

**PRELIMINARY DATA ON SETTLEMENT OF THE FOULING ORGANISMS AT SHELLFISH FARM
IN MALI STON BAY, SOUTH-EASTERN ADRIATIC, CROATIA**

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Abstract

Settlement seasonality of fouling organisms was studied on shellfish collectors, between December 2000 and December 2001. A total of 10 classes and 30 species were determined from collectors submerged for two months, and 15 classes and 41 species from collector submerged for one year, out of which *Pomatoceros triqueter*, *Ciona intestinalis*, *Botryllus schlosseri*, *Bugula neritina* and *Eudendrium racemosum* were present abundantly throughout a year.

Keywords: biofouling, settlement, shellfish farming

Introduction

The Bay of Mali Ston, the highest shellfish production area in the eastern Adriatic, is an extended and ramified bay situated between the mainland and Pelješac peninsula. The tradition of collection and aquaculture of the European flat oyster *Ostrea edulis* extends for a couple of centuries. The Mediterranean black mussel, *Mytilus galloprovincialis*, is also being farmed in this area. Among the numerous problems related to this farming, biofouling is of special concern. Fouling causes considerable damage to cultivated organisms and may result in enormous losses for producers, affecting bivalve growth and survival, and adding weight and drag on culture equipment [1,2]. Therefore, the study of temporal distribution of fouling organisms was undertaken to improve mussel and oyster aquaculture.

Material and methods

Fouling organisms were allowed to settle on clean PVC mussel juvenile collectors attached to long-lines, from December 2000 to December 2001. Experimental collectors were submerged at 1,5 m depth at different seasons to determine seasonal pattern of species settlement and were removed bimonthly, except one collector that was submerged for one year. Water depth at the site was 8 m, temperature ranged from 8-26 °C [3]. Samples were taken by scraping clean three surfaces of 25 cm² from the ribbed collectors. Removed organisms were preserved in 70% ethyl alcohol and taxa were enumerated and identified to species level later on in the laboratory, except diatoms that were identified to the class level.

Results and discussion

The analyzed fouling community in the Bay of Mali Ston consisted of 30 sessile organisms belonging to 10 classes, obtained from collectors that were submerged for two months, and 41 species from 15 classes that were attached to a collector submerged for 12 months (Table 1). Besides Chlorophyta, all classes that were present in bimonthly samples were noticed at the long-term collector. Sponge species, as well as sea urchins, gastropods and the anthozoan *Actinia* were identified only after 12 months of submersion, indicating that these species seem to prefer already fouled surfaces.

Besides Diatoms, only five species were settling throughout the year. The polychaete *Pomatoceros triqueter*, which decreases market value of the mussels, and the ascidian *Ciona intestinalis* were dominant, especially in wintertime. The ascidian *Botryllus schlosseri*, the bryozoan *Bugula neritina* and the hydrozoan *Eudendrium racemosum* were dominant during the warmer season. Other sessile species were present at different times, but were never abundant. Collectors submersed in June and August, sampled in August and October, respectively, were settled by a number of oysters, what correlates with data on distribution of oyster larvae in water column [3]. The only mussel specimen was noticed at the bimonthly collectors that were submersed in August (sampled in October), but samples from a yearly collector show abundant presence of this species; indicating that mussel larvae might prefer surfaces that are already fouled by other species. Interaction in settlement of different species was noted in previous studies. The presence of hydroids enhances tunicates settlement; this assemblage positively influences mussel settling [4]. The presence of bryozoans and tunicates indicates development of flat epibionts that may increase shellfish mortality rate [2]. Further research will quantitatively analyze the temporal and spatial distribution of fouling species on collectors set up in this important aquaculture area.

Table 1. Number of species in fouling community.

Submersion period (months)	2						12
	Feb	Apr	Jun	Aug	Oct	Dec	Dec
Schyzophyta							
Diatomeae	+	+	+	+	+	+	+
Phaeophyta	1						1
Rhodophyta	2		1		1	1	3
Chlorophyta	1						
Porifera							
Calcarea							1
Demospongia							1
Cnidaria							
Hydrozoa	2	2	1	1	2	3	3
Anthozoa							1
Echinodermata							
Echinoidea							2
Plathelminthes							
Turbellaria					1	1	1
Annelida							
Polychaeta	1	1	1	1	2	2	6
Tentaculata							
Bryozoa	3	2	2	3	4	5	4
Mollusca							
Gastropoda							3
Bivalvia			1	5	3		7
Tunicata							
Ascidiacea	2	2	2	2			

References

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