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Two New Genera of Marine Isopod Crustaceans (Flabellifera : Sphaeromatidae) from Southern Australia, with a Reappraisal of the Sphaeromatidae

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Abstract

Two new genera, *Juletta* and *Margueritta*, and the species *Juletta mirandae*, sp. nov., *J. fika*, sp. nov., and *Margueritta sylviae*, sp. nov. are described. The genera are both characterised by having a unicuspidate mandible incisor, both mandibles lacking a lacinia mobilis, medial lobe of maxillule with three spines, pleopods 1 operculate, pleonite 1 free and pleonites 3–6 indistinguishably fused to telson.

Margueritta can readily be distinguished from *Juletta* by the presence of a pleotelsonic foramen and the lack of a proximal lobe on the palm of pereopods 2 and 3. Both genera are recorded from the intertidal or shallow subtidal zones (25 m), and are recorded from eastern Tasmania, Victoria, South Australia (*Juletta*) and southern Western Australia (*Juletta* and *Margueritta*).

The distinctive mouthpart morphology of these genera led to a reappraisal of the mouthpart morphology of the constituent subfamilies of the Sphaeromatidae. It is principally mouthpart characters that are used to distinguish the newly redefined and elevated families Ancinidae Dana, 1852, and Tecticipitidae Iverson, 1982 from the Sphaeromatidae. The Sphaeromatidae are similarly rediagnosed with a more restrictive diagnosis. A synoptic list and key to the families of Flabellifera are given.

Introduction

The Flabellifera (*sensu stricto*, excluding anthurideans and gnathiids: see Brusca and Wilson 1991) is the second largest of the marine isopod suborders, exceeded in number of families only by the Asellota (see Bowman and Abele 1982, for a now-dated list of the families and genera). In contrast to the Asellota, which are primarily deep sea dwellers, the Flabellifera reach their greatest diversity within the waters of the continental shelf. The large families Cirolanidae and Sphaeromatidae are the most commonly encountered isopods of the shallow marine environments.

At family level, taxonomy of the order has advanced slowly. While there has been a steady increase in the number of genera and species known, the number of families has remained fairly static. Eight families established between 1815 and 1893 have remained in use to the present day (although many more family-group names are available). In this century, the Plakarthriidae Richardson, 1904, the Phoratopodidae Hale, 1925, and Bathynataliidae Kensley, 1978*a*, were added. Thereafter, there was a steady increase in the number of families, with a further five recorded by 1991. Some of these were based on new discoveries, such as the Keuphylliidae Bruce, 1980. Others derived from refinements in the taxonomy of larger families, and include the Protognathiidae Wägele & Brandt, 1988 (removed from the Cirolanidae), the Tridentellidae Bruce, 1984 (separated from the Corallanidae), and the Hadromastacidae Bruce & Müller, 1991 (separated from the Limnoriidae after Cookson's 1991 revision). In part, establishment of new families has

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being used for other flabelliferan families. In so doing, the Ancininae and Tecticipitinae are accorded family status. This brings the total number of families in the Flabellifera to 18 (see the synoptic list).

Key to Families of the Flabellifera

Numerous keys to the Flabellifera have been produced, but all of these have been in regional guides (e.g. Schultz 1969; Naylor 1972; Kensley and Schotte 1989). None of these keys includes all the flabelliferan families, and most use a limited number of easily observed characters. This key, developed for ease of use, uses easily observed characters where possible, but also uses characters that reflect the major family groups or lineages.

The Flabellifera, as used here, comprise those families of the cirolanid/cymothoid, sphaeromatid and limnoriid lineages, and consists of those families that have the following suite of characters: body dorsoventrally compressed, with 7 pereonites; never vermiform or bilaterally compressed; mandible, maxillule, maxilla and maxilliped present; 7 pairs of pereopods; uropod rami flattened or cylindrical, inserted ventrolaterally in position, usually anteriorly placed, forming tail fan with pleotelson (uropoda never operculiform over pleopods, never folding dorsally over pleotelson).

The key applies to marine representatives as the stygiofaunal and anchialine elements often show a highly modified morphology.

1. Pleopods 4 and 5 with one or both rami distally narrowed or acute, both rami without PMS (plumose marginal setae), or endopods 3–5 without PMS. Pleon with tergites fused or submerged into pereonite 7 2
   Pleopods 4 and 5 with rami distally rounded and broad; rami with PMS except endopod of pleopod 5 with or without PMS. Pleon usually with 5 unfused tergites 7
2. Pereonite 1 with distinct coxal plates. Mandible without palp. Maxillule and maxilla unilobed. Pleopods 4 and 5 exopods with PMS ..... Plakarthriidae
   Pereonite 1 without distinct coxal plates. Mandible with palp (except for the sphaeromatid *Tholozodium* Eleftheriou, Holdich & Harrison, 1980). Maxillule bilobed and maxilla trilobed. Pleopods 4 and 5 exopods without PMS 3
3. Maxilliped palp 1- or 3-articled. Pleopods 4 and 5 without scale patches or thickened ridges. Uropods biramous (but rami may be reduced or vestigial), endopod not fused to peduncle 4
   Maxilliped palp 5-articled. Pleopods 4 and 5 with or without thickened ridges, with scaled patches on pleopod 5 exopod. Uropods biramous or uniramous, endopod fused to peduncle 5
4. Pleopods not held within pleotelsonic chamber, pleopod 4 operculate; tergite of pereonite 7 absent; pleon with 3 visible tergites ..... Serolidae
   Pleopods held within pleotelsonic chamber, pleopod 4 lamellate; tergite of pereonite 7 present; pleon with 4 or 5 visible tergites ..... Bathynataliidae
5. Mandible with robust, blunt incisor; usually with large, flat crushing molar process (lobate, chitinised in *Waiteolana*); spine row present. Maxillule medial lobe present, with spines. Pereopod 1 propodus not expanded or ovate; dactylus ambulatory ..... Sphaeromatidae
   Mandible with blade-like molar process; lacinia mobilis present; spine row absent; incisor wide, cultrate, tridentate or unidentate. Pereopod 1 propodus dilated, ovate, expanded; dactylus subprehensible 6
6. Mandible incisor tridentate; lacinia mobilis elongate, blade-like. Maxilliped endite without distal spines ..... Ancinidae
   Mandible incisor wide, unidentate; lacinia mobilis short, wide. Maxilliped endite with distal spines ..... Tecticipitidae
7. Mandible incisor 4-dentate; lacinia mobilis prominent, multidentate. Maxilliped endite broad, with truncate distal margin armed with spines ..... Phoratopodidae
   Mandible incisor tridentate, cultrate, piercing or simple; lacinia mobilis reduced or absent. Maxilliped endite small, subcylindrical or elongate and slender 8
8. Mandible incisor wide (tridentate or simple) or piercing; molar process a flat articulating triangular blade (or conditions derived from that form). Maxilliped endite short and subcylindrical or absent 11
   Mandible incisor simple or massive; molar process absent. Maxilliped endite flat or slender and elongate 9
9. Pleon with 2 free tergites dorsally. Uropods anterolateral in position; rami broad, lamellar. Maxilliped epipod absent ..... Hadromastacidae
   Pleon with 5 free tergites. Uropods posteroventral in position, rami short, flattened or claw-like. Maxilliped epipod present 10

10. Cephalon laterally overlapped by pereonite 1. Mandible with simple incisor and prominent spine row. Uropod posteroventeral in position, exopod claw-like ..... Keuphyliidae
Cephalon not laterally overlapped by pereonite 1. Mandible with rasp and file structure, posteromedially acute. Uropods ventrolateral in position, endopod claw-like or simple ..... Limnoriidae
11. Uropods lamellar, held beneath pleotelson (i.e. functioning as 6th pleopods) ..... Anuropidae
Uropods anterolateral in position, not lamellar, forming tail fan 13
12. Pereopods all prehensile (dactylus longer than propodus and strongly curved). Antenna and antennule with peduncle and flagellum not clearly differentiated. Maxilliped with 2 articles ..... Cymothoidae
Pereopods 4–7 ambulatory (dactylus shorter than propodus, not strongly curved). Antenna and antennule with peduncle and flagellum clearly differentiated. Maxilliped of more than 2 articles 14
13. Mandible incisor wide; molar process a prominent serrate triangular blade. Maxillule bilobed with 3–4 circumplumose spines on medial lobe, 9–13 stout spines on lateral lobe 15
Mandible incisor narrow or piercing; molar process reduced or absent. Maxillule medial lobe minute or absent, lateral lobe with 2–5 spines or 1 large falcate spine 16
14. Mandible incisor tridentate; spine row present. Maxilla with 3 setose lobes ..... Cirolanidae
Mandible incisor piercing, spine row absent. Maxilla with single lobe ..... Protognathiidae
15. Mandible with reduced triangular molar process. Maxillule a stylet with hooked terminal spines. Maxilla prominent 17
Mandible with molar process small or absent. Maxillule not an elongate stylet, without hooked spines. Maxilla minute, without spines or hooked scales ..... Corallanidae
16. Eyes often conspicuously large. Maxilla bilobed, medial lobe small, anteromedial in position. Anterior pereopods with dactylus usually strongly curved ..... Aegidae
Eyes not conspicuously large. Maxilla with 2 linearly arranged articles, apex usually covered with hooked scales. Pereopods with ambulatory dactylus ..... Tridentellidae

Checklist of Flabelliferan Families

Aegidae White, 1850. Micropredators of fish. Five genera, over 100 species. Family authorship has usually been attributed to Dana (1853) or (1852); erroneously to Leach by Bruce (1988). The earliest use I can find is that of White (1850: 78).

Ancinidae Dana, 1852. Two genera, each with 4 species. *Ancinus* occurs in shallow water, *Bathycopea* from shallow (17 m) to deep water (4000 m).

Anuropidae Stebbing, 1893. Pelagic or oceanic species. One genus and 7 species.

Bathynataliidae Kensley, 1978*a*. Three monotypic genera, all sublittoral, southern oceans.

Cirolanidae Dana, 1852. About 50 genera, and more than 400 species. Occurs from the intertidal to about 2000 m; scavengers and predators.

Corallanidae Hansen, 1890. Predators or micropredators of marine fish and freshwater decapods. Six genera, about 70 species (Delaney 1989).

Cymothoidae Leach, 1814. All obligate parasites of fish; some freshwater genera. Over 40 nominate genera, and an uncertain number of species; many taxa are of uncertain validity, but probably more than 400 species. The earliest use of the family name was by Leach (1814: 433).

Hadromastacidae Bruce & Müller, 1991. One genus, two species (one from the continental shelf of south-eastern Australia, one from coral reefs of Polynesia).

Keuphylliidae Bruce, 1980. One monospecific genus from Coral Sea reefs off eastern Australia.

Limnoriidae White, 1850. Three genera, more than 70 species. Principally wood or algal borers (Cookson 1991); Lynseiidae Poore, 1987, relocated to this family (Poore and Cookson 1993).

Phoratopodidae Hale, 1925. One monotypic genus from southern Australia.

Plakarthriidae Richardson, 1904. Two species known from southern oceans (Wilson *et al.* 1976).

Protognathiidae Wägele & Brandt, 1988. One monotypic genus, Antarctica; not regarded as valid by Brusca and Wilson (1991).

Serolidae Dana, 1853. Fourteen or 15 genera (Brandt 1991), over 70 species. Primarily antitropical in distribution; on particulate sediments.

Sphaeromatidae Latreille, 1825. Over 80 genera currently accepted, more than 400 species (derived from Harrison and Ellis 1991). Commonest in shallow waters (<200 m).

Tecticipitidae Iverson, 1982. One genus, 11 species. In shallow waters on particulate substrata.

Tridentellidae Bruce, 1984. One genus, 13 species. Micropredators of fish; primarily antitropical in distribution.

Methods

Descriptions are based on the holotype, or holotype and dissected male paratype. All figures are of the dissected male paratype except when otherwise stated. All drawings were made with the aid of a camera lucida attachment. In all figures the antennule, the antenna, the pereopods and pleopods are all drawn to the same scale. All appendages were drawn from slide preparations. Brusca and Wilson (1991) identified the Valvifera as the sister-group of the Sphaeromatidae in their consensus tree (Brusca and Wilson 1991: fig. 14). In order to attempt to identify the apomorphic character states, outgroup comparisons were made to the Valvifera and Cirolanidae.

Specimens for scanning electron microscopy were prepared by the technique of Felgenhauer (1987), with the omission of OsO_4 postfixation.

Specimens are housed at the Australian Museum, Sydney (AM), the Museum of Victoria (NMV) and the South Australian Museum (SAM).

Taxonomy

Order **ISOPODA** Latreille

Family **SPHAEROMATIDAE** Latreille, 1825

Restricted synonymy

Sphéromiens.—Milne Edwards, 1840: 197.

Sphaeromidae.—Stebbing, 1893: 359 (*et auct.*).

Sphaerominae.—Hansen, 1905: 98.

Sphaeromatidae.—Dahl, 1916: 16; Hurley and Jansen, 1977: 25; Iverson, 1982: 250; Kensley and Schotte, 1989: 202.

Type genus: *Sphaeroma* Bosc, 1802.

Diagnosis

Cephalon not fused with pereonite 1; pereonites 2–7 with coxal plates usually indicated by sutures; pleonite 1 tergite often discrete, pleonites 2–5 fused bearing partial sutures, lateral suture lines variously indicated. Pleotelson wholly or partly fused with pleonites.

Frontal lamina and clypeus fused, forming epistome; labrum present. Antennule peduncle 3-articled; antennal peduncle 5-articled. Mandible stout, usually with multicusped incisor; lacinia mobilis short, multicusped, usually present on left mandible; spine row present; molar process forming flat nodulose, grinding or smooth crushing surface, or chitinised lobe. Medial lobe of maxillule with 3 or 4 long pectinate spines and 1 simple spine; lateral lobe gnathal surface with 9–13 stout, simple and/or serrate spines. Maxilla with 3 elongate lobes each bearing long setae, those of lateral and middle lobes being serrate, medial lobe plumose. Maxilliped endite elongate, bearing terminal plumose spines, usually with variously ornamented spines, usually with single coupling hook; palp 5-articled, with articles 2–4 usually expanded to form lobes. Pereopods ambulatory, usually robust; pereopod 1 not chelate, not expanded, may be lobed (*Moruloidea* Harrison, 1984*b*; *Monolistra* Racovitza, 1910); dactylus usually with distinct secondary unguis. Pleopods all biramous, usually lamellar, occasionally pleopod 1 indurate, operculate; pleopods 1–3 with plumose marginal setae; pleopods 4 and 5 with or without thickened ridges, exopod of pleopod 5 with distal scaled patches. Uropods anterolateral in position on pleotelson, endopod fused to peduncle when present; exopod articulating or reduced, set laterally into endopod when present, often absent.

Sexual dimorphism usually present (absent from many Cassidininae), often extreme. Young usually brooded in invaginated pouches of ventral body wall (sometimes in simple marsupium of oostegites, or in pockets without being in pouches: Harrison 1984*a*). Many females have modified mouthparts (usually termed 'metamorphosed', see Harrison 1984*a*).

Many genera capable of rolling into sphere or folding over.

Remarks

The only recent attempts to give restrictive diagnoses to the family were that of Iverson (1982), later followed by Brusca and Iverson (1985), and Kensley and Schotte (1989). Other diagnoses (Menzies 1962; Menzies and Glynn 1968; Schultz 1969; Naylor 1972; Hurley and Jansen 1977) are all far less precise. In general, compared with other flabelliferan families, little detailed attention has been given to mouthpart morphology. To this end, scanning electron micrographs are used (Fig. 1) to illustrate these features, and also the scale patch of pleopod 5.

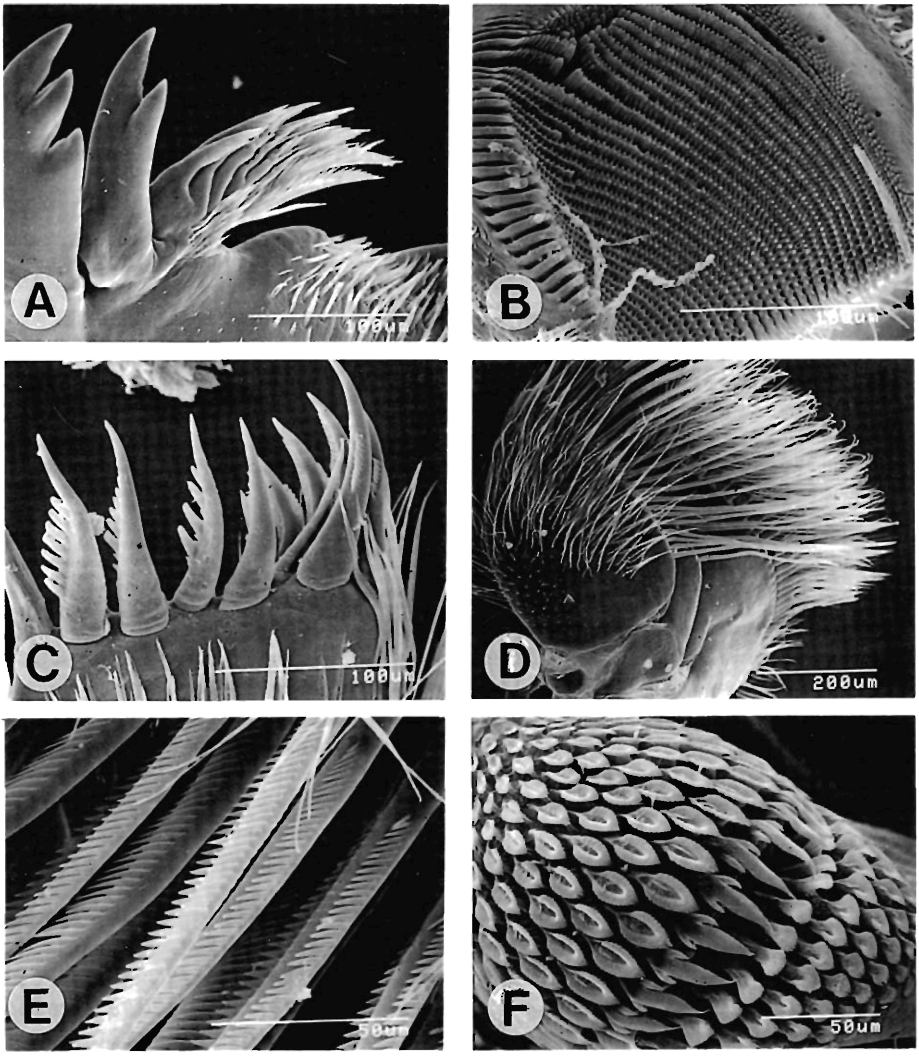

Fig. 1. Scanning electron micrographs of mouthparts of *Sphaeroma walkeri* Stebbing (Redcliffe Peninsula, south-eastern Queensland): *A*, left mandible, incisor, lacinia mobilis and spine row; *B*, right mandible, molar process in frontal view; *C*, maxillule, apex of lateral lobe; *D*, maxilla; *E*, maxilla, detail of setae, lateral lobe; *F*, pleopod 5 exopod, scaled lobe.

The diagnosis given here for the Sphaeromatidae is intended to parallel those for the other families of the Flabellifera, restricting the family to a slightly narrower concept based primarily on details of the mandible and maxillule, and also pereopod morphology.

In so doing, the number of subfamilies is reduced from five to three, but only three genera are removed from the family. The three subfamilies retained are the nominate subfamily, the Cassidininae Hansen, 1905 (see Harrison and Ellis 1991 for the correct authority of the subfamily), and the Dynameninae Bowman, 1981.

The Sphaeromatidae, while readily recognisable both in the field and as a long-established family of the Flabellifera, is difficult to define in terms of unique apomorphies. Most recently, Brusca and Wilson (1991) failed to postulate unique apomorphies. While the families Ancinidae and Tecticipitidae can be characterised by several unique apomorphies, the condition shown by these characters in the Sphaeromatidae is plesiomorphic. The diagnosis given here does not attempt to resolve the apparent difficulties in identifying apomorphies in this family, characterised by its plesiomorphic status as recognised by Brusca and Wilson (1991). This task can only be achieved by a thorough generic revision of the family, again also noted by Brusca and Wilson (1991).

The characters that unite the Sphaeromatidae, Ancinidae and Tecticipitidae, and which can be recognised as apomorphic are: (1) pleonites 3–5 fused (with segments indicated by lateral sutures); (2) uropodal endopod fused to peduncle; (3) pleopods held within a chamber formed by the vaulted telson; (4) maxilliped palp with at least some articles expanded into lobes; and (5) pleopod 5 exopod with distal scaled patches or lobes. Of these characters (listed by Brusca and Wilson 1991), only that of the uropodal endopod being fused to the peduncle and the pleomere fusion is shown by all families and subfamilies. The Tecticipitidae lack scaled patches on pleopod 5 (Kussakin 1979: fig. 224; Iverson 1982), and *Bathycopea* (Ancinidae) also lacks lobate maxilliped palp articles. In the Cassidininae the telson is often weakly domed and the pleopods are often scarcely enclosed within a chamber.

A character regarded as typical of the Sphaeromatidae, and the distribution of which was the basis for the original subdivision of the family by Hansen (1905), is the presence of thickened ridges on pleopods 4 and 5. These are, however, entirely absent from the Cassidininae and also the Ancinidae. The Cassidininae (*sensu stricto*) show several other consistent differences to the Dynameninae and Sphaeromatinae; these include a strongly flattened body shape, antennule peduncles that are flattened and expanded, reduction or loss of the uropodal exopod (except primitively, e.g. *Tholozodium* Eleftheriou, Holdich & Harrison, *Campecopea* Leach), and a narrow mandible incisor.

The distribution of characters, and their phylogenetic significance is not well understood in this family. The genus *Waiteolana* contains species that lack distinct pleopodal ridged (hence Cassidininae), or have the endopods with pleopods 4 and 5 with ridges (hence Sphaeromatinae). A similar condition occurs in the genus *Exosphaeroma* (personal observation).

Harrison and Ellis (1991) gave a key to, and an annotated list of, the genera of the family.

Authorship of the family has routinely been attributed to Milne Edwards. However, Latreille (1825, cited by Jacobs 1987) was the first to use the family-group name.

Subfamily **DYNAMENINAE** Bowman, 1981

General Remarks

The two new genera described here differ from all other marine sphaeromatid genera in having the pleotelson entirely fused to the preceding pleonites, in having operculate first pleopods, and in differences in mouthpart morphology. The mouthpart differences are a unicuspidate incisor, the lack of a lacinia mobilis, and the medial lobe of the maxillule with three pectinate spines (rather than four). The shape of pleopods 1 and 2 is similar to that shown by *Ischyromene* Racovitza (see Harrison and Holdich 1982) and *Amphoroidella* Baker (see Harrison 1984*a*). These two genera are otherwise distinct from the new genera described below.

Juletta, gen. nov.

Type species: *Juletta mirandae*, sp. nov., by designation.

Diagnosis

Male

Body flattened, pereonite 1 with longitudinal, low, rounded, median ridge or low bosses. Cephalon with ventral rostral process separating antennule bases. Eyes small, not concealed by pereonite 1. Coxae of pereonites 2–7 fused to tergite, sutures not visible; pereonite 7 reduced, lateral margins not reaching width of pereonite 6. Pereonites 6, 7 and pleon without dorsal processes. Pleon with 1 distinct segment, remaining segments fused to pleotelson. Apex of pleotelson entire, without foramen.

Antennule peduncle articles 1 and 2 not expanded. Mandible incisor massive, unicuspidate, bluntly rounded; spine row with row of prominent slender truncate spines and, medially to these, a row of acute feebly serrate spines; molar process prominent, with flat crushing surface, without ridges or serrations, with 3–5 plumose setae. Maxillule with 7–8 stout spines on lateral lobe, 3 plumose setae and single simple seta on medial lobe. Maxilla with 4 plumose spines on medial lobe; 4 and 3 finely serrate spines on middle and lateral lobes, respectively. Maxilliped palp articles 1–3 and 5 with lateral margins lacking setae; medial margins of articles 2–4 produced, not narrowed.

Pereopods all ambulatory, all with distinct secondary unguis on dactylus; pereopods 2 and 3 with propodus proximal margin produced to form prominent lobe. Paired unfused penes present at posterior or sternite 7, not reaching pleopods.

Pleopod 1 operculate, indurate, exopod with marginal plumose setae on distal $\frac{1}{3}$ of medial margin only; endopod with medial portion indurate, remainder lamellar. Pleopod 2 endopod 1·5–2·0× as long as endopod; appendix masculina basal, extending just beyond apex of endopod. Pleopod 3 without transverse suture. Pleopods 4 and 5 with both rami with thickened ridges; pleopod 5 exopod with 3 scaled lobes. Uropod lamellar, exopod reduced, set about halfway along ventrolateral margin of endopod.

Female

Mouthparts as for the male. Brood pouch not observed. Pereopods as for the male except there is no propodal lobe. In the type species the ridge on pereonite 1 is not as strongly developed. Ovigerous females not examined.

Remarks

Margueritta, gen. nov. has similar mouthpart, pleonal and pleopodal morphology. That genus can be separated from *Juletta* by the lack of a heel on the propodal palm of pereopods 2 and 3, and the presence of a distinct pleotelsonic foramen.

Etymology

Named for Julie, my best friend, companion and wife. Gender is feminine.

Juletta mirandae, sp. nov.

(Figs 2–4)

Material Examined

Holotype. ♂ (4·9 mm), nr Migo I., Port Harding, Torbay Bay, W.A., 35°04′S.,117°39′E., 15.xii.1983, from rocks, amongst small brown algae and compound tunicates, coll. R. T. Springthorpe (AM P41022).

Paratypes. ♂ (4·7 mm, dissected), ♀ (7·0 mm, non-ovigerous), same data as holotype (AM P37498). Immature (2·7 mm), King George Sound, N. of False I., 35°0·70′S.,118°10·10′E., 15.iv. 1984, red algae on granite at 25·0 m depth, coll. G. C. B. Poore and H. Lew Ton (NMV J20780). ♂ (6·4 mm), as for NMV J20780 except 27·0 m depth (NMV J27582).

Description

Male

Body about as long as wide; greatest width at pereonite 2. Cephalon anterior margin transversely blunt. Pereonite 1 with prominent, flattened, median dorsal ridge; pereonites 2–7 progressively decreasing in length. Dorsal surface of pleotelson shallowly domed, with feeble submedian depressions anteriorly; pleotelson apex shallowly concave.

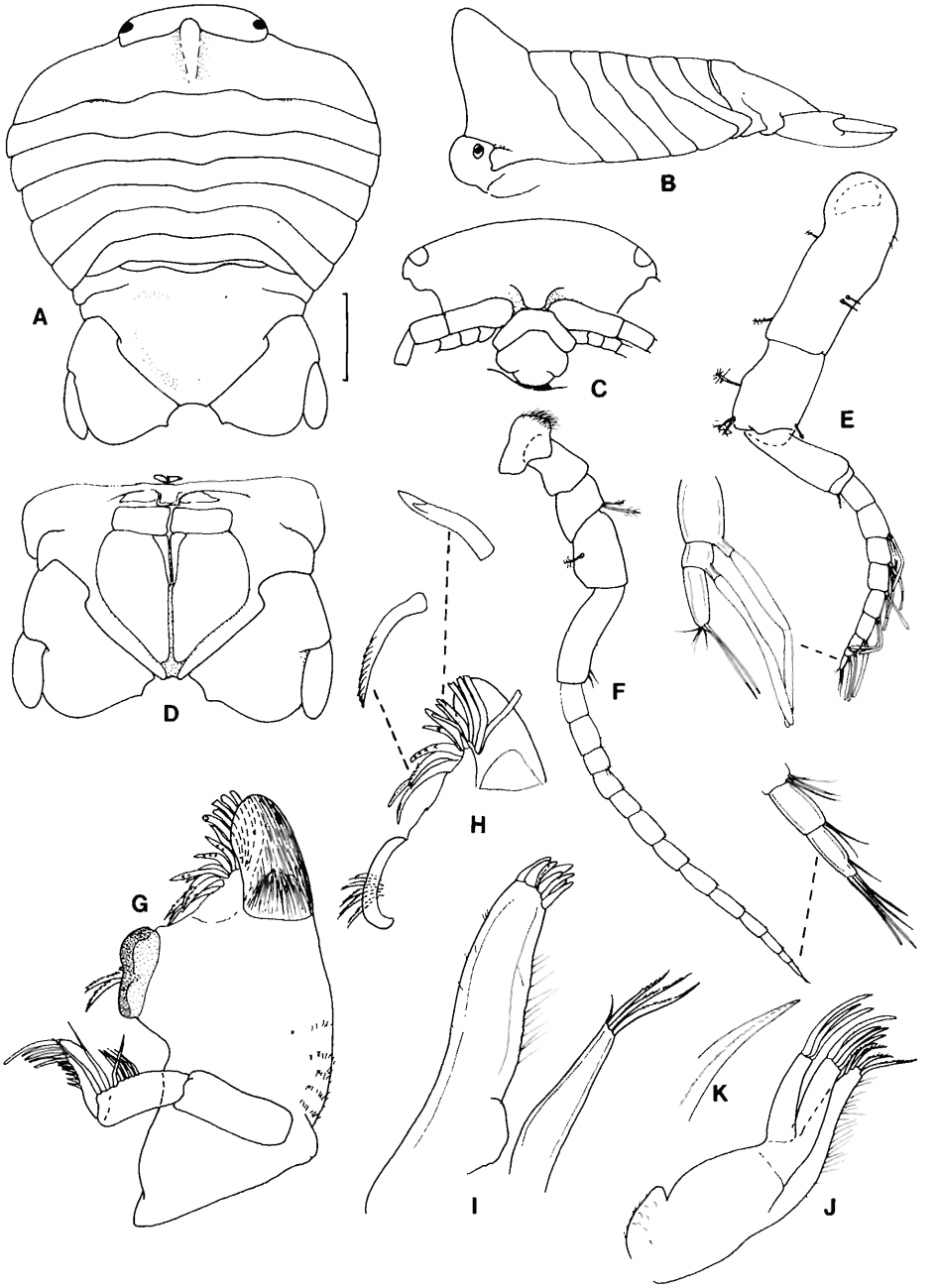

Fig. 2. *Juletta mirandae*, sp. nov. Figs *A–D*, holotype; remainder, male paratype. *A*, dorsal view; *B*, lateral view; *C*, frons; *D*, pleon and pleotelson, ventral view; *E*, antennule; *F*, antenna; *G*, right mandible; *H*, apex, left mandible; *I*, maxillule; *J*, maxilla; *K*, apex of lateralmost spine, maxilla lateral lobe. Scale line 1·0 mm.

Antennule peduncle article 1 twice as long as 2; article 3 longer than 2 but shorter than 1; flagellum composed of 8 articles, about half as long as peduncle. Antenna with articles 1–3 short, article 5 longest; flagellum composed of 13 articles, about 1·25× length of peduncle.

Mandibles symmetrical; palp article 2 with 7 stout setae, article 3 with 12 setae; left molar process with 5 plumose setae, right with 3. Maxillule with 8 spines on lateral lobe. Maxilliped endite with 5 club-shaped plumose spines and 7 acute plumose spines; palp articles 2–5 with 14, 18, 16 and 10 simple setae respectively.

Pereopod 1 robust; merus with spine halfway along posterior margin, carpus and propodus with spine at distolateral angle, posterior margins with dense mass of cuticular spines. Pereopods 2 and 3 similar to 1 but more slender, and with longer spines. Pereopods 5–7 similar to 2 and 3 but without propodal heel and more slender. Paired triangular penial process present at posterior or sternite 7, not reaching pleopods.

Pleopod 1 with exopod pyriform in shape, twice as long and twice as wide as endopod; lateral margin entirely without plumose marginal setae, medial margin with 8 plumose setae on distal $\frac{1}{3}$; endopod with 13 setae on distal and lateral margins; peduncle medial margin with 3 coupling hooks. Pleopod 2 with both rami with plumose marginal setae on lateral

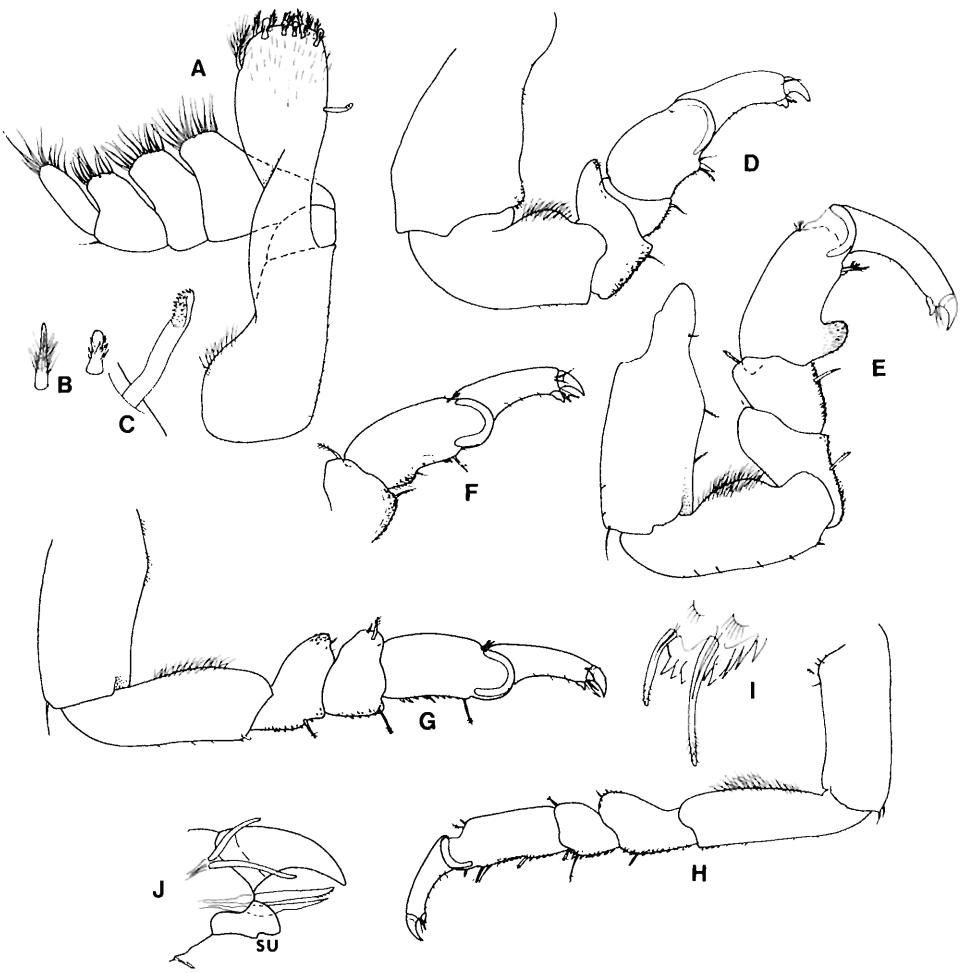

Fig. 3. *Juletta mirandae*, sp. nov. *A*, maxilliped; *B*, spines, distal margin of maxilliped endite; *C*, coupling hook; *D*, pereopod 1; *E*, pereopod 2; *F*, pereopod 5, carpus to dactylus; *G*, pereopod 6; *H*, pereopod 7; *I*, detail, posterodistal angle merus pereopod 5; *J*, dactylus apex, pereopod 5 (su, secondary unguis).

and distal margins; appendix masculina with fine microtrichs on distal $\frac{1}{3}$. Uropod with mediodistal point, forming semicircle with posterior of pleotelson; lateral margin strongly convex; exopod about 0·6× length of endopod, apex rounded.

Female

Pereopods 2 and 3 lack the lobe on the propodus, and the keel on pereonite 1 is not developed. Otherwise, with the exception of sexual characters, as for the male.

Colour

Life colour not recorded; pale tan in alcohol, without chromatophores.

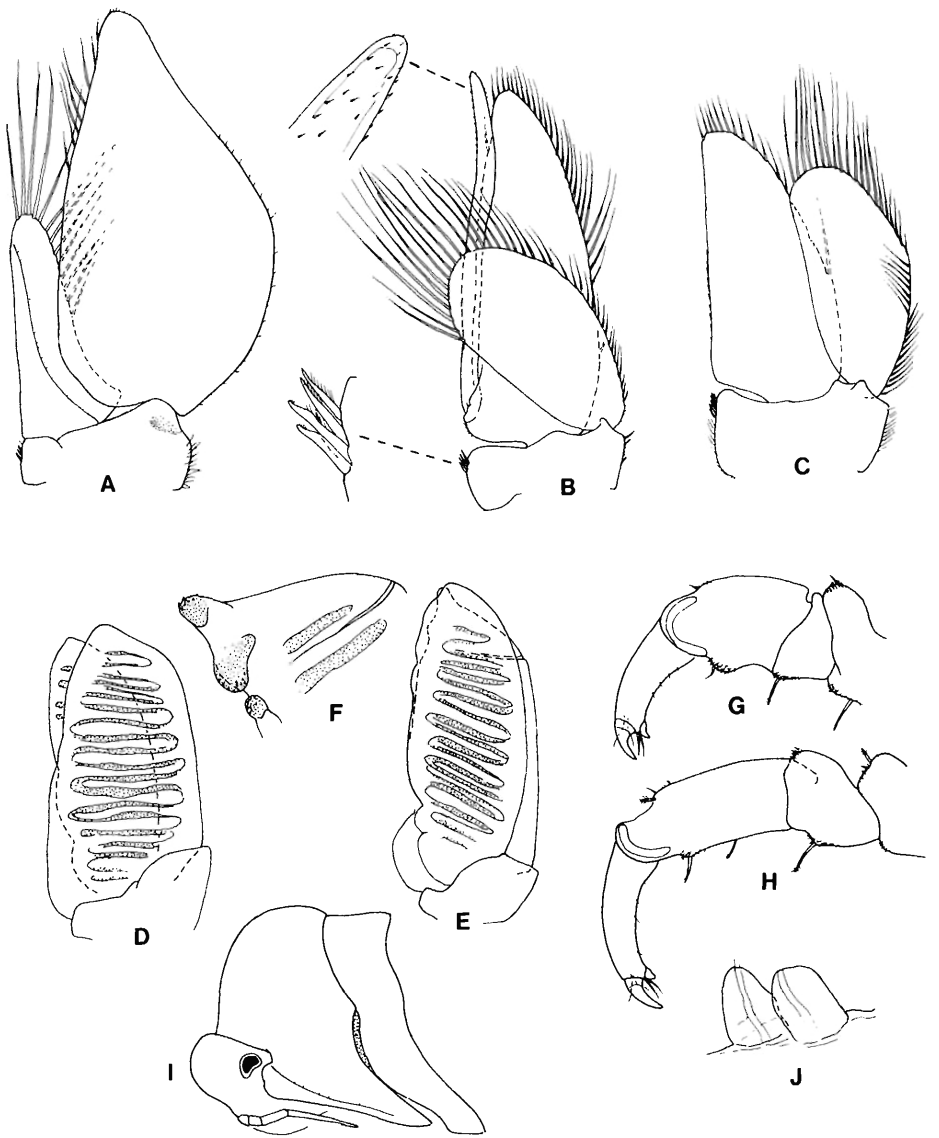

Fig. 4. *Juletta mirandae*, sp. nov. *A–E*, pleopods 1–5 respectively; *F*, pleopod 5 endopod, apex; *G*, pereopod 1, female; *H*, pereopod 2, female; *I*, lateral view of anterior of female; *J*, penes, ♂ (NMV J27582).

Remarks

This species is readily separated from the other species of the genus by the bluntly rounded anterior margin to the cephalon and the prominent keel on pereonite 1; additionally, *Juletta mirandae* is wider anteriorly.

Distribution

Recorded only from the vicinity of Albany and Torbay on the south-west coast of Western Australia.

Etymology

Named for my daughter Miranda.

Juletta fika, sp. nov.

(Figs 5, 6)

Material Examined

Holotype. ♀ (5·0 mm, non-ovig.), Snapper Pt, Beachport, S.A., 37°29·3′S.,139°59·6′E., 14.v.1990, on red algae on limestone reefs, depth 6·0 m, coll. G. C. B. Poore and R. S. Wilson (NMV J20433).

Paratype. ♂ (5·7 mm), Seal Rock, West I., Encounter Bay, S.A., 16.iv.1967, among red algae, 15 m depth, coll. G. Shepherd (SAM C4356).

Additional material. **Victoria:** manca (2·2 mm), NW. side of Henty Reef, Mounts Bay, Apollo Bay, 3.v.1988, on red algae on boulders, 18 m, coll. R. T. Springthorpe and P. B. Berents (AM P41487). **Tasmania:** manca (3·3 mm), Bicheno, 41°53′S.,147°18′E., 22.iii.1988, on erect red algae, 7 m, coll. G. C. B. Poore and H. Lew Ton (NMV J26236); manca (3·4 mm, and 5 mancas 1·8–2·0 mm), E. side of Waubs Bay, Bicheno, 41°53′S.,147°18′E., 23.iii.1988, on tufted red algae, 7 m, coll. G. C. B. Poore and H. Lew Ton (NMV J26239, J26242).

Description

The description notes only the differences from the type species.

Female

Body 1·5× as long as wide. Cephalon anterior margin produced to narrowly rounded point. Pereonite 1 with 2 submedian bosses. Coxal plates with sutures distinct. Dorsal surface of pleotelson with indistinct longitudinal median ridge, pleotelson apex subtruncate.

Antennule peduncle article 3 slightly shorter than article 2; flagellum composed of 7 articles. Antenna with flagellum composed of 11 articles.

Mandible and maxilla not examined. Maxillule with 7 spines on lateral lobe of gnathal surface, medial lobe not observed. Maxilliped endite with spatulate plumose spines.

Pereopods with short setal fringe on anterior margin of ischium; all pereopods with posteroproximal lobe on propodus, pereopods 2 and 3 with posteroproximal lobe not as prominent as in *J. mirandae*.

Pleopod 1 exopod with 2 plumose setae on distomedial margin. Uropod with posterolateral margin smoothly rounded, without mediodistal point.

Male

Differing from the female only in having the head more bluntly rounded, with the anterior margin being slightly dorsally directed. Penes and pleopod 2 as figured.

Colour

Holotype was transparent in alcohol; paratypic material is brown.

Remarks

This species, the most southerly and most easterly record for the genus, is readily distinguished from the only other species in the genus by the strongly produced cephalon, the distinctly narrower body shape, the lack of a dorsal keel on pereonite 1 (having instead

two low bosses), and the posteromedial margin of the uropodal endopod being feebly concave and lacking a subapical point. Additionally, there are differences in the minor details of the pereopods (pereopod 2 propodal heel is smaller) and pleopods (lateral margin of pleopod 1 exopod with fewer setae).

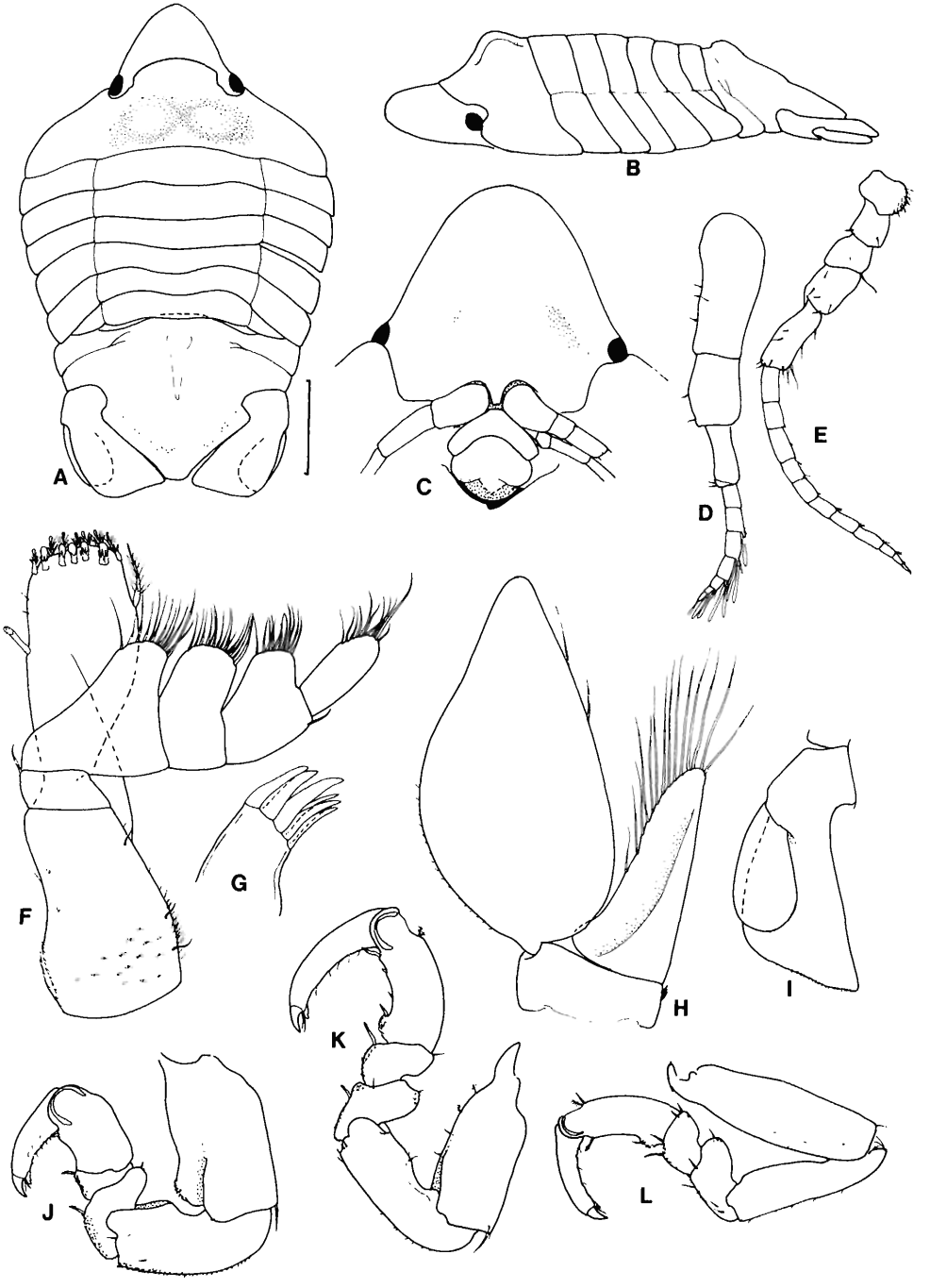

Fig. 5. *Juletta fika*, sp. nov., holotype: *A*, dorsal view; *B*, lateral view; *C*, frons; *D*, antennule; *E*, antenna; *F*, maxilliped; *G*, maxillule apex; *H*, pleopod 1; *I*, uropod, *in situ*, ventral view; *J*, pereopod 1; *K*, pereopod 3; *L*, pereopod 7. Scale line represents 1·0 mm.

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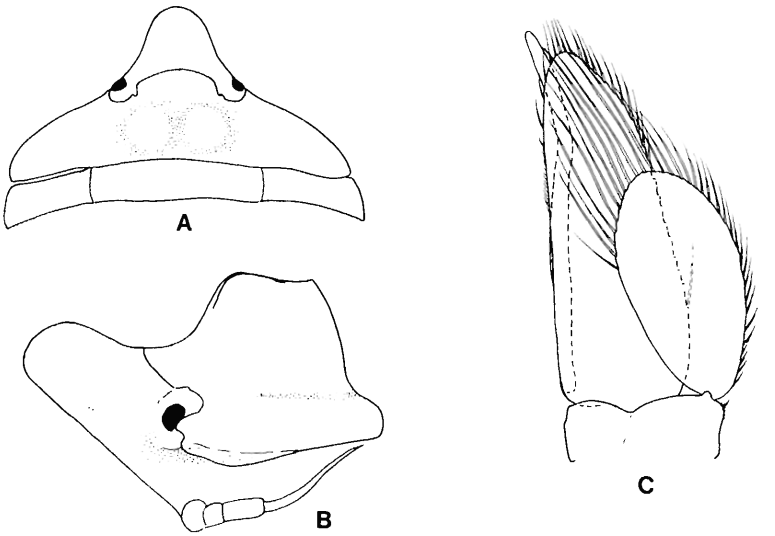

Fig. 6. *Juletta fika*, sp. nov. Male paratype (SAM C4356): *A*, head, pereonites 1 and 2; *B*, head, lateral view; *C*, pleopod 2.

The two adult specimens examined were in brittle condition, and further dissection could not be carried out. The pleopods were examined *in situ*, and appear the same as described for the genus.

Distribution

Recorded from South Australia, Victoria and north-eastern Tasmania, at depths of 6–18 m, on red algae.

Etymology

Derived by combining the first two letters of the names of my sisters Fiona and Katriona.

Margueritta, gen. nov.

Type species: *Margueritta sylviae*, sp. nov., by designation.

Diagnosis

Male

Body flattened, with indistinct longitudinal median ridge. Cephalon with ventral rostral process separating antennule bases. Eyes small, not concealed by pereonite 1. Coxae of pereonites 2–7 fused to tergite, but feeble suture line visible. Pereonite 7 lateral margins not reaching to full width of pereonite 6. Pereonites 6 and 7, and pleon without processes. Pleon with 1 distinct segment, remaining segments fused to pleotelson. Lateral margin of pereonites with scattered setae. Apex of pleotelson with posteriorly directed foramen.

Antennule peduncle articles 1 and 2 not expanded. Mandible unicuspidate, incisor acute; spine row with row of short irregularly truncate spines and row of acute serrate spines; molar prominent, with flat crushing surface, without ridges or serrations; with 3 plumose setae. Lateral lobe of maxillule with 8 stout terminal spines, medial lobe with 3 long fringed setae and single simple seta. Maxilla medial lobe with 4 plumose setae, 4 and 3 large finely serrate spines on middle and lateral lobes, respectively.

Maxilliped palp articles 1–3 and 5 with lateral margins lacking setae; medial margins of articles 2–4 produced.

Pereopods all ambulatory, with distinct secondary unguis on dactylus; pereopods 1 and 2 without produced lobe on proximal part of propodus palm. Paired penes present at posterior of sternite 7, not reaching pleopods.

Pleopod 1 operculate, indurate, pyriform in shape, with plumose marginal setae on distal half of medial margin and apex; endopod with indurate medial portion, remainder lamellar; pleopod 2 endopod nearly twice (1·87) as long as exopod; appendix masculina basal, extending just beyond apex of endopod. Pleopod 3 without transverse suture. Pleopods 4 and 5 with both rami with thickened ridges; exopod of pleopod 5 with 2 scaled lobes. Uropods lamellar, exopod articulating at peduncle.

Female

Mouthparts not metamorphosed. Brood pouch formed from 3 pairs of oostegites arising from pereopods 2, 3 and 4 overlapping at midline; brood held in internal pouches. Pockets absent (see Harrison 1984*a* for terminology). Other than for sexual characters, similar to the male. Some females had more setose lateral margins than did the males.

Remarks

This genus is readily separated from *Juletta* by the presence of a pleotelson foramen, the lack of a produced heel on pereopods 2 and 3 of the males and the mandible having an acute incisor.

Etymology

Named for my mother. Gender is feminine.

Margueritta sylviae, sp. nov.

(Figs 7–9)

Material Examined

Holotype. ♂ (3·8 mm), off jetty at Green I., Rottnest I., W.A., 32°01'S.,115°30'E., 21.xii.1983, among coralline algae at base of jetty, coll. R. T. Springthorpe (AM P41021).

Paratypes. 2♂ (3·0, dissected; 2·9 mm), 5♀ (ovig. 3·4, 3·5; non-ovig. 2·8, 3·0, 3·2 mm), 3 immature (1·8, 1·8, 2·0 mm), same data as holotype (AM P37497).

Description

Male

Body about 1·3× as long as wide; widest at pereonites 3 and 4. Anterior margin of cephalon produced, truncate in dorsal view; pereonite 1 with two ill-defined bosses; pereonites 2–7 progressively decreasing in length. Anterodorsal surface of pleotelson with 2 distinct submedian depressions, between which lies median longitudinal ridge.

Antennule article 1 slightly less than twice as long as article 2, about half total length of peduncle; article 3 shortest; flagellum with 4 articles, about half as long as peduncle. Antenna with peduncle articles 1–3 short, article 5 longest (1·26× length of peduncle).

Mandible palp article 2 with 5 stout serrate setae, article 3 with 9. Maxilliped endite with 4 club-shaped plumose spines and 5 acute plumose spines; medial margins of palp articles 2–5 with 14, 16, 12 and 6 long simple setae respectively.

Pereopod 1 robust, posterior margin of ischium and merus with short setose fringe; distolateral angle of merus, carpus and propodus each with prominent simple spine. Pereopod 2 longer than 1, with more and larger spines on posterior margins; pereopods 2–7 essentially similar, becoming longer and more slender towards posterior.

Pleopod 1 exopod with 9 plumose marginal setae present on distal half of medial margin and 7 on distal $\frac{1}{3}$ of lateral margin; endopod with 11 plumose marginal setae; peduncle medial margin with 3 coupling hooks. Pleopod 2 exopod with 20 long plumose setae, and shorter plumose setae along lateral margin; endopod without setae on medial margin, with setae along distal $\frac{2}{3}$ of lateral margin; appendix masculina without scales on microtrichs, medial margin curving out.

Pleopod 4 exopod with weakly developed scaled apex. Pleopod 5 exopod with 2 distinct apical scaled lobes. Uropod exopod broadly ovate, about 0·9× length of endopod; both rami with marginal setae.

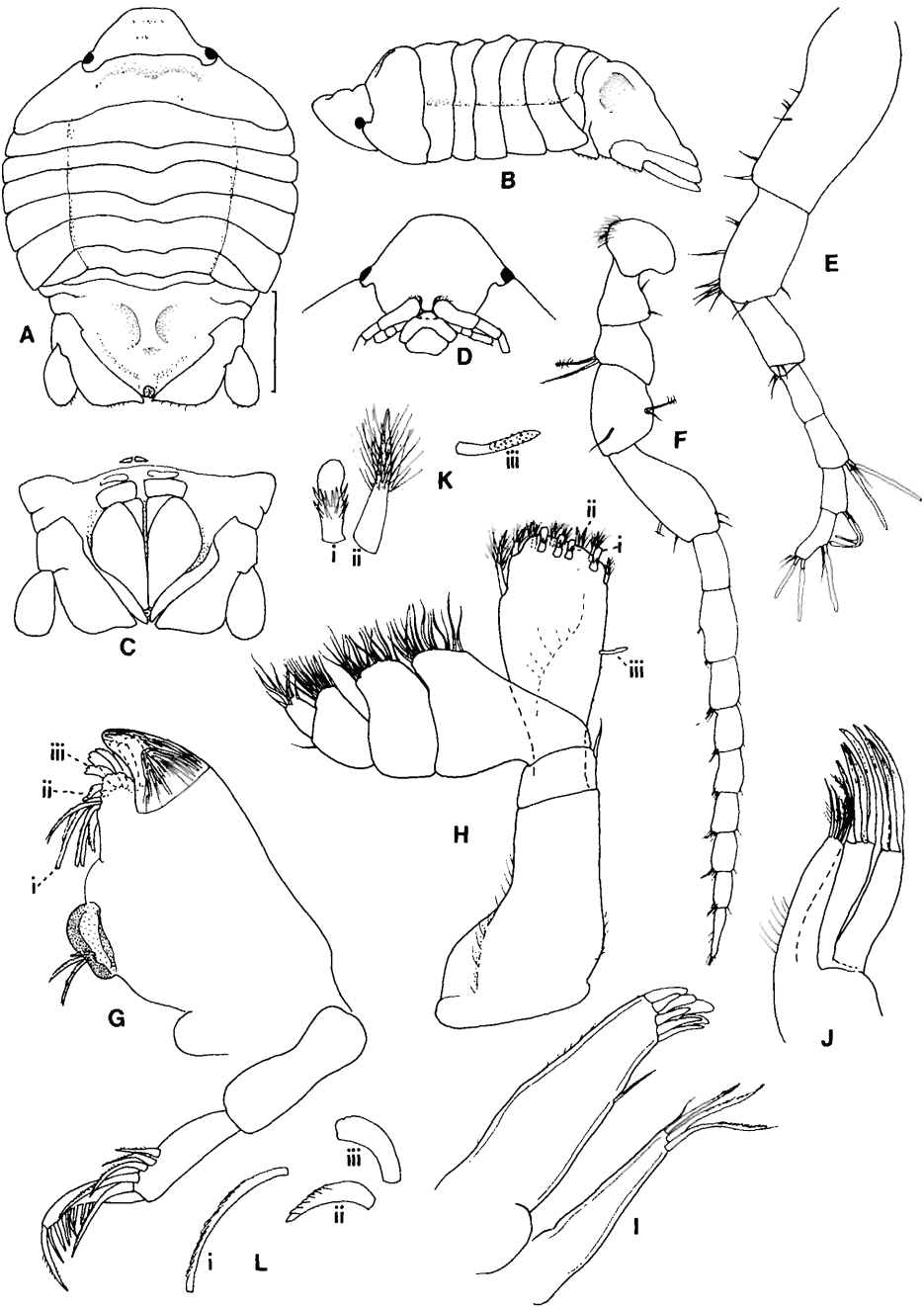

Fig. 7. *Margueritta sylviae*, sp. nov. Figs *A–D*, holotype; remainder, male paratype No. 1, 3·0 mm. *A*, dorsal view; *B*, lateral view; *C*, pleon, ventral view; *D*, frons; *E*, antennule; *F*, antenna; *G*, mandible; *H*, maxilliped; *I*, maxillule; *J*, maxilla; *K*, maxilliped spines i, ii, iii; *L*, mandible spines i, ii, iii. Scale line represents 1·0 mm.

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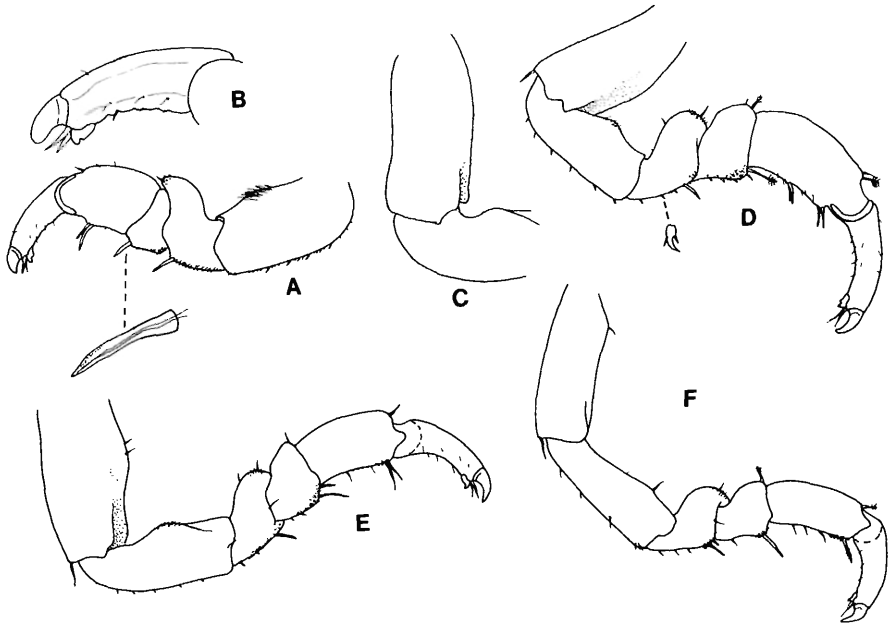

Fig. 8. *Margueritta sylviae*, sp. nov. *A*, pereopod 1; *B*, pereopod 1 dactylus; *C*, pereopod 1 basis; *D*, pereopod 2; *E*, pereopod 6; *F*, pereopod 7.

Female

Similar to the male with exception of the sexual characters, and some females with more abundant setae on uropods and margins of the pereon and pleon.

Colour

Life colour not recorded, pale tan in alcohol, without chromatophores.

Etymology

Named for my daughter Sylvie.

Family **ANCINIDAE** Dana, 1852

Ancininae Dana, 1852: 305.
Ancinini Hansen, 1905: 110.
Anciniidae Tattersall, 1905*b*: 11.
Ancininae.—Iverson, 1982: 250; Kensley and Schotte, 1989: 204.

Type genus: *Ancinus* Milne Edwards, 1840.

Diagnosis

Cephalon fused to pereonite 1 (suture may be present); pereonites 2–7 with coxal plates indicated by suture; pleonites 1–5 indistinguishably fused; pleotelson not fused to pleonite 5.

Frontal lamina fused to clypeus forming epistome; labrum present. Antennule peduncle 3-articled; antennal peduncle 5-articled. Mandible with tridentate cultrate incisor; lacinia mobilis present, elongate and blade-like with multicusped cultrate distal margin; spine row absent; molar process elongate and blade-like with serrate distal margin. Maxillule with medial lobe small, with single simple seta; lateral lobe with about 7–12 spines, some of which are serrate. Maxilla with medial lobe reduced, middle and lateral lobes with long setae. Maxilliped with short rectangular endite, distal margin of which lacks stout spines; palp 5-articled. Pereopod 1 propodus expanded, dactylus prehensile; pereopods 2–7 or 3–7 ambulatory. Pleopods variously modified, pleopods 4 and 5 without plumose marginal

setae, without thick or fleshy ridges; pleopod 5 exopod with scaled patches. Uropods anterolateral in position, endopod absent.

Sexual dimorphism not pronounced.

Remarks

There are only two genera in this family: *Ancinus* and *Bathycopea* Tattersall, 1905*a* (Tattersall 1905*b*). The principal differences between the two genera lie in the morphology of pleopods 1 and 2, and in pereopod 2.

Several apomorphic characters clearly distinguish the Ancinidae. These are the tridentate cultrate mandible incisor, the blade-like lacinia mobilis and molar process, the lack of a spine row, the medial lobe of the maxillule without pectinate spines, the maxilliped endite being short and without stout spines, the pereopod 1 with expanded propodus and the uropod lacking an endopod.

Tattersall (1905*a*, 1905*b*), when establishing the family Ancinidae, was apparently unaware that Dana (1852) had already established the name as the subfamily Ancininae. The family group name was also used by Hansen (1905).

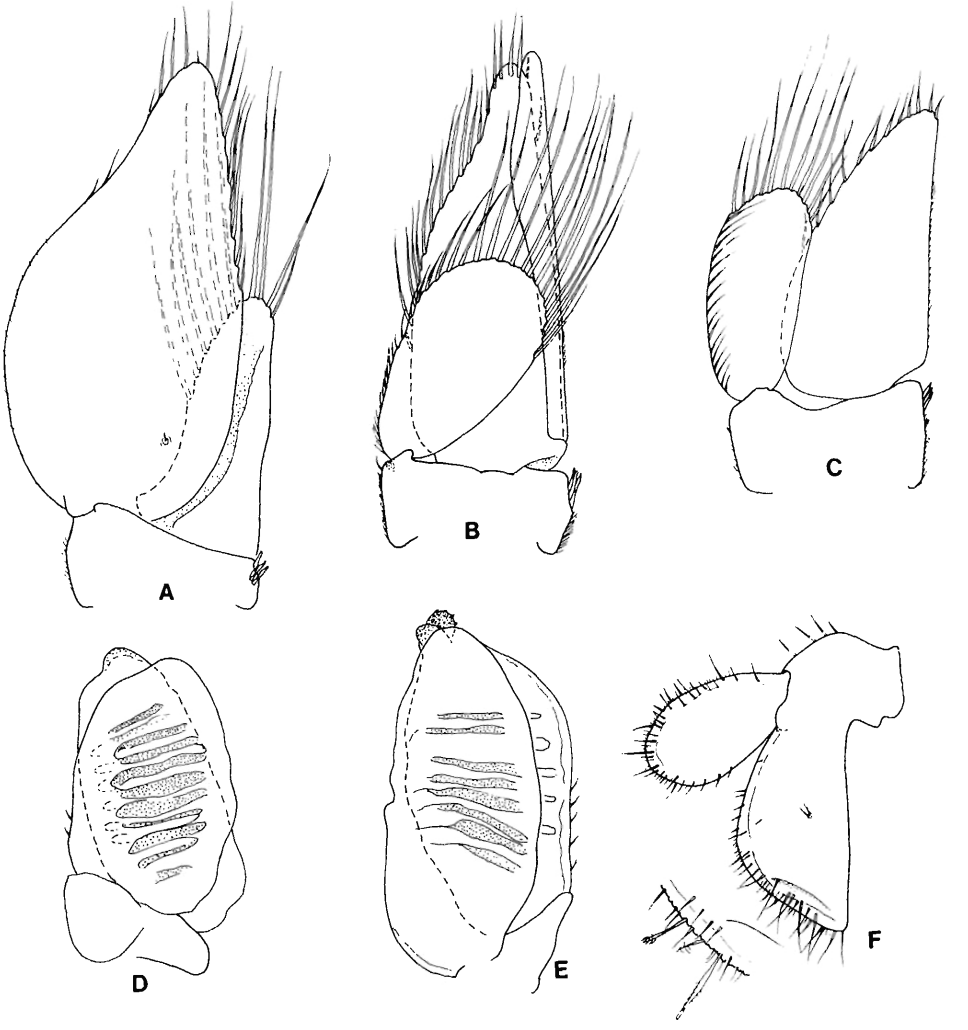

Fig. 9. *Margueritta sylviae*, sp. nov. *A–E*, pleopods 1–5 respectively; *F*, uropod and detail of posterior margin of endopod.

Family **TECTICIPITIDAE** Iverson, 1982

Tecticipitinae Iverson, 1982: 253.

Type genus: *Tecticeps* Richardson, 1897.

Diagnosis

Cephalon not fused with pereonite 1; pereonites 2–7 with coxal plates usually indicated by suture; pleotelson not fused to pleonite 5; pleonites 1–5 fused, but sutures laterally conspicuous.

Frontal lamina fused to clypeus forming epistome; labrum present. Antennule peduncle 3-articled; antennal peduncle 5-articled. Mandible with flat straight-edged cultrate incisor with single small lateral (posterior) cusp; lacinia mobilis with straight or finely serrate distal margin and single small lateral cusp, with spines; spine row absent; molar process elongate, blade-like, with serrate distal margin. Maxillule with medial lobe with 3 long pectinate spines, lateral lobe with about 13 spines on gnathal surface. Maxilla with prominent medial lobe provided with long plumose setae, middle and lateral lobes with long serrate setae. Maxilliped endite elongate, with terminal plumose spines; palp 5-articled, some of which are expanded to form lobes. Pereopod 1 with propodus expanded, pereopod 2 with arched propodus; pereopods 5–7 ambulatory. Pleopods 1 and 2 not operculate; pleopod 4 without and pleopod 5 with thickened folds. Uropods anterolateral in position, biramous.

Sexual dimorphism not pronounced.

Remarks

The species of this monogeneric family have most recently been documented by Kussakin (1979), who listed 11 species. There exists no recent detailed description of species of *Tecticeps*.

The distribution of character states within this genus is unclear. Existing figures for the species of the genus, reproduced in Kussakin (1979), are not comprehensive. In one instance, the mandible is shown with what could be a spine row; in another, the lacinia mobilis is illustrated as spinose. *Tecticeps anophthalmus* Birstein (Kussakin 1979, fig. 224) is illustrated with pleopod 5 lacking thickened ridges, in contradiction to the diagnosis given by Iverson (1982); furthermore, the exopod of pleopod 4 is illustrated as having plumose marginal setae. However, several characters can be identified as apomorphic, including some that are shared with the Ancinidae. These characters are the unicuspidate incisor and lacinia mobilis, the elongate blade-like molar process (also Ancinidae), the expanded propodus of pereopod 1 (also Ancinidae), and the subchelate propodus of pereopod 2. The pleon clearly shows four or five segments with prominent sutures.

The mouthparts and anterior pereopods distinguish this family from the Sphaeromatidae.

The Tecticipitidae are distinguished from the Ancinidae by the unicusped mandible incisor, by the lacinia mobilis being broad (as opposed to elongate and blade-like), and by having plumose spines on the maxilliped endite, prominent medial lobes on the maxillule and maxilla and biramous uropods.

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