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Anomiid (bivalve) bioerosion on Pleistocene pectinid (bivalve) shells, Rhodes, Greece

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Abstract

A trace fossil, *Centrichnus eccentricus,* was found beneath a saddle oyster *(Anomia ephippium*) that was preserved undisturbed on its substratum (a shell of *Pecten jacobaeus*), at the site of attachment of the calcified byssus.

Introduction

It is unusual that the body fossil of a tracemaker is found in life position in direct association with its corresponding trace fossil, although the phenomenon is more common among hard-substrate trace fossils (borings, etchings) than in soft-sediment trace fossils (Boekschoten 1966, 1967). Animals that only etch their substrate superficially are less likely to be preserved in situ than are borers within their borings. An example of a surface etching bivalve is described here from the Pleistocene of Rhodes, Greece (for the stratigraphic setting, see Hanken et al. 1996). The material is deposited in the Geological Museum, University of Copenhagen, numbers with MGUH.

Anomiid bivalve byssus-plug trace fossil

Specimens of the saddle oyster, *Anomia ephippium* Linnaeus, are commonly found preserved undisturbed on their substratum, generally the pectinid bivalve *Pecten jacobaeus*, in the Pleistocene Cape Arkhangelos facies group of the Rhodes Formation in Rhodes, Greece. A valve of *P. jacobaeus* Linnaeus, from the lower part of the Cape Arkhangelos sediments in the small bay east of Pefkos, carried four in-situ individuals of *Anomia ephippium.* Three of these are on the convex, depositionally upper surface of the shell as it lay on the sea floor. This upper surface is covered by carbonate sand which has also penetrated between the anomiid valves and has been lightly cemented. Attempts to remove these three anomiids failed.

Figure 1. Anomia ephippium in life position on the inner surface of a *Pecten jacobaeus*. Scale 5 mm. MGUH 25071.

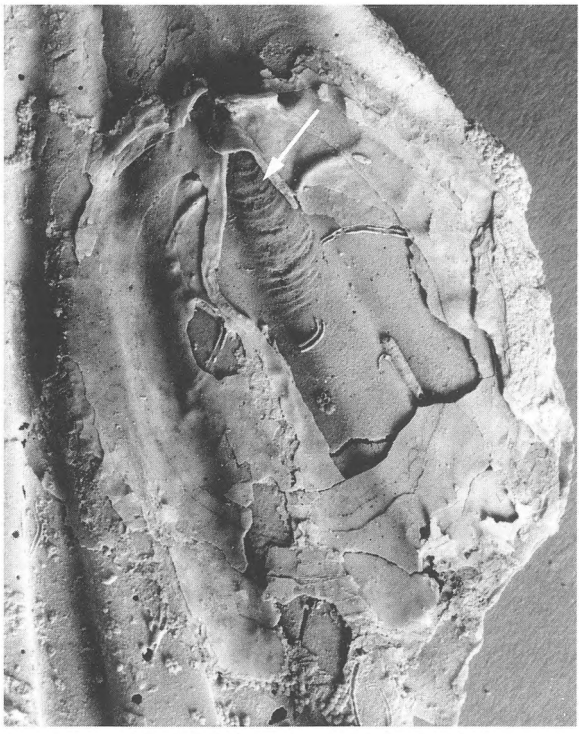

Figure 2. Same individual, after removal of the upper valve. Specimen illuminated from SE to emphasize the etched scar, *Centrichnus eccentricus*, (arrow) on the substrate within the byssal notch of the lower valve. Scale 5 mm.

Figure 3. C. eccentricus on *Pecten jacobaeus* Linnaeus from Pleistocene sediments near St. Yiannis church, Lardos, Rhodes, showing the form of the trace fossil. Scale 5 mm. MGUH 25072.

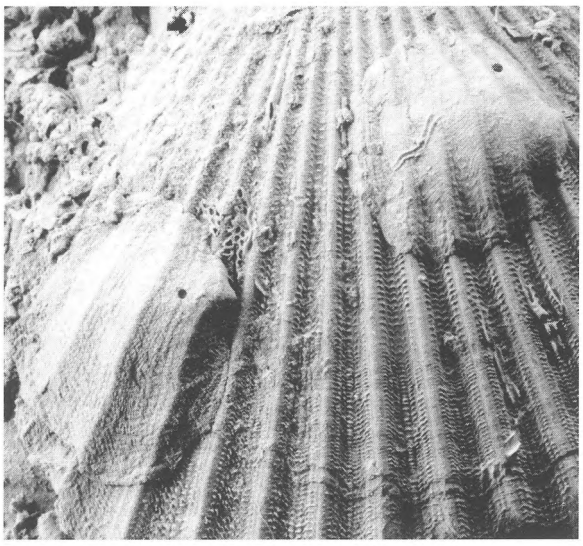

Figure 4. Two *specimens of A. ephippium* attached to *Aequipecten opercularis*. They have developed xenomorphic ornament and each has a small drill-hole penetrating the upper valve. Scale 5 mm. MGUH 25073.

The fourth anomiid (Figure 1) was attached to the concave, under side of the pectinid valve, where it was protected from sediment; the space between the anomiid valves remained empty. Removal of the upper valve exposed the inner surface of the lower. Precisely positioned beneath the opening of the byssal notch in the lower valve, through which the unpreserved byssal plug protruded, is an etched scar corresponding to the trace fossil *Centrichnus eccentricus* Bromley & Martinell (Figures 2 and 3). This relationship has been demonstrated in recent material (Bromley & Martinell 1991), but it is satisfactory also to be able to corroborate the association in fossil material.

Two anomiids drilled by a predator

Two small anomiids are attached to another pectinid, *Aequipecten opercularis* (Linnaeus), from the same locality and horizon. Each has a small drill-hole, *Oichnus simplex* Bromley, in its upper valve (Figure 4). The morphology of the holes suggests predation by a very small muricid gastropod (Bromley 1981). The anomiids thus appear to have been dead before burial and the survival in life position, as proven by the perfect fit of their xenomorphic ornament, is most unexpected.

Acknowledgements

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