

Effects of 2010 coral bleaching on reproductive performance of corals along the eastern coast of Thailand



Narinratana KONGJANDTRE¹, Suwanna PANUTRAKUL¹, Anchalee CHANKONG², and Vipoosit MANTHACHITRA¹

¹Burapha University, Faculty of Science, Mueng, Chonburi 20131, THAILAND

²Department of Marine and Coastal Resources, Eastern Marine and Coastal Resources Research Center, Paknam Prasae, Klaeng, Rayong, 21170, THAILAND

Corresponding Author : N. (Nong) KONGJANDTRE

E-mail: narinratana@buu.ac.th

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Background

In 2010, the coral reefs of Thailand suffered their most severe bleaching event to date. Bleaching estimates were recorded at between 35-95% and were consistent with the coral bleaching literature that record highly variable patterns of bleaching between and within geographic locations and genera. For example, all reefs in the Rayong province in the Gulf of Thailand bleached. While all (100%) Acroporidae and Pocilloporidae colonies bleached, the bleaching of Faviidae and Mussidae colonies ranged between 20-80%. Post-bleaching surveys also showed that the Faviidae and Mussidae represented the majority of the survivors on the Rayong reefs.



Aims

Given evidence that coral bleaching reduces reproduction of corals and increases susceptibility to future stress, the aims of this study were:

- 1) To examine the reproductive capabilities of Faviidae and Mussidae colonies following the Thailand 2010 bleaching event.
- 2) To evaluate the recruitment recovery ability of Faviidae and Mussidae colonies post-bleaching.

Methods

Location: Three stations at the Samet Islands and three stations at the Man Islands in Rayong province (Fig. 1).

Taxa studied: Faviidae and Mussidae colonies (including *Platygyra*, *Goniastrea*, *Favites*, *Favia*, *Symphylia*).

Gamete development: Tagged colonies were observed *in situ* and samples collected for gamete presence/absence and maturation state during February 2011, October 2011, and February 2012.

Recruitment: Settlement plates were deployed in February 2011, June 2011, and October 2011. All plates were retrieved 4 months after deployment and analysed under a microscope in the laboratory.

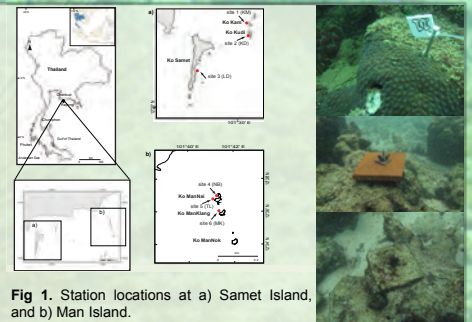


Fig 1. Station locations at a) Samet Island, and b) Man Island.

Results

Reproductive capability

The development of gametes was similar in all five taxa (Fig. 2). A low proportion of mature gametes observed in 2011 spawning season (February 2011).

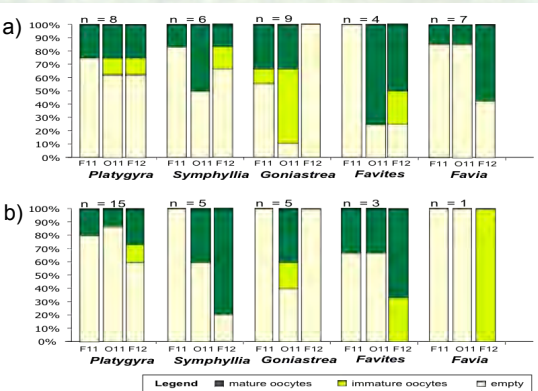


Fig 2. Gamete maturation state observed *in situ* in tagged Faviidae and Mussidae colonies during February 2011, October 2011, and February 2012. a) Samet Island, and b) Man Island.

Recruitment recovery

Two peaks of settlements observed on settlement plates following the spawning periods in February and October 2011 (Fig. 3).

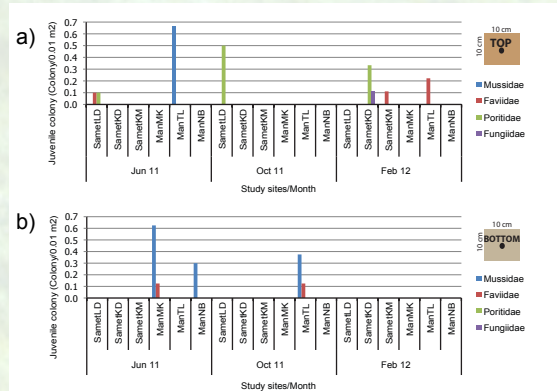


Fig 3. Species composition of juvenile colonies settled on a) top, and b) bottom of settlement plates retrieved in June 2011, October 2011, and February 2012.

Conclusions

1) In February 2011, mature gametes were found in a low proportion (~20%) of colonies observed among Faviidae colonies (*Goniastrea*, *Platygyra*, *Favites*, *Favia*) on reefs in Rayong Province. However, a higher proportion (20-70%) of mature gametes were found among Faviidae and Mussidae colonies in October 2011. These findings suggest that the ability of Faviidae species to recover after a severe bleaching event is greater than expected.

- 2) Broadcast spawners (Faviidae, Mussidae) showed settlement success in June 2011 and February 2012, while brooding species (Poritidae) showed settlement success in October 2011 and February 2012.
- 3) Mussidae had a settlement preference for the bottom of plates, whereas Faviidae and Poritidae had a settlement preference for the top of plates.