The potential role of visual cues for microhabitat selection during the early life phase of a coral reef fish (Lutjanus fulviflamma)

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Abstract

Pelagic larvae of various coral reef fish species are known to be active swimmers that can carefully select preferred microhabitat during settlement. Fish larvae may use visual, environmental, or chemical cues to orient and settle in shallow-water habitats such as coral reefs, mangroves, and seagrass beds. In the present study, we investigated in dual-choice laboratory experiments the visual attraction of recent settlers of a reef fish (Lutjanus fulviflamma) towards different microhabitats, conspecifics, and heterospecifics, and the interactive effects among these cues. Fish preferred seagrass and coral above mangrove roots. Fish were more attracted towards a combination of conspecifics or heterospecifics and seagrass microhabitats than to seagrass microhabitats alone, but showed a significantly stronger preference for conspecifics than for heterospecifics when placed in preferred seagrass or non-preferred mangrove microhabitats. However, the preference for conspecifics disappeared when choice was given between conspecifics placed in non-preferred mangrove microhabitat versus heterospecifics placed in preferred seagrass micro habitat. A multiple choice experiment further showed that recent settlers preferred conspecifics of equal or about 1cm larger body size, but not of 2 or 3cm larger body size. The higher attraction towards the combination of seagrass microhabitats and conspecifics/heterospecifics shows an additive effect of the latter, which could be explained by the fact that presence of resident fish in preferred habitat may indicate favorable conditions in the field and may offer an increased safety through schooling. However, (1) attraction towards conspecifics of (nearly) similar body size and not larger, (2) stronger attraction towards conspecifics in a non-preferred than in a preferred microhabitat, and (3) equal attraction towards conspecifics in non-preferred microhabitat vs. heterospecifics in preferred microhabitat all indicate that the importance of schooling with conspecifics is highly context-dependent. This may have significant effects on the habitat selection and distribution of early-stage fish (and thus also on consecutive life stages) in coastal habitats. Our findings point to the potential ecological significance of various visual cues, and their interactive effects, for early juvenile coral reef fishes while settling into shallow-water habitats and/or selecting early post-settlement habitats.

Key Word microhabitat, coral reef fish