Regular talk

CHEMOSYNTHETIC COMMUNITIES ON REPTILE DEAD-FALLS IN MODERN AND CRETACEOUS SEAS

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An evolutionary "stepping stone" hypothesis has been formulated to explain the progressive adaption of some invertebrates to colonize the environments of hydrothermal vents and hydrocarbon seeps, through the creation of reduced environments from the decay of large organic-falls on the seafloor (i.e., sunken wood and whale carcasses; Distel et al. 2000). In the Mesozoic, when whales had not yet appeared, marine reptiles would have been an important source of large organic-falls on the deep-sea floor. Sea turtles comprise one of the very few groups of large marine organisms that survived the Cretaceous/Paleogene extinction event. Danise and Higgs (2015) previously reported bone-eating *Osedax* worm traces from mid-Cretaceous plesiosaurid and sea turtle bones, but it remains largely unknown which kind of chemosynthetic invertebrates were associated with sea turtle-falls. Here we present two examples of chemosynthetic communities on Cretaceous sea turtles (*Mesodermochelys* sp.) from the Yezo Group in Hokkaido, Japan. The associated chemosynthetic fauna is composed of provannid, *Hikidea* sp. and some other gastropods, as well as thyasirid, lucinid, and solemyid bivalves. The fauna is similar to those of the Cretaceous plesiosaurid-fall and hydrocarbon seep communities in the same region. This finding indicates that the chemosynthetic communities were supported not only by plesiosaurid carcasses but also by decomposing sea turtles. We also deployed dead loggerhead sea turtle (*Caretta caretta*) in a shallow marine setting (ca. 11 m deep) in Tsukumo Bay (Noto Peninsula, Ishikawa Prefecture, Japan). We started the experiment in December, 2013 and over the following 1.5 years, we observed and subsequently recovered several pieces of bone. We observed, microbial mats composed of sulfur-oxidizing bacteria, *Beggiatoa* sp. and the ciliate *Zoothamnium* sp. covering the bone surface. In addition, many gastropods, *Xenoskenea* sp. and Iravadiidae gen. et sp. indet., crawled on bone surface and a few mytilid bivalves (*Idas* or *Adipicola*) lived in small cleavages between the bones. These results show that the sea turtle dead falls could have sustained chemosynthetic life from the Cretaceous until the present.

References

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