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ON THE SYSTEMATIC POSITION OF *DYNAMENELLA EATONI*
(MIERS, 1875) AND REDESCRIPTION OF THE SPECIES
(ISOPODA, SPHAEROMATIDAE)¹⁾

BY

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INTRODUCTION

I found the literature very brief and incomplete regarding descriptions of *Dynamenella eatoni* (Miers, 1875), so that it is necessary to redescribe it. Because some of its diagnostic characters do not suit those of the genus in which it was included, the systematic position of *D. eatoni* was doubtful, and can be elucidated here.

At the United States National Museum Menzies & Glynn (1968) reexamined the holotype of *Dynamenella perforata* (Moore, 1901), the type-species of *Dynamenella* Hansen, 1905. Their description of the species does not agree with Hansen's diagnostic characters for the genus. In their 1968 paper Menzies & Glynn also described *D. barnardi* and at the same time suggested that this species should be removed from *Dynamenella*; according to them *D. eatoni* is similar to *D. barnardi*.

The doubts set by Menzies & Glynn (1968) led me to revise the diagnoses of the genera of the Eubranchiatinae related to *Dynamenella*, to see in which genus *D. eatoni* should be placed; a short diagnosis with the most salient characters of those genera is given below.

Cymodocella Pfeffer, 1887: Sexes similar. Plp3 unsegmented; Plp5, exopod two-segmented. Endopod of Plp1 with a triangular indurated area.

Dynamenopsis Baker, 1908: Sexes similar. Exopod of Plp3 and Plp5 two-segmented. 6th pereionite overlapping lateral margins of 7th.

Paradynamenopsis Menzies, 1962: Sexes similar. Exopod of Plp3, Plp4 and Plp5 two-segmented.

Dynamenella Hansen, 1905: With sexual dimorphism. Exopod of Plp3 and Plp5 two-segmented. 6th pereionite not overlapping 7th. Endopod of Plp1 without a triangular indurated area.

¹⁾ Contribución Científica N° 167 del Centro de Investigación de Biología Marina (CIBIMA).

Dynamenoides Hurley & Jansen, 1977: With sexual dimorphism. Exopod of Plp3 entire. Appendix masculina (male stylet) reduced.

Dynamene Leach, 1818: With sexual dimorphism. Without appendix masculina. Ovigerous females with modified mouthparts.

The British Museum (Natural History), Crustacea Section, sent me on loan the syntypes of *Dynamene eatoni* Miers, from which I designate a lectotype. The left side appendages of the lectotype were dissected and mounted in glycerinate-jelly. The two slides were labeled "Lectotype; 1979: 219:1; *Dynamene eatoni* ♀", each with indications of the appendages mounted. The lectotype itself was similarly labelled and placed in a tube apart from the paralectotypes, which were numbered "1979:220:2". These type specimens were compared with my material from Puerto Deseado, and proved to be conspecific.

I also studied specimens of *Cymodocella tubicauda*, the type-species of *Cymodocella* Pfeffer, 1887, in the Museo Argentino de Ciencias Naturales "Bernardino Rivadavia" (MACN), and came to the conclusion that *D. eatoni* should be removed from *Dynamenella* and placed in *Cymodocella*.

Cymodocella eatoni (Miers, 1875) (figs. 1-29)

Dynamene eatoni Miers, 1875, 1879; Studer, 1884; Dollfus, 1891; Ortman, 1911.

Dynamenella eatoni - Hansen, 1905; Vanhöffen, 1914; Stebbing, 1919; Tattersall, 1921; Giambiagi, 1925; Menzies, 1962; Kussakin, 1968; Carvacho, 1977.

Dynamenella acuticauda Menzies, 1962.

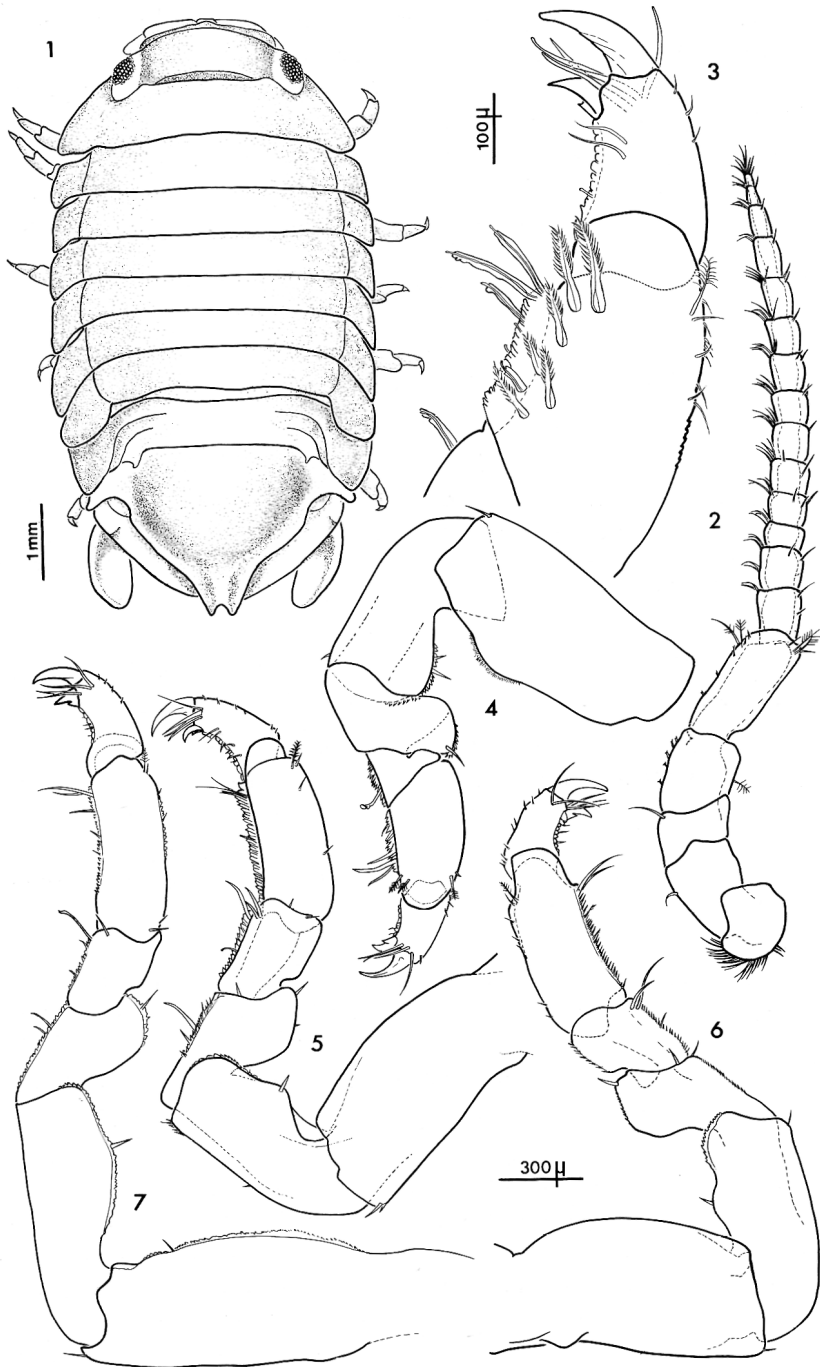
Material studied: Bahía Laura, Santa Cruz province, Argentina (no. 1003). Puerto Deseado, Santa Cruz province (nos. 1007, 1008, 1010, 1012, 1019, 1021, 1022, 1023, 1027, 1028, 1030, 1031, 1038, 1039, 1045, 1047, 1057, 1062, 1064, 1066, 1070, 1071, 1074, 1077). Centro de Investigación de Biología Marina, Buenos Aires.

Roca Magallanes, Puerto Deseado, Santa Cruz province, Argentina; "Patria" A.R.A.; 6 March 1924 (no. 15039). Bahía Laura, Santa Cruz province; 1916; coll. M.D.J. (no. 9199-I). Museo Argentino de Ciencias Naturales "Bernardino Rivadavia", Buenos Aires.

Swain's Bay, Kerguelen; coll. Rev. A. E. Eaton; 1 ♀ lectotype, length 8.2 mm, width 4.2 mm (no. 1979:219:1), 2 ♀ paralectotypes (no. 1979:220:2). British Museum (Natural History), London.

York Bay, Magellan Straits; "Eugenie" Expedition, 1851-1853 (no. 5137). Cumberland Bay, South Georgia; stony bottom with algae, 1-2 m; 9 May 1902; Swedish Antarctic Expedition 1901-03 (no. 6132). Port William, Falkland Islands, 51°40'S 57°44'W; sand, 17 m; Swedish Antarctic Expedition 1901-03 (no. 6719). Punta Corona, Canal Chacao, Chile, 41°47'S 73°53'07"W; tidal belt; 28 February 1949; Lund University Chile Expedition 1948-49, Sta. M 56. Punta Weather, Isla Guafo, Chile, 43°33'30"S 74°49'30"W; tidal belt; 19 February 1949; Lund University Chile Expedition 1948-49, Sta. M 69. South of Punta Arenas, Estrecho de Magallanes, Chile, 53°11'S 70°55'W; tidal belt; 3 May 1949; Lund University Chile Expedition 1948-49, Sta. M 115. Naturhistoriska Riksmuseet, Stockholm. The specimens of the Lund University Chile Expedition are the types of *Dynamenella acuticauda* Menzies, that of Sta. M 115 being the holotype.

Redescription. — An eubranchiatine sphaeromatid, rami of Plp4 and Plp5 with transverse folds. Body oval, convex, smooth and glabrous, with nearly parallel sides.



Figs. 1-7. *Cymodocella eatoni* (Miers). 1, ♀, dorsal view; 2, A2; 3, propodus and dactylus of P1; 4, P1; 5, P2; 6, P3; 7, P7.

Cephalon inserted within the first pereionite, eyes placed dorsolaterally, frontal margin of cephalon with a raised border and a very short interantennal projection. Epistome (fig. 8) truncate at top, with two elongated rami bordering the upper lip; this lip broad and subtriangular in shape, its margin with short hairs. Pereionites subequal, the first longest; posterior margin of epimera 4 to 7 produced backwards, the last overlapping the pleon. The epimeral sutures are more or less marked off, and sometimes not visible. The pleon has two free segments, the narrow first is hidden by the last pereionite and frequently only two lateral triangular areas can be seen; the second is formed by three coalescent segments marked by incised lines. The pleotelson is triangular, globose, its tip with a more or less narrow semicircular notch; the lateral margins of the pleotelson are bent slightly downwards, forming a ventral slit (fig. 1).

The first antenna (fig. 20) shorter than the second, with a tri-articulate peduncle, the first two articles of which are stout with their inner parts with a groove in which the second antenna fits. The first article is longer than broad with several plumose setae (fig. 14) on its outer surface; the second is short, being long as broad, and having three plumose setae (fig. 14); the third is slender and as long as the second, with four simple setae on the outer distal part of the article. The flagellum, as long as the peduncle, has 9 articles, but this number is variable; each segment carries 1 or 2 aesthetascs accompanied by 2, 3, or 4 simple setae on the inner distal part (fig. 21).

The second antenna (fig. 2) has a pentarticulate peduncle, the first article is broader than long, with a row of simple setae on its outer border; the second is as broad as the first and rather longer, with a simple seta on its outer margin; the third is the shortest, but as wide as the second, and carrying a simple seta on its distal outer part; the fourth is as broad as but shorter than the second, it has on its inner margin a plumose seta (fig. 14) and 5 type A setae, probably sensorial on the outer margin (fig. 19); the fifth, longer and more slender than the fourth, carries 5 type A setae on its outer margin and a plumose seta on each side of the distal part (fig. 14). The flagellum has 14 articles, but the number is variable; on each segment there is a group of 2 to 7 simple setae on the outer margin and 1 or 2 on the inner side; the ultimate article carries a group of simple setae.

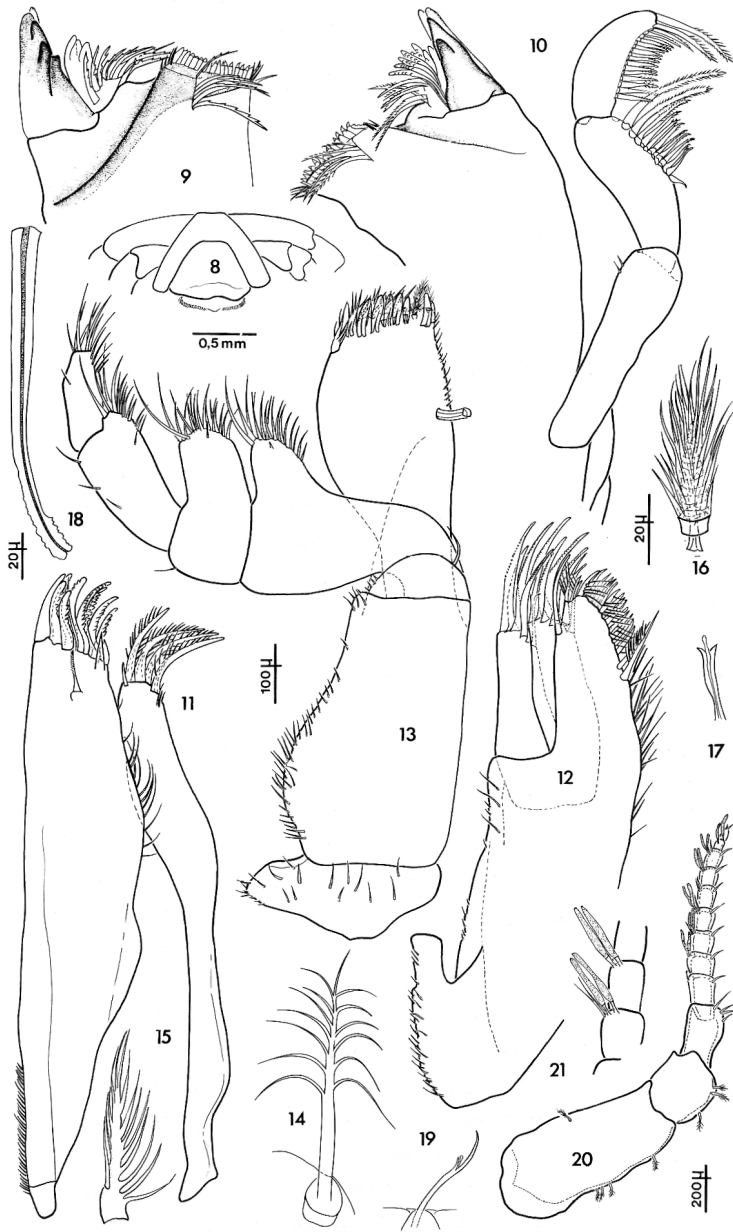
The mandible consists of a stout, enlarged piece, with a tri-articulate palp. The first segment of the palp, without setae, is the longest; the second and third articles are of equal size and carry on their outer border 12 and 18 bipectinate setae, respectively. Left mandible (fig. 9): incisor with two toothed, sclerotized plates, the outer with 5 teeth and the inner with 3; lacinia with 3 teeth and a row of 9 serrate setae, 3 of which are stouter; molar process with a rim of short triangular teeth, and the inner lateral surface with a row of 6 serrate setae. Right mandible (fig. 10): incisor with a strong toothed plate; a row of 7 stout, denticulate and 8 serrate setae; molar process similar to that of left mandible.

First maxilla (fig. 11) composed of two endites, the inner with 4 plumose setae and a short simple seta on its outer margin; the outer endite with 9 denticulate teeth, a large simple seta, and a short, strong, simple seta on its inner surface.

The second maxilla (fig. 12) consists of three endites or lobes, the outer and median lobes join the inner lobe, the inner border of which has a notch and a condyle. Both outer and median endites have on their distal part 6 denticulate spines. On the inner endite, there are 20 setae, one of which is simple, 2 are pectinate, 15 bipectinate (fig. 15), and two are large and strong pectinate setae, placed on the inner margin of the endite; there are also long, simple setae on this border.

The maxilliped (fig. 13) consists of a rectangular basipodite, with simple setae on its outer margin; coxa, pentarticulate palp, and endite join the basipodite. The coxa has several simple setae on its surface, and, in ovigerous females, is expanded, forming a lobe. The endite has a strong coupling hook in the middle of the inner border; there are 6 club-shaped and 6 pectinate setae in the distal part, arranged in two intercalated rows, and 2 penicillate setae (fig. 16) on the inner side. The pentarticulate palp has its first segment very short and rectangular; the complete segment 3, and the distal parts of the second, and fourth segments are each produced into an inner lobe with 14 to 20 long, simple setae; the fifth segment has several simple setae at its tip and part of the inner border.

The first pereopod is short and stout, with a characteristic setation on the propodus; the other pereopods are longer and more slender than the first; they are similar to each other and lengthen slightly from the second to the seventh. In the first pereopod (fig. 4) the basis is approximately twice as long as broad, and has a tuft of short hairs, forming a pad, halfway the length of the outer distal border; inner distal part with a simple seta. The ischion is half as long as the basis and has a row of scale-like setae on its distal outer margin, as well as two simple setae which are conspicuous; there is one simple seta in the inner distal part. The meron is a short article, longer than broad, the outer side expanded, and carrying very short setae; it has one conspicuous seta on its distal part. The carpus is subtriangular, its inner border bears a pad of hairs; here a long seta is present which is provided with a duct that opens at the tip (fig. 18). The propodus (fig. 3), one and a half times longer than broad, has several simple setae on its outer margin and a distal plumose setae; on its inner margin there is a very dense pad of hairs, with three long setae, each with a tube that projects from the seta's tip; a few shorter such setae rise above the setal stripe. The inner surface of the propodus has 6 bipectinate setae, but this number differs in animals of different size, viz., from 2 in young to 7 in adults. The dactylus is short, nearly as long as broad, biunguiculate, and with the accessory claw divided; below the base of the principal claw there are 4 simple setae; the dactylus has a few closely placed scales, among which some bristles arise.



Figs. 8-21. *Cymodocella eatoni* (Miers). 8, epistome and upper lip; 9, left Md, incisor and molar process; 10, right Md, incisor and molar process and triarticulate palp; 11, Mx1; 12, Mx2; 13, Mxp; 14, plumose seta; 15, bipectinate seta; 16, penicillate seta; 17, seta from propodus of the pereopods; 18, tubular seta; 19, type A seta; 20, A1; 21, detail of A1 articles with aesthetascs.

The second to seventh pereopods (figs. 5, 6, 7) are similar in shape; the basis is elongated, with scale-like setae on the outer border and a simple seta in the inner distal part. The ischion, as long as the basis, has its outer margin serrate; it carries a conspicuous seta in its middle; the inner margin is smooth. The meron is a short article, laterally expanded, with a denticulate outer margin and a prominent seta in its distal part; the inner margin has scale-like setae with 1 or 2 conspicuous tubular setae (fig. 18) in the middle. The carpus is as long as the meron, and slightly expanded at its outer margin; the inner border has a very dense pad of hairs, thicker in P2; next to the distal part there are 1, 2, or 3 tubular setae (fig. 18), together with 1 or 2 simple setae. The propodus is as broad as the preceding segment and 1.5 times as long; it carries 1 or 2 simple or plumose setae in the outer distal part; the inner margin has a pad of hairs, amongst which several short setae, each with a central projection (fig. 17); there are also 3 tubular setae (fig. 18) in the distal inner part. The dactylus is rather slender and nearly half as long as the propodus; on the outer border there are short simple setae; the inner side carries closely placed scales and amongst these short setae with a central projection (fig. 17); this article carries two claws, the accessory one being divided; below the base of the principal claw there are 3 simple setae.

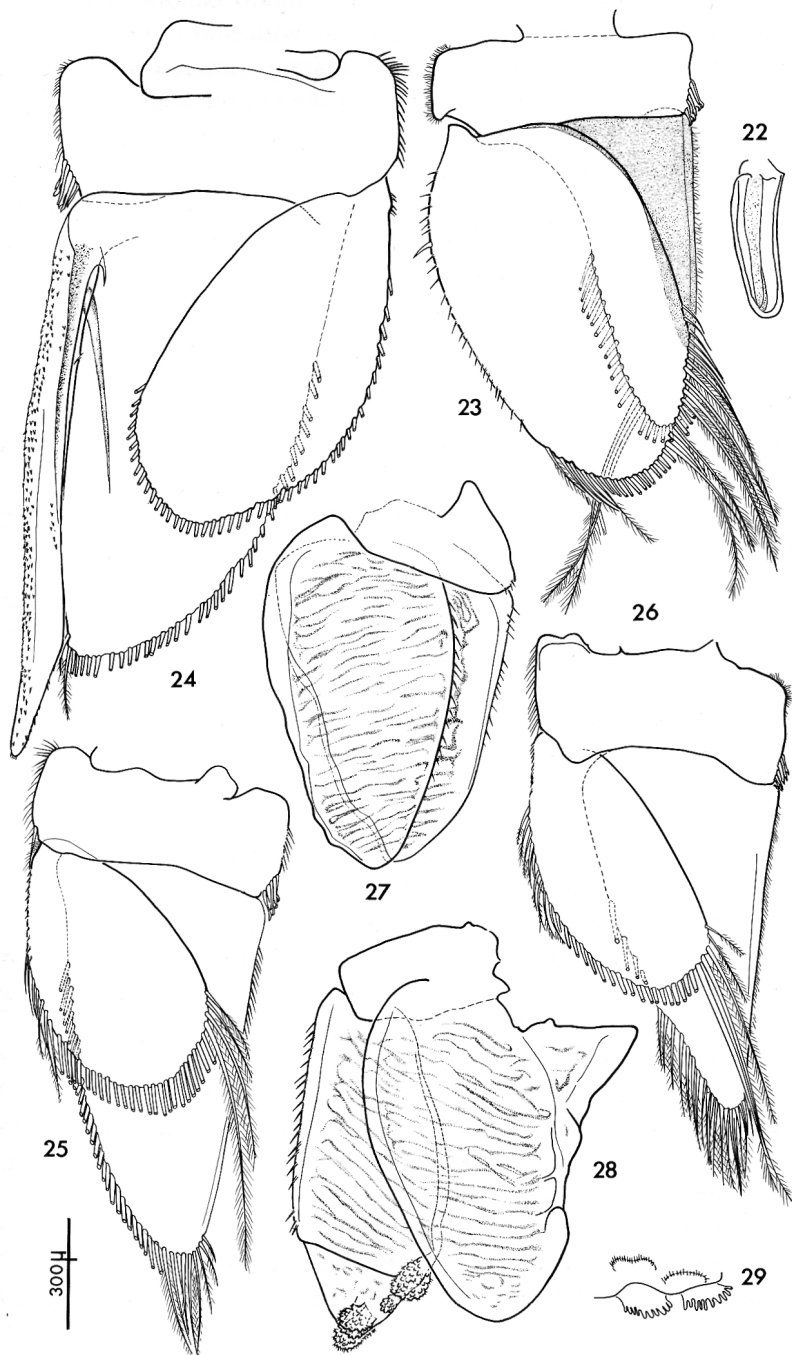
Males have the penes on the ventral surface of the seventh pereionite not fused at their bases; they are four times as long as wide at the base (fig. 22).

The pleopods are biramous, with a rectangular protopodite; the first three pairs bear plumose marginal setae (PMS), the other two have fleshy, transverse folds.

The first pleopod (fig. 23) has the protopodite with a row of fine hairs on the outer margin; on the inner side there are 5 hook-shaped coupling setae. Endopod narrow, triangular, with fine, short setae on the inner margin and 26 PMS at the top and along part of the outer margin. The endopod has an indurate, darker triangular area, sulcate where the exopod fits. The exopod is oblong, it overlaps the endopod; the inferior margin, about half the length of the inner border, has 35 PMS, the inner border carries short, simple setae, and near the proximal end there is a conspicuous spine.

In the second pleopod (fig. 25) the protopodite is similar to that of the first, the endopod is subtriangular, with 39 PMS which are shorter than those of the exopod, and fine short hairs on the inner margin. The exopod is oblong, shorter than the endopod on which it overhangs obliquely; with 34 PMS.

The protopodite of the second male pleopod (fig. 24) has 6 hook-shaped coupling setae instead of 5. The inner side of the endopod is sulcate, where the appendix masculina fits in; this ramus has 36 PMS. The endopod, like in the female, has 46 PMS. The male stylet joins the proximal part of the endopod, and is longer than it; it is narrower towards the apex, which is subacute. Inner surface of male stylet covered by short spines, the number decreasing near the tip.



Figs. 22-29. *Cymodocella eatoni* (Miers). 22, penis; 23, Plp1; 24, ♂ Plp2; 25, ♀ Plp2; 26, Plp3; 27, Plp4; 28, Plp5; 29, pectinate scales of the knobs of Plp5.

In the third pleopod (fig. 26) the protopodite has 6 hook-shaped coupling setae. Endopod subtriangular, inner margin with short setae, inferior and outer margins with 28 PMS. The exopod is oblong, entire, and placed obliquely above the endopod; with 36 PMS. The number of the hook-shaped coupling setae of the protopodite differs with the specimen's size.

The protopodite of the fourth pleopod (fig. 27) lacks coupling hooks. Both the endopod and the exopod are cordiform and have spiniform setae on their outer margins; both rami have fleshy, transverse folds.

The protopodite of the fifth pleopod (fig. 28) is without setae. Endopod oblong, with transverse folds, without marginal setae. Exopod two-segmented, with 4 knobs covered by pectinate scales (fig. 29). The first segment, with folds, carries simple setae on its outer border; in the inner distal part, next to the articulation, there is a big knob. The second segment, without transverse folds, has a little knob near the articulation on the inner margin; the tip has two big knobs.

The rami of the uropod are well-developed, oval, entire, with smooth borders. Endopod fused to sympodite, and reaching the end of the pleotelson. Exopod motile, $3/4$ the length of the endopod.

Sexes similar, adult males can be distinguished from females only by the presence of penes and the male stylet on the second pleopod. Ovigerous females have internal pouches for eggs and embryos, and 4 pairs of oostegites, which overlap in the ventral median line.

The colour is very variable: some specimens are pale reddish-brown, with or without black punctations; others are yellowish with black dots, and a translucent border on the segments and the uropods; again other specimens have whitish areas on head, epimera, dorsal part of the body, pleotelson, and uropods; there are also brown and greyish-blue specimens. The colour is opaque in ovigerous females and in animals which seem next to moult.

Measurements (in mm). — Females: length 4.0-10.8, width 1.6-6.5; males: length 5.2-13.9, width 3.0-8.4.

Ecology. — The species is found in tide-pools, and at mesolittoral and infralittoral levels. Usually it is associated with red algae of the genera *Chondria*, *Ceramium*, *Corallina*, *Epymenia*, *Iridea*, *Polysiphonia*, *Pseudophycodris*, *Rhodymenia*, and *Schizocercis*, the green algae *Ulva*, *Gladophora*, and *Codium*, and with the brown algae *Dyctiota*, *Desmarestia*, and holdfasts of *Macrocystis pyrifera*.

The substratum may be rocky, muddy, or rocky with a varying amount of mud.

I observed specimens of *Iais pubescens* (Dana) on the ventral surface of some specimens of *C. eatoni* between the legs. *Iais* has been commonly found on *Exosphaeroma* species. As epibionts peritrich ciliates and spirorbid tubes were

observed on the legs, and bacterial filaments (perhaps *Beggiatoa*) on the first antenna in animals from muddy bottoms.

Distribution. — Argentina (Santa Cruz province; Tierra del Fuego), Chile (Magellan Straits to Valparaíso), Kerguelen Islands.

DISCUSSION

In order to accurately assess the status of *Cymodocella eatoni*, it was necessary to revise the group of closely related species from the Magellan region, South Africa and New Zealand.

An examination of the holotype of *Dynamenella acuticauda* Menzies, 1962 and dissection of a paratype, showed on comparison with the present material of *C. eatoni* that the two are conspecific. The differences mentioned by Menzies (1962) are considered here to be individual variations.

Of *Dynamenella huttoni* (Thompson, 1879), *D. ovalis* Barnard, 1914 and *Cymodocella tubicauda* Pfeffer, 1887, the following material has been examined:

Dynamella huttoni (Thompson, 1879) (figs. 32, 33)

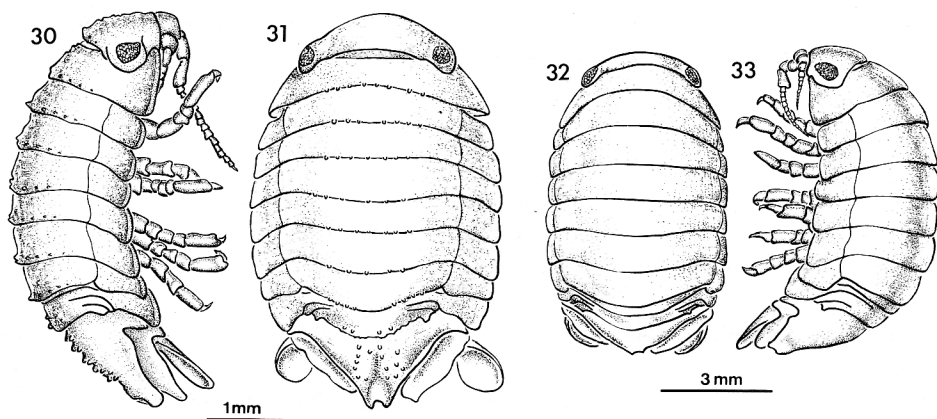
Lyttleton Harbour, New Zealand, 22 March 1923, C. Chilton. No. 13499, Museo Argentino de Ciencias Naturales "Bernardino Rivadavia".

Bethell's Beach, north of Manukau Harbour, New Zealand; intertidal, exposed rocky shore, very steep, with *Durvillea antarctica* holdfasts, coralline algae and mussel beds; 21 October 1968, coll. K. P. Jansen. No. E949, New Zealand Oceanographic Institute.

St. James, South Africa; 15 February 1914, coll. K. H. Barnard. Nos. 8829 and A2678, South African Museum, Capetown. Syntypes of *Dynamenella kraussi* Barnard, 1914.

Dynamenella ovalis Barnard, 1914 (figs. 30, 31)

St. James, South Africa; June 1912; coll. K. H. Barnard; lectotype ♂, length 7.5 mm, width 4.5 mm (no. A2444-1), paralectotypes (no. A2444). Grosse Bucht and Café, Lüderitz, S.W. Africa, 16 and 17 February 1969 (no. A12718). South African Museum.



Figs. 30-33. 30, *Cymodocella ovalis* (Barnard), ♀, lateral view; 31, idem, dorsal view; 32, *Cymodocella huttoni* (Thomson), ♀, dorsal view; 33, idem, lateral view.

Cymodocella tubicauda Pfeffer, 1887

Orcadas del Sur (South Orkney Islands); May 1924 (no. 14493). Puerto Madryn, Chubut Province; May 1924 (no. 14492). Museo Argentino de Ciencias Naturales "Bernardino Rivadavia", Buenos Aires.

Barnard (1916: 106) synonymized *Dynamenella kraussi* Barnard, 1914 with *D. huttoni* (Thompson, 1879). A study of specimens of *D. huttoni* (figs. 32-33) and *D. ovalis* (figs. 30-31) showed that both these species should be removed from *Dynamenella* and transferred to *Cymodocella*. In my opinion, also *D. barnardi* Menzies & Glynn, 1968, should be placed in *Cymodocella*.

In this paper, I choose as a lectotype for *Dynamenella ovalis* the specimen drawn and dissected by Barnard (1914). As the mouthparts and some dissected appendages were loose in the tube labelled "type specimens", I preferred to mount all, except the mandibles, in glycerinate-jelly. This slide was labelled as: "Lectotype; *Dynamenella ovalis* ♂; SAM A2444-1", and has indications about the appendages. The lectotype and the mandibles were placed in a tube separate from the other specimens which were labelled as paralectotypes (SAM A2444). The length and width of the lectotype are the same as those given by Barnard for the male, the other specimens of the sample are females and are smaller than the lectotype; for that reason I labelled it as a male (I could not confirm this because the area of the penes and the ventral part of the seventh pereonite were destroyed).

The slight differences between the three species, now placed in *Cymodocella*, can be summarized as follows:

<i>C. eatoni</i> (Miers, 1875)	<i>C. huttoni</i> (Thompson, 1879)	<i>C. ovalis</i> (Barnard, 1914)
— Body and pleotelson smooth.	Body and pleotelson smooth.	Tuberculations in the posterior border of pereonites and pleotelson; there are also smooth forms.
— Cephalon with a frontal rim.	Cephalon without a frontal rim.	Cephalon with a very slight and incomplete frontal rim.
— Body convex, epimera bent slightly downwards.	Body very convex, epimera bent downwards.	Body oval, epimera not bent downwards.
— Propodus of P1 with 3 to 7 bipectinate setae.	Propodus of P1 with 2 to 4 bipectinate setae (in New Zealand specimens), or 2 bipectinate setae (in South African).	Propodus of P1 with 1 or 2 bipectinate setae.

I include a map (fig. 34) showing the geographical distribution of these three species.

I did not study specimens of *D. brunnea* Vanhöffen, 1914, or of *D. rubida* Baker, 1926, from the Indian Ocean and South Australia respectively; these species are apparently also very close to *C. eatoni*.

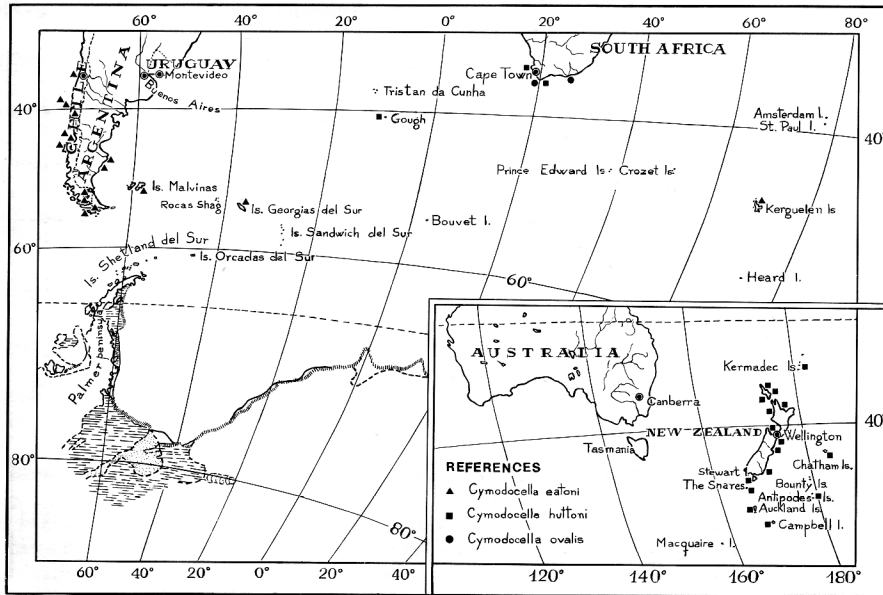


Fig. 34. Geographical distribution of *Cymodocella eatoni*, *C. huttoni*, and *C. ovalis*.

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RESUMEN

En el presente trabajo se redescribe e ilustra a *Dynamenella eatoni* (Miers, 1875), se la compara con *D. huttoni* de Sudáfrica y Nueva Zelandia y con *D. ovalis* de Sudáfrica. Se discute la posición sistemática de *D. eatoni*, y se concluye que esta especie, así como *D. huttoni* y *D. ovalis*, deben transferirse al género *Cymodocella*; por esta razón se da una breve diagnosis, con los caracteres más salientes, de los géneros de Eubranchiatae próximos a *Dynamenella*. Se incluye un mapa con la distribución geográfica de las tres especies citadas. También se designa el lectotipo para *Cymodocella eatoni* y para *C. ovalis*.

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* Not seen.