

HONOURS PROJECT

Project Title: Scleractinian corals as depositories of environmental DNA

Supervisor(s): Dr Zoe Richards



Project

Scleractinian corals are the principal reef-building taxa on coral reefs and for that reason they are incredibly important to protect. To adequately protect corals, it is important to have a good understanding of their diversity and what constitutes a 'species'. Environmental DNA metabarcoding has emerged as a useful way to monitor biodiversity in complex systems such as coral reefs. Most recently however, it has emerged that marine invertebrates act as environmental samplers, and by sequencing habitat-forming taxa, information about the animals that live in and around them can be obtained. For example, when DNA was extracted from the tissue of sponge samples, tens of thousands of trace fish, penguin and seal signatures were detected. While this presents exciting opportunities, it also presents inherent challenges when attempting to interpret information about the host identity. In this project, we will explore the propensity for hard corals to act as environmental depositories by sampling corals and their proximate neighbors *in-situ*. Via eDNA metabarcoding we will determine how much trace information is retained in coral tissue that is derived from a coral's neighbors'. The results of this study will provide much needed insight into complexities of using metabarcoding to interpret species identity in corals.

Funding: ARC Discovery Grant (Pending)

Special Requirements: This project will involve fieldwork at Ningaloo Reef, but possibly at other locations such as Rottnest Island. Fieldwork will involve snorkeling and (possibly) scuba-diving. The student is required to have a driver's license and own transport. It is preferable (but not mandatory) for the student to have a current open-water scuba diving license, the ability to obtain a scuba diving medical and at least 50 hours' scuba-diving experience. Some molecular laboratory skills and an interest in marine invertebrates, eDNA and bioinformatics is desirable.

References:

- Bohmann, K., Evans, A., Gilbert, M.T.P., Carvalho, G.R., Creer, S., Knapp, M., Douglas, W.Y. and De Bruyn, M., 2014. Environmental DNA for wildlife biology and biodiversity monitoring. *Trends in ecology & evolution*, 29(6), pp.358-367.
- Stat, M., Huggett, M.J., Bernasconi, R., DiBattista, J.D., Berry, T.E., Newman, S.J., Harvey, E.S. and Bunce, M., 2017. Ecosystem biomonitoring with eDNA: metabarcoding across the tree of life in a tropical marine environment. *Scientific Reports*, 7(1), p.12240.
- Mariani, S., Baillie, C., Colosimo, G. and Riesgo, A., 2019. Sponges as natural environmental DNA samplers. *Current Biology*, 29(11), pp.R401-R402.