Understanding sargassum brown tide and its effect on corals in Barbados

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Introduction

Sargassum is a brown pelagic seaweed that has been seasonally inundating the windward coasts of Caribbean countries over the last 15 years.

Sargassum can settle within the nearshore where it decomposes resulting in an increase in nutrients and organic matter referred to as sargassum-brown-tide (sbt) (van Tussenbroek et al. 2017).

Sbt can extend over coral reefs, which is concerning as corals require oligotrophic water for optimal health (Fig. 1).

Fig. 1 Location of sbt in relation to reef in Barbados

Research Questions

How does sbt affect water quality?

How does this change in water quality affect coral health?

Method

Eight coral reef sites (with low, medium, high and no exposure to sargassum) were monitored (Fig.2).

Fig. 2 Survey site with high exposure to sargassum influxes

Method cont'd

Two surveys occurred, one in peak sargassum season (summer) and one in low sargassum season (winter). Surveys included testing water for dissolved oxygen, fluorescent dissolved organic matter (fDOM) and turbidity, and monitoring two coral species (*Porites astreoides* and *Pseudodiploria strigosa*) and a macroalgae species (*Dictyota sp.*) (Fig .3).

Fig. 3 Coral species (*Porites astreoides (left)* and *Pseudodiploria strigosa (middle)*) and macroalgae species (*Dictyota sp.* (right))

Results and Discussion

Generalized Linear Mixed-Effects Models with survey sites as a random effect and sbt exposure as a fixed effect showed:

Turbidity and fDOM increased significantly ($p < 0.05$) with sbt exposure (Fig. 4 and 5).

Sbt exposure was negatively associated with healthiness of coral colonies ($p < 0.05$) which is likely due to changes in turbidity and fDOM (Fig. 5).

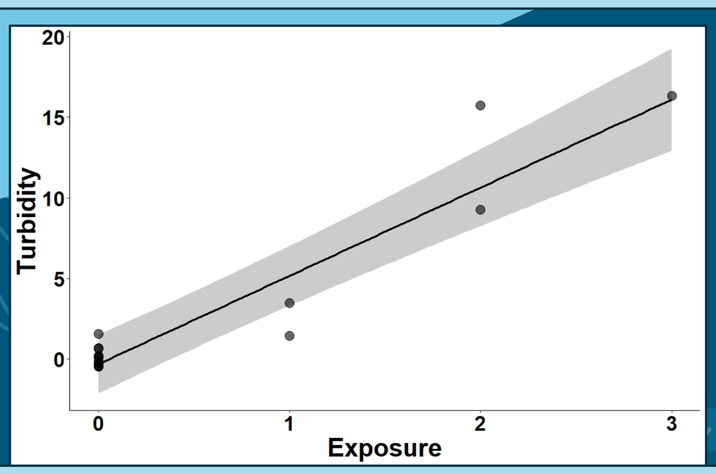

Fig. 4 The effect of sbt exposure (0-3; 0 = no exposure, 3= high exposure) on turbidity

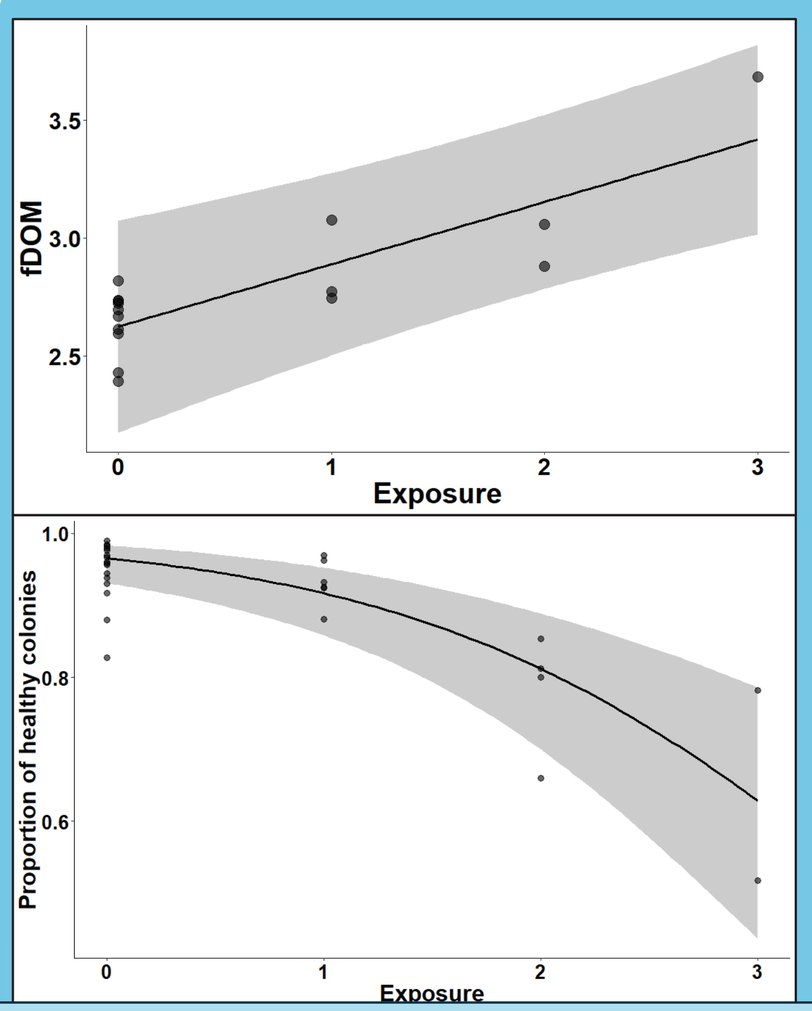

Fig. 5 The effect of sbt exposure (0-3; 0 = no exposure, 3= high exposure) on fDOM and the proportion of healthy colonies

Further Work

Two more rounds of data collection will take place again in the winter (Dec 2024/ Jan 2025) and the summer (Jun/Jul 2025) to have a larger dataset so that a definitive conclusion can be made.

Reference

[1] Tussenbroek, Brigitta I. van, et al. 2017. "Severe Impacts of Brown Tides Caused by Sargassum Spp. on near-Shore Caribbean Seagrass Communities." Marine Pollution Bulletin 122 (1): 272–81

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