

Nitrogen enrichment in macroalgae following mass coral mortality

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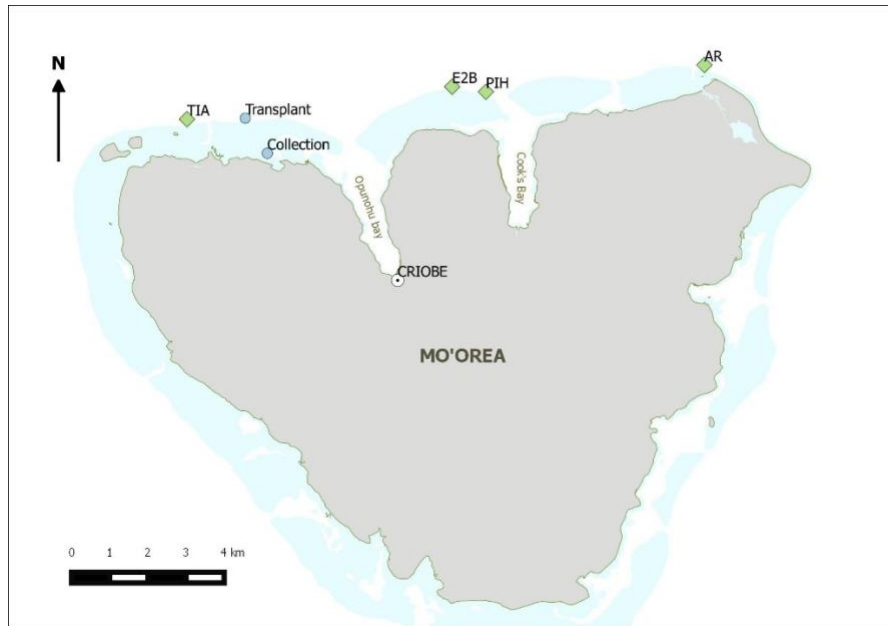
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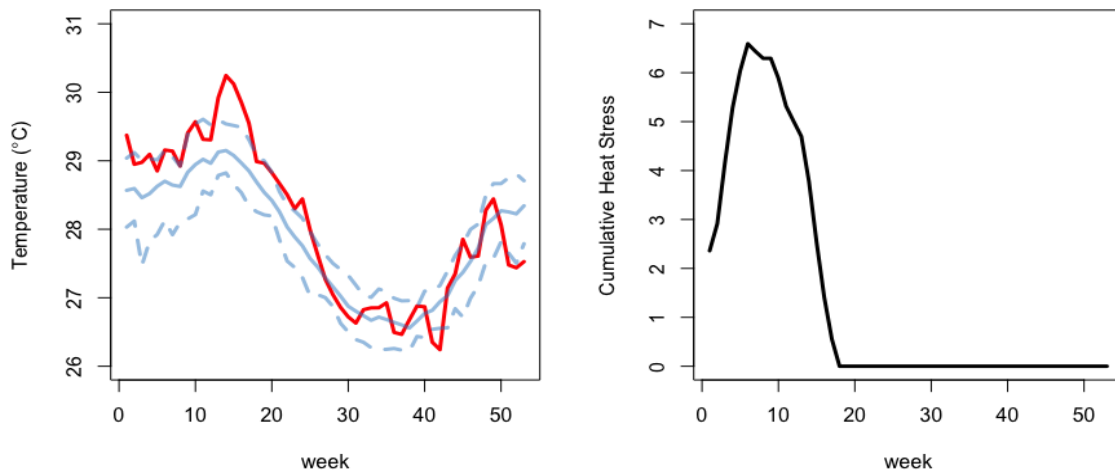
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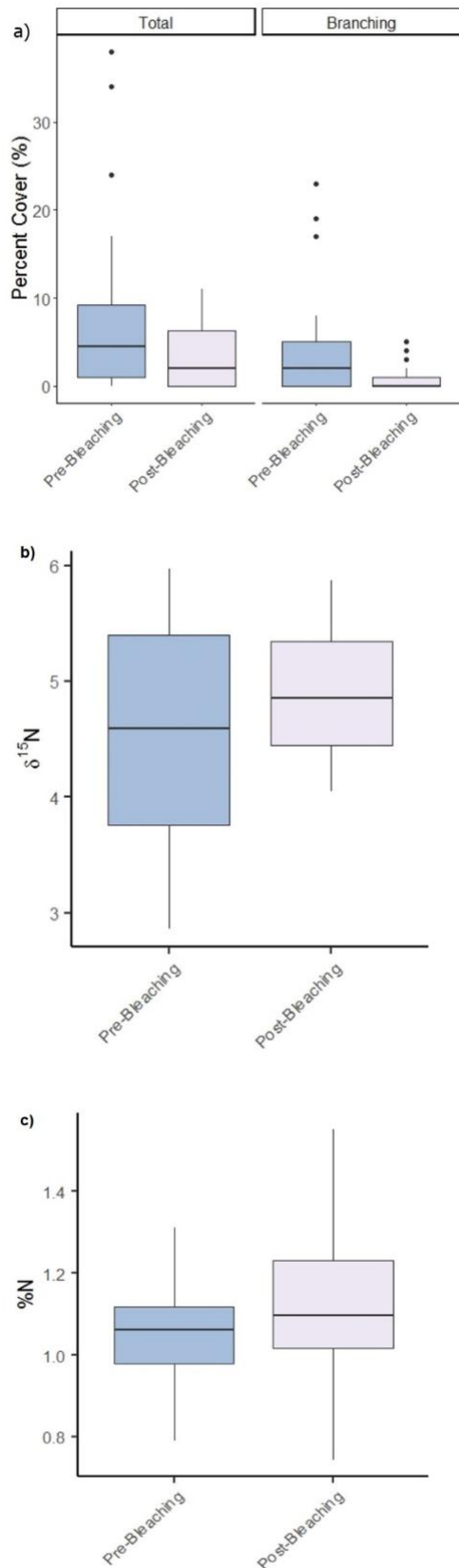
Supplementary Figures



Supplementary Figure 1. Mo'orea, French Polynesia. The sites for collection and translocation of *Sargassum mangarevense* specimens (n=10) are labelled with the blue circles, and the four sites with benthic cover from the Service National d'Observation CORAIL are labelled in abbreviated capital letters (TIA = Tiahura; E2B = Entre Deux Baies; PIH = Pihaena; AR = Aroa) with green triangles. CRIOBE research station, where the specimens were depleted of internal nutrients for 7 days, is indicated with a white circle and black dot.



Supplementary Figure 2. Average Temperature patterns from *in situ* temperature loggers at Tiahura reef on the north shore of Moorea in 2019. (A) In 2019 (blue line) temperatures exceed the maximum monthly mean of 29 °C during the Austral summer, and it was much warmer than the average long-term seasonal pattern (blue line with 95% confidence intervals as dashed blue lines). (B) Cumulative heat stress, measured as a 12-week running sum for all temperatures exceeding the maximum monthly mean, peaked in April 2019.



Supplementary Figure 3. Box plots of the median a) total and branching coral cover in both pre-bleaching and post-bleaching years (2014 and 2017, respectively) on regime-shifted reefs (n=6), b) the average $\delta^{15}\text{N}$ signatures in *Sargassum* sp. tissues in both years, and c) the average percent N (%N) in both years. The pale blue boxes represent the pre-bleaching year and pale pink boxes represent the post-bleaching year, which both show the third quartile (Q3) and first quartile (Q1) range of the data and data outliers.

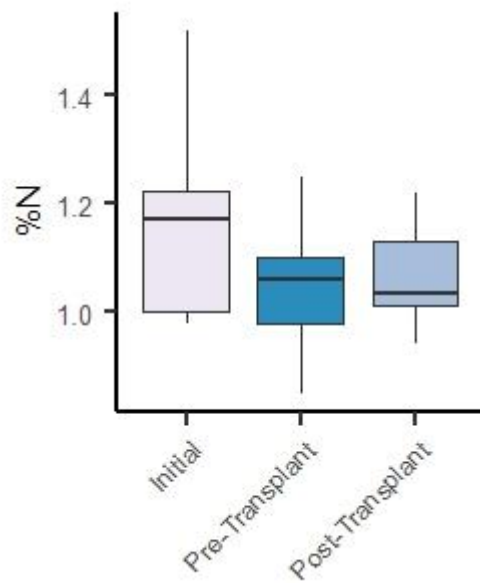


Figure 4. Box and whisker plots of the median %N in *Sargassum mangarevense* tissue across three treatments from a short-term transplant experiment, showing the third quartile (Q3) and first quartile (Q1) range of the data, the whiskers (95% quartile) and data outliers. Connecting letters indicate significance between treatments. Nutrient signatures were measured in subset samples of the same specimens that were collected from a low-nutrient reef (initial), placed in laboratory aquaria to deplete internal nutrient stores for ~7 days (pre-transplant), before they were deployed on the bleached reef for 3 weeks (post-transplant) (n=10).