

RECENT DISCOVERIES OF UNUSUAL SILICOFLAGELLATE DOUBLE SKELETONS, WITH EVOLUTIONARY AND TAXONOMIC IMPLICATIONS

Kevin McCartney¹, Jakub Witkowski^{2,3} & David M. Harwood⁴

¹Department of Environmental Studies, University of Maine at Presque Isle

²Faculty of Geology, University of Warsaw

³Palaeoceanology Unit, Faculty of Earth Sciences, University of Szczecin

⁴Department of Earth and Atmospheric Sciences, University of Nebraska-Lincoln

Double skeletons of silicoflagellates have been observed previously to consist of two skeletons with the corners of each being in close alignment, and general symmetry across the basal ring. All observed Cenozoic silicoflagellate double skeletons conform to this corner-to-corner configuration. Our recent discoveries of double skeletons from Santonian and Campanian (Upper Cretaceous) marine sediments of the northern Canada Arctic Margin show a different configuration where each skeleton is rotated along the basal plane with respect to the sibling. For *Corbisema*, the double skeleton configuration is similar in general pattern to the star-of-David. Similar rotated configurations are observed for specimens of Cretaceous *Schulzyocha* and *Vallacerta*. Thus, known double skeletons of the Cretaceous and Cenozoic exhibit separate and distinct patterns of symmetry alignment across the basal plane.

The recent discovery of a late Paleocene or early Eocene double skeleton specimen of *Corbisema hastata* with the star-of-David configuration suggests that three-sided silicoflagellates of both the corner-to-corner and star-of-David patterns occur in the early Cenozoic. We have previously documented the possibility of two divergent lineages of corbisemid silicoflagellates derived from *Cornua* in sediments from the Santonian of Devon Island. Here, we provide further evidence of this divergence in three-sided silicoflagellates. At present, representatives of these groups can only be distinguished from one another as double skeletons. The group with corner-to-corner double skeletons led to most or all of the known silicoflagellate genera of the Cenozoic. However, the discovery of a star-of-David type double skeleton of *Dictyocha medusa* from the late Eocene of DSDP Site 280 suggests that a distinct group of four-sided silicoflagellates may have evolved from three-sided star-of-David group. This conclusion would complicate the interpretation of early Cenozoic silicoflagellate evolution and taxonomy.