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# Ichthyoplankton of the Bransfield Strait (SIBEX-Phase II, Chile)

VERÓNICA ASENCIO V.[1] and ARMANDO MUJICA R.[1]

*ABSTRACT*

*Quantitative and qualitative analyses are made of ichthyoplankton of the Bransfield Strait area collected during austral summer of 1985. Seven species were found, with* Notothenia larseni *being the most abundant. Highest ichthyoplankton concentrations were found at the northeast entrance of the Gerlache Strait, and the southern shores of the South Shetland Islands.*

*RESUMEN*

*Se realizó un análisis cualitativo y cuantitativo del ictioplancton del estrecho Bransfield, recolectado durante el verano austral de 1985, determinándose la presencia de 7 especies, siendo la más abundante* Notothenia larseni.

*Las máximas concentraciones se ubicaron en la entrada nororiental del estrecho Gerlache y próximo a las costas sur de las islas Shetland del Sur.*

## INTRODUCTION

Increasing fisheries effort on krill resource during recent years has stimulated the international scientific community to maintain investigations of populations affected directly or indirectly by these fisheries activities in the Southern Ocean; included in this consideration are fish populations, particularly of those species having planktonic egg and / or larval stages which are generally found mixed with the massive aggregations of the exploited euphausiid species. These populations could be greatly reduced more than those species exploited by fisheries, because the last one, normally have obtained their sexual maturity.

Within this context, the present work concerns the distribution, abundance and composition of the ichthyoplankton in the Bransfield Strait in order to increase the knowledge of Antarctic fishes.

## MATERIALS AND METHODS

A total of 54 zooplankton samples were collected at 27 oceanographic stations located in the Bransfield Strait and adjacent areas (Fig. 1) during the SIBEX-Phase II cruise, January-February 1985 aboard the R/V "Captain Luis Alcazar". The samples were collected with double oblique bongo net hauls between 0-200 m. depth. Nets were of 333 μm mesh size and were provided with flow meters. The samples were preserved in a 5% formalin-sea water solution buffered with sodium tetraborate.

Larval fish were removed from entire zooplankton samples, enumerated and identified. Abundances were expressed as numbers per 1,000 $m^3$ of water filtered. In graphical representations of

(1) Instituto de Fomento Pesquero. Av. Pedro de Valdivia 2633, Santiago, Chile.

geographical distribution and abundance (Fig. 2), the length of the bar (L) directly corresponds to the number of individuals / 1,000 $m^3$.

## RESULTS AND DISCUSSION

The ichthyoplankton collected during SIBEX II was composed entirely of larval forms. This contrasts to the results of previous FIBEX and SIBEX cruises during January and February 1981 and 1984 (Mujica and Torres, 1982; Mujica and Asencio, 1985), when eggs (species unknown) were collected in addition to larvae.

A total of 156 larvae were collected from 17 of the 26 stations. Larval abundance at positive stations ranged from 2-30 individuals / 1,000 $m^3$. These values were not bigger than those during SIBEX, although fewer samples were collected in 1985 than in the previous year. Maximum larval abundance occurred northwest of Trinidad Island (stations 6-1; Fig. 2); Mujica and Asencio (1985) found maximum larval abundance in 1984. As in 1984 (Mujica and Asencio 1985), larval fish were generally more abundant in the western portion of the Bransfield Strait and close to the coast of the South Shetland Islands than in other areas (Fig. 2). Greatest diversity (four species) ocurred at station 3-4, near King George Island, and coincided with the fourth highest abundance.

The ichthyoplankton was of seven species belonging to three families: Paralepididae, Myctophidae and Nototheniidae. Additionally, 5,82% of the specimens were damaged beyond recognition. Nototheniidae contributed the largest number of species and was numerically dominant, contributing 86,4% of the individuals.

Paralepididae was represented by only one species, *Notolepis coatsii*, Dollo, and was infrequently caught. The individuals caught were in an early developmental stage (23.0 mm. S.L.) and conformed to the descriptions for larvae of this size provided by North and White (1982) and Efremenko (1983). This species was caught at only one station (4-4; Fig. 2) in front Nelson Strait. This station was noted for maximum concentrations of zooplankton and larval *Euphausia superba* (Mujica and Asencio, 1986), and coincided with minimum surface layer concentrations of phosphate and nitrate (Silva, 1986). The location of these specimens was within the distributional limits reported by Regan (1914, 1916) and Efremenko (1983), and coincided with the captures reported by Balbontin *et al.* (1986).

As with Paralepididae, Myctophidae was represented by one species *Electrona antarctica* (Gunther) represented by small sized individuals (5,4-6,1 mm S.L.). These larvae were restricted to three stations in the northern sector of the Bransfield Strait (stations 2-3, 4-4 and 7-4) and like *N. coatsii*. had greatest abundance (5 individuals / 1,000 $m^3$) at stations 4-4 near Nelson Strait. The relatively low abundance of *E. antarctica* (6.34% of total individuals) and its distribution in 1985 contrasts greatly with 1984's when it was the dominant species collected (57% of individuals), its distribution was limited to the western portion of the study area (Mujica and Asencio, 1985). During the 1981 FIBEX cruise, *E. antarctica* was represented by low abundance and occurred at stations outside of Bransfield Strait (Mujica and Torres, 1982). *E. antarctica* is the most common myctophid species in Antarctic waters (Wisner, 1974).

The family Nototheniidae was represented by five species and two genera: *Notothenia larseni* Lonnberg, *N. gibberifrons* Lonnberg, *N. kempi* Norman, *N. sp.* and *Pleuragramma antarctica* Boulenger.

*N. larseni* was widely distributed and was present at 8 of the 17 stations having ichthyoplankton. It was also the most abundant species, representing 32.9% of the total larvae. The largest con-

centrations ocurred in the western portion of the Bransfield Strait, close to the island coast, and corresponded to the areas of highest larval abundance (Fig. 2), indicating the importance of this species in the overall ichthyoplankton distribution and abundance patterns.

*N. larseni* larvae ranged in size from 14.7-18.5 mm S.L. These larvae generally conformed to the descriptions provided by Efremenko (1983), however in the smaller specimens the melanophores were distributed laterally and over the notochord were diffuse or absent, possibly the result of preservation.

This species has undergone numerous taxonomic revisions, and has been placed in three different genera by different authors. Regan (1914), De Witt (1971) and Efremenko (1983), among others, considered it as *Notothenia larseni* and assigned its distribution to the western Antarctic sector or the vicinity of the Antarctic Peninsula. However, Andersen and Hureau (1979), based on analysis of the hypural complex conformation of members of Nototheniidae, include it in the genus *Patagonotothen*.

This opinion is apparently shared by Slosarczyk (1983) who extensively treated this subject. Similarly, the taxonomic key of North and White (1982) includes the designation of *P. larseni*. More recently, Andersen (1984), in an extensive and detailed revision of these genera, incorporated the species in a new genus as *Nototheniops larseni*, apparently solving the problem. Although the present authors agree with the generic designation of Andersen (1984), they use here the name given by Efremenko (1983) because the larval identification was based on this description. It is obvious that the problem of synonimy in descriptive and taxonomic works on Antarctic ichthyofauna greatly complicates species identification of the early development stages.

*Notothenia gibberifrons* was represented by only one specimen (16.6 mm. S.L.) which conformed to the description provided by Efremenko (1983). This individual was caught at station 3-4 near the southeast coast of King George Island, and was within the distributional range of the species described by De Witt (1971).

The larvae of *Notothenia kempi* were all in early developmental stages and ranged in length from 10.0 to 12.9 mm. These larvae made up 27.0% of the total ichthyoplankton, ranking second in abundance to *N. larseni*, and were present at six of the 17 positive stations with maximum abundances at stations 5-4 and 4-4 (Fig. 2). Their distribution was generally restricted to the northern coastal area of the Bransfield Strait and differed from that found during 1984 when the larvae were caught only in the extreme eastern portion of the study area (Mujica and Asencio, 1985). Balbontin *et al.* (1986), in a parallel bongo net sampling effort during SIBEX-II, found a similar distributional pattern for *N. kempi*, and in general found the composition, abundance and distribution of the ichthyoplankton to be similar to that described in this paper.

Seven unidentified specimens probably belonging to the genus *Notothenia*, were caught at stations 6-0 and 6-1 near Trinidad Island (Fig. 2). These specimens, designated as *Notothenia* sp., ranged between 13.0 and 14.5 mm. S.L., and were in an intermediate stage of development (Fig. 3). Total myomere counts ranged from 46-48. Marked pigmentation occurred over intestine and at the base of the caudal fin elements, and small groups of melanophores occurred over the brain, at the pectoral fine base, and in the abdominal region. A ventral pigment line was formed by myoseptal melanophores (Fig. 3). The detailed examinations of meristics and morphometrics characters of these specimens concluded with the imposibility to clasify them because they did not conform to any previously described Nototheniid species. These specimens are similar to those collected in 1984 during SIBEX-I and designated as *Notothenia sp.* 2 by Mujica and Asencio (1985). Those larvae were represented by specimens of similar size and developmental stage as encountered in the present study.

The largest larvae and one exhibiting the greatest size range were represented by *Pleuragramma antarcticum*. These larvae ranged between 13.2 and 47.8 mm S.L. Their distribution was limited to only two stations in the eastern portion of the Bransfield Strait, at stations 3-1 and 3-4 near the coast of King George Island and at the Antarctic Sound, respectively (Fig. 2). A similar distributional pattern was described by Mujica and Asencio (1985). This species is reported to be the most abundant ichthyoplankton component in the Weddell Sea (Hempel *et al.*, 1983).

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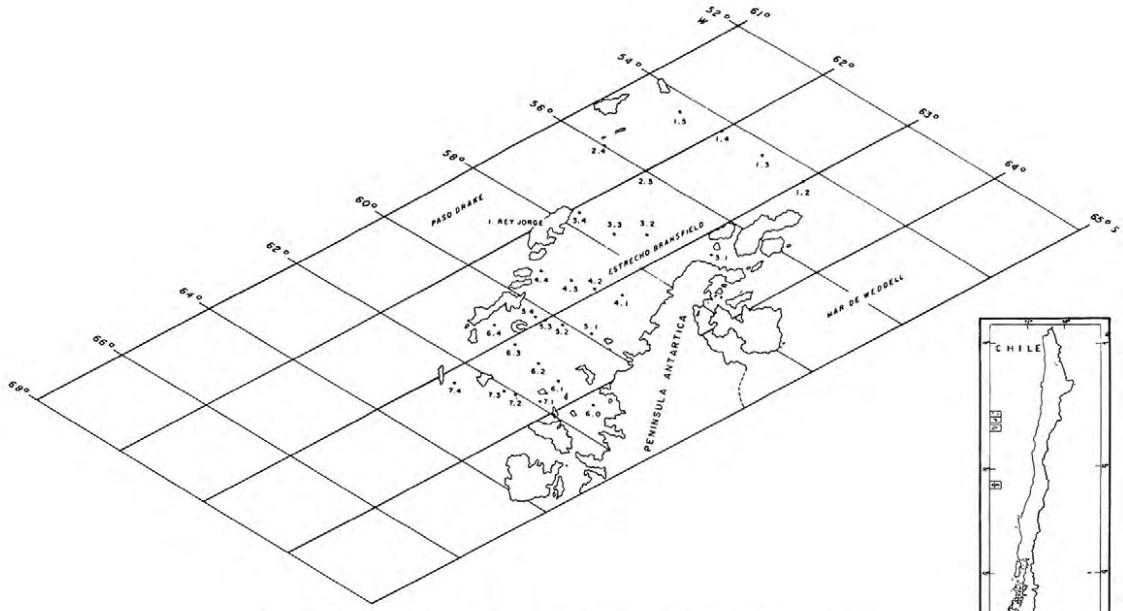


Figure 1.—Geographic position of zooplanktonic stations.

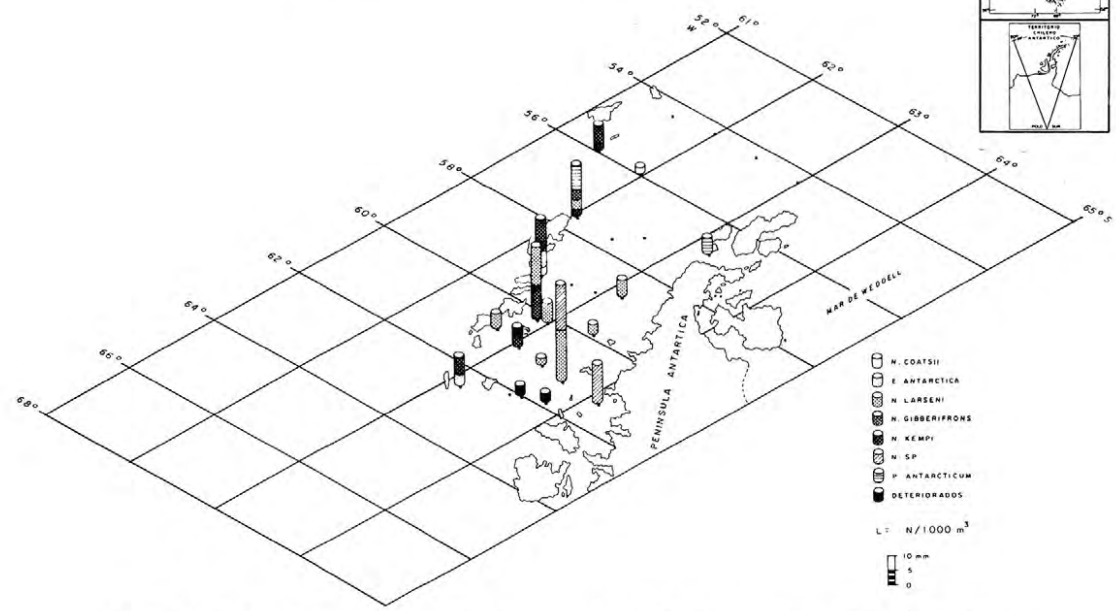


Figure 2.—Distribution, relative abundance and specific composition of ichthyoplankton.

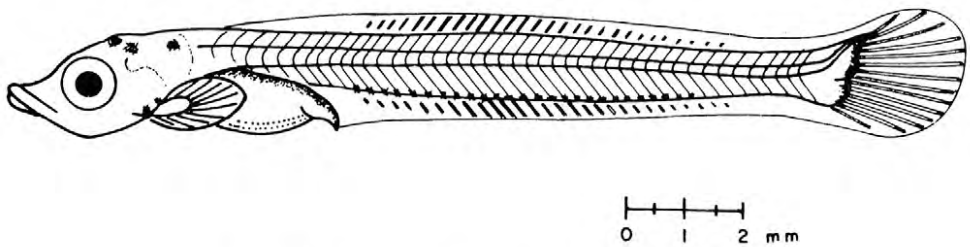


Figure 3.—*Notothenia sp.* larvae (14.5 mm S.L.).

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