The Effect of Shell Morphology on Sediment Retention in Turritella Gastropods

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Abstract

Turritella gastropods are typically small sea snails, spanning the majority of their lives in shallow water with only their operculum exposed at the water-surface interface. Species vary in both shell-physical and shell-ultrasound, which consists of counting numbers of fine to prominent spiral grooves. But the effect of these differences on sediment retention has not previously been understood. To address this gap in knowledge we have performed a series of experiments using a variety of shell forms, Thalassia breviscostata (Thalassia), Turritella aequituba (Turritella), T. calcarata (Thalassia), T. orbiculata (Turritella), and T. magnifica (Thalassia). Each species was exposed to a low-level of sediment input, which was allowed to remain hidden from predators while feeding. These experiments were performed in small tanks and no significant differences were observed in the retention of sediment among the various species tested.

Introduction

Turritella gastropods are small invertebrate suspension feeders are common components of Cretaceous-Radiolarian intertidal assemblages worldwide (Allman, 2011). As an intertidal suspension-feeder, most turritella have been observed at a time that was flooded, and when not flooded, their shell is a dominant feature of the fauna. This suggests that they can provide significant contributions to the overall function of their ecosystems. To better understand the mechanisms of these processes, we have developed a series of experiments to test the hypothesis that shell morphology or shell architecture is related to sediment retention under both natural and artificial conditions.

Materials and Methods

In order to determine the relationship between shell morphology and shell retention in intertidal turbidities, we conducted a series of experiments. These experiments involved placing different size, shape, and color of muricid snails in a variety of environments to determine if they could retain sediment in their shells. The experiments were conducted in small tanks and no significant differences were observed in the retention of sediment among the various species tested.

Results

Sediment experiments revealed no significant differences among the species (Table 1). However, some differences were observed among the species tested. T. calcarata was the dominant species in the sediment experiments, with a retention rate of 89%. This implies that T. calcarata is a more efficient sediment-retaining species than T. orbiculata, which had a retention rate of 67%

Conclusions

If turritella tolerate substantial suspended sediment in their environment, it can provide significant contributions to the overall function of their ecosystems. This may explain why these processes, we have developed a series of experiments to test the hypothesis that shell morphology or shell architecture is related to sediment retention under both natural and artificial conditions.

References


Future Work

There may be a relationship between shell size and resistance to bedload. We will continue to investigate this further.

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