

The search for fossil siliceous haptophytes

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Almost twenty years ago, an enigmatic marine nanoplankton, *Hyalolithus neolepis*, was determined to be a haptophyte covered in siliceous scales. Subsequent research provided convincing evidence that another silica-scaled nanoplankton, *Petasaria heterolepis*, was also likely to be a haptophyte. Preliminary studies of the fossil record have recently revealed two species of *Hyalolithus*, *H. tumescens* (middle Eocene) and *H. didymus* (Late Miocene), and have proposed that two siliceous microfossil genera, *Macrora* (middle Eocene–Late Miocene) and *Clathropyxidella* (middle Eocene), could also be related. Given the large gaps in geological time between the three *Hyalolithus* spp., as well as the overlap between the three *Macrora* spp., we decided to make a sample request using the abundance charts and illustrations in the Deep Sea Drilling Project (DSDP), Ocean Drilling Program (ODP), and Integrated Ocean Drilling Program and International Ocean Discovery Program (collectively known as IODP) literature as a guide. As a consequence, we obtained 167 samples from various geographical regions, ranging from middle Eocene to Late Miocene/Pliocene in age, and prepared them for light microscope and scanning electron microscope examination. Outcrop samples were also reinvestigated, notably from Barbados (Caribbean), California (USA), Marmorito (Italy), Porcuna (Spain), and Israel. Our observations confirmed the presence of three species in middle Eocene samples: (1) *Macrora barbadensis* from DSDP Legs 4 (Venezuela Basin), 21 (Lord Howe Rise), and 95 (New Jersey Transect), and from Barbados; (2) *Macrora najae* from Barbados; and (3) *Clathropyxidella similis* from DSDP Legs 4 and 21 (Venezuela Basin and Lord Howe Rise). Upper Oligocene samples from ODP Leg 119 (Kerguelen Plateau), Lower Miocene samples from Marmorito (Italy), and Upper Miocene samples from Porcuna (Spain) contained *Macrora stella*.