Are *Macrora* and *Clathropyxidella* fossil siliceous haptophytes?

Richard W. Jordan
Yamagata University, Department of Earth & Environmental Sciences, Yamagata, Japan; sh081@kdw.kj.yamagata-u.ac.jp
Kenta Abe
Yamagata University, Graduate School of Science & Engineering, Yamagata 990-8560, Japan; s14e101d@st.yamagata-u.ac.jp
Luca Pellegrino
University of Turin, Department of Earth Sciences, I-10125 Turin, Italy; lu.pellegrino@unito.it

The siliceous haptophyte genus *Hyalolithus* Yoshida et al. inhabits modern subtropical/tropical waters (Yoshida et al., 2006; Jordan et al., 2015) and has a fossil record dating back at least to the Middle Eocene (Abe et al., 2016). Thus, there is a strong possibility that enigmatic living siliceous phytoplankton (e.g. *Petasaria* Moestrup) and siliceous microfossils (e.g. *Macrora* Hanna and *Clathropyxidella* Deflandre) may be closely related (Jordan et al., 2015). Interestingly, *Hyalolithus*, *Macrora* and *Clathropyxidella* have similar geographic distributions, and all three can be found in Middle Eocene sediments, although the former two are also present in Neogene sediments. *Macrora stella* (Azpeitia) Hanna was originally described as the diatom *Pyxidicula stella* Azpeitia, while a similar form was assigned to a new diatom genus, *Pseudorocella* Deflandre. However, they do not possess any diatom-like features, particularly a rimoportula, which is present in *Rocella* Hanna. Like *Hyalolithus*, *Macrora* has a similar-sized, perforated siliceous plate and a thickened, hollow marginal rim. *Clathropyxidella*, on the other hand, has been associated with silicoflagellates and ebridians, but has a hollow skeleton (unlike ebridians), lacks pikes or basal spines (which are present in many silicoflagellate genera), and strongly resembles a highly-domed form of *Macrora*. Illustrations of silicoflagellates like *Cannopilus jouseae* Bachmann from the Middle Miocene and *Dictyocha rotundata* var. *secta* Glezer from the Late Eocene–Early Oligocene bear some similarities to *Clathropyxidella*, but require detailed observations with the use of the scanning electron microscope to determine whether or not they bear pikes and/or basal spines.

References

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