

ICES Identification Leaflets for Plankton

Fiches d'Identification du Plancton

LEAFLET NO. 182

Copepoda

Sub-order: Calanoida
Family: Euchaetidae
Genus: *Euchaeta*

by

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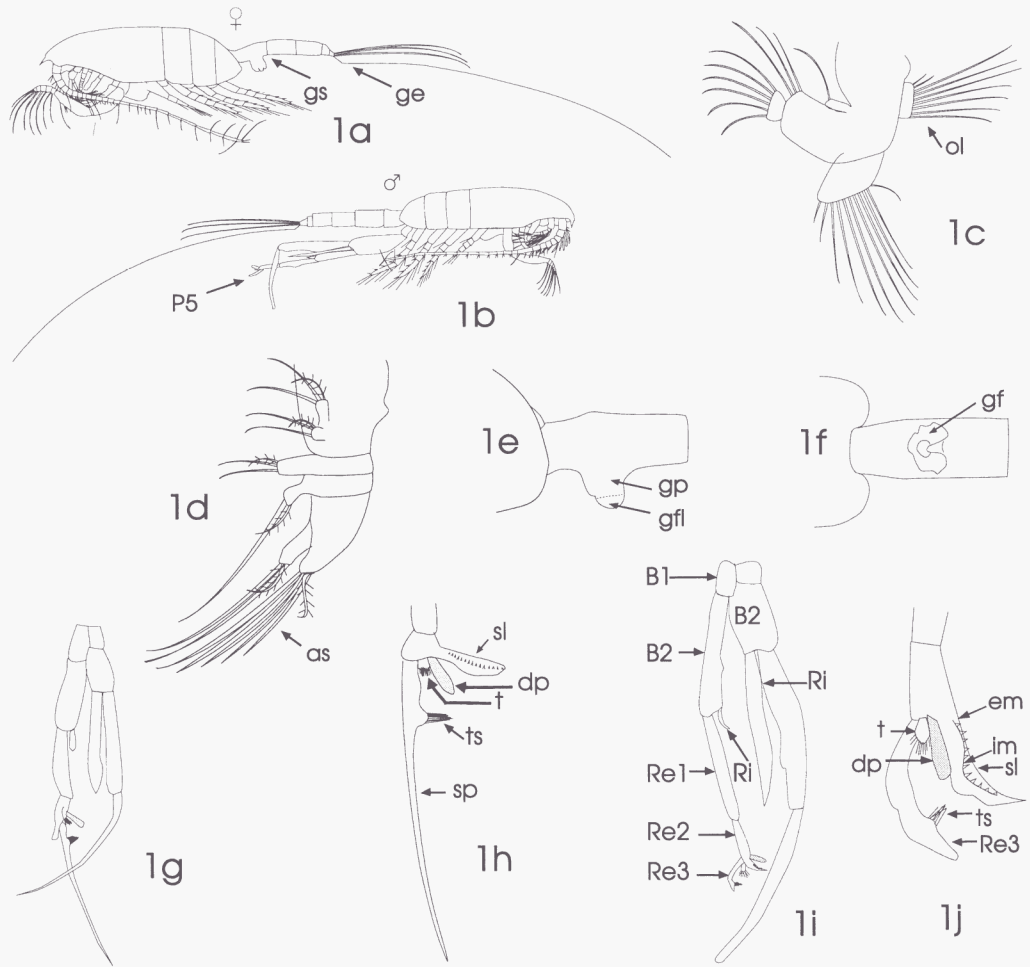


Figure 1. Generalized diagrams detailing the terminology for: *Euchaeta* species. 1a: lateral view of adult female; 1b: lateral view of adult male; 1c: maxillule; 1d: maxilla; 1e: genital somite, lateral view; 1f: genital somite, ventral view; 1g: male fifth leg, posterior view; 1h: terminal segments of male left fifth leg in Fig. 1g; 1i: male fifth leg, posterior view; 1j: terminal segments of male fifth leg in Fig. 1i.

as, apical setae. B1, B2, basipods 1 and 2. dp, digitiform process. ge, geniculate caudal seta. gf, genital field. gfl, genital flange. gp, genital prominence. gs, genital somite. ol, outer lobe of maxillule. Re1–3, exopodal segments 1–3. Ri, endopod. sl, serrated lamella. sp, spiniform process of third exopodal segment. t, tubercle. ts, tuft of spinules.

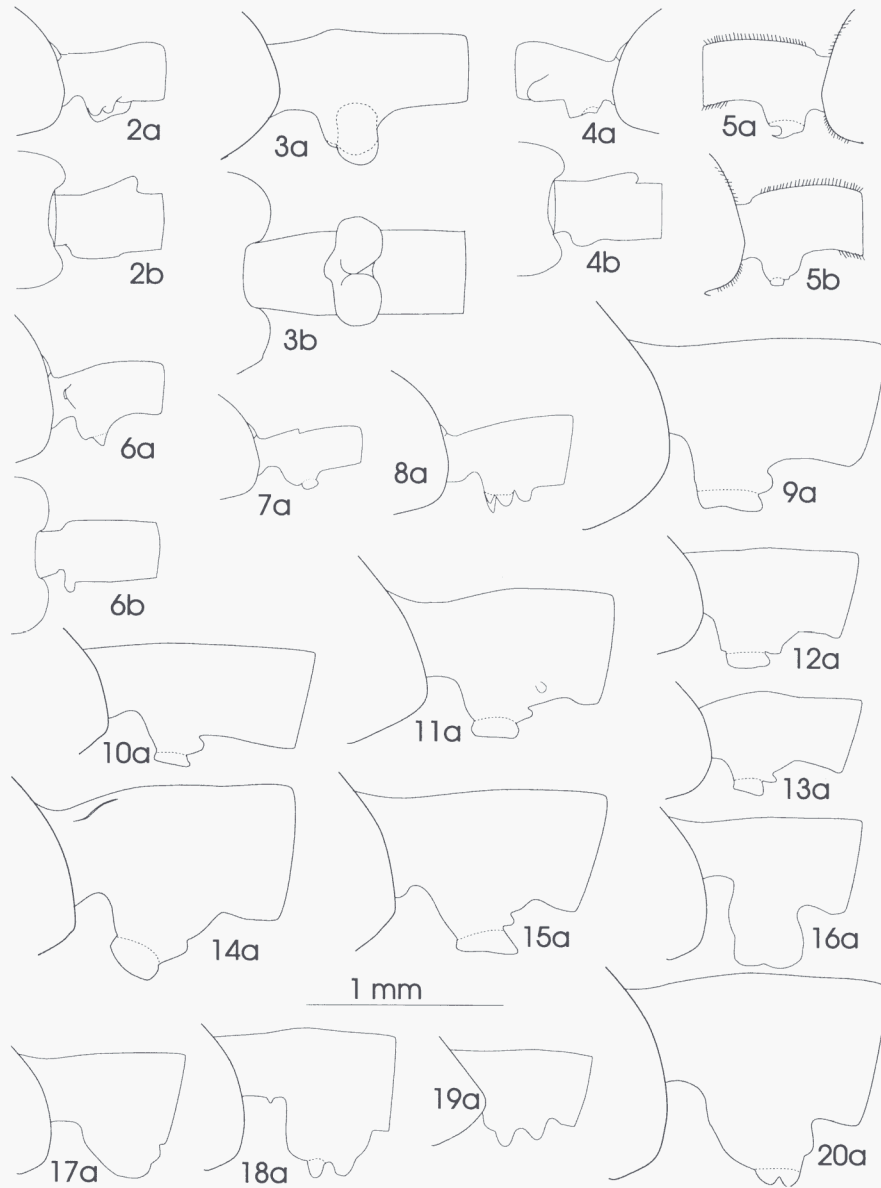


Figure 2. Genital somites of adult female *Euchaeta* species. 2. *E. marina*. 2a: left side, 2b: dorsal view. 3. *E. spinosa*. 3a: left side, 3b: ventral view. 4. *E. media*. 4a: right side, 4b: dorsal view. 5. *E. pubera*. 5a: right side, 5b: left side. 6. *E. acuta*. 6a: left side, 6b: dorsal view. 7a: *E. hebes*, left side. 8a: *E. bisinuata*, left side. 9a: *E. sarsi*, left side. 10a: *E. longissima*, left side. 11a: *E. barbata* and *E. barbata* f. *farrani*, left side. 12a: *E. abbreviata*, left side. 13a: *E. scotti*, left side. 14a: *E. bradyi*, left side. 15a: *E. hanseni*, left side. 16a: *E. gracilis*, left side. 17a: *E. pseudotonsa*, left side. 18a: *E. norvegica*, left side. 19a: *E. incisa*, left side. 20a: *E. glacialis*, left side.

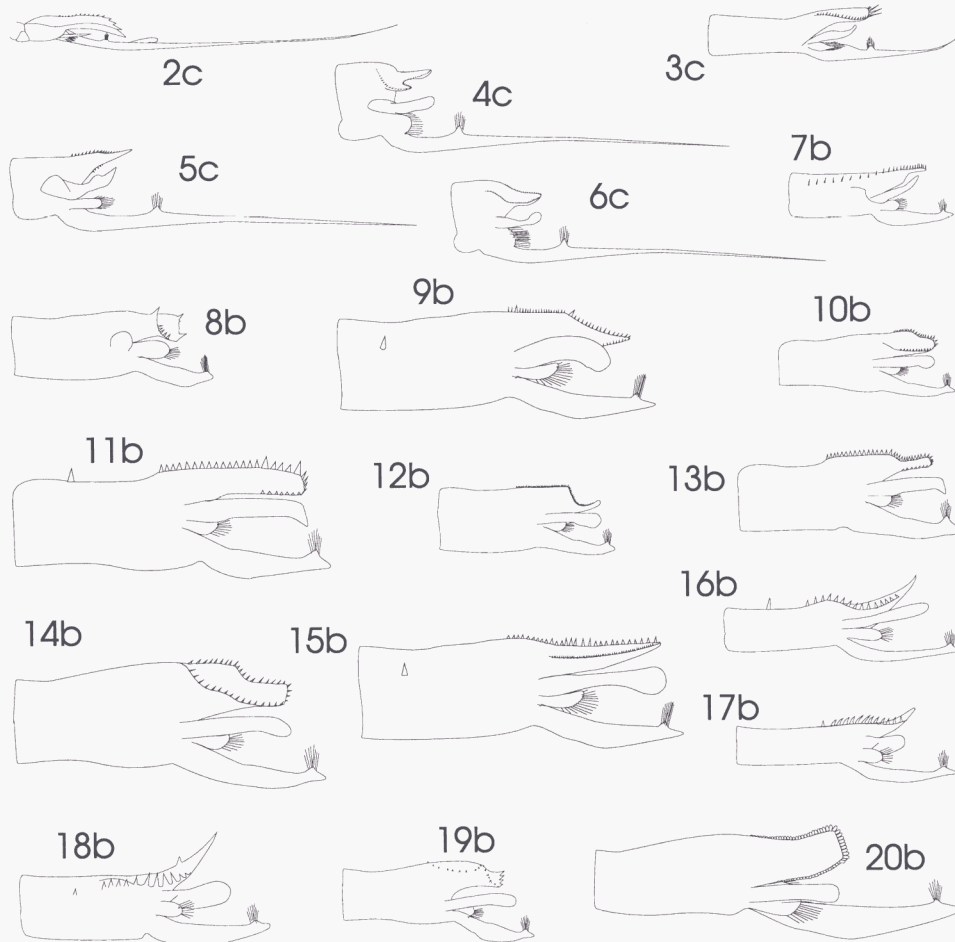


Figure 3. Terminal two segments, exopodal segments of the left fifth legs of adult male *Euchaeta* species. 2c: *E. marina*. 3c: *E. spinosa*. 4c: *E. media*. 5c: *E. pubera*. 6c: *E. acuta*. 7b: *E. hebes*. 8b: *E. bisinuata*. 9b: *E. sarsi*. 10b: *E. longissima*. 11b: *E. barbata* and *E. barbata* f. *farrani*. 12b: *E. abbreviata*. 13b: *E. scotti*. 14b: *E. bradyi*. 15b: *E. hanseni*. 16b: *E. gracilis*. 17b: *E. pseudotonsa*. 18b: *E. norvegica*. 19b: *E. incisa*. 20b: *E. glacialis*.

Family Euchaetidae Giesbrecht, 1892

This family consists of medium to large-sized copepods, with the medium-sized species generally living in the epipelagic and coastal regions, and the larger-sized species generally offshore in the meso- and bathypelagic environments. They were originally ascribed to two genera, *Euchaeta* Philippi, 1843, and *Paraeuchaeta* Scott, 1909, the former principally corresponding with the smaller, the latter with the larger species. Vervoort (1957), however, in reviewing the family, pointed out that division of all the then-known species between these two genera was very difficult in some cases. He consequently proposed placing them all in the single genus *Euchaeta* Philippi, 1843. The adoption of the two genera was useful, and a further re-examination of the species combined with a re-definition of the generic characters could be valuable. Park (1978, 1994a, b) reviews the history of these two genera.

Genus *Euchaeta* Philippi, 1843

First metasomal segment may or may not be clearly separated from the cephalosome. The fourth and fifth metasomal segments are fused and usually posteriorly rounded. Genital prominence of the female is large. Inner seta of each caudal ramus greatly elongated. Enlarged maxillipeds terminate in long, smoothly curved setae. Endopodites of legs 1 and 2 have a single segment. Leg 5 absent in females. Leg 5 of males enlarged, right endopodite much larger

than left; penultimate segment of left leg with serrated lamella; terminal segment may end in a spiniform process.

Key to Northeast Atlantic species of *Euchaeta*

1. Fifth legs absent (Fig. 1a). Females
- Fifth legs present, enlarged and modified (Fig. 1b). Males

Females

1. One or two of the 6 apical setae of the maxilla have long, widely spaced spinules (Fig. 1d). 2
- None of the 6 apical setae of the maxilla has long, widely spaced spinules. 5
2. One of the 6 apical setae of the maxilla has long, widely spaced spinules. 3
- Two of the 6 apical setae of the maxilla have long, widely spaced spinules. Genital somite asymmetrical, with large protuberance on right side (Fig. 2b); genital flanges asymmetrical, with right much larger than left and of different shape (Fig. 2a). *E. marina*

Table 1. Prosome length measurements of Northeast Atlantic *Euchaeta* species. Mean and S.D. as well as ranges are given for adult females and males. Approximate prosome lengths are given for males of species rare in the samples.

	Females		Males	
	Mean ± S.D.	Range	Mean ± S.D.	Range
2. <i>E. marina</i>	2.617 ± 0.130	2.331–2.837	2.475 ± 0.076	2.360–2.584
3. <i>E. spinosa</i>	5.088 ± 0.186	4.534–5.466	5.012 ± 0.180	4.456–5.371
4. <i>E. media</i>	2.695 ± 0.082	2.472–2.837		ca. 2.5
5. <i>E. pubera</i>	1.423 ± 0.082	1.264–1.545		ca. 1.3
6. <i>E. acuta</i>	2.948 ± 0.105	2.578–3.292	2.833 ± 0.074	2.640–3.012
7. <i>E. hebes</i>	2.221 ± 0.112	2.078–2.388		ca. 2.1
8. <i>E. bisinuata</i>	3.726 ± 0.109	3.478–4.099	3.364 ± 0.105	3.168–3.602
9. <i>E. sarsi</i>	6.564 ± 0.188	5.963–7.019	5.206 ± 0.155	4.720–5.528
10. <i>E. longissima</i>	4.171 ± 0.122	3.851–4.472	3.848 ± 0.111	3.602–4.224
11. <i>E. barbata</i>	5.647 ± 0.170	4.845–6.087	4.632 ± 0.130	4.161–4.845
11. <i>E. b. f. farrani</i>	7.199 ± 0.345	6.398–7.950	5.663 ± 0.353	5.342–5.839
12. <i>E. abbreviata</i>	4.413 ± 0.119	4.037–4.845	4.013 ± 0.103	3.727–4.224
13. <i>E. scotti</i>	3.874 ± 0.122	3.478–4.224	3.546 ± 0.100	3.230–3.913
14. <i>E. bradyi</i>	6.189 ± 0.248	5.714–6.894	5.228 ± 0.209	5.031–5.404
15. <i>E. hanseni</i>	6.337 ± 0.211	5.652–6.832	5.652 ± 0.181	5.466–5.776
16. <i>E. gracilis</i>	4.451 ± 0.139	3.975–4.845	3.606 ± 0.162	3.292–3.913
17. <i>E. pseudotonsa</i>	4.470 ± 0.147	3.975–4.907	3.982 ± 0.120	3.665–4.286
18. <i>E. norvegica</i>	4.997 ± 0.221	4.348–5.839	3.874 ± 0.119	3.540–4.224
19. <i>E. incisa</i>	1.980 ± 0.054	1.910–2.022		ca. 1.9
20. <i>E. glacialis</i>	7.788 ± 0.175	7.450–8.024		ca. 6.5

3. Outer lobe of maxillule (Fig. 1c) with 6 long and 2 short setae. Genital prominence asymmetrical with large outgrowths (Fig. 3b); genital flanges asymmetrical, with that on left larger than right one (Fig. 3a).		somite about twice as long as wide, of form in Fig. 10a.	<i>E. longissima</i>
Outer lobe of maxillule with 5 long and 2 short setae. Genital somite asymmetrical, with protuberances on both sides, that on the right being more prominent (Fig. 4a, b); genital flanges also asymmetrical.	<i>E. spinosa</i>	9. Prosome length less than 6.3 mm. Genital somite of form in Fig. 11a.	<i>E. barbata</i>
Outer lobe of maxillule with 4 long setae and 1 short seta. Flanges of genital prominence asymmetrical, that on right with hook (Fig. 5a, b).	<i>E. media</i>	Prososome length more than 6.3 mm. Genital somite of form in Fig. 11a.	<i>E. barbata</i> f. <i>farrani</i>
Outer lobe of maxillule with 5 long and no short setae.		10. Outer lobe of maxillule with 6 long setae.	11
4. Genital somite with small but conspicuous protuberance anteriorly on left side (Fig. 6a, b).	<i>E. pubera</i>	Outer lobe of maxillule with more than 6 long setae.	12
Genital somite without protuberance on left side, but with pronounced step in the dorsal outline (Fig. 7a).	4	11. Outer lobe of maxillule with only 6 long setae. Genital somite more or less straight dorsally; genital prominence long (Fig. 12a).	<i>E. abbreviata</i>
5. Elongated, caudal setae geniculate (Fig. 1).		Outer lobe of maxillule with 6 long setae and 1 minute seta. Genital somite humped dorsally slightly anterior to middle of segment; genital prominence short (Fig. 13a).	<i>E. scotti</i>
Elongated, caudal setae not geniculate. Genital prominence has 3 lobes consisting of a bilobed flange and a posterior protuberance (Fig. 8a).	<i>E. acuta</i>	12. Outer lobe of maxillule with 7 long and 2 minute setae. Genital somite has ridge-like structure anteriorly on dorso-lateral region, and genital prominence is of form in Fig. 14a.	<i>E. bradyi</i>
6. Outer lobe of maxillule with 5 long setae.	<i>E. hebes</i>	Outer lobe of maxillule with 7 long and 2 short setae.	13
Outer lobe of maxillule with more than 5 long setae.	6	13. Genital prominence has distinctive, large flange (Fig. 15a). Genital prominence of other form	<i>E. hanseni</i> 14
7. Outer lobe of maxillule with only long setae.	<i>E. bisinuata</i>	14. Genital prominence without distinct ventral lobes (Figs. 16a, 17a).	15
Outer lobe of maxillule with 5 long setae and 1 short seta. Genital somite of form in Fig. 9a.	7	Genital prominence with distinct ventral lobes (Figs. 18a–20a).	16
8. Genital somite with small lateral protuberance on left side posterior to the genital prominence (Fig. 11a).	10	15. Genital prominence quadrangular (Fig. 16a).	<i>E. gracilis</i>
Genital somite without this small lateral protuberance. Genital	8	Genital prominence as in Fig. 17a.	<i>E. pseudotonsa</i>
	<i>E. sarsi</i>	16. Small ventral tubercle anterior to genital prominence (Fig. 18a). Genital somite without this tubercle.	<i>E. norvegica</i> 17
	9	17. Genital prominence distinctly bilobed (Fig. 19a).	<i>E. incisa</i>
		Genital prominence of form in Fig. 20a.	<i>E. glacialis</i>

Males

1. Third exopodal segment of left fifth leg prolonged into a spiniform process (Fig. 1h). Third exopodal segment not prolonged into a spiniform process (Fig. 1j).		Digitiform process ending in an enlarged or rounded end.	12
2. Third exopodal segment of left fifth leg long, about 5 times length of preceding segment (Fig. 2c). Third exopodal segment short, about twice the length of the preceding segment (Fig. 3c).		10. Distal part of serrated lamella not strongly narrowed (Fig. 11b). Distal part of serrated lamella strongly narrowed (Fig. 13b).	11
3. Serrated lamella extends beyond the tuft of spinules on the third exopodal segment (Fig. 2c). Serrated lamella does not reach the tuft of spinules of the third exopodal segment.	<i>E. spinosa</i>	11. Prosome length less than 5.0 mm. Prosome length greater than 5.0 mm.	<i>E. scotti</i> <i>E. barbata</i> <i>E. barbata</i> <i>f. farrani</i>
4. Serrated lamella has two lobes (Fig. 4c). Serrated lamella does not have two lobes.		12. Serrated lamella dagger shaped with fine marginal spines (Fig. 9b). Serrated lamella otherwise formed.	<i>E. sarsi</i> 13
5. Serrated lamella rounded distally (Fig. 6c). Serrated lamella pointed distally (Fig. 5c).	<i>E. marina</i>	13. Serrated lamella without teeth on external margin (Figs. 1j, 16b). Serrated lamella with teeth on external margin (Fig. 15b).	14 17
6. Row of spines on serrated lamella extends along most of the length of the second exopodal segment (Fig. 7b). Prosome length about 2.5 mm. Row of spines on serrated lamella restricted to distal two thirds of segment, at most with a single spine in proximal third of its length. Prosome length greater than 2.5 mm.		14. Serrated lamella terminates in four spines (Fig. 19b). Serrated lamella terminates in a single point.	<i>E. incisa</i> 15
7. Digitiform process shorter than half the length of the serrated lamella (Fig. 8b). Digitiform process longer than half the length of the serrated lamella.	<i>E. media</i>	15. Serrated lamella terminates in short point (Fig. 17b). Serrated lamella terminates in long point (Figs. 16b, 18b).	<i>E. pseudotonsa</i> 16
8. Serrated lamella ends distally in curved toothed process (Fig. 12b). Serrated lamella otherwise formed.	<i>E. acuta</i>	16. Very prominent spine on proximal edge of second exopodal segment of left fifth leg (Fig. 16b). Proximal edge of segment without this spine (Fig. 18b).	<i>E. gracilis</i> <i>E. norvegica</i>
9. Digitiform process ending in an acute point (Fig. 11b).	<i>E. pubera</i>	17. Distal end of digitiform process swollen (Fig. 15b). Distal end of digitiform process not swollen.	<i>E. hebes</i> <i>E. hanseni</i> 18
		18. Serrated lamella spoon-shaped (Fig. 10b). Serrated lamella not spoon-shaped; rounded serrations on edge of square lamella (Fig. 20b).	19 <i>E. glacialis</i>
	<i>E. bisinuata</i>	19. Distal part of serrated lamella rounded (Fig. 10b). Distal part of serrated lamella square (Fig. 14b).	<i>E. longissima</i> <i>E. bradyi</i>
	<i>E. abbreviata</i>		

References to descriptions and figures

The generic names used in the figures in the references cited may be *Euchaeta*, *Pareuchaeta*, or *Paraeuchaeta*. Those citations describing only one sex are indicated.

2. *E. marina* (Prestandrea, 1833): Brady, 1883, Pl. 18, Figs. 7–15, Pl. 19, as *E. prestandreae*. Scott, 1909, Pl. 19, Figs. 9–20. Wilson, 1932, Fig. 42 (female). Rose, 1933, Fig. 93. Brodskii, 1950, Fig. 112. Crisafi, 1965a, Figs. 1–7. Owre and Foyo, 1967, Figs. 327–335. Tanaka, 1973, Fig. 4 (female). Park, 1975, Fig. 1. Park, 1978, Figs. 65, 66.
3. *E. spinosa* Giesbrecht, 1892: Sars, 1924, Pl. XXX, Figs. 1–6. Rose, 1933, Fig. 96. Brodskii, 1950, Fig. 115. Wilson, 1950, Pl. 18, Figs. 243–244. Tanaka, 1958, Fig. 64 (female). Grice, 1962, Pl. 14, Figs. 21–23 (female). Crisafi, 1965b, Fig. 26 (female). Owre and Foyo, 1967, Figs. 339–344. Park, 1968, Pl. 7, Figs. 12–15 (male). Park, 1975, Fig. 5. Park, 1978, Figs. 71, 72. Bradford *et al.*, 1983, Fig. 30.
4. *E. media* Giesbrecht, 1892: Scott, 1909, Pl. 20, Figs. 10–18 (female). Brodskii, 1950, Fig. 116 (female). Wilson, 1950, Pl. 22, Figs. 323–325 (male). Rose, 1933, Fig. 98 (female). Tanaka, 1958, Figs. 62h–k (female). Grice, 1962, Pl. 13, Figs. 10–14 (female). Owre and Foyo, 1967, Figs. 336–338 (female). Park, 1968, Pl. 7, Figs. 16–22. Park, 1975, Fig. 2. Park, 1978, Figs. 67, 68. Bradford *et al.*, 1983, Fig. 23.
5. *E. pubera* Sars, 1907: Sars, 1924, Pl. XXX, Figs. 16–18, as *E. scabra* (female). Rose, 1933, Fig. 97 (female). Wilson, 1950, Pl. 22, Figs. 327–329, Pl. 23, Figs. 330–331. Tanaka, 1958, Fig. 63 (female). Tanaka, 1973, Fig. 7. Park, 1975, Fig. 4. Bradford *et al.*, 1983, Fig. 26.
6. *E. acuta* Giesbrecht, 1892: *nec* Scott, 1909, Pl. 20, Figs. 1–9 (female). With, 1915, Pl. VI, Figs. 12a–c (female). Sars, 1924, Pl. XXX, Figs. 12–15. Rose, 1933, Fig. 94. Brodskii, 1950, Fig. 113. Crisafi, 1965a, Fig. 25 (female). Owre and Foyo, 1967, Figs. 300–302. Bradford, 1972, Figs. 9(1)–9(4) (female). Tanaka, 1973, Fig. 1. Park, 1978, Figs. 69, 70. Bradford *et al.*, 1983, Fig. 9.
7. *E. hebes* Giesbrecht, 1888: With, 1915, Pl. VI, Figs. 13a–b. Sars, 1924, Pl. XXX, Figs. 7–11. Rose, 1933, Fig. 95. Crisafi, 1965b, Figs. 1–7.
8. *E. bisinuata* Sars, 1907: Farran, 1908, Pl. III, Figs. 17–19 (female). Scott, 1909, Pl. XVI, Figs. 10–17 (female). With, 1915, Pl. VI, Figs. 11a–e, Text-fig. 54. Sars, 1924, Pl. XXXIII, Figs. 16–22. Rose, 1933, Fig. 108. Tanaka, 1958, Fig. 69 (female). Owre and Foyo, 1967, Figs. 309–314 (female). Tanaka and Omori, 1968, Figs. 3D, 4C (female). Park, 1975, Fig. 8. Park, 1978, Fig. 94 (female). Bradford *et al.*, 1983, Fig. 13.
9. *E. sarsi* Farran, 1908: Farran, 1908, Pl. III, Figs. 15–16 (female). *nec* Scott, 1909, Pl. XXI, Figs. 9–15 (male). With, 1915, Text-fig. 50 (female). Sars, 1924, Pl. XXXI, Figs. 8–14. Rose, 1933, Fig. 107. Tanaka, 1958, Fig. 73. Tanaka and Omori, 1968, Figs. 3S, 4S, 18A–D (female). Park, 1975, Fig. 17. Park, 1978, Figs. 97, 98. Bradford *et al.*, 1983, Fig. 29.
10. *E. longissima* Park, 1978: Sars, 1924, Pl. XXXII, Figs. 1–6 as *E. scotti*. Park, 1978, Figs. 121, 122. Bradford *et al.*, 1983, Fig. 22.
11. *E. barbata* Brady, 1883: Farran, 1908, Pl. III, Figs. 13–14 (female). Scott, 1909, Pl. XXI, Figs. 9–15 as *E. sarsi* (male). With, 1915, Pl. VI, Figs. 8a–b, Text-fig. 49. Sars, 1924, Pl. XXXI, Figs. 1–7. Rose, 1933, Fig. 106. Tanaka, 1958, Fig. 67 (female). Tanaka and Omori, 1968, Figs. 3B, 4B, 5 (female). Park, 1975, Fig. 7. Owre and Foyo, 1967, Figs. 303–308. Bradford *et al.*, 1983, Fig. 11.
11. *E. barbata* f. *farrani*: Sars, 1903, Pl. XXVIII. With, 1915, Pl. VI, Fig. 6a, Text-fig. 48 (female). Park, 1978, Figs. 105, 106.
12. *E. abbreviata* Park, 1978: Park, 1978, Figs. 92, 93.
13. *E. scotti* Farran, 1908: Farran, 1908, Pl. III, Figs. 11–12 (female). With, 1915, Pl. VI, Fig. 10a–c, Text-fig. 51. *nec* Sars, 1924, Pl. XXXII, Figs. 1–6. *nec* Rose, 1933, Fig. 104. Park, 1975, Fig. 18. Park, 1978, Fig. 117 (female).
14. *E. bradyi* With, 1915: With, 1915, Text-fig. 53 (female). Sars, 1924, Pl. XXXII, Figs. 12–14 (female). Rose, 1933, Fig. 105 (female). Østvedt, 1955, Fig. 19 (male).
15. *E. hanseni* With, 1915: With, 1915, Text-fig. 52 (female). Sars, 1924, Pl. XXXI, Figs. 15–18 (female). Rose, 1933, Fig. 103 (female). Tanaka, 1958, Fig. 78. Owre and Foyo, 1967, Figs. 315–321; Figs. 351–353 as *E. withi*. Tanaka and Omori, 1968, Figs. 3J, 4J. Park, 1975, Fig. 14. Park, 1978, Figs. 95, 96. Bradford *et al.*, 1983, Fig. 20.
16. *E. gracilis* Sars, 1905: Farran, 1908, Pl. III, Figs. 20–21 as *E. quadrata* (female). With, 1915, Text-fig. 55 (female). Sars, 1924, Pl. XXXIII, Figs. 1–8. Rose, 1933, Fig. 109. Wilson, 1950, Pl. 26, Fig. 393 (female). Vervoort, 1963, Fig. 17 (male). Park, 1975, Fig. 13.
17. *E. pseudotonsa* Fontaine, 1967: With, 1915, Pl. VI, Figs. 4a–b, Text-fig. 46 as *E. tonsa*. Sars, 1924, Pl. XXXIII, Figs. 9–15. Rose, 1933, Fig. 102 as *P. tonsa*. Owre and Foyo, 1967, Figs. 345–350 as *E. tonsa*. Park, 1975, Fig. 16. Park, 1978, Figs. 85, 86. Bradford *et al.*, 1983, Fig. 25.
18. *E. norvegica* Boeck, 1872: Sars, 1903, Pls. XXIV–XXVI. With, 1915, Pl. VI, Figs. 3a–f, Text-fig. 45. Wilson, 1932, Fig. 43. Rose, 1933, Fig. 100. Brodskii, 1950, Fig. 119.

19. *E. incisa* Sars, 1905: Sars, 1924, Pl. XXXII, Figs. 7–11 (female). Park, 1975, Fig. 15.
20. *E. glacialis* Hansen, 1886: Sars, 1903, Pl. XXVII. Rose, 1933, Fig. 101. Brodskii, 1950, Fig. 120.

Distribution

2. *E. marina*: Epipelagic, cosmopolitan between 60°N and 40°S. In Northeast Atlantic, resident southwest of Ireland and expatriate to 60°N, occasionally in northern North Sea.
3. *E. spinosa*: Epipelagic to mesopelagic, cosmopolitan between 40°N and 40°S. Expatriate to southwest of Ireland. Absent farther north.
4. *E. media*: Epipelagic to mesopelagic, cosmopolitan between 40°N and 40°S. Expatriate to southwest of Ireland. Absent farther north.
5. *E. pubera*: Epipelagic in Pacific and Atlantic Oceans between 40°N and 40°S. Potential expatriate to southwest of Ireland.
6. *E. acuta*: Epipelagic in Pacific and Atlantic Oceans between 50°N and 40°S. Resident in Rockall Trough, expatriate to 60°N and into northern North Sea.
7. *E. hebes*: Epipelagic, eastern North Atlantic between 60°N and 20°S, over continental shelf. Resident around Britain, including English Channel. Rare in eastern North Sea.
8. *E. bisinuata*: Bathypelagic, cosmopolitan between 50°N and 40°S. Resident in Rockall Trough and expatriate to 60°N. Absent from North Sea.
9. *E. sarsi*: Bathypelagic, cosmopolitan between 60°N and 60°S. Resident in Rockall Trough, expatriate to 60°N. Absent from North sea.
10. *E. longissima*: Bathypelagic, Pacific and Atlantic sectors of Antarctic Ocean south of 55°S. Resident in Rockall Trough.
11. *E. barbata*: Bathypelagic, cosmopolitan between 50°N and 50°S, distribution in North Atlantic extends to 60°N, expatriate to 70°N. Resident in Rockall Trough. Absent from North Sea.
11. *E. barbata* f. *farrani*: Bathypelagic, large form, cosmopolitan south of 40°S. In North Atlantic, common north of 60°N, extending to 80°N. Resident in Rockall Trough and Norwegian Sea. Absent from North Sea.
12. *E. abbreviata*: Bathypelagic, Atlantic sector of Antarctic Ocean south of 50°S. Only other record is resident population in the Rockall Trough.
13. *E. scotti*: Bathypelagic, cosmopolitan between 50°N and 60°S. In North Atlantic, resident in the Rockall Trough and expatriate to 70°N. Absent from North Sea.
14. *E. bradyi*: Bathypelagic, rare species recorded in Pacific and Atlantic Oceans. In Atlantic, between 70°N and 45°N. Resident in Rockall Trough and Norwegian Sea.
15. *E. hanseni*: Bathypelagic, cosmopolitan between 50°N and 40°S. Resident in Rockall Trough and expatriate to 60°N. Absent from North Sea.
16. *E. gracilis*: Mesopelagic to bathypelagic, cosmopolitan between 60°N and 30°S. Resident in Rockall Trough, expatriate to 60°N. Absent from North Sea.
17. *E. pseudotonsa*: Mesopelagic to bathypelagic, cosmopolitan south of 30°S. Throughout Atlantic to 60°N. Resident in the Rockall Trough, expatriate to 70°N. Recorded in northern North Sea.
18. *E. norvegica*: Epipelagic to bathypelagic, north Atlantic between 80°N and 30°N. Resident in Rockall Trough, sea lochs of western Scotland, northern North Sea, Skagerrak, western Norway including fjords.
19. *E. incisa*: Bathypelagic, Pacific and Atlantic Oceans between 40°N and the equator. Potential expatriate to southwest of Ireland.
20. *E. glacialis*: Epipelagic to bathypelagic, Arctic and North Atlantic north of 60°N. Occasional expatriate south to northern Rockall Trough. Absent from North Sea, present in Norwegian Sea.

Selected references to work on biology

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