

Effect of hull types and antifouling coatings of marine vessels on macroalgae and mussel *Mytilaster lineatus* settlement in the southern Caspian Sea

Hamed Gholipour¹

Mohammadreza Rahimibashar^{2*}

1. M.Sc. of Marine Marine Biology,
Lahijan Branch, Islamic Azad
University, Lahijan, Iran, P.O.
Box: 1616

2. Assistant Professor in
Department of Marine Biology,
Lahijan Branch, Islamic Azad
University, Lahijan, Iran.

***Corresponding author:**
rahimibashar@yahoo.com

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Abstract

One of the biological problems of the Caspian Sea is the invasion of the invasive and biofouling species that cause problems for marine facilities and vessels. The aim of this study was to investigate the effect of hull types and antifouling coatings of marine vessels on macroalgae and mussel *Mytilaster lineatus* settlement and to choose the best hull types and antifouling coatings. In total, 2 hull types (Fiberglass and Steel) and 7 antifouling coatings (Colorless, Pamchal, Ronas, Rangin Zareh, Eskeleh, Bajak and Hempel) was selected in 14 treatments and 3 replications (Chaboksar, 2020-2021). After the installing the plates, the physicochemical factors of water (temperature, salinity and pH) and the related factors (number, wet weight, dry weight, coverage percentage, density and growth rate) were measured during the period and at the end of the period, respectively. The results of different antifouling coatings showed that the presence of algae on fiberglass and steel plates and mussel on steel plates showed a significant difference in most studied factors but the presence of mussel on fiberglass plates did not show any significant difference. Also, the results of different plates showed that the presence of algae in Hempel treatment and mussel in Colorless, Ronas, and Hempel treatments showed a significant difference in most studied factors but the presence of algae in Colorless, Pamchal, Ronas, Rangin Zareh, Eskeleh, and Bajak treatments and mussel in Pamchal, Rangin Zareh, Eskeleh, and Bajak treatments did not show any significant difference. Generally, the antifouling coatings prevented algae and mussel on fiberglass plates and there were only few algae in Colorless treatment. Deterrent materials of antifouling coatings were likely to prevent the settlement. Also, on steel plates, algae and mussel were more evident in Colorless treatment, the dark color in Colorless treatment and lack of coatings probably caused more settlement. This effect can be influenced by the chemicals of coatings. Furthermore, on different plates, the amount of algae and mussel settlement was higher on steel plates which can be due to hardness and microtextures. As a result, it is recommended to use fiberglass and antifouling coatings for using in vessels.

Keywords: Biofouling, Hull type, Antifouling coating, Marine vessels, Macroalgae, Mussel *Mytilaster lineatus*