Dataset:	Growth and survival of mature Sargassum polycystum fronds in crowded and isolated habitats
Project(s):	Killer Seaweeds: Allelopathy against Fijian Corals (Killer Seaweeds)

Abstract: Raw data on the growth of mature Sargassum polycystum fronds transplanted into or outside Sargassum beds, crowded and isolated conditions respectively, in a non-protected area in Fiji. Growth was obtained using the initial height measurement from each rammet and subtracting it from its final height, meaning the rammets that died were recorded as negative change. Details in Dell et al. 2016 Plos One. For a complete list of measurements, refer to the supplemental document 'Field_names.pdf', and a full dataset description is included in the supplemental file 'Dataset_description.pdf'. The most current version of this dataset is available at: http://www.bco-dmo.org/dataset/644062

Description: Growth and survival of mature Sargassum polycystum fronds in crowded and isolated habitats

Raw data on the growth of mature Sargassum polycystum fronds transplanted into or outside Sargassum beds, crowded and isolated conditions respectively, in a non-protected area in Fiji. Growth was obtained using the initial height measurement from each ramet and subtracting it from its final height, meaning the ramets that died were recorded as negative change. Details in Dell et al. 2016 Plos One.

Related Reference:

Dell, C., Longo, G.O., Hay, M.E. (2016) Positive feedbacks enhance macroalgal resilience on Degraded Coral Reefs. Plos One.

Related Datasets:

Sargassum mature growth - figure 2
Sargassum recruit-sized survival - figure 3
Sargassum recruit-sized growth and survival with conspecifics - figures 5 and 6

Acquisition [Reference cited below are from Dell et al (2016) Plos One.]
Description: Study site and species:
This study was conducted between January and May in 2013 and 2015 on the coral coast of Fiji's main island, Viti Levu, in the villages of Votua and Vatu-o-lailai (18°12'32S, 177°42'00E and 18°12'13S, 177°41'29E respectively; Fig 1). These villages are ~3km apart and each has jurisdiction over their stretch of reef flat; a habitat ranging between ~1.5 and 3m deep at high tide and between ~0 and 1.5m deep at low tide. In 2002, these villages established small areas (0.8km2 in Votua and 0.5 km2 in Vatu-o-lailai; Fig 1) as no-take MPAs [25]. Though MPA and non-MPA areas were initially similar in coral and macroalgal cover (33-42% macroalgal cover; 3-12% coral cover [25]), MPAs now differ significantly from the

adjacent non-MPAs in benthic cover and fish diversity and abundance. MPAs now have ~56% live coral cover on hard substrate, ~2% macroalgal cover, ~8 fold higher biomass of herbivorous fishes, and higher recruitment of both fishes and corals than the non-MPAs [5,22]. Meanwhile the non-MPAs have lower fish biomass, 5-16% live coral cover on hard substrates and 51-92% macroalgal cover, the majority of which is comprised by Phaeophytes (primarily Sargassum polycystum C. Agardh [22]). In the MPAs, macroalgal cover is restricted to the shallowest, most shoreward areas (where access by herbivorous fishes appears limited), whereas macroalgal cover in the non-MPAs extends throughout the habitat. Thus, over distances of only a few hundred metres, there are dramatic differences in community composition that may impact the efficacy of factors controlling macroalgal populations, without the confounding factors of great differences in space or time.

Effect of conspecifics on survival and growth of mature fronds

To assess whether conspecific density might facilitate the survival and growth of mature fronds, we transplanted mature fronds into the centre of Sargassum beds and into nearby exposed habitats where they were isolated from others. Growth and duration of survival were measured over a two week period. Due to logistical constraints, this experiment was only conducted in Votua's non-MPA where Sargassum beds were extensive and thus many separate patches were available for use.

Eight 10cm fronds of S. polycystum were removed from the centre of one holdfast, assuring genetic uniformity. Four were threaded through a three-strand rope (secured 5cm apart and 10cm from each end of the rope), and returned to the centre of the Sargassum bed (crowded condition) ~75m from shore at a depth of ~1m at low tide. The other four were threaded through a separate rope and tied in an area devoid of Sargassum two to four metres away (isolated condition). The ends of the rope were tied to the substrate to hold the rope in place. Twenty such rope pairs were set up with a total of 80 S. polycystum pieces in each of the crowded and isolated treatments. After two weeks the ropes were collected, the number of remaining fronds was counted and their length was measured. The initial length was subtracted from the final so that fronds that had been grazed in excess of growth were recorded as negative change.

Processing Description: Grazing was either complete (such that none of the frond remained except the section of thallus held between strands of the rope) or absent (such that the entire frond remained including the apical meristem); there were no fronds with portions missing that might indicate partial grazing. Thus, fronds that were grazed or ungrazed could be easily identified. Consequently, we also calculated an estimate

of growth from only the ungrazed fronds that had retained their apical meristems and survived the experiment. This permitted a comparison of growth between the crowded and isolated conditions when herbivory appeared to be absent. Once again, the initial length was subtracted from the final length of each ungrazed frond and an average change in length per rope was calculated. As all fronds were completely grazed on four ropes, those pairs were excluded leaving n=16 in this dataset. Difference scores satisfied the assumption of normality (p=0.161; Shapiro-Wilk) so data were analysed by a paired t-test. Both analyses were run in SPSS version 16.0 with α=0.05.

BCO-DMO Processing:

- added conventional header with dataset name, PI name, version date
- renamed parameters to BCO-DMO standard
- corrected longitutude from West to East degrees

Deployment Information

Deployment description for Hay_GaTech Fiji_2013

Studies of corals and seaweed were conducted on reef flats within no-take marine protected areas (MPAs) adjacent to Votua, Vatuo-lailai, and Namada villages along the Coral Coast of Viti Levu, Fiji in 2013.

Deployment description for Hay_GaTech Fiji_2015

A study of seaweeds was conducted on reef flats within no-take marine protected areas (MPAs) and non-MPAs adjacent to Votua, Vatuo-lailai, and Namada villages along the Coral Coast of Viti Levu, Fiji in 2013.

Instrument Information

Instrument	
Description	*local description not specified*
Generic Instrument Name	Scale

| **Generic Instrument Description** | An instrument used to measure weight or mass. |