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Alphonse Meunier's enigmatic *Radiosperma* belongs to the ciliates

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The acritarch genus *Radiosperma* was originally described as an “enigmatic organism” by the Belgian biologist Alphonse Meunier (1857-1918). Two species were described: *R. corbiferum* from Arctic waters and *R. textum* from the Belgian coast (Meunier 1910, 1919). It has been widely reported from plankton and sediments since the late 19th century, with suggested biological affinities ranging from invertebrate eggs to tintinnids.

The genus description is now improved and both congeners are redescribed (Gurdebeke *et al.* 2023). Based on SSU and LSU rRNA sequences, *Radiosperma textum* is shown to be a ciliate cyst related to the ciliate genus *Askenasia* and positioned among the classes Prostomatea, Plagiopylea and Oligohymenophorea. *Radiosperma* is considered closely related to *Hexasterias* and *Halodinium*, two former acritarchs that were assigned previously to the ciliophora (Gurdebeke *et al.* 2018).

The spatiotemporal distribution and ecology of both species are discussed, revealing a common confusion in species assignment by most authors. *R. corbiferum* appears limited to Arctic waters and the Baltic Sea, while *R. textum* is found in temperate coastal waters in other parts of the world. The chemical composition is documented based on micro-Fourier Transform Infrared spectroscopy. Its refractory nature provides potential for fossilization and applicability as indicator of freshwater influence in palynological studies.

In addition, newly obtained SSU and LSU rRNA sequences for several flask shaped ciliate cysts (e.g., *Fusopsis* and *Strombidium*) are also included in the phylogenetic analysis and the occurrence of fossilizable cysts in the ciliophoran clade in the marine environment is reviewed. It is confirmed that ciliate cyst morphology has taxonomic significance and that morphological identification of cysts can be reliable. Further elucidating cyst stages in ciliate life cycles will improve understanding of ciliate biology and ecology and their applicability as (paleo)environmental tracers.

References

- Gurdebeke, P.R., Mertens, K.N., Takano, Y., Yamaguchi, A., Bogus, K., Dunthorn, M., Matsuoka, K., Vrielinck, H., Louwye, S., 2018. The affiliation of *Hexasterias problematica* and *Halodinium verrucatum* sp. nov. to ciliate cysts based on molecular phylogeny and cyst wall composition. *European Journal of Protistology* 66, 115–135.
- Gurdebeke, P.R., Mertens, K.N., Rajter, L., Meyvisch, P., Potvin, E., Yang, E.J., André, C., Pospelova, V., Louwye, S. 2023. The ciliophoran affinity of *Radiosperma textum*, and its relation to other marine ciliate cysts. *Marine Micropaleontology* 178, 102185
- Meunier, A., 1910. Microplankton des Mers de Barents et de Kara. Duc d'Orléans. Campagne arctique de 1907. Imprimerie scientifique Charles Bulens: Bruxelles. 355 p. + atlas (XXXVII plates).
- Meunier, A., 1919. Microplancton de la Mer flamande. 4^{me} partie. Les Tintinnides et cetera. Mémoires du Musée royal d'Histoire Naturelle de Belgique 8, 59 p.

Keywords

Diversity; Taxonomy; Ciliophora; Micro-FTIR; LSU and SSU rDNA; Acritarch