Form and function of the graptolite prosicula, and its application to biostratigraphic and evolutionary studies

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The graptolite prosicula is the first ontogenetic structure to be secreted by the graptolite zooid, and has implications for classification and biostratigraphic studies. Using graptolites of Ordovician age, chemically isolated from rocks of western Newfoundland, it is here shown that prosiculae have characteristic morphological structures and the potential both to date the rocks in which they are contained and to in some cases permit identification to generic or specific level.

Morphological features include the presence or absence of a spiral line and diaphragm, the presence and complexity of longitudinal rods, width of nema, and overall prosicular form. In this study, it is concluded that graptolites possessing a wide nema, diaphragm, and a clearly visible spiral line are all Tremadoc (earliest Ordovician) in age, while those with a prominent spiral line and many longitudinal rods arranged in pairs are late Tremadoc. Arenig graptolites characteristically do not show a visible spiral line or a diaphragm, and have only a few longitudinal rods which run parallel along the prosicular length.

The results of this study may also have relevance to subsurface biostratigraphy, particularly to oil exploration in the study areas. Subsurface exploration, using identifiable graptolite species, may be sufficient in determining if oil may be present in that area. In addition, these results suggest that additional research is justifiable to determine if the same morphological changes in graptolites occur in later strata (i.e., the Silurian).