Succession of marine fouling hydrozoan assemblages at a finfish aquaculture facility in Taranto, Italy

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Marine fouling hydroids are responsible for several economic and environmental issues around the world, having been introduced to new habitats and altering native communities. In aquaculture facilities, they have been linked to mortality and health issues. To identify alien or potentially harmful fouling hydroid species in a marine aquaculture facility in Taranto (Italy), a study on the succession of the assemblages of these organisms was conducted on 36 panels immersed in April 2013 next to a fish cage. Three panels were analyzed for each combination of depth (0.2 m, 3 m, and 6 m) and immersion time (3, 6, 9, and 12 months); the hydrozoans growing on the surface of each panel were identified and their surface was estimated and analyzed with multivariate techniques. Species richness, frequency and biomass increased with time, paralleling the overall increase in structural complexity of the fouling assemblages. Medusa production was observed from locally abundant colonies of some species, potentially representing a nuisance for cultured fish through contact-driven envenomations and gill disorders. Several species were observed growing in epibiosis on alien invertebrates. The implications of these findings are discussed in light of the intense traffic of ships in the Port of Taranto.

Introduction

Many hydroid species have been introduced to new habitats, altering the structure of native communities, and playing a facilitating role in the introduction of other non-indigenous taxa, especially crustaceans (Folino-Rorem and Indelicato 2005; Ros *et al*., 2013). Marine fouling hydroids are held responsible also for several economic and environmental issues around the world. In aquaculture facilities, fouling hydroids have been linked to mortality and health issues in finfish and shellfish (Baxter *et al*. 2012). Because of this, we aimed to identify alien or potentially harmful fouling hydroid species in a marine aquaculture facility in Taranto (Italy), through the study of the succession of the assemblages of these organisms.

Materials and methods

The present study was conducted on 36 test panels immersed in April 2013 next to a fish cage. Three panels (replicates) were analyzed for each combination of depth level (0.2 m, 3 m, and 6 m) and immersion time (3, 6, 9, and 12 months); the hydrozoans growing on the surface of each panel were identified and their surface was estimated and analyzed with multivariate techniques, including MDS, SIMPER and PERMANOVA routines.

Results and Discussion

The assemblage of hydrozoans was species-poor, including only 11 species of which widespread *Aglaophenia picardi*, *Obelia dichotoma* and *Ventromma halecioides* characterized the first stages of colonization and succession; while mostly epibiotic species *Clytia hemisphaerica* and *Halecium pusillum* were characteristic of later stages and mature fouling communities. In fact, *Halecium pusillum*, a species producing planktonic propagules, followed closely the dynamics of fouling mussels and grew

preferably on the external surface of mussel shells. Species richness, frequency and abundance increased with time, paralleling the overall increase in structural complexity of the fouling assemblages; the first stages of colonization being significantly different from later stages of succession (as confirmed by MDS and PERMANOVA). Medusa production was observed from locally abundant colonies of *Obelia dichotoma* and *Clytia hemisphaerica*, potentially representing a nuisance for cultured fish through contact-driven envenomations and gill disorders. Although all of the hydrozoan species had been previously reported for the area (Bouillon *et al*. 2004; Pierri *et al*. 2010), several of them were observed growing preferably in epibiosis on alien tunicates, sponges, and bryozoans, suggesting that they could easily be traslocated with their alien substrates to new regions.

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