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# Microbioerosion on a Late Cretaceous mosasaur fall from Antarctica

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Recent large marine vertebrates'falls create significant habitats that support diverse and highly specialized nekton-fall communities (Danise et al., 2014; Dick, 2015). In the Mesozoic, marine reptile-falls could have fulfilled similar roles and hosted analogous communities (Kaim et al., 2008). In this sense, paleoecological studies offall communities allow delineation of the successional stages that preceded final burial of carcasses (Danise et al., 2014). Microbial organisms such as algae, bacteria and fungi and macroinvertebrates areknown to play an important role in the degradation of bones in marine ecosystems (Danise et al., 2012; 2014) and leave different bioerosion structures. Evidence of microbial activity was observed in Cretaceous age plesiosaur and sea turtle bones and in Jurassic age ichthyosaur and sea turtle bones, suggesting that similar communities to those of whale falls could have existed associated with carcasses of Mesozoic marine reptiles (Kaim et al., 2008; Danise et al., 2014; Danise and Higgs 2015). The aim of this work is to report and describe traces attributed to microbial activity in a mosasaur fall from Antarctica. A histological thin section from a vertebra of a mosasaurid (MPL 88-I-2-1) collected from the upper Maastrichtian of the López de Bertodano Formation in Marambio Island (Seymour), Antarctica, was analysed. Thin sections of vertebra were observed and photographed in natural and polarized transmitted light. The compact cortical region is well outlined and vascularised, formed by a matrix woven fibered bone. In this sector vascular channels are simple, elongated, and do not have a preferential orientation. With a greater increase, a large amount of globose lacunae is observed, with a low development of canaliculi. There are no secondary osteons or reabsorption spaces. In this region, microbiorings are observed. They are composed of reticular tunnels that have an average diameter of 100 µm and their maximum measured length is 600 µm. The tunnels are approximately straight, with right angle or square bifurcations. They are often filled by pyrite. Also most microtunnels are connected to the external surface. The features of microborings found in this studied sample resemble to traces originated by endolithic microorganism activity assigned to fungi and algae (Golubic et al., 2005). In the internal region, the inner zone is on the contrary very porous, and is formed by cancellous bone. The trabeculae of this tissue are

formed by lamellar bone. In the intertrabecular spaces it is possible to distinguish rosette-like structures which are characterized by a dark, opaque nucleus of pyrite framboids. In this region microborings were not observed. The mosasaur vertebrae studied herein show an evidence of the activity of micro-organisms during the time when they wereexposed on the seafloor prior to final burial. According to Golubic (2005) when tunnels are branched in different ways and at different frequencies, keeping contact with the substrate surface and often spreading parallel to it, the distinction among fungiand algae is unclear. As successional stages could not be recognized, and the vertebra is well preserved, a rapid burial is inferred.

**References**

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