

Nitrogen fixation rates in algal turf communities of a degraded versus less degraded coral reef

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Algal turf communities are ubiquitous on coral reefs in the Caribbean and are often dominated by N₂-fixing cyanobacteria. However, it is largely unknown (1) how much N₂ is actually fixed by turf communities and (2) which factors affect their N₂ fixation rates. Therefore, we compared N₂ fixation activity by turf communities at different depths and during day and night-time on a degraded versus a less degraded coral reef site on the island of Curaçao. N₂ fixation rates measured with the acetylene reduction assay were slightly higher in shallow (5–10-m depth) than in deep turf communities (30-m depth), and N₂ fixation rates during the daytime significantly exceeded those during the night. N₂ fixation rates by the turf communities did not differ between the degraded and less degraded reef. Both our study and a literature survey of earlier studies indicated that turf communities tend to have lower N₂ fixation rates than cyanobacterial mats. However, at least in our study area, turf communities were more abundant than cyanobacterial mats. Our results therefore suggest that turf communities play an important role in the nitrogen cycle of coral reefs. N₂ fixation by turfs may contribute to an undesirable positive feedback that promotes the proliferation of algal turf communities while accelerating coral reef degradation.

den Haan, J, Visser, PM, Ganase, A, Gooren, EE, Stal, LJ, van Duyl, FC, Vermeij, MJA, Huisman, J 2014 Nitrogen fixation rates in algal turf communities of a degraded versus less degraded coral reef. *Coral Reefs* DOI 10.1007/s00338-014-1207-5