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# Larvae of the species of the genus *Euphausia* (*Euphausiacea, Crustacea*) in the southern part of Drake Passage and the Bransfield Strait during the BIOMASS-SIBEX (December 1983 — January 1984)*[)]

ABSTRACT: In the plankton samples, collected with a Nansen net in three water layers downwards to a depth of 500 m, larvae and eggs of *Euphausia superba* were found as well as the larvae of *E. crystallorophias* and *E. frigida*. Eggs of the species *E. superba* predominated and among the larvae most numerous were calyptopis I and metanauplius stages. Eggs and larvae of *E. superba* occurred in small quantities, mainly in Bransfield Strait. Larvae of *E. crystallorophias* were found in the southeastern part of Bransfield Strait. Metanauplius, calyptopis I and II stages were predominant. Larvae of *E. frigida*, mostly calyptopis I stage, were very scarce and occurred only at the stations located in Drake Passage.

Key words: Antarctica, *Euphausiacea*, early life history

## 1. Introduction

On the basis of the hitherto studies it was possible to establish that reproduction period of Antarctic krill, *Euphausia superba*, occurs in summer season and larval period lasts till next spring (Fraser 1936, Marr 1962). The spots of the occurrence of the largest quantities of early larval stages indicate that breeding occurs first and foremost in the shelf and continental slope regions (Marr 1962, Hempel, I. Hempel G. and Baker 1979, Witek, Koronkiewicz and Soszka 1980). It has been ascertained that

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ontogenetic vertical migrations are very specific for *E. superba* (Marr 1962, Makarov 1982 a). Older larval stages are far and wide scattered by surface currents and consequently they are found in other places than adult krill (Marr 1962, Hempel 1982, Kittel and Jażdżewski 1982, Rakusa-Suszczewski 1984). Tha rate of growth and duration of various larval stages were determined indirectly or in direct observations (Marr 1962, McWhinnie and Denys 1978, Witek Koronkiewicz and Soszka 1980, Kikuno 1982, Marschall and Hirche 1984). Wide differences in time and intensity of breeding were observed among the data from different years (Makarov 1974 a, Witek, Koronkiewicz and Soszka 1980). According to Makarov (1974 b) details of the morphology of various larval stages may change depending on the environmental conditions in the course of the ontogenesis.

The reasons of the differences in time and intensity of the reproduction and dependence of the postlarval krill abundance upon the success of larval development are not sufficiently well known, yet. A possibility of a thorough examination of these problems is given by an intent international research within the BIOMASS programme.

Information about larvae of other species of the genus *Euphausia* are comprised in the papers by John (1936), Makarov (1977, 1982 a, b), Hempel (1981) Hempel and Marschoff (1980), Fevolden (1980) give a general conception of the distribution of larvae and time or reproductionn however, the knowledge of the course of larval development of these species is far less exact and thorough.

This study describes the composition of larvae and distribution of the eggs and larvae of *Euphausia superba*, caught during the BIOMASS-SIBEX investigations. The distribution and larvae composition of other species of the genus *Euphausia* — *E. crystallorophias* and *E. frigida* — found in the collected materials are presented additionally.

## 2. Material and methods

Plankton samples were collected at 61 stations in the period of time between December 12, 1983 and January 8, 1984 (Fig. 1). Detailed description of the oceanographic stations is given by Rakusa-Suszczewski and Lipski (1985). A vertical, closed net of Nansen-type with mouth opening 0.4 m$^2$ and 200 μm mesh. Hauls were made in three water layers, at the depths of 0—100 m, 100—300 m and 300—500 m, at the depths less than 500 m deep the net was lowered to the level of about 5—20 m above the bottom of the sea. Samples were preserved in formaldehyde preparation.

Identification of the larvae was made after Fraser (1936) , John (1936), Percova (1976), Makarov (1979) and the BIOMASS Handbook 3. Besides

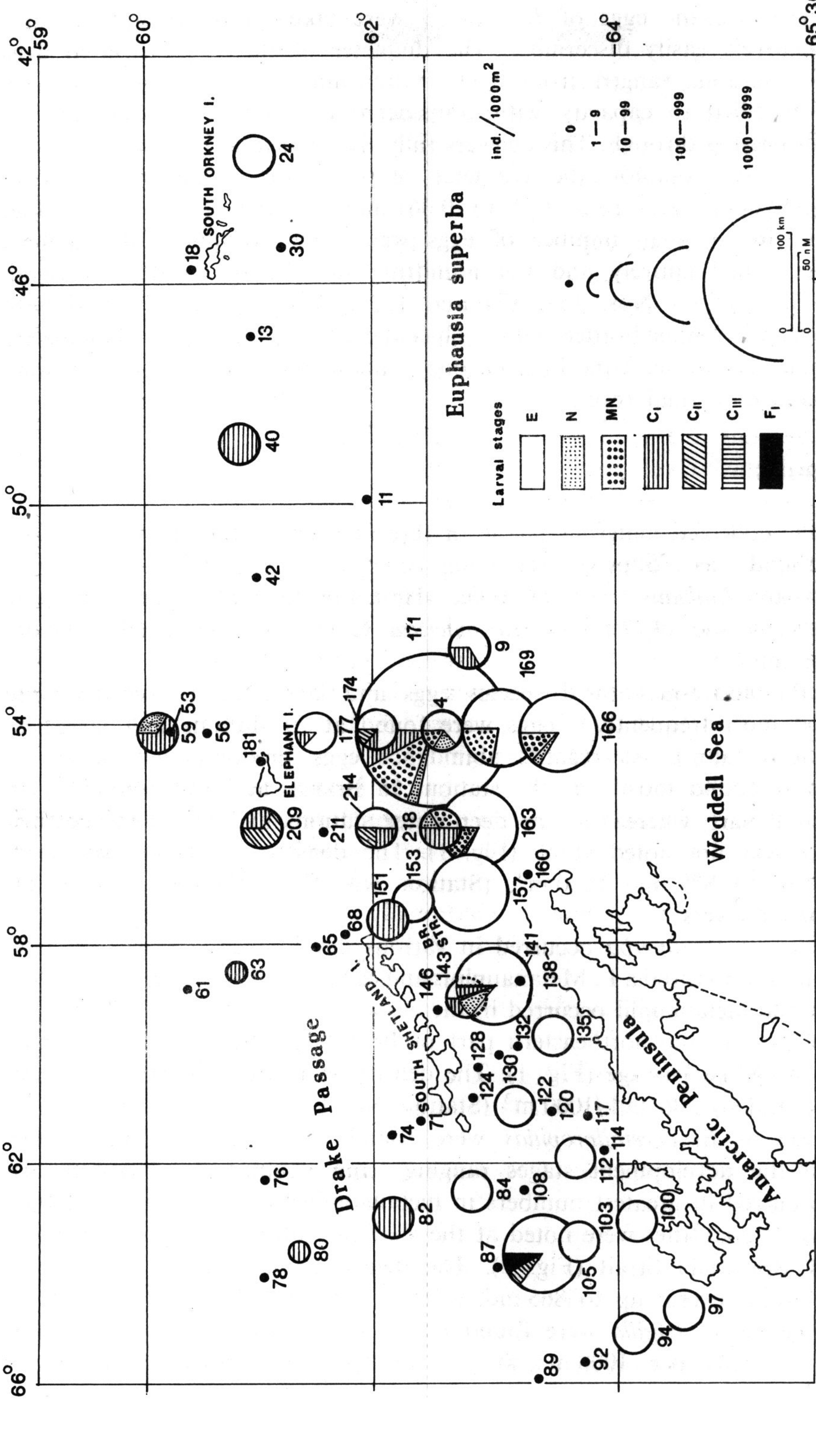


Fig. 1. Distribution and density of *Euphausia superba* eggs and larvae in the 0—500 m water layer

— Station numbers (No), E — eggs, N — nauplius, MN — metanauplius, C I-III — calyptopis I-III, F I — furcilia I.

the larvae also the eggs of *E. superba* were taken into account, as they were relatively easily discernible. The diameter of the 150 measured eggs from 16 stations ranged from 0.53 to 0.61 mm (mean $0.57 \pm 0.015$ mm). The were filled to capacity with translucent contents when examined in the light passing through. This answers fully the desceiption given by Fraser (1936). In this opinion the diameter of *E. superba* agge preserved in formaldehyde ranges from 0.52 to 0.061 mm. At the stations Nos. 138, 146 and 166 a small number of eggs was found, of about 0.50 mm in diameter, filled entirely and not admitting the passage of light through it. At the stations Nos. 157, 174 and 177 a few eggs were found with a narrow peri-vitelline border and translucent contents; their external diameters was about 0.5 mm and the internal one — about 0.44 mm. These eggs were not included in final results.

## 3. Results

In the collected materials larvae of three species of the genus *Euphausia* were found, as follows: *Euphausia superba* Dana, *Euphausia frigida* Hansen, and *Euphausia crystallorophias* Holt and Tatersall. Moerover, there were also larvae of *Thysanoessa macrura* G. O. Sars — not taken under examination.

Of the above-mentioned species eggs and larvae of *E. superba* were observed most frequently — eggs were found at 29 stations and larvae at 19 stations (app.). As regards abundance eggs predominated decidedly. They were found mostly at the stations in Bransfield Strait, especially in the eastern part, whereas at the deep-water stations in Drake Passage their presence was not noted at all (Fig. 1). The density of eggs ranged from several up to 879 ind./1000 $m^3$, (Station No. 171 — the mean value for all sampled layers.

Larvae of *E. superba* occurred in various developmental stages, ranging from nauplius to furcilia L. Metanauplius and calyptopis I stages predominated. Nauplii and metanauplii occurred in the eastern part of Bransfield Strait and calytopises — in the northeastern part of Bransfield Strait and in the open waters of Drake Passage (Fig. 1). The density of larvae populations ranged from several to 206 ind./1000 $m^3$ (Station No. 171).

Larvae of *E. crystallorophias* were found at 9 stations (app.). They were in the development stages ranging from nauplius to calyptopis II. They occurred in greatest numbers in metanauplius and calyptopis I stages. The largest quantities were noted at the shallow stations in the southeastern part of Bransfield Strait (Fig. 2). The density of the larvae populations ranged from several up to 865 ind./1000 $m^3$ (Station No. 169).

Larvae of *E. frigida* were found in the quantities ranging from a few to several tens per 1000 $m^3$ at five deep-water stations to the north

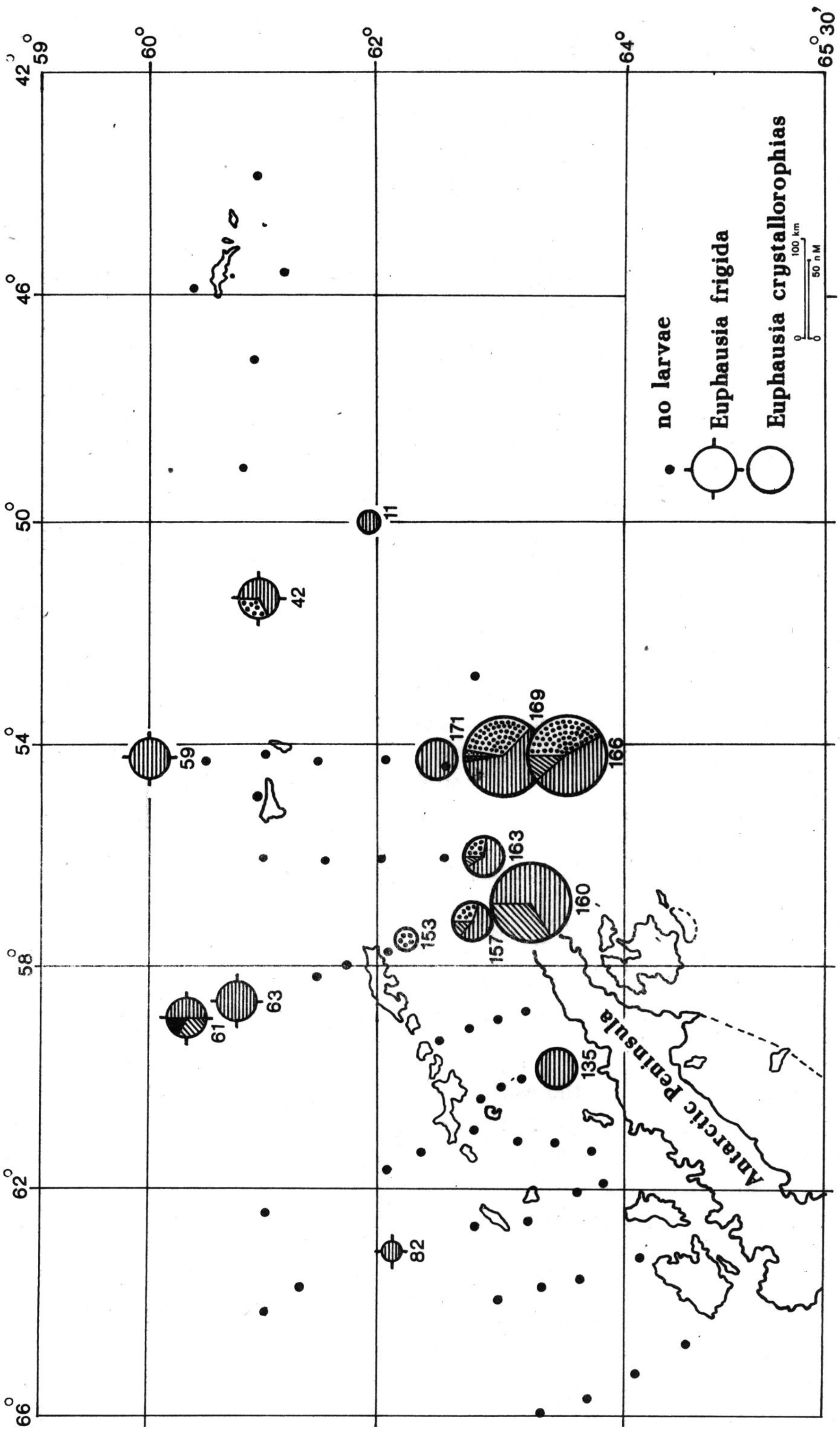


Fig. 2. Distribution and density of larval populations of *Euphausia crystallorophias* and *Euphausia frioida* in the 0—500 m water layer.

Explanations as in Fig. 1.

of the research area — in the waters of Drake Passage (app., Fig. 2). They were in the development stages ranging from metanauplius to furcilia I. Calyptopis I stage predominated.

In the face of the occurrence of eggs and larvae of the species of the genus *Euphausia* in not very large numbers their vertical distribution may be examined only by making an example of the most abundant stations. Vertical distribution of eggs and larvae of *E. superba* at three stations and of larvae of *E. crystallorophias* at two stations is presented in Fig. 3. These are the stations at which the total number of specimens

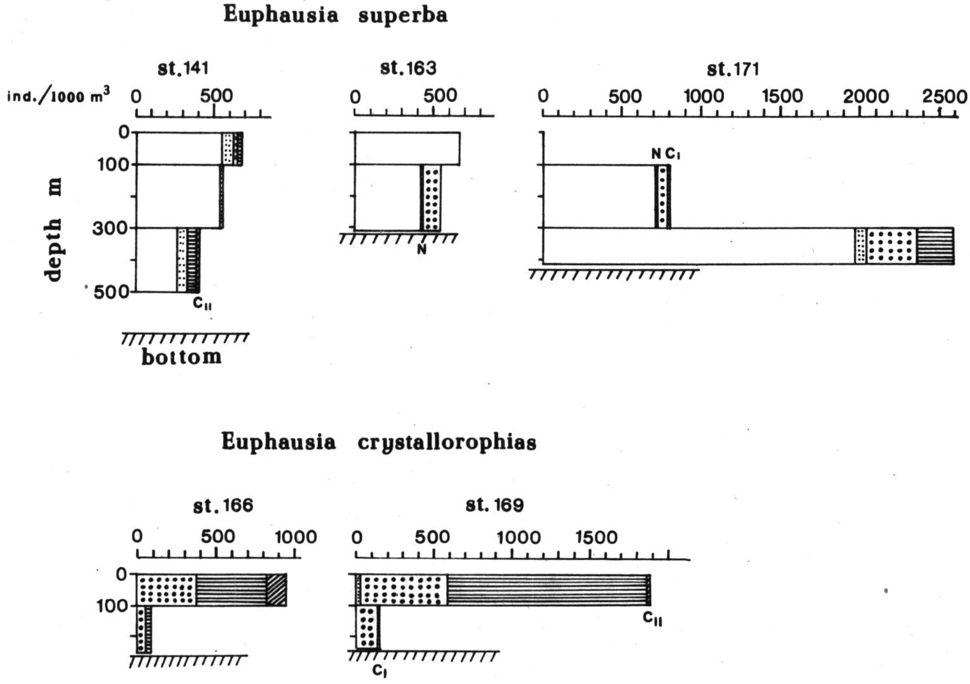


Fig. 3. Vertical distribution of eggs and larvae of *Euphausia superba* and of larvae of *Euphausia crystallorophias* at the most abundant stations

Explanations as in Fig. 1.

in the samples from all the water layers was higher than 40 individuals. All these stations were located over the shelf. The eggs of *E. superba* were at two stations (141 and 163) distributed equally throughout the water column from the surface to the bottom of the sea, whereas at the third station (171) they were concentrated in the lowest water layer, near the bottom, and in the water layer beneath the surface of the sea they did not occur at all. At the station 141 nauplii and metanauplii of *E. superba* occurred throughout the water column from the surface to the bottom, while at the two remaining stations (163 and 171) only in the deepest water layers.

Larvae of *E. crystallorophias* at both of the selected stations occurred mainly in the upper water layer 0—100 m deep.

## 4. Discussion

In the course of polish leg of the SIBEX research the presence of adult individuals of the following four species of the genus *Euphausia* — *E. superba, E. frigida, E. crystallorophias* and *E. triacantha* — was observed in the investigated region (Witek et al. 1985). Among them larvae of the first three species were found, but the presence of the larvae of *Euphausia triacantha* was not observed.

Eggs of *E. superba* are laid into water between November and March (Fraser 1936, Mackintosh 1972, Hempel et al. 1979, Witek et al. 1980, Rakusa-Suszczewski 1984) an the area around the tip of the Antarctic Peninsula is one of the places in the Atlantic sector of their most frequent and abundant occurrence. In the breeding areas and with the development of larvae also in the adjacent areas along the drift of the water masses, in the years favourable for reproduction, larvae are observed in the quantities of many thousands per 1000 $m^3$ (Hempel I. and Hempel G. 1978, Hempel I., Hempel G. and Baker 1979, Witek, Koronkiewicz and Soszka 1980, Kittel and Jażdżewski 1982, Mujica and Torres 1982, and others) and sometimes in the quantities of more than a million of larvae per 100 $m^3$ (Hempel 1982, Rakusa-Suszczewski 1984). Our investigations indicate that investipated period was just the beginning of the breeding season, which was evidenced by distinct predominance of eggs over the larval stages. The quantities of the collected eggs show that the reproduction was not very intense. The limitation of the area of the occurrence of eggs to the region of Bransfield Strait is noteworthy.

A discussion is carried on in the literature around the question whether an effective reproduction of krill may occur as well in the shallow waters over the shelf as in the deep oceanic waters, or whether the breeding and successful development of the early larval stages occurs over the shelf exclusively and only just slightly older larvae are transported by ocurrents into the regions beyond the shelf area (Marr 1982, Hempel 1982, Rakusa-Suszczewski 1984, Samyšev 1984). Though the situation prevailing at the time of our investigations could speak for the second hypothesis, nonetheless, a credible answer to the above questions may be obtained only by thorough study where the larvae occuring in the deep-water regions, sometimes in such a mass-abundance as during the FIBEX research, come from (Hempel 1982, Kittel and Jażdżewski 1982, Mujica and Torres 1982, Brinton and Townsend 1984, Rakusa-Suszczewski 1984). Location of the station with the highest number of eggs collected in the eastern part of Bransfield Strait corresponded to the area of the occurrence of females with eggs (Czykieta et al., in prep.), though coincident occurrence of the maximum concentration was not observed. The largest quantities of females with eggs were recorded in the spots corresponding to the stations Nos. 177 and 174 (Czykieta et al., in prep..). thus to the north of the station 171, where the highest abundance of krill eggs was noted.

According to Lomakina (1978) and Makarov (1982) the breeding season of *E. crystallorophias* occurs in more or less the same time as that of *E. superba*, in the coastal zone and near the pack ice. Larvae of *E. crystallorophias* do not occur in such a massabundance as larvae of *E. superba*, yet Fevolden (1980) and Hempel et al. (1983) observed in the Weddell Sea and Makarov (1982 b) in the regions of Adelaide Island and Biscoe Island larvae concentrations exceeding the density of 10 000 ind./1000 $m^3$. The areas of the occurrence and the degree of the larval development of that species in our materials corroborate the above statements. At all the stations where more larvae then one were found the depth from the surface to the bottom of the sea was less than 500 m and also the presence of icebergs and detached ice-blocks was observed. Predominance of the metanauplius and calyptopis I stage and the density of larvae not exceeding 1000 ind./1000 $m^3$ evidence a relatively recent and not too intense reproduction. Adult specimens of *E. crystallorophias* were found in the course of the investigations only twice, in the central part of the Bransfield Strait (Witek et al. 1985). Once it occurred in the place where the larvae of this species in the calyptopis I stage were present in small quantities (Station 135), in the second case larvae were not observed (Station 132).

*E. frigida* breeds in lower geographic latitudes and somewhat earlier than *E. superba* and *E. crystallorophias* (Makarov 1977, 1982 b, Hempel and Marschoff 1980). It may be presumed that the single larvae found in the northern part of our research region indicate the southern limits of the proper habitat of *E. frigida*. Adult individuals of this species occurred in fairly large numbers, however they were scarce in Bransfield Strait and in the waters derived from the Weddell Sea they did not occur at all (Witek et al. 1985).

*E. triacantha*, the adult individuals of which were caught several times west of Bransfield Strait and in Drake Passage (Witek et al. 1985), occurs still farther northwards than *E. frigida* (John 1936, Baker 1959, Weigmann-Haass and Haass 1980), thus the lack of larvae of this species in our materials is not surprising. Hempel and Marschoff (1980) observed the larvae of *E. triacantha* mainly in the northern part of the Scotia Sea and in the Antarctic Convergence Zone.

The vertical distribution of *E. superba* eggs may be an indicator of the time that has elapsed since the deposition of eggs, if that had occurred in the upper water-layers. The highest density of eggs in the 0—100 m water layer, at the stations 141 and 163 (Fig. 3), would indicate that the process of laying eggs was actually in progress at that time, though the presence of females with eggs was not observed — as mentioned earlier — in the trawl or Bongo-net catches at those stations (Czykieta et al., in prep.).

The density of *E. superba* eggs at the bottom water layer at the station 171 might indicate that they were laid the day before if the speed of their sinking under natural conditions was the same as that experimentally determined, i.e. about 140—320 m/d (Marschall 1983). Hempel (1978) has observed at a day-and-night station in the vicinity of Elephant Island the highest and relatively regular egg-aggregation subsisting during several days in the middle water layers at the depth of 50—400 m, whereas the density of eggs was much lower in the upper water layers at the sea surface and in the water layers below the 400 m depth. Thus, the results of those observations show that the schema of the deposition of eggs and their further development is not easily solved.

Fevolden (1980) and Makarov (1982) pointed out that larvae of *E. crystallorophias* occurred mainly in the upper water layer beneath the sea surface. Our results show that this statement refors not only to the larvae in the calyptopis stage but also to those in the metanauplis stage.

## 5. Резюме

Пробы планктона были собраны на 61 станции вертикальной сетью Нансена в течение периода с 10 декабря 1983 по 8 января 1984. Ловы проводились в слоях 0—100, 100—300 и 300—500 м (на более мелких станциях до 5—20 м над дном). Была найдены икра и личинки *Euphausia superba* а также личинки *E. crystallorophias* и *E. frigida*. Найдены также личинки другой эвфаузиды — *Thysanoessa macrura*, которые в этой работе не описываются. В виде *E. superba* доминировала икра, а среди личинок наиболее многочисленными были стадии метанауплюс и калиптопис I. Икра и личинки *E. superba* находились главным образом в проливе Брансфилда, с найбольшей плотностью в восточной части пролива, над шельфом, где на станции 171 было найдено максимальное количество 1085 экземпляров/1000 м$^3$ (рис. 1). Личинки *E. crastallorophias* были найдены в юго-восточной части пролива Брансфилда в количестве не превышающем 1000 экземпляров/1000 м$^3$. Доминировали стадии метанауплюс и калиптопис I (рис. 2). Личники *E. frigida* находились обычно в стадии калиптопис I и были очень немногочисленны. Они были найдены только на станции расположенных в проливе Дрейка (рис. 2). На найболее обильных станциях икра и личинки *E. superba* были распределены или во всей толще воды или у дна, в то время как личинки *E. crystallarophias* концентрировались в приповерхностном слое воды. (рис. 3). Установлено, что в исследуемом районе размножение криля только началось, было мало интенсивным и ограничивалось к району пролива Брансфилда. Размножение *E. crystallorophias* произошло недавно, а для *E. frigida* исследуемой район не является местом нереста.

## 6. Streszczenie

Próby planktonowe były zebrane na 61 stacjach pionową siatką typu Nansena w okresie od 10 grudnia 1983 r. do 8 stycznia 1984 r. Zaciągi wykonywano w warstwach 0—100, 100—300 i 300—500 m (na stacjach płytszych — do 5—20 m nad dnem). Znaleziono jaja i larwy *Euphausia superba* oraz larwy *E. crystallorophias* i *E. frigida*. Ponadto występowały larwy innej eufauzji — *Thysonoessa macrura*, niniejszym opracowaniem nie objęte. Z gatunku *E. superba* dominowały jaja a spośród larw najliczniejsze były stadia metanauplius i cylyptopis I. Jaja i larwy *E. superba* występowały głównie w Cieśninie Bransfielda, w największym zagęszczeniu we wschodniej części cieśniny, nad szelfem gdzie na stacji 171 stwierdzono maksymalną liczbę 1085 szt./1000 m$^3$ (rys. 1). Larwy *E. crystallorophias* znaleziono w południowo-wschodniej części Cieśniny Bransfielda w ilościach nie przekraczających 1000 szt./1000 m$^3$. Dominowały stadia metanauplius calyptopis I (rys. 2). Larwy *E. frigida*, najczęściej w stadium calyptopis I, były bardzo nieliczne i występowały tylko na stacjach położonych w Cieśninie Drake'a (rys. 2). Na najbogatszych stacjach jaja i larwy *E. superba* były bądź rozprzestrzenione w całej toni, bądź zgormadzone przy dnie, natomiast larwy *E. crystallorophias* zgormadzone były w warstwie przypowierzchniowej (rys. 3). Oceniono, że w badanym rejonie rozród kryla dopiero zaczynał się, był mało intensywny i ograniczony tylko do akwenu Cieśniny Bransfielda. Rozród *E. crystallorophias* był niedawny a dla *E. frigida* badany rejon nie stanowi właściwego obszaru rozrodu.

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# APPENDIX

Abudance (ind./1000 $m^3$) of eggs and larvae of *Euphausia superba* and larvae of *E. crystallorophias* and *E. frigida* at particular stations and water layers.

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Station No | | 4 | | 9 | | | 11 | | 24 | | 40 | | | 42 | | |
| Souding (m) | | 376 | | 2250 | | | 3430 | | 260 | | 1150 | | | 1300 | | |
| Layer (m) | | 100–0 | 360–100 | 100–0 | 300–100 | 500–300 | 300–100 | 500–300 | 100–0 | 250–100 | 100–0 | 300–100 | 500–300 | 100–0 | 300–100 | 500–300 |
| *Euphausia superba* | E | 25 | 48 | | 38 | 13 | | | | 17 | | | | | | |
| | N | | 19 | | | | | | | | | | | | | |
| | MN | | 19 | | | | | | | | | | | | | |
| | C I | | | | 13 | 13 | | | | | 50 | 25 | | | | |
| | C II | | | | | | | | | | | | | | | |
| | C III | | | | | | | | | | | | | | | |
| | F I | | | | | | | | | | | | | | | |
| *Euphausia crystallorophias* | N | | | | | | | | | | | | | | | |
| | MN | | | | | | | | | | | | | | | |
| | C I | | | | | | 13 | | | | | | | | | |
| | C II | | | | | | | | | | | | | | | |
| *Euphausia frigida* | MN | | | | | | | | | | | | | | | 25 |
| | C I | | | | | | | | | | | | | | 13 | |
| | C II | | | | | | | | | | | | | | | |
| | C III | | | | | | | | | | | | | | | |
| | F I | | | | | | | | | | | | | | | |

negative stations: 13, 18, 30, 53, 56, 65, 68, 71, 76, 78, 87, 89, 92, 108, 114, 117, 120, 122, 124, 128, 130, 132, 138, 146, 211.
E — eggs, N — nauplius, MN — metanauplius, C I–III — calyptopis I–III, F I — furcilia I.

| Station No | | 59 | | | 61 | | | 63 | | | 80 | | | 82 | | | 84 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Souding (m) | | 3080 | | | 3500 | | | 3500 | | | 3500 | | | 3700 | | | 420 | | |
| Layer (m) | | 100–0 | 300–100 | 500–300 | 100–0 | 300–100 | 500–300 | 100–0 | 300–100 | 500–0 | 100–0 | 300–100 | 500–300 | 100–0 | 300–100 | 500–300 | 100–0 | 300–100 | 410–300 |
| *Euphausia superba* | E | | | | | | | | | | | | | | | | | 25 | |
| | N | | | 13 | | | | | | | | | | | | | | | |
| | MN | | | | | | | | | | | | | | | | | | |
| | C I | | 25 | | | | | | | | | 13 | | | 13 | 13 | | | |
| | C II | | | | | | | | | | | | | | | | | | |
| | C III | | | | | | | | | | | | | | | | | | |
| | F I | | | | | | | | | | | | | | | | | | |
| *Euphausia crystallorophias* | N | | | | | | | | | | | | | | | | | | |
| | MN | | | | | | | | | | | | | | | | | | |
| | C I | | | | | | | | | | | | | | | | | | |
| | C II | | | | | | | | | | | | | | | | | | |
| *Euphausia frigida* | MN | | 25 | | | | | | | | | | | | | | | | |
| | C I | | | | | 38 | | | 38 | 20 | | | | 25 | | | | | |
| | C II | | | | 25 | 13 | | | | | | | | | | | | | |
| | C III | | | | | | | | | | | | | | | | | | |
| | F I | | | | | 13 | | | | | | | | | | | | | |

| Station No | | 94 | | | 97 | | 100 | | | 103 | | 105 | | 112 | | 135 | | 141 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Souding (m) | | 530 | | | 385 | | 560 | | | 390 | | 305 | | 280 | | 155 | | 630 | |
| Layer (m) | | 100–0 | 300–100 | 500–300 | 100–0 | 370–100 | 100–0 | 300–100 | 500–300 | 100–0 | 380–100 | 100–0 | 290–100 | 100–0 | 275–100 | 145–0 | 100–0 | 300–100 | 500–300 |
| *Euphausia superba* | E | | | 13 | | 28 | | | 25 | | 80 | | 158 | | 71 | 17 | 550 | 538 | 263 |
| | N | | | | | | | | | | | | | | | | 75 | 25 | 63 |
| | MN | | | | | | | | | | | | | | | | 25 | | 63 |
| | C I | | | | | | | | | | | | | | | | 25 | | |
| | C II | | | | | | | | | | | | 13 | | | | | | 13 |
| | C III | | | | | | | | | | | | | | | | | | |
| | F I | | | | | | | | | | | | 13 | | | | | | |
| *Euphausia crystallorophias* | N | | | | | | | | | | | | | | | | | | |
| | MN | | | | | | | | | | | | | | | | | | |
| | C I | | | | | | | | | | | | | | | 50 | | | |
| | C II | | | | | | | | | | | | | | | | | | |
| *Euphausia frigida* | MN | | | | | | | | | | | | | | | | | | |
| | C I | | | | | | | | | | | | | | | | | | |
| | C II | | | | | | | | | | | | | | | | | | |
| | C III | | | | | | | | | | | | | | | | | | |
| | F I | | | | | | | | | | | | | | | | | | |

| Station No | | 143 | 143 | 143 | 151 | 153 | 153 | 153 | 157 | 157 | 160 | 163 | 163 | 163 | 166 | 169 | 169 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sounding (m) | | 1500 | | | 190 | | 2000 | | 220 | | 120 | 315 | | | 260 | 245 | |
| Layer (m) | | 100–-0 | 300–-100 | 500–-300 | 190–-0 | 100–-0 | 300–-100 | 500–-300 | 100–-0 | 210–-100 | 100–-0 | 100–-0 | 310–-100 | 100–-0 | 240–-100 | 100–-0 | 240–-100 |
| *Euphausia superba* | E | | 50 | 38 | | | 113 | 38 | | 205 | | 675 | 417 | | 533 | 100 | 179 |
| | N | | | | | | | | | | | | 12 | | 17 | | 54 |
| | MN | | | | | | | | | | | | 119 | | 67 | 25 | 18 |
| | C I | | 13 | | 13 | | | | | | | | | | | | |
| | C II | | | | | | | | | | | | | | | | |
| | C III | | | | | | | | | | | | | | | | |
| | F I | | | | | | | | | | | | | | | | |
| *Euphausia crystallorophias* | N | | | | | | | | | | | | | | | 25 | |
| | MN | | | | | | | 13 | 50 | | | 13 | 25 | 375 | 50 | 550 | 117 |
| | C I | | | | | | | | 100 | | 200 | 175 | | 450 | 33 | 1275 | 17 |
| | C II | | | | | | | | 25 | | 100 | 13 | | 125 | | 25 | |
| *Euphausia frigida* | MN | | | | | | | | | | | | | | | | |
| | C I | | | | | | | | | | | | | | | | |
| | C II | | | | | | | | | | | | | | | | |
| | C III | | | | | | | | | | | | | | | | |
| | F I | | | | | | | | | | | | | | | | |

| Station No | | 171 | | | 174 | | | 177 | | | 209 | | | 214 | | | 218 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sounding (m) | | 430 | | | 580 | | | 450 | | | 590 | | | 2200 | | | 310 | |
| Layer (m) | | 100–0 | 300–100 | 410–300 | 100–0 | 300–100 | 500–300 | 100–0 | 300–100 | 420–300 | 100–0 | 300–100 | 500–300 | 100–0 | 300–100 | 500–300 | 100–0 | 300–100 |
| *Euphausia superba* | E | | 712 | 1977 | | 13 | 63 | | 75 | | | | | | 13 | 13 | | |
| | N | | 13 | 68 | | | | | | | | | | | | | | 13 |
| | MN | | 63 | 318 | | | | | | | | | | | | | | 25 |
| | C I | | 13 | 227 | | | 13 | | | 22 | | | 13 | | 13 | | | 38 |
| | C II | | | | | | | 13 | | | | | 25 | | | 13 | | |
| | C III | | | | | | | | | | | | | | | | | |
| | F I | | | | | | | | | | | | | | | | | |
| *Euphausia crystallorophias* | N | | | | | | | | | | | | | | | | | |
| | MN | | | | | | | | | | | | | | | | | |
| | C I | 50 | | | | | | | | | | | | | | | | |
| | C II | | | | | | | | | | | | | | | | | |
| *Euphausia frigida* | MN | | | | | | | | | | | | | | | | | |
| | C I | | | | | | | | | | | | | | | | | |
| | C II | | | | | | | | | | | | | | | | | |
| | C III | | | | | | | | | | | | | | | | | |
| | F I | | | | | | | | | | | | | | | | | |