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Cruise "CANARIAS 9206". Preliminary results on composition, abundance and horizontal distribution of ichthyoplankton.

by

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ABSTRACT

In this paper the species of fish larvae, the distribution and abundance of fish eggs and larvae in the upper pelagic zone in an area off the South of Tenerife (Canary Islands) in June 1992 are examined. The larvae of the mesopelagic fish Families Myctophidae, Photychidae, Gonostomatidae and a neritic Family Gobiidae are the main components of icthyoplankton. Two species groups of fish have been recognised: a neritic one, dominated by the Family Gobiidae, and concentrated in the coastal zone, the other oceanic, dominated by the Family Myctophidae, and more homogeneously distributed in the working area. The abundance of larvae was very low, and in contrast to the egg abundances, that declined away from the coast towards the high sea, they did not show any special distribution trend.

INTRODUCTION

Previously published studies about icthyoplankton from waters in and adjacent to Canary Islands are very limited. Among the studies that makes some reference to icthyoplankton in these waters, (the studies of) Hempel and Weikert (1972), John (1979), Andres and John (1984), Badgok and Merret (1976), Rodriguez (1990) should be mentioned. In this paper, which we hope will be the beginning of a wider and more complete study of the composition and ecology of the icthyoplankton that inhabit the waters of the Canarian Archipelago, we will describe the specific composition of the icthyoplanktonic larval community and we will present some data about the abundance and horizontal distribution of the icthyoplankton caught during the survey "CANARIAS 9206" carried out in waters off the South of Tenerife in June 1992.

MATERIALS AND METHODS

The material that was studied corresponds to 34 samples collected from 34 stations located off the south coast of Tenerife. The stations were situated on a grid of transepts normal to the coastline. At first, 5 radials (I... V) were constructed, later adding another 5 intermediate radials (Ia....Va). At each radial, the station closest to the coast was situated at a depth of about 30 m., and from then on, at radials I to V, IVa and Va the stations were situated at every 2 miles. At radial Ia two oceanic stations were sampled, at IIa and IIIa two stations were also sampled, the coast and another located at approximately the level of the other third station of the rest of the radials. The situation of the stations is shown in the figure 1.

A bongo net of 40cm diameter with a mesh size of 250 um (both left and right units) was used to catch the icthyoplankton. Due to the low planktonic abundance in this area, we did not come up against the problem of clogging, which allowed us to use nets with this mesh size, which is the most suitable for a quantitative sampling of icthyoplankton of this area (Rodriguez, 1990). To determine the volume of filtered water, two General Oceanic Flowmeters (model 2031) were used and located at the mouth of both units. The same volume of water was observed filtering through (for) both units. The tows were of the double-oblique type and in each station the column of water sampled ranged from surface to a depth of about 150 m. or to the depth that the water column allowed.

Once in the laboratory, sorting was carried out, the icthyoplanktonic components were counted and identified to as low a taxonomic level as possible. These operations were carried out from the right unit.

The abundance of eggs and larvae were standardised to a number per 10 square metres of surface.

RESULTS.

Specific composition.

A total of 574 larvae have been studied. Fifty three taxonomic categories (38 species and 15 larger taxonomic categories) were identified. The specific composition of the icthyoplankton larvae and the numerical percentage of each species is presented in Table I.

TABLE I. Species composition and numerical percentaje of fish larvae captured.

Species	Percent of total
CLUPEIDAE	
Sardinella aurita Valenciennes, 1847	0.52
GONOSTOMATIDAE	
Cyclothone alba Brauer, 1906	0.52
Cyclothone braueri Jespersen & Taning, 1926	10.63
Cyclothone microdon Günter 1878	0.17
Gonostoma denudatum Rafinesque, 1810	0.17
Gonostoma elongatum Gunther, 1878	0.17
Unidentified sp	0.17
STERNOPTYCHIDAE	
Argyropelecus hemigimnus Cocco, 1829	
Argyropelecus sp	0.17
PHOTICHTHYDAE	
Pollycthys mauli (Poll, 1953)	1.22
Vinciguerria attenuata (Cocco, 1838)	0.17
Vinciguerria nimbaria (Jordan & Willians, 1895)	2.79
Vinciguerria poweriae (Cocco, 1838)	6.27
CHAULIODONTIDAE	
Chauliodus sloani Schneider, 1801	0.17
BATHILAGIDAE	
Bathilagus sp	0.17
MYCTOPHIDAE	
Benthosema suborbitale (Gilbert, 1913)	1.74
Ceratoscopelus maderensis (lowe, 1839)	9.23
Ceratoscopelus warmingii (Lütken, 1892)	16.20
Diaphus metopoclampus (Cocco, 1829)	0.17
Diaphus rafininesquei (Cocco,1838)	0.17
Diaphus sp1	0.17
Diaphus sp2	0.17
Diogenichthys atlanticus (Taning, 1928)	3.66
Hygophum reinhardtii (Lütken, 1892)	1.39
Hygophum taaningi Bekker, 1965	0.35
Lampanyctus croccodilus (Risso, 1810)	0.35
Lampanyctus pusillus (Johnson, 1890)	0.52
Lampanyctus spp	3.14
Lepidophanes gaussi (Brauer, 1906)	6.10
Myctophum nitidulum Garman, 1889	0.35
Myctophum slenops Taning, 19281	0.17
Notolichnus valdiviae (Brauer, 1904)	1.04
Noltoscopelus (Notoscopelus) resplendens Malm, 1861	0.35
Notoscopelus bolini	0.35
Symbolophorus veranyii (Moreau, 1888)	0.87
Unidentified spp.	2.09

TABLE I. (Continued)

Species	percent of total
PARALEPIDIDAE	
Paralepis atlantica Kroyer, 1868	1.04
Unidentified spp.	0.52
MACRORHAMPHOSIDAE	
Macrorhamphosus scolopax (Linnaeus, 1758)	1.04
SERRANIDAE	
Serranus scriba (Linnaeus, 1758)	1.04
CARANGIDAE	
Unidentified sp.	0.17
SCIAENIDAE	
Unidentified spp.	0.35
SPARIDAE	
Unidentified spp.	2.44
LABRIDAE	
Coris julis (Linnaeus, 1758)	0.35
Labrus bergilta Ascanius, 1767	0.52
Unidentified spp.	1.22
GEMPILIDAE	
Unidentified sp.	1.74
GOBIIDAE	
Lebetus guilleti? (Le Danois, 1913)	0.87
Unidentified spp.	13.76
BLENNIDEAE	
Parablennius gattorugine (Brünnich, 1768)	0.17
SCORPAENIDAE	
Unidentified sp	0.17
BOTHIDAE	
Bothus podas (Delaaroche, 1809)	0.35
Ceratoidei	
Unidentified Families	0.35
MELANOCETIADAE	
Melanocetus johnsoni Günter, 1864	0.17

Abundances

The egg abundance ranged from 14.0 H/10m^2 to 844.1H/10m^2 with an average density of 204.2H/m^2. A clear reduction in the densities towards the high sea was observed. Fig. 2.

The larval abundance was from 8.4L/10m^2. to 255.0L/10m^2. , with an average of 90.87L/10m^2. This abundance is quite inferior to 30.7 L/m^2. cited by John (1984) for the Sargasso Sea, a similar region from the bio-chemical point of view to the one studied by us (Braun com. per.) and also inferior to the 15.1 L/10m^2 cited by Gordina (1980) for the area of the Canarian Current. Probably this low abundance is, at least in part, due to the fact that all the sampling was carried out during daylight hours, and practically all with a high light

intensity, which presumably negatively influenced the larvae catches, as a result of two phenomena: large larvae avoided the net, and vertical migration of those groups that move to deeper waters during the day. As both phenomena affect the most advanced larvae (with a greater swimming capacity) this could also have influenced the fact that the larvae caught were small.

In contrast to the eggs, the horizontal distribution of the larval abundance showed no special trend (Fig. 3).

Horizontal Distribution.

Paying attention to the habitat of the adults and their reproduction strategy, it is possible to quite clearly recognise two groups of fish species.

Neritic species

In regions with a continental shelf the larvae of neritic fish are usually distributed along of this, with a maximum density, in most cases, found between 50 and 100 m. (Palomera and Rubies, 1982). However, in our working area, where there is practically no continental shelf (depths of more than 500m can be found at less than two miles from the coast), these larvae are found almost exclusively at the coastal stations. In this way, 81.3% of the neritic fish larvae were caught in the most coastal line of stations, 97.7% between the first and second lines of stations and only 2.4% were caught at the stations further offshore.

The retention of shore fish larvae around the islands is essential to maintain the fish population (Leys and Miller, 1976), phenomenon which is sometimes known as "conservation" (Leiss, 1982). There have been several mechanisms proposed for the which these larvae either they maintain a position close to the coast, or are able to return to it, in some cases from considerable distances (depending on the size of the larvae and the speed of the currents).

In our case it is reasonable to think that the permanence of this larva population in the coastal zone is related to the system of currents in the area, according to Molina (unpublished data) these currents produce a movement of oceanic waters towards the coast. This would also explain the presence of an important number (important population) of oceanic fish larvae that would also be transported by these currents.

The neritic species groups, that represented 21.8% of the total of larvae caught, were made up of 8 families, with the Family Gobiidae with 84 individuals (14.9% of the total larvae catch) being the most numerous. This was followed in numerical importance by the Family Sparidae (with 2.4%) (in both cases with various species of larvae that we did not try to classify). The other families, except for the Labridae, were only represented by one species and with very few individuals.

Oceanic species

In this group those species that inhabit the intermediate water column (meso and

bathypelagic fishes) are included. In total they represented 76.7% of the larvae catch. The families Myctophiae, Gonostamatidae and Photytchidae should be specially mentioned as the adults form a fundamental link in the pelagic ecosystem (and furthermore were very well represented in our samples).

F. Myctophydae: 46.3% of the species of fishe found and 48.6% of the fish larvae caught belong to this family. Moreover two species of the genre *Ceratoscopelus*, *C. warmingi*, with 93 examples, and *C. maderensis*, with 51, were the first and fourth species most frequently caught.

F. Gonostomatidae: 13.1% of the larva catches belong to this family. In this family only *Cyclothone braueri*, second most frequent species, was well represented in the samples.

F. Photitchidae: Three species of the genre *Viciguerria* (*V. poweiae*, *V. nimbaria* and *V. attenuata* were present in the samples.) All together they represented 9.6% of the total fish larvae caught.

In contrast to the neritic larvae, the larvae in this group were more homogeneously distributed, as 9.7% was caught at the most coastal stations line, 26.1% at the second line of stations, 39.7% and 24.5 % was caught at the third and fourth lines of stations, respectively.

CONCLUSIONS

The taxonomic composition of icthyoplankton in our working area, dominated by mesopelagic species of larvae of the family Myctophidae with the highest frequency and the families Gonostomatidaeand Fotytchidae in third and fourth places, is quite similar to typical oceanic regimes.

The majority of the neritic larvae were caught at the most coastal stations, however the oceanic larvae showed a more homogenous distribution.

The larval densities registered were very low and in contrast to the egg densities, that showed a clear reduction from the coast towards the high sea, they did not show any special trend in their horizontal distribution.

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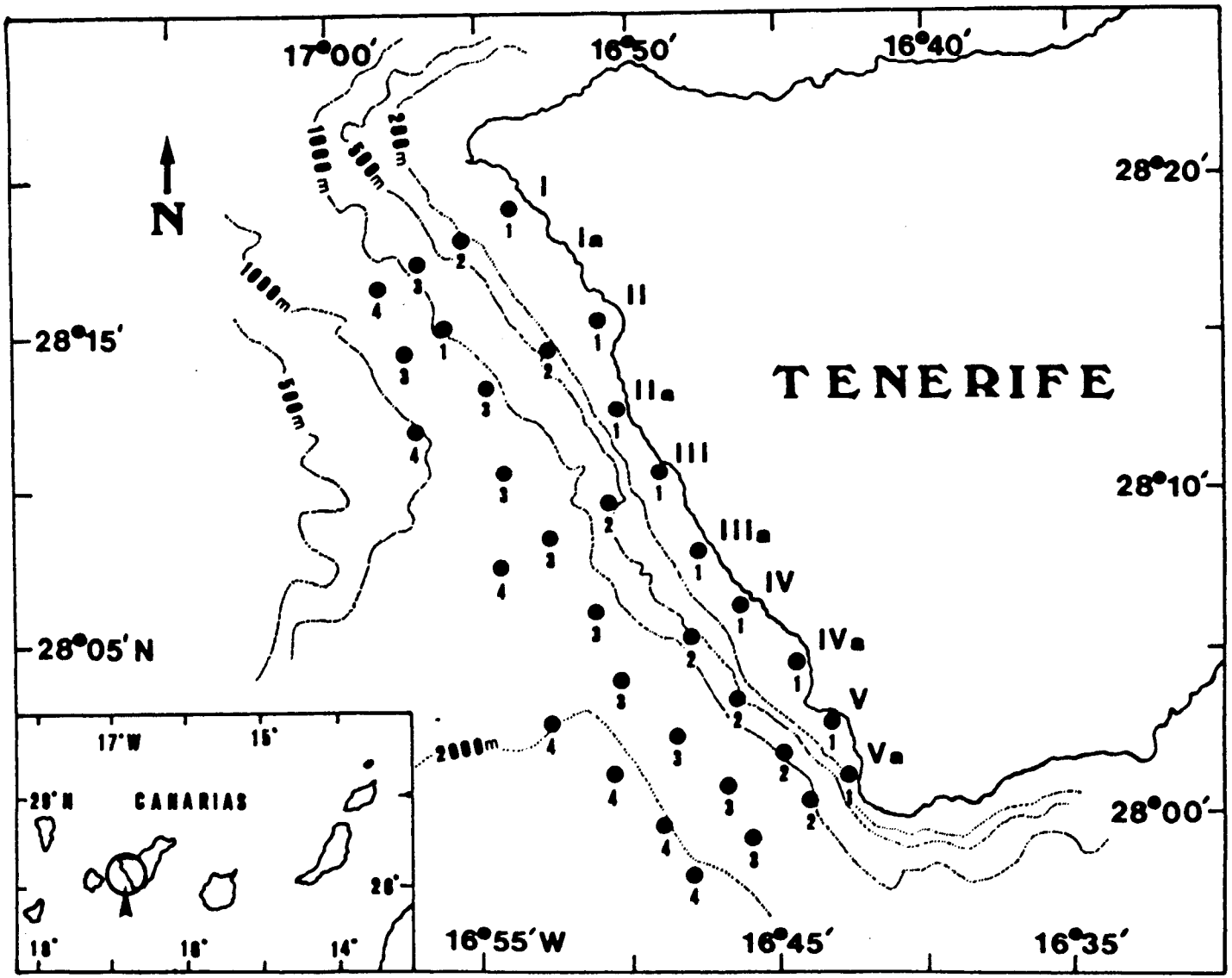

Fig. 1. Map showing the area of study and location of sampling stations

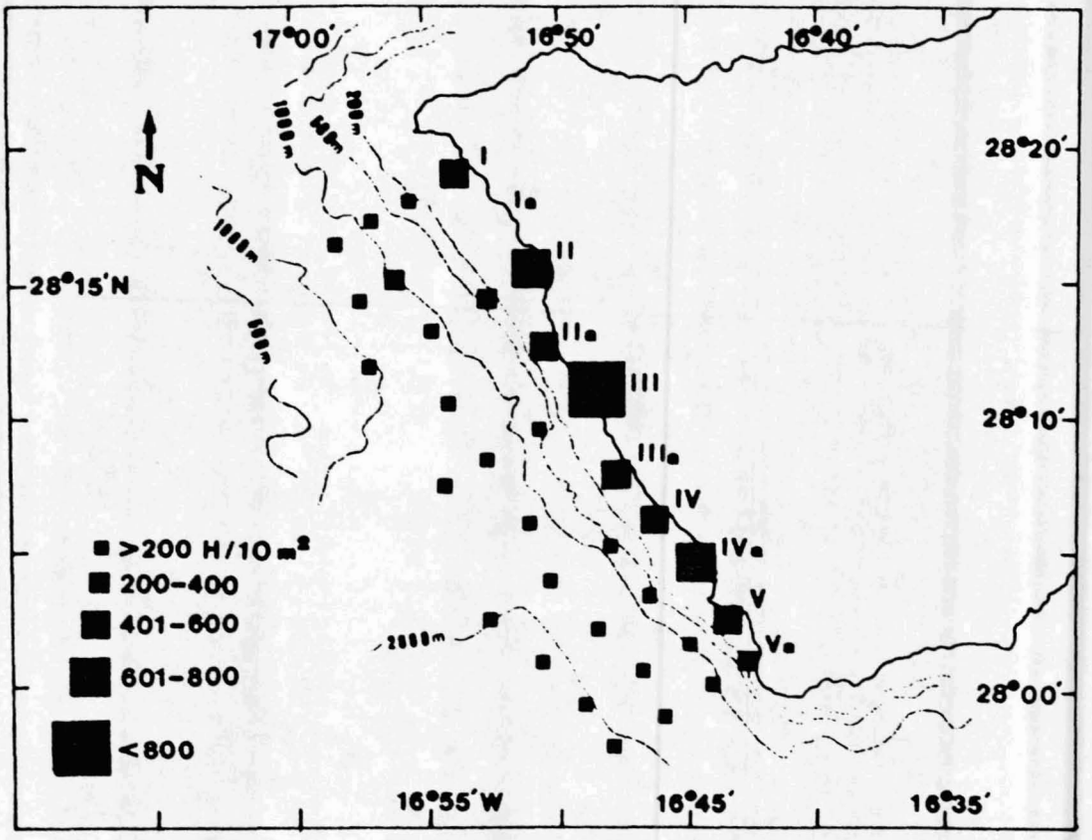

Fig. 2. Horizontal distribution of fish eggs.

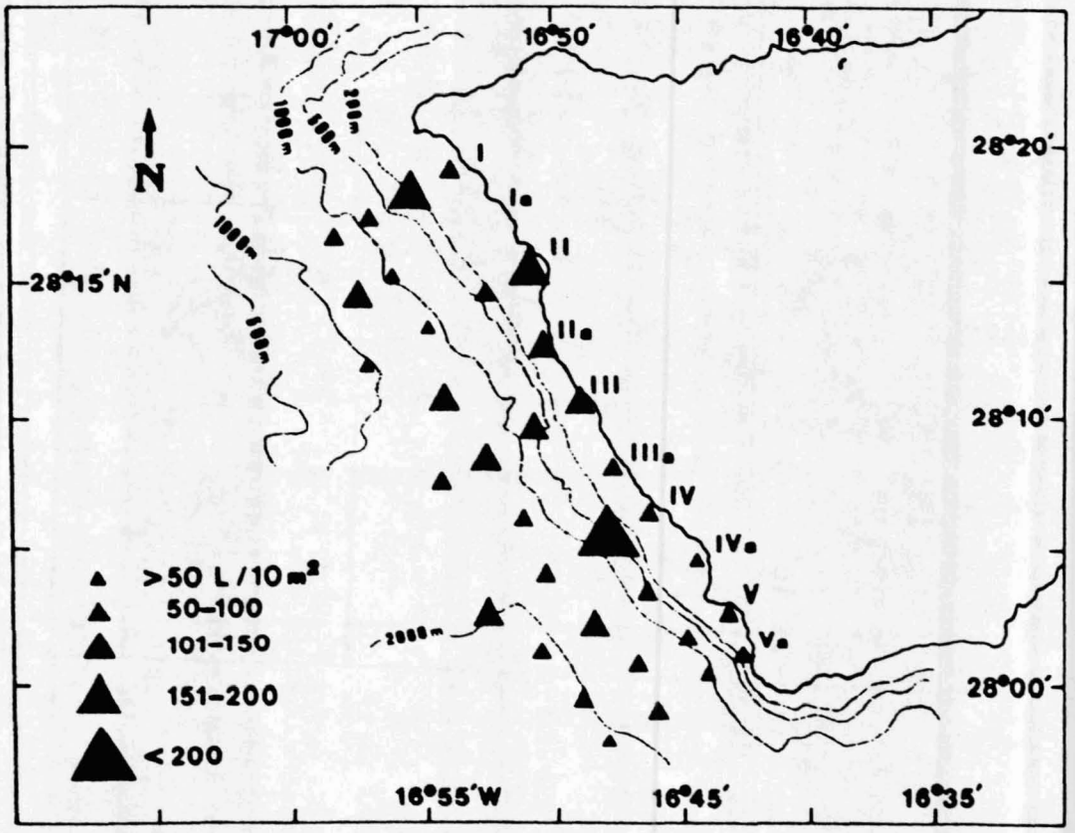

Fig. 3. Horizontal distribution of fish larvae.