

IH306: Baseline survey of an aggressive ascidian on reefs in the Wakatobi, Indonesia

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Ascidians, or sea squirts as they are commonly known, are diverse and abundant members of coral reef communities. They are hermaphroditic, filter feeding invertebrates. They extract food particles from the water column as it passes through their bodies drawn in through an opening in the body wall known as the oral siphon and exiting through another opening called the cloacal siphon. Although many species of Ascidians are solitary, and thus live individually, others form colonies. Colonial ascidians are made up of individual units called zooids. A single colony may be made up of thousands of zooids originating from a single zooid and can reach several meters across.

While most research on reefs focuses on scleractinian corals due to their role as ecosystem architects, other invertebrates such as ascidians fulfill many important functional roles in reef ecosystems. As a result, changes in the abundance of these invertebrates can have considerable impacts on the reef ecosystem as a whole. For instance, in the Caribbean there have been reports of increasing numbers of bioeroding sponges particularly in areas where corals have suffered high levels of mortality. These increases are likely to affect the balance between reef accretion and erosion on these reefs by increasing the rate at which the reef framework is broken down.

A number of recent studies have shown that ascidians can have detrimental effects on marine ecosystems but very little research has been carried out in the Indo-Pacific. Anecdotal evidence suggests that the abundance of a grey didemnid ascidian has increased on reefs in the Wakatobi in recent years. This ascidian forms thinly encrusting very tough rubbery sheets and appears to be a highly effective spatial competitor able to overgrow hard corals, sponges, bryozoans and other benthic invertebrates. Overgrowth by this species results in hard coral mortality as they are deprived of light and the ability to obtain food particles from the water column. This could have serious consequences for the future state of reefs in the Wakatobi, as a reduction in scleractinian coral cover caused by the aggressive overgrowth of this ascidian will impact on the process of calcification, which is responsible for reef growth.

The primary aim of this project is to carry out a baseline survey of the distribution and abundance of this species across a number of sites and depths on the reefs surrounding Hoga Island Marine Research Station. This data will serve as a benchmark for future surveys to assess whether the anecdotal evidence is supported and whether management actions are necessary. Another potential area for investigation is to determine the ability of this ascidian to outcompete other benthic organisms by measuring its growth rate and characterizing the type and number of interactions that it is involved in. Finally, by comparing the abundance of the ascidian at sites with a range of different environmental conditions it may be possible to ascertain if its abundance is correlated with particular environmental conditions such as sedimentation, temperature or hard coral cover.

Reading List

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