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A NEW SPECIES OF *HEMIBOECKELLA* (FRESHWATER COPEPODA CALANOIDA) FROM WESTERN AUSTRALIA

I.A.E. BAYLY *

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INTRODUCTION

The genus *Hemiboeckella* was established by Sars (1912) to accommodate a form which had a general resemblance to *Boeckella* but which differed from this genus in certain significant features. Marsh (1924) could see 'no good reason for separating it from *Boeckella*' and accordingly made *Hemiboeckella* a synonym of this genus. Bayly (1964), however, disagreed: in support of Sars, he maintained that there were very real differences between *Hemiboeckella* and all species of *Boeckella* which should be given nomenclatural expression — a view which is reaffirmed. Bayly (loc. cit.) retained full generic status for *Hemiboeckella* partly for nomenclatural simplicity, but expressed the opinion that ideally subgeneric status might perhaps have been more appropriate. However, as a result of further consideration of the nature of the maxilliped the author now believes that full generic status is adequately justified in terms of structural differentiation.

Until now *Hemiboeckella* has remained monotypic and consequently there has been doubt as to which of the features possessed by *H. searli* Sars should be incorporated into the generic definition. However, a recent collection from a temporary freshwater pool in Western Australia contained numerous specimens of a form which agrees with *H. searli* in several important respects, but cannot be accommodated in either *Boeckella* or *Calamoecia*, the two main genera of freshwater calanoids in Australia. This new species, apart from being of interest in its own right, now makes it possible to put the definition of *Hemiboeckella* on a sound basis, and vindicates Sars' original decision to erect this genus.

REDEFINITION OF THE GENUS

Order — Calanoida
Family — **Centropagidae** Sars
Genus — *Hemiboeckella* Sars
Hemiboeckella Sars, 1912, pp. 13-14.
Type (by monotypy) *Hemiboeckella searli* Sars

Generic definition

Hemiboeckella are centropagids with three-segmented endopodites on P1-P4 of both sexes and P5 of the female and in which the number and

* Department of Zoology, Monash University, Clayton, Victoria 3168.

arrangement of spines and setae on P1-P4 agrees with that of *Boeckella* and the following formulae:

	Endopodite	Exopodite
P1	1.1.321	1.1.421 (or 1.1.322)
P2 and 3	1.2.422	1.1.521
P4	1.2.322	1.1.521

Hemiboeckella differs from *Boeckella* most importantly in the following features:

(i) the maxillipeds are relatively shorter and stouter and the number of setae on segments 4 and 5 (or 2 and 3 excluding the two basal segments) are reduced from 4 and 3 respectively to 2;

(ii) the exopodite of the male fifth left leg, which is shorter than the right exopodite, consists of two segments plus a straight terminal spine, and the distal segment and terminal spine are not combined to form a long curved claw;

(iii) the distal protopodite segment of the male fifth left leg is produced into an inner process which extends beyond the proximal segment of the left exopodite;

(iv) a greater degree of sexual size differentiation.

Remarks

Apart from the above characteristics *Hemiboeckella* also differs from most species of *Boeckella* and *Calamoecia* in that the antennules are only about as long as the metasome. This feature, however, is also found in some, mainly large, species of *Boeckella*, such as *B. robusta*, *B. pseudochelae* and *B. major*, which inhabit small, temporary bodies of water. It may be noted that *Hemiboeckella* is also restricted to this type of habitat, so far as is known.

The degree of sexual size differentiation in *Hemiboeckella* is greater than that in *Boeckella* and *Calamoecia*.

Sars (1912, pl. ix, fig. 8) shows segments 4 and 5 of the female maxilliped of *H. searli* bearing only one seta. However, a critical examination of 5 female maxillipeds shows that this is incorrect; there are two large or fully developed setae, and sometimes a very short and slender vestigial (third) one is visible as well. The general form of this appendage is similar in both species of *Hemiboeckella* and distinctly less elongated than that in *Boeckella* and *Calamoecia*.

DESCRIPTION OF SPECIES

Hemiboeckella andersonae sp. nov.

(Figs 1a-e, 2a-d)

Specimens examined

Numerous specimens of both sexes were present in a collection made by Mrs D. Anderson on 9 October 1972 from a shallow freshwater pool near a freshwater swamp on Culeenup Island, Western Australia (lat. 32° 35'S., 115° 47'E.). This island is in the Yundurup delta at the point where the Murray River enters Peel Islet. Both the pool and the swamp are ephemeral and dry out in summer (D.L. Serventy, pers. comm.). Water is usually present only between June and October. Dr Serventy reports that he found

a copepod (probably *H. andersonae)* very abundant in the pool on 10 August 1970.

Type material

Holotype ♂, allotype ♀, paratypes 3♂, 3♀ (these eight stained, dissected, and mounted on microslides), paratypes 10♂, 10♀ (unmounted in vial); Aust. Mus. Reg. Nos. P19238-46. Paratypes 3♂, 3♀ (stained, dissected, and mounted on microslides) and 10♂, 10♀ (unmounted in vial); West. Aust. Mus. Reg. Nos. 182-73, 183-73 and 184-73. Type locality: Culeenup Island, Yundurup Delta, Western Australia.

Description of female

Size:— Mean length (ten specimens) to end of metasome (measured mid-dorsally so as to exclude posterior 'wings') 0.70 mm, to end of furcal rami 1.01 mm and to end of longest furcal setae 1.25 mm.

General body proportions:— See Figure 1a.

Maxilliped (Figs 1e-f):— Shorter and stouter than in *Boeckella.* All segments with only two setae on anterior side, except for two large basal segments and minute terminal one.

Fifth legs (Figs 1c-d):— Distal protopodite segments with prominent distal process arising from posterior face, but that on right side somewhat longer than that on left making legs asymmetrical; terminal exopodite segments with only four spines (1 inner, 2 terminal, 1 outer); endopodites 3-segmented, first two segments devoid of setae, terminal segment with three setae near distal extremity but one of these inserted distally on outer edge.

Urosome (Figs 1a-b):— 3-segmented; genital segment with slightly greater distance between lateral bulges than between anterior and posterior margins, with conspicuous spine on anterior half of right side; furcal rami with oblique insertion into anal segment, mean length (line half way between inner and outer edges and parallel to them) about 3.3 times mean width.

Description of male

Size:— Mean length (ten specimens) to end of metasome (measured mid-dorsally) 0.50 mm, to end of furcal rami 0.68 mm, and to end of longest furcal setae 0.81 mm.

General body proportions:— See Fig. 2a.

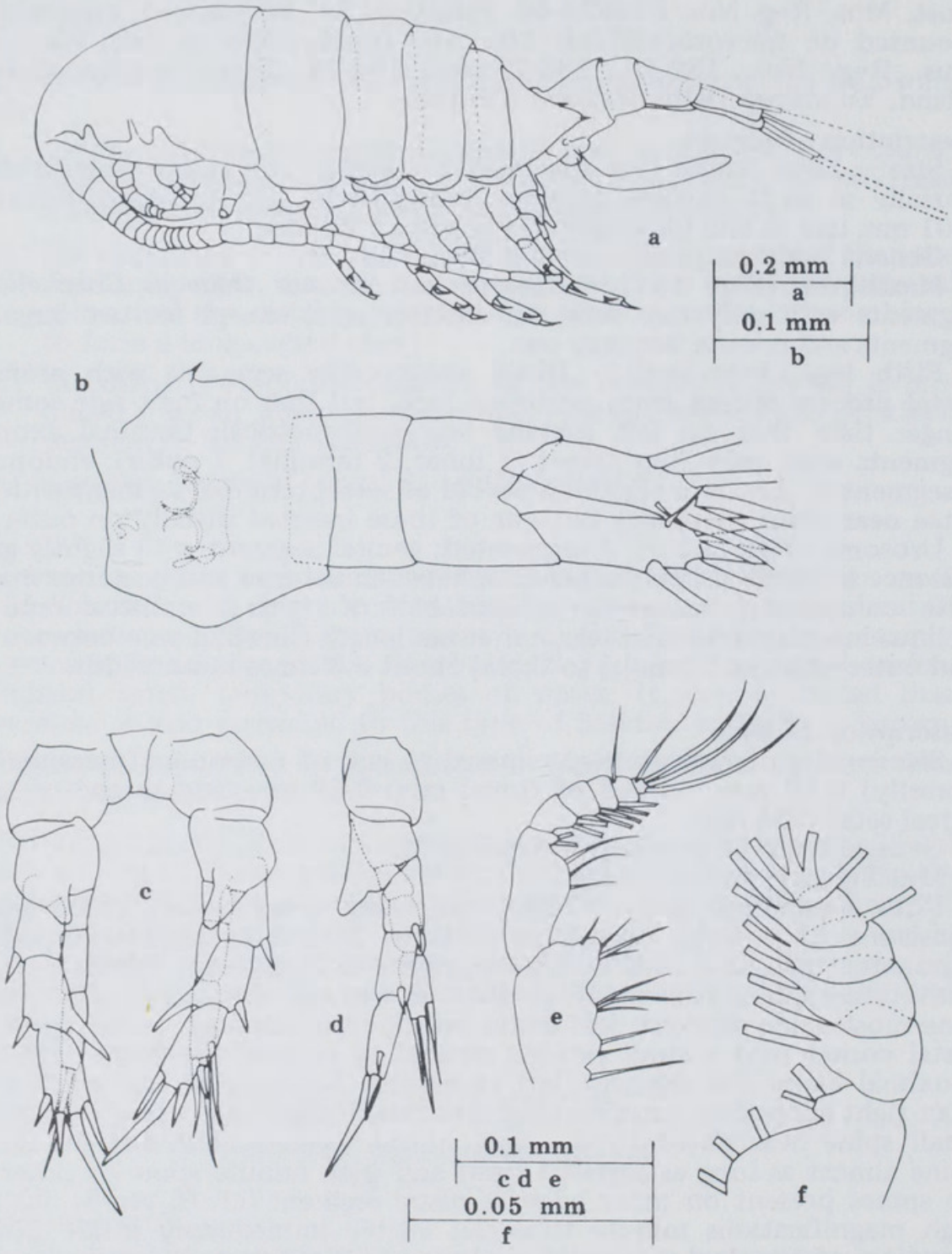
Maxilliped:— As for female.

Fifth legs (Figs 2b-d):— Right exopodite 3-segmented, distal segment consisting of a long, curved claw as in *Boeckella;* right endopodite 3-segmented, proximal and middle segments lacking setae, terminal segment with three spines (or setae) at distal extremity, outermost spine longest, innermost spine shortest; left distal protopodite segment produced at inner distal corner into a stout process extending beyond the distal edge of the proximal exopodite segment; left exopodite 2-segmented and much shorter than right exopodite, proximal segment much larger than distal one and with small spine near outer distal corner, distal segment with straight terminal spine almost as long as segment itself and with minute spine on outer edge, no spines present on inner edge of distal segment (cf. *H. searli)* but under high magnifications minute tubercles visible immediately inside point of insertion of terminal spine; left endopodite 2-segmented, terminal segment with three spines at distal extremity.

Remarks

Previously (Bayly, 1964, pp. 184 and 231) the terminal spine of the exopodite of the male fifth left leg was referred to as a 'segment' on the

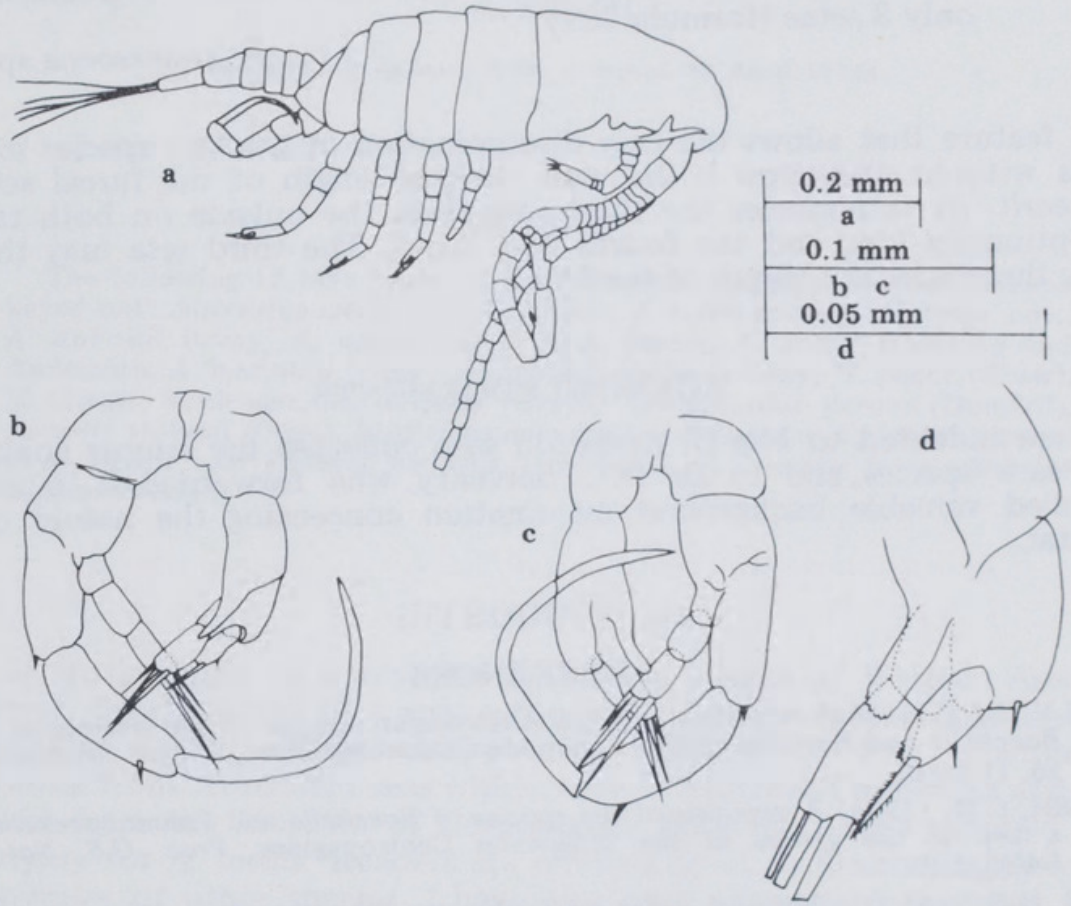
Fig. 1. *Hemiboeckella andersonae* sp. nov., female. a, lateral aspect; b, ventral aspect of urosome; c, posterior aspect of fifth legs; d, lateral aspect of fifth leg; e, maxilliped; f, distal portion of maxilliped.



grounds of its probable developmental homology with the distal half of the claw of *Boeckella* (which was described as a segment). This usage is abandoned in this paper.

The degree of sexual size differentiation in this species is unusually great; the average value of the ratio (mean female length):(mean male length) for the three different measures given above is 1:48. The corresponding ratio for *H. searli*, based on metasome length and length to the end of the furcal rami, is 1:51. In both cases this ratio is distinctly greater than that for any species of *Boeckella* (Bayly, in manuscript) and for this reason the high degree of sexual size differentiation has been incorporated into the generic diagnosis.

Fig. 2. *Hemiboeckella andersonae* sp. nov., male. a, lateral aspect; b, anterior aspect of fifth legs; c, posterior aspect of fifth legs; d, anterior aspect of distal portion of fifth left leg.



KEY TO SPECIES

(Based on the structure of the fifth pair of legs.)

Males

(a) Right endopodite with middle segment produced at inner distal corner into seta-like process, distal segment lacking setae; left endopodite with two small setae laterally placed; distal segment left exopodite with prominent spine on inner edge

H. searli Sars, 1912

(b) Right endopodite with middle segment devoid of outgrowths, distal segment with three setae; left endopodite with three setae

(or spines) at distal extremity; distal segment left exopodite lacking spine on inner edge

H. andersonae sp. nov.

Females

(a) Fifth legs fully symmetrical; distal protopodite segments lacking distal process on posterior face; terminal exopodite segments with total of seven spines (formula 421); endopodites usually with one seta on inner edges of segments 1 and 2, segment 3 usually with total of six setae (formula 222)

H. searli Sars, 1912

(b) Fifth legs slightly asymmetrical; distal protopodite segments with prominent distal process on posterior face; terminal exopodite segments with total of only four spines (formula 121); endopodites lacking seta on inner edge of segments 1 and 2, segment 3 with only 3 setae (formula 021)

H. andersonae sp. nov.

A feature that allows the easy discrimination of the two species in both sexes without dissection is the very unequal length of the furcal setae in *H. searli*. In this species the third seta from the outside on both rami is exceptionally long and the fourth very short. The third seta may thus be more than twice the length of the fourth.

ACKNOWLEDGEMENTS

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REFERENCES

BAYLY, I.A.E. (1964) A revision of the Australasian species of the freshwater genera *Boeckella* and *Hemiboeckella* (Copepoda:Calanoida). *Aust. J. mar. Freshwat. Res.* **15**, 180-238.

MARSH, C.D. (1924) A synopsis of the species of *Boeckella* and *Pseudoboeckella* with a key to the genera of the freshwater Centropagidae. *Proc. U.S. Nat. Mus.* **64**(8), 1-28.

SARS, G.O. (1912) Additional notes on freshwater Calanoida from Victoria, southern Australia. *Arch. Math. Naturv.* **32**(13):3-20.