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Chapter 8. Suborder Limnoriidea

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Abstract

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Diagnoses and illustrated keys are provided for three families and five genera of marine isopods of the suborder Limnoriidea. The ecology and distribution of each taxon are discussed with citation of literature critical for further investigation.

Keywords

Hadromastacidae, Keuphyliidae, Limnoriidae, dichotomous keys

Introduction

The Limnoriidea Brandt and Poore *in* Poore, 2002 include three families whose similarity was recognised by Bruce (1988) and Wägele (1989). While the Limnoriidae are all wood, algal or seagrass borers and therefore herbivores, the other two families are not. Both are flattened and, as far as is known, free-living. The group is unified by the absence of a mandibular molar and long maxillipedal endite, the maxilliped usually being slender.

The suborder name was introduced in Poore (2002) and justified in a cladistic analysis by Brandt and Poore (2003). The Limnoriidea include three families, of which the Limnoriidae includes the junior synonym Lynseidae Poore, 1994.

Diagnosis. Head-pereonite 1 free. Dorsal pereopodal coxal plates present (secondarily reduced in some species); coxal plate of pereopod 1 fused to tergite, or free from tergite; coxal plate 7 present; ventral coxal plates 1–7 (medial extension of

coxa replacing sternite) obsolete (not distinguished from sternite). Pleotelson incorporating pleonite 6 only, pleonites 1–5 free. Pleotelson underside flat, without ventrolateral ridges (pleopods not enclosed laterally). Penial processes medial, closer to midpoint than to pereopods. Mandibular lacinia mobilis present on both sides, or absent; molar absent; palp present, or absent. Maxilla trilobed. Maxillipedal endite reaching at least distal margin of palp article 2, usually distally truncate and setose. Pereopods 1–3 more or less prehensile, directed anteriorly; pereopods 4–7 directed posteriorly. Pleopodal exopods uniarticulate. Pleopod 1 biramous. Pleopod 2 biramous. Pleopod 3 biramous; endopod more or less oval or rectangular, rounded distally. Telsonic region of pleotelson elongate, anus situated anteriorly on pleotelson. Uropod situated anterolaterally on pleotelson; peduncle not operculate; rami ventral to pleotelson, articulating from side to side in vertical axis inside branchial chamber.

Key to families of Limnoriidea

1. Body vaulted; head massive, capable of lateral rotation. Uropodal rami inserting widely separately on peduncle (fig. 8.1) Hadromastacidae
- Body dorsoventrally compressed or semicircular in cross-section; head flat or cylindrical, not capable of lateral rotation. Uropodal rami inserting adjacently on peduncle 2
2. Body dorsoventrally compressed; head flat. Eyes dorsal (fig. 8.2) Keuphyliidae
- Body semicircular in cross-section; head more or less spherical. Eyes lateral (fig. 8.3) Limnoriidae

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Credits

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Fig. 8.1a, b, Bruce (1988). Fig. 8.2a, b, Bruce (1980). Fig. 8.3a, Poore (1987); b, c, Cookson (1991).

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Hadromastacidae Bruce and Müller, 1991

Figure 8.1

The Hadromastacidae comprise three species in one genus from the south-western Pacific and Indian Ocean. The genus *Hadromastax* Bruce, 1988 was originally placed in the Limnoriidae, but it bears little similarity to this family (Bruce and Müller, 1991).

Diagnosis. Head massive, capable of lateral rotation (offset from pereonite 1). Eyes lateral. Coxa 1 and pereonite 1 distinctly separated; pleonites 1–2 distinct, 3–4 laterally marked, pereonite 5 fused to pleotelson. Antennula flagellum with 2–4 articles. Frontal lamina absent; clypeus absent. Mandibular incisor massive in female; lacinia mobilis absent; palp with 3 articles. Maxillipedal epipod present. Pereopod 7 smaller and more slender than other pereopods. Uropodal rami inserting widely separately on peduncle; endopod without apical claw.

Hadromastax Bruce, 1988

Subtidal, shelf; associated with coral. Western and Eastern Indo-Pacific, Temperate Australasia. 3 species (Bruce, 1988:

species description; Bruce and Müller, 1991: genus diagnosis; Bruce, 2004: species description).

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Keuphyliidae Bruce, 1980

Figure 8.2

The family comprises a single species, epizoic on coral reefs in the region of Australia. Bruce (1980, 1988) believed the family to be most closely related to the Limnoriidae, a relationship supported by Brandt and Poore (2003).

Diagnosis. Head flat, not capable of lateral rotation (laterally encompassed by pereonite 1). Eyes dorsal. Coxa 1 and pereonite 1 fused; pleonites 1–5 free. Antennula flagellum with 3 articles. Frontal lamina present; clypeus present. Mandibular incisor not enlarged; lacinia mobilis present; palp absent. Maxillipedal epipod present. Pereopods 1–7 similar.

Uropodal rami inserting adjacently on peduncle; endopod with apical claw.

Keuphylia Bruce, 1980

Subtidal; associated with coral. Central Indo-Pacific. 1 species (Bruce, 1980).

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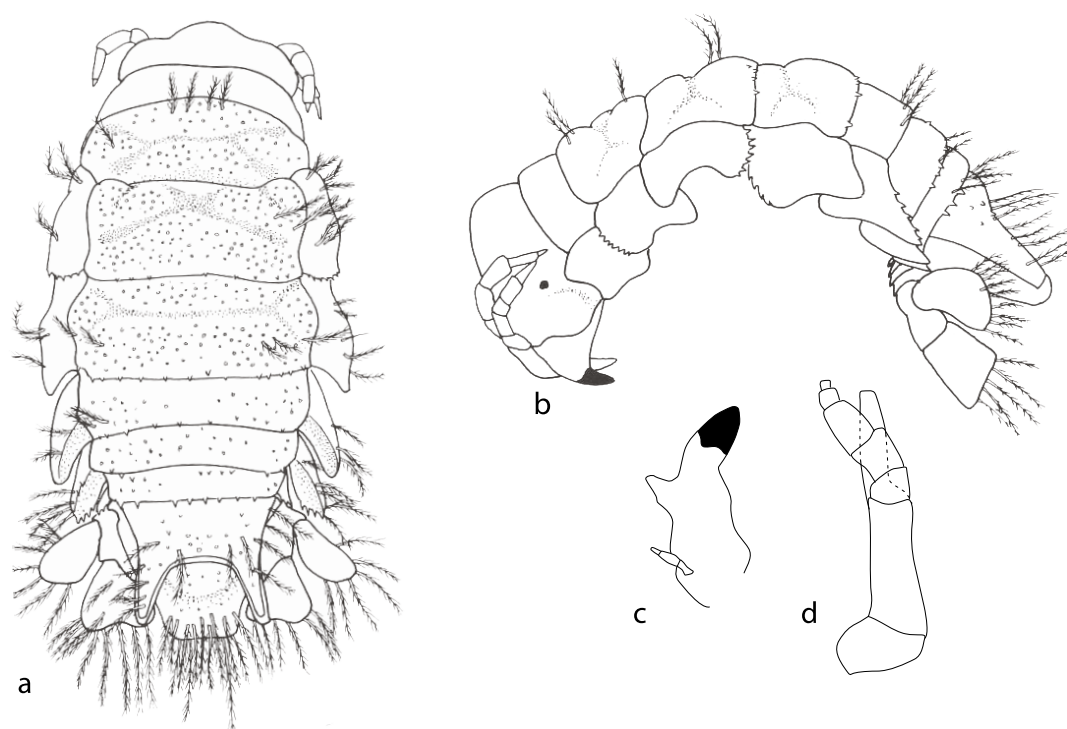


Figure 8.1. Hadromastacidae, *Hadromastax merga* Bruce, 1988. a, b, habitus, female; c, mandible, female; d, maxilliped (without setae).

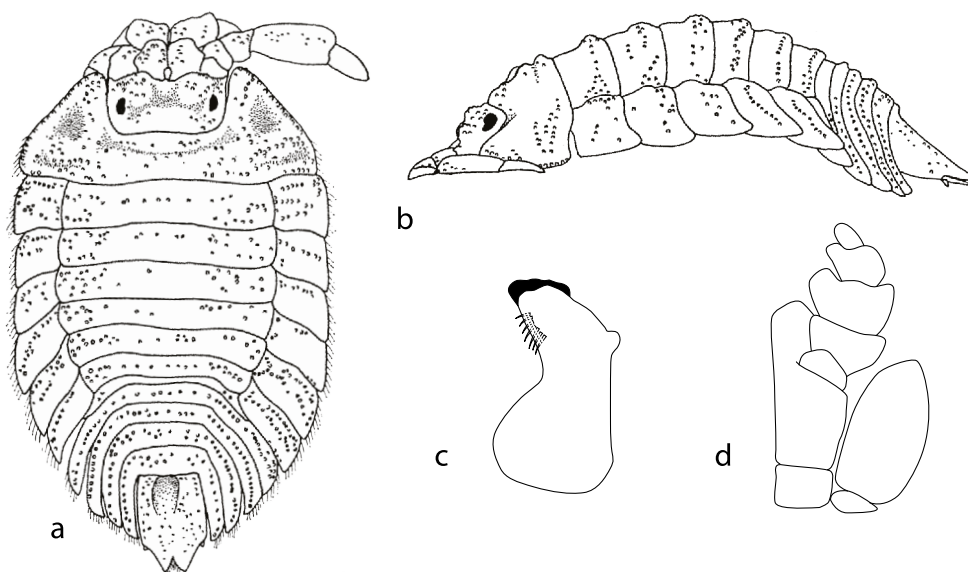


Figure 8.2. Keuphyllidae, *Keuphyllia nodosa* Bruce, 1980. a, b, habitus; c, mandible; d, maxilliped (without setae).

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Limnoriidae White, 1850

Figure 8.3

The Limnoriidae are a cosmopolitan family of marine borers from intertidal to slope depths. Species of *Paralimnoria* are wood borers, those of *Limnoria* are either wood or algal borers, and those of *Lynseia* are from seagrasses. The term “gribble” is applied to species of *Limnoria*. Mature specimens are between 2 and 8.5 mm long. Species of *Limnoria* are found boring in saturated wood and the holdfasts of algae of the genera *Macrocystis*, *Egregia*, *Laminaria*, *Postelsia*, *Eisenia*, *Ecklonia*, *Durvillaea*, *Sargassum*, *Lessonia*, *Corallina* and other red algae (Menzies, 1957). Four species have been found in the rhizomes of seagrasses, *Posidonia*, *Thalassia*, *Phyllospadix*, *Amphibolis* and *Zostera* (Brearley et al., 2008; Cookson and Lorenti, 2001; van Tussenbroek and Brearley, 1998). *Lynseia* is an Australian genus of three species that mines the leaves of sea-grasses of the genera *Zostera* and *Posidonia* (Brearley and Walker, 1995).

The wood borers are of major economic importance; the most-studied species is *L. tripunctata* Menzies, 1951. Damage

to wooden piles and ships is well studied (Cragg et al., 1999), but gribble also attack cultural heritage (Pournou, 2020). *Limnoria* are usually found in pairs in burrows, with the female at the blind end of the tunnel (Eltringham and Hockley, 1961). Cookson's (1991) review of the Australasian species surpassed that of Menzies (1957). Both authors discussed the history of the family and defined the genera and species then known. *Lynseia* was added later (Cookson and Poore, 1994).

Diagnosis. Head more or less spherical, not capable of lateral rotation (laterally encompassed by pereonite 1). Eyes lateral. Coxa 1 and pereonite 1 fused; pleonites 1–5 free. Antennula flagellum with 3 or 4 articles. Frontal lamina absent; clypeus present. Mandibular incisor not enlarged; lacinia mobilis present; palp absent, reduced to seta or of 1–3 articles. Maxillipedal epipod present. Pereopod 7 longer than other pereopods. Uropodal rami inserting adjacently on peduncle.

Key to genera of Limnoriidae

1. Body 7–15 times as long as wide. Pereopods 6 and 7 much longer than pereopod 5 (fig. 8.3a) *Lynseia*
- Body less than 5 times as long as wide. Pereopods 6 and 7 not longer than pereopod 5 (fig. 8.3b, c) 2
2. Uropodal rami elongate, with apical claw (fig. 8.3n). Antennula flagellum with 5 articles (fig. 8.3f). Pereopod 1 secondary unguis trid (fig. 8.3k) *Paralimnoria*
- Uropodal exopod much shorter than endopod, endopod without apical claw (fig. 8.3l). Antennula with 4 or fewer flagellar articles (fig. 8.3d). Pereopod 1 secondary unguis bifid (Fig. 8.3a) or undivided, sometimes with accessory spinules (fig. 8.3j) *Limnoria*

Limnoria Leach, 1814

Diagnosis. Body less than 5 times as long as wide. Antennula flagellum with 3 or 4 articles. Maxillipedal palp of 5 articles. Pereopods 6 and 7 not significantly longer than pereopod 5. Uropodal endopod without apical claw; exopod much shorter than endopod.

Subtidal–slope (0–1100 m); burrowing in decaying wood, large brown algae and seagrass. Temperate Northern and Tropical Atlantic, Temperate Northern Pacific, Indo-West Pacific, Temperate Southern Africa, Temperate Australasia, Southern Ocean. 55 species (Cookson, 1991: rediagnosis, key to 41 species).

Lynseia Poore, 1987

Diagnosis. Body 7–15 times as long as wide. Antennula flagellum with 2 articles. Maxillipedal palp of 1 or 3 articles. Pereopod 1 secondary unguis trifid; pereopods 6 and 7 much longer than pereopod 5. Uropodal endopod without apical claw; exopod much shorter than endopod.

Subtidal; burrowing into leaf bases of seagrasses, *Zostera* and *Posidonia*. Temperate Australasia. 3 species (Poore, 1987:

diagnosis, species description; Cookson and Poore, 1994: diagnosis, family placement, species descriptions; Brearley and Walker, 1995: ecology; 1996: ecology).

Paralimnoria Menzies, 1957

Diagnosis. Body less than 5 times as long as wide. Antennula flagellum with 5 articles. Maxillipedal palp of 5 articles. Pereopod 1 secondary unguis bifid; pereopods 6 and 7 not significantly longer than pereopod 5. Uropodal endopod with apical claw; exopod more than half as long as endopod.

Subtidal; burrowing in decaying wood. Western and Central Indo-Pacific. 2 species (Menzies, 1957: foundation study; Cookson and Cragg, 1988: second species; Cookson, 1991: rediagnosis).

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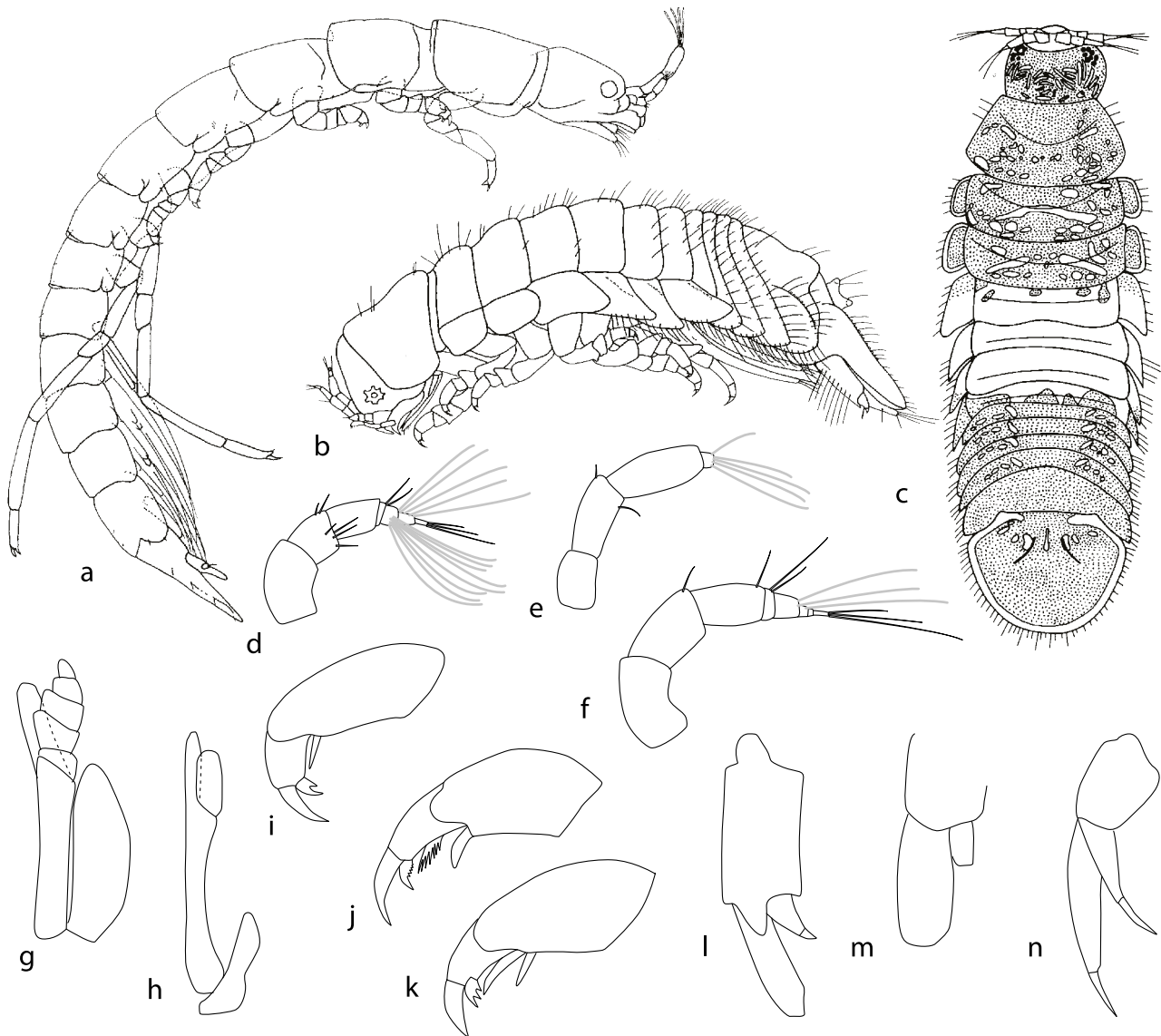


Figure 8.3. Limnoriidae. a, *Lynseia himantopoda* Poore, 1987; b, *Limnoria indica* Becker and Kampf, 1958; c, *Limnoria glaucinosa* Cookson, 1991. Antennula: d, *Limnoria*; e, *Lynseia*; f, *Paralimnoria*. Maxilliped: g, *Limnoria*; h, *Lynseia*. Pereopod 1 propodus, dactylus: i, j, *Limnoria*; k, *Paralimnoria*. Uropod: l, *Limnoria*; m, *Lynseia*; n, *Paralimnoria*.

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