

Does increased diversity cause increased predation pressure?

Supervisory Team

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Key Words

Palaeobiology, macroecology, macroevolution, competition, biotic interactions

Overview

Previous, seminal work has suggested a positive correlation between predation intensity and diversity. Increases in diversity may therefore correspond with increasing predation activity. The intensity of predation can be measured as the proportion of drill holes and repair scars in any given molluscan or marine invertebrate assemblage (see figure). Although previous studies have provided important information on the relationship between diversity and predation intensity, further work is required to assess the pattern in a sample-standardised framework that accounts for the extent of spatial coverage, temporal coverage, taxonomic coverage, and relationship between diversity and abundance.

Results from this broad-scale project will provide critical information on whether macroevolutionary and macroecological patterns are coupled, and will test the role of ecological interactions in shaping community dynamics.



Figure showing a drill hole in *Mercenaria campechiensis* from the Quality Aggregates Quarry, Tamiami Formation, Pinecrest Beds, Pliocene of Florida. Image courtesy of Michelle Casey.

Methodology

This project will involve careful study of drill hole and repair scar frequencies across the Phanerozoic using sample-standardized frameworks. Analyses will be conducted at the regional level, accounting for extent of spatial and temporal coverage. Field sampling will augment bulk samples derived from museum collections. Statistical models will be built to examine the effect of diversity and abundance estimates on predation intensity through time.

Timeline

Year 1: Statistical training courses, literature review, sample acquisition, and training to recognize and analyse predation marks in molluscan specimens.

Years 2 and 3: Analysis of predation intensity in museum specimens from around the world, combined with collection and analysis of field data from the Mesozoic and Cenozoic. Model development and statistical analysis of data.

Year 4: Data integration, thesis completion, papers for international journals/conference presentation.

Training & Skills

In the course of this project, the student will become proficient in most paleobiological subfields, including phylogenetics, macroecology, and statistics. Research will involve both field and museum work, with the opportunity to plan and carry out field sampling protocols. The student will learn how to analyse and model vast amounts of data, which will serve as excellent preparation for future work in palaeobiology or related disciplines.

Training will be provided on how to present scientific results, and how to write scientific papers for publication.

References & Further Reading

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Further Information

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