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Bioerosion in shell beds from the Pliocene Roussillon Basin, France: Implications for the (macro)bioerosion ichnofacies model

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The marine Pliocene at the locality of Nefiach (Roussillon Basin, SE France) includes several shell beds constituted by oysters and scallops that bear a diverse and abundant bioerosion trace fossil assemblage. The most abundant trace fossils are *Gnathichnus pentax* and *Radulichnus inopinatus*, produced by the grazing activity of echinoids and polyplacophorans upon algae and other microorganisms coating shell surfaces. Other bioerosion traces include polychaete dwellings (*Caulostrepsis taeniola* and *Maeandropolydora sulcans*), sponge boring systems (*Entobia* isp.), and rare bryozoan borings (*Pinaceocladichnus* isp.), predation structures (*Oichnus simplex* and repaired durophagous scars), and foraminiferal fixation pits (*Centrichnus* cf. *eccentricus*). The trace fossil assemblage records short-term bioerosion in shellgrounds in a moderate energy setting as evinced by the dominance of epigenic or shallow endogenic structures produced in most cases by 'instantaneous' behaviors. The assemblage can be assigned to the *Gnathichnus* ichnofacies, and it contrasts with that found in Pliocene rocky shores in the same geographic area, which are examples of the *Entobia* ichnofacies. The *Gnathichnus* ichnofacies is validated as an archetypal one and its recurrency demonstrated since the Jurassic. *Entobia* and *Gnathichnus* ichnofacies have to be used in the Mesozoic and Cenozoic as substitutes of the previously existing *Trypanites* ichnofacies, which is still valid in the Palaeozoic.

Key words: Shell beds, ichnology, bioerosion, ichnofacies, *Gnathichnus*, *Radulichnus*, Pliocene, France.

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