

# Exploiting Evolutionary Evidence from Seasonal Harvesting in Middens



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## Opinion

Buried within the vaults of institutions is a wealth of information that potentially could answer many of the questions regarding the effects of climate change on benthic marine organisms. In non-marine middens, there is a plethora of well-documented data on taxonomically important organisms such as the Australian mega-fauna, and information from these middens do contribute to the discussion regarding the ecological and evolutionary context of the target food organisms within the landscape. The same cannot be said for marine middens, where the focus is often on time of occupation, the food yield potential and quantities collected through time rather than the determination of insights into the evolution of the organisms that were consumed.

The family Strombidae has long been traditionally exploited for food and the creation of cultural tokens by tropical coastal tribes from the Neolithic. Consequently, unlike the fossil record which is disjointed and contained sporadically sorted material, middens provide samples that are invaluable to the systematist in terms of sample sizes and the ability to spatio-temporally place that material.

There has been limited work that highlights the potential of middens to illustrate evolutionary trends in target food organisms; however, these works are the exceptions rather than the rule. The potential use of midden data was the studies into *Gibberulus gibbosus* Roding, 1978 of Micronesia that demonstrated that the organism has survived significant climatic shifts, but also grew larger in body size and more frequent through time [1]. This study was the exception, rather than the rule, but it does highlight the potential of midden data to inform on environmental and evolutionary species-specific questions that fall outside the traditional archaeological context upon which middens are traditionally studied.

Institutions that hold collections of marine midden material often make it inaccessible to the taxonomist. This investigational road block can have many causes: there maybe cultural

restrictions; academic unwillingness to share; a lack of interest in the potential information to be mined by the occupation and diet focused archaeologist; or simply the inability to navigate the protocols that would enable that material to be released by the guardian. Despite these potential blockages, one of the main reasons for this underutilisation of midden data is a lack of knowledge of the potential what can be gleaned from the material, an issue that can only be addressed if there is an openness to work with systematitians on a higher level than the simplistic identification within the restrictive context of "what do I have?", or other questions regarding rudimentary population ecology.

Furthermore, in relation to marine gastropods, these collections, with their stratigraphic evidence of long-term exploitation, provides large samples of the locally preferred target food species. This offers evidence that the target organisms have a level of resilience to environmental change and intensive harvesting through time. This is also in contrast to contemporary management plans often focused on short term visualisation of species abundance, rather than considering the long-term exploitative place in the anthropogenic survival. This has modern day implications for the management of how marine resources are managed; marine midden evidence proves that intensive seasonal harvesting does not lead to population collapse [2]. The very fact that there has been longitudinal collection and exploitation makes many of the claims of population denigration at the hands of traditional collections somewhat spurious and may highlight an environmental protectionist contextualisation based on short-term population dynamics or increased non-indigenous population pressures rather than a broader understanding of the innate cultural relationship of people and place [3].

Access to middens is to be viewed as a cultural privilege, and therefore it is important that the evidence obtained is analysed in a cross disciplinary context. This material has the potential to assist in explaining recent evolution patterns, especially

in regions where the middens have been accumulated post oceanic inundation. These middens, such as along the coasts of Queensland, represent populations of organisms that have migrated with changing sea levels and thus may demonstrate shifts in morphology due to founder effects. Conversely, middens on atolls may show shifts in size and morphological form reflecting shifts in the localised climate through time. Midden evidence is at present the domain of the archaeologist, when, it is of equal value to those who study the evolution of the organisms consumed. Open the vaults and let the systematists frolic!

### References

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