

CONSEIL INTERNATIONAL POUR L'EXPLORATION DE LA MER

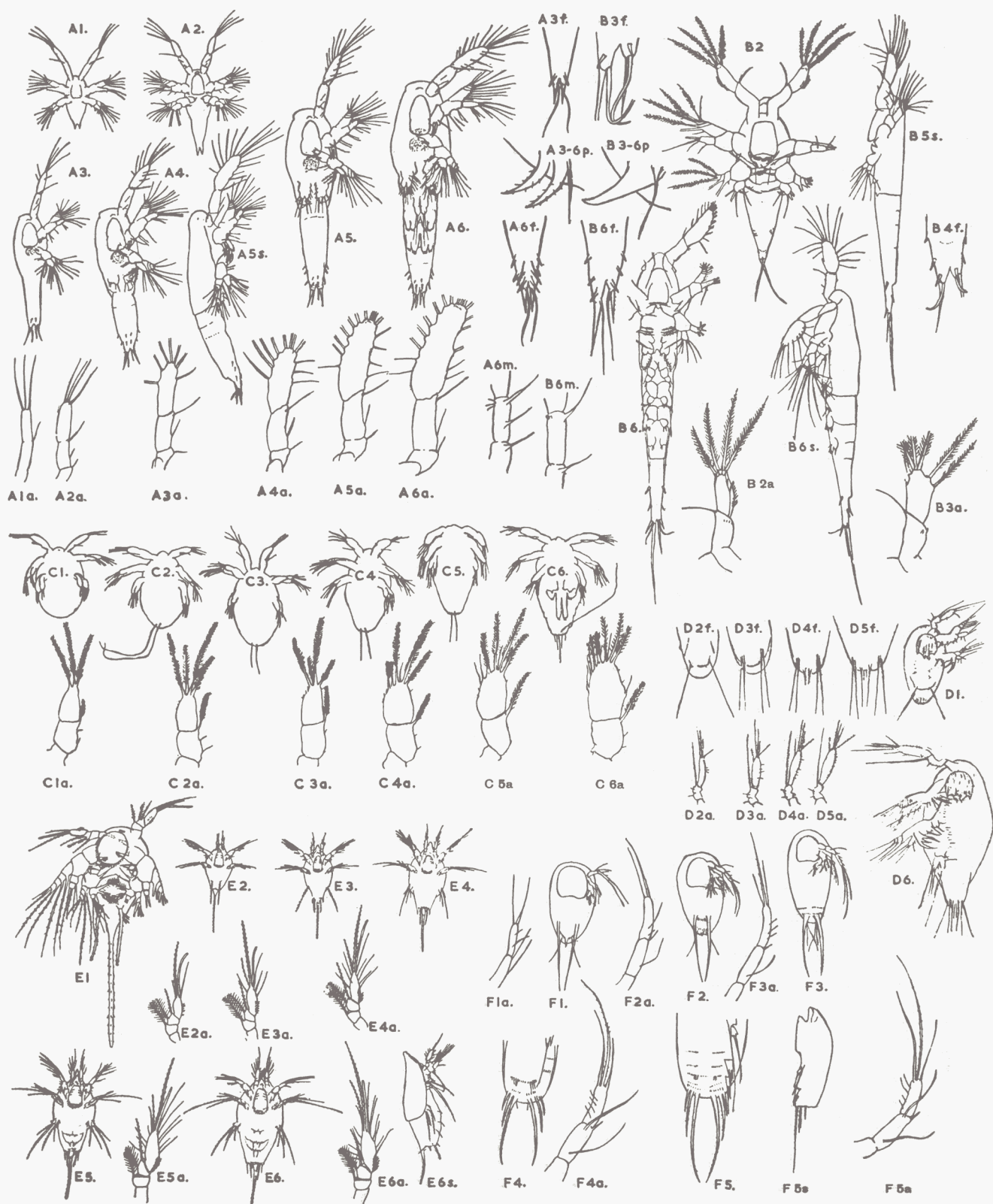
**Zooplankton.**

**Sheet 63.**

**COPEPOD NAUPLII (II)**

(By T. Lovegrove)

**1956.**



This sheet is a continuation of Sheet 50, and includes the nauplii of 6 other copepod genera which are found in the area covered.

Figure	Author	Species	Average Body Length in mm.					
			1	2	3	4	5	6
A	Johnson	<i>Eucalanus elongatus</i> (Dana)	0.224	0.296	0.492	0.664	0.819	0.970
	Gibbons	<i>Eucalanus elongatus</i> (Dana)	—	0.42	0.72	0.88	1.09	1.23
B	Gurney	<i>Rhincalanus nasutus</i> Giesbrecht	—	0.46	0.68	0.85	1.0	1.16
	Gurney	<i>Rhincalanus cornutus</i> Dana	—	—	—	1.0	1.2	1.33
	Steuer	<i>Rhincalanus gigas</i> Brady	—	—	0.86	1.18	1.52	1.80
C	Nicholls	<i>Pareuchaeta norvegica</i> (Boeck)	0.55	0.60	0.64	0.68	0.73	0.78
D	Gibbons & Ogilvie	<i>Oithona helgolandica</i> Claus	0.115	0.130	0.140	0.165	0.190	0.215
	Gibbons & Ogilvie	<i>Oithona spinirostris</i> Claus	0.130	0.150	0.170	0.200	0.235	0.270
	Murphy	<i>Oithona nana</i> Giesbrecht ♀	0.04	0.075	0.097	0.12	0.15	0.19
		<i>Oithona nana</i> Giesbrecht ♂	0.04	0.075	0.09	0.11	0.13	0.15
E	Nicholls	<i>Longipedia coronata</i> Claus	0.15	0.20	0.26	0.33	0.40	0.45
	"	<i>Longipedia scotti</i> G. O. Sars	0.15	0.19	0.24	0.27	0.32	0.37
	"	<i>Longipedia minor</i> T. & A. Scott	0.13	0.18	0.19	0.22	0.27	0.30
F	Ogilvie	<i>Microsetella norvegica</i> (Boeck)	0.11	0.13	0.15	0.18	0.21	

#### Further Information on Identification

##### A. *Eucalanus elongatus* (Dana).

The figures for this species are taken from Johnson. Gibbons' description agrees with them except that he does not describe the first naupliar stage. Johnson describes *E. elongatus* var. *bungii* Giesbrecht but it only differs significantly from the other varieties, e.g., *v. hyalinus* and *v. inermis*, in the number of setae on the second basipod of the mandible — which is also a recognition feature for separating the adults. Although there is a certain resemblance in general form between the nauplii of this genus and *Rhincalanus*, it is possible to distinguish them fairly readily by examination of the furcal region. Note that although Gibbons' description of the furcal region of a stage VI nauplius is correct in having three pairs of lateral spines his figure shows only two. Gibbons, working in the eastern side of the Atlantic found rather greater sizes than Johnson found in the Pacific. Esterly, C. O., 1905, p. 132; Gibbons, S. G., 1936; Giesbrecht, W., 1892, p. 149; Johnson, M. W., 1937.

##### B. *Rhincalanus* spp.

Gurney describes five naupliar stages of *R. nasutus* Giesbrecht, also the last three naupliar and first copepodite stage

of *R. cornutus* Dana, whilst Gibbons' material contained only *R. nasutus*. Neither worker found the first naupliar stage and Gibbons states that in his opinion suppression on this stage occurs and that the second naupliar stage emerges directly from the egg. Steuer describes the late naupliar and early copepodite stages of *R. gigas* Brady. Gibbons' description differs in the setation of *R. nasutus* from that given by Gurney but the differences are only slight and may be due to the mixed nature of Gurney's material. As mentioned above this genus can be readily separated from the rather similar genus *Eucalanus* by examination of the furcal region. Gibbons, S. G., 1936; Giesbrecht, W., 1893; Gurney, R., 1934; Steuer, A., 1935.

##### C. *Pareuchaeta norvegica* (Boeck).

Both Mitchell and Nicholls worked on laboratory reared specimens and Nicholls states that it is difficult to separate individuals into their correct stage by measurement as the growth between stages is small and considerable variations occur in the size of each stage. No "aesthete" bristle occurs on the antennule of these nauplii. Mitchell, J. F., 1928; Nicholls, A. G., 1934.

A, *Eucalanus elongatus*. B, *Rhincalanus* spp. C, *Pareuchaeta norvegica*. D, *Oithona helgolandica*. E, *Longipedia coronata*. F, *Microsetella norvegica*.

The Figures 1—6 refer to the naupliar stage represented.

a = 1st antenna, f = furcal region, m = middle joint of 1st antenna, p = molar process of 2nd antenna, s = side view.

A, from Johnston (1937) except A 3f, A 3—6 p, A 6f and A 6m which are from Gibbons (1936).

B 2, B 2a, B 3a, B 4f, B 5s, B 6 are B 6s are from Gurney (1934) who had *R. cornutus* and *R. nasutus*,

B 3f, B 3—6 p, B 6f, B 6m are *R. nasutus* from Gibbons (1936). C, from Nicholls (1934).

D, from Gibbons and Ogilvie (1933). E, from Nicholls (1935).

F, from Ogilvie (unpublished).

D. *Oithona* spp.

Gibbons & Ogilvie in dealing with the development of *O. helgolandica* Claus and *O. spinirostris* Claus state that the differences between the species are nowhere very pronounced. The first and second naupliar stages are distinguished chiefly by their size and shape together with a small feature in the labrum armature, whilst later stages are separated by the armature of the hind end of the body. Murphy's paper on the life cycle of *O. nana* Giesbrecht gives no details of setation etc. but there are drawings of the 1st and 5th naupliar stages. A table of body sizes purports to show that the difference in size between male and female is evident as early as the 3rd naupliar stage at which stage the different appearance of the front of the head, used as a sex diagnostic in the adult, is recognizable. Gibbons, S. G., & Ogilvie, H. S., 1933; Murphy, Helen, 1923; Oberg, M., 1906.

E. *Longipedia coronata* Claus.

Gurney described the naupliar stages of three species of *Longipedia* without allocating them. Nicholls later described and separated the three species *L. coronata* Claus, *L. scotti* Sars and *L. minor* Scott. Hansen fully described the larva of *Longipedia* as that of an unknown copepod in 1899 and he in turn refers to Claus who recognized this larva as that of a copepod in 1863. Claus, C., 1863; Hansen, H. J., 1899; Gurney, R., 1930, 1931, 1932; Nicholls, A. G., 1935.

F. *Microsetella norvegica* (Boeck).

This is believed to be the first published description of this nauplius and is taken from a manuscript prepared by Helen S. Ogilvie. It is hoped to publish a fuller description in the future. As is usual in Harpacticoida there are only five naupliar stages in *Microsetella*.

Other species.

No nauplii of other truly planktonic harpacticoid species appear to have been described, but there are many descriptions of species from rock pools (Brian, 1921; Fraser, 1936; Johnson and Olsen, 1948) and fresh water (Dietrich, 1915; Gurney, 1931). Most have five naupliar stages but some have six, e.g., *Longipedia* and some fresh water species, whilst in others there are often fewer than five (Gurney, 1931). Cyclopoids may have six naupliar stages as in *Oithona* or five as in *Cyclops*. Semi-parasitic and parasitic copepods usually have smaller numbers. Ravera, 1953, worked out the stages of *Hetercope saliens* and *Eudiaptomus vulgaris* as well as some fresh water cyclopoids. Brian, 1921; Dietrich, 1915; Fraser, J. H., 1936; Gurney, R., 1931, 1932; Johnson and Olsen, 1948; Ravera, O., 1953.

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