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A new giant nektobenthic radiodont benthivore from the Early Ordovician Fezouata Biota in Morocco

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The Fezouata Shale Formation is an Early Ordovician Lagerstätte that preserved exceptionally detailed records of complex marine ecosystems, making it crucial for understanding the early evolution of animal life. It has yielded the youngest known community of radiodonts to date. This group is particularly well known from the Cambrian, with iconic representatives such as *Anomalocaris*, which are emblematic of the Cambrian explosion. Here we describe a new radiodont from the Fezouata Biota, *Falciscaris mumakiana* gen. et sp. nov. based on seven specimens of isolated frontal appendages. These appendages bear long endites with large and robust auxiliary spines, suggesting they were adapted for foraging through sediment in search of prey. The appendages of *F. mumakiana* gen. et sp. nov. can be relatively large compared to the majority of radiodont appendages, with endites reaching up to 11.4 cm in length, suggesting a total body size exceeding one meter for this Ordovician radiodont. In contrast, smaller specimens can be up to 10 times smaller, indicating ontogenetic stages during which the frontal appendage morphology changes little. Following the “Ordovician Plankton Revolution”, the proliferation of planktonic resources and enhanced pelagic-benthic coupling during this period likely allowed for the rise of giant suspension-feeding radiodonts, such as the Aegirocassisinae and *F. mumakiana* gen. et sp. nov., the new giant benthivore. In term of taxonomic diversity, benthivores radiodonts remain a minor component of radiodont diversity in the Fezouata Biota compared to the more dominant suspension feeders.

Key words: Panarthropoda, Radiodonta, Hurdiidae, gigantism, benthivores, feeding evolution, Fezouata Shale, Early Ordovician.

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