

REDESCRIPTION OF THREE POORLY KNOWN SPHAEROMATID GENERA (CRUSTACEA: ISOPODA) FROM SOUTH-EASTERN AUSTRALIA

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Abstract

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The genera *Cassidinella* Whitelegge, 1901, *Ceratocephalus* Woodward, 1877 and *Exocerceis* Baker, 1926 are rediagnosed. Their type species, *Cassidinella incisa* Whitelegge, 1901, *Ceratocephalus grayanus* Woodward, 1877 and *Exocerceis nasuta* (Whitelegge, 1902) are described in full. *Cassidinella akania* sp. nov. is also described and figured. The three genera are known only from south-eastern Australia between the central New South Wales coast to Tasmania and Victoria, with one record of *Ceratocephalus* from South Australia and one of *Exocerceis* from south-eastern Queensland.

Introduction

The sphaeromatid fauna of Australia is large, with in excess of 50 genera, and yet further genera undescribed. Of the named genera three, all endemic to south-eastern Australia, remain poorly characterised, not having been rediagnosed since their inception.

Ceratocephalus Woodward, 1877 is the first described endemic Australian sphaeromatid, and has the further distinction of being the only isopod named in the Encyclopaedia Britannica. The only Australian genera of greater antiquity than *Ceratocephalus* are widespread genera described by Leach (1815), Milne Edwards (1840) and the genus *Sphaeroma* Bosc, 1802. Surprisingly, as *Ceratocephalus* is not uncommon and is large by sphaeromatid standards, the genus was subsequently little recorded in the literature. *Cassidinella* Whitelegge, 1901, while provided with a detailed diagnosis by standards of that time remained equally poorly known. The third genus, *Exocerceis* Baker, 1926 was established for the species *E. nasuta* (Whitelegge, 1902). This genus is not common in benthic samples and, given the thorough surveys carried out in south-eastern Australia (e.g. Poore et al., in press), would appear to be restricted to central New South Wales and southern Queensland coasts.

Methodology and terminology follows that outlined in Bruce (in press). Abbreviations are as follows: AM, Australian Museum, Sydney; NMV, Museum of Victoria, Melbourne; NSW, New South Wales; SAM, South Australian Museum, Adelaide; PMS, plumose marginal setae; BL body length; imm, immature.

Sphaeromatidae Latreille

Sphaeromatinae Latreille

Ceratocephalus Woodward

Ceratocephalus Woodward, 1877: 659. — Beddard, 1886: 147. — Stebbing, 1893: 364. — Nierstrasz, 1931: 211. — Harrison, 1984: 375. — Harrison and Ellis, 1991: 935.

Bregmocerella Haswell, 1884: 1004.

Type species. *Ceratocephalus grayanus* Woodward, 1877, by monotypy (the genus name is correctly pronounced with a hard C, following its Greek derivation i.e. Keratokephalus).

Diagnosis of male. Body slightly less than twice as long as greatest width; widest at pereonite 5; dorsal surfaces rugose. Cephalon with projecting epistome; eyes lateral. Pereonites 2–4 coxae with posterior margin overlapped by next coxal plate; coxae of pereonite 5 overlapping those of pereonites 4 and 6; pereonite 7 narrower than 6. Pleon with 4 segments: segment 1 entire, 2–4 fused with sutures reaching to posterior margin. Pleotelson without entire exit channel, with apex produced. Pereonite 1 without sternite; pleonal sternite absent.

Antennule peduncle article 1 flattened, about as long (1.1) as wide, article 2 very short, about 0.3 as long as article 1 and 3, article 3 slender, nearly 10 times as long as wide; flagellum slightly shorter than peduncle. Antenna massive, enlarged, total length nearly as long as BL; antenna peduncle extending to pereonite 3, article 5 weakly reflexed against article 4, flagellum weakly reflexed against peduncle, with about 30 articles. Mandible unicuspidate, incisor blunt;

lacinia mobilis present on left mandible, spine row present, with 5–6 spines, molar prominent, gnathal surface smooth, marginal teeth present. Maxillule lateral lobe with gnathal spines simple, mesial lobe with 2 serrate and 2 (lateralmost) weakly plumose spines. Maxilla lateral and middle lobe entire, mesial lobe slender, with serrate spines. Maxilliped palp articles 2, 3 and 4 with strongly setose lobes on mesial margin, article 5 elongate; endite distal margin with about 10 weakly serrate spines, 4 submarginal spines 3 spines on dorsal distomesial margin.

Pereopod 1 robust, ambulatory, posterior margin of merus, carpus and propodus with stout acute spines; dactylus with prominent simple accessory unguis. Pereopods 2–7 slender; pereopods 2–6 subsimilar, merus and carpus posterior margin with setulose fringe, merus, carpus and propodus with acute spines; spines longer on pereopod 6; pereopod 7 more slender than 6, without spines, propodus flattened, distally expanded, posterior margin with dense setulose fringe, dactylus short less than half (0.46) length of propodus.

Penes basally close set, not fused, elongate, about 8 times as long as basal width, distal half slender.

Pleopod 1 endopod mesial margin with recessed groove (which receives appendix masculina); distally narrowed forming triangular shape with proximolateral angle produced. Pleopod 2 similar to 1 in shape, appendix masculina slender elongate, about 1.4 times as long as endopod. Pleopod 3 exopod with entire transverse suture. Pleopods 1–3 with both rami with PMS. Pleopod 4 exopod with transverse suture, mesial margin with simple marginal setae; endopod with prominent deep ridges on dorsal side. Pleopod 5 exopod with transverse suture, mesial margin with simple marginal setae, distal margin subtruncate, thickened, covered with scales, mesial margin with 2 scaled lobes adjacent to suture, third prominent scaled lobe positioned about two-thirds along mesial margin; endopod with prominent deep ridges on dorsal side only. Uropod with small exopod set in ventrolateral position into lateral excision; endopod not extending beyond pleotelson apex.

Female. Similar to male, but lacking cephalic ornamentation, epistome not anteriorly produced; pereopod 7 similar to pereopod 6. Ovigerous females with mouthparts metamorphosed; oostegites arising from coxae of pereopods 1, 2, 3 and 4 and overlapping at midline. Embryos held

within body cavity, visibly packed into cephalic space. Ovigerous females with noticeably thinner cuticle than males.

Remarks. Adult males of the monotypic genus *Ceratocephalus* are readily recognized by the elongate cephalic process which, with the elongate and upturned epistome, give a tricorn appearance. No other sphaeromatid genus has antennae as enlarged as those of *Ceratocephalus*. The cephalic ornamentation is not included in the generic diagnosis as such ornamentation is often not of generic value within the Sphaeromatidae.

Ceratocephalus belongs to a group of genera, all of which have a rugose body appearance, and have pereonite 5 overlapping pereonites 4 and 6; additionally these genera also have the posterior margins of pereonites 2 and 3 overlapped by the anterior margin of the next coxae, the reverse of that which is more usual. These genera are *Caecocassidias* Kussakin, 1967, *Kranosphaera* Bruce, 1992, *Moruloidea* Baker, 1908 and *Wait-eolana* Baker, 1926.

Although *Cymodopsis wardii* Baker, 1926 is a junior synonym of the type species of *Ceratocephalus* the two genera are not readily confused. All species of *Cymodopsis* Baker, 1926 have the coxae overlapping anterior to posterior.

Iverson (1982) stated that *Bregmocerella* was a preoccupied name while earlier Whitelegge (1902) believed *Ceratocephalus* was preoccupied. *Ceratocephalus* and *Ceratocephala* (a trilobite) are not homonyms, and *Ceratocephalus* Woodward, 1877 is the senior objective synonym.

Ceratocephalus grayanus Woodward

Figures 1–6

Ceratocephalus grayanus Woodward, 1877: 659, fig. 72. — Stebbing, 1893: 356, fig. 31. — Beddard, 1886: 148. — Nierstrasz, 1931: 211.

Bregmocerella tricornis Haswell, 1885: 1004, pl. 53, fig. 1. — Stebbing, 1893: 365. — Whitelegge, 1902: 274.

Cymodopsis wardii Baker, 1926: 267, pl. 46 fig. 12, pl. 47 figs 1–2.

Material examined. New South Wales. 3♂ (17.9, 19.5, imm. 12.9 mm), 4 imm. (8.4, 8.7, 12.3, 12.6), E of Malabar, 33°57'S, 151°19'E, 2 Jan 1973, 32 m, coll. AMSBS (AM P22227). 3♂ (imm. 11.2, 12.6, 15.4 mm), 2♀ (ovig. 16.1, non-ovig. 16.8 mm), imm. (10.9, 11.2 mm), same location (AM P22229). 3♂ (18.2, 18.9, 19.5 mm), ♀ (ovig. 15.4 mm), imm. (12.5, 13.7 mm), same location but 1973, depth not recorded (AM P22228). 3♂ (imm. 9.8, 10.5, 12.6 mm), ♀ (ovig. 15.4 mm), imm. (8.4, 9.1 mm), E of Long Reef, 33°43'S, 151°46'E, 20 Dec 1985, 174 m, J. K. Lowry and R. T. Springthorpe on FRV *Kapala* (AMP41854).

Additional material. ♀ (non-ovig.), 64 km SW of Mt Cann, Vic., 36 m, F.I.S. *Endeavour* Expedition, 1909–1914 (AM E6756). ♂ (very poor condition), 4 km offshore Newcastle Bight, NSW, 32°50'S, 152°03.5'E, 7 Mar 1898, 46 m, sand and pebbles, E. R. Waite on H.M.C.S. *Thetis* (AM G2215). ♂ (dissected, intact), 3 km E of Cape Three Points, NSW, 33°30'S, 151°27'E, 22 Feb 1898, 50 m, brown sand, E. R. Waite on H.M.C.S. *Thetis* (AM G2198). Imm., off Wineglass Bay, Tas., 42°10'S, 148°18'E, no date, 146 m, E. A. Briggs (AM P10708).

New South Wales. Imm., off Port Stephens, 32°52'S, 152°32'E, 144 m (AM P41312). 6 manca (3.5–4.2 mm), off Newcastle, 32°53'S, 152°35'E, 175 m (AM P41315). Manca (6.3 mm), off Sydney, 33°46'S, 151°43'E, 176 m (AM P41321). ♀ (ovig.), manca, off Stanwell Park, 34°13.8'S, 151°29.1'E, 466–498 m, W. Ponder and R. T. Springthorpe on FRV *Tangaroa* (AM P41307) 6 ♀ (2 ovig), off Port Hacking, 34°11.1'S, 151°26.0'E, 198 m (AM P41308).

Victoria: ♂, 34 km S of Lake Tyres Entrance, 38°11'S, 148°04'E, 56 m, clean shell rubble (NMV J26260). Western Port: ♀, 38°19.92'S, 145°13.95'E, 19 m, sand, gravel (NMV J2929); ♂, 38°26.45'S, 145°21.93'E, 6 m, sand (NMV J2930); ♂, manca, 38°26.64'S, 145°18.79'E, 14 m, sand (NMV J2931); ♂, 38°21.35'S, 145°13.36'E, 10 m (NMV J26373). ♂, 7 imm. and manca 38 km SW of Cape Paterson, 38°55.5'S, 145°17.0'E, 70 m, fine sand (NMV J31524, J26413). ♀, 43 km SW of Port Albert, 38°53.7'S, 147°06.5'E, 58 m, coarse shell (NMV J31525).

Tasmania: 4 ♀, 40 km NNE of Deal I., 39°06'S, 147°26'E, 59 m, clean shell rubble (NMV J26254).

South Australia: ♀ (ovig), Pearson I., Investigator Group, 26 Jun 1973 (SAM C4357).

Holotype of *Cymodopsis wardii* Baker, in very poor condition, pleon and pleotelson missing, 26–29 km NE of South Head, Port Jackson, NSW, 33°44'S, 151°34'E, May 1924, 142–146 m, C. E. Mulvey on *Goonambee* (AM P9494).

Type locality. Stated by Woodward (1877) to be Flinders Island, Bass Strait.

Types. Apparently not held at the BMNH, as they are absent from the list of types given by Ellis (1981). Similarly Haswell's (1885) specimens no longer appear to be extant as no record of them exists at the Australian Museum, and all efforts to trace the specimens have been without success (pers. comm., R. T. Springthorpe, AM).

Description of male. Body about 1.6 times as long as wide (excluding epistome), widest at pereonite 5. Cephalon dorsal surface obscurely bidomed, with tubercles and pits; eyes set on prominent ocular bulge, facets distinct; 2 long (23% BL) subocular horns present anterior to eyes, bending laterally at about two thirds of their length. Pereonite 1 with 2 sublateral patches of thickened and ridged cuticle; pereonites 2–6 with transverse ridge on posterior half; pereonite 7 with posterior margin weakly produced. Pleon posterior margin and dorsal surfaces tuberculate.

Pleotelson strongly vaulted, bidomed, with prominent tubercles on dorsal surface.

Epistome produced forming elongate upwardly curving process, about 58% BL (in lateral view). Antennule peduncle article flattened, about as long as wide, article 2 short, about 0.3 as long as 1; article 3 slender about 9 times as long as wide; flagellum with about 29 articles, slightly shorter than peduncle.

Mandible palp slender, article 2 with about 10 biserrate setae on distolateral margin, lateral margin of article 3 with 27 biserrate setae and 3 distal setae which are twice as long as others. Maxillule lateral lobe with 11 long and 2 short spines. Maxilla lateral and middle lobes with 8 setae each, mesial lobe with serrate spines in 2 ranks of 8 and 9 each.

Pereopod 1 merus, carpus and propodus with 5, 4 and 6 spines respectively; posterior margins of ischium to propodus without dense setulose fringe. Pereopod 2 posterior margin ischium, merus and carpus each with 4, spines.

Pleopod 1 exopod and endopod with about 76 and 34 PMS respectively; exopod with prominent spine at proximolateral angle; surfaces of peduncle and mesial portion rami setulose. Pleopod 2 exopod and endopod with about 80 and 36 PMS respectively; appendix masculina about 1.6 times as long as medial length of endopod. Uropod dorsal surface tuberculate; distal margin obliquely truncate, distolateral margin concave, with prominent tubercle, midlateral margin irregularly excavate, with exopod set into anterior portion of excavation; exopod small, 0.2 length of endopod, distally acute.

Female. Epistome anterior margin projecting and narrowed, but not extending beyond anterior margin of cephalon, otherwise as for the generic diagnosis.

Colour. Pale tan to cream in alcohol; chromatophores present on appendages.

Size. Mature males (with developed cephalic processes and epistome) about 17 to 20 mm; ovigerous females 15.4 to 16.1 mm, immature males recognisable at 9.8 to 15.4 mm, and manca 3.5 to 6.3 mm.

Distribution. Eastern coast of New South Wales from Newcastle Bight (32°50'S) to Wineglass Bay, Tasmania (42°10'S), and westwards to Pearson I., South Australia at depths from 6 m in enclosed bays such as Western Port, Victoria, to between 32 and 498 m offshore.

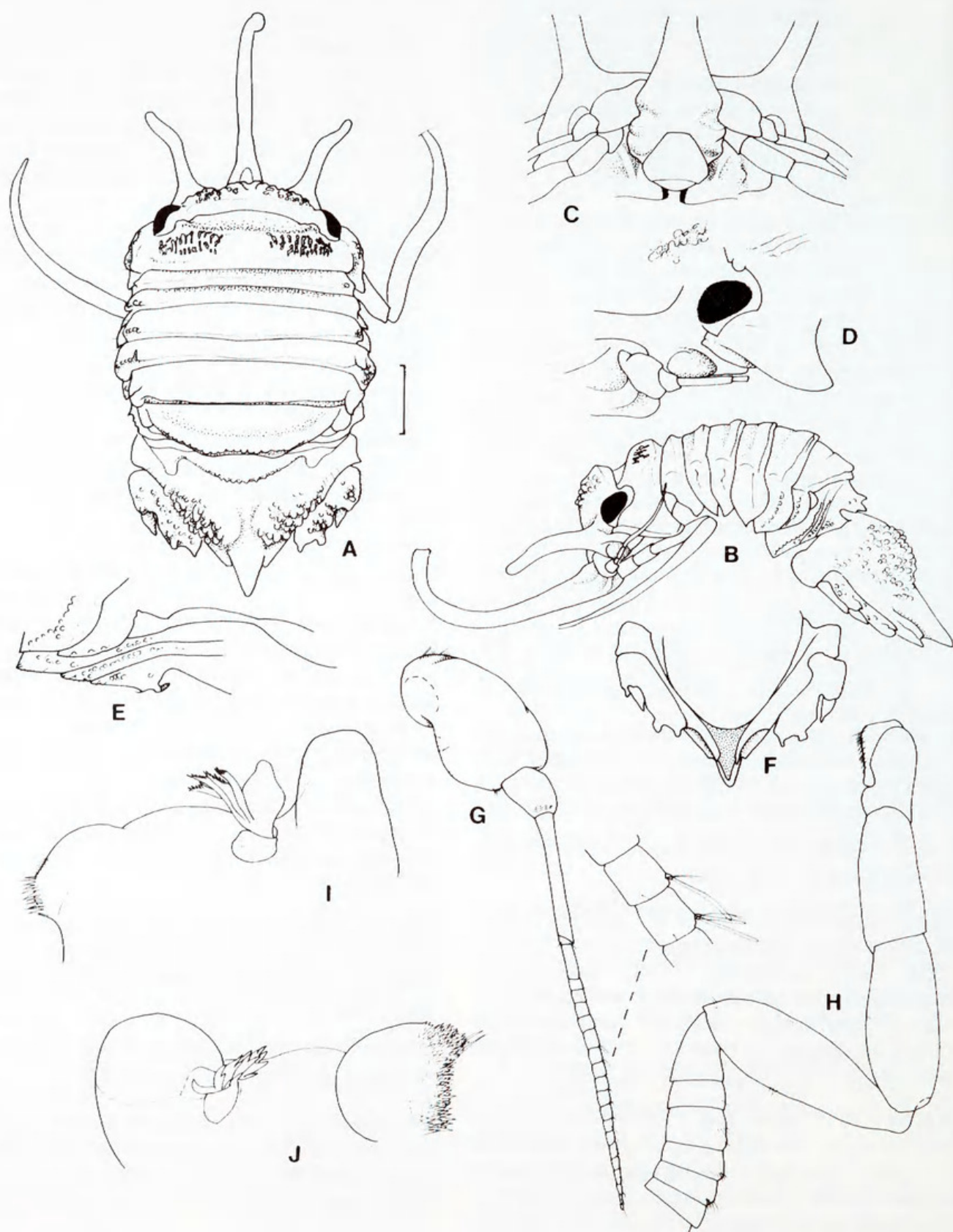


Figure 1. *Ceratocephalus grayanus*. A-F, male 18.9 mm, remainder ♂ 19.5 mm, (AM P22228). A, dorsal view; B, lateral view, C, frons; D, cephalon, anterolateral margin; E, pleon lateral margin, showing segmentation; F, pleon, ventral view; G, antennule; H, antenna peduncle; I, left mandible, distal portion; J, right mandible, distal portion. Scale line 3.0 mm.

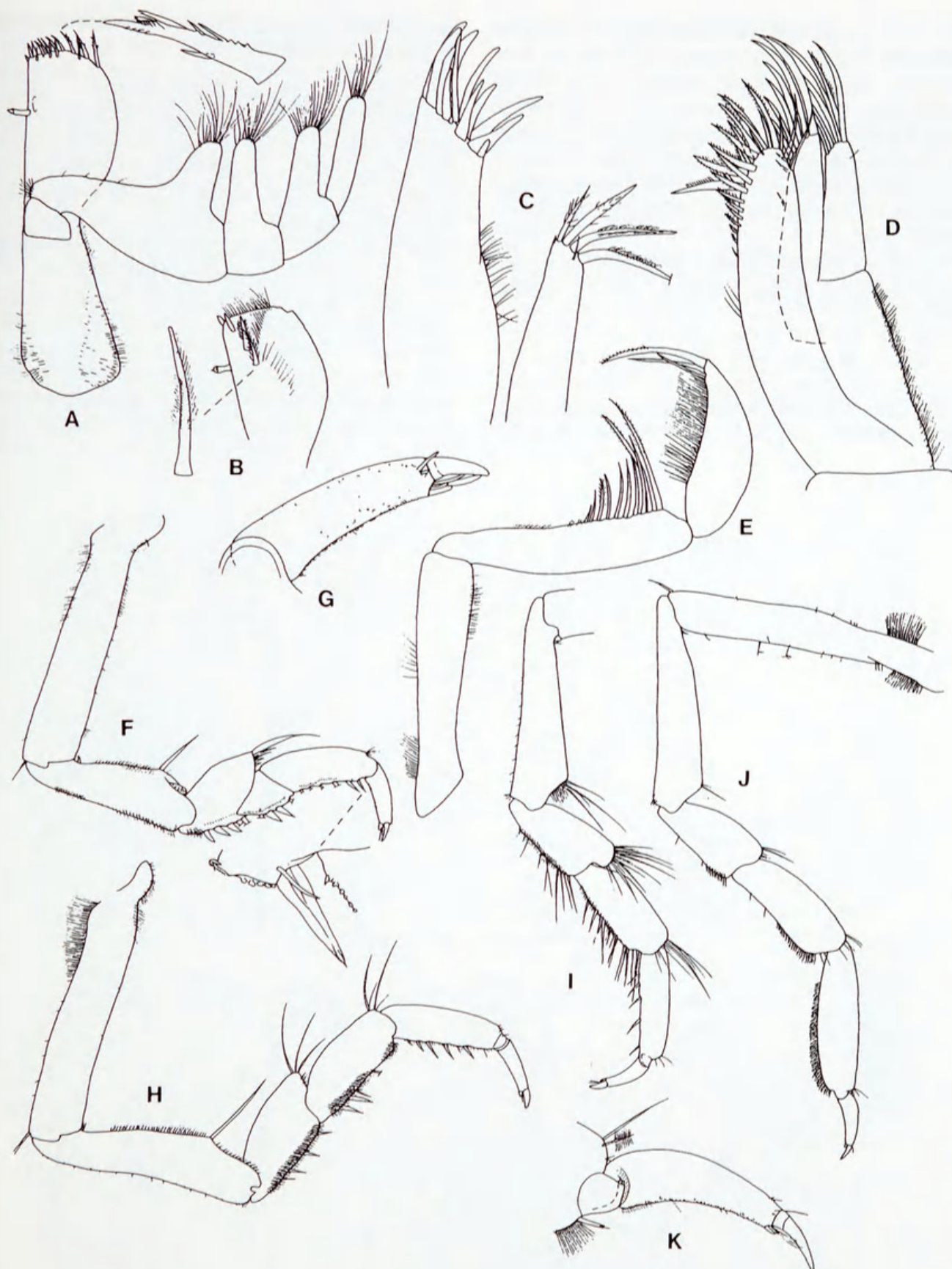


Figure 2. *Ceratocephalus grayanus*. All figs ♂ 18.9mm (AM P22228). A, maxilliped; B, maxilliped endite, dorsal surface; C, maxillule; D, maxilla; E, mandible palp; F, pereopod 1; G, pereopod 1 dactylus; H, pereopod 2; I, pereopod 6 (basis omitted); J, pereopod 7; K, pereopod 7, dactylus.

Remarks. Adult males are impossible to confuse with any other sphaeromatid. The shape and ornamentation of the pleotelson, which has an acute apical projection over the sinus, and of the uropods, which have a large endopod not extending beyond the posterior margin of the pleotelson and a small, acute exopod set in a ventrolateral position, allow identification females and juveniles.

The description is based primarily on specimens from East of Malabar (AM P22228, P22229).

Cassidinella Whitelegge

Cassidinella Whitelegge, 1901: 241. — Nierstrasz, 1931: 211. — Harrison, 1984: 374. — Harrison and Ellis, 1991: 934.

Type species. *Cassidinella incisa* Whitelegge, 1901, by monotypy.

Diagnosis of male. Body strongly vaulted. Cephalon with rostral point in ventral position; eyes round, facets distinct, set on short lobe. Pereonite 1 longest, 2–6 subequal in length; coxae ventrally produced, distally acute. Pleon with 4 segments, segment 1 entire, 2 separate sutures running to posterior margin. Pleotelson strongly vaulted, posteriorly without foramen or ventral exit channel; posterior margin with 3 pointed coplanar lobes. Pereonite 1 without sternal extensions; pleonal sternite absent.

Epistome shorter than wide, with apical point, not extending between antennule bases. Antennule peduncle robust, with 4 articles, flagellum shorter than peduncle. Antenna slender,

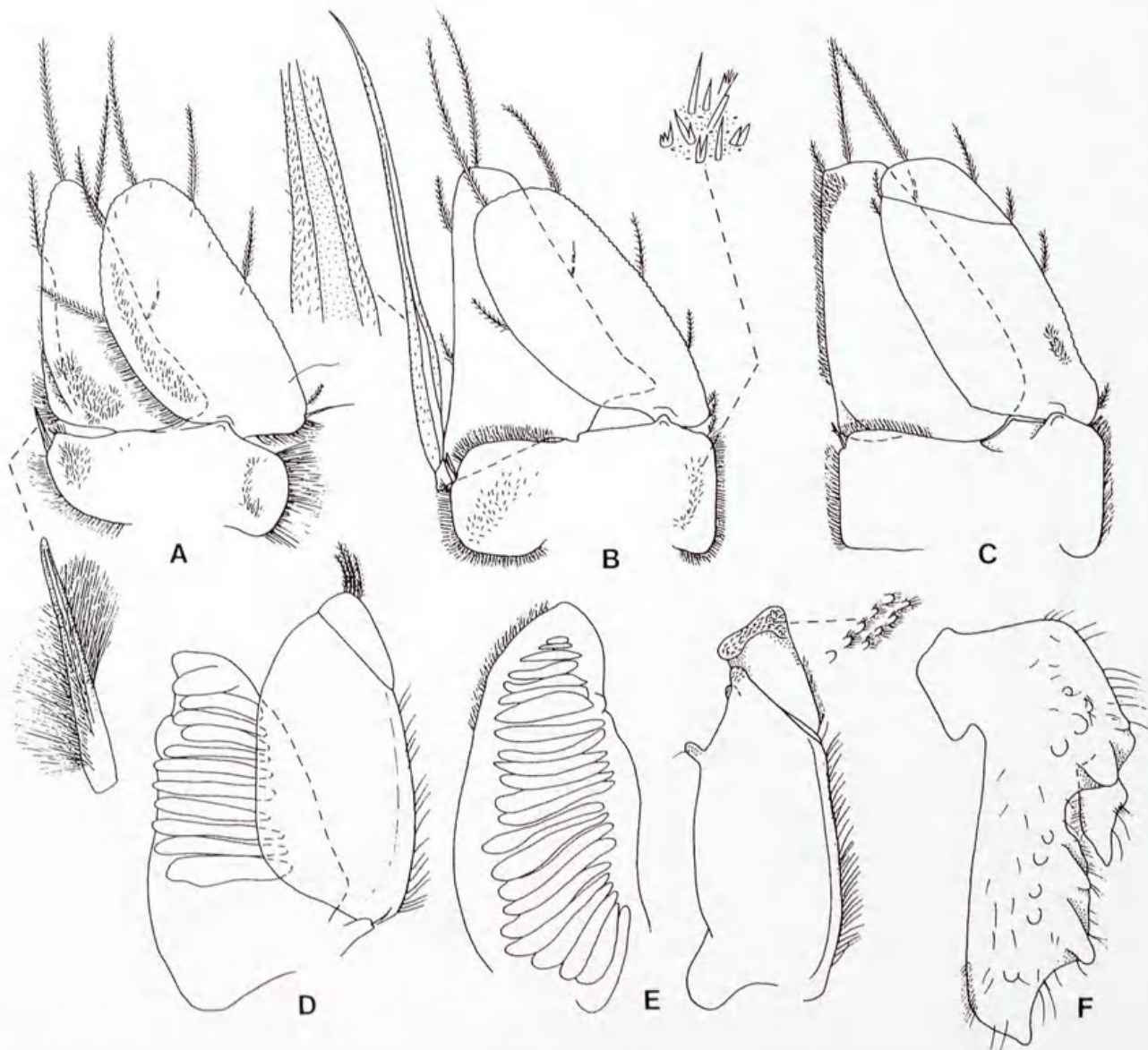


Figure 3. *Ceratocephalus grayanus*. All figs ♂ 18.9 mm (AM P 22228). A-E, pleopods 1–5 respectively; F, uropod.

peduncle articles 1–3 short, article 5 longest, flagellum and peduncle subequal in length. Mandible incisor unicuspidate oblique; tridentate lacinia mobilis prominent on left mandible; spine row of 5 sub-bifid spines; molar process with abundant marginal teeth, mesial surface shallow, concave, irregular. Maxillule mesial lobe with 4 fringed spines, lateral lobe with 11 stout weakly serrate spines. Maxilla entire, setae on lateral and middle lobe finely pectinate. Maxilliped palp articles 2–4 mesial margins with elongate lobes; endite distal margin subtruncate with slender circumplumose spines, single smooth spine at distomesial angle.

Pereopods all ambulatory, dactylus with short acute accessory spine; pereopod 1 robust, with stout spines on posterior margin, pereopods 2–6

subsimilar, pereopod 7 slender.

Penes set well apart, unfused, distally narrowed.

Pleopods 1–3 with PMS on both rami, pleopods 4 and 5 without PMS. Pleopod 1 endopod triangular, exopod distally rounded, peduncle about 2.5 times as wide as long. Pleopod 2 endopod triangular in shape; appendix masculina basally attached. Pleopod 3 endopod triangular in shape, exopod with prominent transverse suture. Pleopod 4 endopod with transverse thickened ridges, single distal seta; exopod with transverse suture. Pleopod 5 endopod with ridges not strongly developed; exopod with transverse suture; lateral margin with row of simple setae, mesial margin with cuticular scales and 4 scaled lobes, 2 distal to suture, 2 proximal to suture.

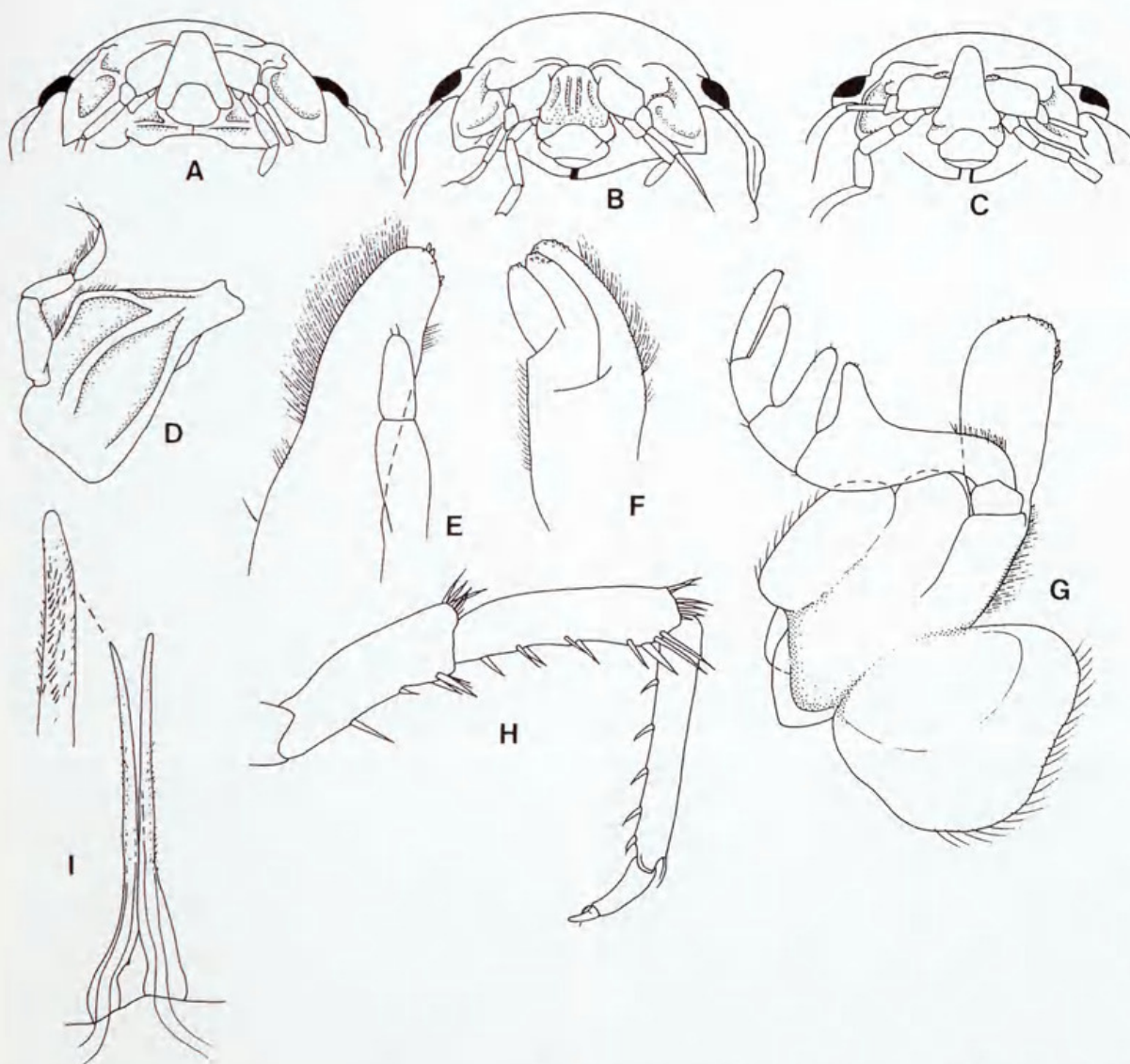
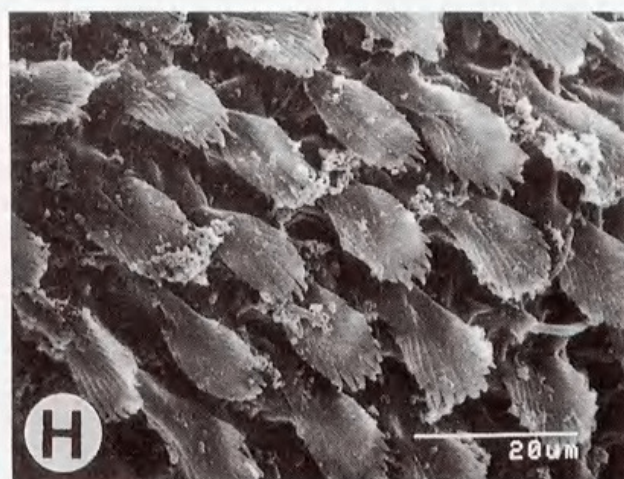
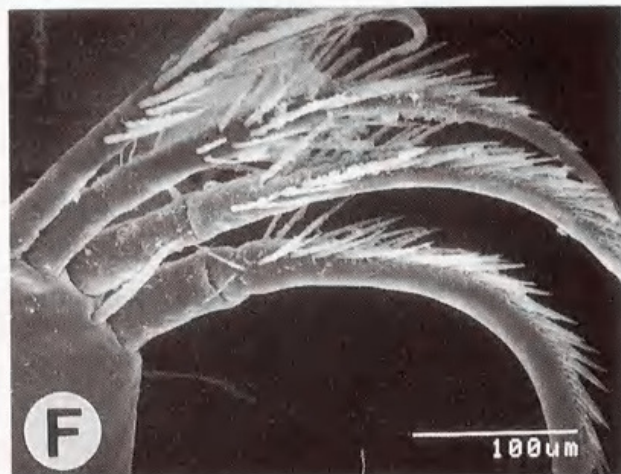
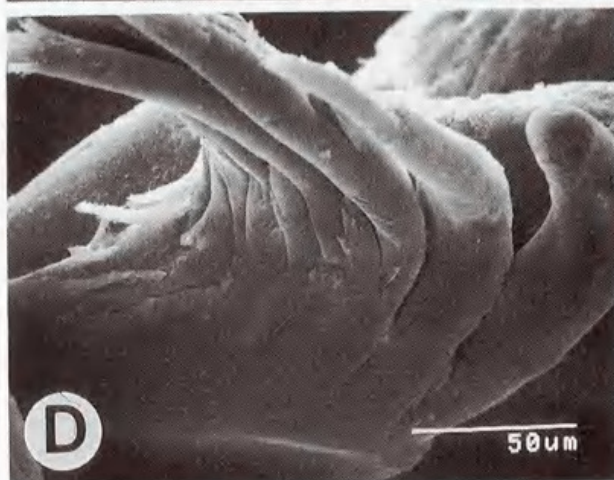
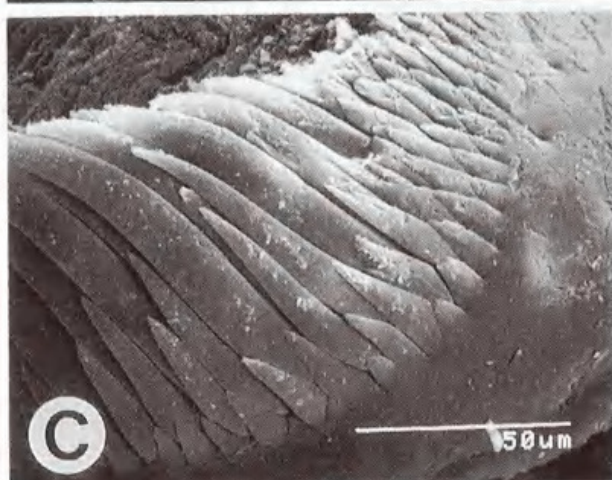


Figure 4. *Ceratocephalus grayanus*. A, D–H, ovig. ♀ 16.1 mm, remainder as indicated (AM P22229). A, frons; B, non-ovig. ♀ 16.8 mm, frons; C, imm. male 15.4 mm, frons; D, mandible; E, maxillule; F, maxilla; G, maxilliped; H, pereopod 7, distal articles; I, penes, male 18.9 mm (AM P22228).



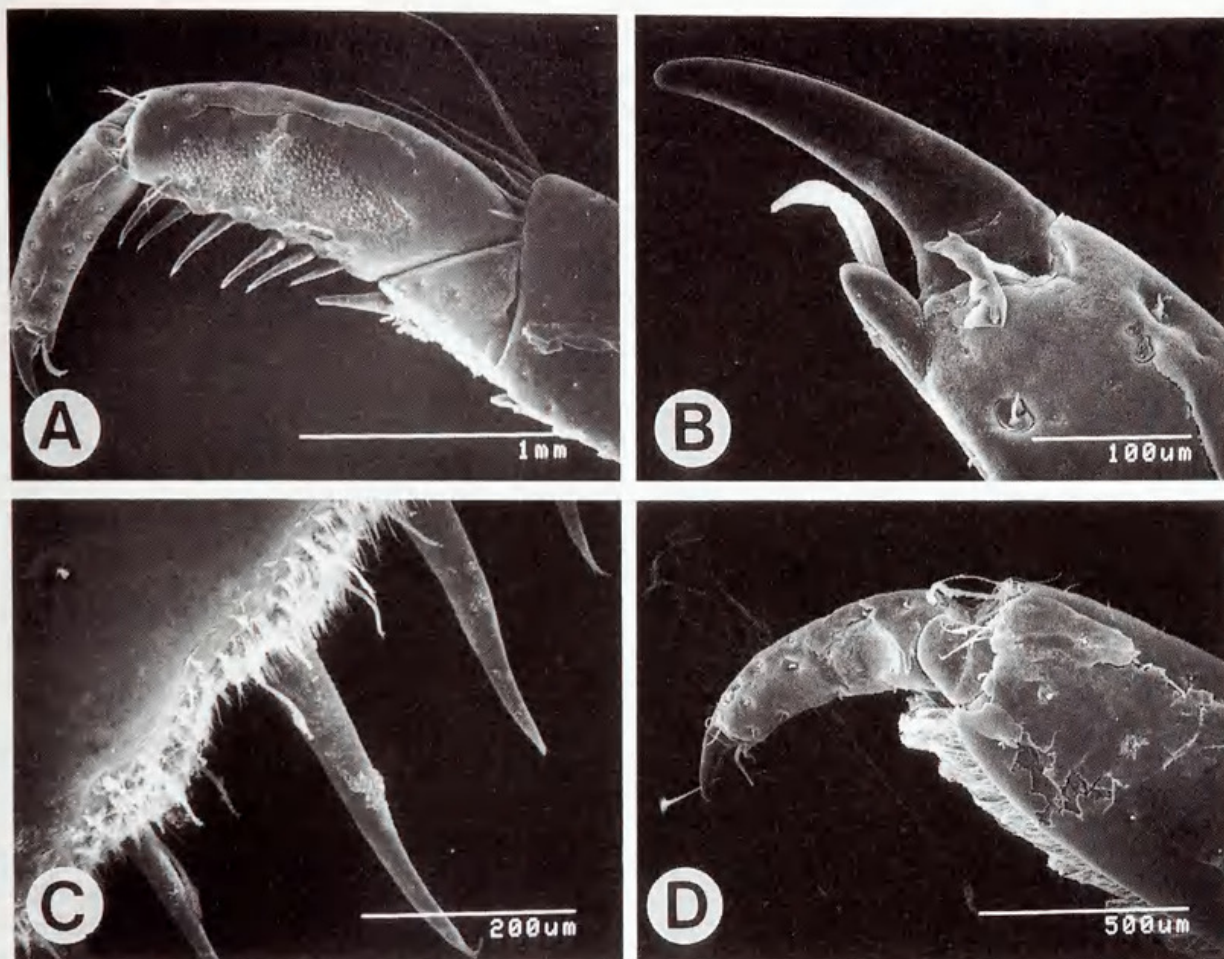


Figure 6. *Ceratocephalus grayanus*. ♂ AM P22228. A, pereopod 1; B, pereopod 1, unguis; C, setules and spines, pereopod 2 merus; D, pereopod 7 distal propodus and dactylus.

Uropod endopod not reaching pleotelson apex
exopod small, about half as long as endopod.

Female. Ovigerous females not present in material examined.

Composition. The type species and *Cassidinella akania* sp. nov. described here.

Remarks. The morphology of the coxae, pleon lateral margin (both distally acute) and the pleotelson posterior margin being formed into three prominent coplanar points readily separates *Cassidinella* from all other sphaeromatine genera.

The two species show considerable differences in ornamentation *C. incisa* having a smooth cuticle, while *C. akania* sp. nov. is covered in spines and setae; the antennule peduncle of *C. incisa* is not flattened while that of *C. akania* is strongly flattened with a falcate second article, and is very similar in appearance to the antennules of such genera as *Platysphaera* Holdich and Harrison and *Syncassidina* Baker (see Bruce, 1994); pereonite 7 in *C. incisa* is shorter and narrower than pereonite 6, while pereonite 7 of *C. akania* is as wide and as long as pereonite 6.

Figure 5. *Ceratocephalus grayanus*. ♂ AM P22228. A, right mandible, distal margin; B, molar, *en face*; C, molar, proximal spines; D, spine row; E, maxillule, lateral lobe; F, maxillule, mesial lobe; G, maxilla; H, pleopod 5, scale patch.

Key to species of *Cassidinella*

1. Body smooth; cephalon, pereonite 1, pleon and pleotelson without acute bosses; antennule peduncle articles 1 and 2 not flattened *C. incisa*
- Body with abundant setae and spines; cephalon, pereonite 1, and pleotelson with 2 acute submesial bosses, pleon with 1 median boss; antennule peduncle articles 1 and 2 strongly flattened *C. akania*

Cassidinella incisa Whitelegge

Figures 7–10

Cassidinella incisa Whitelegge, 1901: 242, figs 23a–g. — Baker, 1926: 269. — Nierstrasz, 1931: 211.

Material examined. Holotype. ♂ (7.3 mm, previously dissected and microslide), 2 km E of Orient Point, NSW, 34°13'S, 150°48'E, 20 Mar 1898, 20–27 m, sand and rock, E. R. Waite on H.M.C.S. *Thetis* (AM G2402).

Other material. New South Wales. 2 ♀ (non-ovig. 7.4, damaged 8.0 mm), off Broken Bay, 33°34'S, 151°41'E, 10 Feb 1986, 135 m, FRV *Kapala* (AM P41316). 2 ♂ (6.0, 6.3 mm) ♀ (8.4 damaged), E of Long Reef, 33°43'S, 151°46'E, 20 Dec 1985, 174 m, J.K. Lowry and R. T. Springthorpe, F.R.V. *Kapala* (AM P41025, P41853). ♂ (c. 5.4 mm, 2 broken), 26–29 km NE of South Head, 33°44'S, 151°34'E, May 1924, 137–146 m, C. W. Mulvey on S.S. *Goonambee* (AM P9489, Baker's 1926 specimens). 2 manca (4.0, 5.0 mm), E of Port Jackson, 33°50'S, 151°33'E, 18 Dec 1985, 135 m, J. K. Lowry, R. T. Springthorpe and P. Colman, FRV *Kapala* (AM P41852). 3 ♀ (ovig. 8.0 mm, non-ovig. 5.0, 5.7), 4 manca (3.7, 4.5, 4.7, 5.4 mm), off Nowra, 34°59.52'S, 151°5.95'E, 14 July 1986, 204 m, coarse shell, G. C. B. Poore et al. (NMV J31526, J19158). Manca (3.6 mm), dredged, 132–141 m, FRV *Kapala* (AM P41310). ♀ (non-ovig. 7.0 mm) (AM P41316).

Victoria. 3 ♂ (6.7, 7.2, 7.4 mm), 4 ♀ (non-ovig. 6.0, 6.0, 6.3, 7.7 mm), 9 manca (3.0–6.0 mm), 38 km SW of Cape Paterson, 38°55.5'S, 145°17.0'E, 12 Nov 1981, 70 m, fine sand, R. Wilson (NMV J26296, J26412).

Tasmania. ♀ (non-ovig. 6.0 mm), 15 km E of Maria I., 42°37'S, 148°20'E, 9 Oct 1984, 102 m, R. S. Wilson (NMV J31528). 3 manca (3.4, 3.7, 4.3 mm), off SE Maria I., 42°37.00'S, 148°12.50'E, 23 Apr 1985, 100 m, fine muddy bryozoa, R. S. Wilson (NMV J31527). ♂ (7.1 mm), 2 manca (3.5, 4.0 mm), 15 km E of Cape Conella, 43°24.6'S, 147°32.5'E, 22 Oct 1984, 82 m, R. Wilson (NMV J26363).

Description of male. Body smooth, covered with clear gel-like layer; about 1.6 times as long as wide, widest at pereonite 4. Pereonite 1 longer than 2, 2–6 subequal in length; pereonite 7 less than half as long as pereonite 6, lateral margins not extending to full width of pereonite 6. Pleon with prominent large rounded dorsal boss. Pleotelson anterolateral angles forming acute points, posterior margin with points acute.

Antennule peduncle articles not flattened, article 1 longer (1.2) than combined lengths of articles 2–4; article 2 1.6 times as long as article 3; article 4 0.35 (35%) length of article 4; flagellum shorter (0.8) than peduncle, with about 14

articles. Antenna peduncle article 1 short, articles 2–4 subequal in length with 3 shorter than either 2 or 4, article 5 longest, longer than combined lengths of articles 3 and 4; flagellum slightly longer than peduncle, with 13 articles.

Mandible palp with 10 biserrate spines on distolateral margin, distal 2 of which are longest, article 3 with 9 biserrate spines. Maxilla lateral and middle lobes each with 5 setae, mesial lobe with about 10 prominent pectinate and plumose spines. Maxilliped palp articles 2–5 with about 8, 12, 12 and 10 setae respectively on mesial margin; endite distal margin with 9 plumose and 1 simple spine.

Pereopod 1 robust, posterior margins without setulose fringe ischium anterior margin with small proximal and larger distal acute spine; merus with 2 acute spines at anterodistal angle, 4 robust acute spines on posterior margin; carpus with 2 robust acute spines on posterior margin; propodus with 3 robust acute spines on posterior margin; dactylus about 0.6 length of propodus, with acute prominent accessory spine; posterior margins of merus to dactylus with scales. Pereopods 2–7 slender, with setulose fringe and scales on posterior margins.

Penes apically narrowed, about 3 times as long as basal width.

Pleopod 1 exopod and endopod with about 30 and 20 PMS respectively. Pleopod 2 and exopod and endopod with about 31 and 20 PMS respectively; appendix masculina 8 times as long as greatest width, 1.2 as long as endopod. Pleopod 3 exopod and endopod with about 30 and 18 PMS respectively. Pleopod 4 with simple marginal setae on proximal lateral margin of exopod and 2 simple setae on distal extremity; endopod with one simple setae. Pleopod 5 with simple marginal setae on proximal lateral margin distal lateral margin with setule fringe. Uropod with both rami acute, endopod 3 times as long as wide; exopod about 0.45 length of exopod.

Female. A single ovigerous female was present in the material examined, but lacked ova. Mouthparts metamorphosed; marsupium formed from oostegites arising from coxae of pereopods 1–4, overlapping at midline.

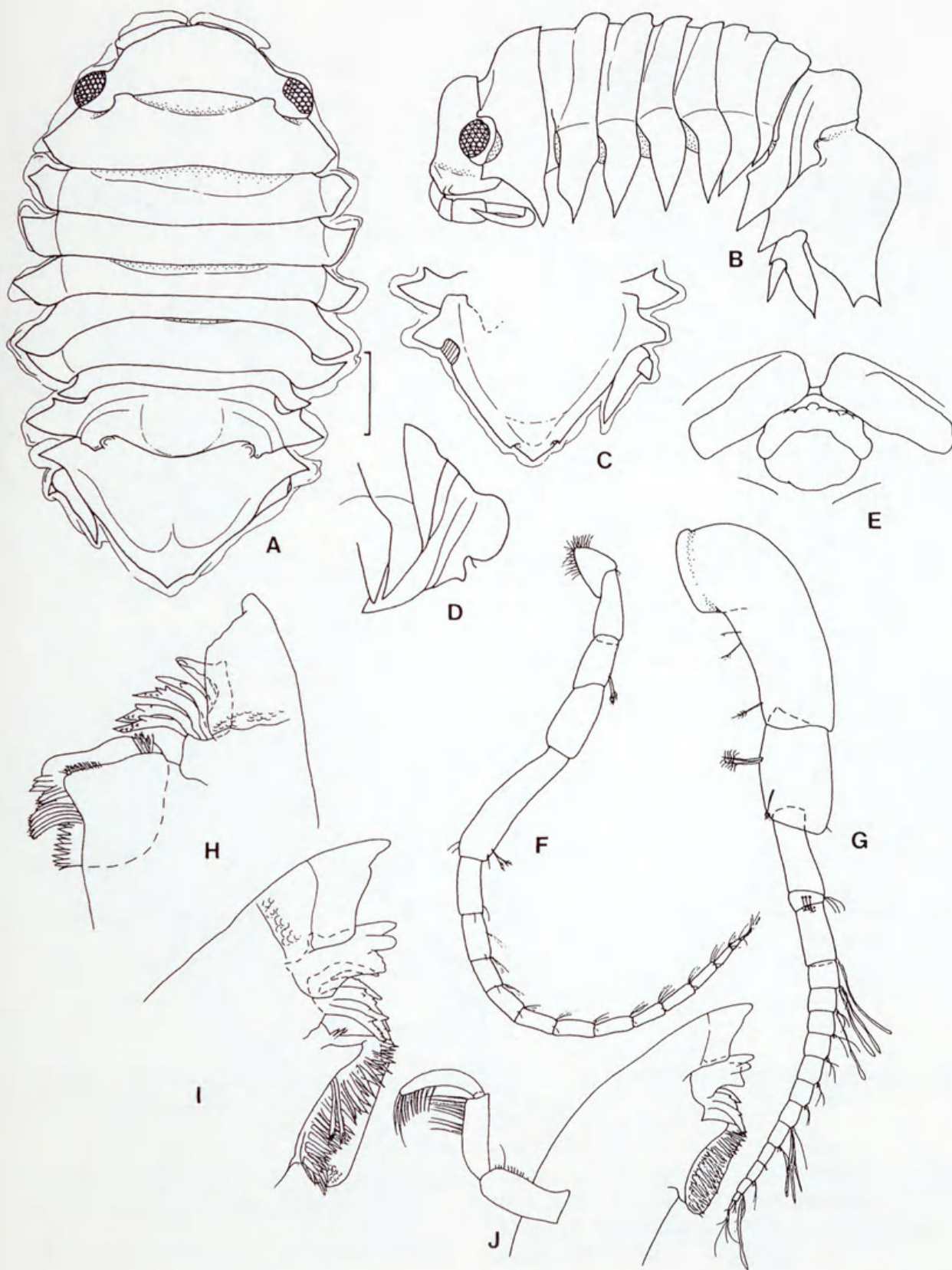


Figure 7. *Cassidinella incisa*. All figs ♂ 7.1 mm (NMV J26363). A, dorsal view (showing gel-jacket); B, lateral view; C, pleotelson, ventral view; D, pleon, showing segmentation; E, frons; F, antennule; G, antenna; H right mandible, distal portion; I, left mandible, distal portion; J, mandible. Scale line 1.0mm.

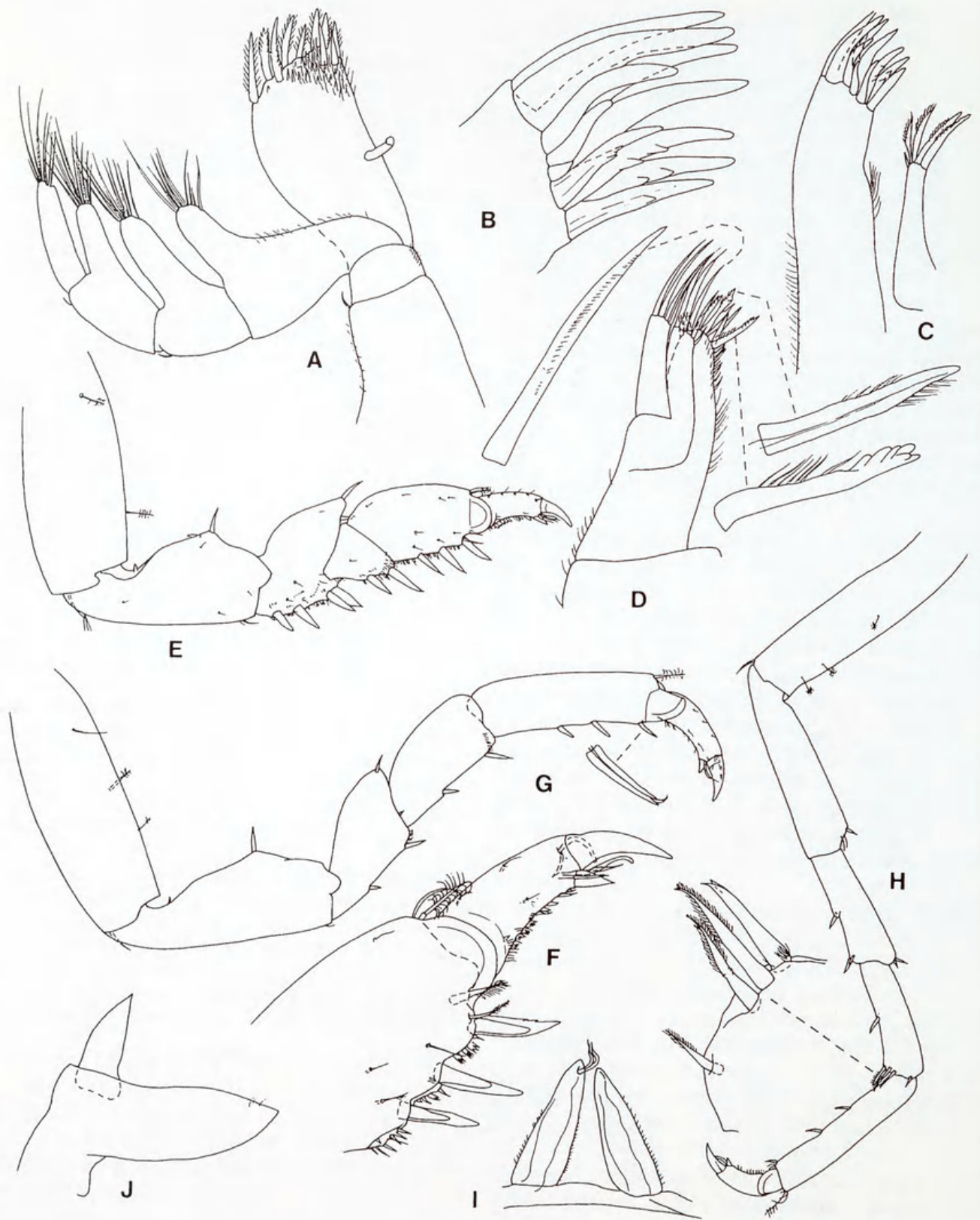


Figure 8. *Cassidinella incisa*. All figs ♂ 7.1 mm (NMV J26363). A, maxilliped; B, maxillule lateral lobe detail; C, maxillule; D, maxilla; E, pereopod 1; F, pereopod 1 distal propodus and dactylus; G, pereopod 2; H, pereopod 7; I, penes; J, uropod.

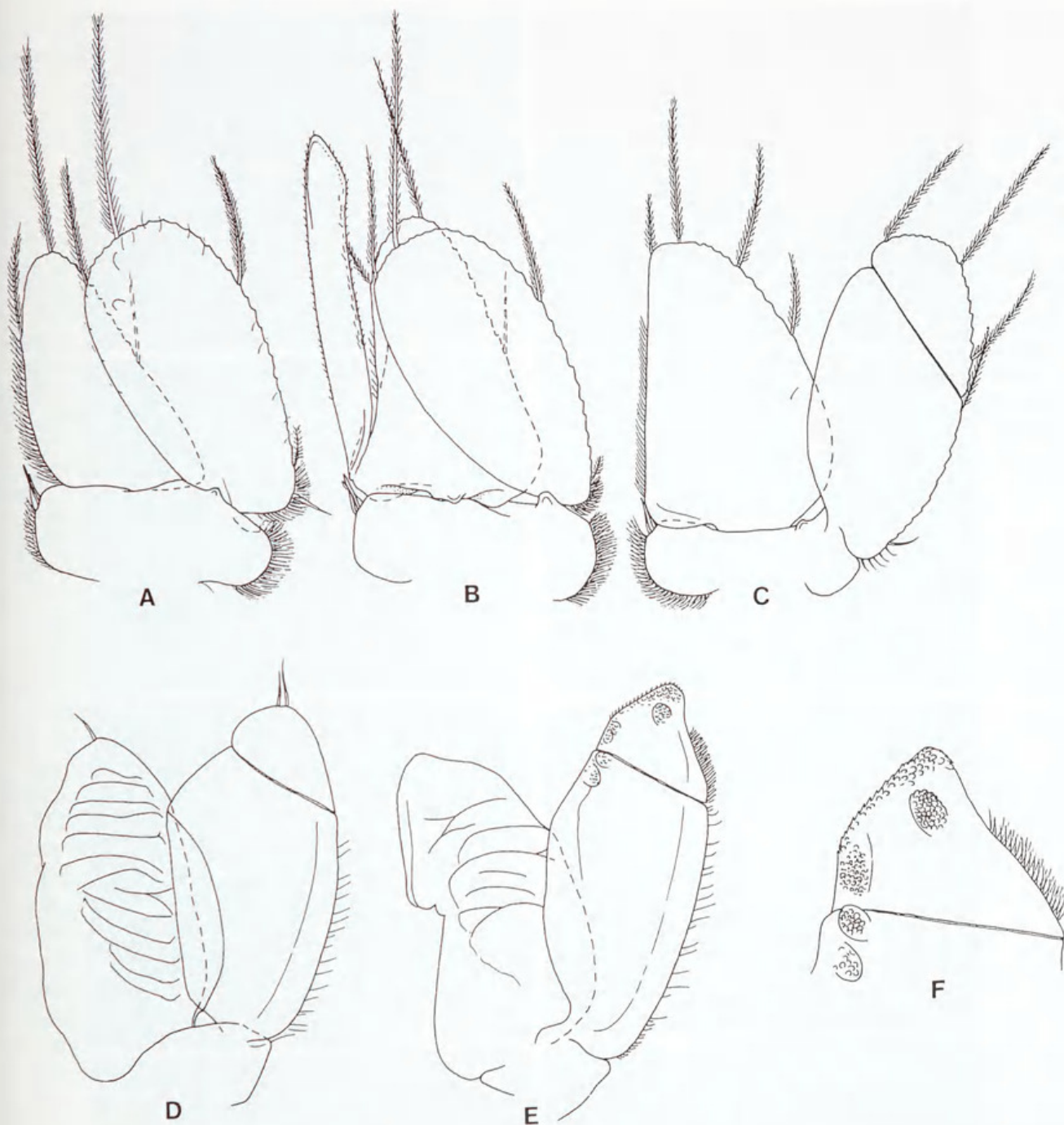


Figure 9. *Cassidinella incisa*. All figs ♂ 7.1 mm (NMV J26363). A-E, pleopods 1-5 respectively; F, detail, pleopod 5 exopod, distal margin.

Colour. Pale cream in alcohol; pereopods 1-6 and pleopods with few black chromatophores.

Size. Males 6.0-7.4 mm, non-ovigerous female 5.0-8.5 mm, manca 3.0-6.0 mm.

Distribution. South-eastern Australia from in the vicinity of Sydney, NSW, eastern Victoria and south-eastern Tasmania at depths between 74 and 204 metres; the holotype was recorded from a

depth of 43-66 fathoms (78-121 m) (Whitelegge, 1901), but Australian Museum data indicates 20-27 m. Substratum records are fine sand, and coarse shell.

Remarks. Readily recognized by the smooth unornamented cuticle, unflattened antennule articles 1 and 2, narrowed pereonite 7, and pereopod 1 with a total of 9 prominent acute spines on posterior margin of merus, carpus and propodus.

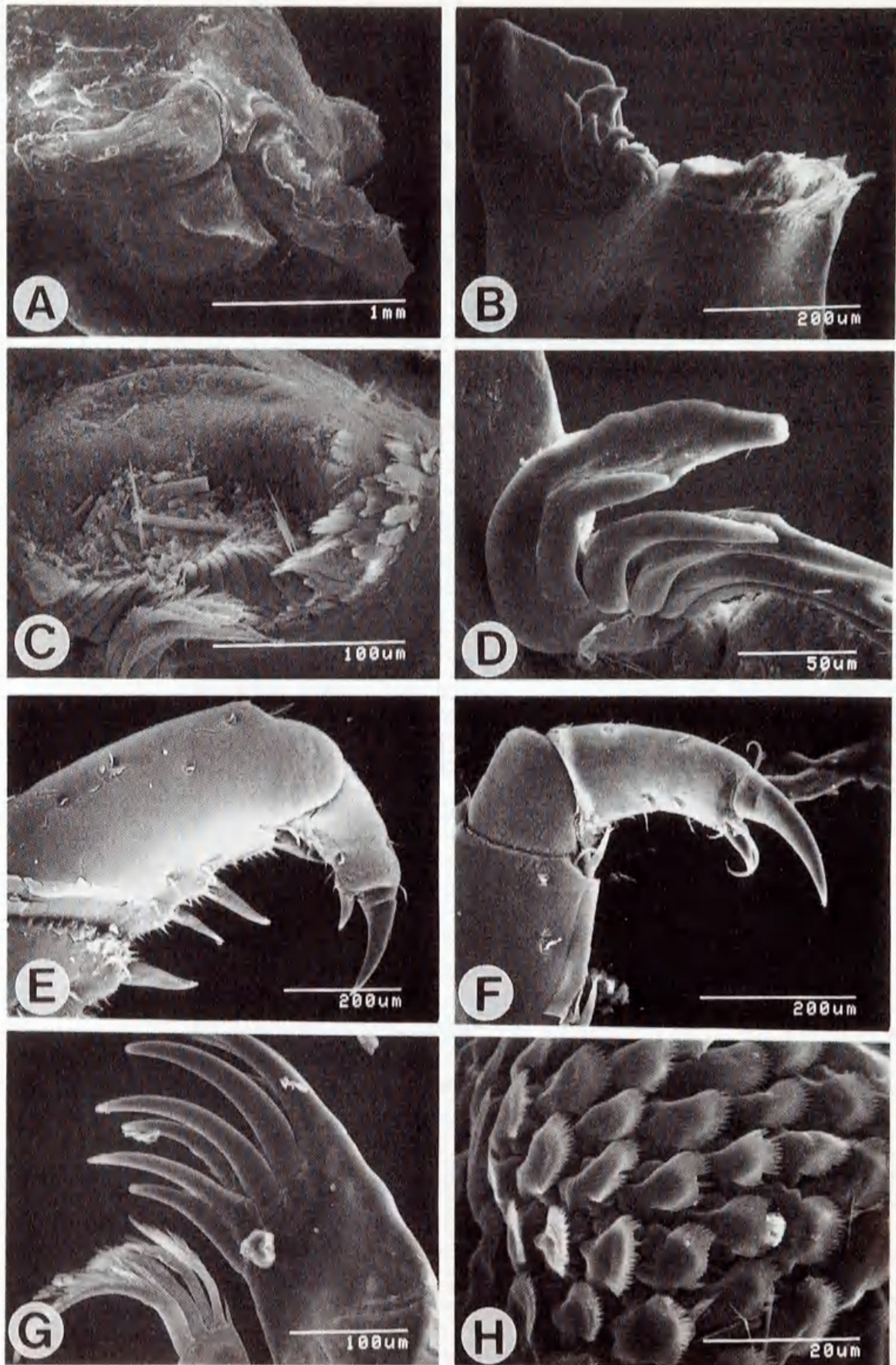


Figure 10. *Cassidinella incisa*. ♂, NMV J26412. A, anterior view of head B, right mandible; C, molar, *en face*; D, spine row; E, pereopod 1, propodus, dactylus; F, pereopod 2, distal propodus and dactylus; G, maxillule; H, pleopod 5 scale patch.

The description is based primarily on specimens from off Cape Conella (NMV J26363).

Cassidinella akania sp. nov.

Figure 11

Material examined. Holotype. ♀ (non-ovig. 5.7 mm), 36 km SW of Stokey Point, King I., Tas., Bass Strait, 40°26.7'S, 143°41.4'E, 22 Nov 1981, 85 m, medium sand, R. Wilson (NMV J31529).

Paratype. ♂ (imm. 5.0 mm), 40 km SSW of Warrnambool, Vic., 38°42.8'S, 142°35.6'E, 20 Nov 1981, 69 m, coarse sand, R. Wilson (NMV J31530).

Additional material. ♂, manca, western Bass Strait, 55 km SW of Cape Otway, Vic., 39°16.7'S, 143°06'E, 21 Nov 1981, 95 m, medium sand, R. Wilson (NMV J34872).

Description of male (imm.). Body with abundant setae and spines, about 1.4 times as long as wide, widest at pereonite 6; gel-like layer present but not obvious. Pereonite 1 longer than 2, 2–7 subequal in length; pereonite 7 as wide as pereonite 6.

Cephalon with 2 prominent conical submedial bosses; pereonite 1 with 2 prominent submedian bosses. Pleon with single median boss. Pleotelson with 2 prominent bosses, posterior margin flat, with 3 rounded points.

Antennule peduncle articles 1 and 2 strongly flattened prominently visible in dorsal view, article 2 anteriorly slightly longer than 1, anterolateral margin produced; articles 1 and 7 with abundant acute spines over surface; peduncle article 3 about 0.3 as long as article 2; flagellum short, about 0.3 as long as peduncle, with 6 articles. Antenna with article 5 longest; flagellum shorter than peduncle, with 8 articles.

Pereopod 1 with anterodistal spines of ischium and merus pectinate; posterior margins of merus, carpus and propodus with 2, 1 and 2 biserrate spines respectively; dactylus 0.66 length of propodus, accessory unguis prominent, slender, about 4 times as long as basal width; posterior margin of propodus with prominent serrate scales. Pereopods 2–7 subsimilar, pereopod 7 with longer biserrate spines on carpus than pereopod 2.

Uropod with abundant acute spines; peduncle anterolateral margin produced to form acute lobe, about 0.4 times as long as wide; exopod 0.6 as long as endopod; apices of both rami acute.

Female. Similar to the male, but ovigerous females (and adult males) not known.

Colour. Pale tan to cream in alcohol.

Distribution. Western Bass Strait, off southern

end of King I., and off Warrnambool, 69–95 metres.

Etymology. The epithet is derived from the Greek *akanos*, a kind of thistle (i.e. prickly).

Remarks. Although no fully adult male is present, this distinctive species is still easily recognized. The genus does not exhibit strong sexual dimorphism, and body ornamentation (as evidenced by mancas, females, immature males and males of *E. incisa*) is unlikely to alter substantially on maturity. Given the scarcity of specimens of this species in the large collections of both the Australian Museum and the Museum of Victoria, the decision has been made to describe *Cassidinella akania* using the existing material.

The species can readily be identified and discriminated from its only congener by the prominent conical bosses on the cephalon, pereonite 1, pleon and pleotelson, by the flattened antennule peduncle, and by the densely setose and spinose body surfaces. The description was prepared from the dissected male paratype and female holotype. The holotype was not dissected in order to avoid damaging the specimen.

The immature male has paired submedian penes on sternite 7 but lacks an appendix masculina. The non-type specimens differ from the types only in having a more conspicuous and intact gel-like layer and so appearing less setose.

Dynameninae Bowman

Exocerceis Baker

Exocerceis Baker, 1926: 271. — Harrison, 1984: 380. — Harrison and Ellis, 1991: 939.

Exocerceis — Nierstrasz, 1931: 217 (lapsus).

Type species. *Cerceis nasuta* Whitelegge, 1902, subsequent designation by Baker (1926).

Diagnosis of male. Body vaulted, dorsal surface coarsely pitted. Cephalon anterior margin produced, concealing antennule bases in dorsal view; prominent posteriorly directed rostral process in ventral position; eyes with facets distinct pereonite 1 longest, pereonites 2–6 subequal in length, 7 longer than 2–6, slightly shorter than 1; coxae ventrally narrowed, posterior margin overlapping anterior margin of next coxa. Pleon with 4 segments, segment 1 entire, 2 separate sutures, anterior running to lateral margin, posterior to posterolateral margin. Pleotelson with apical notch between 2 acute points, third dorsal median point projecting over notch. Pereonite 1 without sternite; pleon with long sternal



Figure 11. *Casidinella akania* sp. nov. Figs A–D, holotype, remainder ♂ paratype. A, dorsal view; B, lateral view; C, frons; D, pleotelson, ventral view; E, antennule; F, antenna; G, maxillule, lateral lobe; H, maxilliped endite; I, pereopod 1; J, pereopod 1, distal propodus and dactylus; K, pereopod 2; L, pereopod 7; M, pleopod 1; N, pleopod 2; O, spines from distal margin of carpus, pereopod 7. Scale line 1.0mm.

extension and sternal process extending to pleopod bases.

Epistome not projecting between antennule bases, not anteriorly produced. Antennule peduncle articles 1 and 2 robust, calcified, article 3 slender, flagellum shorter than peduncle. Antenna peduncle slender, articles 1–3 short, 5 longest; flagellum shorter than peduncle. Mandible incisor prominently tridentate, prominent tridentate lacinia mobilis present on left mandible, spine row with 5 (left) or 7 (right) pectinate spines; molar process prominent with abundant marginal teeth, gnathal surface weakly nodulose. Maxilla mesial lobe with 4 large serrate spines, and 2 small spines; lateral lobe with 10 spines, some of which are serrate. Maxilla entire, setae on lateral and middle lobes very finely serrate. Maxilliped palp articles 2–4 mesial margin forming finger-like lobes; endite distal margin subtruncate with slender circumplumose setae, single smooth spine at distomesial angle.

Pereopods all robust, ambulatory, dactylus with short acute accessory spine; articles generally without long setae, or prominent spines; pereopod 1 shorter and stouter than pereopods 2–7 which are subsimilar.

Penes short, set well apart, not reaching pleonal sternite.

Pleopods 1–3 with PMS on both rami, 4 and 5 without PMS. Pleopod 1 endopod triangular, exopod with truncate distal margin; both rami with longitudinal axes oblique to peduncle; peduncular coupling hooks short and stout. Pleopod 2 rami similar to pleopod 1, but exopod distolateral margin with toothed, distal margin with prominent plumose spines; endopod with appendix masculina in medial position. Pleopod 3 endopod collinear with peduncle; exopod oblique, without transverse suture. Pleopod 4 exopod with small scaled patch on mesial margin, both rami with distinct clearly defined ridges. Pleopod 5 exopod with simple setae on lateral margin, 3 scale lobes distally; both rami with distinct clearly defined ridges. Uropod rami distal margins deeply serrate, not acute or produced, extending slightly beyond pleotelson apex.

Female. Ovigerous females not present in the material examined. Non-ovigerous females differ from males in lacking three acute points on the posterior of the pleotelson, having instead an apically produced, ventrally open notch.

Remarks. The principal differential characters recognized by Baker (1926) and used in the key of Harrison and Ellis (1991) were the produced

unflattened anterior margin to the cephalon, article 1 of the antennule peduncle without an acute process (i.e. distal margin blunt) and the bluntly rounded distal margin of the uropodal exopod (not truncate as stated by Harrison and Ellis, 1991). To these, the following characters can be added: pleopod 1 rami without serrate margins, pleopod 2 exopod distal margin with about 8 prominent spines (rather than the usual PMS), pleopod 3 exopod without transverse suture; uropodal rami with deeply serrate distal margins.

The genus is monotypic.

Exocerceis nasuta (Whitelegge)

Figures 12–15

Cerceis nasuta Whitelegge, 1902: 276, figs 36a–b.

Exocerceis nasuta - Baker, 1926: 272, pl. 48 figs.10–12.

Exocirceis nasuta - Nierstrasz, 1931: 217 (lapsus?).

Material examined. Syntypes. 4♀ (non-ovig. 4.7, 5.8 mm, 1 dissected, 1 without head), 6 km E of Wattamola, NSW, 34°10'S, 151°11'E, 22 Mar 1898, 99–108 m, mud, E. R. Waite on H.M.C.S. *Thetis* (AM G2279). ♂ (poor condition, + appendages), 2 km E of Crookhaven R., NSW, 34°14'S, 150°48'E, 20–27 m, sand and rock, E. R. Waite on H.M.C.S. *Thetis* (AM G2277).

Other material. Queensland. 1 (crushed), off Moreton I., 27°27'S, 153°39'E, 29, Mar 1969, 77 m (AM P41857).

New South Wales: ♂ (5.6 mm), 6 manca (1.5–1.7 mm, post partum), off Newcastle, 32°53'S, 152°35'E, 15 Aug 1985, 175 m, FRV *Kapala* (AM P41859). 2♀ (non-ovig. 3.4, 5.0 mm), E of Long Reef, 33°43'S, 151°46'E, 14 Dec 1985, 174 m, J. K. Lowry and R. T. Springthorpe on FRV *Kapala* (AM P41277). 2♂ (5.6 dissected, 6.0 mm), 22♀ (non-ovig. 3.4–5.2 mm, mean = 4.3 mm; 25 unmeasured), E of Long Reef, 33°43'S, 151°46'E, 20 Dec 1985, 174 m, J.K. Lowry et al., on FRV *Kapala* (AM P41856, P41858). ♀ (non-ovig. 5.2 mm), off Nowra, 34°59.52'S, 151°05.94'E, 14 Jul 1986, 204 m, coarse shell, G. C. B. Poore et al. (NMV J19154).

Description of male. Body about 2.3 times as long as wide; widest at pereonite 6. Pleon with 4 or 5 sublateral granular longitudinal ridges. Pleotelson with 2 large bilaterally compressed bosses.

Antennule peduncle article 1 longest, 2.3 times as long as article 2, 1.8 times as long as article 3; flagellum with 6 articles, extending to posterior of pereonite 1. Antenna peduncle article 4 1.8 times as long as 3, article 5 1.3 times as long as 4; flagellum shorter than peduncle, with 10 articles, extending to pereonite 2. Mandible palp article 2 with about 4 serrate setae on distolateral margin, article 3 with 10 serrate setae on distolateral margin. Maxilla with 7 and 8 setae on lateral and middle lobes; mesial lobe with 2 prominent and about 8 smaller stout plumose spines setae. Maxilliped endite distal margin with 3 sub-

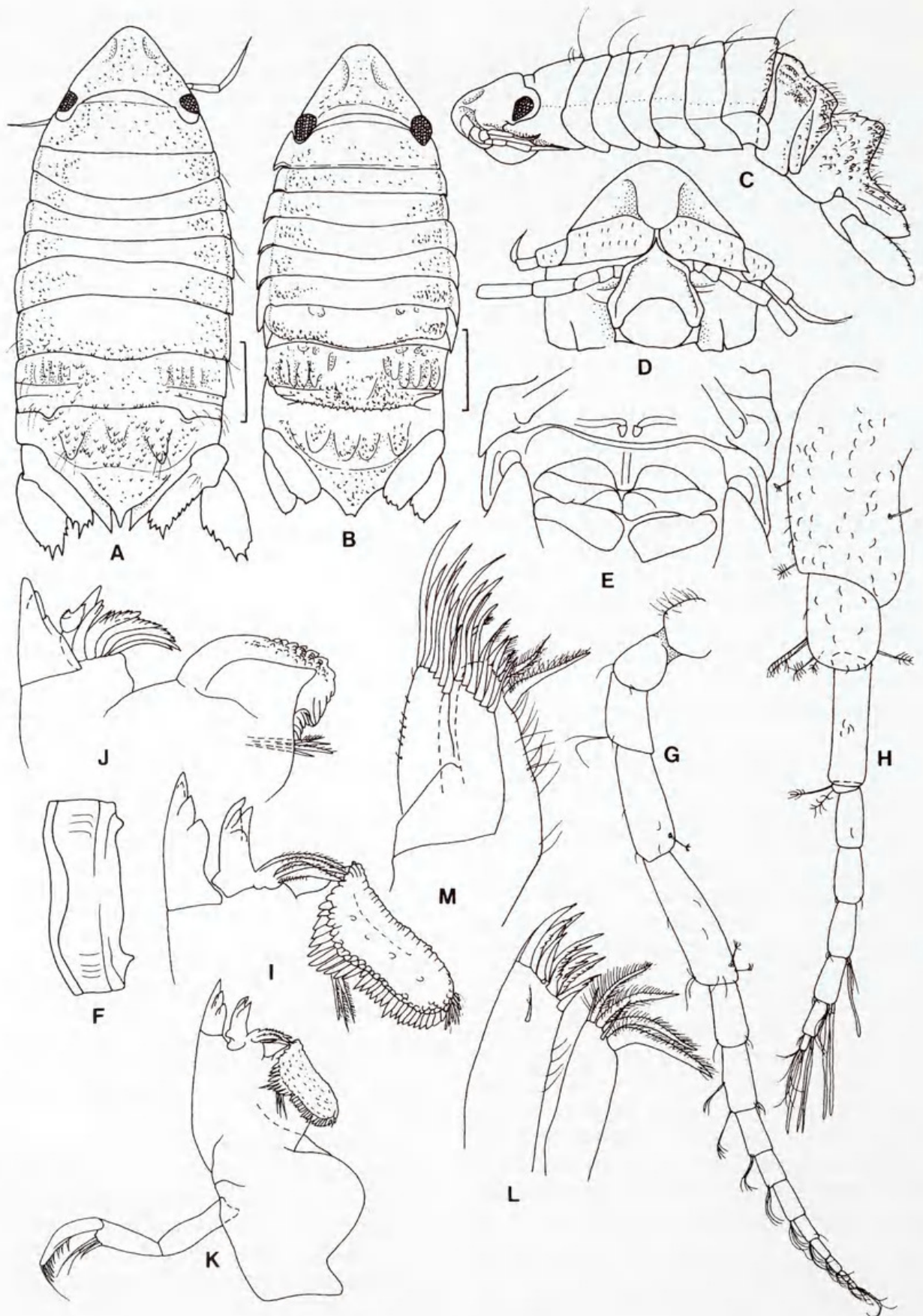


Figure 12. *Exocerceis nasuta*. A, C–F, male 6.0mm. G–L, male 5.6mm (AMP41858), unless otherwise indicated. A, dorsal view; B, 5.8 mm ♀ syntype (AM G2279); C, lateral view; D, frons; E, pleonal sternite and penes; F, pleonal sutures; G, antennule; H, antenna; I, left mandible, distal portion; J, right mandible; K, mandible; L, maxillule; M, maxilla. Scale lines 1.0mm.

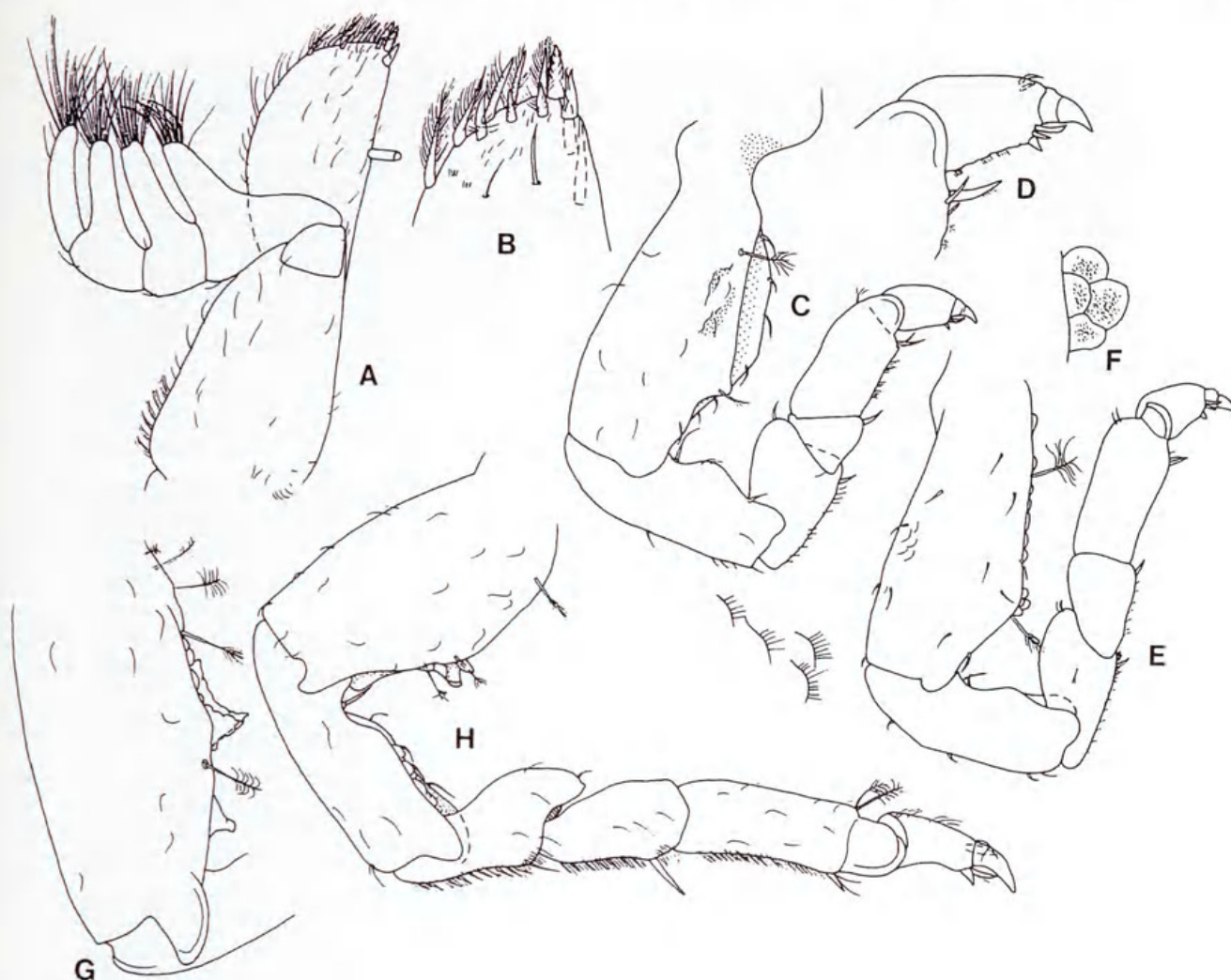


Figure 13. *Exocerceis nasuta*. All figs, male 5.6 mm (AMP41858). A, maxilliped; B, maxilliped endite, detail; C, pereopod 1; D, pereopod 1, dactylus; E, pereopod 2 (plus detail of cuticular scales); F, pereopod 2, cuticular scale, anterior margin of basis; G, pereopod 6, basis; H, pereopod 7.

marginal plumose spines, 4 acute marginal spines and 1 simple and one cactus spine; dorsal distomesial margin with 2 densely plumose spines; endite with about 12–14 setae each on lobes of articles 2–5.

Pereopod 1 robust, propodus and merus subequal in length, carpus short, triangular; dactylus about 0.6 as long as propodus, unguis short, about 0.3 as long as dactylus; accessory unguis small, acute; basis anterior margin with cuticular process; posterior margin with single acute spine at posterodistal angle of merus, carpus and propodus. Pereopod 2 similar to 1 but more slender; posterior margin of basis with epicuticular nodule on anterior margin. Pereopod 3 merus to carpus more elongate than in pereopods 1 and 2; posterior margin of merus, carpus and ischium with scales and setules; pereopods 4 to 7 generally similar to 3, becoming progressively longer.

Penes short, set wide apart, distally rounded. Pleopod exopod with about 26 PMS, endopod with 11.

Pleopod 2 appendix masculina slightly shorter (0.94) than length of endopod mesial margin, inserted about 0.36 along length of mesial margin, straight apex bluntly rounded; exopod with 15 PMS and distally 6 stout plumose spines; distolateral angle with 2 prominent serrations, endopod with 20 PMS. Pleopod 3 exopod with about 32 PMS, endopod with 14. Uropod with prominent simple spines on endopod surface, lateral surface of peduncle and lateral margin of exopod; lateral margin of endopod and mesial margin of exopod with short PMS; both rami with deeply bifid apices.

Female. Similar to male except dorsal surface of pleotelson appears to have 4 indistinct longitudinal ridges and posterior margin formed into

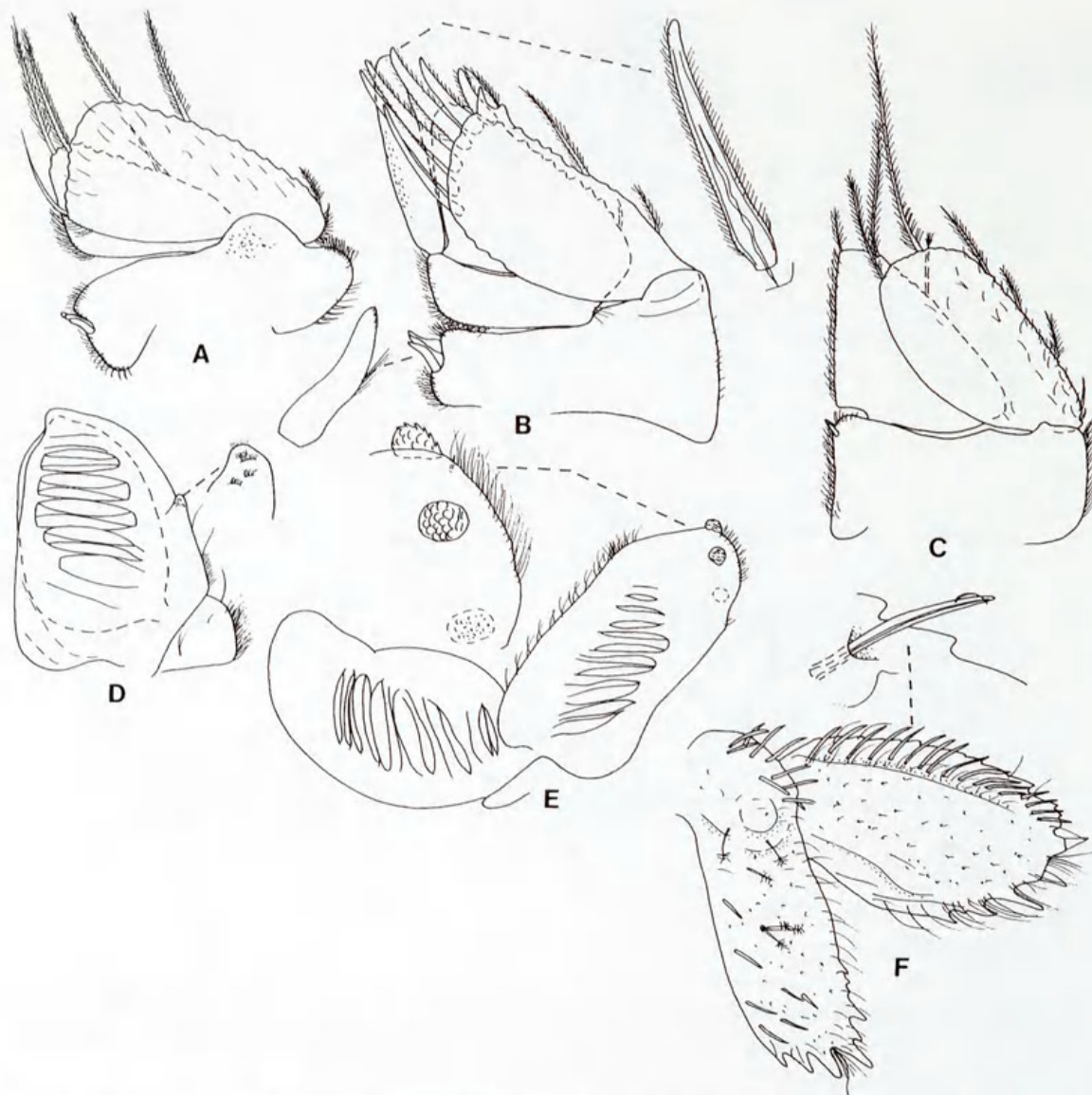


Figure 14. *Exocerceis nasuta*. All figs, male 5.6mm (AMP41858). A-E, pleopods 1-5 respectively; F, uropod.

ventrally open, posteriorly directed tube, lacking the three acute lobes of male. Ovigerous females not present in material examined.

Colour. Pale cream in alcohol.

Size. Males 5.6–6.0mm, non-ovigerous females 3.4–5.8mm.

Distribution. Off Moreton I., south-eastern Queensland (one record) to central NSW coast between Nowra and Newcastle, at depths between 20 and 204 metres.

Remarks. While superficially similar to some *Cerceis* species, the blunt anterior margin of the cephalon and uropod exopod being bluntly

rounded immediately identifies both the genus and the species, as does the presence of prominent plumose spines on the pleopod 2 endopod.

The description is based primarily on specimens from off Long Reef (AM P41858).

Acknowledgments

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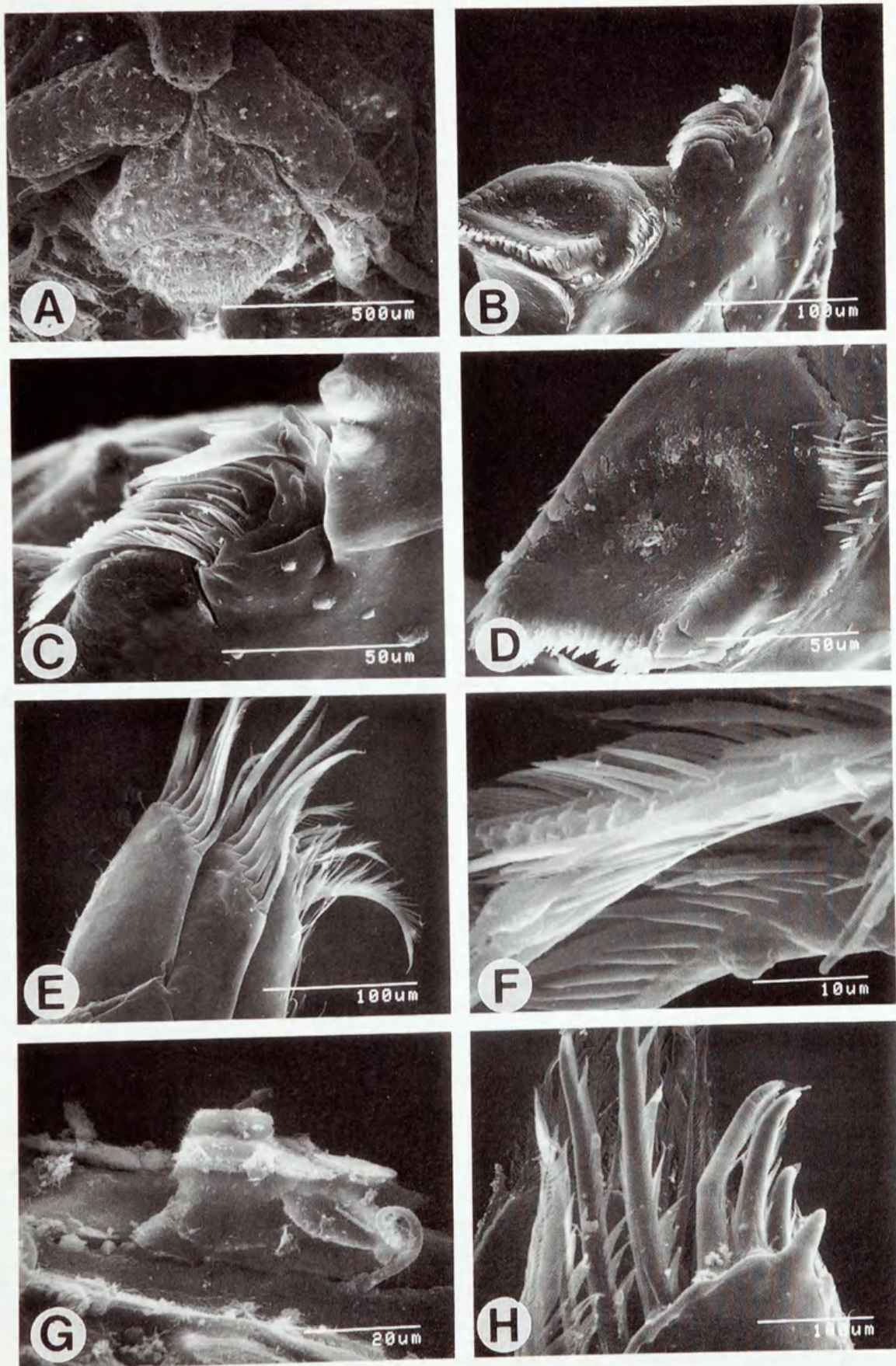


Figure 15. *Exocerceis nasuta*. ♀ (AM P41858). A, frons; B, left mandible, distal portion; C, spine row, left mandible; D, molar, *en face*; E, maxilla; F, spines, maxillule, mesial lobe; G, cuticular scales, pereopod 7; H, pleopod 2, exopod spines.

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