

The bountiful coprolites of the Joggins Formation, Nova Scotia

MAX CHIPMAN*, M. GREY, AND P. PUFAHL

Department of Earth and Environmental Science, Acadia University, Wolfville, Nova Scotia B4P 2R6

The fossil cliffs at Joggins (Nova Scotia) hold a wealth of fossils, both terrestrial and aquatic, from the Late Carboniferous Period. Fossils from the aquatic realm have historically been understudied and the ecosystem that they represent is poorly understood. This research broadens our understanding of the aquatic ecosystem, specifically the food web, by examining fish coprolites that are abundant in limestone of the Joggins Formation. Coprolites preserve undigested material that give us a window into the diets of these fish and a better idea of species interactions within the ecosystem. The coprolites have been studied in thin section and hand sample, as well as cathodoluminescence and computed tomography to determine the contents. We found that specimens could be divided into six categories based on size and shape: cigar/cylindrical shaped; cone shaped; small/ equant; spiral; irregular; and massive (samples greater than 5 cm in length). Small coprolites are the most abundant and massive coprolites are the rarest. They range in size from <1 cm to >10 cm and are 2–3 cm on average. The mineralogy of the coprolites is high-calcium phosphate, similar to the composition of bone. This composition suggests that the fish producing these coprolites were carnivorous and that there is a lack of herbivores present, supporting earlier faunal study findings. Bone fragments have been found in almost all samples; however, specific species identification has thus far not been possible. This research provides both a foundation for further studies on coprolites and similar fossils and a deeper understanding of aquatic ecosystems as fish diversified further into fresh water in the Palaeozoic.

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