

# COMPARISON OF MIDDAY AND DUSK HERBIVORY ON *THALASSIA TESTUDINUM* BY PARROTFISH (SCARIDAE)

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## ABSTRACT (DBZ)

We examined parrotfish (Scaridae) herbivory on *Thalassia testudinum* at midday and dusk in the back reef at Discovery Bay, Jamaica, a habitat with few predatory fish. We found that the number of bites, the proportion of blades grazed, and the area removed per replicate were greater at dusk. Although these results were not statistically significant, the trends suggest that fish may heighten feeding activity in anticipation of a nocturnal period of non-feeding.

Key Words: *Thalassia testudinum*, parrotfish, herbivory

## INTRODUCTION (DBZ)

Parrotfish (Scaridae) forage on *Thalassia testudinum* during the day and retreat to nocturnal shelters after dusk (Hobson, 1977). Diurnal variation in foraging may be caused by predation pressure. Hay et al. (1983) reported peak grazing on turtlegrass between 09:00 and 13:00, decreasing throughout the afternoon. In particular, they noted an increase in the number of predators and a decrease in herbivory at dusk and dawn (Hay et al. 1983). In the back reef at Discovery Bay, however, predatory fish are scarce, so we would not expect diurnal variation in foraging due to visual predation. The parrotfish may respond by increasing relative foraging rates at dusk to store food resources for the nocturnal period of non-foraging. We hypothesized that with low predation, parrotfish will respond to their physiological needs and herbivory of turtlegrass would increase at dusk.

## METHODS (DML)

This study was performed midway between shore and the reef crest about 100m northwest of the dock at Discovery Bay Marine Laboratory, Jamaica.

On 21 February, 1994 we collected 168 turtle grass blades, all of which had epibiotic growth. We standardized the length of blades to 230mm by cutting off blade tips that had been grazed by parrotfish, and removing extra length from the blade bases. Blades were sorted into 28 replicates of six blades each. The six blades in each replicate were fastened together with a clothespin.

At 12:00 on 22 February, 14 replicates were anchored with bolts in 2m of water about 0.5m apart along the edge of a turtle grass bed. These midday replicates were retrieved at 14:30. We set out the remaining 14 replicates at 16:30 in the same fashion and retrieved them at 19:00.

For each of the 28 replicates, we recorded total number of bites, total blade area removed by herbivory and proportion of blades with at

least one bite. We counted any blades that had been bitten through horizontally as having one bite. In calculating total blade area removed, we used an approximate blade width of 15mm and area removed per bite of 6.28mm<sup>2</sup>. We used a Mann-Whitney U-test to compare midday and dusk values for the three variables measured.

## RESULTS (DML)

We found that the number of bites per replicate, blade area removed per replicate and proportion of blades bitten per replicate all tended to be greater at dusk than at midday. However, these trends were not statistically significant ( $n_1 = n_2 = 14$ ;  $U = 119.5, 124, 125.5$  respectively;  $p > 0.10$ ).

## DISCUSSION (PSW)

With over 20 times more blade area removed at dusk than midday, it appears as though parrotfish are increasing their feeding prior to retreating to their nocturnal refuges. However, large variance in this and the two other measures of herbivory resulted in insignificant differences between midday and dusk. In order to more clearly define these trends of increased herbivory at dusk, we believe many more replicates are needed to compensate for the short treatment time (2.5 hours).

During the dusk treatment we had 4 blades with large portions of the blade tips missing (up

to 40% of the blade missing) while there were none during the day. For those blades with the tips missing, we made a conservative estimate of one bite (assuming that it would require at least one bite to allow the tip of the blade to be removed). Because of this, we feel that our values for number of bites per replicate are severely underestimated.

It remains to be tested if the trends are the result of individual fish increasing their feeding at dusk or a greater number of fish foraging. In the latter case, the trends could be explained by increased number of fish passing through our site as they retreat to their night refuges.

Diurnal fish have been observed retreating to their nighttime refuges at about the same time each night (John J. Gilbert, personal communication). If parrotfish are increasing herbivory at dusk, it would be interesting to shorten the treatment times and see if the increase in herbivory occurs with similar precision. Another area that could be investigated is whether herbivory increases at dawn due to the nocturnal periods of non-feeding.

## LITERATURE CITED

Hay, M.E., T. Collrun, D. Dawning. 1983. "Spatial and temporal patterns in herbivory on a Caribbean fringing reef: the effects of plant distribution." *Oecologia* 58: 299-308.

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