VARIATION OF CEPHALOPOD PARALARVAE IN THE RÍA OF VIGO, NW SPAIN

A. F. GONZÁLEZ(1), J. OTERO(1), A. GUERRA(1), R. PREGO(1), F. J. ROCHA(3) & A. W. DALE(2)

(1) Instituto de Investigaciones Marinas (CSIC), Eduardo Cabello 6, 36208 Vigo, Spain
(2) Departamento de Oceanografía, Universidad de Vigo, Spain
(3) Departamento de Investigaciones Aplicadas, CIES, Islas Cíes, Spain

1. INTRODUCTION

Cephalopods represent a valuable resource whose commercial importance increases annually (Caddy and Rodhouse, 1998). Integration of environmental and biological data for baseline studies of cephalopod fishery resources remains an incipient field that needs to be developed with a thorough understanding of the oceanographic variability (Zeidberg and Hamner, 2002). The most comprehensive studies of the life history of cephalopods have been carried out in Japanese waters where data on Todarodes pacificus paralarvae, oceanographic parameters, and cephalopod catches have been recorded since 1954 (Okutani and Watanabe, 1983). In the north-eastern Atlantic, there have been only a few studies on cephalopods embracing some of the disciplines affordable in the present study (Rocha et al., 1999). The western coast of the Iberian Peninsula experiences different oceanographic regimes that favour seasonal upwelling of water originating from either subpolar or subtropical branches of the North Atlantic Current, being influenced by the distribution patterns of different larval dynamics (Fusté and Gili, 1991), the reared mussel production (Blanton et al., 1987) and is also able to support large sardine fisheries (Tenore et al., 1995).

The present work studies the influence of oceanographic parameters on the abundance of Octopus vulgaris and Loligo vulgaris paralarvae.

2. MATERIAL AND METHODS

A total of 17 surveys were undertaken by the RV Mityus during the upwelling favourable period from May to October in 2000 (9 cruises) and 2001 (8 cruises). Biological and hydrographic sampling was undertaken in each survey, consisting of five stations in waters located in two different areas east and west of the Cies Islands (Ría of Vigo, NW Spain). Zooplankton samples were collected by towing, from near-bottom to the surface, a 750 mm diameter bongo net of 370 μm mesh. The zooplankton samples were fixed onboard with 4% buffered formalin for 24 hours and preserved in 70% alcohol. Paralarvae were separated and later classified. The mantle length (ML) of 178 individuals was recorded to the nearest 0.05 mm. Vertical temperature-salinity profiles were obtained in each station using a SBE-919 CTD with an accuracy of ± 0.005 °C and ± 0.01°C. Additional oceanographic data on sea surface temperature (SST) was obtained from the Sillero buoy located at station 42°07.2'N 9°24'W. Cross-shore (-Qx) component of the Ekman transport was calculated by means of geographic wind speed obtained from atmospheric pressure fields for a position 43°N 11°W, following the methodology adapted for the Iberian Peninsula by Lavin et al. (1991).

3. RESULTS

A total of 229 paralarvae belonging to the families Octopodidae, Loliginidae, Ommastrephidae and Sepioliidae were collected during the period studied. Paralarvae abundance in 2000 and 2001 ranged from 0.7 to 4.02, and from 0 to 4.71 ind x 1000 m², respectively. The 96.5% were identified as Loligo vulgaris and Octopus vulgaris. Significant differences were found between years in L. vulgaris abundance (p<0.05, Student’s t-test), whereas no significant differences occurred in O. vulgaris abundance (p>0.05, Student’s t-test). During 2000, higher abundance of paralarvae was observed in July, September and October for L. vulgaris and O. vulgaris. In 2001, abundance of both species was higher in May and also in September for O. vulgaris. Although bongo hauls revealed east-west differences in abundance, with highest catches in station 4, these patterns were not statistically significant for L. vulgaris and O. vulgaris paralarvae among stations sampled during 2000 and 2001 (p>0.05, Kruskal-Wallis test). The mantle length ranged from 1.0 to 4.9 mm (2.32 ± 0.933, n = 58), and from 1.5 to 3.25 mm (2.23 ± 0.515, n = 24) for L. vulgaris paralarvae in 2000 and 2001, respectively. Concerning O. vulgaris, ML varied from 1.25 to 2.25 mm (1.62 ± 0.199, n = 51) in 2000, and from 1.25 to 2.0 mm (1.6 ± 0.204, n = 45) in 2001. No significant differences were found between mean sizes among stations undertaken in 2000 and 2001 cruises, for both paralarvae species (p>0.05, Kruskal-Wallis test). In 2000, both -Qx and SST clearly showed consecutive upwelling pulses from May to mid-August, followed by an extended relaxation period and a further upwelling event in October. In 2001, two clear events of upwelling occurred in May and September. During summer, northerly winds were not very intense, provoking a stable period of low upwelling. From late September on, southerly winds began to prevail (Figure 1).

4. DISCUSSION

Paralarval surveys must be emphasized as they are fundamental in studying distribution, biology, spawning areas and population structure of cephalopods. However, the relatively small samples obtained with the bongo net are the principal limitation in paralarval studies. It is well
Acknowledgements

This research forms part of the Project PR-404 A PROY 99-32 granted by the Xunta de Galicia. Dr. J.M. Cabanas (IEO, Vigo) provided the data on upwelling index.

References


Figure 1: Daily cross-shore component of the Ekman transport (-Qc) and SST during 2000 (a) and 2001 (b).