

THE SYSTEMATICS AND DISTRIBUTION OF PLANKTONIC COPEPODS IN THE LAWSON'S BAY, WALTAIR

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INTRODUCTION

OUR present knowledge of the systematics and distribution of the copepods in the seas around India is largely based on the reports of plankton collected by R.I.M.S. 'Investigator' during the years 1910 to 1925 and also on the material collected during the 'Siboga' and 'John Murray' expeditions. Excellent accounts on the systematics and distribution have been given by Sewell (1912, 29a, 32, 40, 47, 48 and 49) on the collections made by the 'Investigator' and 'John Murray' Expeditions. Scott (1909) has reported on the systematics and distribution of copepods collected during the 'Siboga' expedition. Mention should be made of the work of Wolfenden (1906) on the material collected by J. Stanley Gardiner around the Maldiva and Laccadive islands. Krishnaswamy (1951, 52a, 52b, 53a, 53b, 53c and 56) has made valuable contribution to the systematics of the copepods in the inshore waters off Madras in the Bay of Bengal.

The seasonal distribution of copepods have been studied by Jacob and Menon (1947) from the West Hill Sea, Ganapati and Rao (1954) off Waltair, Kartha (1959) and Prasad and Kartha (1959) at Mandapam. Jacob and Menon (1947) correlated the distribution of copepods with diatoms, hydrographical conditions and fisheries. Ganapati and Rao (1954) studied the distribution of copepods in space and time in the neritic waters off Visakhapatnam coast in relation to the salinity and temperature changes. Kartha (1959) gave an account of the distribution of copepodites and adults of copepods in the Gulf of Mannar and Palk Bay and found a difference in the species composition as well as populations of the adults in the two areas. Prasad and Kartha (1959) found a close relation between the breeding of copepods and the diatom cycles both in the Gulf of Mannar and Palk Bay.

Observations on the seasonal distribution of copepods along with general plankton investigations have been made by Menon (1931); Aiyar, Menon and Menon (1936); Ganapati and Sarma (1958); Prasad, Bapat and Tampi (1952); Prasad (1954, 56) Chacko (1950); Menon (1948); George (1953) and Bal and Pradhan (1945, 52).

In the present paper an attempt has been made to correlate the distribution of planktonic copepods in the inshore waters in the Lawson's Bay with the currents, salinity, temperature and diatom cycles.

MATERIAL AND METHODS

Surface plankton samples, collected thrice a week with an ordinary half-meter tow-net made of best Swiss organdy at about the 10 fathom line, in the Lawson's Bay during the years 1957, '58 and '59, were used in the present study.

By counting the number of copepods in three aliquot samples (10 cc. each), the total number of copepods present in a collection was calculated.

CLASSIFIED LIST OF COPEPODS

CALANOIDA

Family : CALANIDAE.

- Genus : *Nannocalanus* Sars.
Nannocalanus minor (Claus).
Genus : *Canthocalanus* A. Scott.
Canthocalanus pauper (Giesbrecht).
Genus : *Undinula* A. Scott.
Undinula darwini (Lubbock).
U. vulgaris (Dana).

Family : EUCALANIDAE.

- Genus : *Eucalanus* Dana.
Eucalanus attenuatus (Dana).
E. crassus Giesbrecht.
E. elongatus (Dana).
E. monachus Giesbrecht.
E. mucronatus Giesbrecht.
E. pseudattenuatus Sewell.
E. subcrassus Giesbrecht.
Genus : *Rhincalanus* Dana.
Rhincalanus cornutus Dana.
R. nasutus Giesbrecht.
Genus : *Mecynocera* Thompson, I. C.
Mecynocera clausi Thompson, I.C.

Family : PARACALANIDAE.

- Genus : *Paracalanus* Boeck.
Paracalanus aculeatus Giesbrecht.
P. parvus (Claus).
Genus : *Acrocalanus* Giesbrecht.
Acrocalanus gibber Giesbrecht.
A. gracilis Giesbrecht.
A. longicornis Giesbrecht.
A. monachus Giesbrecht.

Family : PSEUDOCALANIDAE.

- Genus : *Clausocalanus* Giesbrecht.
Clausocalanus arcuicornis (Dana).
Genus : *Calocalanus* Giesbrecht.
Calocalanus pavo (Dana).

Family : AETIDEIDAE.

- Genus : *Euaetideus* Sars.
Euaetideus sp.

- Genus : *Euchirella* Giesbrecht.
Euchirella bella Giesbrecht.
E. brevis Sars.
E. messinensis (Claus).
- Family : EUCHAETIDAE.
 Genus : *Euchaeta* Philippi.
Euchaeta marina (Prestandrea).
- Family : SCOLECITHRICIDAE.
 Genus : *Scolecithrix* Brady.
Scolecithrix danae (Lubbock).
 Genus : *Scaphocalanus* Sars.
Scaphocalanus robustus (T. Scott).
- Family : CENTROPAGIDAE.
 Genus : *Centropages* Kroyer.
Centropages dorsispinatus Thompson and Scott.
C. furcatus (Dana).
C. gracilis (Dana).
C. orsinii Giesbrecht.
C. tenuiremis Thompson and Scott.
C. trispinosus Sewell.
- Family : PSEUDODIAPTOMIDAE.
 Genus : *Pseudodiaptomus* Heerick.
Pseudodiaptomus aurivilli Cleve.
 Genus : *Schmackeria* Poppe and Richard.
Schmackeria serricaudatus (T. Scott).
- Family : TEMORIDAE.
 Genus : *Temora* Baird.
Temora discaudata Giesbrecht.
T. turbinata (Dana).
- Family : METRIDIIDAE.
 Genus : *Pleuromamma* Giesbrecht.
Pleuromamma abdominalis (Lubbock).
- Family : LUCICUTIIDAE.
 Genus : *Lucicutia* Giesbrecht.
Lucicutia flavicornis (Claus).
L. ovalis Wolfenden.
- Family : HETERORHABDIDAE.
 Genus : *Heterorhabdus* Giesbrecht.
Heterorhabdus spinifrons (Claus).
- Family : AUGAPTILIDAE.
 Genus : *Haloptilus* Giesbrecht.
Haloptilus longicornis (Claus).

Family : ARIETELLIDAE.

- Genus : *Metacalanus* Cleve.
Metacalanus aurivilli Cleve.

Family : CANDACIIDAE.

- Genus : *Candacia* Dana.
Candacia aethiopica (Dana).
C. bradyi A. Scott.
C. curta (Dana).
C. discaudata A. Scott.
C. pachydactyla (Dana).
C. simplex Giesbrecht.
C. turgida Wilson.

Family : PONTELLIDAE.

- Genus : *Labidocera* Lubbock.
Labidocera acuta (Dana).
L. acutifrons (Dana).
L. bengalensis Krishnaswamy.
L. detruncata (Dana).
L. euchaeta Giesbrecht.
L. kroyeri (Brady).
- Genus : *Pontella* Dana.
Pontella andersoni Sewell.
P. danae var. *ceylonica* Thompson and Scott.
P. fera Dana.
P. investigatoris Sewell.
P. securifer Brady.
- Genus : *Pontellopsis* Brady.
Pontellopsis armata (Giesbrecht).
P. regalis (Dana).
P. scotti Sewell.
- Genus : *Pontellina* Dana.
Pontellina plumata Dana.
- Genus : *Calanopia* Dana.
Calanopia elliptica (Dana).
C. minor A. Scott.
C. thompsoni A. Scott.

Family : ACARTIIDAE.

- Genus : *Acartia* Dana.
- Sub-genus : *Odontacartia* Steuer.
Acartia (*Odontacartia*) *erythraea* Giesbrecht.
- Sub-genus : *Planktacartia* Steuer.
Acartia (*Planktacartia*) *danae* Giesbrecht.
A. (P.) negligens Dana.

Family : TORTANIDAE.

- Genus : *Tortanus* Giesbrecht.
Tortanus forcipatus Giesbrecht.
T. gracilis (Brady).

CYCLOPOIDA

Family : OITHONIDAE.

- Genus : *Oithona* Baird.
Oithona linearis Giesbrecht.
O. nana Giesbrecht.
O. plumifera Baird.
O. rigida Giesbrecht.
O. robusta Giesbrecht.
O. setigera (Dana).

Family : CLAUSIDIIDAE.

- Genus : *Saphirella* T. Scott.
Saphirella sp.

Family : LICHOMOLGIDAE.

- Genus : *Macrochiron* Brady.
 Sub-genus : *Paramacrochiron* Sewell.
Macrochiron (Paramacrochiron) paryum (A. Scott).
 Genus : *Pachysoma* Claus.
Pachysoma punctatum (Claus).

Family : ONCAEIDAE.

- Genus : *Oncaea* Philippi.
Oncaea conifera Giesbrecht.
O. venusta Philippi.

Family : CORYCAEIDAE.

- Genus : *Corycaeus* Dana.
 Sub-genus : *Corycaeus* Dahl.
Corycaeus (Corycaeus) spectosus Dana.
 Sub-genus : *Agetus* Kroyer.
Corycaeus (Agetus) limbatus Brady.
 Sub-genus : *Onychocorycaeus* Dahl.
Corycaeus (Onychocorycaeus) giesbrechti Dahl.
C. (O) ovalis Claus.
 Sub-genus : *Urocorycaeus* Dahl.
Corycaeus (Urocorycaeus) furcifer Claus.
 Sub-genus : *Corycella* Farran.
Corycaeus (Corycella) gibbulus Giesbrecht.

Family : SAPPHIRINIDAE.

- Genus : *Sapphirina* Thompson.
Sapphirina metallina Dana.
S. nigromaculata Claus.
S. opalina Dana.
S. ovato-lanceolata Dana.
 Genus : *Copilia* Dana.
Copilia mirabilis Dana.
C. quadrata Dana.
C. vitrea (Haeckel).

HARPACTICOIDA

Family : LONGIPEDIIDAE.

Genus : *Longipedia* Claus.
Longipedia scotti (Sars.).

Family : ECTINOSOMIDAE.

Genus : *Microsetella* Brady and Robertson.
Microsetella norvegica (Boeck).
M. rosea (Dana).

Family : PELTIDIIDAE.

Genus : *Alteutha* Baird.
Alteutha sewelli Krishnaswamy.

Family : DIOSACCIDAE.

Genus : *Diosaccus* Boeck.
Diosaccus hamiltoni Thompson & Scott.
D. truncatus Gurney.

Family : MACROSETELLIDAE.

Genus : *Miracia* Dana.
Miracia efferata T. Scott.
Genus : *Macrosetella* A. Scott.
Macrosetella gracilis (Dana).

Family : TACHIDIIDAE.

Genus : *Euterpina* Norman.
Euterpina acutifrons (Dana).

Family : CLYTEMNESTRIDAE.

Genus : *Clytemnestra* Dana.
Clytemnestra rostrata (Brady).

SEASONAL DISTRIBUTION OF COPEPODS

As many as 109 species of copepods have been identified and listed. The bulk of the copepod population is made up of the Calanoid genera *Canthocalanus*, *Eucalanus*, *Paracalanus*, *Acrocalanus*, *Clausocalanus*, *Centropages*, *Schmackeria* and *Acartia*, the Cyclopoids *Oithona*, *Oncaea* and *Corycaeus* and the Harpacticoid *Euterpina*.

The distribution of the various species during the different months of the year is given at the end of the paper. There has not been any marked deviation in the time of their appearance during the three years under observation and as such it was found unnecessary to indicate their distribution separately for each year. According to their occurrence the copepods could be grouped into the following 3 categories :—

(1) Species which occur either throughout the year or for most part of the year.

Canthocalanus pauper
Eucalanus subcrassus
Paracalanus aculeatus
Paracalanus parvus

Labidocera acuta
Calanopia elliptica
Acartia erythraea
Tortanus forcipatus

<i>Acrocalanus gibber</i>	<i>Oithona rigida</i>
<i>Acrocalanus gracilis</i>	<i>Oncaea conifera</i>
<i>Clausocalanus arcuicornis</i>	<i>Oncaea venusta</i>
<i>Euchaeta marina</i>	<i>Corycaeus limbatus</i>
<i>Centropages furcatus</i>	<i>Corycaeus ovalis</i>
<i>Centropages dorsispinatus</i>	<i>Corycaeus speciosus</i>
<i>Schmackeria serricaudatus</i>	<i>Euterpina acutifrons</i>
<i>Temora discaudata</i>	<i>Macrosetella gracilis</i>

Of these, six species occur throughout the year in good numbers and form the bulk of the copepod fauna. The others appear in large numbers only during certain months while being present in smaller numbers for most part of the year.

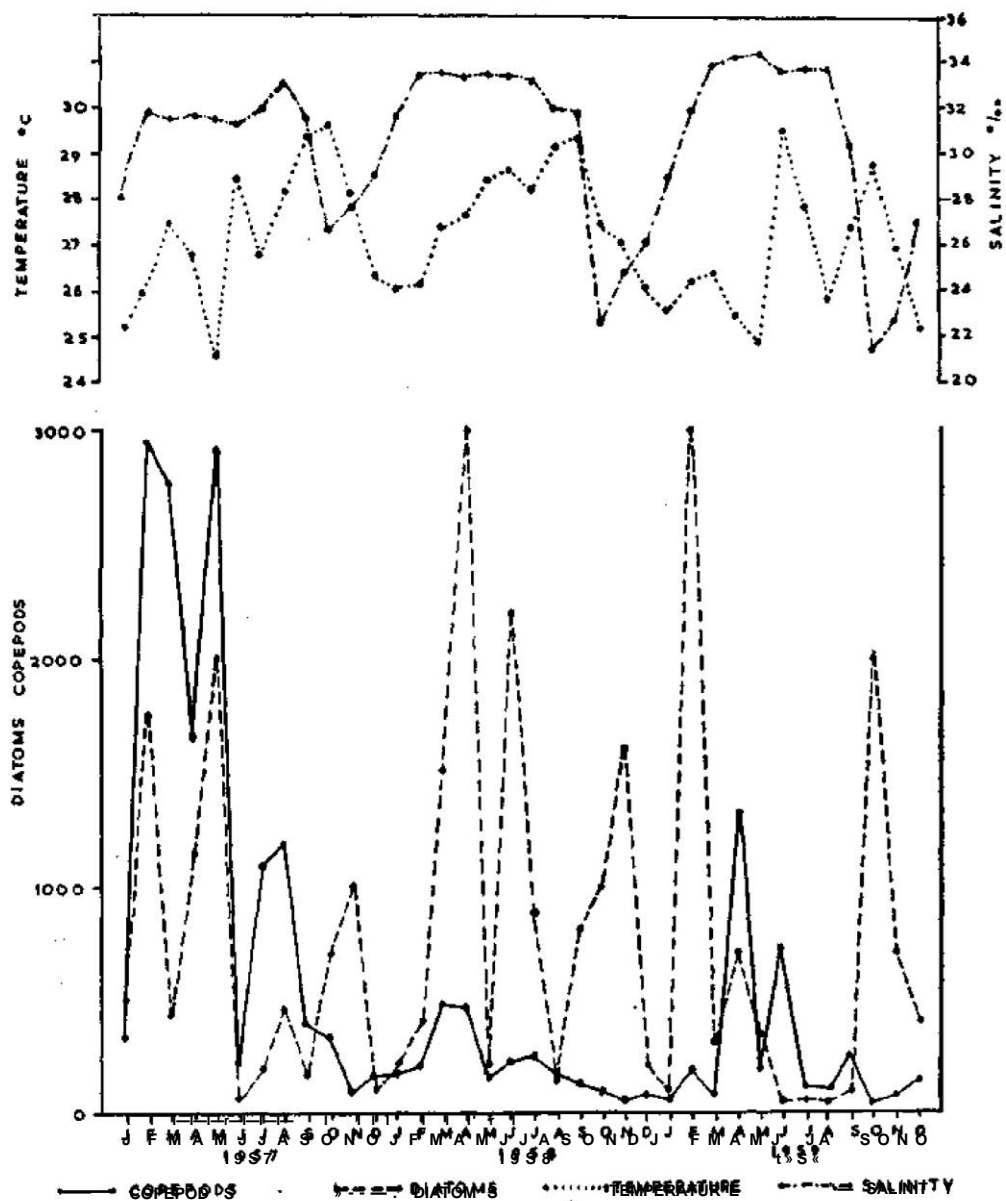
Paracalanus aculeatus and *P. parvus* have their maxima from January to April and again from July to September. *Schmackeria serricaudatus* occurs in maximum numbers in March and again in June and July. *Acartia erythraea* were observed in large numbers in May and August in 1957 and in March to April and again in June in 1958 and 1959. *Oithona rigida* is the dominant copepod during the February-June period. While *Euterpina acutifrons* showed three maxima in a year, February to March, July and September, the others show only two maxima.

(2) Species which occur only during certain months of the year.

<i>Undinula darwini</i>	<i>Calanopia minor</i>
<i>Undinula vulgaris</i>	<i>Calanopia thompsoni</i>
<i>Eucalanus crassus</i>	<i>Oithona linearis</i>
<i>Mecynocera clausi</i>	<i>Oithona nana</i>
<i>Acrocalanus longicornis</i>	<i>Oithona plumifera</i>
<i>Calocalanus pavo</i>	<i>Oithona robusta</i>
<i>Centropages trispinosus</i>	<i>Oithona setigera</i>
<i>Centropages gracilis</i>	<i>Macrochiron parvum</i>
<i>Centropages tenuiremis</i>	<i>Corycaeus gibbulus</i>
<i>Centropages orsinii</i>	<i>Corycaeus giesbrechti</i>
<i>Temora turbinata</i>	<i>Copilia mirabilis</i>
<i>Lucicutia flavicornis</i>	<i>Diosaccus truncatus</i>
<i>Candacia aethiopica</i>	<i>Sapphirina nigromaculata</i>
<i>Candacia discaudata</i>	<i>Sapphirina ovatolanceolata</i>
<i>Labidocera bengalensis</i>	<i>Clytemnestra rostrata</i>

(3) Species which are very rare and occur sporadically in small numbers.

<i>Eucalanus attenuatus</i>	* <i>Labidocera euchaeta</i>
* <i>Eucalanus elongatus</i>	<i>Labidocera kroeyeri</i>
* <i>Eucalanus monachus</i>	<i>Pontella andersoni</i>
<i>Eucalanus mucronatus</i>	* <i>Pontella danae</i> var. <i>ceylonica</i>
<i>Eucalanus pseudattenuatus</i>	* <i>Pontella fera</i>
* <i>Rhincalanus cornutus</i>	* <i>Pontella investigatoris</i>
* <i>Rhincalanus nasutus</i>	* <i>Pontella securifer</i>
* <i>Euaetideus</i> sp.	* <i>Pontellopsis armata</i>
* <i>Euchirella bella</i>	<i>Pontellopsis regalis</i>
* <i>Euchirella brevis</i>	<i>Pontellopsis scotti</i>
* <i>Euchirella messinensis</i>	<i>Pontellina plumata</i>
* <i>Scolecithrix danae</i>	* <i>Tortanus gracilis</i>
* <i>Pseudodiaptomus aurivilli</i>	* <i>Saphirella</i> sp.
* <i>Scaphocalanus robustus</i>	* <i>Pachysoma punctatum</i>



Text-Figure. The Copepods and Diatoms shown in the figure represent their number in 10 ml. of the plankton sample.

<i>Pleuromamma abdominalis</i>	<i>Corycaeus furcifer</i>
<i>Lucicutia ovalis</i>	<i>Sapphirina metallina</i>
<i>Haloptilus longicornis</i>	* <i>Sapphirina opalina</i>
<i>Heterorhabdus spinifrons</i>	<i>Copilia quadrata</i>
<i>Metacalamus aurivilli</i>	* <i>Copilia vitrea</i>
<i>Candacia bradyi</i>	<i>Longipedia scotti</i>
* <i>Candacia curta</i>	* <i>Microsetella norvegica</i>
* <i>Candacia pachydactyla</i>	* <i>Microsetella rosea</i>
<i>Candacia simplex</i>	<i>Alteutha sewelli</i>
<i>Candacia turgida</i>	* <i>Diosaccus hamiltoni</i>
* <i>Labidocera acutifrons</i>	* <i>Miracia efferata</i>
* <i>Labidocera detruncata</i>	

It is interesting to note that those marked with an asterisk belonging to the class (3) are restricted to the Northerly current period, when the highly saline waters flow from the Malayan and Equatorial regions into the Bay.

A study of the seasonal distribution of the copepods during the different months of the year during the three-year period makes it possible to draw some general inferences. Text Fig. represents graphically the total copepod content in the plankton during the different months of the year together with diatom density, salinity and surface temperature for the same period. The copepod peaks in 1957 closely coincide with the diatom peaks except in the October-November months. There is also an inverse relationship of copepod abundance and temperature. It is interesting to observe that the copepod peaks are also during the months when the salinity conditions are high and steady. It is significant that even though the diatoms are abundant during the October-November period the copepod population is very low, owing to the prevailing low salinity and high temperature.

In 1958 the copepod numbers have been in general low, even though the diatoms did not show any corresponding fall. The salinity was also high and steady from January to July. The only explanation that could be offered for the low numbers of copepods for the year is the prevailing steady high temperature without the characteristic dips observed in 1957.

The pattern of distribution in 1959 is almost similar to that in 1957 with the periods of copepod abundance coinciding with steady high salinity conditions and low temperature.

SUMMARY

1. Thirty-two families, comprising 48 genera and 109 species of copepods are recorded from the inshore waters off Waltair coast.
2. The density of copepod populations showed a direct relationship with diatom numbers and salinity and an inverse relationship with temperature.
3. The low numbers of copepods in 1958 is attributed to the prevailing high and steady temperature unlike the other two years.

COPEPOD CALENDAR

S. No.	Species of Copepods	J	F	M	A	M	J	J	A	S	O	N	D
CALANOIDA													
1.	<i>Acartia danae</i>	—	—	—	—	R	—	—	R	—	—	—	—
2.	<i>A. erythraea</i>	R	R	R	F	R	R	R	F	R	R	R	R
3.	<i>A. negligens</i>	R	R	—	—	—	—	—	—	—	—	—	—
4.	<i>Acrocalanus gibber</i>	R	F	R	R	R	R	R	R	R	R	R	R
5.	<i>A. gracilis</i>	R	R	R	R	R	R	R	R	R	R	R	R
6.	<i>A. longicornis</i>	—	R	R	—	R	R	—	—	R	—	—	—
7.	<i>A. monachus</i>	—	R	—	R	—	—	—	—	—	—	—	—
8.	<i>Calanopia elliptica</i>	R	R	R	R	R	R	R	R	R	—	R	R
9.	<i>C. minor</i>	R	—	—	—	—	—	R	R	R	—	R	R
10.	<i>C. thompsoni</i>	R	—	R	R	R	R	—	—	—	R	—	—
11.	<i>Calocalanus pavo</i>	R	R	R	—	R	R	R	R	—	—	R	R
12.	<i>Candacia aethiopica</i>	R	—	R	—	R	—	—	—	R	R	R	—
13.	<i>C. bradyi</i>	—	—	—	R	—	—	—	R	—	—	—	R
14.	<i>C. curia</i>	—	—	—	R	—	—	—	—	—	—	—	—
15.	<i>C. discaudata</i>	—	—	R	—	—	—	—	R	—	R	R	R
16.	<i>C. pachydactyla</i>	—	—	R	R	—	—	—	—	—	—	—	—
17.	<i>C. simplex</i>	—	—	—	R	—	R	—	R	R	—	R	—
18.	<i>C. turgida</i>	R	—	—	R	—	—	R	—	—	—	—	—
19.	<i>Canthocalanus pauper</i>	R	R	F	R	R	F	R	R	R	R	R	R
20.	<i>Centropages dorsispinatus</i>	R	R	R	R	R	R	R	R	R	R	R	R
21.	<i>C. furcatus</i>	R	R	R	R	R	R	R	R	R	R	R	R
22.	<i>C. gracilis</i>	R	R	—	R	R	—	—	R	R	—	—	—
23.	<i>C. orsinii</i>	R	R	—	—	—	—	—	—	—	—	R	R
24.	<i>C. tenuiremis</i>	R	R	R	R	R	R	R	—	R	R	R	R
25.	<i>C. trispinosus</i>	R	R	—	R	R	R	—	R	R	R	R	R
26.	<i>Clausocalanus arcuicornis</i>	F	R	F	R	R	R	R	R	R	—	—	R
27.	<i>Euaetideus</i> sp.	—	—	—	R	—	—	—	—	—	—	—	—
28.	<i>Eucalanus attenuatus</i>	—	—	R	—	—	R	—	—	—	—	—	R
29.	<i>E. crassus</i>	—	R	R	—	R	—	R	R	—	—	—	R
30.	<i>E. elongatus</i>	—	R	R	—	R	—	—	—	—	—	—	—
31.	<i>E. monachus</i>	—	R	R	—	—	R	—	—	—	—	—	—
32.	<i>E. mucronatus</i>	—	R	—	—	—	R	—	—	R	—	—	—
33.	<i>E. pseudattenuatus</i>	—	—	—	R	—	—	—	R	R	—	—	—
34.	<i>E. subcrassus</i>	R	R	F	R	R	R	R	R	R	R	R	R
35.	<i>Euchaeta marina</i>	R	R	R	R	R	R	R	R	R	R	R	R
36.	<i>Euchirella bella</i>	—	—	R	R	—	—	—	—	—	—	—	—
37.	<i>E. brevis</i>	—	—	R	R	—	—	—	—	—	—	—	—
38.	<i>E. messinensis</i>	—	—	R	R	—	—	—	—	—	—	—	—
39.	<i>Haloptilus longicornis</i>	—	R	—	R	—	R	R	—	R	—	—	—
40.	<i>Heterorhabdus spinifrons</i>	—	—	—	R	—	—	—	R	R	—	—	—
41.	<i>Labidocera acuta</i>	R	—	R	—	R	—	R	R	R	R	R	—
42.	<i>L. acutifrons</i>	—	—	—	—	R	—	—	—	—	—	—	—
43.	<i>L. bengalensis</i>	—	—	—	R	R	R	R	R	R	R	—	R
44.	<i>L. detruncata</i>	—	—	—	R	R	—	—	—	—	—	—	—
45.	<i>L. euchaeta</i>	—	—	—	R	R	—	—	—	—	—	—	—
46.	<i>L. kroyeri</i>	—	—	R	—	R	—	—	—	—	—	R	R
47.	<i>Lucicutia flavicornis</i>	R	R	R	R	R	R	R	—	R	—	—	—
48.	<i>L. ovalis</i>	—	—	R	R	R	—	R	—	—	—	—	—
49.	<i>Mecynocera clausi</i>	R	R	R	—	R	—	R	—	R	—	—	R
50.	<i>Metacalanus aurivilli</i>	—	—	R	—	R	—	R	—	R	R	—	—
51.	<i>Nannocalanus minor</i>	—	—	—	—	—	—	—	—	—	—	—	R
52.	<i>Paracalanus aculeatus</i>	F	R	R	R	R	R	F	F	F	C	R	R
53.	<i>P. parvus</i>	F	R	R	R	R	R	R	R	R	R	R	R
54.	<i>Pleuromamma abdominalis</i>	—	R	—	R	—	R	R	—	R	—	—	—

R = 1-5 in 10 ml. sample

F = 6-20 -do-

C = 21 and above -do-

S. No.	Species of Copepods	J	F	M	A	M	J	J	A	S	O	N	D
55.	<i>Pontella andersoni</i>	R	—	—	—	—	—	—	—	—	—	—	R
56.	<i>P. danae</i> var. <i>ceylonica</i>	—	R	R	—	R	—	R	—	—	—	—	—
57.	<i>P. fera</i>	—	R	R	—	R	—	—	—	—	—	—	—
58.	<i>P. investigatoris</i>	—	R	R	—	R	—	—	—	—	—	—	—
59.	<i>P. securifer</i>	—	—	—	R	R	—	—	—	—	—	—	—
60.	<i>Pontellina plumata</i>	R	—	—	R	—	—	—	—	—	R	—	—
61.	<i>Pontellopsis armata</i>	—	—	—	R	—	—	—	—	—	—	—	—
62.	<i>P. regalis</i>	—	R	R	—	R	—	—	R	R	—	—	—
63.	<i>P. scotti</i>	—	—	—	R	—	—	—	—	R	—	R	—
64.	<i>Pseudodiaptomus aurivilli</i>	—	—	—	R	—	—	—	—	—	—	—	—
65.	<i>Rhincalanus cornutus</i>	—	—	—	R	R	—	—	—	—	—	—	—
66.	<i>R. nasutus</i>	—	—	—	R	—	—	—	—	—	—	—	—
67.	<i>Scaphocalanus robustus</i>	—	—	—	R	—	—	—	—	—	—	—	—
68.	<i>Schmackeria serricaudatus</i>	R	R	F	R	F	R	R	R	R	R	R	R
69.	<i>Scolecithrix danae</i>	—	—	—	R	—	—	—	—	—	—	—	—
70.	<i>Temora discaudata</i>	R	R	R	R	R	R	R	R	R	—	R	R
71.	<i>T. turbinata</i>	—	—	—	R	—	R	R	—	R	—	R	—
72.	<i>Tortanus forcipatus</i>	R	R	R	R	R	R	—	R	R	R	R	R
73.	<i>T. gracilis</i>	—	—	—	R	—	R	R	—	—	—	—	—
74.	<i>Undinula darwini</i>	R	—	R	R	R	R	R	—	R	—	—	R
75.	<i>U. vulgaris</i>	R	R	R	R	R	—	R	R	R	—	—	R
CYCLOPOIDA													
76.	<i>Copilia mirabilis</i>	R	—	—	R	—	R	R	R	—	—	—	R
77.	<i>C. quadrata</i>	—	—	—	—	—	—	R	R	—	—	—	—
78.	<i>C. vitrea</i>	—	—	R	—	—	—	—	—	—	—	—	—
79.	<i>Corycaeus furcifer</i>	—	—	R	—	—	—	—	R	—	—	—	—
80.	<i>C. gibbulus</i>	R	R	R	—	R	—	R	—	—	R	—	R
81.	<i>C. giesbrechti</i>	R	R	R	—	R	—	—	—	—	—	—	—
82.	<i>C. limbatus</i>	R	R	R	R	R	R	R	R	R	R	R	R
83.	<i>C. ovalis</i>	R	R	R	R	R	R	R	R	R	R	R	R
84.	<i>C. speciosus</i>	R	R	R	R	R	R	R	R	R	R	R	R
85.	<i>Macrochiron parvum</i>	R	R	R	R	R	R	R	R	R	—	R	R
86.	<i>Oithona linearis</i>	—	—	—	R	—	R	R	—	—	—	—	—
87.	<i>O. nana</i>	R	R	R	R	—	R	R	—	R	—	—	—
88.	<i>O. plumifera</i>	R	R	R	R	R	R	R	R	R	—	—	R
89.	<i>O. rigida</i>	F	C	C	C	C	F	F	R	R	R	R	R
90.	<i>O. robusta</i>	—	—	—	—	—	R	R	R	R	—	—	—
91.	<i>O. setigera</i>	—	R	R	R	R	—	R	R	R	—	—	R
92.	<i>Oncaea conifera</i>	R	R	R	R	R	R	R	R	R	R	R	R
93.	<i>O. venusta</i>	R	R	R	R	R	R	R	R	R	R	R	R
94.	<i>Pachysoma punctatum</i>	—	—	R	R	—	—	—	—	—	—	—	—
95.	<i>Saphirella</i> sp.	—	—	—	R	—	R	—	—	—	—	—	—
96.	<i>Sapphirina metallina</i>	R	—	R	R	—	—	—	R	—	—	—	—
97.	<i>S. nigromaculata</i>	R	—	R	R	R	R	R	R	—	—	—	—
98.	<i>S. opalina</i>	—	—	R	—	—	—	—	—	—	—	—	—
99.	<i>S. ovatolanceolata</i>	R	—	—	R	—	R	R	—	—	—	—	R
HARPACTICOIDA													
100.	<i>Alteutha sewelli</i>	—	—	R	R	R	—	R	R	—	—	—	—
101.	<i>Clytemnestra rostrata</i>	R	—	R	R	—	—	R	R	R	—	R	—
102.	<i>Diosaccus hamiltoni</i>	—	—	R	—	—	—	—	—	—	—	—	—
103.	<i>D. truncatus</i>	R	R	—	—	R	R	—	—	—	—	—	—
104.	<i>Enterpina acutifrons</i>	R	F	F	F	F	R	F	R	R	R	R	R
105.	<i>Longipedia scotti</i>	—	—	R	—	R	—	—	R	R	—	—	—
106.	<i>Macrosetella gracilis</i>	R	R	R	R	R	R	R	R	R	R	R	R
107.	<i>Macrosetella norvegica</i>	—	—	—	—	R	R	R	—	—	—	—	—
108.	<i>M. rosea</i>	—	—	R	—	—	—	—	—	—	—	—	—
109.	<i>Miracia efferata</i>	R	—	R	R	R	—	R	—	—	—	—	—

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