CONSEIL INTERNATIONAL POUR L'EXPLORATION DE LA MER

Zooplankton.
Sheet 32.

COPEPODA
SUB-ORDER: CALANOIDA
Family: Calanidae

(By G. P. Farran†,
revised by W. Vervoort)

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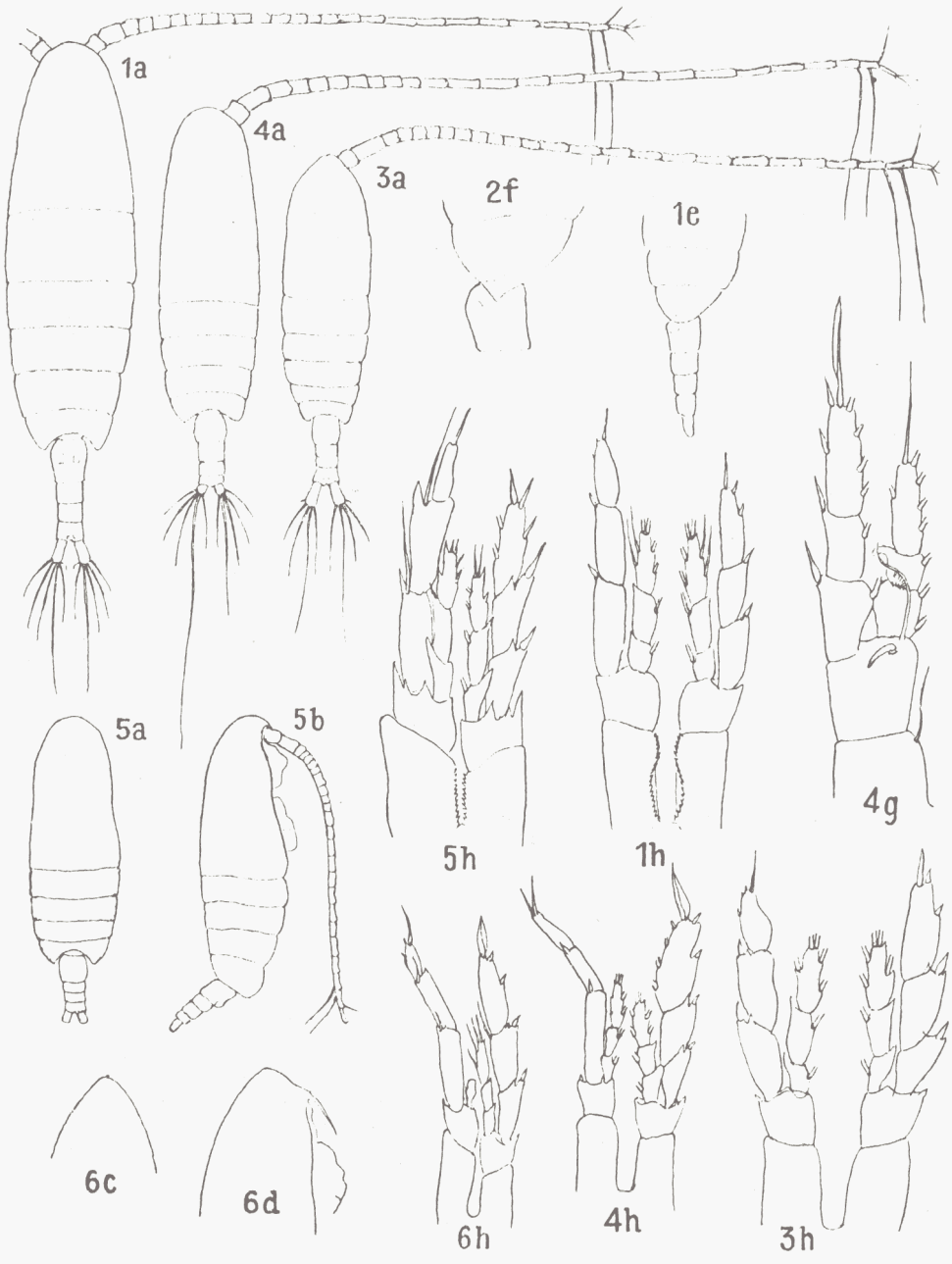

1, *Calanus finmarchicus*; 2, *Calanus hyperboreus*; 3, *Calanus tenuicornis*; 4, *Neocalanus gracilis*; 5, *Nannocalanus minor*; 6, *Calanoides carinatus*.
♀ dorsal; b, ♀ lateral; c, ♀ head dorsal; d, ♀ head lateral; e, ♀ 4th and 5th thoracic somites and abdomen, lateral; f, ♀ 5th thoracic somite and genital segment, lateral; g, ♀ 1st foot; h, ♂ 5th feet.
(Figs. 1a, e, h, 2f, after Sars; 3a, h, 4h, 5a, 6c, d, h, after Giesbrecht; 5b, h, after Sewell; 4a, g, original.)

Family CALANIDAE

Female with 4-segmented abdomen; cephalon and 1st thoracic segment usually fused. 1st to 4th feet with 3-jointed endopods and 3-jointed exopods. 3rd exopodal joints of 2nd to 4th feet each with 2 spines on outer edge and 5 setae on inner edge. 5th pair of feet resembling the preceding. Males usually with dorsal hump in mid-dorsal line; 5th feet well developed but more or less modified.

The various genera of the Calanidae are mainly based on characters of the 5th feet in the male.

1. *Calanus finmarchicus* (Gunnerus, 1765). 5th thoracic segment rounded posteriorly. *Calanus helgolandicus* (Claus, 1863) has been, and still is, a bone of contention for many taxonomists and ecologists. Female more slender, head more produced and less broadly rounded, furca longer. Male with more distinct asymmetry of left 5th foot. All these characters variable to some extent. Females of both forms can be separated, according to Rees (1949), by the shape of the serrated line on the inner margins of the 1st basal joints of the 5th feet. In *C. finmarchicus* its shape is slightly concave to slightly convex; in *C. helgolandicus* it is strongly concave, the middle of the line curves towards the posterior surface of the joint. Both forms can best be considered as geographically and ecologically differentiated subspecies of one species, *Calanus finmarchicus*.

   Mainly neritic epiplankton.

2. *Calanus hyperboreus* Kröyer, 1838. Resembles *C. finmarchicus* but larger, more transparent and with acutely pointed lateral border of 5th thoracic somite.

   Boreal and Arctic epiplankton, in temperate waters bathypelagic.

3. *Calanus tenuicornis* Dana, 1849. Furcal rami large, each with one very small seta on outer edge. Male with reduced mouth parts.

   Oceanic epiplankton.

4. *Neocalanus gracilis* (Dana, 1849). Body robust. Female with cephalon fused with 1st thoracic somite. Furca short, 2nd inner marginal seta on left side very long, curved. 2nd basipodal joints of 1st feet each with prominent hook on its anterior surface. Male with cephalon and 1st thoracic somite separated. 3rd exopodal joints of 2nd to 4th feet with outer edges partly toothed.

   Oceanic, mainly epiplankton, occasionally deep-water.

5. *Nannocalanus minor* (Claus, 1863). Cephalon and 1st thoracic somite fused. 5th thoracic somite broadly rounded posteriorly and partly overlapping genital segment.

   Oceanic epiplankton.

6. *Calanoides carinatus* (Kröyer, 1849). Cephalon keeled. Male with endopod of left 5th leg composed of a single joint, without setae.

   Oceanic deep-water; copepodids sometimes abundant in Atlantic epiplankton.

Species	Length in mm.	1st thoracic segment	5th thoracic segment	Furca	1st antennae	Inner margin 1st basal joints of 5th feet	Endopod of left 5th foot in male	Remarks
C. finmarchicus	♀ 2·7—5·0 ♂ 2·4—3·6	separate from cephalon	rounded	1×2	as long as body	serrate	1+1+6 setae	—
C. hyperboreus	♀ 6·9—9·6 ♂ 6·5	separate from cephalon	with acute tip	1×2	as long as body	serrate	1+1+6 setae	larger and more transparent than *C. finmarchicus*
C. tenuicornis	♀ 1·9—2·5 ♂ 1·80—1·95	separate from cephalon	rounded	1×2, large, with small outer edge seta	1½ × as long as body	smooth	1+1+5 setae	—
N. gracilis	♀ 3·0—3·9 ♂ 2·5—2·8	♀ fused with cephalon, separate in ♂	rounded	1×1	♀ 1½ × as long as body ♂ as long as body	smooth	1+1+4 setae	hook on 2nd basal joint of 1 st feet
N. minor	♀ 1·8—2·3 ♂ 1·7—2·0	fused with cephalon	broadly rounded, overlapping genital segment	1×1	shorter than body	serrate	0+0+4 setae	—
C. carinatus	♀ 2·25—2·85 ♂ 2·35	separate from cephalon	rounded	1×1	shorter than body	smooth	single small joint without setae	cephalon keeled

References to Descriptions and Figures.

1. *C. finmarchicus:* Giesbrecht, 1892, Pl. 6, Figs. 19, 20, 34—36; Pl. 7, Figs. 8, 13, 32, 33; Pl. 8, Figs. 3, 15, 20, 21, 31, 33. Giesbrecht & Schmeil, 1898. Mrázek, 1902, Figs. 1, 2. Sars, 1901—03, Pls. 1—4 (as *C. finmarchicus* and *C. helgolandicus*). Van Breemen, 1908, Figs. 1, 2 (as *C. finmarchicus* and *C. helgolandicus*). With, 1915, Figs. 1—5. Pesta, 1928, Fig. 10. Rees, 1949, Fig. 1 (as *C. finmarchicus* and *C. helgolandicus*).

2. *C. hyperboreus:* Giesbrecht, 1892, Pl. 6, Figs. 2, 6; Pl. 7, Fig. 12; Pl. 8, Figs. 10, 23. Giesbrecht & Schmeil, 1898. Sars, 1901—03, Pl. 5. Van Breemen, 1908, Fig. 3. With, 1915, Pl. 1, Fig. 1, Textfig. 6. Wilson, 1932, Fig. 8.

3. *C. tenuicornis:* Giesbrecht, 1892, Pl. 6, Figs. 12, 13; Pl. 7, Figs. 5, 16, 23; Pl. 8, Figs. 18, 27. Giesbrecht & Schmeil, 1898. Van Breemen, 1908, Fig. 8. Vervoort, 1946.

4. *N. gracilis:* Giesbrecht, 1892, Pl. 1, Fig. 1; Pl. 6, Figs. 1, 23, 24; Pl. 7, Figs. 3, 4, 7, 9, 14, 17, 18, 20, 21, 26; Pl. 8, Figs. 2, 4, 6—8, 12, 16, 26 (as *C. gracilis*). Giesbrecht & Schmeil, 1898 (as *C. gracilis*). Van Breemen, 1908, Fig. 7 (as *C. gracilis*). Wilson, 1932, Fig. 13. Vervoort, 1946.
5. *N. minor:* Brady, 1883, Pl. 3, Figs. 1—7 (as *C. valgus*). Giesbrecht, 1892, Pl. 6, Figs. 3, 16, 22; Pl. 7, Figs. 6, 22; Pl. 8, Figs. 1, 9, 19, 30 (as *C. minor*). Giesbrecht & Schmeil, 1898 (as *C. minor*). Wheeler, 1900, Fig. 2 (as *C. minor*). Wolfenden, 1905, Pl. 97, Figs. 36—38 (as *C. minor*). Candeias, 1926 (as *C. minor*). Sewell, 1929, Figs. 2, 3. Wilson, 1932, Fig. 19 (as *C. minor*). Vervoort, 1946. Sewell, 1947, Fig. 1.
6. *C. carinatus:* Lubbock, 1856, Pl. 3 (as *C. brevicornis*). Giesbrecht, 1892, Pl. 6, Figs. 7, 9, 18; Pl. 7, Figs. 10, 11; Pl. 18, Figs. 5, 28 (as *C. brevicornis*). Giesbrecht & Schmeil, 1898 (as *C. brevicornis*). With, 1915 (as *C. carinatus*). Candeias, 1926 (as *Calanoides brevicornis*). Vervoort, 1946, Figs. 1—3 (Vth Copepodid stage).

Distribution	Species
Gulf of Bothnia	—
Gulf of Finland	—
Baltic proper	1
Belt Sea	1
Kattegat	1, 2
Skagerak	1, 2
Northern North Sea	1, 2, (3)
Southern North Sea	1, 2, (3), (4)
English Channel (eastern)	1
English Channel (western)	1
Bristol Channel and Irish Sea	1
South and West Ireland	1, 2, 3, 4
North-eastern Atlantic	1, 2, 3, 4, 5, 6
Faroe Shetland Area	1, 2, (3)
Faroe Iceland Area	1, 2
Norwegian Sea	1, 2
Barents Sea	1, 2

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