BEAUFORTIA

INSTITUTE OF TAXONOMIC ZOOLOGY (ZOOLOGICAL MUSEUM)
UNIVERSITY OF AMSTERDAM

Vol. 31 no. 5 November 30, 1981

REDESCRIPTION OF THE ISOPOD (CRUSTACEA) FAMILY PHORATOPODIDAE

NIEL L. BRUCE

Department of Zoology, University of Queensland, St. Lucia, QLD 4067, Australia

ABSTRACT

The isopod family Phoratopodidae is known by the single genus and species *Phoratopus remex*. The discovery and redescription of a second specimen suggests the family, while remaining within the Flabellifera is also allied to the Valvifera subfamily Macrochiridotheinae.

INTRODUCTION

In 1925 Herbert M. Hale established the family Phoratopodidae. The family contained a single genus and species and was described from a single damaged female collected in 1886 in Encounter Bay, South Australia. Hale placed the family within the Flabellifera, between the Cirolanidae and the Corallanidae, and in his remarks allied the family most closely to the Cirolanidae (Eurydicidae of Hale) especially by the form of the mouthparts. Hale also mentioned the similarity of the first pereopods in *Phoratopus* and the cirolanid genus *Hansenolana* Stebbing. Hale recognised that in all other respects the new family was distinct.

The discovery of a second specimen in the collections of the Australian Museum, Sydney, has allowed a more detailed assessment of the family's status to be made, the results of which lead to the conclusion that the Phoratopodidae is perhaps most closely allied to the subfamily Macrochiridotheinae of the infraorder Valvifera.

TAXONOMY

Family Phoratopodidae Hale, 1925

Diagnosis: Isopoda, Flabellifera with body strongly vaulted, does not conglobate. Cephalon flat, anterolateral margins slightly incised; eyes dorsolateral, reduced. Pereonites 2-6 with large unfused coxae, pereonite 7 with small coxae. Pleon with 5 unfused segments, plus pleotelson. Antennule larger than antenna, peduncle 4-articulate; antennal peduncle 5-articulate. Frontal lamina indistinct, clypeus and labrum prominent. Mandible massive, incisor quadridentate; palp triarticulate, molar process vestigal, lacinia fused forming second cutting edge. Maxillule and maxilla entire. Maxilliped with palp articles setose, endite flat, broad. Pereopods greatly dissimilar, pereopods 4-7 with dactyl reduced or absent; pereopod 1 chelate; pereopods 4 and 5 with article 3-5 greatly expanded and flattened. Pleopods with all rami setose. Uropods inserted anterolaterally on pleotelson, mobile.

Genus *Phoratopus* Hale, 1925

Phoratopus Hale, 1925: 158; Nierstrasz, 1931: 163.

Generic characters as for the family.

Type species. *Phoratopus remex* Hale, 1925. Holotype held by the South Australian Museum, Adelaide, Registration number C302.

Type locality. Encounter Bay, South Australia.

Remarks. The unique form of the cephalon, coxae and pereopods at once separates *Phoratopus* from all other Flabellifera.

Phoratopus remex Hale, 1925 (Figs. 1-3)

Phoratopus remex Hale, 1925: 158, Fig. 15; Nierstrasz, 1931: 163.

Material. ♀ (20.15 mm), south west of Fowlers Bay, South Australia, 32°42'S, 131°27'E, 4.VII. 1966, 79 metres, CSIRO stn G 2/90/62. (A.M. Reg. No. P30361).

Description. Body twice as long as broad, without ornamentation. Cephalon deeply immersed into first pereonite, anterior margin with distinct rostral projection on either side of which lie the antennules; anterolateral margin incised; eyes dorsolateral, reduced, lie on projecting flange (Fig. 2e); posterior of cephalon with maxillipedal somite indicated by two lateral grooves. Pereonite 1 longest, pereonites 2-6 subequal in length and 7 slightly shorter. Coxal plates all visible in dorsal view, all large except for those of pereonite 7 which are almost concealed by the coxae of pereonite 6; posterior and ventral margins of coxae 4-6 setose. Pleonites 1 and 2 with posterolateral margins not produced, pleonites 3-5 with posterolateral margins acute. Pleotelson shallowly domed, entire posterior margin setose.

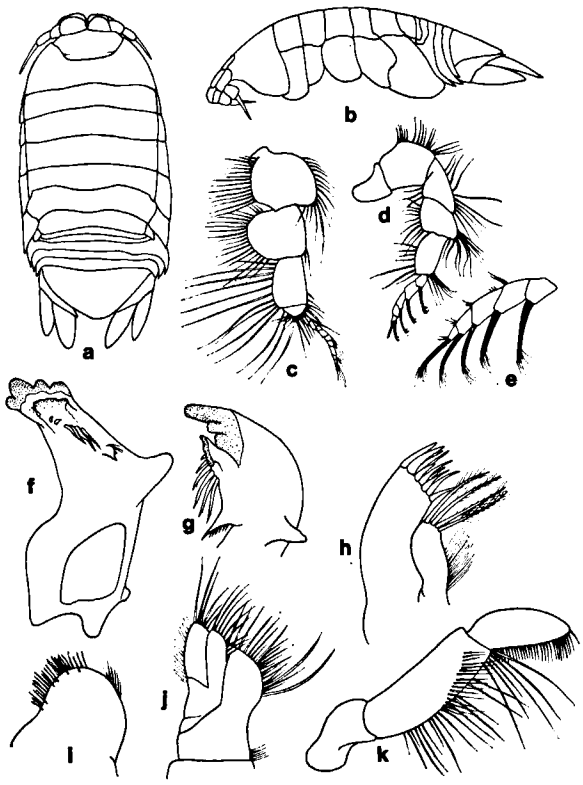

Fig. 1. *Phoratopus remex*. a) dorsal view, b) lateral view, c) antennule, d) antenna, e) antennal flagellum, f) right mandible, g) right mandible, h) maxillule, i) paragnath, j) maxilla, k) mandibular palp.

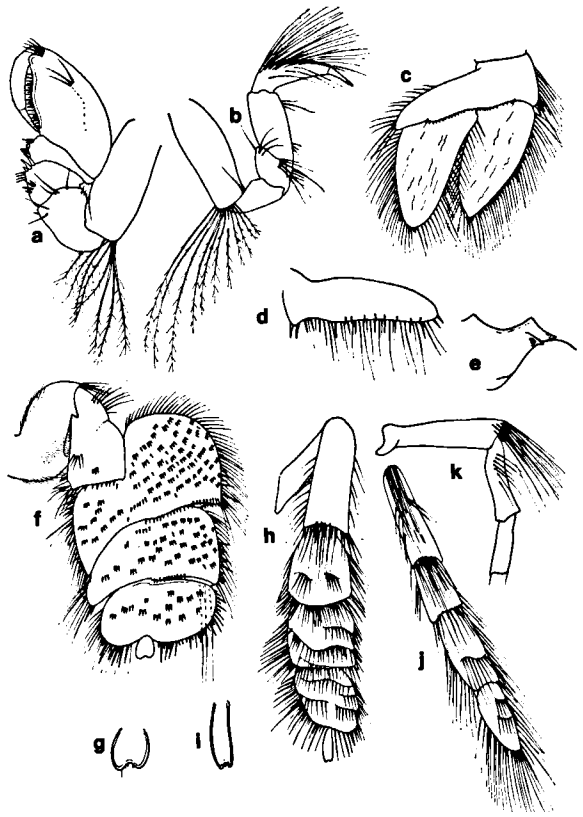

Fig. 2. *Phoratopus remex*. a) pereopod 1, b) pereopod 2, c) uropod, d) uropod peduncle, ventral view, e) cephalon, right half in dorsal view, f) pereopod 5, g) pereopod 5, dactyl, h) pereopod 6, i) pereopod 6, dactyl, j) pereopod 7, ischium-propodus, k) pereopod 7, lateral view, basis, ischium.

Antennule largely conceals anterior margin of cephalon, posterior margins of peduncle articles with long plumose setae; flagellum slender, composed of 12 articles. Antenna with peduncular articles 2-5 setose; flagellum with 6 articles, superior distal angles of which are slightly produced and bear a dense group of setae.

Frontal lamina indistinct, appears fused to cephalon; clypeus prominent, with median ridge; labrum with slightly depressed central area, and deeply incised posterior margin. Mandible massive, with quadridentate incisor, distal portion of lacinia mobilis forms a second biting edge, at the base of which lie 6 long spines; molar process vestigial; palp prominent, medial margins of articles 2 and 3 with setae. Maxillule with 10 stout spines on

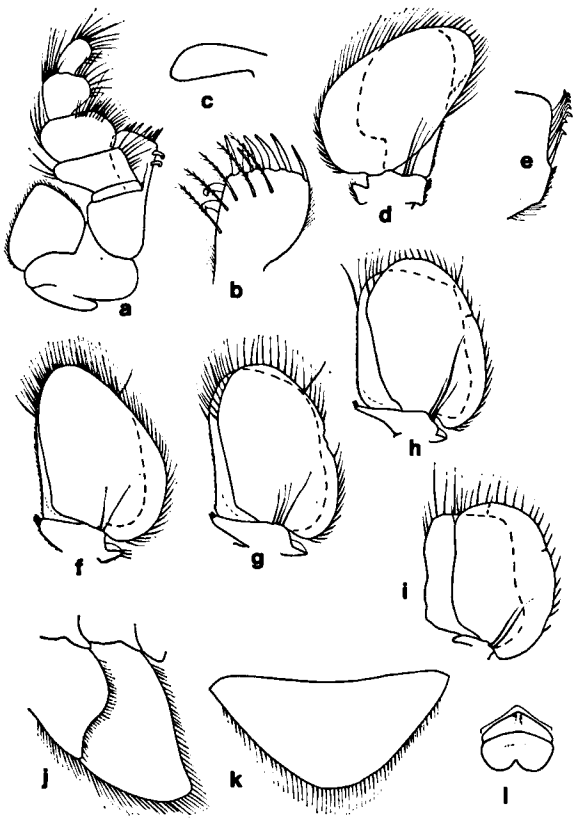

Fig. 3. *Phoratopus remex*. a) maxilliped, b) maxilliped endite, c) oostegite (pereopod endite?), d) pleopod 1, e) pleopod 1 coupling hooks, f-i) pleopods 2-5 respectively, j) coxae 5 and 6, k) pleotelson, l) clypeus and labrum.

exopod, endopod with 4 slender plumose spines. Maxilla with all articles densely setose. Maxilliped with palp article 1 twice as wide as long; endite broad, flat, with truncate apex armed with 6 robust spines; 2 coupling hooks present on medial margin of endite.

Pereopod 1 massive, basis with long feebly plumose setae at inferodistal angle; ischium with few setae along distal margin; merus short, with 3 spines at inferior distal angle; carpus with single tubercular spine on inferior margin, on either side of which lie 3 short stout setae; propodus chelate, inferior margin with continuous row of fine spines, dactyl recurved, reaching proximal end of propodus. Pereopods 2 and 3 slender, merus shortest article, carpus and propodus subequal in length and longer than ischium; propodus with dense mass of setae on superior margin. Pereopods 4 and 5 with robust basis and with merus, carpus and propodus greatly expanded, the lateral flat surfaces of these articles being covered by clusters of short stout spines, medial surfaces without spines, margins with numerous acute spines and setae; dactyl a flattened lobe with unguis vestigial but present. Pereopod 6 less broad, less flattened, all articles except basis with abundant long setae; dactyl and unguis present. Pereopod 7 slender, with abundant long setae, dactyl absent. At the base of each pereopod lies a paddle shaped lobe (Fig. 3c) either a rudimentary ostegite or endite.

Pleopod 1 with 7 coupling hooks on inner margin of peduncle, endopod narrower than exopod, basally constricted. Pleopod peduncle becomes progressively shorter towards posterior; lateral margin of peduncle of pleopods 2-4 with lamellar accessory lobe.

Uropods extend well beyond apex of pleotelson, both rami lanceolate in shape, exopod slightly shorter than endopod, all margins setose, medial margin of endopod and lateral margin of exopod with short spines. Peduncle with spines along dorsal and ventral edges of posterior margin.

Male. Not known.

Colour. Brown in alcohol.

Size. 30.5 mm (Hale, 1925), present specimen 20.15 mm.

Distribution. Known from two locations off the South Australian coast, Encounter Bay in the East and southwest of Fowlers Bay in the West. To a depth of 78 metres.

DISCUSSION

Hale allied the Phoratopodidae to the Cirolanidae primarily on the basis of mouthpart similarity. In fact detailed examination of the mouthparts reveals little in common with the Cirolanidae. The mandible, maxilla and maxillule agree closely to figures given of Macrochiridotheinae given by Moreira (1973) and Hurley & Murray (1968), and whilst the maxilliped endite varies in shape within the subfamily, that of *Phoratopus* resembles closely those of the genera *Maoridotea* Jones & Fenwick, 1978 and *Austrochaetilia* Poore, 1977. The broad, flat, maxilliped endite with a truncate spinose distal margin is a feature altogether lacking in the Cirolanidae. *Phoratopus* has further characters in common with the Macrochiridotheinae including the general form of the cephalon, anten-

nules, antennae, and the form of the pereopods (Hurley & Murray (1968), Holthuis (1964) and Moreira (1973) provide figures for comparison). Pereopods 1 to 3 could easily be mistaken for Macrochiridotheinae appendages, and while pereopods 4 and 5 differ in being greatly expanded and flattened, pereopods 4-7 have the dactyl reduced or absent a feature typical of the Macrochiridotheinae (Jones & Fenwick, 1978). The uropods and pleopods convincingly place *Phoratopus* in the Flabellifera, as in the Valvifera the uropods are ventral. The pleopods of both families are generally lamelliform. The penes of the Valvifera open on the pleon, but as only females of *Phoratopus* are known, comparisons cannot be made.

The single species of *Phoratopus* shows several primitive characters — 4-articulate antennule, distinct coxal plates, an unreduced pleon, lateral mobile uropods, and unreduced setation of the pleopods. Within the Macrochiridotheinae there is progressive fusion of the anterior coxal plates, of the pleon segments, and all species have ventral uropods. One could consider these taxa as totally unrelated, and the similarities due to convergence. Comparison of *Phoratopus* to the families Cirolanidae, Aegidae and Anuropidae reveals little in common with those species or genera which are planktonic, fossorial, or both. Family characters are not lost in adapting to particular habitats. *Phoratopus* in terms of adaptive morphology and character convergence of pereopods closely parallels the fossorial amphipod family Phoxocephalidae. Both these unrelated taxa have flattened pereopod articles which are spinose and provided with abundant setae, probably an adaption to a similar environment.

Alternatively it can be hypothesized the similarities reflect a phylogenetic affinity. If *Phoratopus* were to be "advanced" by progressive reduction such as increased fusion of the pleon and coxae, then a ventral migration of the uropods would yield an undisputable valviferan. Figure 4 illustrates the possible position of *Phoratopus* in relation to some other isopod taxa.

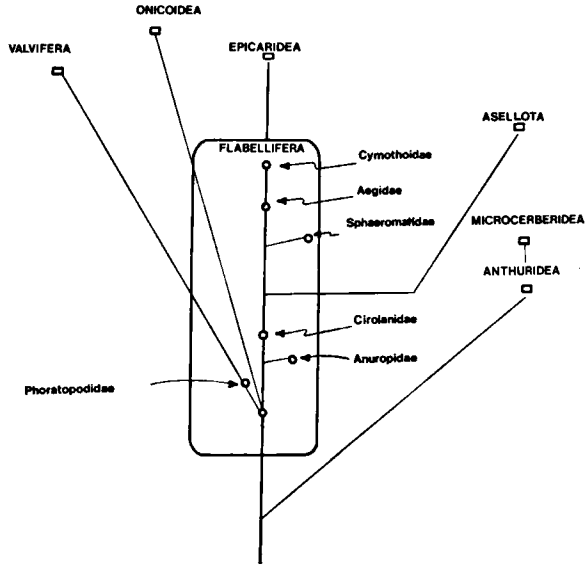

Fig. 4. The relationship of *Phoratopus* to other infraorders, and to some other flabbeliferan families. (Adapted from Kussakin, 1979).

ACKNOWLEDGEMENTS

I am grateful to Dr J. K. Lowry and Peter Terril of the Australian Museum for loan of the specimen, and to Dr R. C. Brusca of the Allan Hancock Foundation for his comments on the manuscript. This work was made possible by an Australian Biological Resources Study Grant.

REFERENCES

HALE, H. M., 1925. Review of Australian isopods of the cymothoid group. Part I. Trans. R. Soc. S. Aust. **49**: 128-234.

HOLTHUIS, L. B., 1964. *Saduriella* a new genus of Isopoda Valvifera from Northwestern Spain. Zool. Meded. **40**: 29-35.

HURLEY, D. E. & R. H. MURRAY, 1968. A new species of *Macrochiridothea* from New Zealand, with notes on the idotheid subfamily Chaetilinae (Crustacea Isopoda: Valvifera). Trans. R. Soc. N.Z., **10**: 241-249.

JONES, M. B. & G. D. FENWICK, 1978. *Maoridotea naylori*, a new genus and species isopod (Valvifera, Idoteidae, Chaetilinae) from the Kaikoura Peninsula, New Zealand. J. nat. Hist. **12**: 617-625.

KUSSAKIN, O. G., 1979. Marine and brackish water isopod Crustacea. Suborder Flabellifera. Acad. Science USSR: 1-470 (Leningrad). (In Russian).

MOREIRA, P. S., 1973. Species of *Macrochiridothea* Ohlin, 1961 (Isopoda, Valvifera) from southern Brazil, with notes on the remaining species of the genus. Bolm. Inst. oceanogr. S. Paulo, **22**: 11-47.

NIERSTRASZ, H. F., 1931. Die Isopoden der Siboga Expedition. III Isopoda genuina. II Flabellifera. Siboga Exped. Monogr. **32c** (Livr. 114): 121-233.

POORE, G. C. B., 1977. *Austrochaetilia capeli*, a new genus and species of chaetiline idoteid (Isopoda) from Port Phillip Bay, Australia. Crustaceana, **33**: 113-118.

Received: June 15, 1981

Institute of Taxonomic Zoology (Zoölogisch Museum), University of Amsterdam, P.O. Box 20125, 1000 HC Amsterdam - The Netherlands