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X-ray computed microtomography as a fundamental piece in the study of microcrinoids

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This study employs X-ray computed microtomography (micro-CT) to investigate the internal structures of microcrinoids, focusing on the roveacrinid *Sergipecrinus reticulatus* from the Aptian–Albian (112–115 Ma) of the Sergipe Basin, Brazil. For the first time, sub-basal balls were observed in situ and in three dimensions, representing the first 3D documentation of these internal structures in a microcrinoid cup. This constitutes both a methodological advance, the first use of micro-CT applied to this group, and a descriptive and taxonomic advance, as it reveals an unprecedented internal morphology. These structures, previously observed only under SEM and identified in fragments of other genera, might be hollow; however, micro-CT analysis reveals they are dense, containing only small and sub-resolution pores. This discovery suggests that their presence may be more widespread across the Roveacrinidae than previously thought, raising questions about their evolutionary and functional significance. As a cladistics trait, the presence of sub-basal balls contributes to the phylogenetic reconstruction of the family. Moreover, this study underscores the value of micro-CT in revealing detailed, non-destructive insights into microfossil morphology and proposes its broader application to uncover the internal structures of other genera within the Roveacrinidae.

Key words: Echinodermata, Roveacrinida, microfossil, Albian, Sergipe-Alagoas Basin, Brazil.

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