A NEW SPECIES OF BOECKELLA (COPEPODA: CALANOIDA) AND ADDITIONAL COMMENTS ON SOME OTHER SPECIES OF THE GENUS

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(With two text figures.)

SUMMARY

The new species, *Boeckella bispinosa*, is described and figured from Tasmanian material. The male fifth legs of *B. opaqua* Fairbridge, a Western Australian species, are figured and the original description supplemented. The female genital segment of *B. pseudochelae* Searle is figured. New records of *B. symmetrica* Sars, *B. minuta* Sars, and *B. major* Searle are given.

INTRODUCTION

The Australasian species of *Boeckella* were revised by Bayly (1964). In this revision a species believed to be new was figured, but not fully described or named because only a single specimen was available. Since then a few more specimens of this species have come to hand from Tasmania, and the opportunity is now taken to describe it. In addition, some material of *B. opaqua* Fairbridge, which was previously lacking, has become available, and this is figured and the original description supplemented. Finally some new records are mentioned, and a few comments made concerning the taxonomy of the females of *Boeckella*.

DESCRIPTION OF SPECIES

Boeckella bispinosa sp. nov.

Figs. 1A-1F

Boeckella sp. Bayly, 1964, p. 230, figs. 4E, 21A and 21B.

Material Examined

TASMANIA: Roadside pool four miles north of Campbell Town (altitude about 180 m), 9 ♂, 6 ♀, coll. J. Wilson, 20 ix 1963.

Material Examined Previously

WESTERN AUSTRALIA: Pond, Kelmscott, Perth, 1 ♂, coll. D. H. Edward, 5 ix 1960.

Type Material

Holotype ♂, allotype ♀, paratypes 4 ♂, 4 ♀; Aust. Mus. Reg. Nos. P15026-9. Type locality: Campbell Town, Tasmania.

Description of Female

Size.—Length inclusive of furcal setae, 2.30 mm (mean of 5); length to end of furcal rami, 1.97 mm (mean of 5).

Antennule length.—The antennules when extended backwards reach to the posterior edge of the genital segment. They are thus relatively shorter than in *B. minuta* and relatively longer than in *B. major* and *B. pseudochelae*.

Fifth legs.—Terminal exopodite segments with a total of seven spines.

Urosome (Fig. 1F).—Genital segment about 1.3 times as long as maximum width, asymmetrical with distinct excavation on left side anteriorly, genital operculum 0.42 times length of segment from anterior edge; urosome segment 2 about 0.6 times as long as wide; furcal rami about 2.3 times as long as maximum width.

Description of Male

Size.—Length inclusive of furcal setae, 1.65 mm (mean of 5); length to end of furcal rami, 1.40 mm (mean of 5).

Fifth legs.—Right distal protopodite segment produced inwards to meet median sagittal plane, projecting lobe attached to innermost edge distinctly mediad and proximal to point of attachment of right endopodite; right endopodite essentially 2-segmented and with segments of subequal length, sometimes with additional weak line of segmentation appearing in distal segment about one-third length from proximal edge, with two spines at distal extremity (invariably in the 10 specimens examined) (hence specific name), spines sometimes as long as distal segment and sometimes distinctly shorter, endopodite exclusive of spines extending 0.4-0.6 times distance along inner edge middle exopodite segment.

Inner distal corner left distal protopodite segment produced into a toothless lobe extending about 0.3 times distance along inner edge proximal exopodite segment; left endopodite very minute, no longer than protopodite lobe; middle exopodite segment (basal segment of exopodite claw) with small tooth on inner edge near proximal attachment.

Remarks

It is possibly more than mere coincidence that the only two collections found to contain this species were both made in September. It is also noteworthy that both collections were from small bodies of water. The Tasmanian habitat was

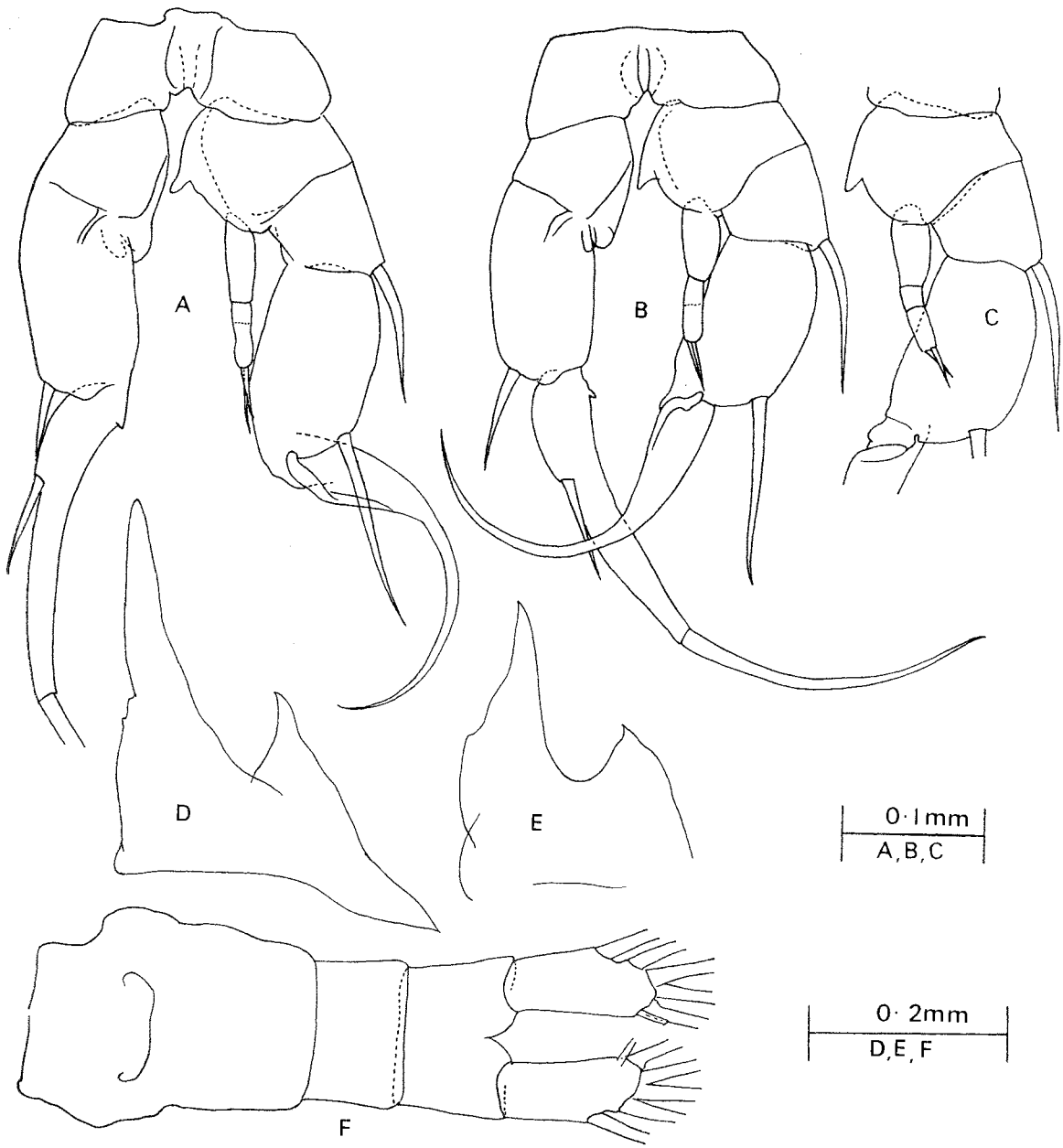

FIG. 1.—*Boeckella bispinosa*, sp. nov. A, B, posterior aspects of male fifth legs; C, posterior aspect of portion of male fifth right leg (A-C, all of different individuals); D, E, lateral aspects of right half of last metasomal segment of females; F, ventral aspect of female urosome.

described by J. Wilson (personal communication) as " a permanent or semi-permanent hole for stock watering ".

The collection containing the 15 specimens of *B. bispinosa* contained no fewer than four other calanoid species. These were as follows (the number of specimens indicated in parentheses): *B. major* (28), *B. pseudochelae* (6), *B. triarticulata* (3), and *Calamoecia gibbosa* (3). The author cannot recall having previously found more than three different calanoid species present in the one freshwater collection. Of the accompanying species, *B. major* and *B. pseudochelae* are both noted by Bayly (1964)

as occurring in small bodies of water (ponds and pools). The possibility that *B. triarticulata* and *C. gibbosa* represented contaminants from an earlier collection seems rather unlikely in view of the nature of the immediately preceeding catch.

From data given above it may be calculated that the ratio (mean length females): (mean length males) for *B. bispinosa* is 1.40. This is rather high (cf. 1.30 (Bayly 1964) and 1.31 (B. V. Timms, unpublished data) for *B. minuta*, and 1.13 for *B. propinqua* (Bayly 1964)). It appears that the degree of size differentiation between the sexes is subject to a considerable amount of inter-specific variation and is a useful taxonomic character.

Surprisingly the only two records of this species come from opposite sides of the continent. It is evidently scarce yet widely distributed (at least with respect to longitude). Its distribution is somewhat similar to that of *B. symmetrica* which is common to south-eastern and south-western Australia but does not extend very far northwards (see Bayly 1964, fig. 23). Despite the existence of slight differences between the present eastern and western material (the length of the spines on the male right fifth endopodite, and the increased segmentation of this endopdoite in some of the eastern material) there is no hesitation in assigning it to the same species.

Boeckella opaqua Fairbridge

Figs. 2A-2D

Boeckella opaqua Fairbridge, 1945, pp. 25-38, Bayly, 1964, p. 226.

Material Examined

WESTERN AUSTRALIA: Granite rock pool, 56 miles east of Norseman at Smithania Rock, 10 ♂, coll. A. K. and J. Lee, 4 vi 1964; large granite pool, Yellowdine Rock, 1 ♂, 5 vii 1964; granite pool, east Yellowdine, 3 ♂, 5 vii 1964; High Pond, Yorkrakine, 1 ♂, 12 vii 1952; last three all coll D. H. Edward.

Discussion and Description of the Male Fifth Legs

Generally speaking the material examined agreed fairly well with Fairbridge's description. However, a few variations and a useful taxonomic feature not mentioned by Fairbridge were noted.

Fairbridge described and figured the right endopodite as if it were distinctly 2-segmented. However, in none of the 15 specimens examined was this the case. In 12 specimens this endopodite was completely unsegmented, and in the remaining three it was weakly 2-segmented. It should thus be described as 1-2-segmented. In the material examined this endopodite extended less than halfway along the inner edge of the middle exopodite segment.

Fairbridge stated that the lobe attached to the inner distal corner of the left distal protopodite segment "is not denticulated". However, when the present material was examined under higher magnifications distinct serrations were in evidence along the inner edge of this lobe (see Figs. 2C-D). As described by Fairbridge, the left endopodite was invariably 2-segmented in the present material. It extends almost to the end of the proximal exopodite segment and is thus unusually well developed (cf. *B. symmetrica*).

There is another feature, not previously stressed, that appears to be more distinctive of this species than any single feature mentioned above. This is the nature of the spine on the outer edge of the left middle exopodite segment (equivalent to the basal segment of the left exopodite claw). It is exceptionally long and usually extends to the distal extremity of the segment or just beyond (in two specimens examined it was somewhat short of the distal extremity). Another peculiarity is that this spine scarcely diverges from its segment but remains closely adpressed to the outer edge. This feature is not in itself completely diagnostic of this species but in most cases separates it from the closely allied species *B. symmetrica* (in this species the spine usually extends less than 0.8 times the distance along the segment). It should be pointed out that in *B. opaqua* the segmentation between the middle and distal segment of the left exopodite is not uncommonly weak and sometimes absent giving rise to an apparent 2-segmented condition.

In *B. symmetrica* the right endopodite is usually distinctly longer than the left one, but in *B. opaqua* the two endopodites are of sub-equal length.

Remarks

It will be noted that the habitat of the specimens examined corresponds exactly with that described by Fairbridge viz "shallow granite pools".

THE IMPORTANCE OF THE STRUCTURE OF THE GENITAL SEGMENT IN THE TAXONOMY OF FEMALES

In my earlier revision of the genus (Bayly 1964) the taxonomy of the females was largely neglected. Although it was admitted that the structure of the genital segment was subject to specific variation, difficulties in exploiting this taxonomically were pointed out. Perhaps the chief of these is the essentially non-meristic nature of much of the variation, and the difficulty of concisely and quantitatively describing the complex shapes involved. Despite my earlier reservations, I am now inclined to believe that a detailed comparative study of the genital segment represents the best hope for an eventually satisfactory taxonomy of the females.

In separating the females of the several species in the mixed collection containing *B. bispinosa* I was impressed by the differences between the urosomes, and especially the genital segments, of *B. bispinosa* and *B. pseudochelae* (cf. Figs. 1F and 2E). As shown by Figure 2E, the female genital segment of *B. pseudochelae* is subcircular or about as long as wide (cf *B. bispinosa*, 1.3 times as long as maximum width). The anterior recess on the left side of genital segment of *B. bispinosa* is also characteristic and contrasts with the smooth convexity of both sides in *B. pseudochelae*. The genital segments of *B. bispinosa* and *B. pseudochelae* may be compared with those of *B. hamata* Brehm, *B. geniculata* Bayly and *B. montana* Bayly which are figured by Bayly (1964). The construction of a satisfactory dichotomous key to females of species other than *B. minuta* (which is readily identified by the fifth legs) on the basis of genital segment structure would not be easy. The direct successive comparison of material in hand with figures of the genital segment would probably be the most reliable method of establishing identity.

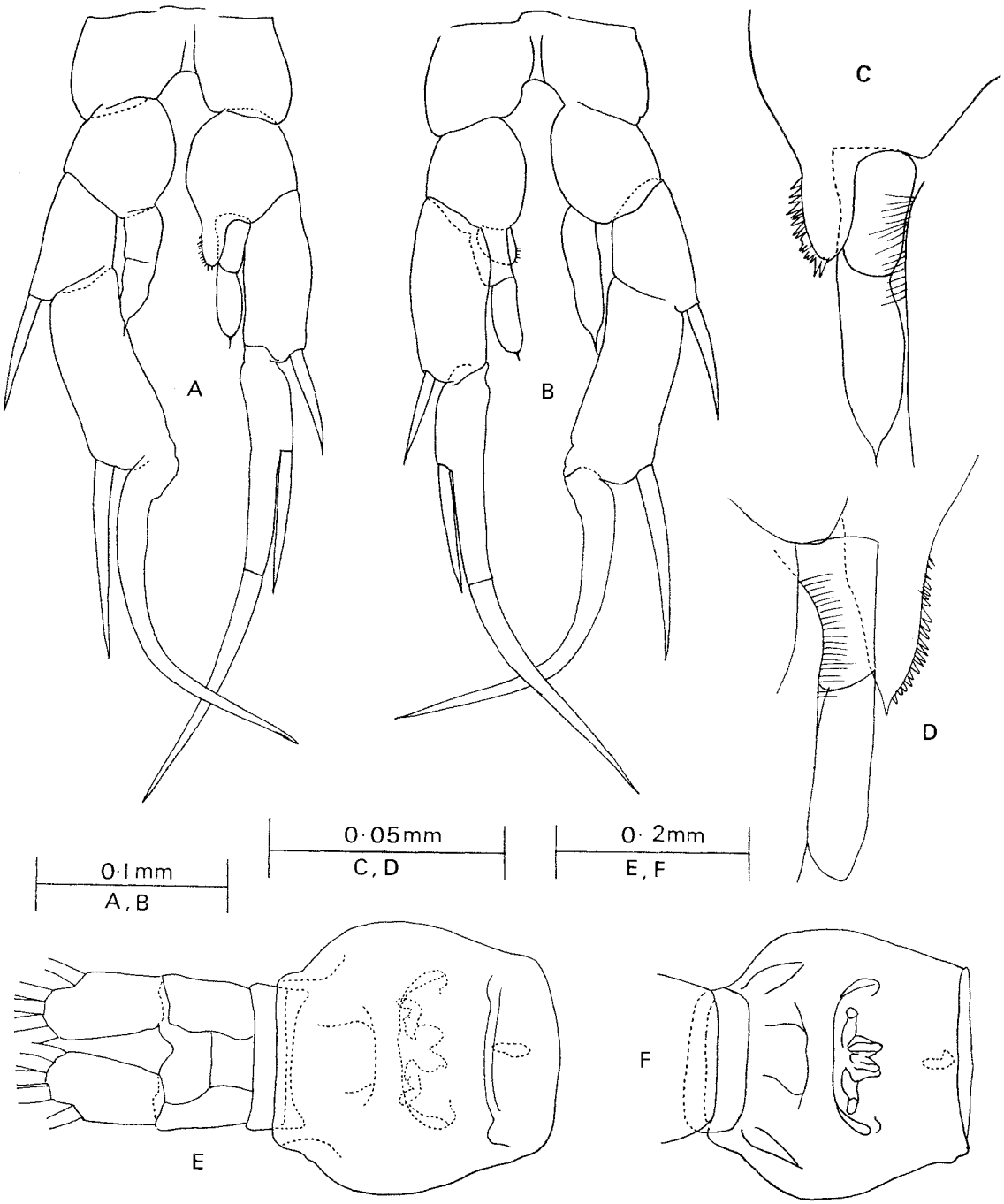

FIG. 2.—A-D, *Boeckella opaqua* Fairbridge; E, F, *B. pseudochelae*. A, B, anterior and posterior aspects, respectively, of male fifth legs; C, D, anterior and posterior aspects, respectively, of portion of male fifth left leg including endopodite. E, dorsal aspect of female urosome; F, ventral aspect of female genital segment.

NEW RECORDS

Since publication of the revision (Bayly 1964) a few noteworthy records, which extend known distribution limits, have come to hand. Some of these were incorporated in a recent paper (Bayly 1966, p. 131) dealing mainly with *Diaptomus*, others are as follows:—

(1) *Boeckella symmetrica Sars.*—Specimens collected from a large farm pond at Papatoetoe, Auckland, by Miss M. H. Barclay proved to be this species. This is the first record of *B. symmetrica* from New Zealand. This means that six species of *Boeckella* are now known to occur in New Zealand, and that four species are common to Australia and New Zealand. *B. symmetrica* is thus even more widespread than previously thought, and the earlier map (Bayly 1964, fig. 23) showing its distribution should now be amended. The possibility now arises that Henry's (1924) record of *B. triarticulata* from the vicinity of *Auckland* represented a misidentification of *B. symmetrica* not *B. propinqua*. There is a close structural similarity between B. *symmetrica* and *B. triarticulata*.

(2) *B. minuta* Sars.—This was collected by the author from a farm dam at Yarra Glen near Melbourne in March 1964. This is the first record of this species from Victoria since early this century. An earlier remark (Bayly 1964, p. 201) may not, therefore, have much significance.

(3) *B. major* Searle.—This species was collected from two high altitude lakes (Island Lake and a small unnamed lake about half a mile away) near Cooma, New South Wales, by Dr. W. D. Williams in August, 1964. It was also collected (together with *B. pseudochelae*) by the author from shallow, partially frozen, pools between Shannon Lagoon and Great Lake, Tasmania, in August 1965. Most recently (May 12, 1966) it was collected from a shallow pool adjacent to Christmas Bay, Great Lake, by Mr. P. A. Tyler.

B. major and *B. pseudochelae* seem to occur in small bodies of water mainly during the period late autumn to early spring. This is probably true also of *B. bispinosa*.

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