

Substrate choice by ascidian larvae does not explain the distribution of adults

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Abstract

Small-scale patterns of abundance of sessile invertebrates are determined by pre- and post-settlement events that affect the heterogeneity of settlement and differential mortality in different microhabitats. Spatial and temporal patterns of substrate colonisation by habitat engineers may promote autogenic succession sequences. In the White Sea barnacles *Balanus crenatus* and ascidians (mainly *Styela rustica*) often form clusters on small substrates scattered on muddy bottom. Barnacles dominate on the primary substrate (mainly shells of bivalve *Serripes groenlandicus*) while ascidians occupy barnacle shells and each other. The whole patch develops from barnacle to ascidian domination. In the field experiments only barnacles and no ascidian recruits are found on initially empty *Serripes* shells after a year of exposure (while at the same period ascidian recruits are abundant on barnacles from natural clusters). We tested whether the pattern of ascidian abundance is generated by substrate preferences of their larvae for non-silted (due to self-clearance) microhabitats like shells of live barnacles compared to other substrates. *Serripes* shells [S], clusters of barnacles (*Serripes* shell [SB] with live barnacles [LB] and their empty shells [DB] on it) and plexiglass plates [P] were placed in 7 replicate aquariums. All substrates were covered with thin layer of silt to imitate natural siltation pattern. Fertilised eggs of *Styela rustica* were added. After 10 days settlers were counted. Settlement density was highest on [P], numbers of settlers on [SB] and [S] didn't differ and were higher than on barnacle shells. Surface of [LB] attracted more larvae than [DB]. Although the localisation of ascidians on mobile plates and on the inner surface of immobile plates of [LB] is potentially the most dangerous for both species, density of settlers was higher there than in the other zones of [LB] or [DB]. Our results indicate that previously observed low abundance of *Styela rustica* on silted *Serripes* shells is mediated by mechanisms other than larval substrate preferences. High settlement of ascidian larvae to potentially dangerous zones of [LB] may increase the probability of barnacle overgrowth by ascidians.