

# IN33 Will coral reefs become sponge reefs?

**Dr James Bell, Victoria University of Wellington, New Zealand**

Coral reefs have experienced major changes in recent decades, which have been attributed to anthropogenic activities. Furthermore, the impacts of local stressors (e.g. sedimentation and nitrification), global climate change and ocean acidification are expected to have further impacts on reef fauna in the near future, particularly causing further declines in coral cover and potential phase-shifts to algal-dominated communities. While there has been a considerable amount of research considering what the impacts of different climate change and ocean acidification scenarios, and anthropogenic stressors might be on corals, we have a much poorer understanding of how other non-coral organisms might be directly or indirectly effected (either positively, negatively or unaffected).

Sponges are an important component of coral reefs across the world with a range of important functional roles. Given that sponges are one of the dominant components of reef fauna in many places and because space is generally limiting in healthy coral reef systems, sponges are likely to interact in a variety of ways with a range of organisms as they grow. Although limited space might be expected to result in intra- and inter-phyletic spatial competition between sponges, many earlier studies have highlighted how sponge survival can be facilitated by positive interactions with other organisms. Despite these positive interactions, other studies have clearly shown that sponges are effective spatial competitors with the ability to overgrow other reef organisms and cause the necrosis of tissue that has been overgrown.

Understanding the patterns of spatial associations (in contrast to determining the nature of any interactions) between sponges and other organisms is an important step in identifying the indirect effects of decreased abundance of other reef organisms (particularly corals) on sponges. Furthermore, much of our current understanding of coral-sponge ecology is from studies conducted in the Caribbean, with far less being known about sponges in the more diverse Indo-Pacific region. If sponges show positive spatial association with corals, then coral declines are likely to effect sponges. Such effects may be beneficial or harmful for the sponges depending on the nature of the interaction that the association represents. This project will investigate the spatial associations and potential competitive interactions between sponges and other organisms in order to assess how coral reef function may change as a result of future declines in corals.

## **Further Reading:**

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