

NORÉN FREDRIK, 2002. Factors regulating planktonic dinoflagellate populations, with special emphasis on the parasitic flagellate *Parvilucifera infectans*.

Abstract

The biotic factors affecting a planktonic protistan ecosystem are the focus of this thesis with a broad spectrum ranging from the identification of a novel parasitic flagellate, *Parvilucifera infectans*, to the influence of filter-feeders and dinoflagellate encystment on the dinoflagellate community.

Parvilucifera infectans Norén et Moestrup 1997 was described from the Swedish west coast using molecular and ultrastructural methods. Its closest relatives are the oyster parasite *Perkinsus* and the free-living predatory flagellate *Colpodella*. They seem to constitute a monophyletic group, ranked in the "classical" taxonomy as the new phylum Perkinsozoa, related to both the dinoflagellates and the apicomplexa. Together with the ciliates those four groups constitutes the alveolate clade.

The occurrence of *Parvilucifera* seems to be world-wide, found on four continents: Europe, Australia, India and North America. The spectrum of host species is unusual broad, efficiently infecting and killing ~30 species of both thecate and atehcate dinoflagellates, several potentially toxic.

Important in the parasite-host ecology of *Parvilucifera* is that the host dinoflagellate *Alexandrium* is able to sense the presence of the parasite whereafter *Alexandrium* cells rapidly transform into a more resistant life stage. This short term defense of the *Alexandrium* could be an important factor preventing the parasite to graze down the host population completely.

The grazing effect on a plankton community was studied in the Öresund, showing that during non-selective grazing by *Mytilus edulis*, the plankton community shifted towards faster growing species, i.e. smaller species such as flagellates and diatoms.

An ecologically important factor is the degree of cyst formation. A three weeks field study revealed that among 31 environmental parameters only surface water temperature, photosynthetically active radiation and halocline position were significantly correlated to dinoflagellate encystment rate. There was no relationship between nutrient concentrations (NO_2^- , NO_3^- , NH_4^+ and PO_4^{3-}) in water and the encystment of dinoflagellates.

Keywords: alveolata, phylogeny, morphology, TEM, SSU, LSU, rRNA, induced defence, ecdysed, evolution, harmful, algae, HAB, mitigation, control, mussel, filtering, PAR

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