

1447-2554 (On-line)

<https://museumsvictoria.com.au/collections-research/journals/memoirs-of-museum-victoria/>

DOI <https://doi.org/10.24199/j.mmv.2026.85.4>

Deep-water Pycnogonids (Arthropoda, Pycnogonida) from the Indian Ocean Territories, north-western Australia collected by RV Investigator expeditions to the Australian Christmas Island and Cocos (Keeling) Islands Territories

<https://zoobank.org/urn:Isid:zoobank.org:pub:723F3A59-9AAE-4FBA-B432-BF12FAF49A92>

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Abstract

Staples D.A., 2025. Pycnogonida from the Indian Ocean Territories, north-western Australia. *Memoirs of Museum Victoria* 85: 149–160.

Six species of Pycnogonida belonging to five genera were collected by CSIRO research vessel RV Investigator expeditions to the Australian Christmas Island and Cocos (Keeling) Islands territories to the north-west of the Australian mainland. The small collection consists of four species new to science, one known deep-water species and one subadult form that remains unidentified. Specimens were gathered from the seafloor using sleds and nets at depths ranging from 328 m to 2435 m.

Keywords

Pycnogonida, Indian Ocean Territories (IOT), Christmas Island, Cocos (Keeling) Islands, deep-water

Introduction

Six species of Pycnogonida belonging to five genera were collected during a deep-water survey of Australia's Indian Ocean Territories (IOT) located around Christmas Island and Cocos (Keeling) Islands to the north-west of the Australian mainland in the western Indian Ocean. Museums Victoria led the survey, with support from CSIRO Marine National Facility and Parks Australia. The survey took place over two voyages of the CSIRO research vessel RV Investigator, the first from 30 June to 29 July 2021 (voyage IN2021-V4) and the second from 30 September to 3 November 2022 (voyage IN2022-V08). Specimens were collected from the seabed using sleds and nets at depths ranging from 328 m to 2435 m. The small collection consists of four species new to science and two species of *Colossendeis*, one of which one is unidentified. The unidentified specimen is subadult and lacks sufficient diagnostic characters to distinguish it from its congeners.

The new species identified are *Ascorhynchus turritoides* sp. nov., *Cilunculus cocos* sp. nov., *Tanystylum iotum* sp. nov. and *Pantopipetta incompta* sp. nov. All new species are represented by solitary specimens and only *C. cocos* sp. nov. is based on a mature specimen. Deep-sea sampling in remote locations presents unique challenges both in terms of logistics and financial costs. Opportunities to revisit the same sites are few, adding to the significance of the collection. The description and naming of the subadult specimens amongst this material therefore takes on added importance. Distinctive

characteristics are expected to be retained as stable and reliable diagnostic characters in the mature adult. Only *Colossendeis minor* Schimkewitsch, 1893 is represented in significant numbers. Whereas the new species are all small to tiny, with 3.8–14 mm leg spans, the large size of the *Colossendeis* specimens makes them relatively conspicuous amongst the bulk collections delivered onboard ship. For this reason, the specimen numbers of *Colossendeis* are not expected to be indicative of relative abundance.

Materials and methods

Leg span is based on twice the sum total of the leg segments (excluding the claws) of a single leg plus the width of the trunk. In the case of subadult specimens, these leg spans are not expected to be indicative of the adult.

Special consideration is given to the measurement of specimens with a nominal trunk length of less than 1.0 mm. Individual segments of each appendage are minute, and in order to maintain proportionality, each segment is measured to three decimal places.

All specimens are lodged in Museum Victoria, Melbourne (registration number prefix NMV) and stored in 70% EtOH.

Systematic account

Family Ascorhynchidae Hoek, 1881

Genus *Ascorhynchus* Sars, 1877

***Ascorhynchus turritoides* sp. nov.**

Fig. 1a–g, pl. 1a–c

<https://zoobank.org/urn:lsid:zoobank.org:act:723F3A59-9AAE-4FBA-B432-BF12FAF49A92>

Material examined. Holotype, subadult (NMV J76051), Raitt Ridge North, 13° 10' 52" S – 13° 11' 19" S, 95° 36' 03" E – 96° 38' 56" E, Indian Ocean, Cocos (Keeling) Islands, 1736–1747 m, 19 Oct 2022.

Diagnosis. Eye tubercle tall, pointed. Trunk somites 1, 2 and 3

form a flared cowl, much wider and taller than the anterior part of the preceding somite, each cowl with tall, pointed dorsomedian tubercle. Lateral processes each with single, pointed dorsodistal tubercle less than half height of the corresponding median trunk tubercle. Lateral processes 2 and 3 separated by about own diameter.

Description. Holotype, a small delicate subadult specimen, leg span about 14 mm. Trunk somites fully segmented, cephalon shorter than combined length of remaining somites, posterior margin of somites 1, 2 and 3 each formed into a flared cowl, much wider than anterior part of the preceding somite, each cowl extending dorsally into a tall, pointed process. Process on somite 1

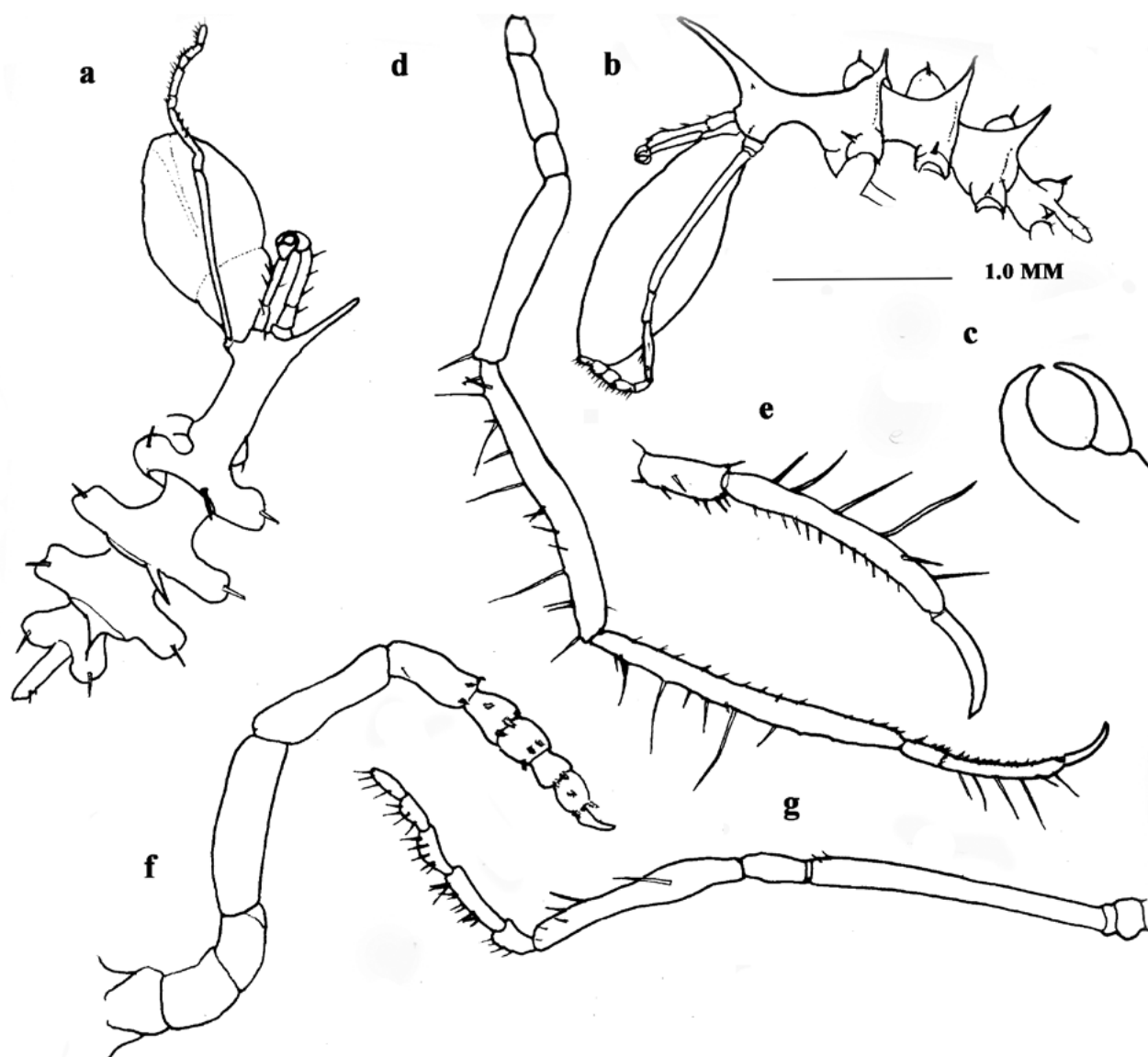


Figure 1. *Ascorhynchus turritoides* sp. nov. holotype (NMV J76051): a, b trunk dorsal and lateral; c, chela finger (freehand); d, leg 2; e, tarsus and propodus; f, right oviger; g, left palp.

shortest, about half the height of those on segments two and three, which are in turn about half the height of the eye tubercle. Length lateral processes about twice basal width, with single, pointed dorsodistal tubercle less than half height of trunk median processes. Lateral processes 1 and 2 separated by almost twice basal width, processes 2 and 3 separated by about own diameter.

Eye tubercle (fig. 1a, b) implanted near anterior margin of cephalon, slightly curved forward, without irregularities, tapering from broad base to sharply pointed apex, height (measured along posterior margin) about 4.5 times width at base. Two small but conspicuous pointed lateral sense organs near its base, eyes not evident.

Anal tubercle carried horizontally, articulated at base, cylindrical, straight, length about five times width, several dorsal and lateral setae present.

Proboscis divided by a strong proximal constriction at about one third length, basal part narrowest, jaws triradial (pl. 1c).

Chelifore scape two-segmented, first segment widest at base, shorter than distal segment, with single dorsomedian seta, second segment with five setae along outer lateral margin. Chela present, fingers gaping, strongly curved, smooth (fig. 1c).

Palp (fig. 1g) ten-segmented, not including basal cephalic process, two proximal segments very short, distinct, segment 2 shortest, segment 3 longest, about 4.5 times length of segment

4, segment 5 next longest, length about 70% of segment 3, slightly inflated proximally and bearing several strong spines, segment 6 short, segment 7 third-longest segment and the longest of the four distal segments. Segments 6–10 with ventral setae, mostly longer than the segment itself.

Oviger (fig. 1f) ten-segmented, attached to short cervical process on ventrolateral surface, distinctly separated from first lateral processes (pl. 1a), first three segments short, segment 4 longest, segment 5 slightly shorter, segment 6 half the length of segment 5, with three simple distal spines and two lateral spines, compound spine formula segments 7–10 is 4:3:2:3, mainly arranged transversely on the distal margin of each segment, each spine with 3–4 lateral teeth, smaller secondary spines evident but with unclear number and arrangement. Terminal claw curved, about as long as segment 10, with what appears to be a single, tiny median tooth on one oviger but which may be stubborn foreign matter.

Legs (fig. 1d). Tibiae with long, fine setae, femur shorter than either tibia, with low dorsodistal mound supporting long seta, tibia 2 longer than tibia 1, tarsus slightly less than one third length of propodus, propodus evenly curved, lined with about 12 sole spines, heel not developed, claw slightly less than half the propodus length, auxiliary claws absent. Cement glands and genital pores not evident.

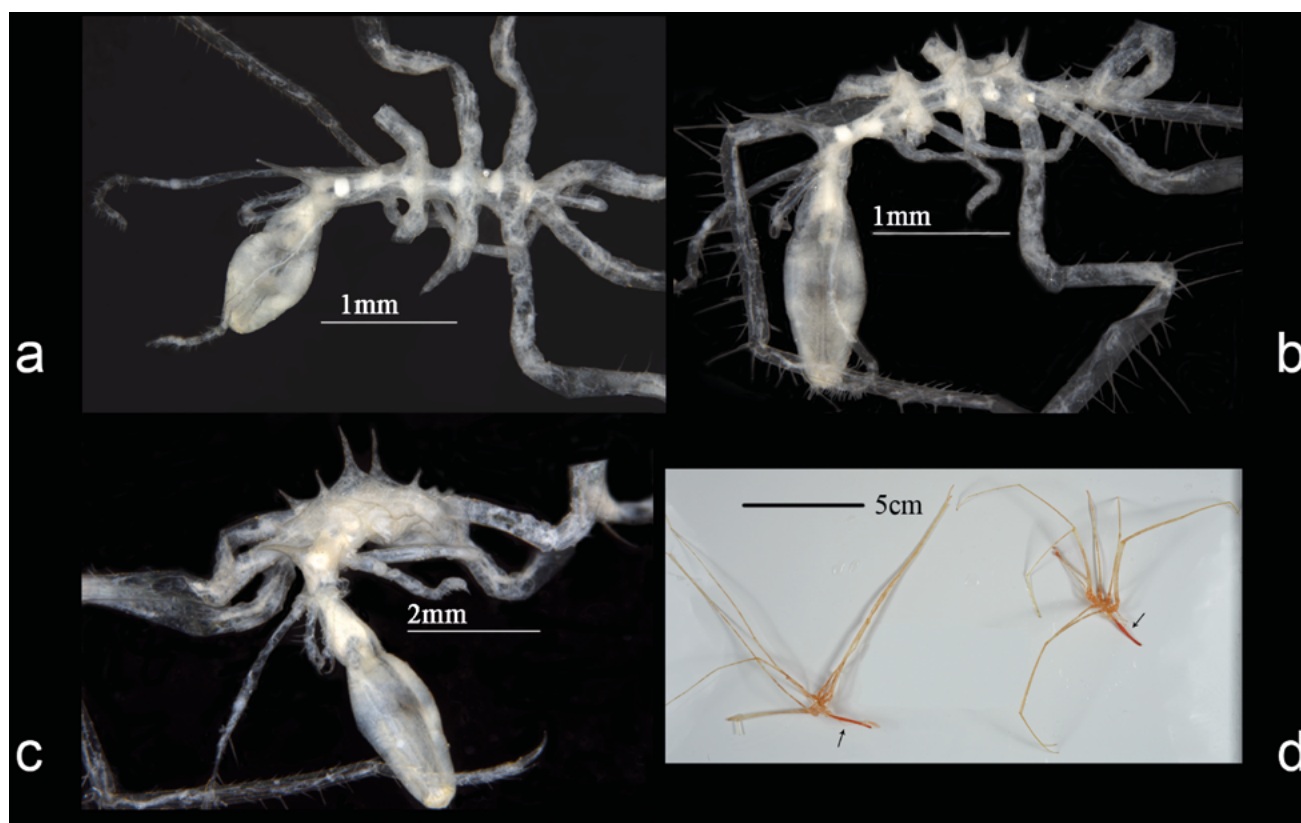


Plate 1. *Ascorhynchus turritoides* sp. nov. holotype (NMV J76051): a–c, trunk dorsal, lateral and anterior view. *Colossendeis minor* Schimkewitsch, 1893 (NMV J75991): d, two specimens (arrows indicate dorsal side).

Measurements of holotype (mm). Trunk length (frontal margin of cephalic segment to tip of 4th lateral process), 1.95; width across second lateral processes, 0.89; proboscis length (lateral), 1.47; greatest diameter proboscis, 0.59; anal tubercle length, 0.52. Palp (left): seg. 1, 0.09; seg. 2, 0.04; seg. 3, 0.81; seg. 4, 0.17; seg. 5, 0.62; seg. 6, 0.11; seg. 7, 0.19; seg. 8, 0.14; seg. 9, 0.13; seg. 10, 0.13. Oviger: seg. 1, 0.06; seg. 2, 0.16; seg. 3, 0.08; seg. 4, 0.53; seg. 5, 0.05; seg. 6, 0.26; seg. 7, 0.17; seg. 8, 0.11; seg. 9, 0.05; seg. 10, 0.11; claw, 0.11. Second leg: coxa 1, 0.20; coxa 2, 0.43; coxa 3, 0.22; femur, 1.04; tibia 1, 1.66; tibia 2, 1.70; tarsus, 0.24; propodus, 0.69; claw, 0.29.

Etymology. The specific name recognises the likeness of this species to *A. turritus* Stock, 1978.

Remarks. The presence of well-developed chelae and the apparent absence of genital pores indicate immaturity, but its general appearance and complete segmentation of the palps and ovigers, suggest that it is at an advanced stage of development. The specimen is in poor condition, with most appendages distorted and in a state of collapse. Only one leg is complete but none of the legs has escaped damage. Due to their tiny size and potential for further damage or loss, the ovigers and palps have not been dissected. Strigilis spination appears to vary between the left and right oviger; examination of a mature specimen is required for clarification.

In acuteness and height, the eye tubercle of this specimen can only be compared to *A. turritus* Stock, 1978 recorded from the Bay of Biscay and Bermuda. Stock's description of the eye tubercle of *A. turritus* as "exceedingly tall, pointed, slightly bent forward" applies equally to this species. Based on Stock's figure (Stock, 1978, fig. 2b), the base of the eye tubercle in *A. turritus* is narrower and well defined whereas in this species the flared base merges with the cephalon. Height is in the order of 4.5 to 5 times basal width. In all other species with a tall eye tubercle the height is about three times the basal width. The eye tubercle in those species is generally more robust, and either of irregular shape or positioned well posterior to the anterior margin of the cephalon. Other differences that distinguish this species are the more widely spaced lateral processes and the proportions of the tarsus and claw relative to the propodus. Stock also noted that the ovigers of *A. turritus* are "practically in contact" with the first lateral processes, but in this specimen the ovigers are distinctly separate (pl. 1a, b). The shape of the eye tubercle is the most obvious way to distinguish both this species and *A. turritus* from other forms that share acute and distally flared trunk somites.

Family Ammotheidae Dohrn, 1881

Genus *Cilunculus* Loman, 1908

Cilunculus cocos sp. nov.

Fig. 2a–h, pl. 2a–f

<https://zoobank.org/urn:lsid:zoobank.org:act:FCCE00D6-67F1-46FF-975F-4337F5AC6714>

Material examined. Holotype, adult male (NMV J76050), Cocos (Keeling) Islands, Indian Ocean, 11° 49' 56" S – 11° 50' 37" S, 96° 37' 36" E – 96° 38' 56" E, 1896 m, T. O'Hara et al., 4–15 Oct 2022.

Diagnosis. A small species. Trunk somites inflated posteriorly, without processes or setae, lateral processes long, slender, length about three times basal width, no setae or tubercles, first processes orientated forward and upwards. Cephalic hood present, no horns over bases of chelifores. Eye tubercle very small, inconspicuous.

Description. Male holotype. A small flimsy specimen (leg span 9.3 mm). Somites segmented, posterior margins of trunk somites 1–3 form low cowls over anterior part of proceeding segment, lateral processes smooth. Cephalon without horns or spurs, bases of palps and scapes concealed by shallow anterior hood. Lateral processes slender, length about three times basal width, first processes upcurved and directed slightly forward (fig. 2a, b), processes 3 and 4 separated by about three times basal width.

Eye tubercle placed on anterior margin of cephalon, very small short conical tip facing forward, four tiny unpigmented eyes.

Proboscis bulbous, ovoid, with short constricted basal part, orientation ranges from horizontal to vertically downwards (pl. 2b, c).

Chelifore scape short, one-segmented, basal half obscured by the cephalic hood, single spine on inner lateral margin, chela atrophied.

Palp (fig. 2f) nine-segmented, first segment placed beneath hood, segment 2 longest, segment 4 next longest, distal five segments with long ventral setae (pl. 2c).

Oviger (fig. 2g, h) ten-segmented, bases attached to short ventrolateral cervical processes, not in contact with first lateral processes, terminal claw slender, pinnate, compound spine formula difficult to determine but appears to be 1:1:2:2.

Anal tubercle unsegmented at base, length 5.5 times mid-width, slender, margins almost parallel, slightly tapered distally, two small lateral distal setae.

Leg 3; (fig. 2c) all segments with very long, fine setae some up to three times width of segment, second coxa 2.8 times length coxa 1, tibia 2 longest segment, tibia 1 longer than femur, tarsus short, propodus moderately curved, heel not raised, single strong heel spine, 7–9 smaller sole spines, main claw slender about half length of propodus, auxiliary claws a little shorter than main claw. Femoral cement glands legs 3 and 4 only, very long, unarticulated, length more than twice corresponding width of femur (pl. 2f). Genital pore opening through a short truncate ventrodistal cone on second coxae legs 3 and 4 (pl. 2d, f), small spine on outer edge.

Measurements of holotype (mm). Trunk length (frontal margin of cephalic segment to tip of 4th lateral process), 1.35; width across second lateral processes, 0.07; proboscis length (lateral), 0.81; greatest diameter proboscis, 0.34; anal tubercle length, 0.39. Palp: seg. 1, 0.05; seg. 2, 0.41; seg. 3, 0.08; seg. 4, 0.24; seg. 5, 0.06; seg. 6, 0.07; seg. 7, 0.05; seg. 8, 0.05; seg. 9, 0.04. Oviger: seg. 1, 0.10; seg. 2, 0.38; seg. 3, 0.07; seg. 4, 0.39; seg. 5, 0.35; seg. 6, 0.10; seg. 7, 0.69; seg. 8, 0.05; seg. 9, 0.05; seg. 10, 0.20. Third leg: coxa 1, 0.12; coxa 2, 0.36; coxa 3, 0.18; femur, 0.95; tibia 1, 1.23; tibia 2, 1.31; tarsus, 0.06; propodus, 0.39; claw, 0.19; aux claws 0.18.

Etymology. The specific name alludes to the close proximity of the collection site to the Cocos Islands (noun in apposition).

Remarks. Two Australian species of *Cilunculus* are described from New South Wales waters: *C. australiensis* Clark, 1963 from Port Hacking and Wollongong (unpublished) and *C. hirsutus* Clark, 1963 from near Botany Bay. Arango (2009)

recorded an unidentified subadult specimen from Albany Western Australia, at a depth of 776 m. Two additional species from southern Australia will be described in following papers. Both *C. australiensis* and *C. hirsutus* are readily distinguished

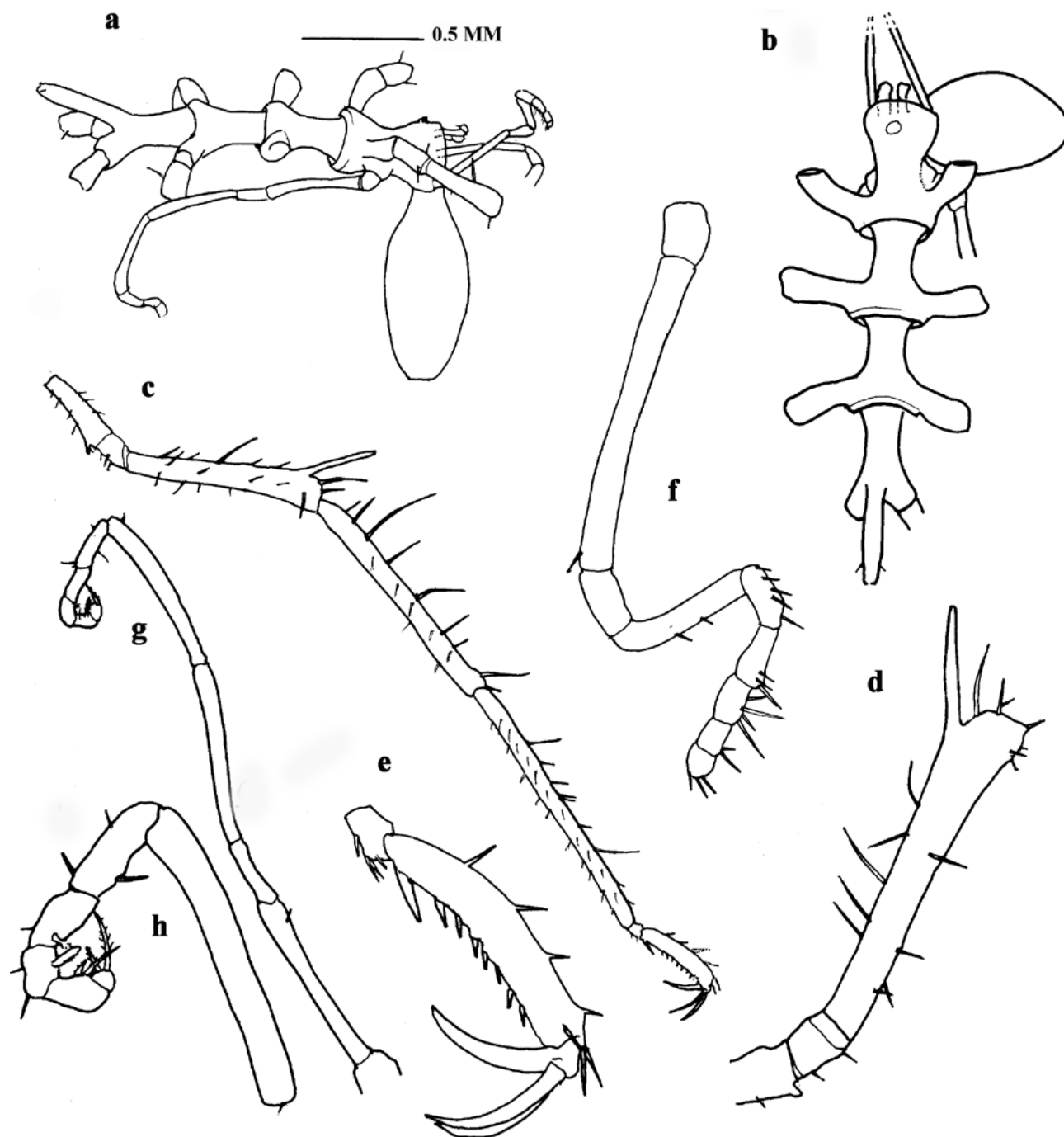


Figure 2. *Cilunculus cocos* sp. nov., holotype (NMV J76050): a, b, trunk lateral and dorsal views; c, leg 3; d, femur leg 3, e, tarsus and propodus leg 3; f, right palp; g, h, right oviger and strigilis.

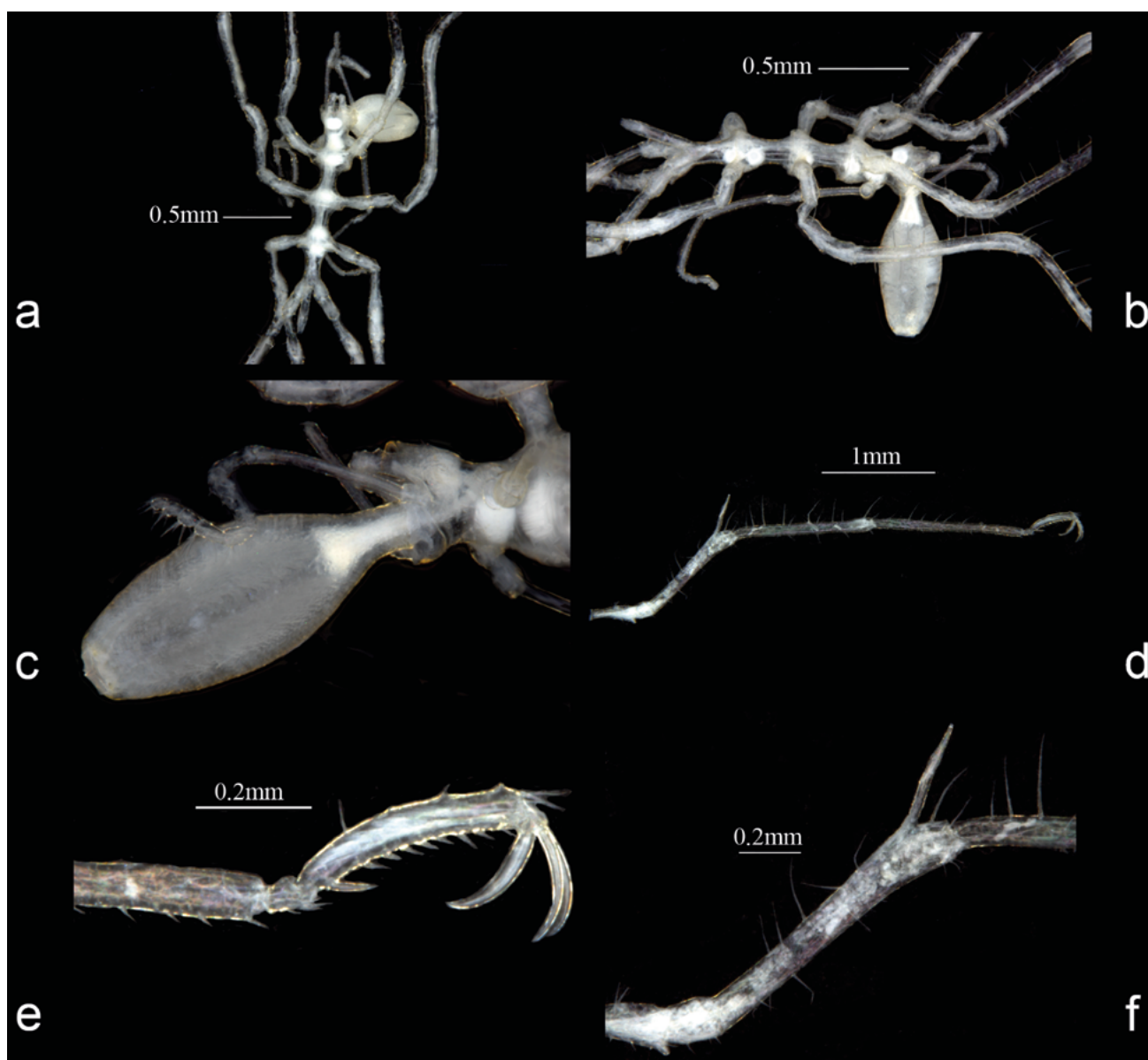


Plate 2. *Cilunculus cocos* sp. nov., holotype (NMV J76050): a, b, trunk, lateral and dorsal views; c, proboscis lateral; d, leg 3; e, tarsus and propodus; f, femur, showing cement gland tube in detail.

from their congeners by their well-developed eye tubercles and more compact habitus. The Albany specimen differs in having lateral processes separated by less than their own diameter, palp segments 6–10 subequal and tiny auxiliary claws. The right palp of this species was lost after dissection and the left palp was measured whilst intact.

With the possible exception of *C. galeristus* Nakamura and Child 1991, no other species appears to share the upturned first lateral processes with this species. Although Nakamura and Child did not mention the orientation of the lateral processes, their figures do not rule out the possibility that the first lateral processes in *C. galeristus* are also inclined upwards (Nakamura

and Child, 1991, figs 7a, d). This species is otherwise unique amongst its congeners by possessing a combination of a low eye tubercle, smooth lateral processes and auxiliary claws almost as long as the main claw. In the presence of widely spaced lateral processes and low eye tubercle, it is similar to *C. crintus* Stock, 1991 from New Caledonia, but that species differs conspicuously in possessing long spines on the lateral processes. The widely spaced lateral processes, single heel spine and long auxiliary claws also invite comparison with *C. sekiguchii* Nakamura and Child 1983: 35, but that species has a tall eye tubercle and is armed with long dorsodistal setae on the lateral processes.

Family Austrodecidae Stock, 1954**Genus *Pantopipetta*** Stock, 1963***Pantopipetta incompta*** sp. nov.

Figs 3a–d, pl. 3a

<https://zoobank.org/urn:lsid:zoobank.org:act:EB60A25F-2B92-46C7-8EC0-D795AA32A20D>

Material examined. Holotype (juvenile, probably female) (NMV J76220), IN2022 VO8 163G Indian Ocean, Cocos (Keeling) Islands Territory, Indian Ocean Territories, Muirfield Seamount, 13° 10' 51" S, 96° 15' 03" E, RV Investigator, 528–527 m, Gandalf net (on beam trawl), 21 Oct 2022. Collector O'Hara et al. and Marine Invertebrates team.

Diagnosis. Trunk without dorsal tubercles or processes. Lateral processes smooth, length 3.8 times basal width, widely spaced. Eye tubercle extremely tall, stick-like, slightly bulbous at tip. Auxiliary claws absent. Proboscis, slender, annulated, pipette-shaped. Anal tubercle slender, inclined at about 45°, length about five times width.

Description. Leg span about 5.3 mm. Trunk segmented, without dorsal tubercles or processes, glabrous, width of trunk somite 4 about half that of somites 1–3, trunk lateral processes long, smooth, widely spaced, processes 1 and 2 longest, length about four times basal width, processes 3 and 4 much shorter, fourth processes shortest, processes 2 and 3 separated by about 1.8 times basal width. Cephalon less than half length of remainder of trunk.

Eye tubercle extremely tall, base unclear but appears to be distinctly swollen; stem distal to the base slender, smooth, stick-like, tip slightly bulbous with tiny median papilla and two raised sense organs. Four unpigmented eyes at tip (fig. 3b).

Anal tubercle slender, inclined at about 45°, arched, two distal spines, length about six times mid-width, cylindrical, segmentation at base not evident (fig. 3b).

Proboscis annulated distally, proximal part smooth, not conspicuously swollen, proximally curving downward before curving sharply upwards to form overarching distal part, jaws vertically bilateral and extending partially on to the ventral surface.

Palp seven-segmented, not including the basal cephalic process. Segment 1 short; segment 2 longest with well-developed spine on inner margin prior to mid-length; segment 3 one fifth length of segment 2; segment 4 next longest, two thirds length segment 2, three strong spines present on inner margin and several distal spines, segments 5–7 short (segment 7 shortest), many distal setae (fig. 3d).

Oviger partially developed, rudimentary, unsegmented.

Leg 2 (fig. 3c). Auxiliary claws absent. There is no evidence of a femoral cement gland duct, tibia 1 with long dorsodistal seta and tibia 2 with similar subterminal seta, dorsodistal seta on femur about one third length of spines on coxae, coxae 2 and 3 with single ventrodistal spine, dorsal processes absent, legs 3 and 4 more slender and shorter than legs 1–2: coxa 2 about 2.5 times length coxa 1, tibia 1 longest segment, femur longer than tibia 2, tarsus short with 3 ventral

spines, propodal heel absent, sole with nine spines, terminal claw smooth, half the length of propodus.

Measurements of holotype (mm). Trunk length (frontal margin of cephalic segment to tip of 4th lateral process), 0.708; eye tubercle length 0.331; width across second lateral processes, 0.523; proboscis length (dorsal), 0.723; anal tubercle, 0.192. Palp: seg. 1, 0.030; seg 2, 0.315; seg. 3, 0.046; seg. 4, 0.261; seg. 5, 0.038; seg. 6, 0.460. Leg 2: coxa 1, 0.616; coxa 2, 0.154; coxa 3, 0.069; femur, 0.438; tibia 1, 0.477; tibia 2, 0.423; tarsus, 0.038; propodus, 0.154; claw, 0.077.

Etymology. Latin, *incompta* unadorned, referencing the absence of seta or protuberances on the trunk.

Remarks. The eye tubercle has been bent at right angles to the trunk axis but is complete. Rather than risk losing the tiny dissected parts, the eye tubercle and palps are illustrated intact. The ovigers are rudimentary, with terminal claw not yet developed. The linear arrangement of the distal palp segments, combined with the absence of dorsomedian trunk processes and the long, widely-spaced lateral processes, adequately distinguish this specimen from the closely related genus *Austrodecus*.

The genera *Pantopipetta* and *Austrodecus* are morphologically so closely allied that it is appropriate to transpose terminology. Stock (1957) identified two forms of eye tubercle in the *glaciale* section of *Austrodecus*, which he found formed the basis of a natural taxonomic division. He designated these forms as “long-eyed” and “short-eyed”, but in some cases these designations are clouded by intermediate forms. Stock did not actually define his terminology, but seems to have relied on differences that are self-evident. The eye tubercle of *P. incompta* sp. nov. is most like that of the long-eyed *Austrodecus excelsum* Stock, 1991, which Stock described as “stick-like”, presumably due to its extremely long, slender and parallel-sided ascending stem. For the sake of consistency, the term “stick-like” is applied here. In the same paper, Stock described *A. tuberculatum* Stock, 1991, which shared an eye tubercle of identical shape and *A. bathyale* Stock, 1991, which differed only in having a much shorter eye tubercle stem. Stock did not attribute the shorter stem to damage. Given that the adult type material of *A. excelsum*, *A. tuberculatum* and *A. latum* Stock, 1991 share a common stick-like eye tubercle, it is most unlikely that the juvenile eye tubercle of *P. incompta* will change to any appreciable extent. In those species, the base of the tubercle is well defined and although the shape of the eye tubercle base in *P. incompta* is unclear, there is nothing to suggest that it differs in any significant respect from the *Austrodecus* species. Based on published figures, only *P. armoricana* (Stock, 1978) and perhaps *P. auxiliata* (Stock, 1968) appear to share a similarly shaped eye tubercle with the new species, but as with other long-eyed species in the genus, the eye tubercle tapers from an inflated and ill-defined base. Only *P. lenis* Hosodai and Kakui, 2020 and *P. hosodai* Kakui and Fujita, 2023 in that group share the absence of prominent tubercles on the lateral processes with *P. incompta* but both species are readily distinguished by the presence of propodal auxiliary claws.

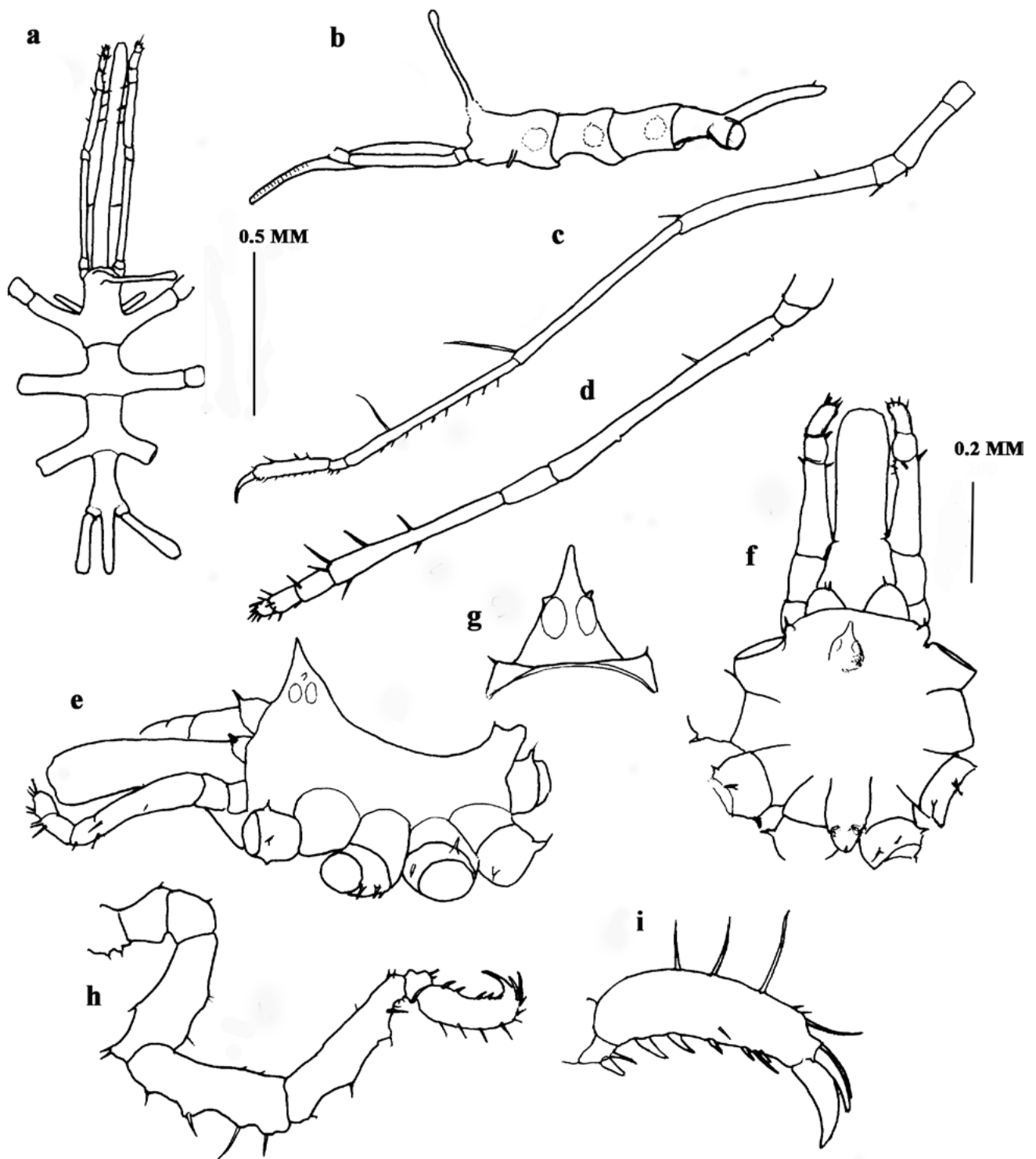


Figure 3. *Pantopipetta incompta* sp. nov., holotype (NMV J76220): a, b, trunk dorsal and lateral views; c, leg 2; d, left palp. *Tanystylum iotum* sp. nov., holotype (NMV J76221): e, f, trunk dorsal and lateral; g, eye tubercle anterior view; h, i, leg 1 and propodus.

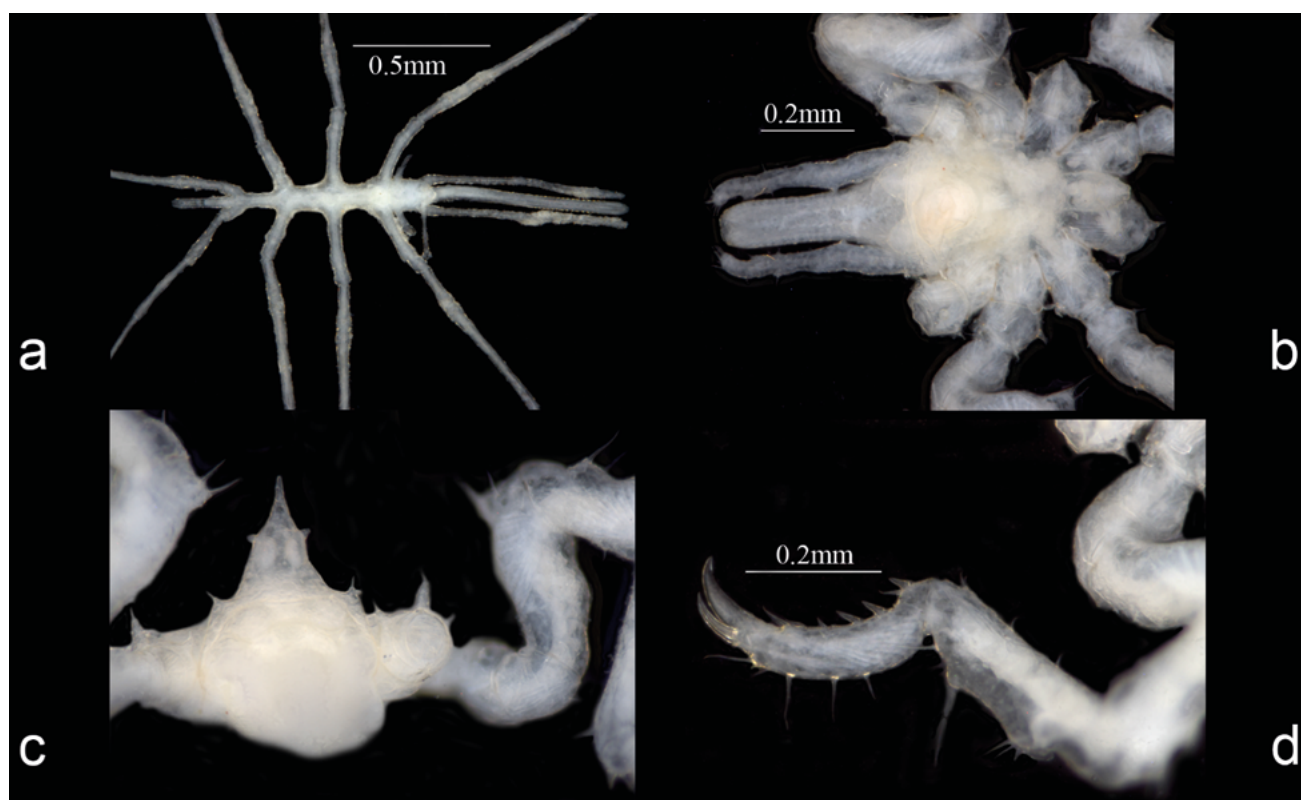


Plate 3. *Pantopipetta incompta* sp. nov., holotype (NMV J76220): a, trunk, dorsal. *Tanystylum iotum* sp. nov., holotype (NMV J76221): b, trunk dorsal; c, eye tubercle; d, leg 4, distal segments.

Genus *Tanystylum* *Miers, 1877

*See Child (1992: 33) regarding comments on publication date.

Tanystylum iotum sp. nov.

Fig. 3 e–i, pl. 3b–d

<https://zoobank.org/urn:lsid:zoobank.org:act:E7E7A912-7B78-4D0F-9D87-0E146791AC4F>

Material examined. Holotype. Juvenile, (NMV J76221), Indian Ocean, Cocos (Keeling) Islands Territory, Indian Ocean Territories, IN2022 VO8 163G, 11° 51' 27" S, 096° 47' 24" E, RV Investigator, Gandalf net (on beam trawl), 404–328 m, 14 Oct 2022. Collected by O'Hara et al. and Marine Invertebrates team.

Diagnosis. Trunk discoid, smooth, unsegmented, lateral processes touching, without spines or tubercles. Eye tubercle conical, tip pointed, lateral sensory processes prominent.

Description. Specimen tiny, leg span about 3.8 mm. Trunk (fig. 3e, f) smooth, unsegmented, discoid, lateral processes touching, without setae, spines or tubercles. Cephalon with two spine-tipped mounds on anterolateral corners.

Eye tubercle conical, broad at base, apical cone tapered to sharp point (pl. 3c, fig. 3g), surface with several minute setae, four eyes, unpigmented in preserved specimen, lateral sense organs projecting, positioned about level with top of eyes.

Proboscis bottle-shaped, proximal part very broad, swollen ventrally, distal part slightly downcurved, about 2.25 times length of proximal part, tip blunt, rounded.

Chelifore atrophied, forming bulbous protrusions from anterior margin of cephalon. Several tiny anterior spinules.

Palp possibly five-segmented, immature segmentation indistinct, potentially confused by the presence of obscure suture line (s), segment 1 short, segment 2 twice length segment 1, segment 3 longest, widest proximally, with strong spine-tipped lateral spur on interior margin and several short distal setae, segment 4 short, bearing ventral setae, terminal segment longer than segment 4, curved, with well-developed distal setae (fig. 3e).

Ovigers rudimentary.

Anal tubercle erect, unsegmented at base, broad, stepped dorsally, two small spines at base of lower stepped part (fig. 3e).

Leg surface with irregular spine-tipped swellings (fig. 3h). Coxa 1 with three small spine-tipped dorsodistal tubercles, coxa 2 about 1.3 times length of coxa 1. Tibia 2 longest segment, tibia 1 longer than femur, femur surface smooth, dorsodistal swelling bearing three long setae, tibiae with rounded, dorsal swellings each bearing a single, long, fine spine (fig. 3h). Tarsus with strong spine and one finer spine, two widely spaced heel spines, heel not raised, sole with about three robust spines, auxiliary claws about half length of main claw (fig. 3i).

Measurements of holotype (mm). Trunk length (frontal margin of cephalic segment to tip of 4th lateral process), 0.410; greatest width lateral processes, 0.410; proboscis length (dorsal), 0.420; anal tubercle length, 0.080. First leg: coxa 1, 0.092; coxa 2, 0.123; coxa 3, 0.077; femur, 0.354; tibia 1, 0.377; tibia 2, 0.415; tarsus, 0.046; propodus, 0.231; claw, 0.107; aux. claws, 0.077.

Etymology. The specific name is an abbreviation of Indian Ocean Territories (IOT).

Remarks. This species belongs to a group that shares a bottle-shaped proboscis and slightly downcurved rounded tip. Only *T. paramexicanum* Müller and Krapp, 2009 and perhaps *T. chierchia* Schimkewitsch, 1887 share a trunk surface without tubercles, bumps or spines, but both species have an eye tubercle with a stepped posterior surface and tubular anal tubercle. A few species share a strong spine on the inner surface of palp segment 3 or 4 but only in *T. chierchia*, *T. calicrostrum* Schimkewitsch, 1890 and *T. tubrostrum* Stock, 1954 does the spine appear to originate from a rarely mentioned basal prominence similar to that in this species. The tiny size of this specimen makes dissection of appendages impractical.

Family Colossendeidae Hoek, 1881

Genus Colossendeis Jarzynsky, 1870

Colossendeis minor Schimkewitsch, 1893

Pl. 1d

Colossendeis minor Stock, 1984: 702–704, figs 1–6.—Bamber and Thurston, 1995: 144 (key), 148 fig. 9.—Bamber, 2002, 720–723.—Bamber, 2010: 54–55, fig. 90.—Bamber, 2011, 62.

Colossendeis macerrima minor Schimkewitsch, 1893: 30, figs 7–10, 14, 15.—Turpaeva, 1971 289–290 pl. 7 figs 6–7.

Colossendeis macerrima Bouvier, 1917: 10–13.—Stock, 1984: 702–704, figs 1–6

Material examined. Two adults (NMV J75991), 643–997 m, **IN2021, V04 005, Indian Ocean**, 6/7/2021. One adult (NMV J75992), 3200–3345 m, IN2021, V04 007, Christmas I., Indian Ocean (10° 33' 22" S – 10° 32' 34" S, 105° 45' 61" E – 105° 46' 18" E), 7/7/2021. One adult (NMV J75993), 957–1154 m, IN2021, V04 009, Christmas I., off McPherson Point, (10° 26' 11S – 10° 26' 11" S, 105° 34' 30" E – 105° 36' 16" E), Indian Ocean, 7/7/2021. One specimen (NMV J75997), 2418–2156 m, IN2022, V08 187, (13° 33' 42" S – 13° 33' 10" S, 096° 22' 06" E – 096° 22' 56" E), Indian Ocean, 25/10/2022. One adult (NMV J76000), 2435–2298 m, IN2022, V08 105, (11° 38' 04" S – 11° 39' 40" S, 104° 11' 25" E – 104° 13' 33" E), Indian Ocean, 7/10/2022. One adult (NMV J76001), 2435–2298 m, IN2022, V08 105, (11° 38' 04" S – 11° 39' 40" S, 104° 11' 25" E – 104° 13' 33" E), Indian Ocean, 7/10/2022. Three specimens (NMV J76004), 932–965 m, IN2022, V08 165, (13° 14' 32" S – 13° 15' 08" S, 096° 17' 31" E – 096° 18' 10" E), Indian Ocean, 21/10/2022. One specimen (NMV J76005), 1023–1019 m, IN2022, V08 157, (13° 14' 38" S – 13° 15' 39" S, 096° 04' 53" E – 096° 05' 56" E), Indian Ocean, 20/10/2022. One subadult (NMV J76007), 820–822 m, IN2021 V08 126, (11° 47' 30" S – 11° 47' 30" S, 096° 50' 26" E – 096° 51' 33" E), Indian Ocean, 14/10/2022. One subadult (NMV J75994), 1285–1350 m, IN2021, V04 035 Apollo Seamount, Indian Ocean (11° 24' 45" S – 11° 24' 46" S, 104° 56' 32" E – 104° 57' 55" E), 13/7/2021.

Remarks. A widely distributed Indo-Pacific species, also known from the NE Atlantic, with a depth range of 850–4850 m (Bamber, 2011: 62). The large size of many specimens in this family has given prominence to variations in ratios and proportions that may also be present in much smaller pycnogonids but largely overlooked. In some cases, reliance on these variables appears to have given rise to tenuous relationships and led to expanded diagnoses that either overlap or form an uneasy continuum between species. Bamber (2002) provided an excellent summary of the *C. macerrima* complex to which these species belong. Two forms in particular, *C. minor* Schimkewitsch, 1893 and *C. gardineri* Carpenter, 1907, have slender proboscides with a distinctly upcurved tip much narrower than the basal part. Specimens in this collection conform most closely with *C. minor* based on (1) the proboscis shape and length (proboscis about twice the length of trunk), (2) spination of tarsus and propodal sole (lined with barely evident spinules or setae) and (3) palp segment 10 longer than segment 9 (about 1.3 times). Turpaeva (1994) was of the opinion that morphological differences between *C. minor* and *C. gardineri* are age-related, but none of the subadult forms in this collection share the propodal sole spination characteristic of *C. gardineri*.

***Colossendeis* sp.**

Pl. 4 a, b

One subadult (NMV J76006). 2435–2298 m, IN2022 V08 105 123, Indian Ocean, 7/10/2022.

This subadult specimen is without clearly defined characters that enable it to be either assigned to a known species or to be described as a new species with confidence. Unfortunately, the terminal segment of each palp is missing and the trunk is rather distorted. The eye tubercle is low and its true shape is unclear. The proboscis is straight and the tip is in the order of 1.6 times the base width. Reliance on ratios and proportions is problematic in juveniles and it seems incautious to speculate on species status. In possession of an articulated oviger claw, this specimen conforms to the description of the juvenile *C. tasmanica* Staples 2007 and in particular, in its shape (Staples, 2007, fig. 3g) but the shape of the proboscis is inconsistent with that species.

Acknowledgments

The author would like to thank and acknowledge the Chief Scientist for the voyages, Dr Tim O'Hara. This research was supported by a grant of sea time on RV Investigator from the CSIRO Marine National Facility (MNF, <https://ror.org/01mae9353>) and operational support and funding from Australia's Department of Climate Change, Energy, the Environment and Water through the Parks Australia and Bush Blitz programs. The authors also acknowledge The Nippon Foundation-Nekton Ocean Census Programme (<https://oceancensus.org/>) for supporting the discovery and description of these species. The voyages form part of the Second International Indian Ocean Expedition's endorsed project IIOE2-EP40. The constructive observations and recommendations by the reviewers are very much appreciated.



Plate 4. *Colossendeis* sp. (NMV J76006): a, trunk, lateral view; b, oviger terminal segments.

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