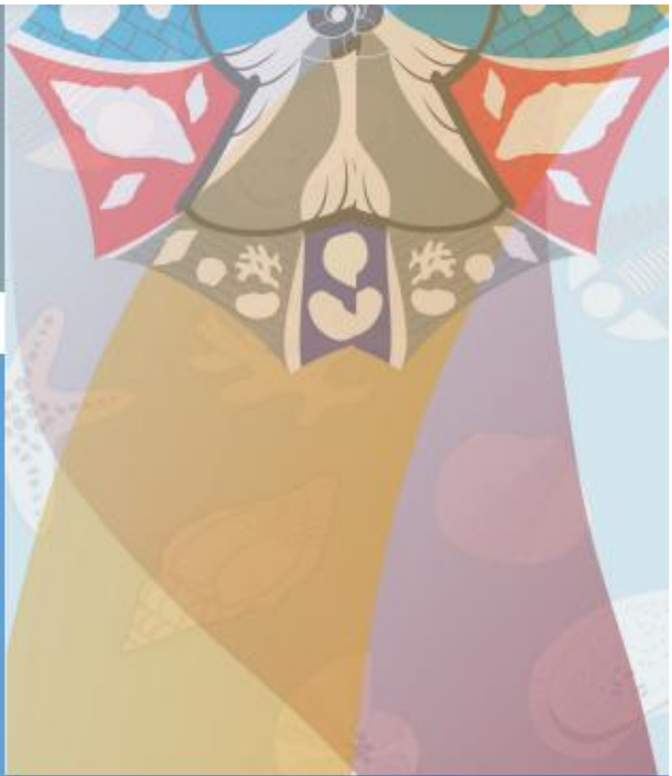

V SIMPÓSIO BRASILEIRO DE PALEOINVERTEBRADOS

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III REUNÃO DE OSTRACODÓLOGOS DO BRASIL

BOLETIM DE RESUMOS

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MICROSCOPIC TEXTURES IN THE INSECT FOSSILS' CUTICLE FROM THE CRETACEOUS CRATO LAGERSTÄTTE: ARE THEY MISS IMPRINTS?

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The Crato Formation is an Early Cretaceous Lagerstätte of the Araripe Basin, Brazil, known for its exceptionally preserved fossils. Among all metazoans, insects are the most numerous and diversified group with 16 orders. The order Ephemeroptera (also knownas mayflies) corresponds to about 7% of the paleoentomofauna diversity, preserved in laminated limestone successions, interpreted as a hypersaline lake environment, with 16 species and nine families. Eight samples of Hexagenitidae larvae were analyzed under ascanning electron microscope with X-ray dispersive spectroscopy, to determine themorphological completeness and taphonomic changes of the fossils, focusing mainlyonthemicrofabricandchemicalcomposition.Thespecimens are poorly fragmented and well-articulated with some three-dimensionality and high morphological fidelity. The outer cuticle of the larvae fossils is a massive, reddish-brown texture, without individualized crystals, associated with the larvae exoskeleton. In SEM, this massivetexture has polygonal microcracks, similar to desiccation cracks but on a smaller scaleand limited to the insect cuticle. In the UFRJ-DG 34-Ins specimen (Macrofossil Collection, Rio de Janeiro Federal University), the massive texture occurs with a wrinkle like texture, in addition to the polygonal microcracks. There are three possible ways in which these microscopic cracks and wrinkles could originate: 1) the breakdown of the cuticle by mechanical factors (such as the transport in life and post-mortem); 2) inherent morphologies of the larvae themselves; and 3) the process of dehydration of microbial mats during the fossilization process. The more organized arrangement of the polygonal micro-cracks and the absence of other features that could indicate a high transport rate (fragmentation and disarticulation) make the mechanical hypothesis unfeasible. Additionally, there is no record of a wrinkled surface in the cuticle of a living or fossil insect, especially Ephemeroptera larvae, generated by mechanical factors. The second hypothesis is more plausible than the first, as the insect cuticle could exhibit a variety of protuberances. The presence of three-shaped microtrichia in living Ephemeroptera of theCaenoculini tribe slightly resembles the structures described here. However, these bodycomponents have more rounded surfaces, unlike the polygonal micro-cracks seenintheCrato fossils. Furthermore, to the best of our knowledge, there is no record of wrinkledsurfaces in the cuticle of living Ephemeroptera. The third hypothesis is related to the sealing effect of the microbial mats on the coating of the carcasses, creating a microbial sarcophagus that enhances fossil preservation. In this case, the observed textural patterns represent the original organic surface of the mat on a micro-scale, which could correspond to a microbially induced sedimentary structure (MISS) preserved in the insect cuticle. With the organic affinity of these textures, we suggest that this biological hypothesis could be more suitable to explain the genesis of these elements, especially when they are associated with other microscopic features that suggest the presence of the mats. These features include mineralized coccoids, filaments and EPS, framboidal pyrite, and the already-known microbial nature of the Crato laminated limestones[CAPES 88887.481076/2020-00, FAPERJ E-26/200.828/2021 and CNPq 303596/2016- 3]