NON-INDIGENOUS SPECIES AT THE ALICANTE HARBOR (SE-SPAIN): *OCULINA PATAGONICA* DE ANGELIS, 1908 AND *BOTRYCAPULUS ACULEATUS* (GMELIN, 1791)

Andrés Izquierdo [1], Angel Loya [2], Marta Díaz-Valdés [2] and Alfonso A. Ramos-Espla [1] *

[1] Centro de Investigación Marina (CIMAR). Universidad de Alicante - Ayuntamiento de Santa Pola, Cabo de Santa Pola s/n, Alicante, Spain

[2] Dept. Ciencias Marinas y Biología Aplicada. Universidad de Alicante. 03080, Alicante, Spain - alfonso.ramos@ua.es

Abstract

Two non-indigenous species, an haermatypic coral (*Oculina patagonica*) and a gastropod (*Bostrycapulus aculeatus*) have been reported 30 years ago from Alicante harbour. But whereas *B. aculeatus* has not spread outside the harbour, *O. patagonica* has colonized an extensive area of the Spanish Mediterranean (from Catalonian to Andalusia) and competes with indigenous species.

Keywords : Species Introduction, Western Mediterranean, Cnidaria, Gastropods.

Introduction

The scleractinian coral *Oculina patagonica* De Angelis, 1908 and *Bostrycapulus aculeatus* (Gmelin 1791) (= *Crepidula aculeata*) are exotic species. The first the originates from the Southwest Atlantic [1] and the second is a cosmopolitan gastropod in the tropics and subtropics [2]. Both species were first recorded in Alicante harbour in 1973 [3,4], probably introduced by way of vessel fouling. Since, *O. patagonia* spread to the rest of the Mediterranean helped by the intense maritime traffic [4,5], whereas *B. aculaeatus* is confined to Alicante harbour. Considering the importance of the development of non-indigenous species in the Mediterranean [6], we present preliminary data on the biology and density of the population of these exotic species in Alicante harbour.

Materials and methods

The study was carried at spring 2006 at the Alicante harbour in 2 localities: "Levant quay" (N 38°19'52.1" W 00°29'10.3"; 12m depth) near the harbour entrance with good water circulation; and "Fishing Dock" (N 38°20'11.1" W 00° 29'11.8"; 6m depth) in a more enclosed area and low water replacement rate. The sampling has been carried by scuba diving: i) *O. patagonica* by means of 5 underwater pictures (square 20x20cm) per site and 3 sites (0.5, 3 and 6m depth) in each locality (90 pictures), to calculate the % of cover; ii) *B. aculeatus* taking 2 samples by removing 20x20 squares of the substrate at 3 depths (0.5, 3 and 6m) in each locality (total 36 samples).

Results and discussion

O. patagonica is abundant at both localities (fig. 1), but more abundant in shallower depths (0-3m), where in some sites it covers almost 100% of the substrate. It present two morphotypes: encrusting (frequent in shallow sites) and branched (rare in the deeper and shadow sites).

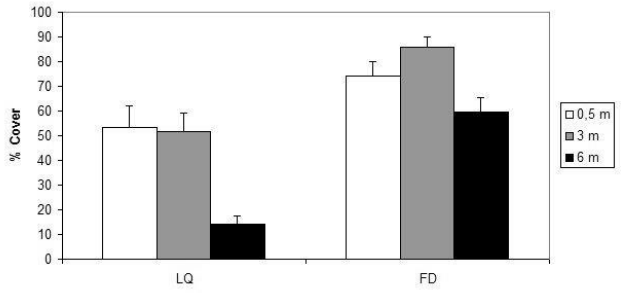

Fig. 1. Cover percentage (%) of *Oculina patagonica* at two localities of Alicante Harbour. (LQ) Levant Quay; (FD) Fishing Dock.

Bostrycapulus aculeatus is present in borh localities (fig. 2), with variable density, though more abundant at deeper sites (6m). The maximum density (275 ind/m^2) was at the LQ, vs. 50 ind/m^2 at FD. The size range has been 13-31mm, and we have observed ovigerous capsules in early November.

The introduction of exotic species across the Mediterranean is increasing [4, 6], and it is important to monitor them. *Oculina patagonica* is a successful invader that spread along the entire coast of Spain (anthropized and natural environments). Thirty years after the first record from Alicante harbour, *Oculina* covers most of the harbour walls from surface to bottom (11m depth), and it spreads quickly to newly built structures within the harbour (unpubl. data).

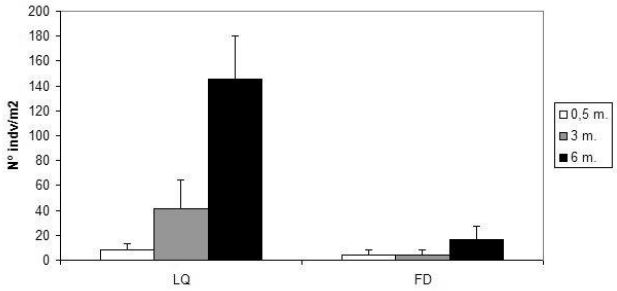

Fig. 2. Density of *Bostrycapulus aculeatus* at two localities of Alicante Harbour. (LQ) Levant Quay; (FD) Fishing Dock.

It competes with the native fouling species, limiting the space available for new recruits and even covering most of the sessile organisms. *Oculina* may suffer 'bleaching' with high temperatures [8], but at Alicante the bleaching is localised - limited to overshadowed sites and in contact zone with the sponge *Crambre crambe*.

Although *B. aculeatus* is established inside Alicante harbour, its distribution is confined to the harbour, where its density increases with depth, perhaps due to the competition with *Oculina*.

References

1 - Zibrowius, H. 1974. *Oculina patagonica*, scleractiniaire hermatypique introduit en Méditerranée. *Helgol. Wiss. Meeres.*, 26 (2): 153-173.

2 - Zenetos, A., Gofas, S., Russo, G., Templado, J. 2003. CIESM Atlas of Exotic Species in the Mediterranean. 3. Mollucs. CIESM Publishers, Monaco. 376 pp.

3 - Collin, R. 2005. Development, phylogeny, and taxonomy of *Bostrycapulus* (Caenogastropoda: Calyptraeidae), an ancient cryptic radiation. *Zool. J. Linn. Soc.*, 144: 75-101.

4 - Zibrowius, H. and Ramos, A.A. 1983. *Oculina patagonica*, scleractiniare exotique en Máditerranée - nouvelles observations dans le sud-est de l'Espagne. *Rapp. Comm. Int. Mer Médit.*, 28 (3): 297-301.

5 - Zibrowius, H. 1991. Ongoing modification of the Mediterranean marine fauna and flora by the establishment of exotic species. *Mesogee* 51, 83-107.

6 - Fine, M., Zibrowius, H., Loya, Y. 2001. *Oculina patagonica*: a non-lessepsian scleractinian coral invading the Mediterranean Sea. *Mar. Biol.* 138, 1195-1203.

7 - Streftaris, N., Zenetos, A., Papathanassiou, E. 2005. Globalisation in marine ecosystems: the story of non-indigenous marine species across european seas. *Ocean. Mar. Biol. Ann. Rev.* 43, 419-443.

8 - Fine, M. & Loya, Y. 2003. Alternate coral-bryozoan competitive superiority during coral beaching. *Mar. Biol.* 142, 989-996.