the other subterranean species, including *A. eminus*, by the long and thin morphology of the pedipalpal patella, as well as having a larger number of setae on the pedipalps (Figures 6D, 6E).

### Adults

**Colour:** body pale yellow pink, carapace and pedipalps much darker than the abdomen and red brown in colouration, legs pale yellow-pink colour (Figure 5).

**Chelicera:** surface smooth with 1 lyrifissure present at upper ridge of hand, hand with 4 setae, movable finger with 1 sub-distal seta, all setae acuminate; galea elongate with 1 subdistal ramus and 2 distal rami; serrula exterior with 15 (♂), 20 (♀) blades; rallum with 4 blades.

**Pedipalp (Figures 6D, 6E):** trochanter stout and robust with anterior margin rounded, 1.76-1.98 (♂), 1.78-1.81 (♀) × longer than broad, femur with prolateral margin slightly concave and retrolateral margin convex; 3.58-4.81 (♂), 3.14-3.58 (♀) × longer than broad; patella cylindrical, robust pedicel with basal portion slimmer than distal portion, 2.30-2.72 (♂), 2.83-3.20 (♀) × longer than broad; chela: hand overtly rounded and smooth with 3 lyrifissures present at basal portion on dorsal face, chela (with pedicel) 3.06-3.23 (♂), 3.06-3.09 (♀) × longer than broad, chela (without pedicel) 2.88-3.12 (♂), 2.70-2.78 (♀) × longer than broad, hand (without pedicel) 1.42-2.22 (♂), 1.40-2.22 (♀) × longer than broad, movable finger 1-1.05 (♂), 1-1.06 (♀) × longer than hand (without pedicel). Fixed finger with 8 trichobothria; movable finger with 4 trichobothria (Figure 6A); *esb* and *eb* situated proximally at base on prolateral face, *esb* above *eb* diagonally to the right, *est* vertically in line with *ist* on prolateral face halfway between *it* and *isb*, *et* positioned on prolateral face halfway up nodus ramosus, *ib* and *ist* situated basally on retrolateral face, *b* situated adjacent to *sb*, *st* situated halfway up movable finger, *t* approximately two areolar distances apart from *st* but slightly closer to chelal jaw. Chelal teeth juxtadentate, fixed finger with 37-38 (♂), 32-38 (♀) teeth, teeth start relatively acute and become progressively rounder towards base, movable finger with 40-42 (♂), 43-44 (♀) teeth that appear juxtadentate, starting relatively acute and progressively become rounded earlier than teeth on the fixed finger. Venom apparatus only present in fixed finger, venom duct long, terminating in nodus ramosus between *et* and *it*.

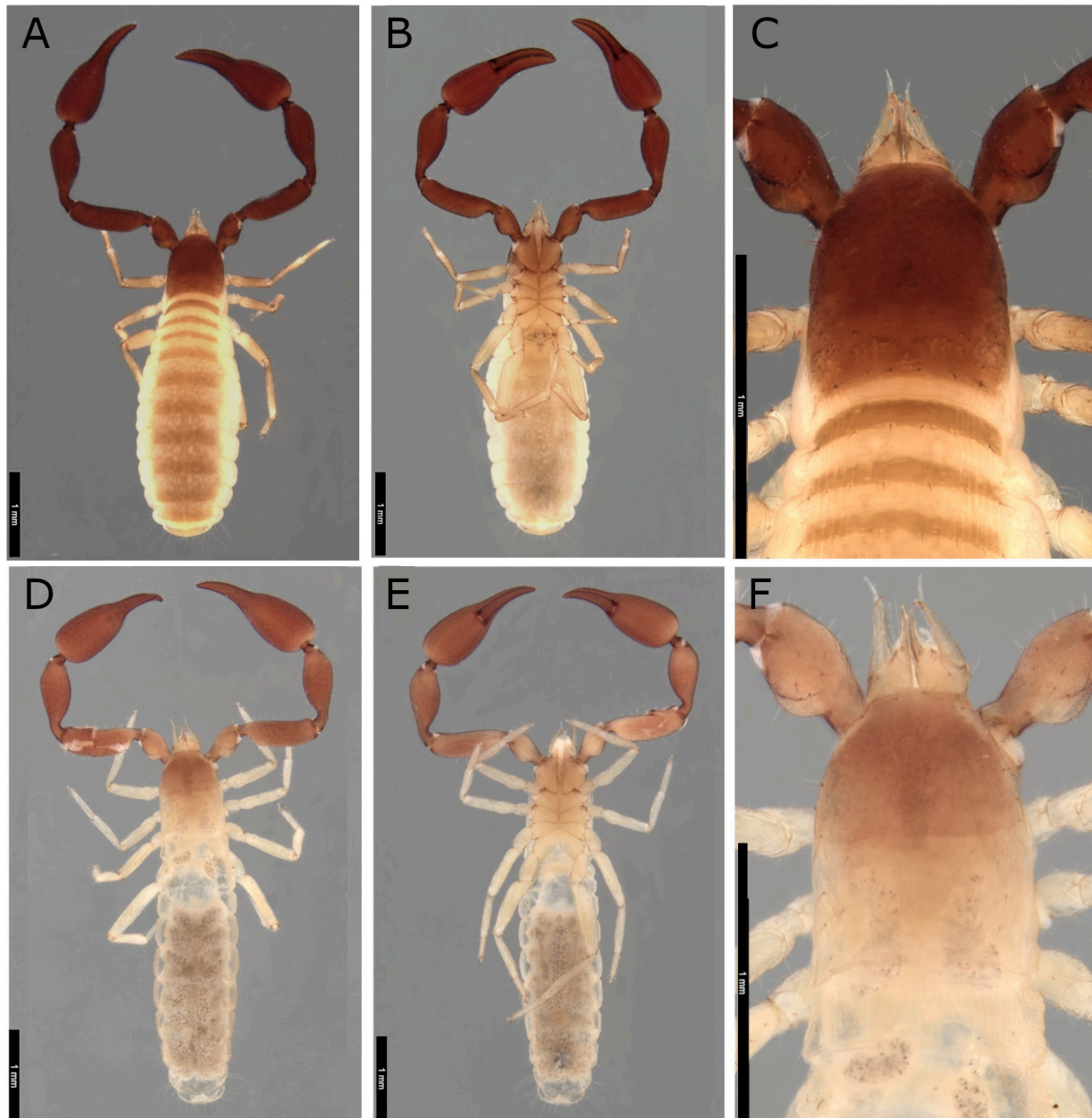
**Cephalothorax:** carapace (Figure 6B) sub-rectangular; relatively setose and smooth; anterior and posterior margin convex; 1.36-1.37 (♂), 1.28-1.47 (♀) × longer than broad; with 48 (♂ holotype), 43 (♀ paratype) setae arranged 17: 15: 5: 4: 7 (♂), 12: 11: 10: 10 (♀); without furrows; eyes absent. Chaetotaxy of coxae I-IV: 14-20: 16-20: 11-20: 18-24 (♂), 20-24: 16-20: 16-20: 24-26 (♀).

**Legs (Figure 6C):** junction between femora and patellae I and II 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; femur + patella of leg IV 3.65 (♂), 3.79 (♀) × longer than deep; tarsus with basal tactile seta, TS = 0.09 (♂), 0.10 (♀); subterminal tarsal setae arcuate and acute; arolium slightly longer than claws, not divided.

**Abdomen:** tergites straight, not divided; tergal chaetotaxy: 6: 7-10: 7-10: 10: 10-11: 10: 10: 9-10: 12-14: 12: 6-12: 2 (♂), 8: 8-9: 9: 11-12: 11-12: 8-14: 11-14: 11-12: 12: 12-13: 4-8: 2; (♀) sternal chaetotaxy: 4-10: (4) 6-8 (4): (1-2) 8-12 (1-2): 7-12: 10-12: 10-12: 12: 11-12: 12-13: 10-12: 2 (♂), 6-10: (1-4) 5-12 (1-4): (1-2) 6-14 (1-2): 13-14: 12-14: 14: 13-14: 12-13: 12-14: 10-14: 2 (♀).

**Genitalia:** male: dorsal apodeme with long and rounded apex, ejaculatory canal atrium broad, lateral apodemes





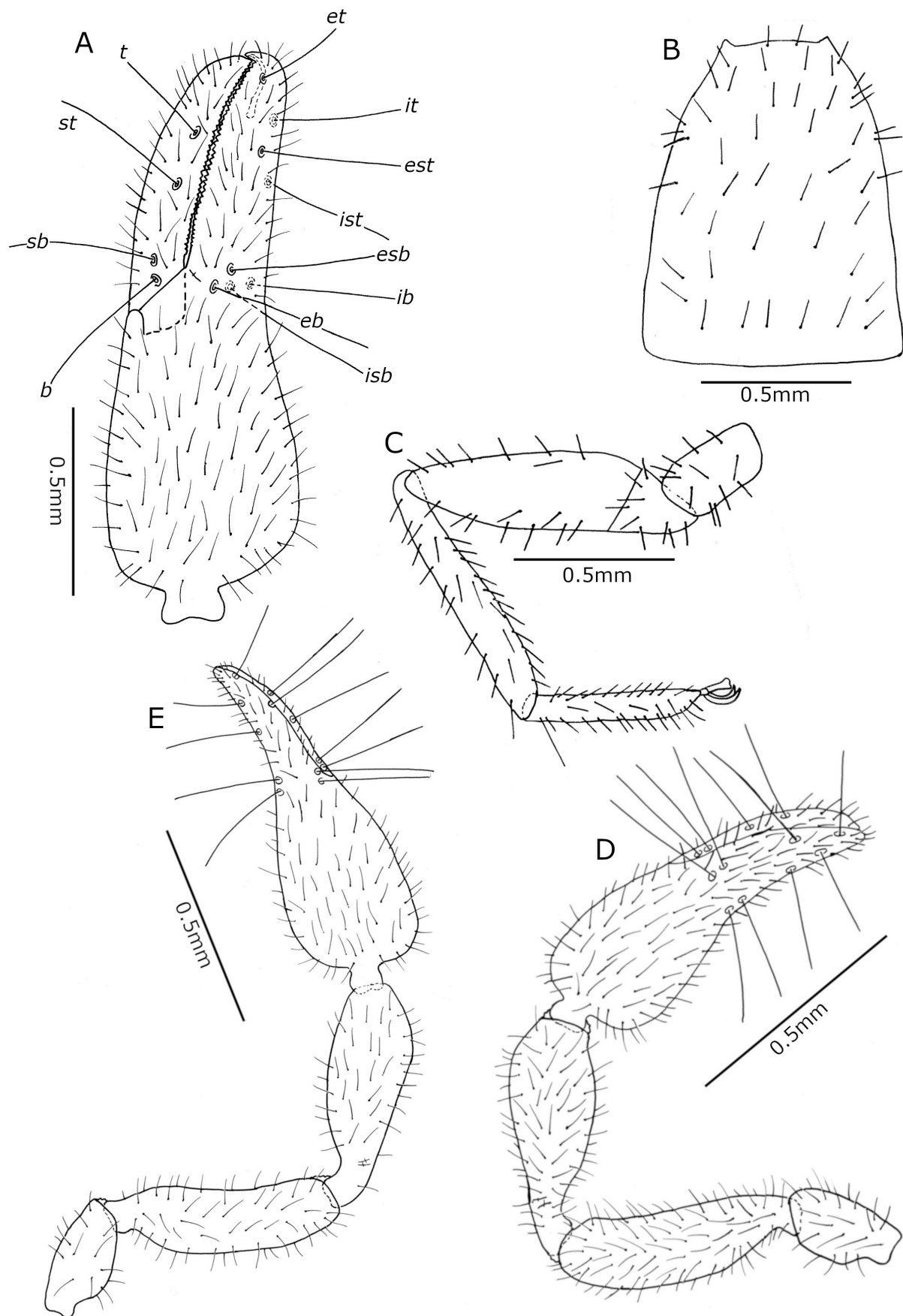
**Fig 5.** *Anatemnus capillatus* sp. nov., A-C, holotype male (WAM T156157): A, body, dorsal; B, body, ventral; C, cephalothorax, dorsal; D-F, paratype female (WAM T124436): D, body, dorsal; E, body, ventral; F, cephalothorax, dorsal.

spherical, lateral rods Y-shaped with rounded apices, hooked branches wide, genital atrium without genital setae; female: with single anteriorly directed spermathecal lobes and 1 pair of small lateral cribriform plates.

**Dimensions (mm):** Male holotype (WAM T156157) followed by male paratype (WAM T170415). Body length (excluding chelicerae): 3.710 (3.695). Pedipalp: trochanter 0.515/0.260 (0.510/0.290), femur 1.250/0.275 (0.985/0.275), patella 0.925/0.340 (0.975/0.330), chela (with pedicel) 1.485/0.485 (1.520/0.470), chela (without pedicel) length 1.395 (1.465), chelal hand (without pedicel) length 0.690 (0.685), movable finger length 0.685 (0.720). Carapace 0.945/0.690 (0.970/0.715). Leg IV:

femur + patella 0.840/0.230 (0.730/0.225), tibia 0.760/0.115 (0.745/0.110), tarsus 0.545/0.070 (0.430/0.06).

Female paratype (WAM T124436) followed by female paratype (WAM T170414). Body length (excluding chelicerae) 5.950 (4.245). Pedipalp: trochanter 0.525/0.295 (0.525/0.290), femur 1.055/0.295 (1.020/0.325), patella 1.045/0.335 (1.075/0.380), chela (with pedicel) 1.685/0.550 (1.745/0.565), chela (without pedicel) length 1.530 (1.525), chelal hand (without pedicel) length 0.765 (0.750), movable finger length 0.765 (0.740). Carapace 1.085/0.740 (1.015/0.790). Leg IV: femur + patella 0.985/0.260 (0.905/0.215), tibia 0.895/0.135 (0.855/0.110), tarsus 0.550/0.095 (0.470/0.060).



**Fig 6.** *Anatemnus capillatus* sp. nov., A-D holotype male (WAM T156157): A, left chela, dorsal; B, carapace; C, left leg IV; D, left pedipalp dorsal; E, paratype female (WAM T124436), right pedipalp, dorsal.

## Remarks

*Anatemnus capillatus* has only been found in a single cave in Barrow Island (Figure 1).

## Etymology

The specific epithet refers to the abundance of thick bristly setae on the chelal hand and pedipalp (*capillatus*, Latin, hairy) (Brown 1956).

## Disclosures

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