European Journal of Taxonomy 970: 138–174
https://doi.org/10.5852/ejt.2024.970.2755
ISSN 2118-9773
www.europeanjournaloftaxonomy.eu
2024 · Leduc D.

Research article

urn:lsid:zoobank.org:pub:D69E85B6-D756-4862-AA0B-43C33A442CB8

Four new free-living marine nematode species (Plectida: Ceramonematidae) and two new species records (Desmodorida: Desmodorinae) from Rangitāhua / Kermadec Islands, Aotearoa / New Zealand

Daniel LEDUC

National Institute of Water and Atmospheric Research, Wellington, 14–901, New Zealand.
Email: Daniel.Leduc@niwa.co.nz

urn:lsid:zoobank.org:author:9393949F-3426-4EE2-8BDE-DEFFACE3D9BC

Abstract. Kermadec Islands is a remote subtropical island arc in the Southwest Pacific Ocean located 800–1000 km northeast of New Zealand's North Island. Until now, no data was available on the nematode fauna living in the seafloor environments surrounding these islands. A single sample of subtidal coarse sediments from the Raoul Island coast yielded four new ceramonematid species: *Ceramonema taikoraha* sp. nov., *C. taiora* sp. nov., *Metadasynemoides taihua* sp. nov. and *Pselionema huakita* sp. nov. This new discovery is the first addition to the family since 2008 and brings the total number of valid ceramonematid species globally to 67 species. Dichotomous identification keys are provided for valid species of *Ceramonema*, *Metadasynemoides* and *Pselionema*. The desmodorid species *Acanthopharynx dormitata* and *Desmodora bilacinia*, were also recorded from Raoul Island some 1350 km away from their type locality in Wellington Harbour (New Zealand's North Island). These species may have a relatively widespread distribution but testing this hypothesis will require further morphological comparisons and analyses of molecular sequence data to confirm the status of the Kermadec specimens.

Keywords. Nematoda, Meiofauna, subtidal, Raoul Island, Ngāti Kuri.

Leduc D. 2024. Four new free-living marine nematode species (Plectida: Ceramonematidae) and two new species records (Desmodorida: Desmodorinae) from Rangitāhua / Kermadec Islands, Aotearoa / New Zealand. *European Journal of Taxonomy* 970: 138–174. https://doi.org/10.5852/ejt.2024.970.2755

Introduction

The family Ceramonematidae Cobb, 1933 is a group of globally distributed, free-living nematodes found exclusively in marine environments, and most commonly in shallow coarse sediments. The family currently comprises seven valid genera and 63 valid species (Holovachov 2014), and is thought to be monophyletic based on the synapomorphy of unique ornamentation of the body annules overlapping the adjacent annules (Lorenzen 1981). Ceramonematid nematodes are indeed easily recognized by the broad, thick and often ornamented cuticularized body annules, which may provide protection against physical damage from shifting sediment particles in highly hydrodynamic environments. The family was

most recently revised by Tchesunov & Miljutina (2002) and Holovachov *et al.* (2008a, 2008b) provided the most recent species descriptions. The latter author did not follow the subdivision of the family into the Ceramonematinae Cobb, 1933 and Pselionematinae De Coninck, 1965 subfamilies adopted by Tchesunov & Miljutina (2002), as this division was based on a single trait (i.e., setiform vs papilliform outer labial sensilla) and ignored variability in other important morphological characters.

Recent collections of shallow sediments from Rangitāhua / Kermadec Islands, a remote subtropical island arc in the South Pacific Ocean located 800–1000 km northeast of Aotearoa / New Zealand's Te Ika-a-Māui / North Island, provided an opportunity to investigate the taxonomy and diversity of nematodes in the shallow habitats surrounding the islands for the first time. In this material, I discovered four new free-living marine nematode species of the family Ceramonematidae, which are describe here. Two species of the family Desmodoridae originally described from the Wellington / Te Whanganui-a-Tara coast on New Zealand's lower North Island were also found.

Rangitāhua is within the rohe (territory) of Ngāti Kuri, with the islands having spiritual, cultural and customary significance (Ngāti Kuri Trust Board 2013). As kaitiaki (guardians / stewards), Ngāti Kuri seek to understand and protect the biota dwelling on land and in the seas around these islands, regarding the biota as taonga (treasures) and recognising the national and international significance of the unique diversity and assemblages found at Rangitāhua. One of the current priorities for Ngāti Kuri is the documentation of the species occurring within their rohe. The research reported here was undertaken collaboratively with Ngāti Kuri, who have contributed to the process of scientific naming through mātauranga Māori (Māori knowledge).

Material and methods

Samples were obtained from the coast of Raoul Island, the largest of the Kermadec Islands, located 1100 km north north-east of New Zealand's North Island. Sediment was collected in November 2021 at 15–16 m water depth at three locations using a pipe dredge (Fig. 1). The sediment samples were fixed in 5% buffered formalin upon collection. In the laboratory, samples were rinsed on a 45 µm mesh to remove the formalin and were transferred to freshwater. The nematodes were extracted by agitating each sample in a bucket and decanting the overlying water over a 45 µm mesh. Nematodes were handpicked under a stereo microscope and transferred to pure glycerol (Somerfield & Warwick 1996).

Species descriptions were made from glycerol mounts using differential interference contrast microscopy and drawings were made with the aid of a camera lucida. Measurements were obtained using an Olympus BX53 compound microscope with cellSens Standard software for digital image analysis. All measurements are in µm (unless stated otherwise), and all curved structures are measured along the arc. The terminology used for describing the arrangement of morphological features such as setae follows Coomans (1979), terminology of stoma structures follows Decraemer *et al.* (2014). The terms 'epicristae' and 'zygapophyses' were first used by Haspeslagh (1973) and more recently discussed by Tchesunov & Miljutina (2002) to designate cuticular structures found only in ceramonematids. Epicristae are portions of the longitudinal ridges of the cuticle that overlap with the adjacent annules. Zygapophyses are flat, plate-like extensions of cuticle located between the longitudinal ridges, overlapping to a lesser or greater extent with adjacent annules anteriorly and posteriorly; zygapophyses are thought to enable articulation of the thickly cuticularised annules. In their electron microscopy study of the cuticle structure of *Ceramonema carinatum* Wieser, 1959, Stewart & Nicholas (1992) used a different terminology: they describe annules composed of cortical plates bearing vanes (longitudinal ridges), with the overlapping projections of cortical plates (zygapophyses) overlying the basal platform of the cortical plates of adjacent annules. Here, we adopted the terminology from Haspeslagh (1993) because it is more commonly used in the taxonomic literature. Type specimens are held in the NIWA Invertebrate Collection (Wellington).

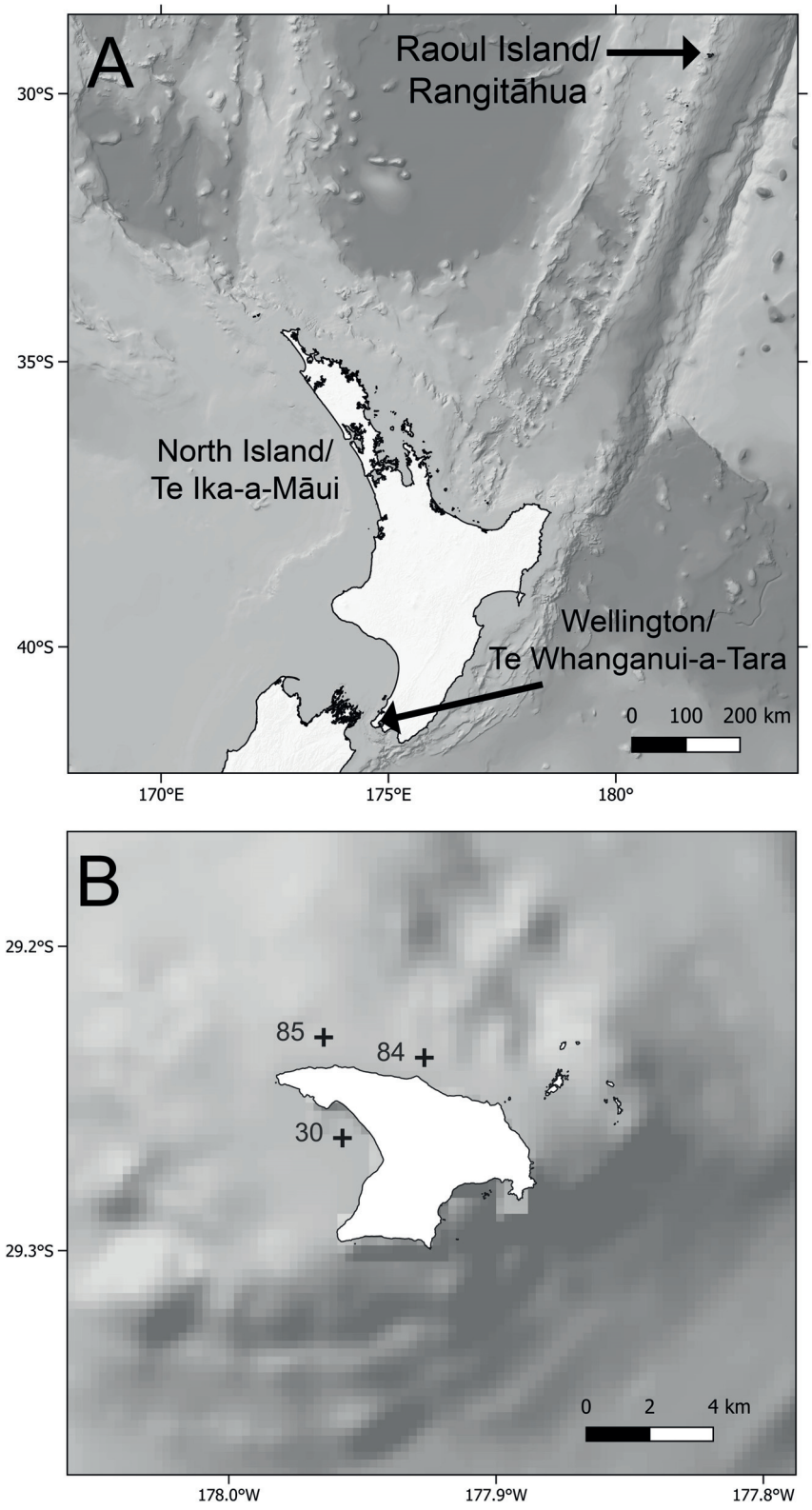

Fig. 1. Map showing locations. **A**. Raoul Island and Wellington city at southern end of New Zealand's North Island (northern portion of South Island also visible). **B**. Subtidal sampling sites off the coast of Raoul Island identified by their station numbers.

Abbreviations for morphological terms and measurements

a = body length / maximum body diameter
b = body length / pharynx length
c = body length / tail length
c' = tail length / anal or cloacal body diameter
cbd = corresponding body diameter
L = total body length
n = number of specimens
V = vulva distance from anterior end of body
%V = V / total body length × 100

Results

Taxonomy

Phylum Nematoda Cobb, 1932
Class Chromadorea Inglis, 1932
Order Plectida Gadea, 1973

Family **Ceramonematidae** Cobb, 1933

Dasynemellidae De Coninck, 1965: 627–628.

Diagnosis (emended from Holovachov (2014))

Cuticle coarsely annulated along entire body, except for smooth cephalic capsule and terminal cone of tail; cuticle of some species may appear pink or purple upon regular fixation (without using dye). Each annule divided into plates by eight longitudinal crests / ridges extending from cephalic capsule to posterior body part, dividing entire body into eight sectors. Epicristae of each annule overlap parts of adjacent annules. Zygapophyses probably present in all species, but often visible only under SEM. Annules unequal in width, often wider dorsally than ventrally; annule width increases gradually from first postcephalic annule to annule located somewhat posterior to pharyngo-intestinal junction; annules increase in width posterior towards midbody region; posterior to ⅔ of body length, annule width gradually decreases again, with narrowest annule located near anal / cloacal opening or on tail; narrowest adanal or caudal annule followed posteriorly by one much wider annule and then by caudal annules in which width gradually decreases toward terminal cone; last annule before terminal cone most narrow. Intracuticular vacuoles absent or present; in some species body annules may display external ornamentations on surface. Lateral alae absent. Body pores present at least on cephalic capsule and on terminal cone. Epidermal glands absent. Somatic sensilla absent, except for caudal setae in males. Labial region in shape of cephalic capsule; lip pairs fused into three lobes or all lips fused completely. Cephalic capsule cylindrical, with rounded or blunt apical part, often with protruding perioral cylinder and peripheral cuticular ridges. Inner labial sensilla indistinct. Outer labial sensilla setiform or papilliform. Cephalic sensilla setiform; their bases located on outer surface of the lips, anterior to amphid. Subcephalic and cervical sensilla, ocelli and deirids absent. Amphids located at middle of cephalic capsule; amphidial aperture usually shorter and narrower than immediately underlying amphidial fovea, often dissimilar in shape and size between sexes. Shape of amphidial aperture varies from unispiral to loop-shaped and hook-shaped with asymmetrical branches. Secretory-excretory system present; renette cell elongate, located opposite to ventral side of cardia and anterior part of intestine. Excretory ampulla present, located at level of isthmus. Cuticularized excretory duct very short, opens to exterior somewhat posterior to nerve ring level. Oral opening triangular or rounded. Buccal cavity funnel-shaped: cheilostom usually as cylindrical or funnel-shaped anterior-most part, not cuticularised; gymnostom short and not cuticularised; stegostom closed, linear, its muscular lining continuous with that of corpus. Pharyngeal tubes absent. Pharynx

subdivided by breaks in muscular tissue into anterior corpus and posterior postcorpus; corpus uniformly cylindrical, muscular, with evenly distributed myofilaments; postcorpus glandular and consisting of anterior narrower isthmus and pear-shaped basal swelling; dorsal sector of basal bulb often enlarged to accommodate dorsal pharyngeal gland; pharyngeal lumen uniform in thickness along entire pharynx length; valves absent. Dorsal and two subventral gland orifices penetrate pharyngeal lumen at base of stoma. Dorsal gland nucleus is visible in anterior part of basal swelling. Cardia conoid, glandular, surrounded by intestinal tissue. Female reproductive system didelphic-amphidelphic with equally developed branches, ovaries reflexed antidromously. Spermatheca usually absent. Vulva equatorial, transverse. Vagina straight or sigmoid; pars proximalis vaginae encircled by single sphincter muscle; pars refringens vaginae and epiptygmata absent. Male reproductive system diorchic, anterior testis outstretched, posterior one reflexed. Spicules symmetrical, arcuate; gubernaculum present. Copulatory apparatus composed of single midventral precloacal sensillum, located on precloacal cuticular plate. Setae in caudal region of males arranged in subventral and subdorsal rows along tail. Three caudal glands present, their nuclei incaudal. Spinneret functional.

Remarks

The family was reviewed by Tchesunov & Miljutina (2002), who provided identification keys to all ceramonematid genera and species. The only subsequent species descriptions for the family were provided by Holovachov *et al.* (2008a, 2008b). We emended the diagnosis to account for the presence of spermatheca in *Metadasynemoides taihua* sp. nov.

Ceramonema Cobb, 1920

Ceramonema Cobb, 1920: 264, fig. 48.
Ceramonemoides Haspeslagh, 1973: 264.
Cyttaronema Haspeslagh,, 1973: 176.
Proceramonema Tchesunov & Miljutina, 2002: 17, figs 9–11.

Type species

Ceramonema attenuatum Cobb, 1920.

Diagnosis (from Tchesunov & Miljutina 2002)

Body cuticle consists of 70–320 broad and thick annules. Annules equal or unequal in width. If unequal, their width increases gradually from first subcephalic annule to those near cardia; then annule width drops sharply and again increases gradually to broad anal annule; following annules on tail narrow gradually to terminal cone. Intracuticular vacuolisation in annules may be present. Annule zygapophyses present or absent. Six or eight longitudinal crests extended along body. Labial region not set off. Setose outer labial sensilla and cephalic setae arranged in two separate circles. Amphids loop-shaped, elongate or rounded.

Remarks

Tchesunov & Miljutina (2002) suggested to split the genus into two groups of species: one group comprising species with distinct zygapophyses and a second group comprising species with small / indistinct zygapophyses (as seen using light microscopy). The key to species of the genus *Ceramonema* provided by Tchesunov & Miljutina (2002) did not include the two species described by Bussau (1993), which are considered valid by Holovachov (2020). Three species were subsequently described by Holovachov *et al.* (2008), bringing the total number of valid species of *Ceramonema* described prior to this study to 23.

List of valid species of *Ceramonema* Cobb, 1920

Group 1: species with distinct zygapophyses

C. africana Furstenberg & Vincx, 1993
C. algoensis Furstenberg & Vincx, 1993
C. attenuatum Cobb, 1920
C. carinatum Wieser, 1959
C. chitwoodi De Coninck, 1942
C. fluctuosum Tchesunov & Miljutina, 2002
C. kromensis Furstenberg & Vincx, 1993
C. pisanum Gerlach, 1953
C. racovitzai Andrássy, 1973
C. reticulatum Chitwood, 1936
C. salsicum Gerlach, 1956
C. taikoraha sp. nov.
C. taiora sp. nov.
C. undulatum De Coninck, 1942
C. yunfengi Platt & Zhang, 1982

Group 2: species with small / indistinct zygapophyses

C. altogolfi Holovachov, Tandingan De Ley, Mundo-Ocampo, Baldwin, Rocha-Olivares & De Ley, 2008
C. aureolum Bussau, 1993
C. filipjevi De Coninck, 1942
C. inguinispina Holovachov, Tandingan De Ley, Mundo-Ocampo, Baldwin, Rocha-Olivares & De Ley, 2008
C. manganum Bussau, 1993
C. marisalbi Tchesunov & Miljutina, 2002
C. mokievskii Tchesunov & Miljutina, 2002
C. nasobema Holovachov, Mundo-Ocampo, Tandingan De Ley & De Ley, 2008
C. rectum Gerlach, 1957
C. rhombus Andrássy, 1973

Key to species of *Ceramonema* Cobb, 1920 (Group 1 with distinct zygapophyses) (updated from Tchesunov & Miljutina 2002)

1. Body length > 700 µm 2
– Body length < 700 µm, less than 90 body annules. Amphid small, about 8 µm long and 4 µm wide, or less ..... ***C undulatum*** De Coninck, 1942

2. Body slender, ratio of a ≥ 80 3
– Body relatively stout, ratio of a ≤ 70 4

3. Lip region elevated, cap-like, number of body annules 300–307 (male) or 315 (female) .... ***C. algoensis*** Furstenberg & Vincx, 1993
– Lip region not elevated, number of body annules much greater in males (287) than in females (184–186) ..... ***C. yungfengi*** Platt & Zhang, 1982

4. Cephalic ratio > 1 5
– Cephalic ratio < 1 ..... ***C. racovitzai*** Andrássy, 1973

5. Intracuticular vacuolisation in body annules and / or cephalic capsule present 6
– Intracuticular vacuolisation absent 13

6. Cephalic capsule without intracuticular vacuolisation 7
– Cephalic capsule with intracuticular vacuolisation 9

7. Cephalic capsule elongate and evenly wide throughout its length, cephalic ratio ≥ 1.5, cephalic setae 8–12 µm 8
– Cephalic capsule tapering anteriorly, cephalic ratio about 1, cephalic setae 6–9 µm, 111–117 body annules ..... ***C. chitwoodi*** De Coninck, 1942

8. Amphid 26 µm long or > 65% of cephalic capsule length, cephalic ratio > 2 ..... ***C. fluctuosum*** Tchesunov & Miljutina, 2002
– Amphid about 16 µm long or less than 45% of cephalic capsule length, cephalic ratio about 1.5 ..... ***C. carinatum*** Wieser, 1959

9. Cephalic ratio > 1, cephalic setae ≤ 0.3 length of cephalic capsule 10
– Cephalic ratio about 1, length of cephalic setae > 0.5 length of cephalic capsule ..... ***C. reticulatum*** Chitwood, 1936

10. Amphid loop-shaped, elongate, 16–26 µm long, tail cone ≥ 19 µm long 11
– Amphid loop-shaped, shorter, 9–15 µm long, tail cone 14–15 µm long ..... ***C. africana*** Furstenberg & Vincx, 1993

11. Male without precloacal spine 12
– Male with precloacal spine, wide cloacal annule formed by fusion of two contiguous annules, 119–127 body annules, ratio of a = 32–36 ..... ***C. taiora*** sp. nov.

12. Body length 1380–1428 µm, ratio of a = 49–60, ratio of c = 7 ..... ***C. taikoraha*** sp. nov.
– Body length = 960 µm, ratio of a = 38, ratio of c = 5 ..... ***C. salsicum*** Gerlach, 1956

13. Cephalic ratio about 1.5 4
– Cephalic ratio about 1, amphid small (10 µm long), its anterior margin at level of cephalic setae, 213 body annules in male ..... ***C. kromensis*** Furstenberg & Vincx, 1993

14. Amphid loop-shaped with equal branches, amphid length < 0.3 cephalic capsule length, labial region protruded, body length about 1600 µm ..... ***C. pisanum*** Gerlach, 1953
– Amphid loop-shaped, with unequal branches, amphid length > 0.5 cephalic capsule length, labial region not protruded, body length about 1100 µm ..... ***C. attenuatum*** Cobb, 1920

Key to species of *Ceramonema* Cobb, 1920 (Group 2 with small or indistinct zygapophyses)
(updated from Tchesunov & Miljutina 2002)

1. Perioral tube absent 2
– Perioral tube projecting 5–7 µm anterior to the lips. 121–134 body annules, pronounced sexual dimorphism in amphid shape with ventral branch extending to 55–80th annule in males ..... ***C. nasobema*** Holovachov, Mundo-Ocampo, Tandingan De Ley & De Ley, 2008

2. Outer labial setae either ≤ 5 µm or ≥ 8 µm 3
– Outer labial setae about 6 µm long, slightly shorter than cephalic setae, body length 750–1200 µm, 86 body annules, ratio of a 30–40, small, loop-shaped amphids ..... ***C. manganum*** Bussau, 1993

3. Outer labial setae ≤ 5 µm 4
– Outer labial setae ≥ 8 µm 7

4. Body ≥ 700 µm long, body annules broad, 8–12 µm wide 5
– Body < 600 µm long, with less than 100 narrow (2–7 µm wide) annules, cephalic ratio about 1.6 ..... ***C. filipjevi*** De Coninck, 1942

5. Cephalic ratio < 1.2, amphids located mostly or completely within posterior half of cephalic capsule 6
– Cephalic ratio = 1.3, female with small loop-shaped amphid located on anterior half of cephalic capsule ..... ***C. rectum*** Gerlach, 1957

6. 187–195 body annules, cephalic setae located about halfway down length of cephalic capsule .... ***C. rhombus*** Andrássy, 1973
– 120 body annules, cephalic setae located near anterior extremity of cephalic capsule .... ***C aureolum*** Bussau, 1993

7. Cephalic ratio 1.1–1.6 8
– Cephalic ratio > 2 ..... ***C. mokievskii*** Tchesunov & Miljutina, 2002

8. Male without thorn-shaped precloacal projection 9
– Male with thorn-shaped precloacal projection, fewer than 200 body annules, sexual dimorphism in amphid shape (unispiral in female, loop-shaped in male), double cloacal annule ....***C. ininguispina*** Holovachov, Tandingan De Ley, Mundo-Ocampo, Baldwin, Rocha-Olivares & De Ley, 2008

9. Female with unispiral amphids, cephalic capsule with pores, regular cloacal annule, gubernaculum with apophysis ..... ***C. altogolfi*** Holovachov, Tandingan De Ley, Mundo-Ocampo, Baldwin, Rocha-Olivares & De Ley, 2008
– Female with loop-shaped amphids, cephalic capsule without pores, enlarged cloacal annule, gubernaculum without apophysis ..... ***C. marisalbi*** Tchesunov & Miljutina, 2002

Ceramonema taikoraha sp. nov.
urn:lsid:zoobank.org:act:4839352A-7414-4D01-B124-5F2E10D743C0
Figs 2–4, Table 1

Diagnosis

Ceramonema taikoraha sp. nov. is characterised by body length 1380–1428 µm, presence of 161–177 body annules, presence of intracuticular vacuoles, conspicuous zygapophyses, absence of precloacal spine, cephalic setae 0.38–0.50 cbd long in males and 0.32 cbd long in female, medium-sized loop-shaped amphids that are slightly shorter in females than in males, cloacal annule not formed by fusion of contiguous body annules, and gubernaculum with narrow dorsal apophyses.

Differential diagnosis

The new species belongs to Group 1 (species with distinct zygapophyses) and is most similar to *Ceramonema taiora* sp. nov., *C. salsicum* (described from the Bay of Biscay, NE Atlantic), and *C. africana* (described from the coast of South Africa) in having cuticle ornamentation with distinct zygapophyses, body length greater than 700 µm, ratio of a < 70, cephalic setae ca ⅓ of cephalic capsule length or less, and cephalic capsule with intracuticular vacuolisation. *Ceramonema taikoraha* sp. nov. differs *C. taiora* sp. nov. by greater body length (1380–1428 vs 1040–1141 µm in *C. taiora* sp. nov.), higher ratio of a (49–60 vs 32–36 in *C. taiora* sp. nov.), higher ratios of b and c (7–8 vs 4–6 in *C. taiora* sp. nov.), higher number of body annules (161–177 vs 119–127 in *C. taiora* sp. nov.), cloacal annule morphology (two unfused contiguous body annules vs fused annules in *C. taiora* sp. nov.), shorter amphids (16–18 vs 19–26 µm in *C. taiora* sp. nov.), and absence of precloacal spine (vs present in *C. taiora* sp. nov.). The new species differs from *C. salsicum* by the greater body length (1380–1428 vs 960 µm in *C. salsicum*), higher ratio of a (49–60 vs 38 in *C. salsicum*) and c (7 vs 5 in *C. salsicum*), and shorter tail (8–9 vs 10 cloacal body diameters long in *C. salsicum*). The new species differs from

C. africana in greater body length (1380–1428 vs 1029–1090 µm in *C. africana*), higher ratio of b (7–8 vs 5–6 in *C. africana*), and longer amphids (in males: 18 vs 10–15 µm; in females: 16 vs 9 µm). The new species is also characterised by a somewhat greater ratio of a (49–60 vs 35–49 in *C. africana*) and a somewhat longer cephalic capsule (33–37 vs 27–33 in *C. africana*).

Ceramonema taikoraha sp. nov. is also similar to *C. inguinispina* (described from the Gulf of California) in having body length greater than 700 µm, ratio of a < 70, cephalic setae ca ⅓ of cephalic capsule

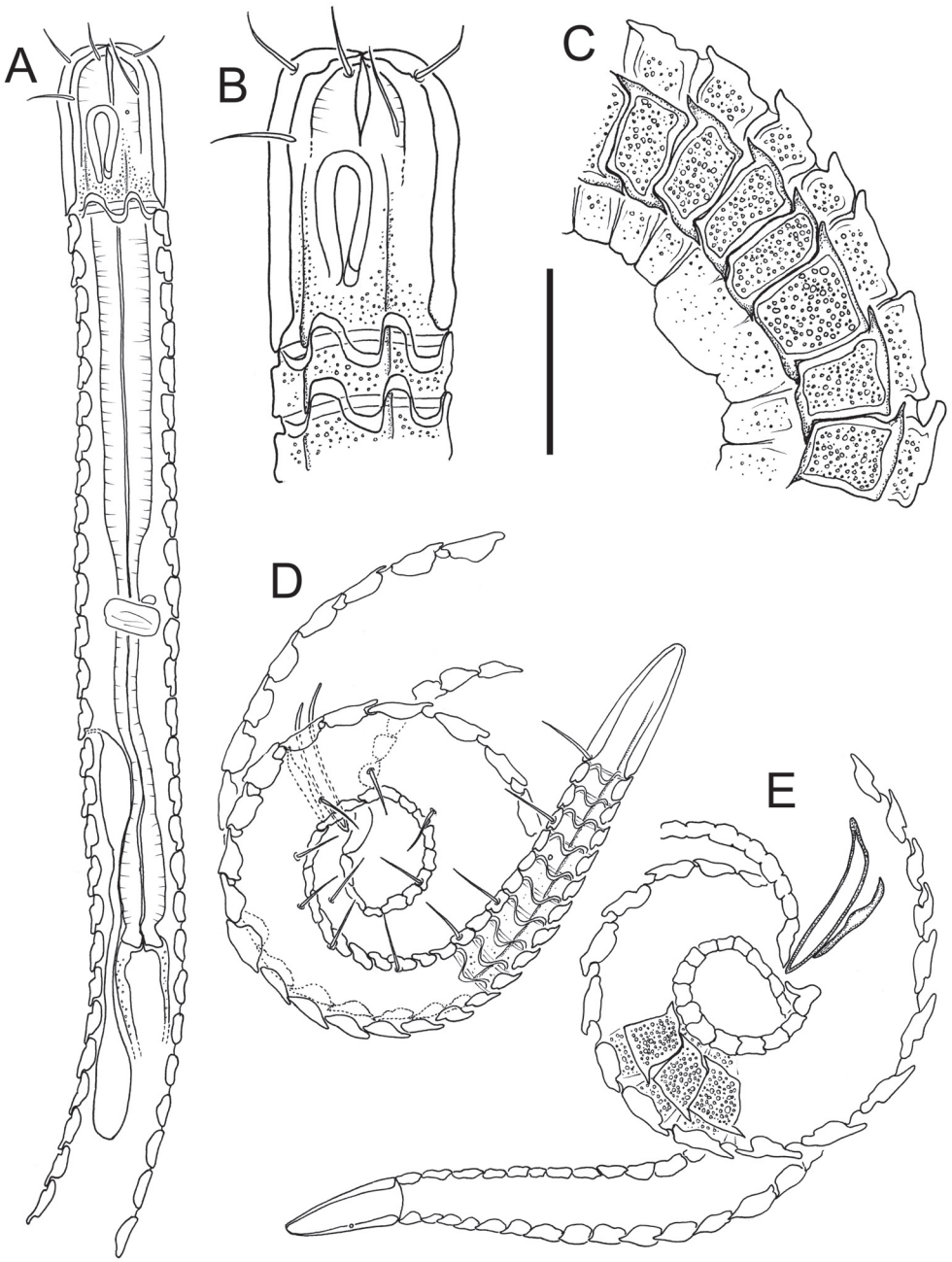

Fig. 2. *Ceramonema taikoraha* sp. nov., ♂♂. **A–C, E**. Holotype (NIWA 154943). **C**. Paratype (NIWA 154944). **A**. Pharyngeal region. **B**. Cephalic region. **C**. Surface of cloacal region. **D**. Posterior body region. **E**. Posterior body region showing copulatory apparatus. Scale bar: A = 45 µm; B = 25 µm; C = 18 µm; D–E = 27 µm.

length or less, and cephalic capsule with intracuticular vacuolisation but differ in cuticle ornamentation (distinct vs small zygapophyses in *C. inguinispina*), greater body length (1380–1428 vs 822–1154 µm in *C. inguinispina*), longer tail (186–206 vs 109–168 µm in *C. inguinispina*), amphid shape in females (loop-shaped vs unispiral in *C. inguinispina*), shorter amphids (16–18 vs 5–14 µm in *C. inguinispina*), and absence of precloacal spine (vs present in *C. inguinispina*). The new species also possesses a somewhat longer cephalic capsule (33–37 vs 24–33 µm in *C. inguinispina*).

Etymology

'*Taikoraha*' are tidal movements over shallow expanses of sediments. Like other ceramonematids, this species of nematode worm ('*toke*') possesses thick interlocking cuticle plates to withstand the strong currents of the tide (*tai*) in the coarse sediments ('*koraha*') where it lives. Māori name '*toke taikoraha*'.

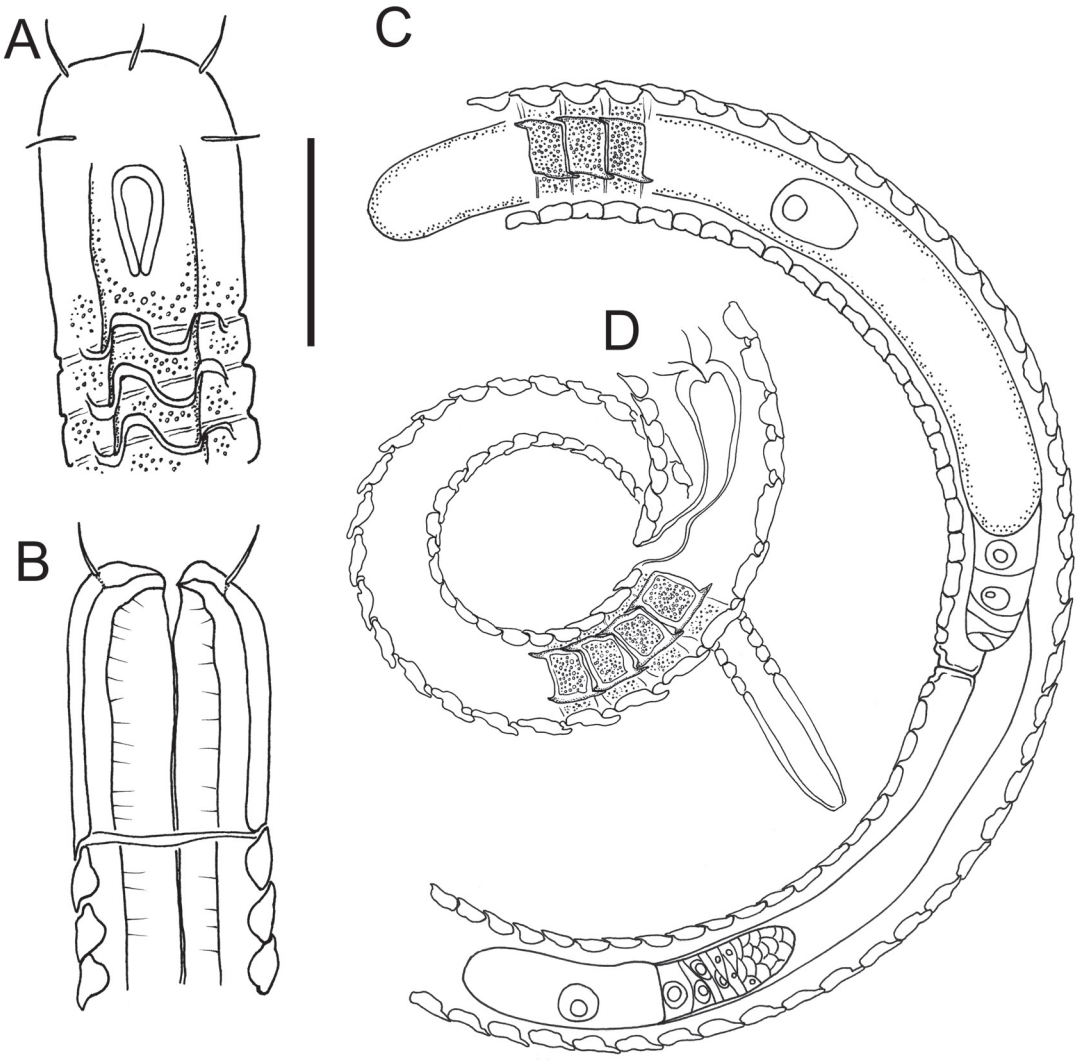

Fig. 3. *Ceramonema taikoraha* sp. nov., paratype, ♀ (NIWA 154944). **A**. Surface view of cephalic region. **B**. Optical section of cephalic region. **C**. Reproductive system. **D**. Posterior body region. Scale bar: A–B = 30 µm; C = 47 µm; D = 37 µm.

Type material

Holotype

NEW ZEALAND • ♂; Kermadec Islands, Raoul Island (off Western Spring); 29.22992° S, 177.96448° W; depth 16 m; 22 Nov. 2021; coarse sand and gravel sediments, voyage TMOR2021, station 85; NIWA 154943.

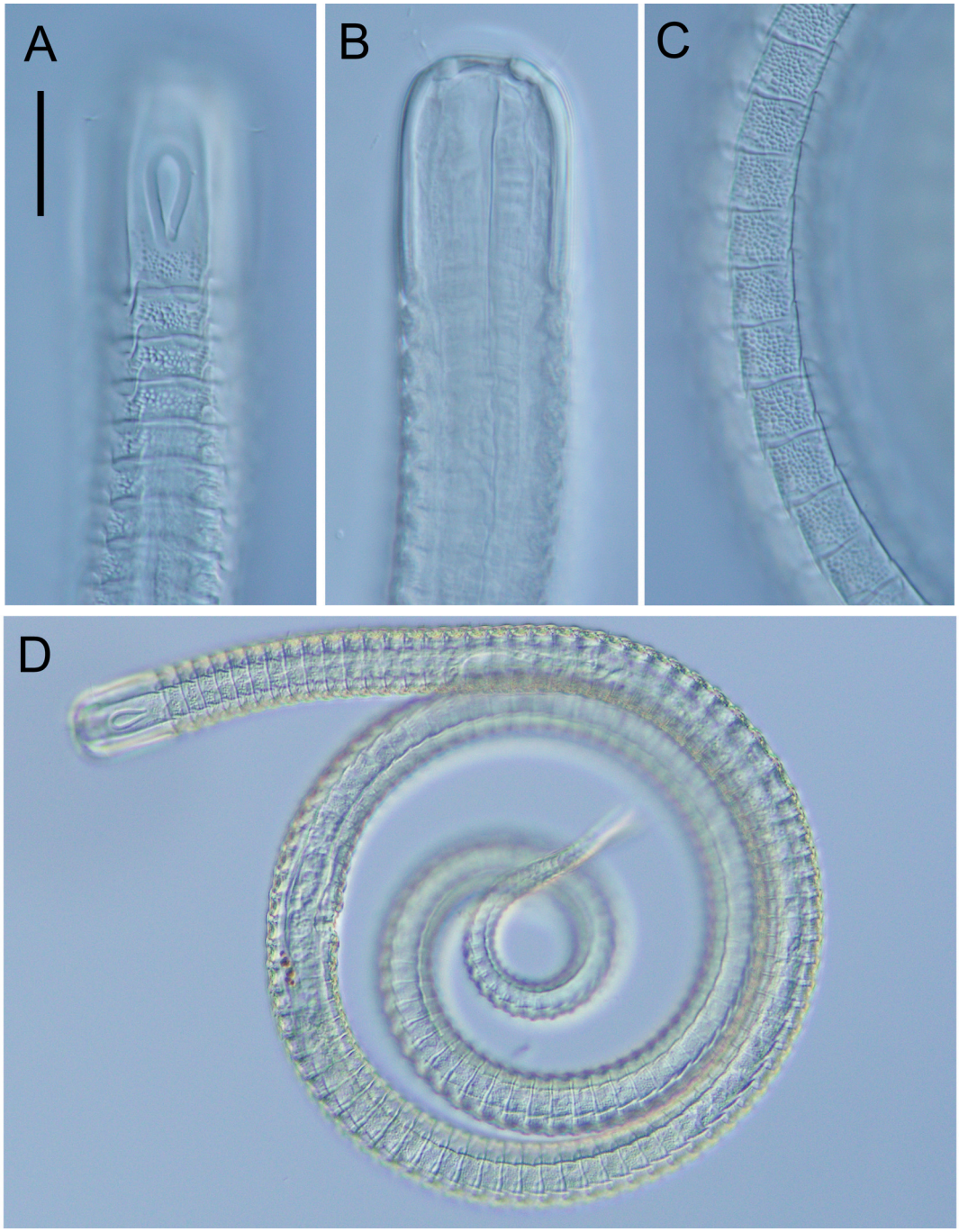

Fig. 4. *Ceramonema taikoraha* sp. nov., paratypes (NIWA 154944), light micrographs. **A**. ♀, surface view of anterior body region. **B**. ♀, optical section of anterior body region. **C**. ♂, surface view of cuticle. **D**. Entire female. Scale bar: A–C = 20 µm; D = 50 µm.

Table 1. Morphometrics of *Ceramonema taikoraha* sp. nov. and *C. taiora* sp. nov. Abbreviations: see Material and methods.

Character	*Ceramonema taikoraha* sp. nov.			*Ceramonema taiora* sp. nov.		
	males		females	males		females
	holotype	paratypes	paratype	holotype	paratypes	paratypes
n	1	2	1	1	1	4
L	1428	1380, 1401	1408	1047	1040	1070–1141
a	60	55, 58	49	33	33	32–36
b	7	7, 8	7	5	5	5–6
c	7	7	7	5	5	4–5
c’	8.7	8.1, 9.0	8.8	8.7	7.7	8.9–9.5
cephalic capsule width × length	25 × 37	25 × 33–37	28 × 37	31 × 37	31 × 41	33–34 × 43–45
cephalic ratio	1.5	1.3–1.5	1.3	1.2	1.3	1.3
number of pharyngeal annules	19	19, 21	22	20	18	17–18
number of mid-body annules	117	113, 119	120	72	71	71–77
number of tail annules	34	29, 35	35	35	30	30–32
total number of annules	170	161, 175	177	127	119	119–127
body diam. at cephalic setae	25	23, 25	28	31	30	31–34
body diam. at amphids	25	25	29	31	30	33–35
length of outer labial setae	11	9–11	7–8	10	8	7–9
length of cephalic setae	12–13	8–11	9	10–13	11	9–12
amphidial fovea height	18	18	16	23	26	19–20
amphidial fovea width	8	8, 9	8	11	10	9–10
amphididial fovea width / cbd (%)	32	32, 36	28	35	33	26–29
amphid from anterior end	14	11, 13	15	12	11	17–20
nerve ring from anterior end	125	125, 129	130	150	146	144–153
nerve ring cbd	25	25	26	30	30	32–35
excretory pore from anterior	166	162	ND	169	ND	171–179
pharynx length	205	175, 195	198	206	193	193–209
pharyngeal bulb diam.	11	11, 13	15	14	ND	14–20
pharynx cbd at base	23	24, 25	26	30	30	32–34
max. body diam.	25	24, 25	29	32	32	32–35
spicule length	29	24, 31	–	27	28	–
gubernaculum length	16	12, 15	–	14	13	–
cloacal / anal body diam.	23	23	22	26	26	25–27
tail length	201	186, 206	194	227	200	226–247
V	–	–	646	–	–	471–511
%V	–	–	46	–	–	42–45
vulval body diam.	–	–	29	–	–	31–33

Paratypes

NEW ZEALAND • 2 ♂♂, 1 ♀; same data as for holotype; NIWA 154944.

Type habitat and locality

Shallow subtidal, Raoul Island, New Zealand.

Description

Male

Body almost colourless, with slight golden colouration, cylindrical, slightly wider in pharyngeal region than in mid- and posterior body region and tapering slightly towards posterior extremity. Cuticle coarsely annulated along entire body, except for smooth cephalic capsule and terminal cone. Each annule divided into plates by eight longitudinal crests / ridges extending from cephalic capsule to terminal cone. Epicristae of each annule slightly overlapping adjacent annules. Zygapophyses conspicuous. Annules unequal in width and often wider dorsally than ventrally; annule width increasing gradually from first postcephalic annule (6–7 µm, as measured in lateral field) to annule number 28–32 or slightly posterior to ventral gland (10–11 µm), followed by much narrower one (6–7 µm); annules then widen slightly (7–8 µm), and stay roughly equal in size for most of mid-body region until decreasing in width again in precloacal region to about 5 µm in annule immediately anterior to cloaca; this annule followed posteriorly by wider annule (8 µm) then by caudal annules gradually decreasing in width toward terminal cone; last annule before terminal cone is narrowest (3–4 µm). Intracuticular vacuoles occurring within posterior part of cephalic capsule and within body annules. Cuticle pores present; one usually observed on terminal cone (variable position) and one on left or right side of cephalic capsule at level of anterior edge of amphidial fovea and slightly dorsally to the latter. Lateral alae absent. Cephalic capsule elongated, longer than wide, cylindrical with rounded lip region not set off by any constriction. Longitudinal crests extending from base of cephalic capsule to about level of base of cephalic setae. Inner labial sensilla not observed. Outer labial setiform, slightly shorter than, and located anterior to, cephalic setae (0.38–0.50 cbd); cephalic setae located slightly anterior to amphids. Loop-shaped amphids located near middle of cephalic capsule; amphidial aperture slightly shorter than amphidial fovea. Buccal cavity small, funnel shaped, without differentiation. Pharynx cylindrical, distinctly subdivided into anterior corpus and posterior postcorpus; corpus ca 60% of pharynx length, uniformly cylindrical, muscular, with evenly distributed myofilaments; postcorpus ca 40% of pharynx length, also muscular consisting of anterior narrower isthmus and pear-shaped basal swelling. Pharyngeal glands indistinct. Pharyngeal lumen uniform in thickness, tubes and valve-like structures absent. Cardia 10–12 µm long, partially surrounded by intestine. Nerve ring surrounding isthmus. Secretory-excretory system present; excretory pore on annule 14–16; ventral gland slightly posterior to cardia.

Reproductive system diorchic, anterior testis outstretched and located to right of intestine, posterior one reflexed and located to left of intestine in holotype (position of posterior testis in paratypes could not be determined). Spicules paired, symmetrical, weakly arcuate or almost straight except for bent proximal portion; narrow, and rounded manubrium. Gubernaculum plate-like with narrow dorsal apophyses. Precloacal spine or seta absent. Thirteen or 14 pairs of subventral caudal setae, 6–8 µm long. Caudal glands not observed. Terminal cone 20–23 µm long.

Female

Similar to males, but with slightly lower ratio of a, slightly shorter cephalic setae 0.32 cbd long, shorter amphidial fovea and without caudal setae. Reproductive system didelphic, amphidelphic, with reflexed ovaries; anterior ovary to right of intestine and posterior ovary on left of intestine. Vulva a transverse slit near mid-body. Vagina straight, with thickened walls. Pars refringens vaginae not observed. Intrauterine egg not seen. Anal annule similar to adjacent annules.

Ceramonema taiora sp. nov.
urn:lsid:zoobank.org:act:90D8C255-78AD-4C9B-BA3A-7996D252B103
Figs 5–6, Table 1

Diagnosis

Ceramonema taiora sp. nov. characterised by body length 1040–1141 µm, relatively small number (119–127) of body annules, cuticle with conspicuous zygapophyses, presence of intracuticular vacuoles, cephalic setae 0.29–0.38 cbd long, relatively large loop-shaped amphids that are slightly smaller in females than in males, wide cloacal annule formed by fusion of two contiguous annules, presence of conspicuous precloacal spine, and gubernaculum with small rounded apophyses.

Differential diagnosis

The new species belongs to Group 1 (species with distinct zygapophyses) and is similar to *Ceramonema taikoraha* sp. nov., *C. salsicum* (described from the Bay of Biscay, NE Atlantic), and *C. africana* (described from the coast of South Africa) in having cuticle ornamentation with distinct zygapophyses, body length greater than 700 µm, ratio of a ≤ 70, cephalic setae ca ⅓ of cephalic capsule length or less, and cephalic capsule with intracuticular vacuolisation.

Ceramonema taiora sp. nov. differs from *C. taikoraha* sp. nov. by shorter body length (1040–1141 vs 1380–1428 µm in *C. taikoraha* sp. nov.), lower ratio of a (32–36 vs 49–60 in *C. taikoraha* sp. nov.), lower ratios of b and c (4–6 vs 7–8 in *C. taikoraha* sp. nov.), lower number of body annules (119–127 vs 161–177 in *C. taikoraha* sp. nov.), cloacal annule morphology (fused annules vs two unfused contiguous body annules in *C. taikohara* sp. nov.), longer amphids (19–26 vs 16–18 µm in *C. taikoraha* sp. nov.), and presence of precloacal spine (vs absent in *C. taikoraha* sp. nov.).

The new species differs from *C. salsicum* by greater body length (1040–1141 vs 960 µm in *C. salsicum*), lower ratio of a (32–36 vs 38 in *C. salsicum*), lower number of body annules (119–127 vs 145 in *C. salsicum*), shorter tail (8–9 vs 10 cloacal body diameters long in *C. salsicum*) and presence of a precloacal spine (vs absent in *C. salsicum*); from *C. africana* in lower ratio of a (32–36 vs 35–49 in *C. africana*), lower number of body annules (119–127 vs 156–170 in *C. africana*), longer amphids (in males: 23–26 vs 10–15 µm in *C. africana*; in females: 19–20 vs 9 µm in *C. africana*), longer cephalic capsule (37–45 vs 27–33 in *C. africana*), and presence of a precloacal spine (vs absent in *C. africana*).

Ceramonema taiora sp. nov. is also similar to *C. inguinispina* (described from the Gulf of California) in having body length greater than 700 µm, ratio of a ≤ 70, cephalic setae ca ⅓ of cephalic capsule length or less, cephalic capsule with intracuticular vacuolisation and presence of precloacal spine, but differ in cuticle ornamentation (distinct vs small zygapophyses in *C. inguinispina*), lower number of body annules (119–127 vs 135–191 in *C. inguinispina*), longer amphids (19–26 vs 6–14 µm in *C. inguinispina*) and longer spicules (27–28 vs 20–26 µm in *C. inguinispina*).

Etymology

‘*Tairoa*’ are nutrients ingested by nematode worms (‘*toke*’). Active nematode populations help cycle nutrients at the seabed thus helping to maintain healthy ocean (‘*moana*’) ecosystems. Māori name ‘*toke tairoa*’.

Type material

Holotype

NEW ZEALAND • ♂; Kermadec Islands, Raoul Island (off Western Spring); 29.22992° S, 177.96448° W; depth 16 m; 22 Nov. 2021; coarse sand and gravel sediments, voyage TMOR2021, station 85; NIWA 154945.

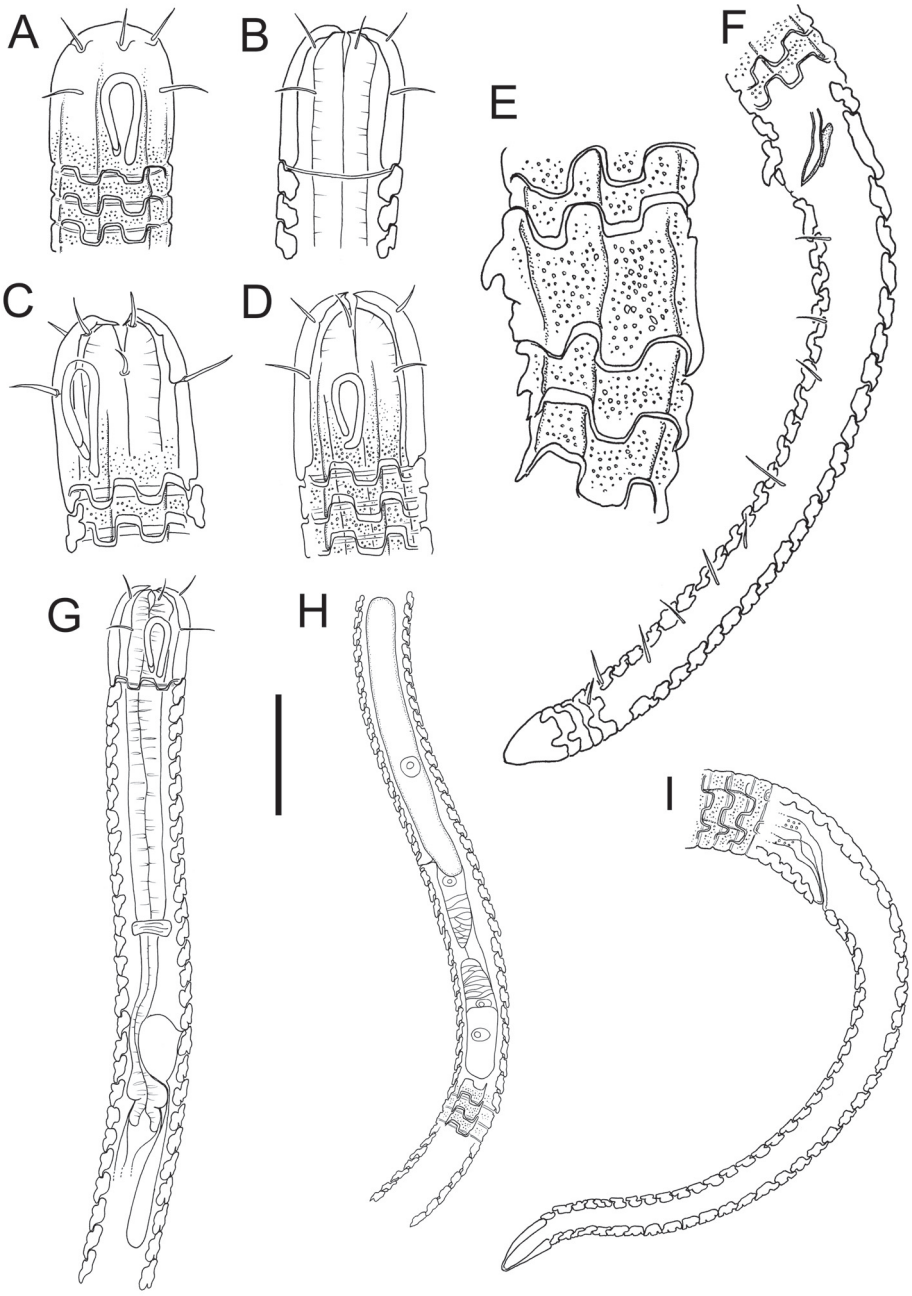

Fig. 5. *Ceramonema taiora* sp. nov. **A–B, G**. Holotype, ♂ (NIWA 154945). **C–F, H–I**. Paratypes (NIWA 154946). **A**. Cephalic region, surface view. **B**. Cephalic region, optical cross-section view. **C**. ♂, cephalic region, combined (super-imposed) surface and cross-scetion views. **D**. ♀, cephalic region, view. **E**. ♂, cloacal region. **F**. ♂, posterior body region. **G**. Pharyngeal body region. **H**. ♀, reproductive system. **I**. ♀, posterior body region. Scale bar: A–D = 30 µm; E = 16 µm; F = 33 µm; G, I = 45 µm; H = 68 µm.

Paratypes

NEW ZEALAND • 1 ♂, 4 ♀♀; same data as for holotype; NIWA 154946.

Type habitat and locality

Shallow subtidal, Raoul Island, New Zealand.

Description

Male

Body almost colourless, with slight golden colouration, cylindrical, slightly wider in pharyngeal region than in mid- and posterior body region and tapering slightly towards posterior extremity. Cuticle coarsely annulated along entire body, except for smooth cephalic capsule and terminal cone. Each annule divided into plates by eight longitudinal crests / ridges extending from cephalic capsule to terminal cone. Epicristae of each annule slightly overlapping adjacent annules. Zygapophyses conspicuous. Annules unequal in width and often wider dorsally than ventrally; annule width increasing gradually from first postcephalic annule (10–12 µm, as measured in lateral field) to annule number 22–27 or slightly posterior to ventral gland (ca 16 µm), followed by a much narrower one (10–11 µm); annules then widen slightly (11–14 µm), and stay roughly equal in size for all of mid-body region until immediately cloacal annule; cloacal annule ca 25–27 µm wide, made of two fused contiguous annules and with suture mostly visible ventrally; this annule followed posteriorly by 15 µm wide annule then by caudal annules gradually decreasing in width toward terminal cone; last annule before terminal cone is narrowest (5 µm). Intracuticular vacuoles occurring within posterior part of cephalic capsule and within body annules. Cuticle pores not observed. Lateral alae absent. Cephalic capsule elongated, slightly longer than wide, cylindrical with rounded lip region not set off by any constriction although fine suture visible on cuticle surface below insertion point of outer labial sensilla. Longitudinal crests extending from base of cephalic capsule to about level of base of anterior edge of amphids. Inner labial sensilla not observed. Outer labial setiform, located anterior to, and slightly longer than, cephalic setae (0.37 cbd long). Loop-shaped amphids located in posterior and middle of cephalic capsule; amphidial aperture slightly shorter than amphidial fovea. Buccal cavity small, funnel shaped, without differentiation. Pharynx cylindrical, subdivided into anterior corpus and posterior postcorpus; corpus ca 60–65% of pharynx length, cylindrical, narrowing slightly posteriorly, muscular; postcorpus ca 35–40% of pharynx length, also muscular consisting of short, anterior narrow isthmus and pear-shaped basal swelling. Pharyngeal glands indistinct. Pharyngeal lumen uniform in thickness, tubes and valve-like structures absent. Cardia 5–8 µm long, surrounded by intestine. Nerve ring surrounding anterior portion of isthmus. Secretory-excretory system present; excretory pore on annule 17–18; ventral gland slightly posterior to cardia.

Reproductive system diorchic, anterior testis outstretched and located to right of intestine, posterior one located to left of intestine; position, and structure of posterior testis relative to intestine could not be determined. Spicules paired, symmetrical, weakly arcuate with bent proximal portion. Gubernaculum plate-like with small, rounded dorsocaudal apophyses. Conspicuous precloacal spine present. Ten pairs of subventral caudal setae, 8–10 µm long. Caudal glands not observed. Terminal cone 19–27 µm long.

Female

Similar to males, but with shorter and narrower amphidial fovea and longer tail without caudal setae. Cephalic setae 0.27–0.38 cbd long. Reproductive system didelphic, amphidelphic, with reflexed ovaries; anterior ovary to right of intestine and posterior ovary on left of intestine. Vulva a transverse slit located slightly anterior to mid-body. Vagina straight, with thickened walls. Pars refringens vaginae not observed. Intrauterine egg not seen. Anal annule similar to adjacent annules.

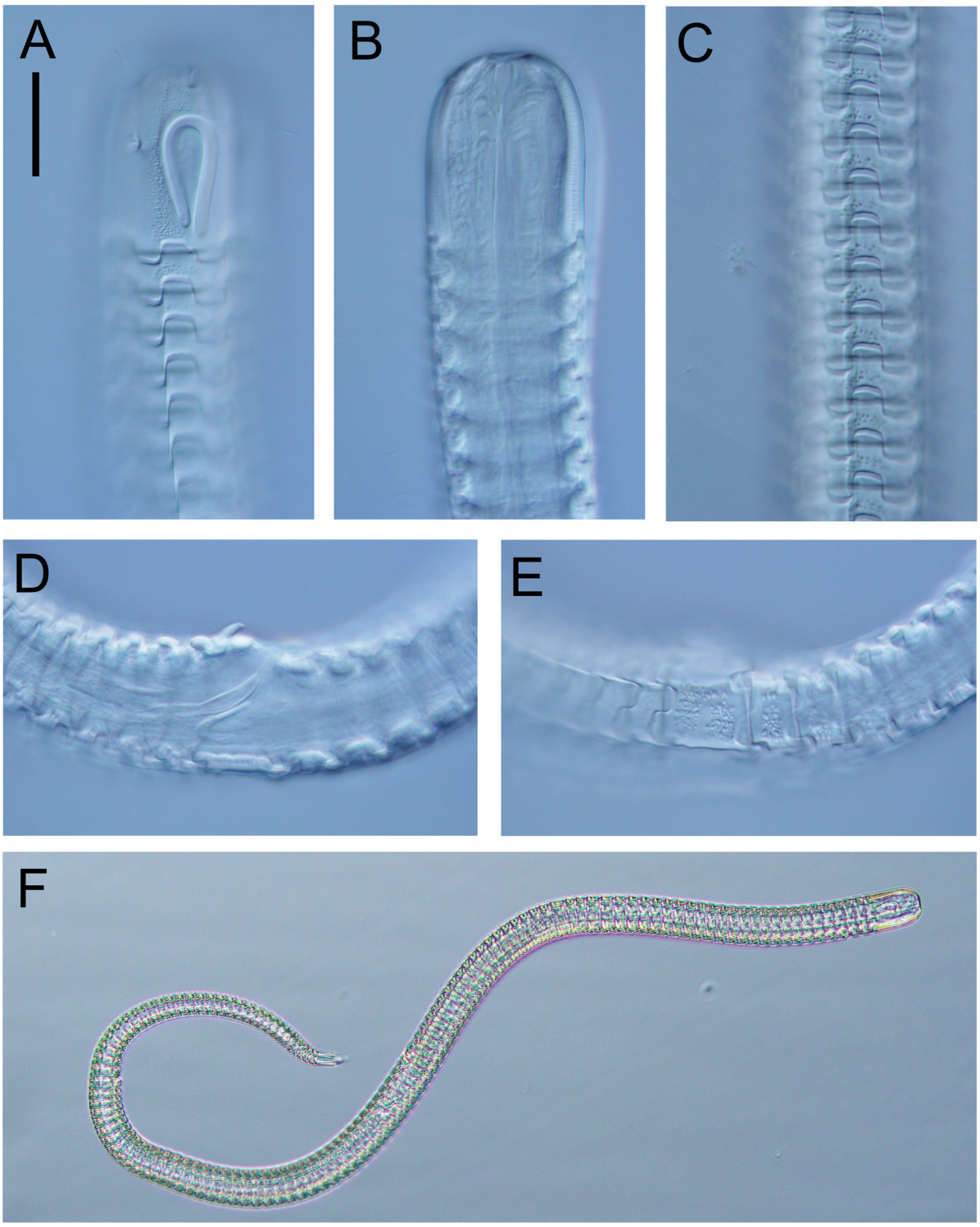

Fig. 6. *Ceramonema taiora* sp. nov., paratypes (NIWA 154946), light micrographs. **A**. ♂, surface view of cephalic region. **B**. ♂, optical section of cephalic region. **C**. ♂, surface view of cuticle, mid-body region. **D**. ♂, cloacal region, showing specular apparatus and precloacal spine. **E**. ♂, surface view of cloacal region. **F**. Entire female. Scale bar: A–E = 20 µm; F = 85 µm.

Metadasynemoides Haspeslagh, 1973

Type species

Metadasynemoides longicollis (Gerlach, 1952) Haspeslagh, 1973.

Diagnosis (modified from Tchesunov & Mijutina 2002 and Holovachov 2014)

Body cuticle consists of 400–1000 equally narrow annules. Zygapophyses indistinct under light microscopy. Cuticular crests extend from near anterior margin of cephalic capsule to terminal cone. Lateral lines (parallel grooves as seen using SEM) may be present on cuticle beginning from amphids and extending close to level of anus/cloaca. Labial region distinctly set off from cephalic capsule. Setose outer labial sensilla and setose cephalic sensilla subequal in length and arranged in two separate but close circles both inserted on labial region anterior to margin of cephalic capsule. Amphid spirally coiled in 1–2 turns, loop-shaped, rounded or of other shape, often differing in shape between males and females.

Remarks

A key to all five valid species described prior to the present study is provided by Tchesunov & Miljutina (2002). Cuticular structures of *Metadasynemoides cristatus* (Gerlach, 1957) Haspeslagh, 1973 such as lateral lines were described in detail by Nicholas & Stewart (1990) based on light and electron microscopy.

List of valid species of *Metadasynemoides* Haspeslagh, 1973

M. cristatus (Gerlach, 1957) Haspeslagh, 1973
M. labiatus Tchesunov & Miljutina, 2022
M. latus (Gerlach, 1957) Haspeslagh, 1973
M. longicollis (Gerlach, 1952) Haspeslagh, 1973
M. spinosus (Gerlach, 1963) Tchesunov & Miljutina, 2002
M. taihua sp. nov.

Key to species of *Metadasynemoides* Haspeslagh, 1973 (modified from Tchesunov & Miljutina 2002)

1. Body length about 1500 µm or less 2
– Body length 2000–3000 µm. Cephalic setae 17 µm long; circles of outer labial and cephalic setae close to each other. Cephalic capsule stout and anteriorly truncated ..... ***M. longicollis*** (Gerlach, 1952) Haspeslagh, 1973

2. Cephalic setae 5–12 µm long (up to 70% cbd) 3
– Cephalic setae 24 µm long (> 100% cbd). Cephalic capsule elongate, tapered anteriorly. Amphid loop-shaped, with longer ventral branch ..... ***M. spinosus*** (Gerlach, 1963) Tchesunov & Miljutina, 2002

3. Tail about 4.5–5.0 anal/cloacal body diameters long; ratio of c > 11. Amphid rounded, at least in females 4
– Tail about 8–11 anal/cloacal body diameters long; ratio of c < 11. Cephalic capsule elongate, tapered anteriorly. Amphid of female loop-shaped, with longer ventral branch extending to the second postcephalic annule ..... ***M. labiatus*** Tchesunov & Miljutina, 2022

4. Cephalic capsule stout and truncated anteriorly, cephalic ratio near 1 5
– Cephalic capsule elongate and tapered anteriorly. Cephalic ratio > 1. In male, amphid loop-shaped, with longer ventral branch extending to postcephalic annules. Outer labial setae longer than cephalic setae ..... ***M. cristatus*** (Gerlach, 1957) Haspeslagh, 1973

5. Body length about 1000–1200 µm, ratio of b = 4, ratio of c = 13–14. Male with spiral amphid with two turns .....***M. latus*** (Gerlach, 1957) Haspeslagh, 1973
– Body length about 1400–1500 µm, ratio of b = 6, ratio of c = 9–11. Male with loop-shaped amphid .....***M. taihua*** sp. nov.

Metadasynemoides taihua sp. nov.
urn:lsid:zoobank.org:act:E383579C-BE54-4031-A7AA-E71E07778FE8
Figs 7–10, Table 2

Diagnosis

Metadasynemoides taihua sp. nov. characterised by body length 1407–1519 µm, presence of relatively few (475–526) body annules, four longitudinal rows of sublateral somatic setae, presence of intracuticular vacuoles in cephalic capsule and body annules, cephalic setae 0.33–0.48 cbd long of similar or slightly greater length than outer labial setae, loop-shaped amphids of similar size in both males and females, presence of precloacal seta, spicules almost straight and gubernaculum without apophyses.

Differential diagnosis

The new species is most similar to *M. latus* in having a stout, truncated cephalic capsule with a cephalic ratio close to 1, body length less than 2000 µm long, cephalic setae less than 1 cbd long and similar in length to outer labial setae, and a relatively short tail (< 6 anal or cloacal body diameters long). *Metadasynemoides taihua* sp. nov. differs from *M. latus* in having a longer body length (1407–1519 vs 1015–1169 µm in *M. latus*), higher ratio of b (6 vs 4 in *M. latus*) and c (9–11 vs 13–14 in *M. latus*), different amphid shape (in males: loop-shaped vs multispiral in *M. latus*) and wider amphids (6–7 vs 5 µm in *M. latus*).

Etymology

'*Taihua*' is the seashore. Along with other nematode species, this new species helps maintain and replenish its healthy status. Māori name '*toke taihua*'.

Type material

Holotype

NEW ZEALAND • ♂; Kermadec Islands, Raoul Island (off Western Spring); 29.22992° S, 177.96448° W; depth 16 m; 22 Nov. 2021; coarse sand and gravel sediments, voyage TMOR2021, station 85; NIWA 154947.

Paratypes

NEW ZEALAND • 3 ♂♂, 1 ♀; same data as for holotype; NIWA 154948.

Type habitat and locality

Shallow subtidal, Raoul Island, New Zealand.

Description

Male

Body colourless, cylindrical, tapering slightly towards posterior extremity. Cuticle coarsely annulated along entire body, except for smooth cephalic capsule and terminal cone. One paratype specimen with two small protists attached to cuticle, ca 25 µm in length. Each annule divided into plates by eight longitudinal crests / ridges extending from cephalic capsule to terminal cone. Epicristae of each annule slightly overlapping adjacent annules; thin membranous layer extending 2–4 µm out from epicristae

along entire body length. Cuticle with pairs of lateral lines (grooves) present from slightly posterior to amphids to near level of cloaca. Zygapophyses indistinct. Body annules 2.0–2.4 µm wide (as measured in lateral fields), roughly equal in width throughout pharyngeal and mid-body regions, gradually decreasing in width from cloacal region towards terminal cone, last annule before terminal cone is narrowest (ca 1.5 µm); some body annules fuse together ventrally or dorsally. Intracuticular vacuoles

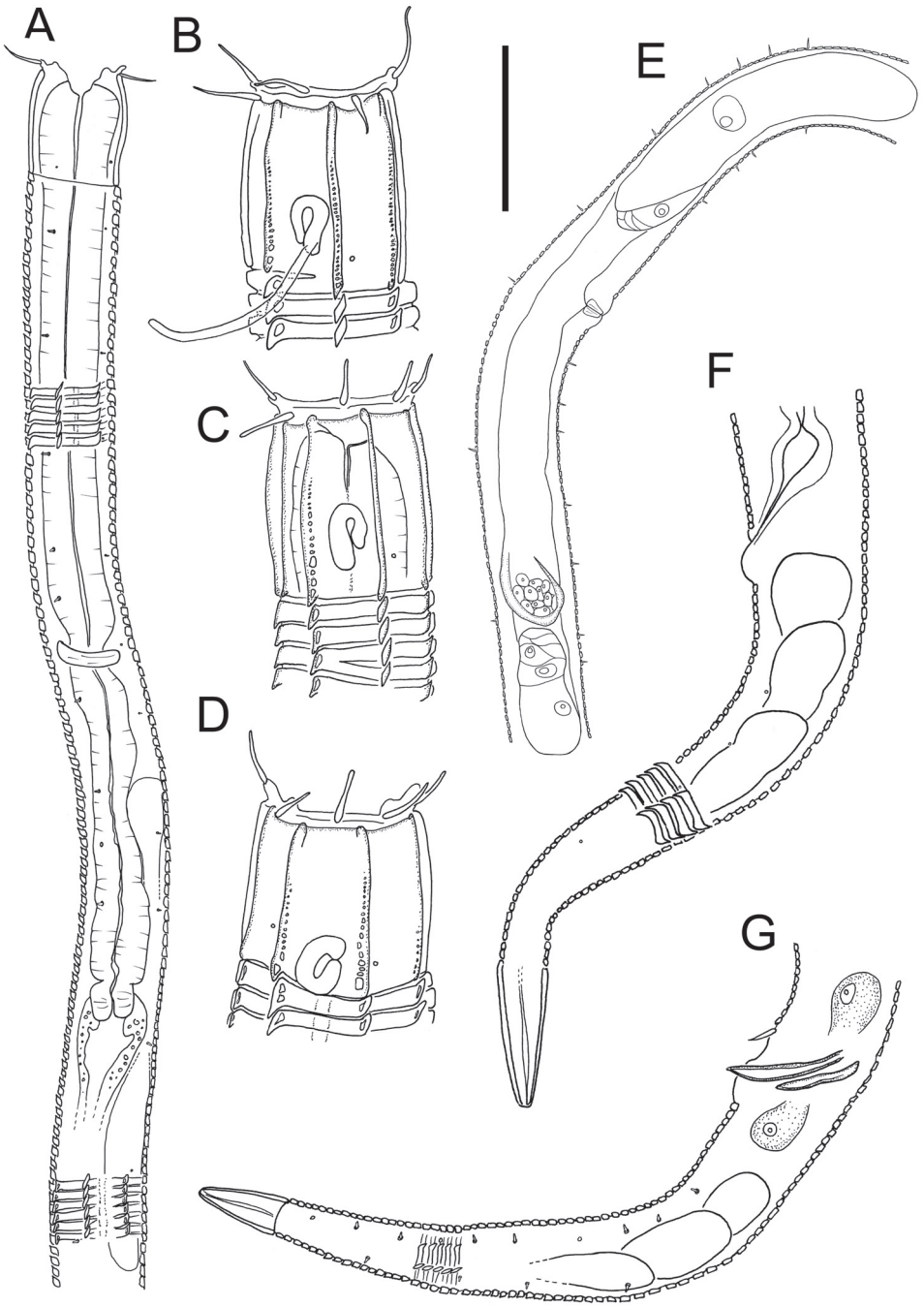

Fig. 7. *Metadasynemoides taihua* sp. nov. **A, G**. Holotype, ♂ (NIWA 154947). **B–F**. Paratypes (NIWA 154948). **A**. Pharyngeal body region. **B**. ♂, cephalic region. **C**. ♀, cephalic region. **D**. ♀, cephalic region. **E**. ♀, reproductive system. **F**. ♀, posterior body region. **G**. Posterior body region. Scale bar: A = 50 µm; B–D = 30 µm; E = 67 µm; F–G = 40 µm.

occurring along longitudinal crests of cephalic capsule and cuticle underlying crest/ridges (vanes). Four sublateral longitudinal rows of short somatic setae extending along entire body length, including tail; somatic setae sometimes not visible, giving appearance of cuticle pore being present. One or two sublateral cuticle pores present on one or both sides of amphids; no pore observed on terminal cone. Lateral alae absent, but lateral sides of cuticle smooth (apparently without annulation) in some paratypes from posterior to pharyngeal body region; in all specimens, two faint, lateral longitudinal lines (possibly

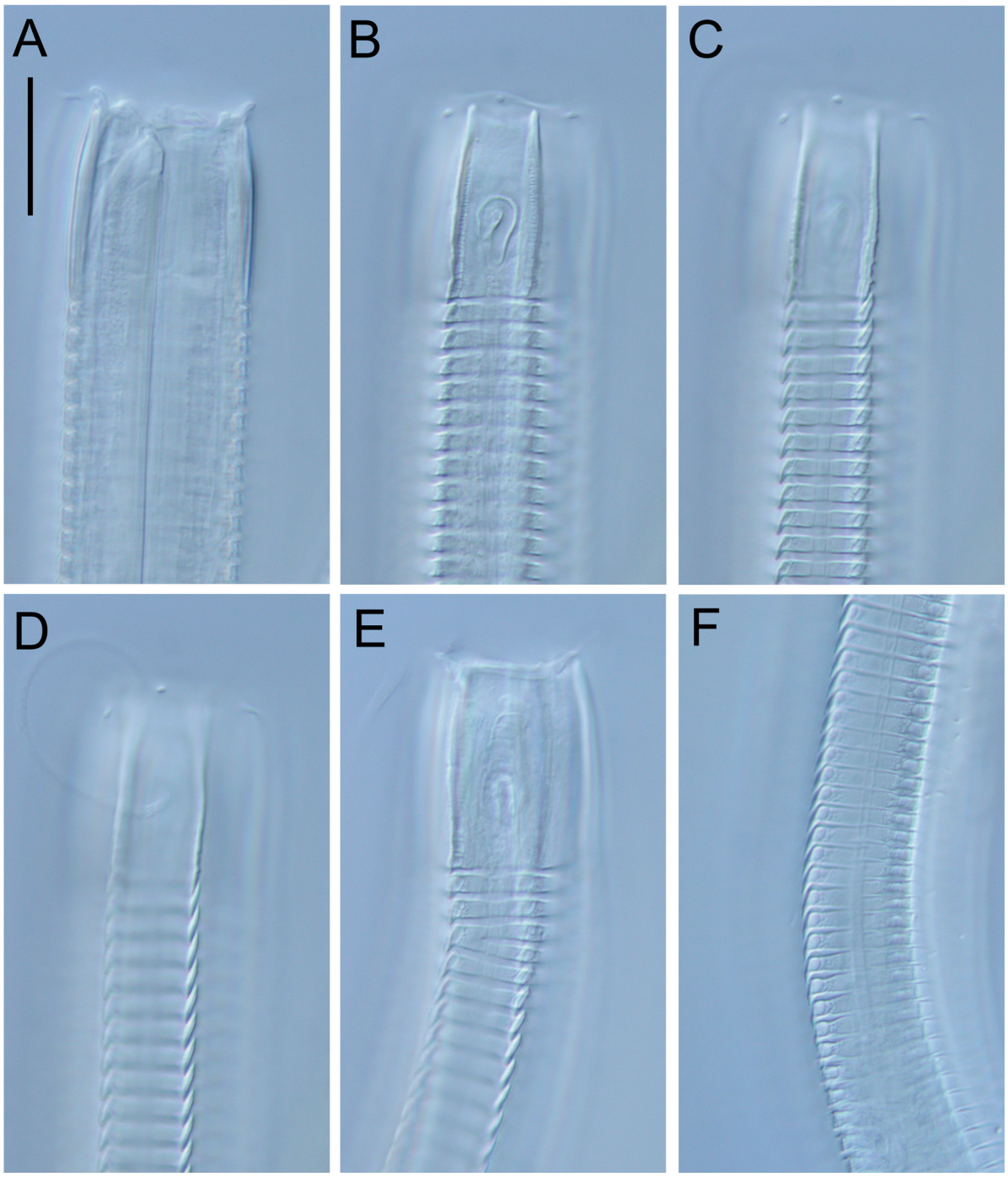

Fig. 8. *Metadasynemoides taihua* sp. nov., paratype, ♂ (NIWA 154948), light micrograph. **A–E**. Anterior body region. **F**. mid-body cuticle. Scale bar = 20 µm.

grooves) extend from below cephalic capsule to at least posterior end of pharyngeal region, not always clearly visible. Cephalic capsule about as long as wide, truncated anteriorly; flexible lip region set off from rigid cephalic capsule by discontinuity in cuticle. Longitudinal crests extending from base of cephalic capsule to base of lip region. Inner labial sensilla not observed. Outer labial setiform, located immediately anterior to cephalic setae 0.33–0.48 cbd long; cephalic setae of similar or slightly greater length than outer labial setae, both located on lip region. Loop-shaped amphids located towards base of cephalic capsule; amphidial aperture of same size and shape as amphidial fovea. Elongated corpus gelatum sometimes visible. Buccal cavity small, funnel shaped, without differentiation, with slightly cuticularized walls. Pharynx cylindrical, subdivided into anterior corpus and posterior postcorpus; corpus ca 60% of pharynx length, uniformly cylindrical, muscular; postcorpus ca 40% of pharynx length, also muscular consisting of short anterior narrower isthmus followed by irregular pharynx outline and slight basal swelling. Pharyngeal glands indistinct. Pharyngeal lumen uniform in thickness, tubes and valve-like structures absent. Cardia 8–14 µm long, surrounded by intestine. Nerve ring surrounding isthmus.

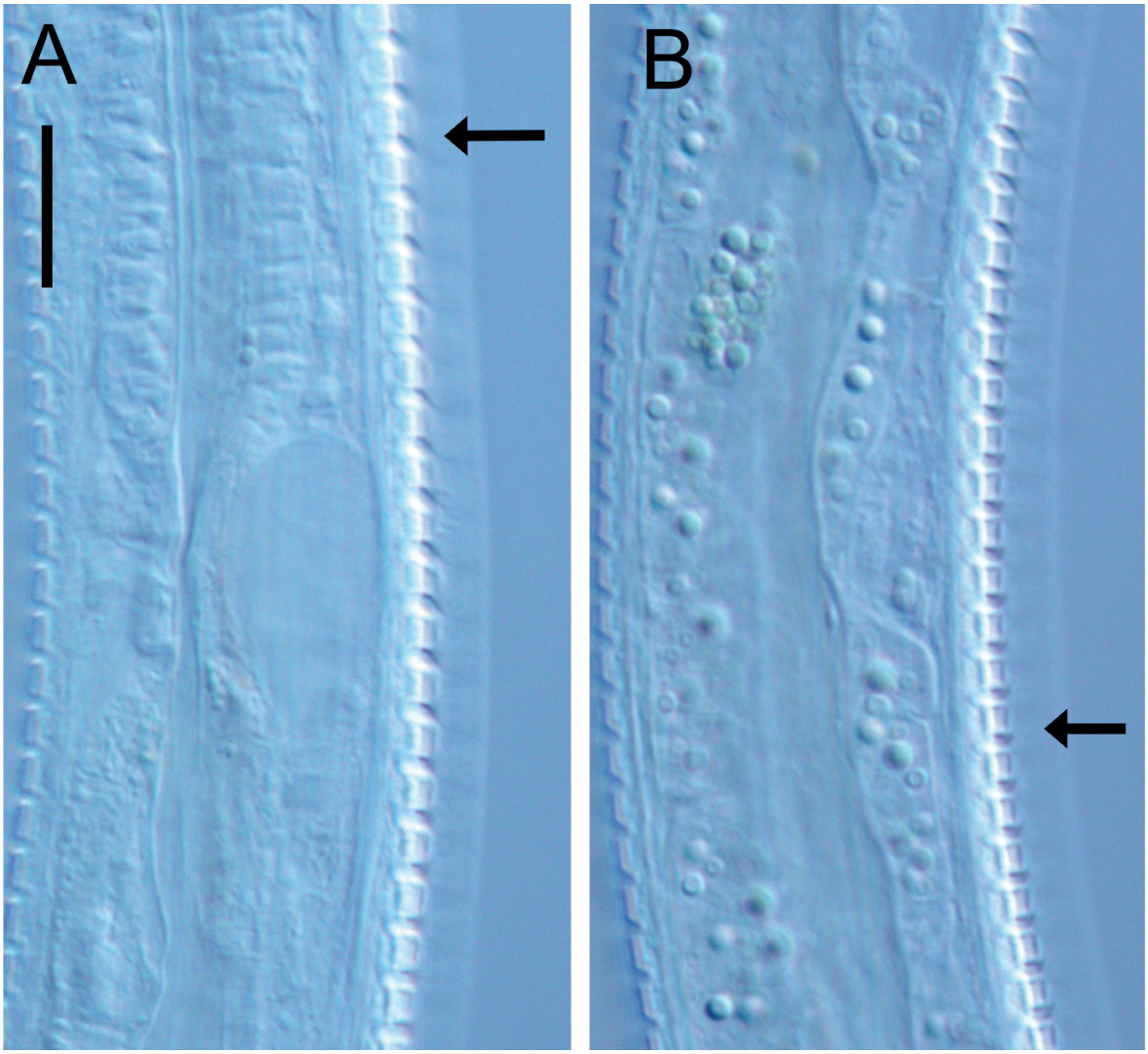

Fig. 9. *Metadasynemoides taihua* sp. nov., holotype, ♂ (NIWA 154947), light micrographs. **A**. Pharyngeal body region at level of secretory-excretory system (ampulla). **B**. Mid-body region. Arrows show membrane extending from body annule epicristae. Scale bar = 10 µm.

Secretory-excretory system present; excretory pore on annule 45–55; ventral gland slightly posterior to cardia.

Reproductive system diorchic with two opposed testes located either both to right or both to left of intestine; anterior testis outstretched, posterior testis reflexed. Spicules paired, symmetrical, weakly arcuate to almost straight along entire length. Gubernaculum plate-like without apophyses. Precloacal seta present, 6–9 µm long. Caudal glands and spinneret present. Terminal cone 21–28 µm long.

Female

Similar to males, but with slightly lower ratio of a and fewer caudal setae. Reproductive system didelphic, amphidelphic, with reflexed ovaries; anterior ovary to the right of intestine and posterior ovary on left of intestine. Anterior ovary with spermatheca. Vulva a transverse slit slightly posterior to mid-body. Vagina straight, with thickened walls, surrounded by sphincter muscle. Pars refringens vaginae not observed. Intrauterine egg not seen. Anal annule similar to adjacent annules.

Pselionema Cobb, 1933

Pselionema Cobb, 1933: 33.
Pselionemoides Haspeslagh, 1973: 335.

Type species

Pselionema annulatum (Filipjev, 1922) Cobb, 1933.

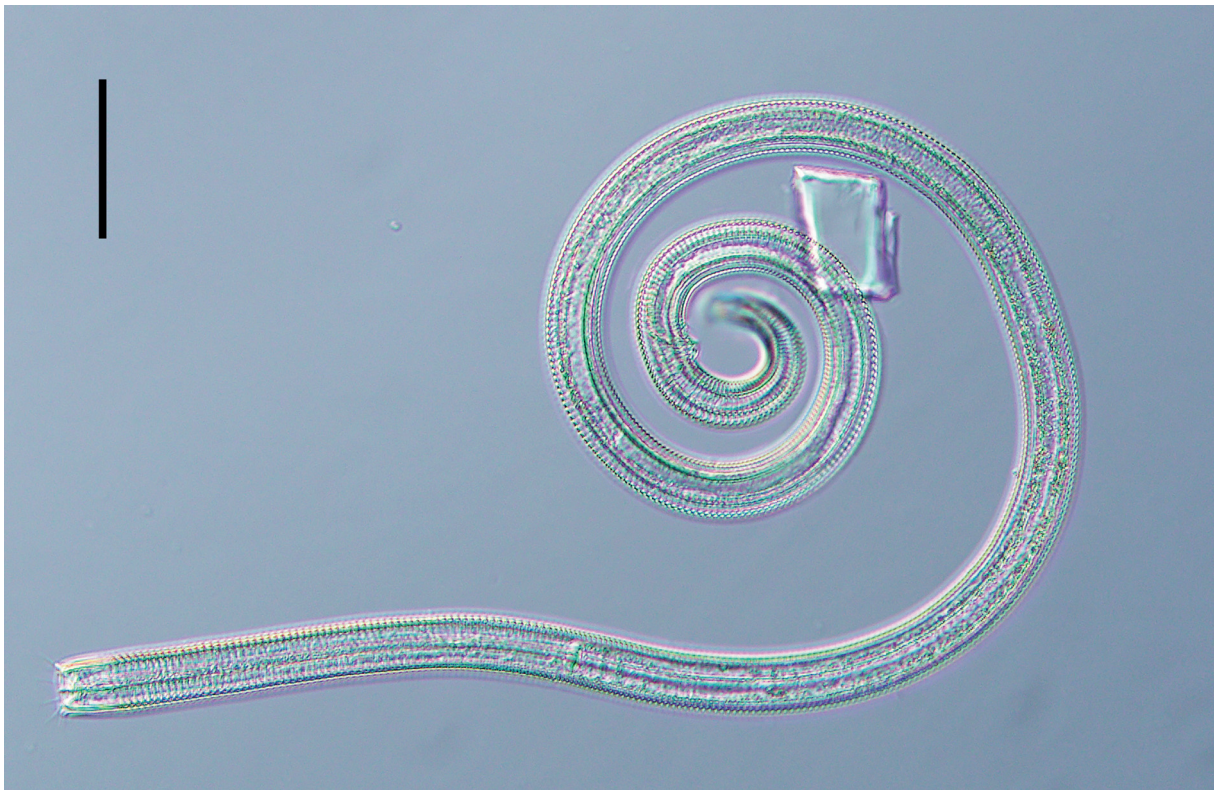

Fig. 10. *Metadasynemoides taihua* sp. nov., paratype, ♂ (NIWA 154948), light micrograph. Scale bar = 75 µm.

Table 2. Morphometrics of *Metadasynemoides taihua* sp. nov. Abbreviations: see Material and methods.

	males		female
	holotype	**paratypes**	**paratype**
n	1	3	1
L	1415	1407–1519	1412
a	52	51–53	39
b	6	6	6
c	11	9–10	10
c’	5.0	4.7–5.8	5.0
cephalic capsule width × length	27 × 30	27–30 × 30–33	32 × 31
cephalic ratio	1.1	1.0–1.1	1.0
number of pharyngeal annules	68	66–68	66
number of mid-body annules	372	354–403	390
number of tail annules	57	53–59	54
total number of annules	497	475–526	510
body diam. at cephalic setae	25	23–25	26
body diam. at amphids	27	27–31	32
length of cephalic setae	12	7–10	9–11
length of outer labial setae	11	8–12	9–10
amphid height	10	10–12	10
amphid width	6	6–7	7
amphid width / cbd (%)	22	22–25	22
amphid from anterior end	16	15–19	21
nerve ring from anterior end	147	143–161	144
nerve ring cbd	27	26–31	34
excretory pore from anterior end	175	174–192	189
pharynx length	236	234–254	233
pharyngeal bulb diam.	18	15–17	20
pharynx cbd	27	25–27	32
max. body diam.	27	27–30	36
spicule length	30	29–30	–
gubernaculum length	19	21–23	–
cloacal / anal body diam.	26	27–29	28
tail length	131	137–156	139
V	–	–	842
%V	–	–	60
vulval body diam.	–	–	36

Diagnosis (from Tchesunov & Mijutina 2002 and Holovachov 2014)

Cuticle consists of 70–210 annules. Annules usually thick and broad, zygapophyses usually distinct. Labial region not separated by constriction. Outer labial sensilla papillose, cephalic sensilla setose. Amphidial aperture loop-shaped, elongate.

Remarks

A key to species of *Pselionema* was provided by Tchesunov & Miljutina (2002). The latter authors included *P. rigidum* Chitwood, 1936 as a valid species; however, this species was synonymised with *P. beauforti* Chitwood, 1936 by Hopper (1973). An additional species was subsequently described by Holovachov *et al.* (2008a).

List of valid species of *Pselionema* Cobb, 1933

P. annulatum (Filipjev, 1922) Cobb, 1933
P. beauforti Chitwood, 1936
P. concinnum Tchesunov & Miljutina, 2002
P. deconincki Vitiello & Haspeslagh, 1972
P. detriticola Vitiello, 1974
P. dissimile Vitiello, 1974
P. huakita sp. nov.
P. longissimum Gerlach, 1953
P. minutum Vitiello & Haspeslagh, 1972
P. mirabile Tchesunov & Miljutina, 2002
P. ornatum (Timm, 1961) Hopper, 1973
P. parasimplex Vitiello, 1971
P. psednum Holovachov, Tandingan De Ley, Mundo-Ocampo, Baldwin, Rocha-Olivares & De Ley, 2008
P. richardi De Coninck, 1942
P. simile De Coninck, 1942
P. simplex De Coninck, 1942

Key to species of *Pselionema* Cobb, 1933 (updated from Tchesunov & Miljutina 2002)

1. Body with about 200 annules 2
– Body with about 160 or less body annules 4

2. Body annules narrow (2–4 µm), body slender, ratio of a ≥ 70 3
– Body annules broad (8–11 µm), body stouter, ratio of a about 40 ..... ***P. mirabile*** Tchesunov & Miljutina, 2002

3. Body length 1444–1747 µm, 252–292 body annules, cephalic setae 13–17 µm, spicules 25 µm long ..... ***P. psednum*** Holovachov, Tandingan De Ley, Mundo-Ocampo, Baldwin, Rocha-Olivares & De Ley, 2008
– Body length 1032 µm, 203 body annules, cephalic setae 7 µm, spicules 17 µm long ..... ***P. dissimile*** Vitiello, 1974

4. Body length > 400 µm 5
– Body length < 400 µm, ratio of a = 20–30 ..... ***P. minutum*** Vitiello & Haspeslagh, 1972

5. Body length about 1000 µm or more 6
– Body length < 900 µm 9

6. Body relatively stout (ratio of a = 50–65) 7
– Body slender (ratio of a > 70) 8

7. Cephalic setae 7–8 µm, cephalic capsule length 25–31 µm, amphid length 12–14 µm, 17–20 body annules in tail region ..... ***P. simile*** De Coninck, 1942
– Cephalic setae 10–15 µm, cephalic capsule length 38–43 µm, amphid length 16–18 µm, 24–30 body annules in tail region ..... ***P. huakita*** sp. nov.

8. Gubernaculum present ..... ***P. longissimum*** Gerlach, 1953
– Gubernaculum absent ..... ***P. concinnum*** Tchesunov & Miljutina, 2002

9. Zygapophyses distinct 10
– Zygapophyses indistinct .....***P. ornatum*** (Timm, 1961) Hopper, 1973

10. Cephalic capsule with pores 11
– Cephalic capsule without pores … 2

11. Spicules about 30 µm long .....***P. annulatum*** (Filipjev, 1922) Cobb, 1933
– Spicules about 20 µm long .....***P. detriticola*** Vitiello, 1974

12. Less than 130 body annules, body length 500–700 µm 13
– About 150 body annules or more, body length about 580 µm, ratio of c = 8, amphid about 12 µm long .....***P. richardi*** De Coninck, 1942

13. Body very short, about 500 µm long 14
– Body longer, 600–700 µm long 15

14. About 70 body annules cephalic setae 5–7 µm long ..... ***P. simplex*** De Coninck, 1942
– About 120 body annules, cephalic setae about 3 µm long .....
.....***P. deconincki*** Vitiello & Haspeslagh, 1972

15. Cephalic setae about 4 µm long, ventral pore on 19th body annule, spicules about 20 µm long .....
.....***P. parasimplex*** Vitiello, 1971
– Cephalic setae about 8 µm long, ventral pore on 13th body annule, spicules about 30 µm long .....
..... ***P. beauforti*** Chitwood, 1936

Pselionema huakita sp. nov.
urn:lsid:zoobank.org:act:31276D59-4875-4ACF-AEB6-F2A7A6CE77B4
Figs 11–12, Table 3

Diagnosis

Pselionema huakita sp. nov. characterised by body length 900–1259 m, presence of 123–161 body annules, small or indistinct zygapophyses, cephalic setae 0.71–0.93 cbd long, loop-shaped amphids with unequal branches located at middle of cephalic capsule, spicules 29–34 µm long, and tail 9–15 cloacal / anal body diameters long.

Differential diagnosis

The new species is most similar to *P. simile* (described from the coastal Mediterranean) in body length (about 1000 µm), ratio of a (50–70), and number of body annules (ca 160 or less). The new species differs from *P. simile* in cephalic capsule length (38–43 vs 25–31 µm in *P. simile*), longer cephalic setae (10–15 vs 7–8 µm in *P. simile*), longer amphids (16–18 vs 12–14 µm in *P. simile*), longer spicules (29–34 vs 27 µm in *P. simile*), and greater number of cuticle annules in tail region (24–30 vs 17–20 in *P. simile*).

Etymology

'*Huakita*' are bacteria, which are likely an important food source for this species and other ceramonematids. Māori name '*toke huakita*'.

Type material

Holotype

NEW ZEALAND • ♂; Kermadec Islands, Raoul Island (off Western Spring); 29.22992° S, 177.96448° W; depth 16 m; 22 Nov. 2021; coarse sand and gravel sediments, voyage TMOR2021, station 85; NIWA 154949.

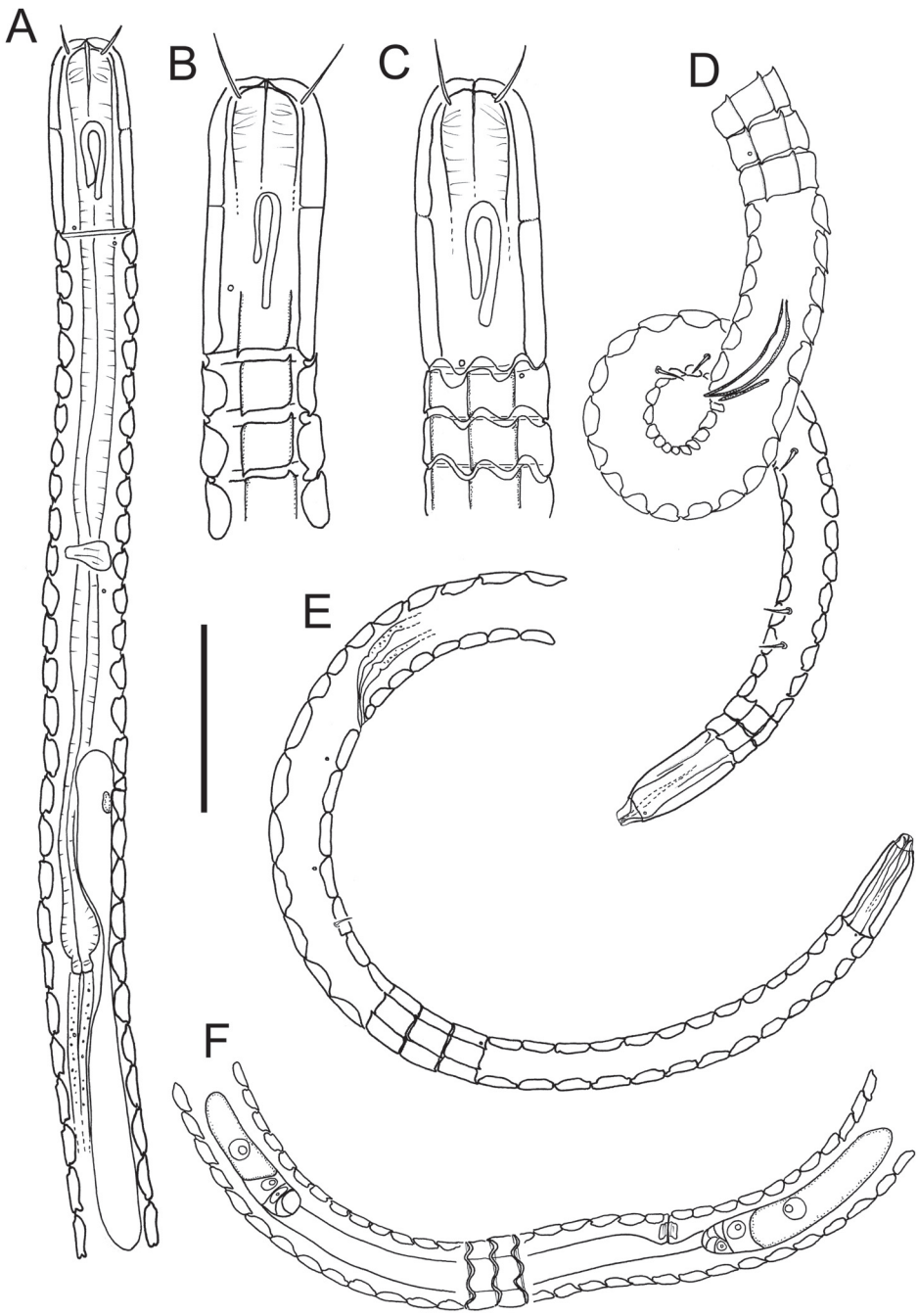

Fig. 11. *Pselionema huakita* sp. nov. **A**. Holotype, ♂ (NIWA 154949). **B–F**. Paratypes (NIWA 154950-1). **A**. Pharyngeal body region. **B**. ♀, cephalic region. **C**. ♂, cephalic region. **D**. ♂, posterior body region. **E**. ♀, posterior body region. **F**. ♀, reproductive system. Scale bar: A = 40 µm; B–C = 30 µm; D = 37 µm; E = 44; F = 52 µm.

Paratypes

NEW ZEALAND • 2 ♂♂, 1 ♀; same data as for holotype; NIWA 154950 • 1 ♂, 1 ♀; Kermadec Islands, Raoul Island (Denham Bay); 29.26302° S, 177.95747° W; depth 15 m; 20 November 2021; sandy sediments, voyage TMOR2021, station 30; NIWA 154951.

Type habitat and locality

Shallow subtidal, Raoul Island, New Zealand.

Description

Male

Body colourless, slender, cylindrical, tapering slightly towards posterior extremity. Cuticle coarsely annulated along entire body, except for cephalic capsule and terminal cone. Each annule and terminal cone divided into plates by eight longitudinal crests / ridges extending from cephalic capsule to terminal cone. Epicristae of each annule slightly overlapping adjacent annules. Zygapophyses small, may be indistinct. Annules unequal in width along body; annule width increasing gradually from first postcephalic annule (6–7 µm, as measured in lateral field) to annule number 29–39 or slightly posterior to ventral gland (10–11 µm), followed by narrower one (7–8 µm); annules then stay roughly equal in size for most of mid-body region until decreasing in width again in precloacal region to about 6 µm in annule immediately anterior to cloaca; this annule followed posteriorly by much wider annule (12–13 µm) then by caudal annules gradually decreasing in width toward terminal cone; last annule before terminal cone is narrowest (ca 5 µm). Caudal annules transversely unequal, usually wider on dorsal side than ventral side. Intracuticular vacuoles absent. Four sublateral cuticle pores present on cephalic capsule; two laterodorsal pores at base of cephalic capsule or at level of posterior edge of amphid, and one dorsal and one ventral pore at level of anterior edge of amphids. Single sublateral cuticle pore also present on first body annule, and other sublateral pores sparsely distributed along rest of body. One cuticle pore observed near tip of terminal cone. Lateral alae absent. Cephalic capsule elongated with rounded lip region; lip region not set off from rest of cephalic capsule. Longitudinal crests extending from base of cephalic capsule to about one third of cephalic capsule length. Inner and outer labial sensilla not observed. Cephalic setae 0.71–0.93 cbd long. Loop-shaped amphids with unequal branches located at middle of cephalic capsule; amphidial aperture of same size and shape as amphidial fovea. Buccal cavity minute or funnel shaped, without differentiation or cuticularisation. Pharynx cylindrical, with relatively weak subdivision into anterior corpus and posterior postcorpus; corpus ca 55% of pharynx length, uniformly cylindrical, muscular; postcorpus ca 45% of pharynx length, also muscular consisting of narrower isthmus followed by short, pear-shaped pharynx. Pharyngeal glands indistinct. Pharyngeal lumen uniform in thickness, tubes and valve-like structures absent. Cardia 5–6 µm long, not surrounded by intestine. Nerve ring surrounding anterior portion of isthmus. Secretory-excretory system present; excretory pore on annule 15–16; ventral gland slightly posterior to cardia.

Reproductive system diorchic with two opposed testes located either both to right or both to left of intestine. Anterior testis outstretched; structure of posterior testis could not be determined. Spicules paired, symmetrical, weakly arcuate, 29–34 µm long. Gubernaculum plate-like, without apophyses. Precloacal seta or spine absent. Caudal glands not observed; spinneret present with apparently three separate outlets immediately posterior to terminal cone. Terminal cone 18–23 µm long.

Female

Similar to males, but with slightly smaller amphids and longer tail with few if any caudal setae. Reproductive system didelphic, amphidelphic, with reflexed ovaries; in one specimen, both ovaries located to left of intestine. Position of ovaries in other specimen could not be determined. Anterior ovary more developed than posterior ovary. Vulva a transverse slit slightly anterior to mid-body. Vagina

straight, with thickened walls, surrounded by sphincter muscle. Pars refringens vaginae not observed. Intrauterine egg not seen. First and second postanal annules 10–13 µm wide.

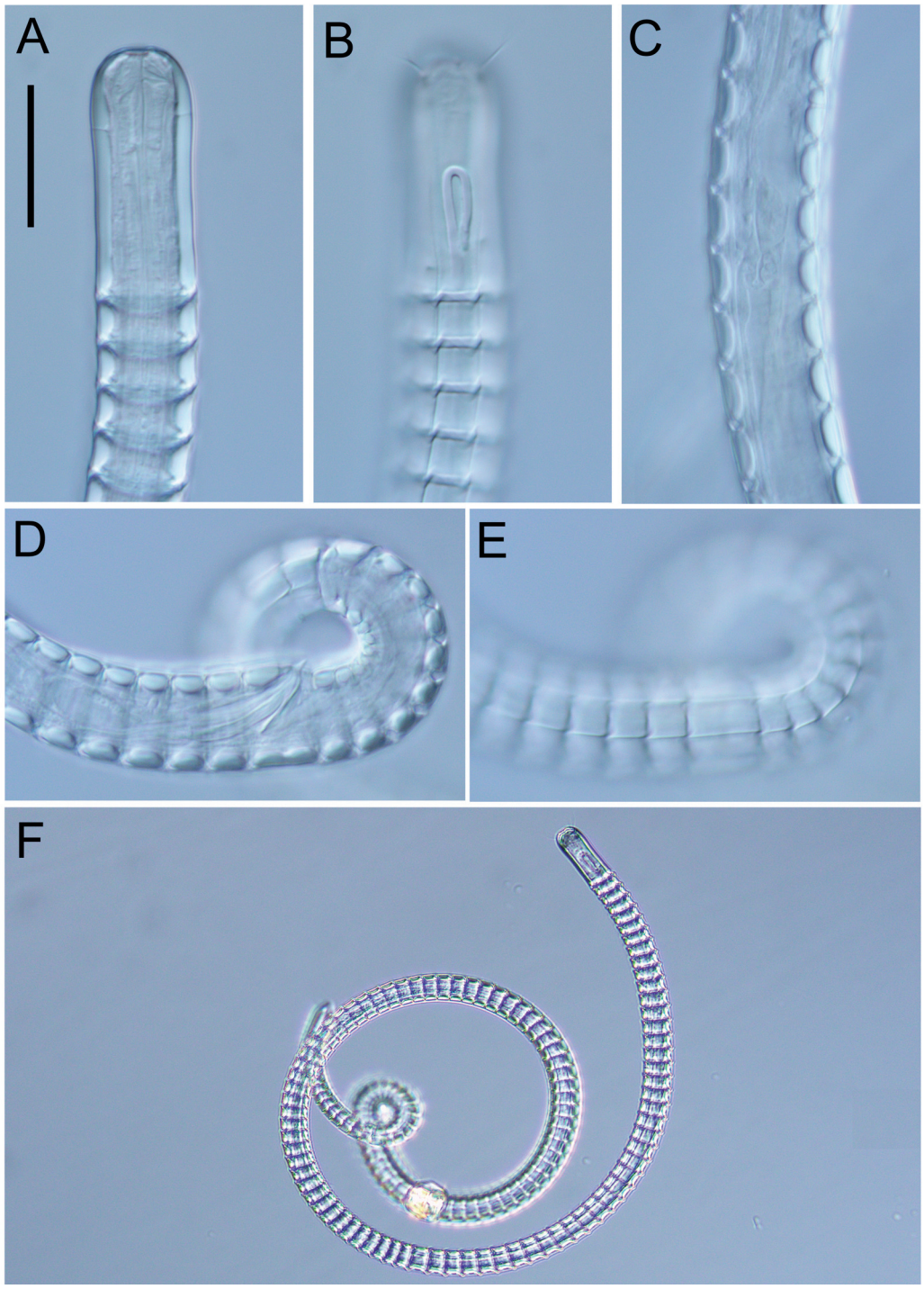

Fig. 12. *Pselionema huakita* sp. nov., light micrographs. **A–B**. Holotype, ♂ (NIWA 154949). **C–F**. Paratype, ♂ (NIWA 154950). **A**. Optical section of cephalic region. **B**. Surface view of cephalic region. **C**. Optical section showing junction of pharynx and intestine. **D**. Optical section of cloacal region. **E**. Surface view of cloacal region. **F**. Entire male. Scale bar: A–E = 40 µm; F = 85 µm.

Table 3. Morphometrics of *Pselionema huakita* sp. nov. Abbreviations: see Material and methods.

	males		females
	holotype	**paratypes**	**paratypes**
n	1	3	2
L	1271	900–1213	1058, 1259
a	67	50–64	57, 59
b	7	5–7	6, 7
c	7	6–7	5, 7
c’	9.7	9.0–10.2	11.3, 15.1
cephalic capsule width × length	18 × 41	17–18 × 38–43	17, 22 × 40
cephalic ratio	2.3	2.1–2.4	1.8, 2.4
number of pharyngeal annules	19	18	16, 19
number of mid-body annules	114	93–116	83, 118
number of tail annules	26	24–30	24
total number of annules	159	141–160	123, 161
body diam. at cephalic setae	14	14–15	13, 17
body diam. at amphids	18	16–18	17, 22
length of cephalic setae	12–13	10–13	10–15
length of outer labial setae	18	17–18	16, 17
amphid height	5	5–6	4, 5
amphid width	28	31–33	23, 24
amphid width / cbd (%)	17	15–19	16, 17
amphid from anterior end	112	120–124	142
nerve ring from anterior end	18	18–19	17
nerve ring cbd	160	143–157	146, 153
excretory pore from anterior end	191	172–185	176, 182
pharynx length	8	8–9	8, 10
pharyngeal bulb diam.	19	17–19	18, 22
pharynx cbd	19	18–19	18, 22
max. body diam.	34	29–33	–
spicule length	15	12–16	–
gubernaculum length	18	16–17	13, 16
cloacal / anal body diam.	174	153–174	181, 196
tail length	–	–	468, 584
V	–	–	44, 46
%V	–	–	18, 22

Order Desmodorida De Coninck, 1965
Family Desmodoridae Filipjev, 1922

Genus ***Acanthopharynx*** Marion, 1870

Acanthopharynx Marion, 1870: 36, fig. 4.

Xanthodora Cobb, 1920: 317, fig. 98.

Diagnosis (from Leduc & Zhao 2016 and Tchesunov *et al.* 2023)

Cephalic capsule divided into main and labial regions by fine suture immediately posterior to outer labial papillae, not composed of joined plates. Subcephalic setae usually present on cephalic capsule (except in *A. merostomacha* (Steiner, 1921)), often numerous; anteriormost subcephalic setae sometimes located at same level as cephalic setae and/or forming up to two additional separate crowns posteriorly, with each crown comprising up to 24 setae. Additional subcephalic setae sometimes present on cephalic capsule posterior to crown(s) of setae; may be shorter, of similar length, or longer than crown setae, and either irregularly spaced or arranged in longitudinal rows. Amphidial fovea usually unispiral, sometimes cryptospiral, spiral or loop-shaped, not located on cuticularised plate. Buccal cavity with large, heavily cuticularised, dorsal tooth, small subventral teeth and row of denticles sometimes present. Pharynx usually with posterior pharyngeal bulb ≥ 50% of total pharynx length, or gradually widening posteriorly, sometimes with heavily cuticularised lumen. Precloacal supplements usually present, may consist of pores, papillae or mounds, or sometimes tubular, conical or triangular. Spicules short, arcuate, heavily cuticularised, often with capitulum. Gubernaculum present.

Acanthopharynx dormitata Leduc & Zhao, 2016
Fig. 13, Table 4

Diagnosis

Acanthopharynx dormitata characterised by cephalic capsule with crown of 14 setae (four cephalic and ten subcephalic setae) and 24 additional subcephalic setae arranged in eight longitudinal rows, unspiral amphidial fovea, buccal cavity with crown of denticles, female reproductive system with spermatheca, male with nine precloacal and two postcloacal supplements, and gubernaculum surrounding spicules distally.

Material examined

NEW ZEALAND • 1 ♂; Kermadec Islands, Raoul Island (Homestead); 29.23660° S, 177.92683° W; depth 19 m; 22 Nov. 2021; coarse sand and gravel sediments, voyage TMOR2021, station 84; NIWA 154953.

Type habitat and locality

Red seaweed partially covered in sediments and growing on boulders of the lower intertidal zone, Greta Point, Wellington, New Zealand (174.80489° E, 41.30356° S).

Remarks

The male Raoul Island specimen agrees well with the description of the species based on the Wellington specimens by Leduc & Zhao (2016) with respect to cuticle ornamentation, arrangement and size of anterior sensilla, buccal cavity armature, amphid shape, pharynx structure, shape of copulatory structures, shape and number of precloacal and postcloacal supplements, and tail morphology. The Raoul Island specimen, however, has a longer body (2954 vs 1809–2311 µm in the Wellington specimens), higher ratio of a (62 vs 38–50 in Wellington specimens) and c (35 vs 22–29 in Wellington specimens), slightly larger amphid (36 vs 25–30% cbd in Wellington specimens) and shorter spicules (49 vs 59–62 µm in Wellington specimens) and gubernaculum (24 vs 27–29 µm in Wellington specimens) (Table 4). It could be argued that the latter discrepancies justify the erection of a new species; however, more specimens need to be observed and molecular data need to be obtained before to inform this decision. For the time being, the Raoul specimen is considered to belong to *Acanthopharynx dormitata*.

Genus ***Desmodora*** de Man, 1889

Desmodora de Man, 1889: 9.
Mastodex Steiner, 1921: 25, fig. k.

Diagnosis (from Leduc & Zhao 2016)

Cuticle without ridges or spines. Cephalic capsule either smooth or partly to entirely ornamented with small vacuoles. Cephalic setae located either in labial region or on main part of cephalic capsule.

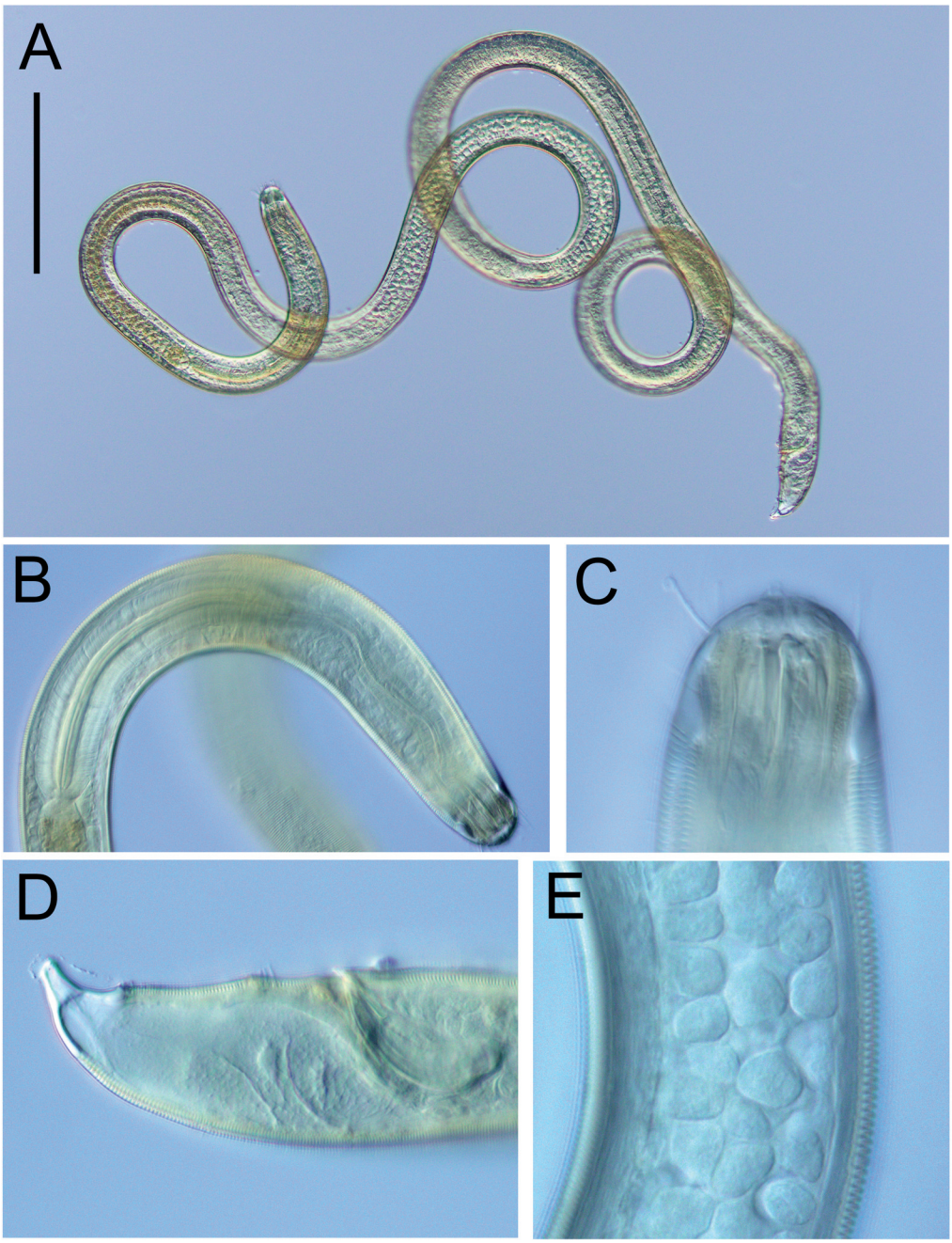

Fig. 13. *Acanthopharynx dormitata* Leduc & Zhao, 2016, ♂ (NIWA 154953). **A**. Entire body. **B**. Pharyngeal region. **C**. Cephalic region and buccal cavity. **D**. Cloacal and tail region. **E**. Sperm. Scale bar: A = 200 µm; B = 85 µm; C = 22 µm; D = 44 µm; E = 26 µm.

Table 4. Morphometrics of specimens of *Acanthopharynx dormitata* Leduc & Zhao 2016 and *Desmodora bilacinia* Leduc & Zhao 2016 from the type locality (Wellington) and Rangitāhua. Abbreviations: see Material and methods.

	Acanthopharynx dormitata Leduc & Zhao, 2016		***Desmodora bilacinia*** Leduc & Zhao, 2016			
	males		**males**		**females**	
region	**Wellington**	**Rangitāhua**	**Wellington**	**Rangitāhua**	**Wellington**	**Rangitāhua**
n	5	1	3	2	2	2
L	1809–2311	2954	1218–1661	1285, 1486	1407, 1543	1198, 1468
a	38–50	62	36–49	37, 42	30, 32	28, 31
b	6–8	9	7–11	8, 9	9, 13	7, 8
c	22–29	35	16–22	12, 15	23, 25	11, 13
c’	1.6–1.8	1.8	1.7–3.1	3.2, 3.3	2.7, 3.4	3.3, 3.7
head diam. at cephalic setae	20	18	17–18	17, 18	18, 19	20
head diam. at amphids	23–25	22	21–25	26, 27	23, 25	26
length of sub–cephalic setae	5–10	11	4–6	4–5	4	4
length of cephalic setae	6–8	9	6–7	4–6	5, 6	5
amphid height	6–7	8	13	17, 18	8, 9	11
amphid width	6–7	8	11	14, 16	8, 10	11
amphid width / cbd (%)	25–30	36	49–52	52, 62	35, 40	42
amphid from anterior end	4–7	3	7–10	5	12	7, 10
nerve ring from anterior end	91–117	115	76–94	79, 87	84	93
nerve ring cbd	43–48	47	33–35	33, 34	38	37
pharynx length	278–308	326	150–167	154, 167	111, 172	160, 178
pharyngeal bulb length	154–167	175	30–32	31, 36	33	36–41
pharyngeal bulb diam.	30–34	31	17–23	24	25, 26	25, 26
pharynx cbd at base	44–48	48	33–34	35	37, 40	37, 38
max. body diam.	46–49	48	34	35	47, 48	43, 48
spicule length	59–62	49	39–44	43	–	–
gubernaculum length	27–29	24	15–16	15, 17	–	–
cloacal / anal body diam.	42–47	46	32–34	31, 32	30, 34	30, 33
tail length	70–81	84	58–105	98, 107	80, 114	108, 111
V	–	–	–	–	796, 910	680, 830
%V	–	–	–	–	57, 59	57
vulval body diam.	–	–	–	–	47, 48	43, 48

Subcephalic setae sometimes present, when present few in number and mainly located posteriorly to amphidial fovea. Amphidial fovea cryptospiral or multispiral, seldom loop-shaped. Buccal cavity with large dorsal tooth and smaller subventral teeth. Pharynx with oval or circular posterior bulb. Spicules short, arcuate, with capitulum and velum. Precloacal supplements sometimes present, usually pore-like, seldom consisting of cuticular swellings or flaps. Tail usually conical, seldom conico-cylindrical.

Desmodora bilacinia Leduc & Zhao, 2016
Fig. 14, Table 4

Diagnosis

Desmodora bilacinia is characterised by eight longitudinal rows of somatic setae of medium length (3–8 μm), eight subcephalic setae present on cephalic capsule, unispiral amphidial fovea, males with two precloacal supplements consisting of thin, rounded cuticular extensions and two rows of thick subventral setae extending from precloacal supplements to near tail tip, and non-annulated tail tip with perforations covering anterior third to two-thirds.

Material examined

NEW ZEALAND • 2 ♂♂, 2 ♀♀; Kermadec Islands, Raoul Island (off Western Spring); 29.22992° S, 177.96448° W; depth 16 m; 22 Nov. 2021; coarse sand and gravel sediments, voyage TMOR2021, station 85; NIWA 154954.

Type habitat and locality

Coarse sand and gravel sediments under a small boulder, lower intertidal zone, Greta Point, Wellington, New Zealand (174.80251° E, 41.30442° S).

Remarks

The male Raoul Island specimens agrees well with the description of the species based on the Wellington specimens by Leduc & Zhao (2016) in almost all respects. The Raoul Island specimens, however, are characterised by smaller ratio of c (11–15 vs 16–25 in the Wellington specimens) as well as somewhat larger amphids (in males: 52–62 vs 49–52% wide in the Wellington specimens; in females: 42 vs 35–40% cbd in the Wellington specimens) (Table 4).

Discussion

This is the first study on the marine nematode fauna of Kermadec Islands. Samples of subtidal coarse sediments from around Raoul Island yielded four new ceramonematid species and two new species records for the region. Preliminary sorting of the nematode material indicates the presence of at least eighteen other nematode species in the samples (D. Leduc, unpubl. data).

Prior to this study, the family Ceramonematidae comprised 63 valid species. The addition of four new species from the Kermadec region represents a substantial increase, bringing the total number of species to 67. Two of the new species described here belong to the genus *Ceramonema*, the most species-rich genus of the family with 25 valid species. *Ceramonema taikoraha* sp. nov. and *C. taiora* sp. nov. occurred in the same sample (station 85) and were first thought to belong to the same species because of their morphological similarities (i.e., cuticle ornamentation with distinct zygapophyses, cephalic capsule with intracuticular vacuolisation, body length and shape, and relatively short cephalic setae); however, a more detailed examination showed them to differ in some key aspects (e.g., number of body annules and presence/absence of a precloacal spine). *Pselionema huakita* sp. nov. belongs to the second most species rich genus of the family (16 valid species), whilst *Metadasynemoides taihua* sp. nov. belongs to a less diverse genus (six valid species); both of these species also co-occurred in the same sample as *Ceramonema taikoraha* and *C. taiora* (station 85).

Acanthopharynx dormitata and *Desmodora bilacinia* were originally described from the coast of Wellington on the lower North Island of New Zealand. Their presence on Raoul Island, some 1350 km away from Wellington, suggests that these species have a relatively widespread distribution. Determining

the status of the Raoul Island populations with certainty will, however, require further morphological investigation and comparison of molecular sequence data from both localities.

Even though they are minute in size, the multitudes of toke moana (marine worms, or nematodes) play a critical role in maintaining the purity of the marine ecosystem by consuming the food sources brought by the swirling tides. The discovery and naming of four new nematode species is an outcome of

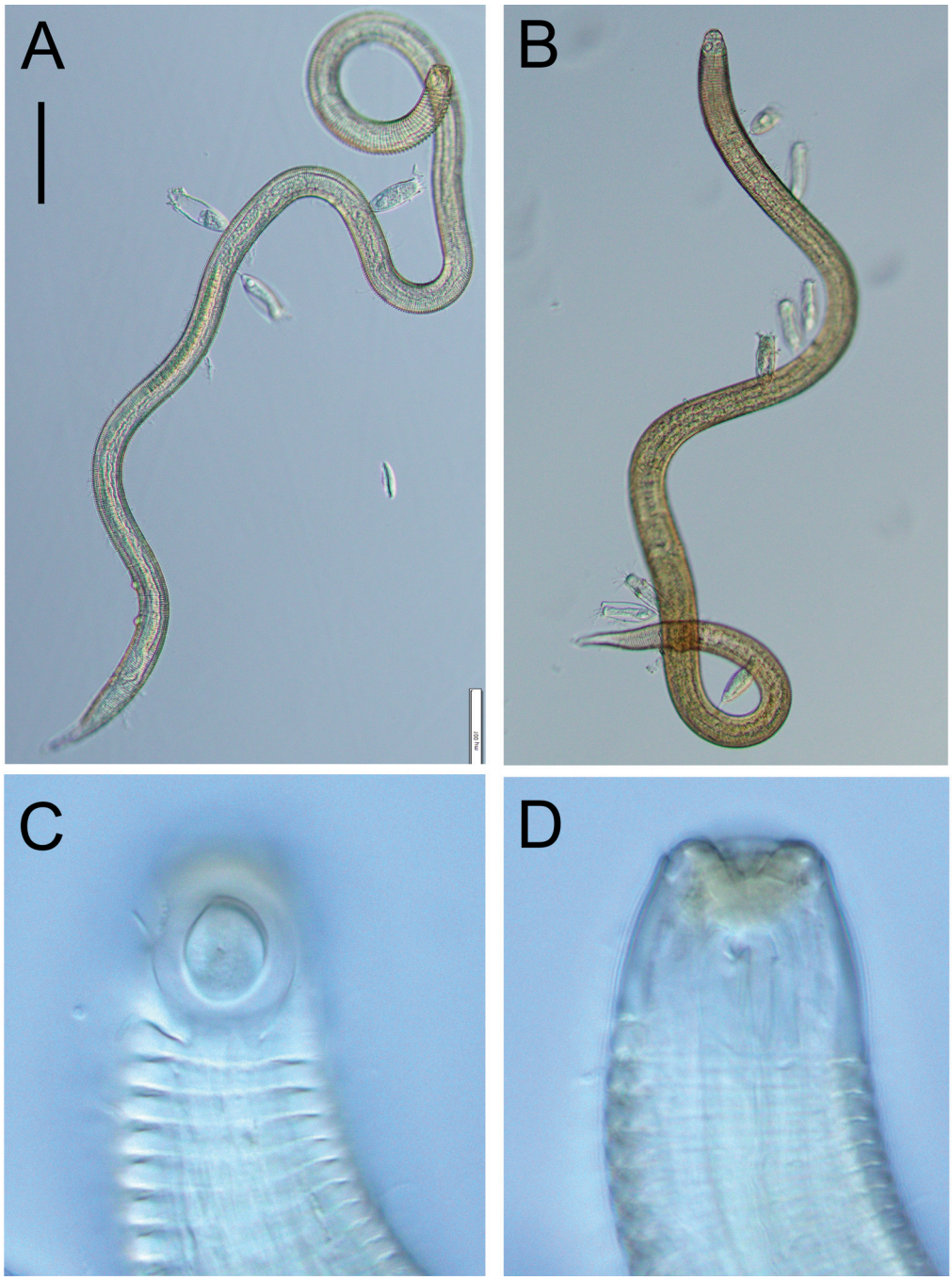

Fig. 14. *Desmodora bilacinia* Leduc & Zhao, 2016 (NIWA 154954). **A**. Entire male. **B**. Entire female. **C**. ♂, cephalic region showing amphidial fovea. **D**. ♂, cephalic region showing buccal cavity. Scale bar: A–B = 100 µm; C–D = 11 µm.

collaboration between Ngāti Kuri and taxonomists working together. This collaboration acknowledges Ngāti Kuri as kaitiaki and produces knowledge about biodiversity that is permeated with a Ngāti Kuri spiritual, environmental and cultural framework. Applying a Ngāti Kuri framework to inform the naming of nematodes has enabled knowledge, power, language, values and principles to flow back and forth between taxonomists and iwi.

Acknowledgements

Funding for this work was provided by the Endeavour programme Te Mana o Rangitāhua and by NIWA's Marine Invertebrate Taxonomy Project OCBR2302 (Protecting Marine Biodiversity programme). This research and research collaboration acknowledges Ngāti Kuri as mana whenua and mana moana of Rangitāhua. Te Mana o Rangitāhua is an iwi-led Research Programme, funded by the Ministry for Business, Innovation and Employment (AWMMU2001) and hosted at Tāmaki Paenga Hira Auckland Museum. Research is led by Ngāti Kuri through Te Ara Whānui Research Centre and undertaken with the support and guidance of Puu Kaiao – a Living Protocol for Te Mana o Rangitāhua between Ngāti Kuri and Tāmaki Paenga Hira Auckland Museum. Te Mana o Rangitāhua is supported by Waipapa Taumata Rau University of Auckland, Massey University, National Institute of Water and Atmospheric Research, Manaaki Whenua Landcare Research, Northern Seabird Trust, and Auckland University of Technology. Te Mana o Rangitāhua is grateful to Inkfish for their support and in-kind funding to the research program. The samples used in this study were collected during Expedition Rangitahi, and I thank members of the research team and in particular Wendy Nelson and Joe O'Callaghan for collecting the sediment samples. I extend my thanks and gratitude to the Ngāti Kuri Trust Board, Jerry Norman and Te Tira Tapaina Ingoa for their support and guidance and for sharing their mātauranga o Ngāti Kuri. I am grateful to three anonymous reviewers for providing constructive criticisms on the manuscript. The author reports there are no competing interests to declare.

References

Bussau C. 1993. *Taxonomische und ökologische Untersuchungen an Nematoden des Peru-Beckens*. PhD thesis, University of Kiel, Germany.

Coomans A. 1979. A proposal for a more precise terminology of the body regions in the nematode. *Annales de la Société Royale zoologique de Belgique* 108: 115–117.

Decraemer W., Coomans A. & Baldwin J. 2014. Morphology of Nematoda. *In*: Schmidt-Rhaesa A. (ed.) Handbook *of Zoology: Gastrotricha, Cycloneuralia and Gnathifera, Volume 2: Nematoda*: 1–59. De Gruyter, Berlin. https://doi.org/10.1515/9783110274257.1

Haspeslagh G. 1973. Superfamille des Ceramonematoidea (Cobb, 1933) (Nematoda), évolution et systématique. *Annales de la Société Royale zoologique de Belgique* 102: 235–263.

Holovachov O. 2014. Order Plectida Gadea, 1973. *In*: Schmidt-Rhaesa A. (ed.) *Handbook of Zoology: Gastrotricha, Cycloneuralia and Gnathifera, Volume 2: Nematoda:* 487–535. De Gruyter, Berlin. https://doi.org/10.1515/9783110274257.487

Holovachov O. 2020. The nomenclatural status of new nematode nomina proposed in 1993 in the doctoral thesis of Christian Bussau, entitled Taxonomische und ökologische Untersuchungen an Nematoden des Peru-Beckens (Nematoda). *Bionomina* 19: 86–99. https://doi.org/10.11646/bionomina.19.1.5

Holovachov O., Tandingan De Ley I., Mundo-Ocampo M., Baldwin J.G., Rocha-Olivares A. & De Ley P. 2008a. Nematodes from the Gulf of California. Part 1. The genera *Ceramonema* Cobb, 1920, *Pselionema* Cobb in Cobb, 1933 and *Pterygonema* Gerlach, 1954 (Nematoda: Ceramonematidae). *Nematology* 10: 347–373. https://doi.org/10.1163/156854108783900311

Holovachov O., Mundo-Ocampo M., Tandingan De Ley I. & De Ley P. 2008b. Nematodes from the Gulf of California. Part 2. *Ceramonema nasobema* sp. n. (Nematoda: Ceramonematidae). *Nematology* 10: 835–844. https://doi.org/10.1163/156854108786161508

Hopper B.E. 1973. Free-living marine nematodes from Biscayne Bay, Florida. VI. Ceramonematidae: Systematics of *Pselionema annulatum* var. *beauforti* Chitwood, 1936, and a note on the production and transport of an egg capsule. *Proceedings of the Helminthological Society of Washington* 40: 265–272.

Leduc D. & Zhao ZQ. 2016. Morphological and molecular characterisation of new *Acanthopharynx* and *Desmodora* species (Nematoda: Desmodorinae) from intertidal sediments of New Zealand. *Nematology* 18: 905–924. https://doi.org/10.1163/15685411-00003004

Lorenzen S. 1981. Entwurf eines phylogenetischen Systems der freilebenden Nematoden. *Veröffentlichungen des Instituts für Meeresforschung in Bremerhaven* 7: 1–472.

Ngāti Kuri Trust Board. 2013. Treaty settlement offer. Ratification Guide.2018. Ngataki. Available from https://ngatikuri.iwi.nz/deed-of-settlement-docs/ [accessed 17 Sep. 2024].

Nicholas W.L. & Stewart A.C. 1990. Structure of the cuticle of *Metadasynemoides cristatus* (Chromadorida: Ceramonematidae). *Journal of Nematology* 22: 247–261.

Somerfield P.J. & Warwick R.M. 1996. *Meiofauna in Marine Pollution Monitoring Programmes: a Laboratory Manual*. Ministry of Agriculture, Fisheries and Food, Lowestoft.

Stewart A.C. & Nicholas W.L. 1992. Structure of the cuticle of *Ceramonema carinatum* (Chromadorida: Ceramonematidae). *Journal of Nematology* 24: 560–570.

Tchesunov A.V. & Miljutina M.A. 2002. A review of the family Ceramonematidae (marine free-living nematodes), with description of nine species from the White Sea. *Zoosystematica Rossia*: 11: 3–39. https://doi.org/10.31610/zsr/2002.11.1.3

Tchesunov A., Rodriguez Garcia P., Simakova U. & Mokievsky V. 2023. *Acanthopharynx* marine nematodes (Nematoda, Chromadoria, Desmodoridae) dwelling in tropical sponges: Integrative taxonomy with description of a new species. *Diversity* 15: 48. https://doi.org/10.3390/d15010048

Manuscript received: 17 November 2023
Manuscript accepted: 13 June 2024
Published on: 3 December 2024
Topic editor: Magalie Castelin
Section editor: Jean-Lou Justine
Desk editor: Eva-Maria Levermann