

Parmalean and other siliceous nannofossils from the Oligocene of Polish Flysch Carpathians

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Acta Palaeontologica Polonica 68 (3), 2023: 441-456 doi:<https://doi.org/10.4202/app.01078.2023>

Well-preserved fossil assemblages provide valuable insights into the evolutionary history of biota and their environments. Here, we report on Rupelian (early Oligocene) siliceous nanoeukaryotes from diatomites in the Carpathian Mountains, southeastern Poland. These sediments yielded novel forms of parmaleans and parmalean-like fossils. Their cell wall structure differs from that of described genera. Instead of the generically specific separate dorsal plate and set of girdle plates, some of our taxa contain one upended, hollow, subspherical, perforated cup. To accommodate these differences, we propose a new division Parmaphyta, a new family Parmoligocenaceae, a new genus *Parmoligocena* and a new species *Parmoligocena janusii*. Other remains are reminiscent of the extant genus *Pentalamina* and for this we propose a new genus and species, *Pentalaminamorpha radiata*. The taxonomic affinity is less certain for other nannofossils found, as they are only somewhat similar to parmaleans, and so we only tentatively associate them with this group. All these fossils occur together with a diverse assemblage of diatoms (mostly from Leptocylindrales, Rhizosoleniales, Coscinodiscales, Cymatosirales, and Hemiaulales), silicoflagellates (mostly species from the genus *Corbisema*) and archaeomonads. Together they suggest the palaeoenvironmental context for the parmaleans, a neritic marine environment, thus similar to where silicified parmaleans can be found today.

Key words: *Parmoligocena*, *Pentalaminamorpha*, diatomites, siliceous nannofossils, parmaleans, Oligocene, Polish Flysch Carpathians.

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