Coral reefs are some of the world’s richest ecosystems, hosting one third of the world’s marine fish species. Coral reefs provide us with numerous ecosystem services such as food provision, storm defence and tourism destinations. Reef areas are rapidly vanishing worldwide as a result of poor protection and multiple threats including climate change and overfishing. Reef restoration or rehabilitation may help reverse some of the current trends in reef degradation. Indonesia displays the highest marine biodiversity in the world, however many Indonesian reefs are threatened particularly by destructive fishing practices.

Objectives

To investigate the effect of reef rehabilitation on resident fish communities and on large predatory fish passing through the reef.

Methods

- Does coral rehabilitation improve fish abundance over time?
  - At Bontosua we surveyed new sites prior to and following addition of spiders.
  - At Badi we surveyed established rehabilitation sites dating back to 2013, 2015 and 2016.

- Visual SCUBA diving surveys
  At each site, measuring tapes (20 m) were laid out in a haphazardly stratified manner at a consistent depth, parallel to the reef crest. Two divers swam along each side of the tapes, each surveying an area 2.5 m wide and 5 m above the reef. Numbers of fish species present, along with their size (total length) and colour phase (i.e. terminal or juvenile phase, female or male) were recorded.

- Estimation of coral cover
  To obtain information on substrate composition, quadrats were laid every meter along the measuring tapes and photographed.

- Videos of predatory fishes
  Larger fishes may be disturbed by diver presence. Therefore, GoPro cameras were placed approximately 0.5 m above the substrate at each site and filmed for 1.5 hours, when divers were not in the water. The videos were analysed for every predatory fish that entered an 33 m² area. Fish size was estimated based on a scale placed in front of the camera at the start of each video. Other rare animals such as sea turtles were also recorded.

Findings so far

The presence of spiders had significantly increased the number of fish after only one month (Fig. 1) on Bontosua Island. Comparing sites on Badi Island found that older, more established rehabilitation sites yielded significantly more fish than the younger sites.

Figure 1: Average (±SD) fish abundance at pre-rehabilitation, 1 week and 1 month old sites (Fig. 1) on Bontosua Island and established rehabilitation sites on Badi Island (P<0.05).

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