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NEW SPECIES OF *LYNSEIA* AND TRANSFER OF THE GENUS TO LIMNORIIDAE (CRUSTACEA: ISOPODA)

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Abstract

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Two new species of *Lynseia* are described: *L. annae*, in southern and central Western Australia, was taken from burrows in leaves of seagrasses of the thin-leaved *Posidonia australis* group: *P. australis* and *P. sinuosa*; *L. dianae*, in southern Western Australia and western South Australia, from the thick-leaved *Posidonia ostenfeldii* group: *P. coriacea*, *P. ostenfeldii* and *P. robertsoniae*. The type species, *L. himantopoda*, is also recorded from Western Australia, in burrows in *Heterozostera tasmanica*. On the basis of variability in mandibles and uropods the diagnosis of the genus is widened. Similarity of the limbs of the new species to those of *Limnoria* require it to be transferred to Limnoriidae White. The family Lynseiidae Poore is thereby placed in synonymy with Limnoriidae. A key to genera is presented.

Introduction

The discovery of two species of isopods similar to *Lynseia himantopoda* Poore, 1987, only member of the family Lynseiidae Poore, 1987, prompted a re-examination of this family and its relationships to Limnoriidae White. In this contribution the family status of the Lynseiidae is shown to be unsustainable and its only genus is placed in the larger family. A key to genera is presented, replacing that of Cookson (1991) who reviewed the Limnoriidae in detail.

All species of limnoriids are borers of plant material: *Paralimnoria* in wood, *Limnoria* in wood, algae or seagrass and *Lynseia* in seagrasses. It is tempting to suggest that the three species of *Lynseia*, which are confined to southern Australia, arose there from a seagrass-eating, *Limnoria*-like ancestor. By elongation and other adaptations they became obligate seagrass borers. Two species of *Limnoria* are recorded from seagrass in southern Australia, *L. agrostisa* Cookson and *L. raruslima* Cookson.

The three species of *Lynseia* are host specific (Brearley and Walker, 1993). *Lynseia himantopoda* is confined to the narrow-leaved *Heterozostera tasmanica* and is distributed with this species across southern Australia. The two new species burrow in the broader leaves of species of *Posidonia*. *Posidonia australis* Hook. *f.* and *P. sinuosa* Cambridge and Kuo belong to the *Posidonia australis* species group which have thin flexible leaves and inhabit sheltered waters (Cambridge and Kuo, 1979). Both are infested by *Lynseia annae*. *Posidonia coriacea*, Kuo and Cambridge *P. ostenfeldii* den Hartog and *P. robertsoniae* Kuo and Cambridge are members of the *Posidonia ostenfeldii* species group characterised by narrower leaves, thicker in cross-section and inhabiting areas of stronger wave action (Kuo and Cambridge, 1984). Both are mined by *L. dianae* and the burrows are more difficult to detect than in the other species group of *Posidonia*. Seagrass workers in the Mediterranean, where *Posidonia* also exists, have not reported leaf miners.

Limnoriidae White **comb. nov.**

Limnoriadae White, 1850: 68.

Limnoriidae. — Cookson, 1991: 153 (modern diagnosis and synonymy).

Lynseiidae Poore, 1987: 258. — Bruce, 1988: 346 ff.

Diagnosis. Body semicircular in cross-section, elongate, 3–15 times as long as wide. Head more or less spherical, freely articulating with pereonite 1. Anterior margin of pereonite 1 directed upwardly or level with body, overlapping head posteriorly. Pleonites 1–5 free. Pleotelson with lateral crests. Antennae 1 contiguous, with scale (except *Lynseia himantopoda*). Antennae 2 lateral or ventrolateral to antenna 1. Eyes lateral. Frontal lamina absent. Clypeus transversely elongated, reaching lateral margin of antenna 2 articulation. Labrum circular. Mandible with palp 3-articulate or reduced to seta; incisors acute; lacinia mobilis small; spine row present (left spine row absent in *Lynseia dianae*); molar absent. Maxilla 1, outer lobe apex with 4–5 smooth lateral setae and 5 serrated medial setae.

Maxilla 2: inner lobe with simple setae plus large medial plumose oblique seta; 3–4 proximally plumose setae on middle lobe; 2 proximally plumose setae on outer lobe. Maxilliped narrow; epipod present; endite long. Pereopods ambulatory; carpus of pereopods 6 and 7 and often of others with distal comb-seta. Pereopod 1 propodus with 2 comb-setae posterodistally (thickened setae on *Lynseia dianae*). Pereopod 7 longer than other pereopods. Pleopods flabelliferan. Uropod ventrolateral; rami terminal, oval or circular in cross-section; exopod shorter than endopod, often with corneous apex.

Remarks. The diagnosis of the Limnoriidae given by Cookson (1991) is not seriously disrupted by the admission of the species of *Lynseia*, a genus previously assigned to its own family. The new diagnosis accommodates the greater elongation and narrowing of the body and some limbs found in *Lynseia*.

The differences between the Lynseiidae and Limnoriidae discussed by Poore (1987) are shown now not to be real. The two additional species of *Lynseia* share more features with species of *Limnoria* and *Paralimnoria* than does the unusual type species *Lynseia himantopoda*. Of the five apomorphies of *Lynseia* listed by Poore three are autapomorphies of *L. himantopoda*: lateral coxal plates fused to tergite, mandibular palp absent, loss of one ramus on pleopod 5. The reduced number of articles in the maxillipedal palp and elongate pereopods 6 and 7 are true for the genus but to a lesser extent in the new species.

The family Limnoriidae now includes three genera: *Limnoria*, *Paralimnoria* and *Lynseia*. Bruce (1988) originally tentatively placed his new genus and species *Hadromastax merga* in the Limnoriidae on the basis of head shape and articulation, antenna 1 and 2, mouthparts, pereopods and pleopods. Later Bruce and Müller (1991) removed *Hadromastax* to its own family recognised by several unique characteristics of the mandible, maxilla 1, maxillipedal epipod, free coxae 1, uropod, pereonite 1, and pleonal structure.

Phycolimnoria Menzies, 1957, initially a subgenus of *Limnoria* Leach, 1814, was synonymised with it by Cookson (1991) after a phylogenetic analysis.

Limnoria and *Paralimnoria* were diagnosed in detail by Cookson (1991), all 51 species were listed, all Australasian species described, and their biology and literature discussed.

Key to genera of Limnoriidae

1. Body more than 6 times as long as wide; pereopods 6 and 7 much longer than pereopod 5; mandibular palp of at most 1 minute article; maxillipedal palp of 1 or 3 articles ..... *Lynseia* Poore
— Body less than 5 times as long as wide; pereopods 6 and 7 not significantly longer than pereopod 5; mandibular palp of 0–3 articles; maxillipedal palp of 5 articles 2
2. Uropodal rami elongate, both with corneous apex; antenna 1 flagellum of 5 articles; pereopod 1 secondary unguis trifid ..... *Paralimnoria* Menzies
— Uropodal exopod much shorter than endopod, only exopod with corneous apex; antenna 1 flagellum with 4 or fewer articles; pereopod 1 secondary unguis bifid, simple or sometimes with spinules ..... *Limnoria* Leach

See this work for a key to species of *Lynseia* and Cookson (1991) for keys to world species of *Paralimnoria* and *Limnoria*.

Lynseia Poore

Lynseia Poore, 1987: 259.

Diagnosis. Body 7–15 times as long as wide. Pleonite 1 epimeron square, extending ventrally as far as in other pleonites. Head longer than wide. Pleotelson elongate. Antenna 1 flagellum of 2–3 articles. Antenna 2 ventrolateral to antenna 1; flagellum of 1 article. Mandibular palp of 1-article or seta only; laeinia mobilis reduced (or absent on right mandible: *L. himantopoda* and *L. dianae*); lacking rasp and file (as are seen in *Limnoria*). Maxilla 1 outer lobe with 4 or 5 smooth similar apical spiniform setae. Lateral plates of coxae 2–7 posteriorly rounded. Pereopods with strong secondary unguis. Pereopods 6 and 7

elongate, pereopod 7 carpus as long or longer than basis. Pleopod peduncles without medial projection. Pleopod 5 with exopod reduced or absent, rami without plumose setae. Uropodal exopod less than half as long as endopod; endopod with 3 separate single or groups of brush setae. (Eggs almost as wide as body, carried in single longitudinal row.)

Remarks. Lynseia is most readily distinguished from *Limnoria* and *Paralimnoria* by its thin and elongate body shape, epimeron of pleonite 1 square and as long as epimeron 2 (short and acute in other genera), long pereopods 6 and 7 (especially the elongate carpus), reduced maxillipedal palp, reduced antennae 2 flagellum, and reduced pleopod 5 exopod. Pereopod 7 always points posteriorly, whereas in *Limnoria* it is often found anteriorly directed.

All species of *Lynseia* are small, rarely more than 2.5 mm long, and are found in burrows in the leaves of seagrasses. Rare specimens are found free-swimming in seagrass beds but the period spent moving between host plants is not known.

The genus is so far confined to southern and central western Australia; there have been no records from extensive seagrass beds in eastern Australia nor from other continents.

Key to species of *Lynseia*

1. Body 15 times as long as wide; pereopods 6 and 7 about 4 times as long as pereopod 4; maxillipedal palp of 1 article ..... *Lynseia limantopoda*
— Body less than 9 times as long as wide; pereopods 6 and 7 less than 3 times as long as pereopod 4; maxillipedal palp of 3 articles 2
2. Pleotelson with strong lateral and anterior crests; uropodal exopod with corneous apex; mandibular palp of 1 article bearing 2 setae ..... *Lynseia annae*
— Pleotelson without strong lateral and anterior crests, convex dorsally; uropodal exopod laminar; mandibular palp reduced to only 2 setae ..... *Lynseia dianae*

Lynseia annae sp. nov.

Figures 1–3

Lynseia sp. 2. — Brearley and Walker, 1993: 417–425, fig. 1b.

Material examined. Holotype: Western Australia. Nancy Cove, Rottnest I. (32°0'S, 115°30'E), 3 m, *Posidonia sinuosa* leaves, A. Brearley, 12 Dec 1990, NMV J17242 (female, 1.45 mm).

Paratypes: collected with holotype, NMV J17246, (1 male, 2 slides); J17247 (1 male, 1 slide); J17248, (56 + 4 ovigerous females); J17245, (1 male, 3 slides). Thomson Bay, Rottnest I. (32°0'S, 115°33'E), 3 m, *Posidonia australis* leaves, A. Brearley, 22 Aug 1991, NMV J13247 (1 male, 1.6 mm, 2 slides), J13248 (48 specimens). S of Penguin I., Warnbro Sound (32°20'S, 115°43'E), 2 m, *Posidonia sinuosa* leaves, T. Evans, 11 Nov 1990, NMV J17243 (1 male, 1.55 mm, 1 slide), WAM 53-93 (3 males, 1.2–1.5 mm, 3 females, 1.8–2.1 mm). Cliff Head, Dongara (29°32'S, 114°59'E), 2.5 m, *Posidonia sinuosa* leaves, C. Manning, 27 Feb 1991 NMV J13245, (1 male, 1.58 mm, 3 slides), J13246 (11 specimens). Dunsborough, Geographe Bay (33°37'S, 115°18'E), 1 m, *Posidonia sinuosa* leaves, A. Brearley, 11 Jul 1991 NMV J13243, (1 immature, 2 slides). Geraldton, outside marina (28°46'S, 114°37'E), 9 m, *Posidonia sinuosa* leaves on rubble, T. Carruthers and G. Kendrick, 14 Aug 1991, WAM 54-93 (9 specimens).

South Australia, Ceduna (32°08'S, 133°41'E), 20 m off swimming beach, 1–1.5 m, *Posidonia australis* leaves, A. Brearley, 15 Jan 1993, NMV J31669 (8 specimens), WAM 57-93 (8 specimens).

Description. Body, pale yellow in preserved material, about 7 times as long as wide; pereonites shorter posteriorly; pleon about 0.4 of total length; pleonite 5 0.4 times as long as pleotelson. Pereonite 2 with fine anterodorsal transverse sculpture; pleonite 5 with minute dorsal tubercles. Pleotelson with concave oblique face about 1.4 times as long as wide, bordered by strong irregularly denticulate ridge laterally (lateral crests) to near midanterior margin; dorsal surface with partially fused pectinate scales; lateral surface anterior to base of uropod with fine vertical ridges; midposterior margin with scale spikes and vestigial sheathed setae between 2 larger stout setae.

Clypeus produced forward of antennae by distance equal to width of antenna 1 peduncle. Antenna 1 with small scale bearing 2 simple setae; second flagellar article with about 8 aesthetascs, third article with 1 aesthetasc and 3 simple setae. Antenna 2 about 0.6 times length of antenna 1; flagellum single article with 5 distal setae. Mandibular palp of 1 article bearing 2 apical simple setae; right mandible incisor with subapical tooth; lacinia mobilis small; spine row

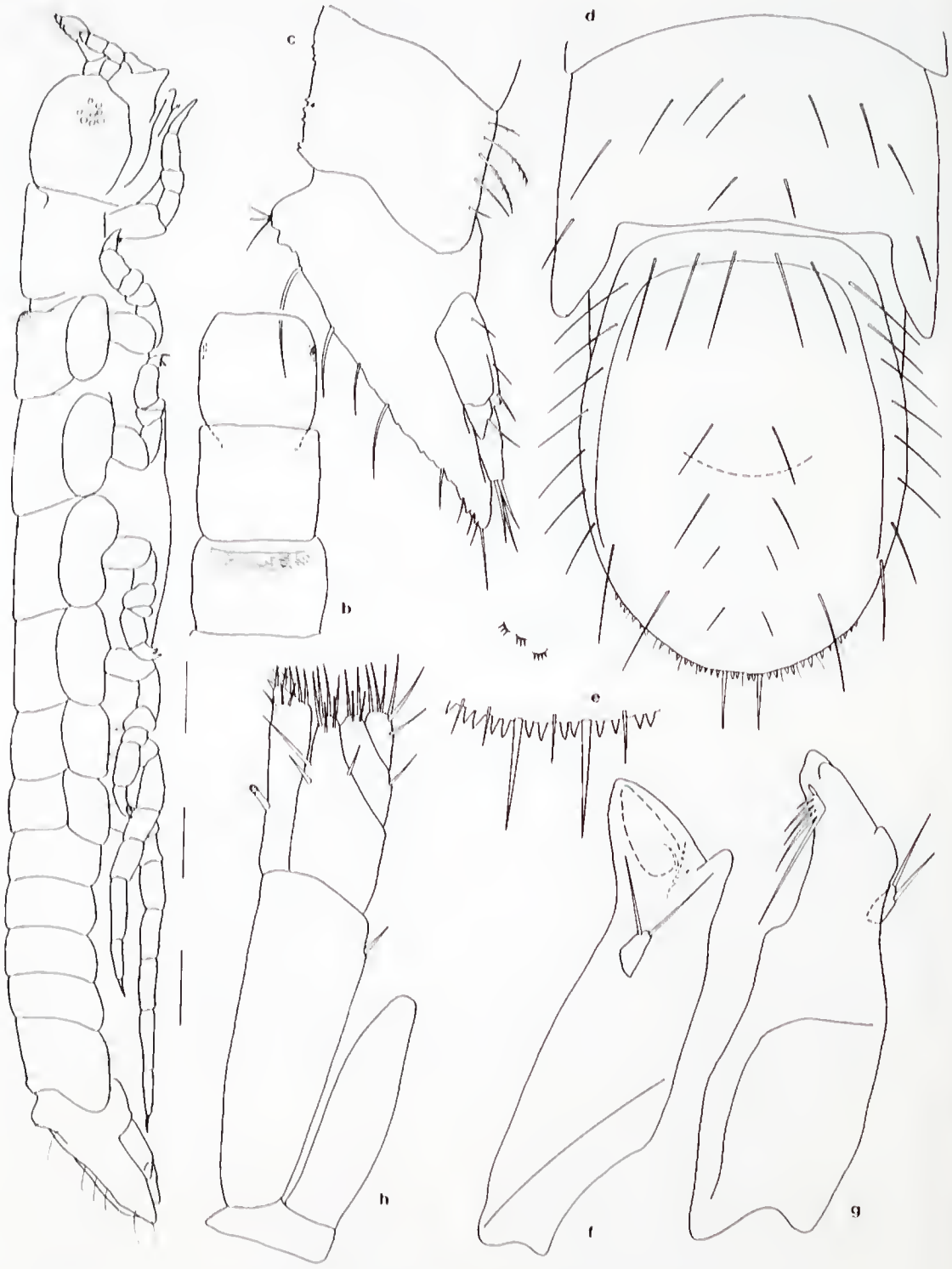

Figure 1. *Lynscia annae* sp. nov. a, habitus. b, head, pereonites 1 and 2. c, d, pleonite 5 and pleotelson. e, margin of pleotelson. f, g, left and right mandibles. h, left maxilliped. a, b, male, NMV J13245; c, e, female, NMV J17242; d, male, NMV J13247; f–h, male, NMV J17243. Scale lines = 0.1 mm.

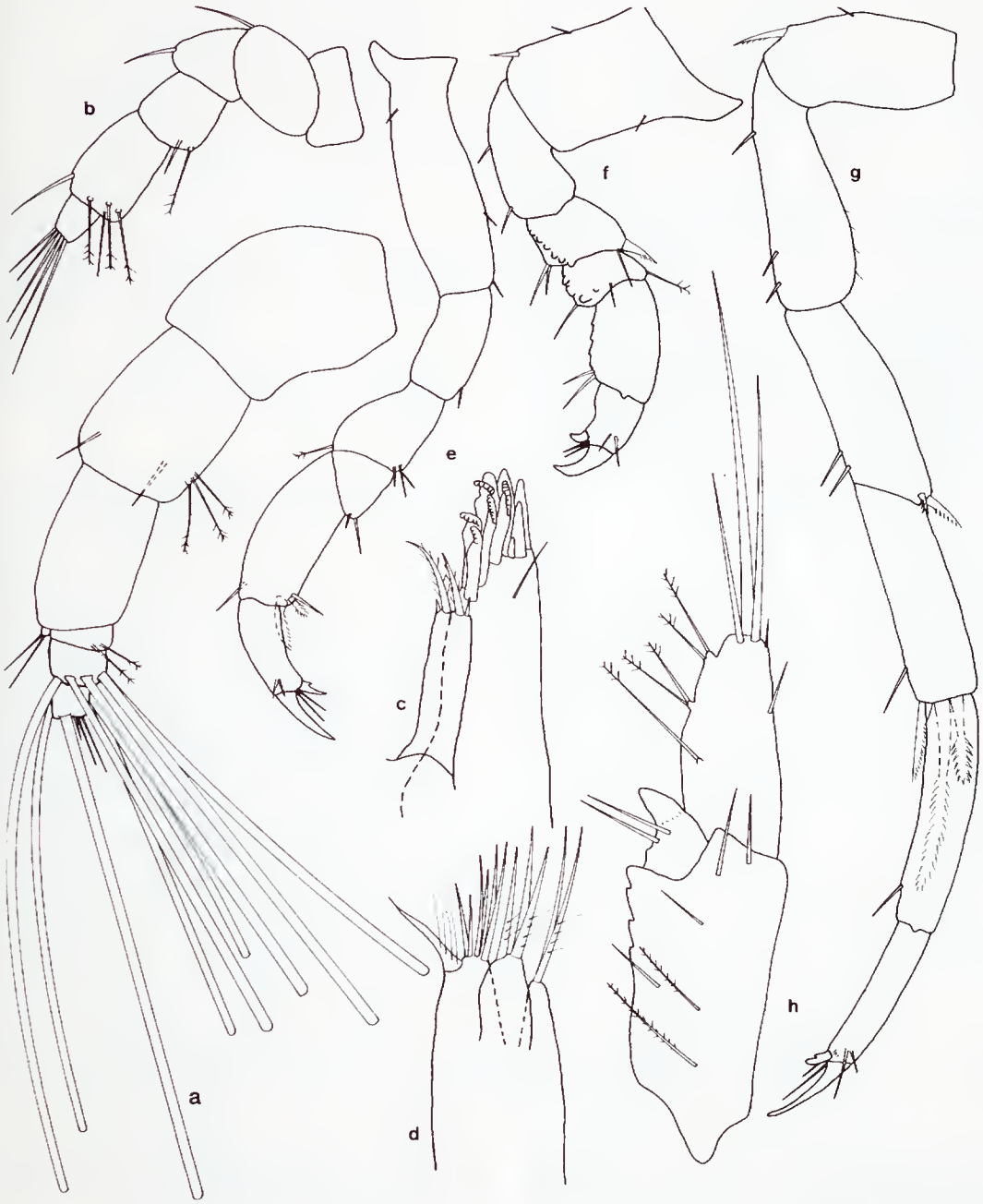

Figure 2. *Lynseia annae* sp. nov. a, b, antennae 1, 2. c, d, left maxillae 1, 2. e, f, g, pereopods 1, 4, 7. h, uropod. a–g, male, NMV J17245; h, female, NMV J17242.

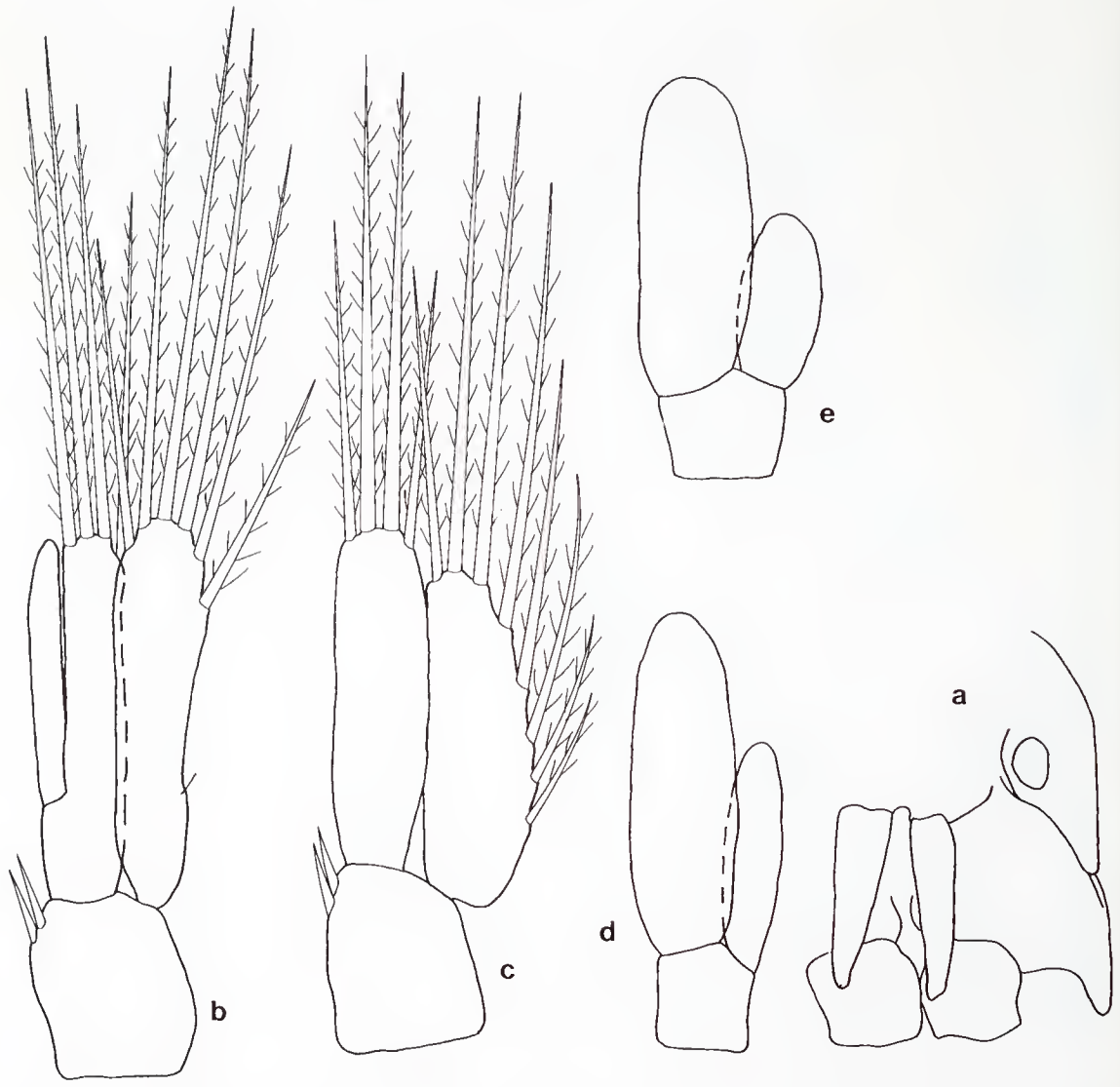

Figure 3. *Lynseia annae* sp. nov. a, pereonite 7 and pleonite 1 showing penes and peduncles of pleopods 1. b–e, pleopods 2, 4, 5 and 5. a, male, NMV J13245; b–d, male, NMV J17245; e, male, NMV J17246.

with 5 spines on right mandible, 2 on left. Maxilla 1: inner lobe with 2 short setae and 2 long plumose setae; outer lobe with 10 apical setae, mesial ones denticulate, one very short. Maxilla 2 inner lobe with 7 setae, medial one long; middle and outer lobes shorter than inner lobe, with 3 and 2 setae respectively. Maxillipedal epipod elongate, 3.7 times as long as wide, not reaching base of palp, without setae; palp reaching as far as endite, of 3 articles; endite with 3 curved pappose setae lateral to 2 distomedial pappose setae, with coupling hook.

Coxae 2–7 with clear lateral sutures. Pereopod 4 shortest; pereopod 1 1.3 times as long, pereopod 5 1.4 times as long, pereopod 6 2.0 times as long, and pereopod 7 2.2 times as long as pereopod 4. Secondary unguis of pereopods 1 and 7 bifid. Pereopod 7 carpus with 3 comb-setae.

Penes 4 times as long as width at base, tapering, separate, attached to posterior margin of ventral plate of pereopod 7.

Oostegites on pereopods 3 and 4.

Pleopod 1 with 3 coupling hooks, pleopods 2–4 with 2 coupling hooks. Exopod plumose setae

mostly apical on pleopods 1 and 2, apical and lateral on pleopods 3 and 4. Pleopod 2 with plumose setae up to 1.3 times as long as exopod; appendix masculina reaching endopod tip, articulating proximal to midlength of endopod, apically rounded. Pleopod 5 with 2 rami, articulation of endopod anterior to exopod, exopod about 0.6 times as long as endopod, endopod 0.9 times as long as endopod of pleopod 2, peduncle without lateral seta.

Uropodal peduncle with posterolateral tubercles; endopod 0.7 times as long as peduncle; exopod 0.4 length of endopod with 1+2+2 brush setae laterally, with corneous apex.

Etymology. For Anne Brearley, whose work on the biology of these isopods has discovered so much.

Distribution. Geraldton, Western Australia, to Ceduna, South Australia; from burrows in leaves of *Posidonia australis* and *P. sinuosa*; to 9 m depth.

Remarks. *Lynseia annae* is immediately recognisable from its body proportions and the pleotelson which develops lateral and anterior crests in more mature specimens. Other diagnostic characters are the corneous apex on the uropod exopod, lack of a seta on the maxilliped epipod, the large separate penes, three coupling hooks on pleopod 1, only 2 large pappose setae on the inner lobe of maxilla 1, and mandibular palp of one article. The rami of pleopod 5 were narrower in one of the individuals dissected than the other (Fig. 3d, e).

The ornamented pleotelson was usually held strongly inclined to the remaining body, apparently to obstruct the burrow. In seagrass leaves they were often found in pairs, with female deeper in the burrow. The animal was seen mostly with its lateral margins touching the thinnest surface of the leaves, feeding only on the mesophyll cells between the epidermis of the emergent leaf. Up to 75% of leaves were burrowed at Rottnest I. Burrows may branch and minor branches contained smaller individuals (Brearley and Walker, 1993).

Four ovigerous females were found, all with eggs in a single longitudinal row (3–4 eggs each). In *Limnoria* and *Paralimnoria* there are usually several eggs abreast.

The species has a wide distribution in central and south-eastern Western Australia and has been found in western South Australia. The species was not found in searches in Shark Bay, Western Australia nor near Sydney, NSW where *P. australis* exists (A. Brearley, pers. comm.).

Lynseia dianae sp. nov.

Figures 4, 5

Lynseia sp. 3. — Brearley and Walker, 1993: 417, 424–425.

Material examined. Holotype: Western Australia. Lal Bank, off Marmion, Perth (31°50'S, 115°45'E), 4 m, *Posidonia coriacea* leaves, C. Manning, 13 Mar 1991, NMV J17253 (male, 1.9 mm).

Paratypes: collected with holotype, NMV J13238 (1 female with embryo), J13239 (1 male, 1.95 mm), J17251 (1 male, 2.0 mm, 1 slide), J17252 (1 female, 1.8 mm, 1 slide), J17254 (10 males, 1.6–2.0 mm; 19 females and juveniles, largest 2.6 mm). Bremer Bay (34°24'S, 119°26'E), *Posidonia ostenfeldii* leaves, T. Carruthers, 3 Jun 1991, NMV J17249 (1 male, 1.85 mm, 1 slide), J17250 (2 males, 1.5–1.9 mm, 7 females, 1.6–2.3 mm). Little Boat Harbour, Bremer Bay (34°24'S, 119°26'E), *Posidonia robertsoniae* leaves, T. Carruthers, 12 Jan 1992, WAM 52-93 (8 specimens).

Description. Body, pale yellow in preserved material, about 8–9 times as long as wide; pereonites shorter posteriorly; pleon about 0.4 of total length. Pleonite 5 0.5 length of pleotelson. Pereon generally smooth. Pleotelson mid-dorsally convex, with lateral crests weakly raised; dorsal surface structure without scales, posterior margin without setae or scale spikes.

Clypeus produced forward of antennae by distance equal to width of antenna 1 peduncle. Antenna 1 with minute scale or absent; flagellum of 2 articles, second article with about 4 aesthetascs and 3 simple setae. Antenna 2 about 0.85 times as long as antenna 1; flagellum single article with 5 distal setae. Mandibular palp lacking, replaced by 2 simple setae; right incisor with subapical tooth; lacinia mobilis absent; spine row with 6–8 spines on right, absent on left. Maxilla 1 inner lobe with 3 plumose setae; outer lobe with 9 apical setae. Maxilla 2 inner lobe with 6 simple setae plus longer oblique plumose seta, middle and outer lobes as long as inner lobe, with 4 and 2 setae respectively. Maxillipedal epipod elongate, 5 times as long as wide, not reaching base of palp, with 1 seta; palp reaching as far as endite, with 3 articles; endite with 3 curved pappose setae lateral to 2 distomedial pappose setae, with coupling hook.

Coxae 2–7 with clear lateral sutures. Pereopod 1 propodus with 2 posterodistal comb-setae or 2 basally thickened simple setae. Pereopod 4 shortest; pereopod 1 1.7 times as long, pereopod 5 2.3 times as long, pereopods 6 and 7 2.7 times as long as pereopod 4. Secondary unguis of

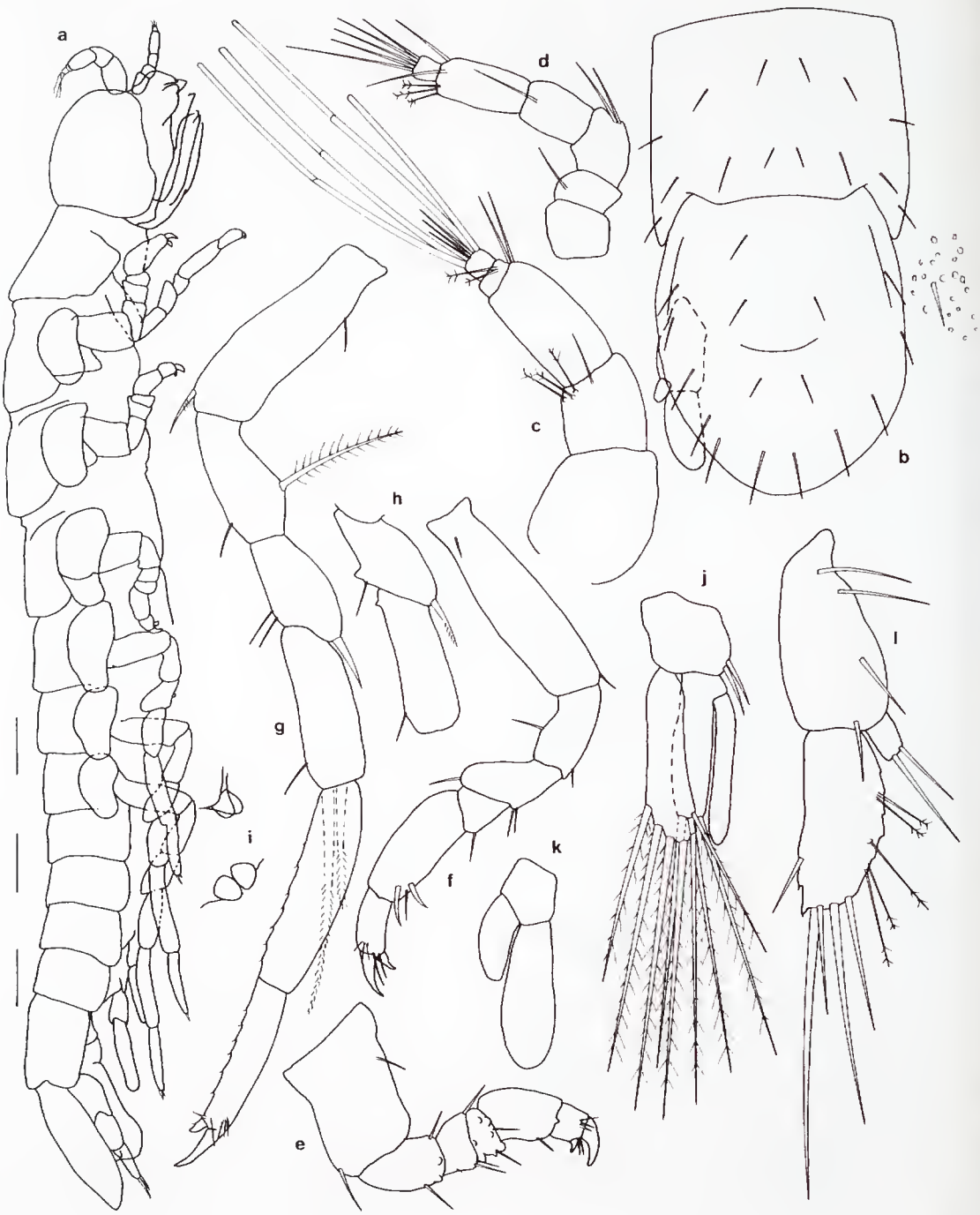

Figure 4. *Lynseia dianae* sp. nov. a, habitus. b, pleonite 5 and pleotelson (plus detail of surface). c, d, antennae 1, 2. e, f, g, pereopods 1, 4, 7. h, merus and carpus of pereopod 7. i, penes, lateral and ventral views. j, k, pleopod 2, 5. l, uropod. a, i, male, NMV J13239; b, e–g, j, l, male, NMV J17251; c, d, h, male, NMV J17249; k, female, NMV J17252. Scale lines = 0.1 mm.

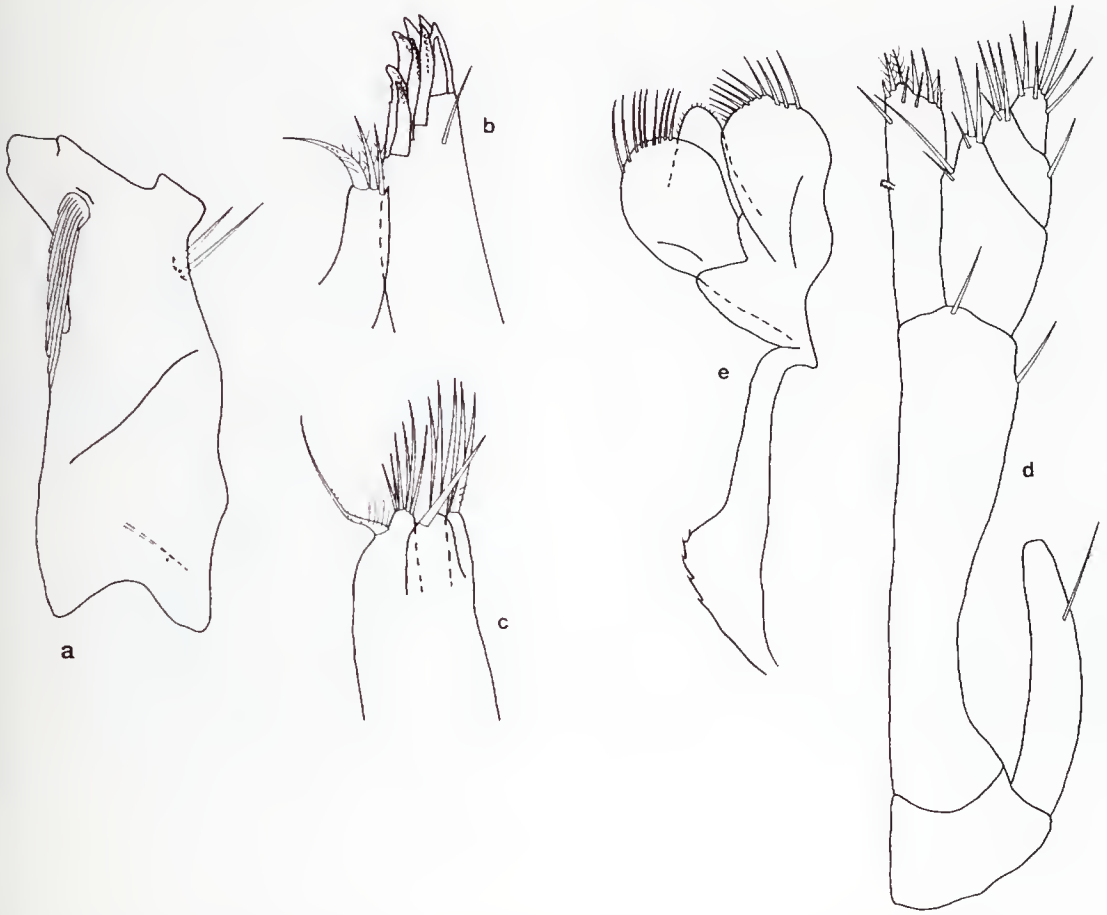

Figure 5. *Lynseia dianae* sp. nov. a, right mandible. b, c, left maxillae 1, 2. d, left maxilliped. e, labium. a–e, male, NMV J17251; e, male, NMV J17249.

pereopods 1 and 7 simple, with posterior setule. Pereopod 7 carpus with 2–3 comb-setae, merus and carpus with or without tubercle. Ischium of pereopods 5–7 with large anterior plumose seta.

Penes short, less than twice as long as broad, separate but contiguous.

Oostegites on pereopods 3 and 4.

Pleopods 1–4 with 2 coupling hooks. Exopod plumose setae mostly apical on pleopods 1 and 2, apical and lateral on pleopods 3 and 4. Pleopod 2 with plumose setae up to 1.5 times as long as exopod; on male appendix masculina reaching beyond endopod tip, articulating proximal to midlength of endopod. Pleopod 5 with 2 rami, articulation of endopod anterior to exopod, exopod about 0.5 times as long as endopod, endopod 0.9 times as long as endopod of pleopod 2, rami without setae.

Uropod peduncle without posterolateral tubercles; endopod 0.9 times as long as peduncle; exopod 0.2 length of endopod, laminar, with 2 apical setae.

Etymology. For Diana Walker whose concern for the health of seagrasses has led to the discovery of these two new species.

Distribution. South Western Australia, from Perth to Bremer Bay; in burrows in leaves of *Posidonia coriacea*, *P. ostenfeldii* and *P. robertsoniae*.

Remarks. The key feature separating *Lynseia dianae* from *L. annae*, which has only slightly more elongate form, is the shape of the pleotelson; well developed lateral crests are absent and the dorsal area is slightly convex. In addition, it differs in possessing a simple secondary unguis on pereopod 1, lacking setae and scale spikes on

the posterior margin of the pleotelson, possessing a simple seta on the maxilliped epipod, only two coupling hooks on pleopod 1, having a laminar uropodal exopod, having three plumose setae on the inner lobe of maxilla 1, and in lacking a mandibular palp.

Lynseia dianae differs from both other species by: large plumose seta on ischium of pereopods 5–7, longer basis on pereopod 7, narrow maxilliped epipod, very short separate penes, only two flagellar articles on antenna 1, and four setae on the middle lobe of maxilla 2.

It differs from *L. himantopoda* in having a coupling hook and more apical setae on the maxillipedal endite, three not one articles on the maxillipedal palp, pleopods 3–4 with both lateral and apical plumose setae, pleopod 5 with two rami.

On some specimens examined (from slides and in situ), the antennal scale was detected while in others it was so small that it could not be certain that it was separate from the peduncle. One ovigerous female carried a single embryo 0.23 the length of the whole animal, in two pairs of oostegites on pereopods 3 and 4.

Only 17% of leaves of the host plants at Marmion were mined (Brearley and Walker, 1993).

Lynseia himantopoda Poore

Figure 6

Lynseia himantopoda Poore, 1987: 259–263, figs 1–4. — Brearley and Walker, 1993: 417, 420, 425.

Material examined. Victoria. Rhyll spit, Phillip I. (38°28'S, 145°19'E), artificial seagrass, G. Edgar, 29 Sep 1991 NMV J13099 (6 specimens).

South Australia. Port Macdonnell Pier (38°03.5'S, 140°42.1'E), 0.5 m, *Heterozostera tasmanica* leaves, G. C. B. Poore and R. S. Wilson, 13 May 1990 (stn CRUST 81), NMV J20403 (1 male).

Western Australia. Thomson Bay, Rottnest I. (32°0'S, 115°33'E), 2 m, *Heterozostera tasmanica* leaves, A. Brearley, 23 Jan 1991, WAM 58-93 (17 specimens). Princess Royal Harbour, E side (35°03'S, 117°53'E), 1.5 m, *Posidonia* leaves, G. Edgar, 28 Jan 1991, NMV J21806 (1 male).

Distribution. Southern coast of Australia, central Victoria to region of Perth, Western Australia; burrows in leaves of *Heterozostera tasmanica*; to about 2 m depth.

Remarks. New material extends the range of this species to southern Western Australia where it is confined to *Heterozostera tasmanica* as it is in the eastern states. Brearley and Walker (1993) recorded 38% of leaves with burrows near the leaf sheath at Rottnest I. The burrows were

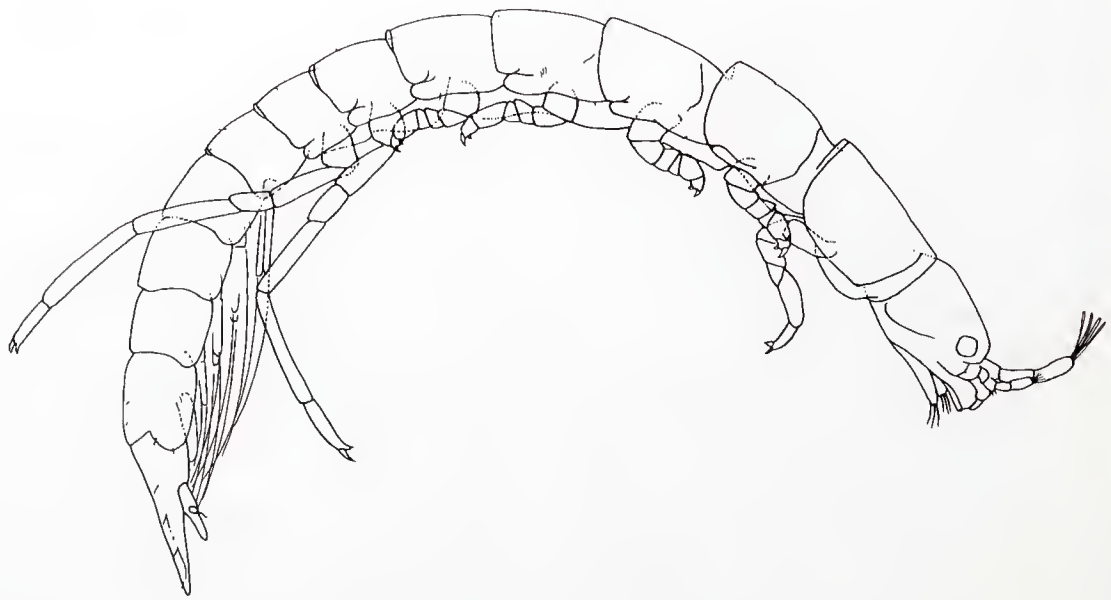

Figure 6. *Lynseia himantopoda* Poore, 1987. Habitus (from Poore, 1987).

confined to mesophyll tissue, the epidermis being untouched.

Dissection of new material showed that it does have an inner lobe on maxilla 1 like that in other species (not figured by Poore, 1987) and confirmed the absence of exopod on pleopod 5.

Acknowledgements

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