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AUSTRALONANNOPUS AESTUARINUS GEN. NOV., SP. NOV. (CRUSTACEA: HARPACTICOIDA), AN ABERRANT CLETODID FROM AUSTRALIAN BRACKISH WATERS

by R. Hamond

CSIRO, Division of Fisheries and Oceanography, Cronulla, N.S.W.

(with 23 text-figures)

ABSTRACT

The new species is described and figured in both sexes from a numerous population found near Hobart, Tasmania; isolated individuals have also been found in brackish waters in New South Wales. The new genus *Australonannopus* is defined, and is shown to be unique among the Cletodidae in that (1) the fourth feet have no trace whatever of an endopod in either sex, and (2) the secondary sexual characters of the male are shown by the exopod of P2, instead of by the endopod of P3 as in all other genera.

Three cletodid genera have been described since the most recent key (Lang 1965) to the genera of this family; the way in which they and *Australonannopus* fit into this key is discussed. *Australonannopus* is shown to occupy a rather isolated position within the family, although its nearest relative is possibly *Nannopus; A. aestuarinus* is so far the only known species.

INTRODUCTION

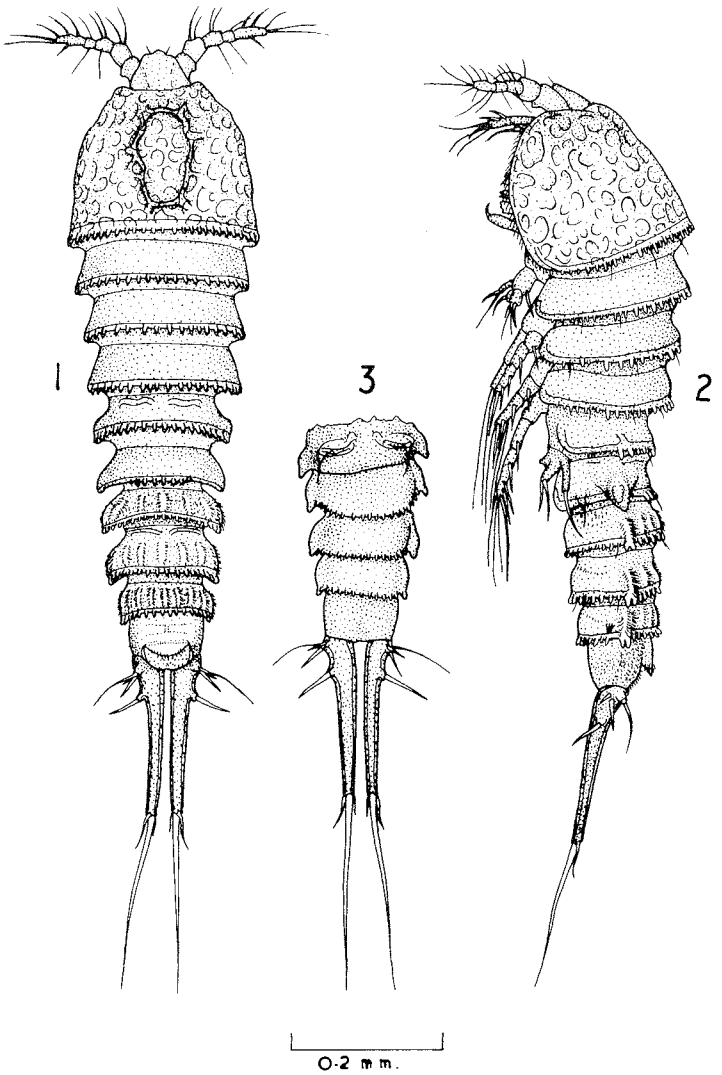
The family Cletodidae is known to contain a total of 34 genera, including three established since the most recent key to them (Lang 1965), but only five (*Nannopus, Huntemannia, Parepactophanes, Cletocamptus,* and *Limnocletodes*) are found to any great extent in waters which are not fully marine in character. It is therefore of great interest that the present species, whose discovery in Australia is preceded only by *Cletocamptus deitersi* (see Hamond 1973) and *Cletodes* sp. nov. (see Hamond, in press), should also be an inhabitant of brackish waters; although such waters contain a rich harpacticoid fauna both in New South Wales and in Tasmania, taxonomic considerations appear to justify the publication of this species by itself.

MATERIAL AND METHODS

The material of *A. aestuarinus* studied was as follows:-
(1) The type lot, consisting of 73 females of which 5 were ovigerous, 27 adult males, and 29 copepodites, among an *Enteromorpha*-like alga growing on glutinous black mud, just submerged at low tide, about a hundred yards up the estuary from the mouth of Browns River, Hobart, Tasmania (approximate position 42°58'S., 147°20'E.), collected by Dr. P.S. Lake and myself in the afternoon of 29.1.1972.
(2) An adult female, which had lost its furca, at Tea Gardens, New South Wales, in the seaward end of the estuary draining the Myall Lakes into Port Stephens (approximate position 32°40'S., 152°10'E), collected by Mr. D.J. Tranter in 1971 (no date).
(3) An adult male in the entrance to Middle Creek, close to where it drains into the western end of Narrabeen Lagoon (northern coastal suburbs of Sydney, approximate position 33°43'S., 151°16.3'E.), 15.11.1970, collected by me.

The specimens were studied as in Hamond (1969, 1971). Three adults of each sex were dissected from the type lot, the female holotype and female paratypes 1 and 2, and the male allotype and male paratypes A and B. The Tea Gardens' specimen is not

considered as a paratype owing to the lack of its furca; the Narrabeen specimen, and several of the paratypes from Hobart, are retained in my own collection. The holotype (G1447) and allotype (G1448) have been deposited in the Tasmanian Museum; all the figures were drawn from them, except for figure 15, which was drawn from paratype B.



FIGS. 1 - 3 - *A. aestuarinus*, ♀. Fig. 1, dorsal view; Fig. 2, lateral view; Fig. 3, abdomen in ventral view.

DESCRIPTION

Female Holotype

Length 1.0 mm; prosome wider and higher than the rest of the body, which tapers away evenly from it (figs. 1-3). Rostrum triangular, depressed ventrally, and with a

rounded apical lobe (figs. 1, 14). Prosome irregularly pitted, and with chitinous ribs on the inner surface arranged to form an irregular oval dorsally (fig. 1). First pediger fused with prosome. All somites have a dorsal and lateral fringe of coarse tubercles on the rear margin with a few sensillae; on the front half of the genital double-somite this fringe is reduced to a dorsal row of seven tubercles, but on the rear half, and on the two succeeding somites, this fringe completely encircles the body, with lateral interruptions due to the moderately pronounced pleura. The abdominal somites also have their dorsal surfaces raised into a series of rounded carinae (fig. 4) whose slopes are covered with minute tubercles; the operculum is curved, and its margin is smooth but overhung by spinules arising from its upper surface. Each furcal ramus is about five times as long as its greatest (basal) width, and has on its outer surface a basal protuberance with three setae and a more distal protuberance with one spine-like seta; the basal parts of the rami are noticeably convergent, but from there onwards they curve so as to run parallel. The apex of each ramus has a large median seta only slightly longer than the ramus itself; the smallest (innermost) seta arises directly from the ramus, whereas the slightly larger (outermost) seta appears to arise from the base of the median seta (figs. 7, 8).

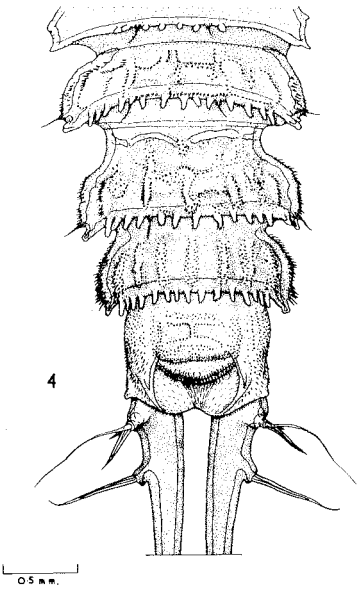


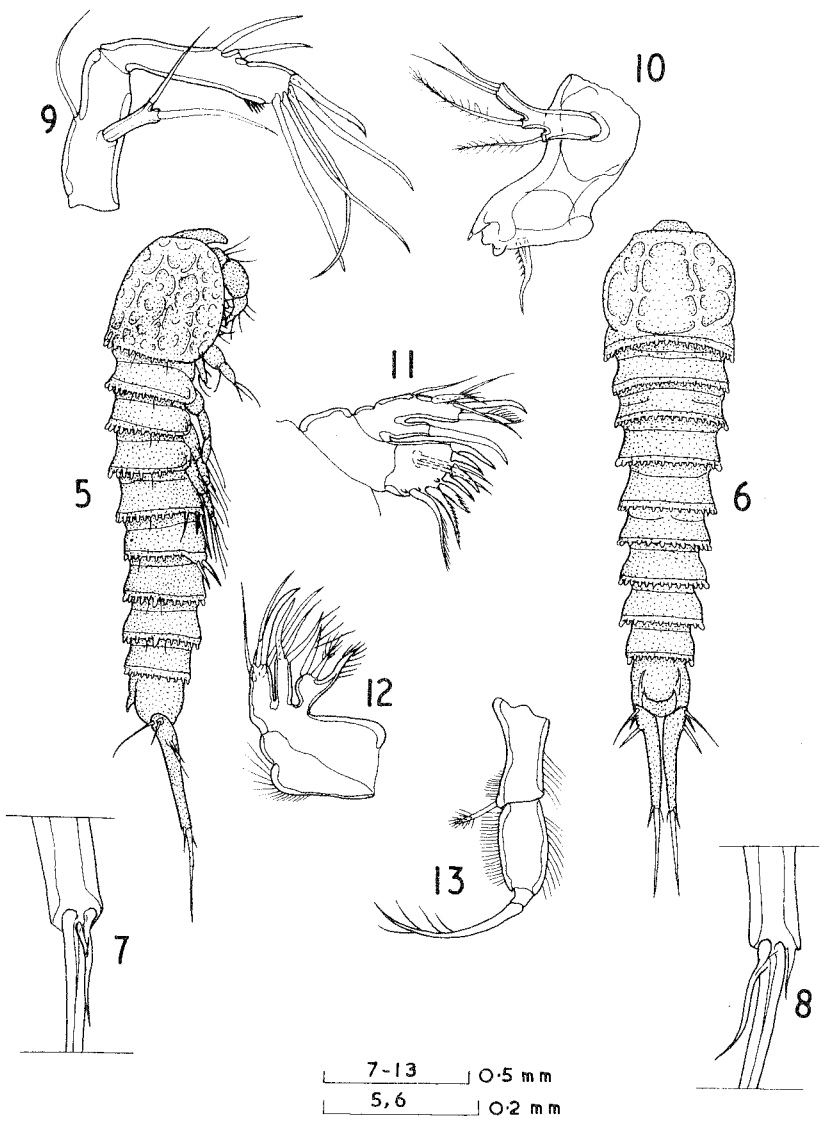
FIG. 4 - *A. aestuarinus*, ♀, dorsal view of abdomen.

Antennule (fig. 14) of six segments, with a large aesthetasc on the fourth segment and a very thin one on the apex of the sixth segment; the third segment has a rearward prominence bearing a large coarsely pinnate seta, all other antennular setae being smooth. The object resembling a wine-glass in figure 14 is the lorica of an epizoic ciliate, intentionally omitted in figures 1 and 2.

Antenna (fig. 9) with a single-segmented exopod bearing two smooth setae, one apical and the other subapical. Mandible (fig. 10) with a small cutting edge with three blunt teeth, and a single-segmented exopod with two pinnate lateral setae and two smooth terminal setae. Maxillule (fig. 11); precoxal arthrite with a cutting edge of four teeth and three unilaterally pinnate spines; coxa with a stout inner spine; basis with, terminally, a smooth hooked spine and a straight unilaterally pinnate spine, and subterminally two straight smooth setae; exopod represented by a smooth slender seta, endopod by a stout seta which is pinnate apically. Maxilla (fig. 12) with three endites (coxa not separable from either the precoxa or the basis), the two proximal endites each with one spiniform thorn and two spines; basal endite with a stout apical spine surrounded by three smooth setae; exopod and endopod lacking. Maxillipede (fig. 13) with a long claw bearing four slender setules, and an elongate-oval hand whose palmar edge bears a comb-like row of setules.

All four pairs of swimming-feet have three-segmented exopods; the first three pairs also have two-segmented endopods, whereas P4 has no endopod at all. Setal formula:-

P1 (fig. 17)		P2 (fig. 18)		P3(fig. 20)		P4 (fig. 21)	
exp	enp	exp	enp	exp	enp	exp	enp
0.0.022	0.111	0.1.022	0.020	0.0.022	0.020	0.0.122	-



FIGS. 5-13. - *A. aestuarinus* 5 & 6 ♂, the rest ♀. Fig. 5, lateral view; Fig. 6, dorsal view; Fig. 7, apex of left furcal ramus, external lateral view; Fig. 8, the same in dorsal view; Fig. 9, antenna; Fig. 10, mandible; Fig. 11, maxillule; Fig. 12, maxilla; Fig. 13, maxillipede.

P4 has a pear-shaped setophore with a swollen base tapering rapidly to a very short and small neck, bearing a short smooth seta.

P5 (fig. 23) with fused rami; the basiendopodal lobe bears two small smooth setae, and the exopodal lobe has two large pinnate apical setae and a small smooth surface seta. The external seta of the basiendopod is even longer (although less heavily pinnate) than the exopodal setae, and is borne on a long cylindrical setophore which is pilose all round.

Male Allotype

General appearance (figs. 5, 6) very like that of the female, but markedly slimmer in proportion to its length (0.74 mm). In dorsal view the prosome has a very characteristic shape (fig. 6), as if a rectangle, slightly longer than broad, has had its two front corners cut off sharply at about 45 degrees. Rostrum turned downwards even more than in the female; prosomal sculpture less clearly defined. Somitic ornamentation as in the female except that, on the sixth pediger, the fringe of tubercles extends dorsally and laterally from one P6 to the other (fig. 5) instead of being merely dorsal.

Antennule (fig. 15) strongly subchirocerate, with an aesthetasc on the fourth segment and a very small one subterminally. P2 (fig. 19) with the inner seta of the middle exopod segment modified into a short conical spine with very thick walls; the inner endopod seta is short and smooth, the outer being long and bipinnate as in the female. P4 (fig. 22) has a small basal setophore with a very large seta, and there is no inner seta on the terminal exopod segment. P5 (fig. 16) with fused rami bearing a total of five spiniform setae; the innermost spine points away from the bodywall (and thus towards the viewer) at about 35 degrees, and the external seta also points away from the body at a shallow angle sideways, whereas the other setae lie more or less flat along the ventral surface. P6 with two spiniform setae, the outer being straight and the inner curving slightly outwards. Spermatophore cylindrical with rounded ends and curved stalk. Other features as in female.

Colour

In life, unknown; after a fortnight in dilute formalin, a very dark horny chestnut brown in the adults, the copepodites being paler inversely to their age.

Range of variation

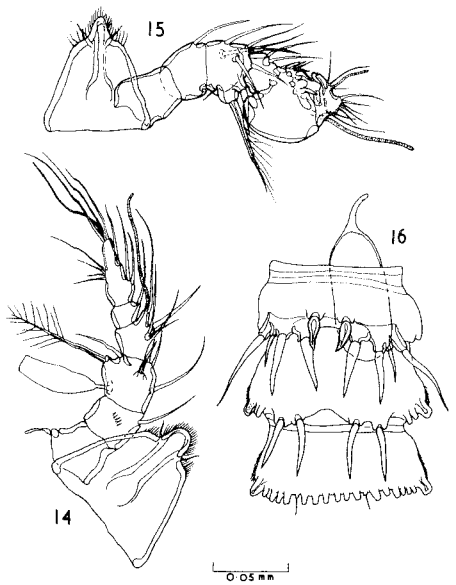
None in the dissected specimens; however, paratype A had an abnormality in that the right hand P2exp2 had two identical inner spines, one above the other, whereas its left hand partner had the usual single spine. The lengths of the adults vary hardly at all in either sex.

REMARKS ON THIS AND OTHER RECENTLY ESTABLISHED GENERA

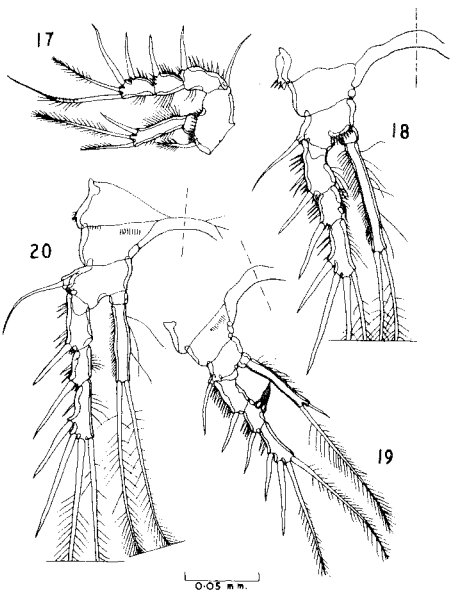
Australonannopus is clearly a cletodid, but is unique in having no trace of an endopod in P4 of either sex, and in the location of the male secondary sexual characters on the exopod of P2 instead of (as in all other cletodid genera) on the endopod of P3, which in *Australonannopus* is indistinguishable in the two sexes. The very small seta on the surface of the female P5 is also unrecorded for any other cletodid, but may possibly have been overlooked. The shape of the furca is rivalled only by that of *Stylicletodes verisimilis* Lang (1965, fig. 241a), which is very different in other ways.

Since Lang's key (1965, pp. 424-426), the following genera (apparently all valid) have been described; *Hypalocletodes* Por (1967), *Odiliacletodes* Soyer (1964), and *Coralliicletodes* Soyer (1966). Using Lang's key, *Hypalocletodes* leads to *Eurycletodes*, the distinctions between them being given by Por (1967, p. 159). Of Soyer's genera, *Odiliacletodes* leads to *Fultonia*, but the respective female fifth feet are very different (Soyer 1964, pp. 639-641); and *Coralliicletodes* leads to couplet 26 but has four setae on the basiendopod of the female P5, whereas genera keying out after couplet 26 have either 5 or 6 setae, or 3 setae or fewer, in this position.

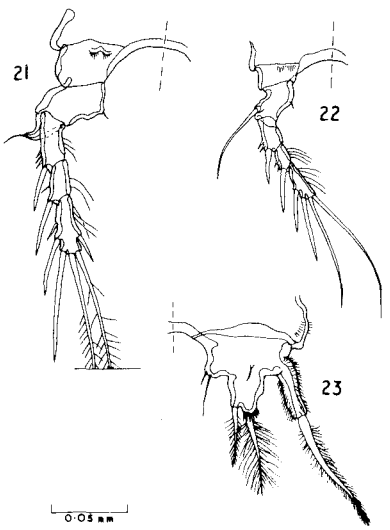
Australonannopus could be fitted into the very beginning of the key, owing to the complete lack of a fourth endopod; however, this is not a taxonomically safe proceeding, because this endopod is very small in the known members of some other genera, and it is quite possible that undiscovered members of these genera will also lack this endopod entirely. Alternatively, *Australonannopus* leads either to couplet 29 (*Eurycletodes*, which is very different in several ways) or to couplet 21, next to *Nannopus* which is also found in reduced salinities; however, the figures of



FIGS. 14-16.- *A. aestuarinus*. 14 ♀, the others ♂. Figs. 14 & 15, rostrum and antennule in dorsal view; Fig. 16, ventral view of P5 and P6, with the spermatophore.



FIGS. 17-20.- *A. aestuarinus*. 19 ♂, the others ♀. Fig. 17, P_1; Figs. 18 & 19, P_2; Fig. 20, P_3.



FIGS. 21-23.- *A. aestuarinus*. 22 ♂, the others ♀. Figs. 21 & 22, P_4; Fig. 23, P_5.

Nannopus (Lang 1948, pp. 1292-3) reveal a good many differences from those of *Australonannopus*. The latter appears to occupy a rather isolated position within the family, although *Nannopus* is possibly its nearest relative (hence the generic name, intended to convey the idea of "the Australian analogue of *Nannopus*").

DIAGNOSIS OF AUSTRALONANNOPUS, GEN. NOV.

A cletodid with a slender body, not compressed or depressed, whose somites are clearly demarcated and have tuberculate rear margins. Rostrum distinct at base, triangular, and with an apical protuberance and terminal fringe of hairs. Furcal rami long, basally convergent and distally parallel, the interramal distance small. Antenna with single-segmented exopod carrying two setae. Mandible and maxilla both without exopod or endopod; the latter has three endites. Each swimming leg has a three-segmented exopod, whose distal segment bears two outer spines; P1 to P3 each with an endopod composed of a short proximal and a very long distal segment; P4 without any trace of an endopod.

Female; genital double-somite distinctly divided all round; antennule with six segments, the fourth and sixth bearing aesthetascs; P5 with fused rami, with a total of four marginal setae and a small surface seta.

Male; antennule strongly subchirocerate; P2exp2 with the inner seta transformed into a stout spine; P3 as in the female, except that the inner of the two terminal endopod setae is short and smooth; P5 and P6 with 5 and 2 spiniform setae respectively.

Type (and only known) species: *A. aestuarinus*, sp. nov.

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Dr. Hamond's present address is C/o Department of Zoology, University of Melbourne.