THE IMPORTANCE OF VISUAL CUES IN SCARIDAE SELECTION OF THALASSIA TESTUDINUM BLADES

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ABSTRACT (DJG)

Parrotfish (Scaridae) have been shown to graze more heavily on Thalassia testundinum blades with a high epibiotic load than blades without epibionts. We tested whether scarids use visual cues to select T. testudinum blades with epibionts by placing, in the field, blades with epibionts, blades with simulated epibionts, and blades without epibionts. Scarids preferentially grazed on blades with epibionts and simulated epibionts. This supports the hypothesis that scarids visually select the epibotic blades which may incur a greater nutrient return than blades without epibionts.

Key Words: Thalassia testundinum, parrotfish, epibiont, preferential grazing, visual selection. herbivory.

INTRODUCTION (MEB)

Tropical turtle grass beds are one of the world's most productive ecosystems. T. testudinum beds support a diverse community of epibionts (flora and fauna). Parrotfish (Scaridae) have been shown to graze more heavily upon blades with epibionts than blades without epibionts or with the epibionts removed (Dartmouth FSP Classes). Scarids may be receiving more nutrients from epibionts than from T. testudinum. A study in Syringedium filiforme seagrass beds in Florida has shown that carbon isotype ratios in herbivorous fish more closely resemble ratios of epiphytic algae than those of S. filiforme (Fry, 1984). We hypothesized that scarids select T. testudinum blades with epibionts using a visual cue, as opposed to a chemical or physical cue. We predicted that there would be more herbivory on blades flour-treated blades (visually simulated epibonts) than on blades without epibionts.

METHODS (DJG)

This experiment was conducted south of the canoe cut, Discovery Bay, Jamaica on 22 February, 1994, from 14:45 to 17:45. 180 T. testudinum blades were collected and subjected to one of three treatments. 60 blades with high epibiont loads composed one treatment. The remaining 120 blades with low epibiont load were scraped with a razor to remove any remaining epibionts. Of these blades, 60 were coated with flour to simulate epibiotic growth. All leaves were cut to 12cm in length.

A 10m transect was run east to west at a depth of 3m in a sandy area. An iron bolt anchored three clothespins, each of which held six T. testudinum blades from one of the three treatments. All bolts had blades from each treatment. Ten such bolts were placed a meter apart along the transect. After three hours, the bolts were collected, numbers of blades bitten per treatment counted, and the means compared with a Mann-Whitney U-test.

RESULTS (ANS)

After three hours, 70 out of 180 blades showed signs of parrotfish herbivory. Significantly more blades with simulated epibionts were grazed than blades without epibionts (2.5 ± 0.64 out of six blades vs. 0.3 ± 0.15) ($U_{10} = 85.5$, $z = -2.83$, $df = 10$, $p = 0.005$; Figure 1). Although the number of blades grazed tended to be greater in the epibiont treatment as compared to the simulated epibiont treatment (4.2 ± 0.49 vs. 2.5 ± 0.64), this difference was not significant ($U_{10} = 75$, $z = -1.926$, $df = 10$, $p = 0.05$). In addition, significantly more blades with epibionts were grazed than blades without epibionts ($U_{10} = 100$, $z = -3.88$, $df = 10$, $p = 0.0001$; Figure 1).

We observed a greater percentage of leaf area removed by scarids in blades with epibionts compared to blades with the simulated epibiont treatment, although this increase was not quantified. Most blades treated with flour had one or two bite scars, while many blades with epibionts had a large percentage of leaf tissue removed.

DISCUSSION (ANS)

In agreement with previous studies, scarids preferred foraging on blades with a high epibiont load. Because scarids also preferentially chose blades which looked similar to blades with epibionts, we conclude that scarids most likely use a visual cue to forage on blades with a higher energy return.

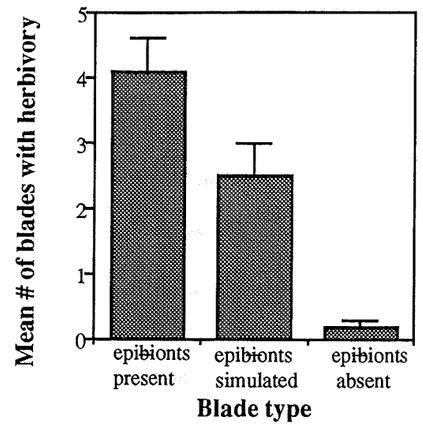

Figure 1. Mean number of T. testudinum blades with Scaridae herbivory damage. Six blades were exposed for 3hr in each replicate.

The decrease of herbivory in our simulated epibiont blades is likely explainable by the apparent unpalatability of the flour treatment. Fish bit the flour treatment once or twice, while they continued to forage on the high epibiont blades. Therefore, were most likley attracted to the blades by their appearance and did not prefer foraging on the simulated epibionts.

LITERATURE CITED

Fry, B. 1984. "13/12c ratios and the trophic importance of algae in Florida Syringadium filiforme seagrass meadows". Marine Biology 79: 11-19.