

SPECIES OF *EURYDICE* (ISOPODA, FLABELLIFERA) FROM SOUTHERN BRAZIL*

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SYNOPSIS

This paper reports species of *Eurydice* (Isopoda, Flabellifera) occurring on the continental shelf of southern Brazil, from lat. 22°00'S. Three species are recorded. *E. littoralis* (Moore, 1902), is a new occurrence from Brazil. Detailed illustrations and new morphological data are furnished for this species hitherto inadequately described. *E. elongata* sp. n. and *E. emarginata* sp. n., are new to science. The flagellar process on the antenna 2, reported in three species of *Eurydice*, seems to be an exclusively male characteristic, and probably it will also occur in the males of most of the already described species. Genus and species diagnosis are provided, together with a classification key for all species recorded up to date from southern Brazil. All available distributional and ecological information completes the account of each species.

INTRODUCTION

The genus *Eurydice* (Isopoda, Flabellifera) is remarkable amongst the Isopoda, because the majority of its members are able to actively swim and to migrate vertically (Fage, 1933; Macquart-Moulin, 1969; Jones & Naylor, 1970). Species of the genus are frequently found in the surface plankton, where often a large number of specimens can be collected, particularly when attracted by night lights (Fage, *op. cit.*; Băcescu, 1948).

Many species of the genus are found in the intertidal zone along sand beaches (Jones & Naylor, 1967). Extensive studies have been conducted to ascertain the bathymetrical distribution and ecological preference of these species, as well as, the rôle of each in the ecological zones of the beaches (Soika, 1955; Jones, 1969, 1970; Fish, 1970).

The purpose of this paper is to report the species of *Eurydice* gathered up to now along the southern Brazilian coast, both on bottom and surface plankton. It is hoped that it may be the starting point for future ecological studies.

* Part of material studied was gathered during the author's ISOTAN-DRAGA I Program.

Genus *Eurydice* Leach, 1815

SYNONYMS - *Eurydice* - Richardson, 1905, p.123; Hansen, 1905, p.339-340; Tattersall, 1911, p.202-203; Vanhöffⁿ, 1914, p. 505; Naylor, 1957, p.3; Menzies & Barnard, 1959, p.31; Menzies & Frankenberg, 1966, p.48; Menzies & Glynn, 1968, p. 39-40.

Branchuropus - Moore, 1902, p. 167; Richardson, 1905, p. 128.

DIAGNOSIS - Antenna 1 with 1st article of peduncle extended straight in front at right angle to remaining antennal articles. Antenna 2 with peduncle of 4 articles. Endite of maxilliped without hooks. Pleon with 5 free pleonites. Uropod biramous; peduncle with inner distal angle produced only slightly backwards.

- modified from Richardson, 1905.

REMARKS - Species of Isopoda can be easily distinguished as belonging to the genus *Eurydice* by the very striking and peculiar arrangement of the 1st peduncular article of antenna 1 in relation to the remaining ones.

The genus contains to date no less than 21 species. Three species are recorded from southern Brazil, 2 of which are new to science. These species are: *E. littoralis* (Moore, 1902), *E. emarginata* sp. n. and *E. elongata* sp. n.

KEY TO SPECIES OF *EURYDICE* FROM SOUTHERN BRAZIL

- 1 - Apex of pleotelson emarginate, and with 11 plumose setae and 4 unequal movable spines, of which 2 longer and medial, and 2 shorter lateral *E. emarginata* sp. n. (p. 70)
- Apex of pleotelson not emarginate 2
- 2 - Pleotelsonal apex with 4 plumose setae and 4 unequal movable spines; innermost 2 movable spines flanking 2 plumose setae and an irregular 3-pointed apex, reaching back to a level beyond posteromarginal spinelike points of pleotelson *E. elongata* sp. n. (p. 73)
- Pleotelsonal apex with 10 plumose setae and 4 unequal movable spines, of which 2 longer and medial, and 2 shorter lateral; 1 plumose seta between major and minor spines; 2 major movable spines one on each side of 4 medial plumose setae longer than spines *E. littoralis* (Moore) (p. 76)

Eurydice emarginata sp. n.

(Fig. 1-8)

SYNONYMS - None.

DIAGNOSIS - Antenna 2 moderately slender, reaching back to about pereonite VII. Coxal plates broad, elongate, all of them with inferodistal angle

extending rearwards into an acute point increasing in size from before backwards. Pleotelson with a middorsal anterior concavity; lateral margins broadly rounded, converging regularly towards an emarginate apex; apex with 2 small posteromarginal spinelike points, one on each side, flanking 11 plumose setae and 4 unequal movable spines, of which 2 longer and medial, and 2 shorter lateral; minor movable spines flanked outwardly by 2 plumose setae; 1 plumose seta between major and minor spines; 2 major spines located one on either side of the apical emargination, which is fringed by 5 plumose setae. Uropod, outer angle of exopod with 3 movable spines and 4 bare setae, 1 seta small and lateral, and 3 longer placed between 2 movable spines; outer distal angle of endopod with 2 movable spines flanking 1 plumose and 2 unequal bare setae, 1 of which very long.

HOLOTYPE - Young female, 4.6 mm long. E. Nonato col. Deposited in the "Museu de Zoologia", University of São Paulo, São Paulo, Brazil.

TYPE LOCALITY - Praia do Lamberto, Enseada do Flamengo, Ubatuba, São Paulo, alongside the pier of the Base Norte, Instituto Oceanográfico, USP.

NAME - The species name *emarginata*, from *e* + Latin *marginatus*, alludes to the notched apex of pleotelson.

SIZE RANGE - No data available, since adult specimens were not collected.

MATERIAL EXAMINED - See Station List (p. 80) for details on station data. São Paulo. Praia do Lamberto, Enseada do Flamengo: holotype specimen plus 5 juveniles.

BATHYMETRICAL DISTRIBUTION - One single record from surface.

GEOGRAPHICAL DISTRIBUTION - Known only from the type locality.

SUPPLEMENTARY DESCRIPTIVE NOTES -

Body - (Fig. 1-2) - Elongate, slender, slightly arched. Eyes large, black pigmented. Coxal plates as in Figure 2, being noteworthy that also the inferior distal angle of pereonite I extends backwards to a small acute point. Coxal plates of pereonite VII as long as those of pereonite II, medially. Apex of pleotelson as shown in Figure 5.

Antenna 1 - (Fig. 3) - Flagellar article 1 a little longer than peduncular article 3. Flagellum 5-articulated, with all the articles, except the minute last one, bearing long thick aesthetes. Flagellum reaching back to about middle eye level.

Antenna 2 - (Fig. 4) - Article 3 of peduncle about 2.2 times shorter than article 4. Outer margin of peduncular article 3 with a longitudinal row of 8 stout setae increasing in size from before backwards, inner margin with 1 broom sensory seta proximally, and 1 seta at the inferodistal angle. Peduncular article 4 with 2 pairs of setae along outer margin, few setae near outer distal angle, 1 broom sensory seta and 1 simple seta distally on the inner margin. Flagellum composed of 13-14 articles.

Pereopod I - (Fig. 6) - Inferodistal angle of basis with elongate setae. Ventral margin of ischium with a longitudinal row of setae, superior distal angle also with setae. Merus, ventral margin with 3 stout spines, 2 short pectinate setae, and 1 simple seta, upper distal angle with setae. Carpus small, lower margin with 1 single seta and 1 stout spine. Propodus, ventral margin with 3 short pectinate setae, a submarginal row of elongate pectinate setae, infero distal angle with 1 strong terminal spine minutely plicate at the upper surface. Dactylus and posterior end of propodus: see Figure 6a.

Pereopod VII - (Fig. 7) - Basis with ventral margin bearing 1 thick pectinate seta and few setae distoposteriorly, distal angle with elongate setae. Merus and carpus broad. Dactylus small, narrow and elongate. See accompanying figure for details on setal pattern and shapes of setae.

Uropod - (Fig. 8) - Protopod with 1 elongate plumose seta on inner distal angle, outer margin moderately rounded and bordered by long plumose setae, 1 large stout spine on inner distal angle (Fig. 8a). Setal-spine complex at the exopod outer posterior angle as in Figure 8b, that on endopod as shown in Figure 8c.

REMARKS - This species is most like *E. spinigera* Hansen, 1890, in that the emarginate apex of pleotelson bears 4 movable spines of unequal size. However, *E. emarginata* can be easily distinguished by the shape of pleotelson, devoid of a distinct posteromarginal constriction, by the small number of plumose setae on the notch, by the presence of 4 plumose setae, 2 on each side, flanking the outermost movable spines, and by the much anterior insertion on both plumose setae and minor movable spines in relation to the major ones.

ECOLOGICAL AND DISTRIBUTIONAL NOTES - Very little can be reported on this species, since it is known only from the type locality. As is usual within the species of *Eurydice*, this species also migrates vertically at night to the sea surface, where it can be attracted by night lights. It does not seem to be a common species in the place of collection, since only few individuals were collected, in spite of the numerous plankton samples examined from the site which were loaned to the author.

Eurydice elongata sp. n.

(Fig. 9-20)

SYNONYMS - None.

DIAGNOSIS - Antenna 2 longer and more slender in the male, reaching back to the forward level of pleotelson, in the female reaching back to about distal level of pereonite VII. Coxal plates broad and elongate, with the lower distal angle extending backwards into an acute point, larger on pereonite VI, lacking on pereonites I and II. Dorsal surface of pereonites and pleonites with a slight groove, in the male lightly marked. Pleotelson with a middorsal anterior concavity; lateral margins broadly rounded anteriorly, narrowing backwards regularly towards a truncate apex; apex with 2 large postero marginal spinelike points, one on each side, flanking 4 plumose setae and 4 equal movable spines; 1 lateral plumose seta flanking outwardly 1 movable spine; spines placed close together, with no plumose setae between them, but usually with 1 minute simple seta; innermost movable spines flanking an irregular 3-pointed apex and 2 plumose setae, midapical point reaching back to a level beyond posteromarginal spinelike points of pleotelson. Uropod, outer distal angle of exopod with 3 movable spines and 4 unequal bare setae placed between 2 spines; endopod outer distal angle with 2 movable spines flanking 1 plumose seta and 2 bare setae, 1 of which very long.

HOLOTYPE - Adult male, 5.9 mm long. Y. Matsuura col.; allotype ovigerous female, 5.0 mm long. P.S. Moreira col. Deposited in the "Museu de Zoologia", University of São Paulo, São Paulo, Brazil.

TYPE LOCALITY - Rio de Janeiro, Sta. L-269, lat. 23°14'S, long. 44°12'W; local depth: 45 m sampling depth: from 35 m to surface.

NAME - The specific name is derived from the Latin word *elongatus*, and refers to the male elongate body.

SIZE RANGE - Adult males, 5.6 - 6.1 mm long; adult females, 4.5 - 5.6 mm long.

MATERIAL EXAMINED - Details on stations in Station List (p. 80). Rio de Janeiro. Sta. II: over 30 specimens. Sta. 1138: 1 specimen. Sta. L-269: 15 specimens. Sta. P.20.1: 3 specimens. São Paulo. MBT Sta. 51: 1 specimen. MBT Sta. 50: 3 specimens.

BATHYMETRICAL DISTRIBUTION - Probably from surface to 62 m depth.

GEOGRAPHICAL DISTRIBUTION - Off Rio de Janeiro and off N coast of São Paulo, Brazil.

SUPPLEMENTARY DESCRIPTIVE NOTES -

Body - (Fig. 9-11) - Longer, slender and only slightly arched in the male, robust and strongly vaulted dorsally in the female. Coxal plates as in Figure 11; the absence of acute inferodistal points on pereonites I and II should be noted. Coxal plates of pereonite VII about 1.3 times shorter than those of pereonite II, medially. Surface of body and chiefly of appendages minutely scaled; middorsal surface of male pleonites noticeably concave. Eyes large, black pigmented, larger in males than in females, corneal facets also larger and more convex in the male. Apex of pleotelson: see Figure 12.

Antenna 1 - (Fig. 13) - Without striking differences between the sexes, but in the male the flagellar article 1 is proportionally longer than all remaining flagellar articles together. Male peduncular article 3 about 2.8 times shorter than article 1 of flagellum (Fig. 14). Flagellum reaching back to about the posterior level of the eyes; it is 5-articulated, with all the articles, except the minute last one, bearing long aesthetes, in the male in higher number.

Antenna 2 - (Fig. 15) - Article 3 of peduncle about 1.7 times shorter than article 4. Outer margin of peduncular article 3 with a short longitudinal row of 4 stout setae, increasing in size posteriorly, inner margin with 1 proximal, broom sensory seta, lower distal angle with 1 seta. Peduncular article 4 with small setae single or distributed in transverse rows along outer margin, 1 broom sensory seta nearby inferior distal angle. Flagellum composed of 26-27 (male) and 24-25 articles (female), the first ones shorter, the remaining increasing in slenderness posteriorly; in the males most of the flagellar articles with a plicate distal process (Fig. 15a).

Pereopod I - Male - (Fig. 16) - Lower distal angle of basis with few setae. Dorsodistal angle of ischium with 1 stout spine, ventral margin bordered by simple setae and 3 short pectinate distal setae. Merus with inferior margin with 3 stout spines, 2 short pectinate setae and 1 simple seta, dorsodistal angle with both 1 stout spine and simple setae. Carpus small, lower margin with 2 unequal setae, lower distal angle with 2 short pectinate setae. Propodus with a submarginal row of spaced setae, 4 stronger pectinate setae along inferior margin, ventrodistal angle with 1 robust terminal spine minutely plicate at the surface. Dactylus and rear margin of propodus as in Figure 16a, ventral side of claw with 1 seta.

Pereopod I - Female - (Fig. 17) - Similar to the male. Merus with setae on the upper distal angle, but no stout spine. Propodus with ventral margin bordered by 5 strong pectinate setae, instead of 4 as in male.

Pereopod VII - (Fig. 18) - Basis bearing at ventral margin 2 setae distoposteriorly, distal angle with elongate setae. Ischium through propodus

with both stout spines and slender setae in transverse rows along ventral and dorsal margins, as well as on rear angles of articles. Merus and carpus broad. See accompanying figure for details on setal pattern.

Pleopod 2 - Male - (Fig. 19) - Protopod with 3 stout pectinate hooks and 3 plumose setae distally on the inner margin. Exo- and endopod of about equal length. Appendix masculinum slender, almost straight, slightly enlarged at the rear portion, apex slightly and unequally emarginate.

Uropod - (Fig. 20) - Inner distal angle of protopod with 1 short plumose seta, outer margin widely rounded, and bordered by long plumose setae, 1 stout spine distally (Fig. 20a). Setal-spine complex at the outer posterior angle of exopod as in Figure 20b, at the endopod outer posterior angle, as in Figure 20c.

REMARKS - This species can be easily distinguished from all other *Eurydice* species, by the morphology of the coxal plates, and by the characteristic 3-pointed apex of pleotelson. The movable spines, placed close together on the pleotelson apex, are of similar size, and in most cases have a short delicate seta between them. At no time were plumose setae observed between the spines, nor were the 2-paired spines placed far from one another.

Interesting to note that most of the examined specimens did not have the midapical tip of pleotelson, consequently this locale is more or less smooth, and with or without plumose setae (Fig. 12a, b). The apex of the pleotelson seems to be very fragile, and most likely was broken off during capture and handling of the material aboard ship.

Secondary sexual dimorphism is not striking in this species. However, it can be noted chiefly in the size (see *Size Range*) and morphology of the body (cp. Fig. 9-10), in length of antenna 2, longer in male, and in the presence of a plicate process in the flagellum of male antenna 2. Small differences between the sexes are also present in the ornamentation of pereopods II and VII.

The plicate flagellar process found in males of both *E. elongata* sp. n. and *E. littoralis* (Moore), occurs also in males of *E. valkanovi* Băcescu (1949, p. 15, fig. 31 a-b). Regarding the remaining species of the genus, there is no available information nor are illustrations suggesting such a presence on the flagellar articles of antenna 2. Băcescu studied only males and juveniles, and consequently he could not verify the presence of process on the other sex. However, because of the material studied here, it is possible to say that the flagellar process seems to be an exclusively male characteristic, and that probably it will also occur in the males of most of the already described species, were their flagellar articles carefully examined.

ECOLOGICAL AND DISTRIBUTIONAL NOTES - The species was collected on the bottom as well as swimming freely in the water. The upper limit of the

bathymetrical distribution of the species is not precise, since at Sta. L-269, the animals were collected in a vertical zooplankton haul from a depth of 35 m to the surface.

E. elongata sp. n. seems to be a cryophyle eurythermic species, as suggested by the available bottom water temperatures ranging 14.95 to 19.98°C, at the collection sites. However, as the species migrates vertically, it may also be found in surface waters of higher temperature: 23.46°C (Sta. L-269). The salinity values associated with the species ranged from 35.51 to 36.04‰.

Eurydice littoralis (Moore, 1902)

(Fig. 21-33)

- SYNONYMS - *Branchuropus littoralis* - Richardson, 1905, p. 128-130, fig. 110-111;
- Eurydice branchuropus* - Menzies & Barnard, 1959, p. 32, fig. 26-27; Schultz, 1966, p. 14; Makkaveyeva, 1968, p. 103;
- Eurydice littoralis* - Menzies & Frankenberg, 1966, p. 49, fig. 24; Menzies & Glynn, 1968, p. 40, fig. 4.

DIAGNOSIS - Antenna 2 reaching back to about level of pereonite VI. Coxal plates large, elongate, all of them with lower distal angle extending backwards into an acute point increasing in size from before rearwards. Pleotelson with a middistal anterior concavity; lateral margin widely rounded, converging distally to a broad, rounded apex; apex with 2 large posteromarginal spinelike points, one on each side, flanking 10 plumose setae and 4 unequal movable spines, 2 of which longer and medial, and 2 shorter lateral; minor movable spines flanked outwardly by 2 plumose setae; 1 plumose seta between major and minor spines; 2 major movable spines one on either side of 4 plumose setae longer than spines. Uropod, outer distal angle of exopod with 3 movable spines and 4 base setae, placed between 2 spines; endopod, outer distal angle with 2 movable spines flanking 2 long plumose setae and 1 short bare seta.

HOLOTYPE - A specimen 6.0 mm long, sex not stated (Moore, 1902, *in* Richardson, 1905).

TYPE LOCALITY - Puerto Rico, about 36 m depth (Moore, 1902, *in* Richardson, *op. cit.*).

SIZE RANGE - Adult males, 3.3 - 5.0 mm long; ovigerous females, 3.0 - 4.8 mm long. The specimen (holotype) studied by Moore measured 6.0 mm, but as mentioned, the sex was not noted.

MATERIAL EXAMINED - Details on stations see Station List (p. 80). São Paulo. Praia do Lamberto, Enseada do Flamengo: 27 specimens; Sta. V-65.8: 15 specimens; Sta. E.65.8: 3093 specimens; Sta. E.65.5: 11 specimens; Sta. MBT 91: 4 specimens.

SUPPLEMENTARY DESCRIPTIVE NOTES -

Body - (Fig. 21) - Elongate, moderately arched. Eyes large, black pigmented. Coxal plates as shown in Figure 22, where pereonite I should be noted also with the lower distal angle extending backwards into a point. Coxal plates of pereonite VII about 1.3 times longer than those of pereonite II, medially. Apex of pleotelson: see Figure 25.

Antenna 1 - Female (Fig. 23); *male* (Fig. 24) - Article 1 of flagellum in both sexes about 1.3 times longer than peduncular article 3. Article 2 of peduncle with 3 (female) and 4 (male) plumose setae and 1 broom sensory seta on the inner side. Flagellum of 5 articles bearing thick and elongate aesthetes, last article minute, devoid of aesthete, and tipped by a tuft of setae.

Antenna 2 - Female - (Fig. 26) - Article 3 of peduncle about 2 times shorter than article 4. Peduncular article 3 bearing a longitudinal row of 9 stout, minutely pectinate setae at the outer margin, setae increasing in size from before backwards, inner margin distally with 2 setae, proximally with 1 elongate broom sensory seta. Article 4 of peduncle with 2 setae on the outer margin, 1 broom seta and 1 simple seta distally on outer and inner margins, both kinds of setae much shorter on the outer margin. Flagellum composed of 14-15 articles in both sexes.

Antenna 2 - Male - Flagellar articles bearing distally a plicate process (Fig. 27), lacking in the female.

Pereopod I - Female - (Fig. 28) - Basis with elongate setae distally on the upper margin and on the inferodistal angle. Ischium, ventral margin bordered by slender setae, dorsodistal angle with setae. Lower margin of merus with 4 stout spines, 3 short pectinate setae and 1 simple seta, dorsodistal angle with setae. Carpus with 1 stout seta and 1 seta ventrally. Propodus with a submarginal row of setae, lower margin with 4 stout pectinate setae, inferodistal angle with 1 strong terminal spine minutely plicate at the upper surface. Dactylus and rear portion of propodus as shown in Figure 28a.

Pereopod I - Male - (Fig. 29) - Similar to the female, but differing in being very poorly ornamented. Propodus end and dactylus: see Figure 29a.

Pereopod VII - Female (Fig. 30); *male* (Fig. 31) - Basically similar, particularly in the shape of the articles and the shape of the setae. However,

the sexes differ strongly in the pattern of ornamentation, and in number of setae present in all articles. The female pereopod VII differs from the male chiefly in the following features: a) it is distinctly broader and more stoutly built; b) it is more setose, with the simple setae being longer and more numerous on each of the articles; c) higher number of transversal rows of slender setae distally on the lower margin of merus. Other details of minute differences between both male and female pereopod VII, may be seen in the accompanying figures.

Pleopod 2 - Male - (Fig. 32) - Protopod with 3 strong hooks and 1 plumose seta nearby posterior inner angle. Exo- and endopod similar in shape and about equal length. Appendix masculinum (Fig. 32a) about 1.3 times shorter than endopod; it is slender, enlarged distally and distinctly incurved outwards, outer and inner margins bordered by minute setae, apex slightly and unequally emarginate.

Uropod - (Fig. 33) - Protopod with 1 elongate plumose seta on the inner distal angle, outer margin moderately rounded bearing long plumose setae, outer distal angle with 1 stout large spine (Fig. 33a). Setal-spine complex at the outer posterior angle of both exo- and endopod, respectively, as in Figures 33b and 33c.

REMARKS - *E. littoralis* has been very poorly described and illustrated. The accompanying drawings and supplementary notes should further the identification and complement the present knowledge on this species. It may be easily distinguished from all others in the genus by the size and arrangement of setae and spines on the pleotelson apex, and by the setal-spine complex in both exo- and endopod outer distal angles of uropod.

The available published data and the large amount of material studied, have shown that the number of pleotelsonal movable spines (2 minor lateral and 2 major medial) are constant, contrary to the observed variation in the number of plumose setae (varying from 2 to 4) placed between the 2 major movable spines (Menzies & Barnard, 1959, p. 33, fig. 27-C; Menzies & Frankenberg, 1966, p. 90, fig. 24-D-H). No such variation was observed in the present material.

The 2 outermost movable spines are always approximately half the length of the major medial spines (Menzies & Barnard, *op. cit.*, fig. 26; Menzies & Frankenberg, *op. cit.*, fig. 24; and Fig. 25 from this work). Menzies & Glynn's (1968, p. 40, fig. 4-B) statement that the medial plumose setae are half the length of the major movable spines could not be confirmed.

Secondary sexual dimorphism is present but not striking. Males seem to be slightly longer than females (see *Size Variation*), they bear an antennal process on the flagellum of antenna 2, and both pereon and pleon are approximately of the same width. Noticeable differences are found also in the number of setae and in the pattern of setation of pereopods I and VII.

The adult males can be distinguished at once from the females by the well developed penis, and by the endopod of pleopod 2 bearing the appendix masculinum.

BATHYMETRICAL DISTRIBUTION - From surface to 960 m depth.

GEOGRAPHICAL DISTRIBUTION - Puerto Rico (Moore, 1902, *apud* Richardson, 1905; Makkaveyeva, 1968). USA: southern California (Menzies & Barnard, 1959), La Jolla Canyon, off southern California (Schultz, 1966), and off Georgia coast (Menzies & Frankenberg, 1966). São Paulo, Brazil (new occurrence).

ECOLOGICAL AND DISTRIBUTIONAL NOTES - In the Northern Hemisphere the species occurs in both the Pacific and Atlantic Oceans. This is the first record of the species off Brazil. Its finding off São Paulo extends considerably southwards the geographical distribution of the species.

E. littoralis seems to be a eurybathic species, and was reported from the surface to 960 m depth, off Georgia, USA (Menzies & Frankenberg, *op. cit.*). However, most of the species recorded are restricted to the continental shelf (Menzies & Barnard, *op. cit.*; Menzies & Frankenberg, *op. cit.*). Off São Paulo the species has been collected between 10-40 m depth.

The species can be attracted by night lights (Menzies & Glynn, *op. cit.*), and occurs on both the bottom, and not infrequently at the sea surface. *E. littoralis* seems to be the most common and abundant species of the genus in southern Brazil, and its finding along and off all the northern Brazilian coast may be expected. It occurs in large numbers in some sites (for instance, at Sta. E.65.8), where in few minutes hundreds of specimens may be easily collected at night using light as a lure.

This species seems to be primarily an eurythermic warmer water species, and has been collected in southern Brazilian waters with temperature ranging from 23.8 to 25.8°C. However, along its geographical range, the species may also be found in colder waters, as at MBT Sta. 91 (19.70°C), and as was probably the case off Georgia, at 960 m depth.

RESUMO

No presente trabalho faz-se um levantamento das espécies do gênero *Eurydice* (Isopoda, Flabellifera) ocorrendo na plataforma continental centro-sul do Brasil, a partir da Lat. 22°00'S. Três espécies são assinaladas para a região: *E. littoralis* (Moore, 1902), *E. elongata* sp. n. e *E. emarginata* sp. n. Novos dados morfológicos e detalhadas ilustrações são apresentadas para a espécie *E. littoralis*. O processo flagelar da antena 2, observado em três espécies de *Eurydice*, parece constituir uma característica exclusiva dos machos, donde se pressupõe possa também ser encontrado em outros machos de

espécies já descritas. São fornecidas diagnoses para o gênero e espécie, assim como uma chave de classificação para todas as espécies tratadas. Tanto quanto possível, observações ecológicas completam a descrição das espécies.

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LIST OF STATIONS AND SPECIES PRESENT*

RIO DE JANEIRO

1. Sta. II; 22°15.5'S - 40°54.5'W; February, 1969; 11:25 h; 51 m; coarse sand; 15.63°C, 35.78‰; 4.13 ml/l; R/V "Prof. W. Besnard"; circular dredge.
E. elongata sp. n.
2. Sta. 1138; 22°24'S - 40°59'W; August, 1970; 23:00 h; 57-62 m; coarse sand; 15.52°C, 35.61‰; 4.96 ml/l; R/V "Prof. W. Besnard"; beam trawl.
E. elongata sp. n.
3. Sta. L-269; 23°14'S - 44°12'W; November, 1969; 19:10 h; local depth: + 45 m; sampling depth: 35 m - surface; temperature: 35 m = 18.41°C; surface = 23.46°C; R/V "Prof. W. Besnard"; zooplankton net, vertical haul.
E. elongata sp. n.
4. Sta. P.20.1; 23 16'S - 44 09'W; January, 1970; 22:30 h; 50 m; sand with silt; 19.61°C, 36.04‰; R/V "Prof. W. Besnard"; Foerster-Petersen grab type.
E. elongata sp. n.

SÃO PAULO

5. Lamberto beach, Enseada do Flamengo, Ubatuba, alongside the pier of the Base Norte of the Instituto Oceanográfico, USP; local depth: 2 m; night surface plankton, using an electric light as a lure; hand net.

Data	Time	Species collected
October, 1968	21:00 h	<i>E. littoralis</i>
October, 1969	22:15 h	<i>E. littoralis</i> and <i>E. emarginata</i> sp. n.
January, 1970	22:30 h	<i>E. littoralis</i>
October, 1970	23:00 h	<i>E. littoralis</i>

* - Station data listed as follows: Station number; locality and/or latitude-longitude; date; time; depth; substrata; temperature, salinity and oxygen content of bottom water; vessel; collecting gear, and species present.

6. Sta. V-65.8; Saco Grande, Enseada da Fortaleza, Ubatuba; February, 1965; 14:00 h; shelly fine sand with silt; 10 m; 25.8°C, 34.78‰; 4.03 ml/l; "Veliger"; "Calypso dredge", modified.
E. littoralis
7. MBT Sta. 51; 23°30'S - 44°49'W; May, 1970; 03:00 h; 42 m; shelly sand with silt; 14.95°C, 35.51‰; 3.92 ml/l; R/V "Prof. W. Besnard"; MBT dredge.
E. elongata sp. n.
8. Sta. E.65.8; Enseada das Palmas, Ilha Anchieta; 23°32'S - 45°04'W; May, 1965; 23:00 h; 5 m; 24.9°C; 4.40 ml/l; night plankton haul, using an electric light as a lure; hand net; "Emília".
E. littoralis
9. MBT Sta. 50; 23°39'S - 45°06'W; May, 1970; 11:00 h; 28 m; calcareous sand with silt; 19.98°C, 35.59‰; R/V "Prof. W. Besnard"; MBT dredge.
E. elongata sp. n.
10. Sta. E.65.5; nearby Ilha da Vitória; 23°42'S - 45°04'W; May, 1965; 08:25 h; 40 m; clay; 23.8°C; "Emília"; "Calypso dredge", modified.
E. littoralis
11. MBT Sta. 91; 25°13'S - 47°29'W; June, 1970; 32 m; 03:55 h; compact fine sand; 19.70°C, 35.85‰; 4.36 ml/l; R/V "Prof. W. Besnard"; MBT dredge.
E. littoralis

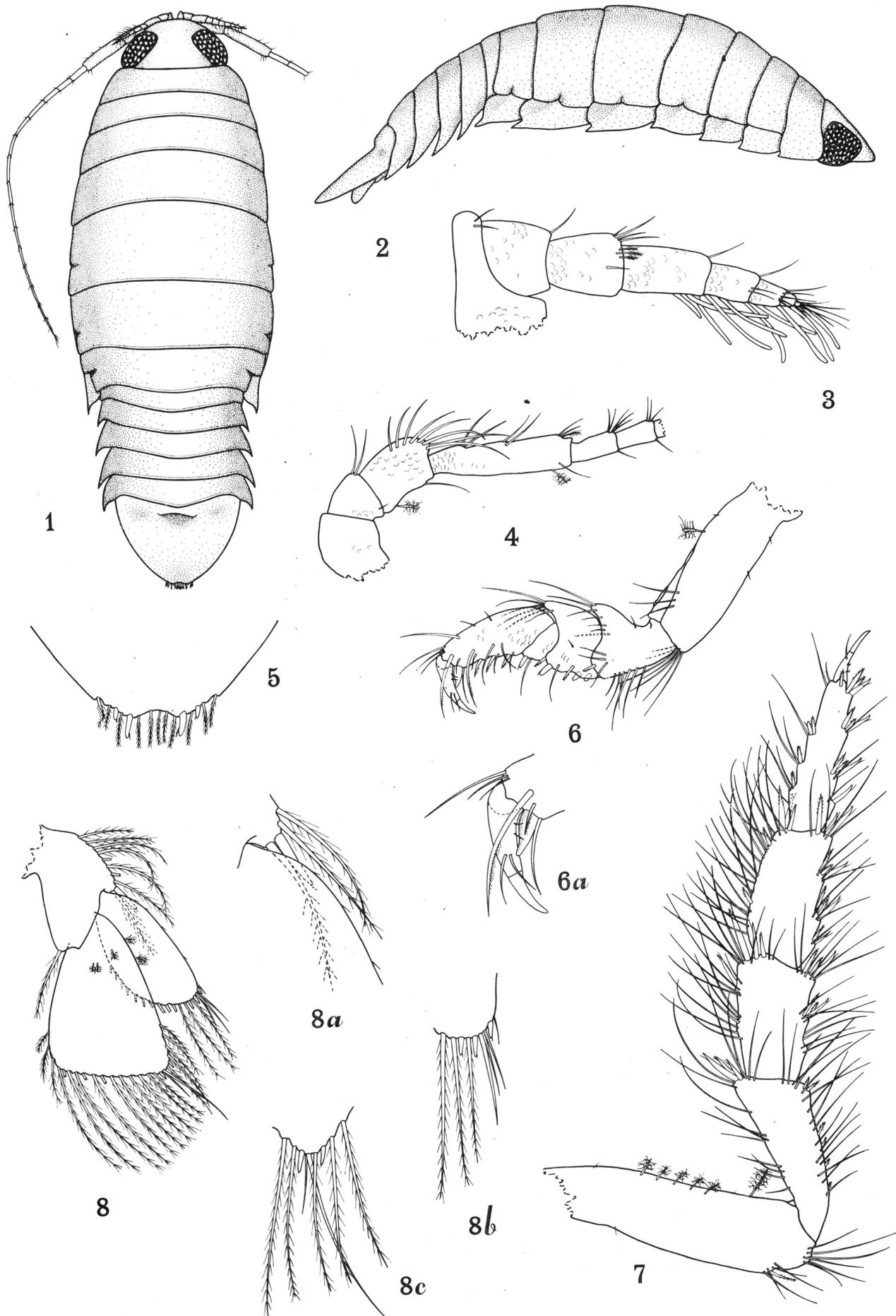
REFERENCES

- BĂCESCU, M. 1948. Les représentants du genre *Eurydice* (Crustacés, Isopodes) dans la mer Noire. Not. Biol., 6 (1-2):108-122, figs. 1-5, pl. I.
- 1949. Données sur la faune carcinologique de la Mer Noire le long de la côte Bulgare. Trav. Stn. Marit. Varna (Bulgarie), 14:13-17, figs. 25-34.
- FAGE, L. 1933. Pêches planctoniques a la lumière effectuées a Banyuls-sur-Mer et a Concarneau. III. Crustacés. Archs. Zool. exp. gén., 76 (3):110-127, 184-196, fig. 9.
- FISH, S. 1970. The biology of *Eurydice pulchra* (Crustacea: Isopoda). J. mar. biol. Ass. U.K., 50:753-768.
- HANSEN, H.J. 1905. Revision of the European marine forms of the Cirolaninae, a subfamily of Crustacea, Isopoda. J. Linn. Soc. Zool., 29:337-373, pls. 33-35.
- JONES, D.A. 1969. The genus *Eurydice* (Crustacea, Isopoda) in the Aegean Sea, including *E. longispina* sp. nov. Cah. Biol. mar., 10:15-29, figs. 1-4.
- 1970. Factors affecting the distribution on the intertidal isopods *Eurydice pulchra* Leach and *E. affinis* Hansen in Britain. J. Anim. Ecol., 39 (2):455-472, figs. 1-8.
- & NAYLOR, E. 1967. The distribution of *Eurydice* (Crustacea: Isopoda) in British Waters, including *E. affinis* new to Britain. J. mar. biol. Ass. U.K., 47:373-382, figs. 1-2.
- & ——— 1970. The swimming rhythm of the Sand beach isopod *Eurydice pulchra*. J. exp. mar. Biol. Ecol., 4:188-199, figs. 1-8.
- MACQUART-MOULIN, Cl. 1969. Les isopodes Cirolanidae, Cymothoidae, Sphaeromidae, et Idoteidae dans le plancton du Golfe de Marseille. Tethys, 1 (2):261-270.

- MAKKAVEYEVA, E.B. 1968. Species composition and distribution of Tanaidacea and Isopoda in the coastal region of Cuba. Inst. Biol. Juznyh Morej Akad. A. O. Kovalevskogo, Kiev, Vypusk II:99-105, figs. 1-2 (in Russian).
- MENZIES, R.J. & BARNARD, J.L. 1959. Marine Isopoda on coastal shelf of southern California: systematics and ecology. Pacif. Nat., 1 (11-12) :3-35, figs. 1-28.
- & FRANKENBERG, D. 1966. Handbook on the common marine isopod Crustacea of Georgia. Athens, Univ. Georgia Press, 93 p., figs. 1-27.
- & GLYNN, P.W. 1968. The common marine isopod Crustacea of Puerto Rico. Etud. Fauna Curaçao, 27:1-133, figs. 1-43.
- MOORE, H.F. 1902. Report on Porto Rican Isopoda. Bull. U.S. Fish. Commn., 1900, 20, pt. 2:161-176, pls. 7-11 (not seen).
- NAYLOR, E. 1957. Isopoda. Fich. Ident. Zooplankton, Sheet 78:1-4, figs. 1-18.
- RICHARDSON, H. 1905. Monograph of the Isopods of North America. Bull. U. S. natn. Mus., no. 54, p. VII-LIII:1-727, figs. 1-740.
- SCHULTZ, G.A. 1966. Submarine canyons of southern California. Part IV. Systematics: Isopoda. Allan Hancock Pacif. Exp., 27 (4):1-56, pls. 1-15.
- SOIKA, G.A. 1955. Éthologie, écologie, systématique et biogéographie des *Eurydice* s. str. (Isopoda, Cirolanides). Vie Milieu, 6 (1):38-52, figs. 1-7.
- TATTERSALL, W.M. 1911. Die Nordischen Isopoden. Nord. Plankt., 6:181-313, figs. 1-340.
- VANHÖFFEN, E. 1914. Die Isopoden der Deutschen Südpolar-Expedition 1901-1903. Dt. Südpol.-Exped., 15, Zool. 7:449-598, figs. 1-132.

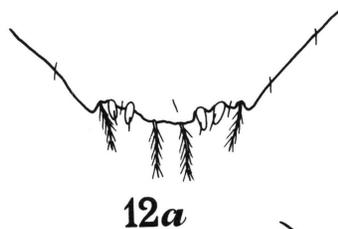
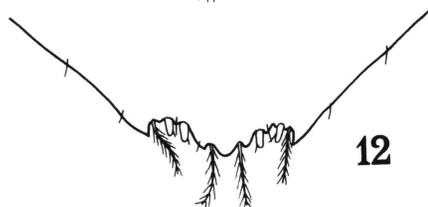
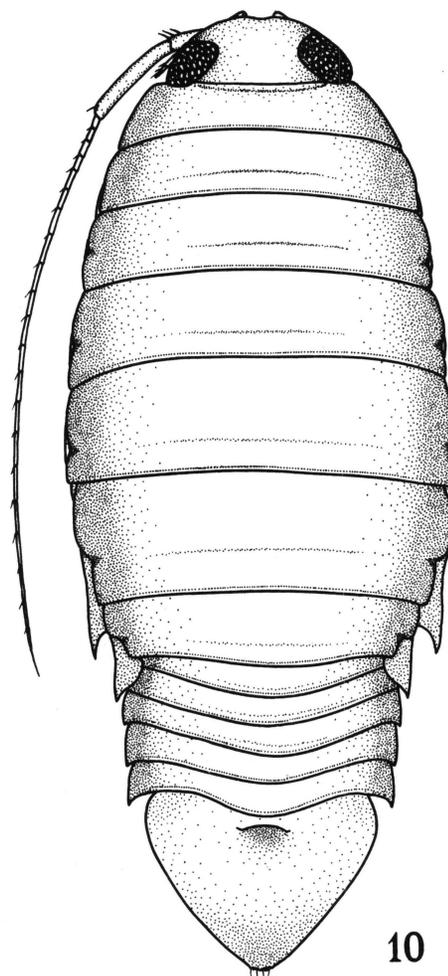
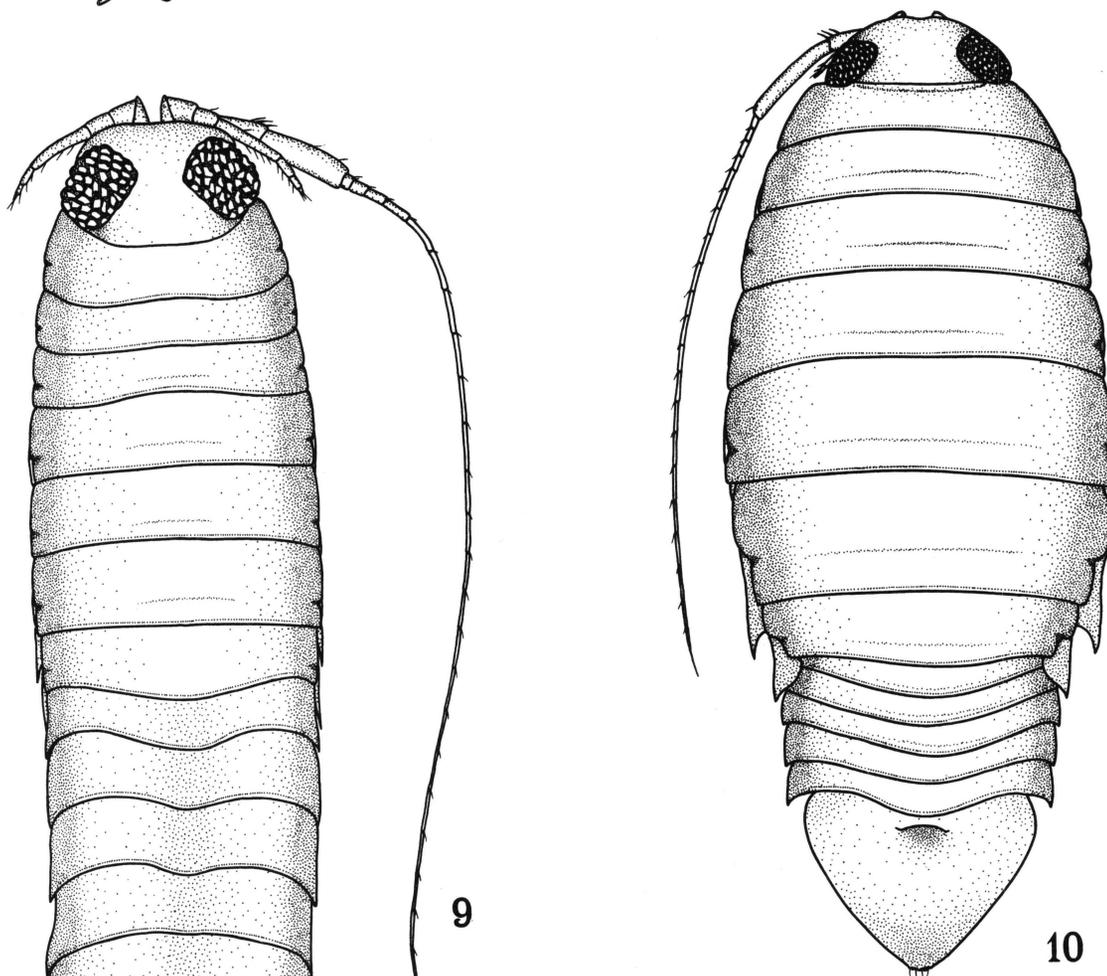
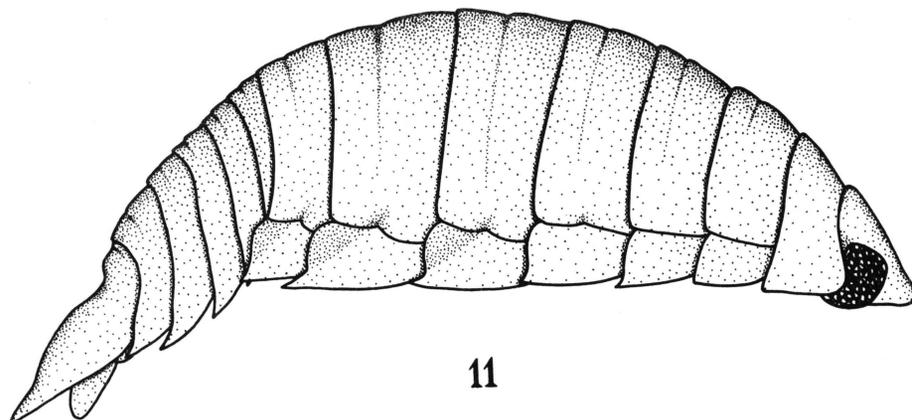
Eurydice emarginata sp. n., young female, 4.6 mm long.

- Fig. 1 - Whole animal, dorsal view.
- Fig. 2 - Whole animal, lateral view.
- Fig. 3 - Antenna 1.
- Fig. 4 - Peduncle and 1st flagellar articles of antenna 2.
- Fig. 5 - Apex of pleotelson.
- Fig. 6 - Pereopod I.
6a - Propodus distal end and dactylus of same.
- Fig. 7 - Pereopod VII.
- Fig. 8 - Uropod.
8a - Outer distal angle of protopod of same.
8b - Setal-spine complex on exopod outer distal angle.
8c - Setal-spine complex on endopod outer distal angle.



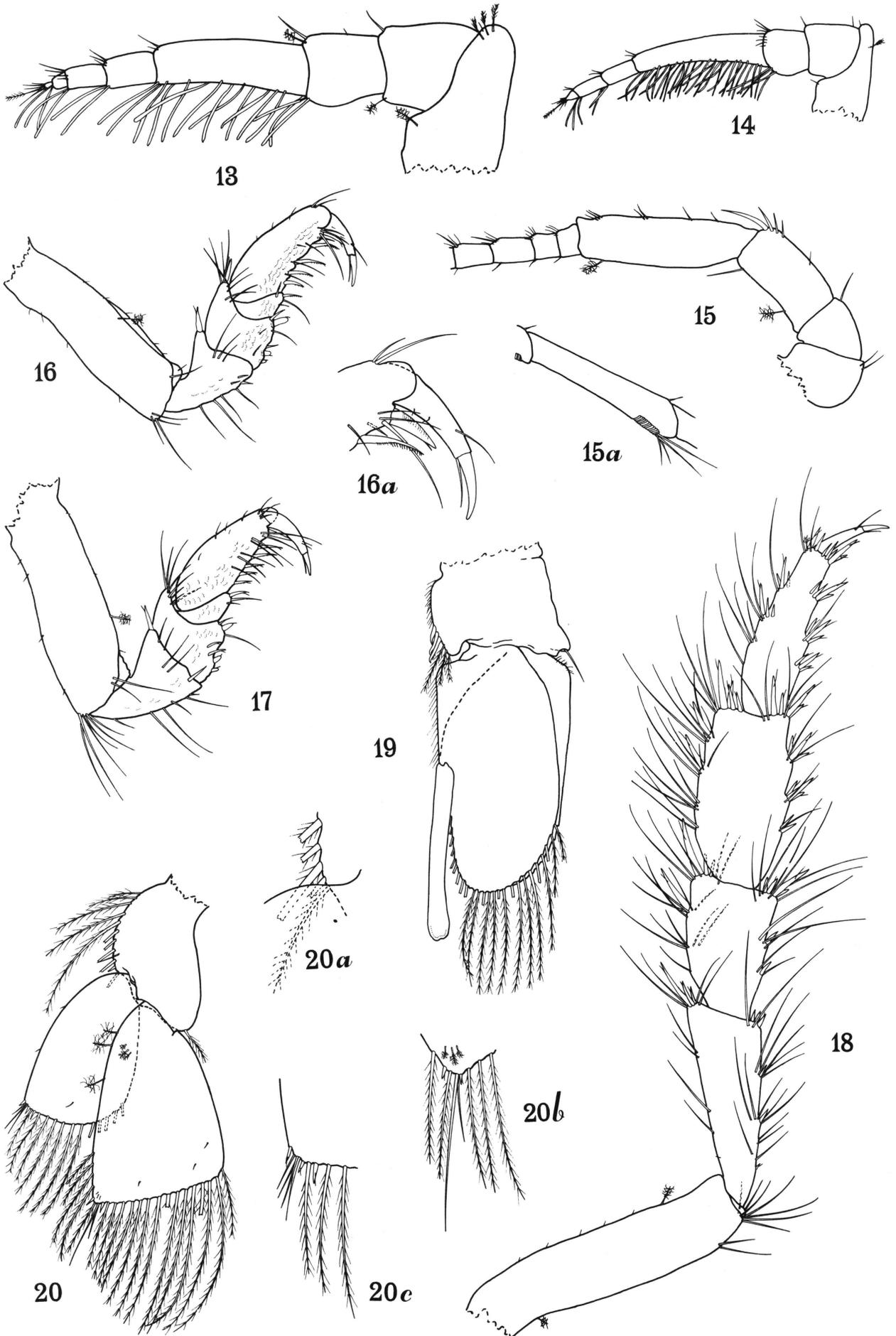
Eurydice elongata sp. n., holotype male, 5.9 mm long;
allotype ovigerous female, 5.0 mm long.

- Fig. 9* - Whole animal, male, dorsal view.
Fig. 10 - Whole animal, female, dorsal view.
Fig. 11 - Whole animal, female, lateral view.
Fig. 12 - Apex of pleotelson.
Fig. 12a, b - Damaged apex of pleotelson, as usually
found in the specimens studied.



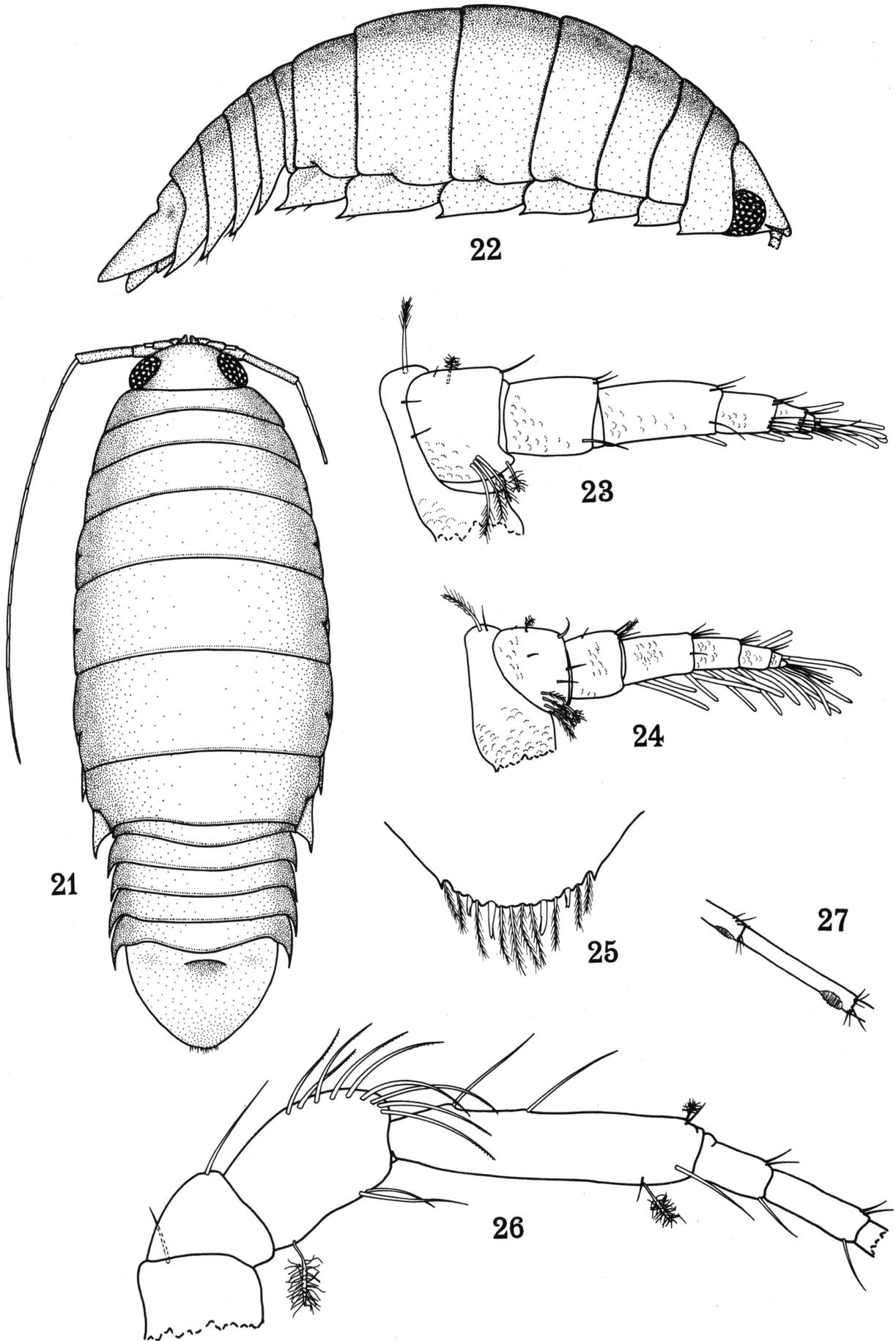
Eurydice elongata sp. n., holotype male, 5.9 mm long;
allotype ovigerous female, 5.0 mm long.

- Fig. 13* - Female antenna 1.
Fig. 14 - Male antenna 1.
Fig. 15 - Male antenna 2.
15a - Flagellar article of same, showing the plicate process.
Fig. 16 - Male pereopod I.
16a - Propodus distal end and dactylus of same.
Fig. 17 - Female pereopod I.
Fig. 18 - Male pereopod VII.
Fig. 19 - Male pleopod 2.
Fig. 20 - Uropod.
20a - Outer distal angle of protopod of same.
20b - Setal-spine complex on outer distal angle of exopod.
20c - Setal-spine complex on endopod outer distal angle.



Eurydice littoralis (Moore), ovigerous female, 5.0 mm long;
adult male, 3.6 mm long.

- Fig. 21* - Whole animal, female, dorsal view.
Fig. 22 - Whole animal, female, lateral view.
Fig. 23 - Female antenna 1.
Fig. 24 - Male antenna 1.
Fig. 25 - Apex of pleotelson.
Fig. 26 - Female antenna 2.
Fig. 27 - Flagellar article of male antenna 2,
showing the plicate process.



Eurydice littoralis (Moore), ovigerous female, 5.0 mm long;
adult male, 3.6 mm long.

- Fig. 28* - Female pereopod I.
28a - Propodus distal end and dactylus of same.
- Fig. 29* - Male pereopod I.
29a - Propodus distal end and dactylus of same.
- Fig. 30* - Female pereopod VII.
Fig. 31 - Male pereopod VII.
- Fig. 32* - Male pleopod 2.
32a - Male appendix masculinum.
- Fig. 33* - Uropod.
33a - Outer distal angle of protopod of same.
33b - Setal-spine complex on exopod outer distal angle.
33c - Setal-spine complex on endopod outer distal angle.

