

**Bryozoan occupancy and abundance through the last three million years:  
extending process and observation models to the fossil record.**

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**Abstract:** Bryozoans are colonial organisms that are not only abundant in the fossil record but also have many living representatives today. We are interested in estimating the changing occupancy and mean abundance of encrusting cheilostome bryozoan taxa over a 3 million year interval in a marine sedimentary basin on the east coast of the North Island of New Zealand. Occupancy and mean abundance of these bryozoans are hypothesized to be driven by some combination of temperature and sea-level change, substrate availability, as well as autecological characters and competitive effects by other fouling organisms. Environmental drivers are also postulated to influence preservation and subsequent sampling of fossil Bryozoa. We sampled hard shell substrates systematically for bryozoans such that there are replicate samples in both time and space. In these preliminary analyses, we estimate occupancy and mean abundance of select species of commonly occurring bryozoans to get a glimpse of variation in abundance among species and how environmental drivers such as the degree of physical disturbance in the habitat and regional temperature might affect sampling rates. This is likely the second study where Mackenzie et al.'s occupancy models (Mackenzie et al. 2006) are applied to fossil data (the first being Liow 2013). It demonstrates the importance of explicitly including sampling in the modelling framework used to investigate ecological parameters especially when working with fossil organisms where sampling probability is guaranteed to be less than one.

**References**

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