Ichthyoplankton Variability and Fish Catches in the Canary Current

P. Bécognée[1], F. Bordes[2], J.M. Rodríguez[3], S. Hernández-León[1]

[1]*Biological Oceanography Laboratory, Facultad de Ciencias del Mar, Universidad de Las Palmas de G.C., Campus Universitario de Tafira, 35017 Las Palmas de Gran Canaria, Canary Islands, Spain (pbecognee@acciones.ulpgc.es).*

[2]*Instituto Canario de Ciencias del Mar, Apartado 56, Telde, Gran Canaria, Canary Islands, Spain.*

[3]*Centro Oceanográfico de Gijón Avenida Príncipe de Asturias, 70 bis 33212 Gijón, Spain.*

The clupeids and engraulids (*Sardina pilchardus*, *Sardinella aurita* and *Engraulis encrasicolus*) are important commercial species in the Canary Islands waters, mainly because of their use as live bait in tuna fishing. Knowledge of spawning periods and recruitment is thus essential for the management of the fisheries around the archipelago. However, those studies are scarce or lacking in the region and conforms an important gap in the oceanographic studies around the archipelago. The Canary Islands are located on the eastern flank of the North Atlantic subtropical gyre and are in the path of the Canary Current. Hernández-León *et al*. (2001) described a sharp eddy system downstream of the Canary Islands influencing bacteria, phytoplankton and zooplankton distribution. Moreover, Rodríguez *et al*. (2001) also showed that Gran Canaria Island and the eddy system acts as a retention area of fish larvae due to two stagnation areas created by the hydrodynamic conditions around the island. The modelled larval drift resulted in enough retention time to allow most of the ichthyoplankton to remain near the island, mainly north and south of the island coinciding with the areas where the main current is reduced due to stagnation.

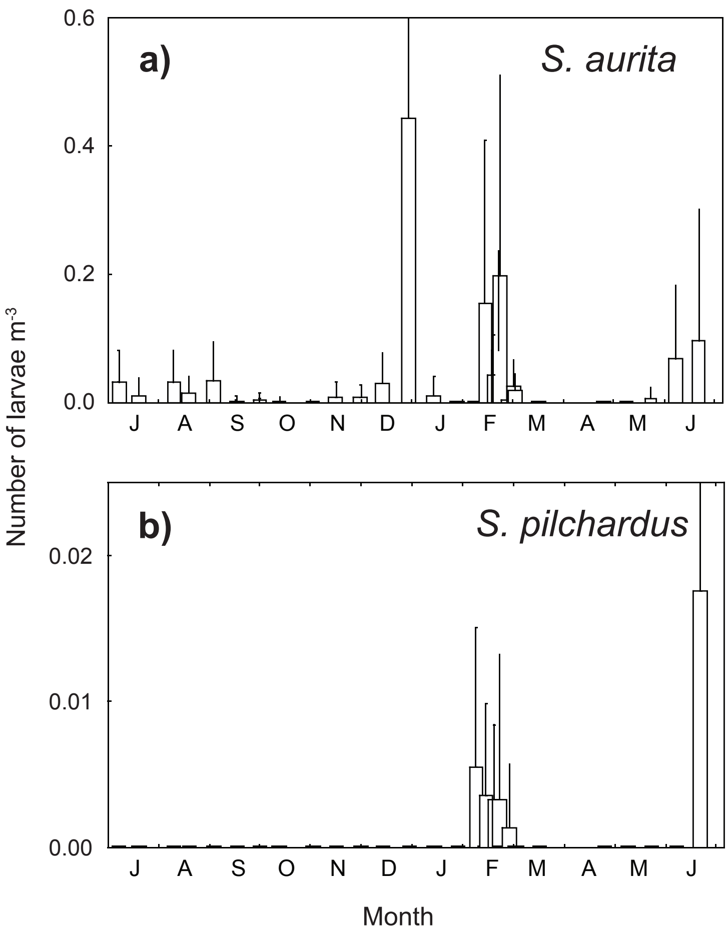

Figure 1. Annual cycle of the abundance of fish larvae around Gran Canaria (a) *Sardinella aurita* larvae, (b) *Sardina pilchardus*.

The distribution and abundance of fish larvae and particularly of three important commercial clupeoid species in the Canary Islands waters was studied along the eastern and southern shelf of Gran Canaria Island (Canary Islands) from July 2000 to June 2001. Oblique bongo hauls were carried out fortnightly during daytime but coinciding with days of full and new moon, except during February in which the area was sampled every 2-5 days.

A total of 3603 fish larvae were found and analysed during the annual cycle. The ichthyoplanktonic community was composed by 17.3% of clupeoid larvae distributed in 92.9% of *Sardinella aurita*, 4.7% of *Engraulis encrasicolus* and 2.4% of *Sardina pilchardus*. *Sardinella aurita* larvae appeared during the whole year with two periods of maximum abundance (Fig. 1a), June to September and December to February. During the full moon their abundance was on average 38.5% (± 6.8%) of their numbers during the new moon, showing a clear lunar periodicity. *Engraulis encrasicolus* larvae appeared from November to March but also coinciding with the new moon, and *Sardina pilchardus* larvae only appeared during two short periods (Fig. 1b), both coinciding with filaments shed from the African coastal upwelling which reached the island. *Sardina pilchardus* was not reproducing around the islands and appeared as juveniles in the catch of fishermen 2 to 4 months later. Therefore, the contact of filaments of upwelling with the islands suggests important social and economic benefits for the local fisheries.

In summary, the results show that there exists a transport for fish larvae from the spawning area off Northwest Africa to the Canary Islands illustrated in two occasions by the presence of *Sardina pilchardus* larvae in the coast of Gran Canaria Island in February and June 2001. Therefore, the transport of fish larvae in the upwelling filaments observed by Rodríguez *et al*. (1999) can lead to an African connection between the fisheries in the upwelling area and the Canary Islands. The presence of a lunar cycle in the abundance of fish larvae was also a striking result as it can suggest that the common observation of a lunar periodicity in the reproduction of many warm water fish species could be related to the recently observed moon cycle in zooplankton, in the food of fish larvae. Both the transport of fish larvae in the filaments and the lunar periodicity deserves further evaluation.

References

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