

# ICHTHYOPLANKTON ASSEMBLAGES OF THE THERMAIKOS, TORONEOS AND SIGGITIKOS GULFS IN JUNE 2004 AND 2005

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## Abstract

Fish egg and larval assemblages of two ichthyoplankton surveys carried out in the N.W. Aegean Sea in June 2004 and 2005 were analysed in relation to topographic and oceanographic conditions. The nMDS analysis showed two main geographical groups of stations characterized by different environmental parameters (depth, temperature, salinity and chlorophyll-a) as well as different species composition.

**Keywords:** *Ichthyoplankton, Bathymetry, Chlorophyll-A, Aegean Sea*

**Introduction** Examining spatial and temporal patterns with respect to the distribution and abundance of ichthyoplankton in relation to oceanographic conditions may provide insight into the adaptation of spawning strategies to the prevailing physical and biological processes, as well as the effect of the variability in these processes on year-class strength [1]. **Materials and Methods** A grid of 13 stations (Fig. 1) was sampled during two ichthyoplankton surveys in the Thermaikos, Toroneos and Siggitikos gulfs in June 2004 and 2005, using a 60-cm bongo net (0.250 & 0.500 mm nets) with oblique tows. In addition, environmental parameters (temperature, salinity and chlorophyll-a) were measured using a CTD. The eggs and larvae of the 250 mm net were sorted and identified into taxa (family, genus and species if possible) and their abundance expressed as individuals per 10 m<sup>2</sup> filtered water.

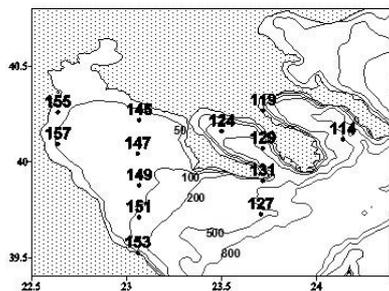


Fig. 1. Map of the study area.

nMDS plots of a Bray-Curtis similarity matrix were produced taking into account the most abundant taxa (taxa with only one occurrence at all 26 stations were excluded). Data were transformed [ $\log(x+1)$ ] to enhance the contribution considering only the most abundant taxa. **Results and Discussion** A total of 53 taxa belonging to 36 families were identified during the two surveys. In the 2004 survey, 47 taxa of fish larvae and 9 taxa of fish eggs were identified. The most abundant larvae were the small pelagic *E. encrasicolus* (28.9% of the total abundance) and *S. aurita* (24.3%), followed by the bathypelagic *C. maderensis* (14.6%). Regarding eggs, the most abundant species were *S. aurita* (38.6%) and *E. encrasicolus* (31%). In 2005, 43 taxa of fish larvae and 9 taxa of fish eggs were identified, with bathypelagic larvae *C. maderensis* (25.1%) and *H. benoiti* (15.9%) being the most abundant species, followed by the small pelagic *E. encrasicolus* (14%) and *S. aurita* (12%). Eggs were dominated by small pelagic *E. encrasicolus* (37%) and *S. aurita* (11%). Despite the fact that the main species synthesis is not generally altered between the two years, the total abundance measured in 2005 was almost half for the eggs and almost one third for the larvae compared to 2004. This reduction is caused mainly by small pelagic *E. encrasicolus* and *S. aurita* and less by bathypelagic *C. maderensis* and *H. benoiti*. It is possible that such a decrease is due to the reduction of chlorophyll-a (approximately 40%) in the Thermaikos gulf in 2005 compared to 2004, which is directly affected at the spawning behaviour of small pelagic species in this area. MDS analysis showed two well defined geographical groups of stations, those of Thermaikos and Toroneos + Siggitikos gulfs respectively. Environmental factors and major

contributor species are plotted as correlated vectors. The Thermaikos group of stations is characterized by lower depths and higher values of salinity, temperature and chlorophyll-a in comparison with the Toroneos + Siggitikos group (Fig. 2a). Regarding the major contributor species, the Toroneos + Siggitikos group is correlated mainly with larvae of bathypelagic species such as *C. maderensis*, *H. benoiti*, *M. punctatum*, *C. braueri* and two neritic species, namely, *C. chromis* and *C. julis* with large dispersal patterns. On the other hand, the Thermaikos group is correlated mainly with eggs and larvae of small and medium pelagic species such as *E. encrasicolus*, *S. aurita*, *S. japonicus*, *T. mediterraneus* and larvae of demersal species such as Gobiidae, *S. hepatus*, *C. macrophalma* and *Callionymus spp* (Fig. 2b)

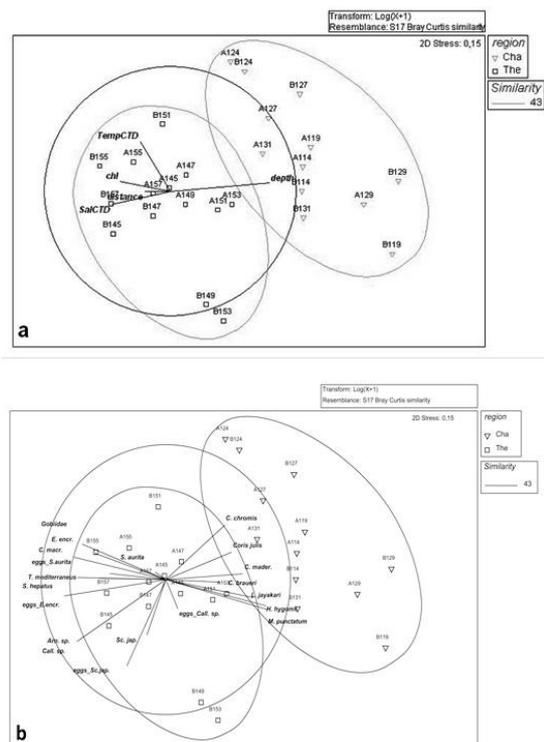


Fig. 2. Plot of the stations distributed using n-MDS analysis. Env. factors (a) and the major contributor species (b) are plotted as correlated vectors.

## References

1 - Somarakis S., Ganiak K., Siapatis A., Koutsikopoulos C., Machias A., and Papaconstantinou C., 2006. Spawning habitat and daily egg production of sardine in the eastern Mediterranean. *Fisheries Oceanography* 15: 281-292