Mamiellophyceae shift in seasonal predominance in the Baltic Sea

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Supplementary file 1. A description of the sampling site, sampling methods and environmental conditions during sampling.

The study was carried out in the vicinity of Tvärminne Zoological Station, north-west Gulf of Finland, Baltic Sea (see Enberg et al. 2018). Krogarviken (59° 50.650′ N, 23° 15.100′ E) is a semi-enclosed shallow bay with an average water depth of 3 m. The site has high sea-ice probability and sea-ice breakup events are unlikely during the ice-covered season. Storfjärden (59° 51.250′ N, 23° 15.815′ E) is approximately 30 m deep and more exposed to heavy winds, which can easily cause sudden sea-ice breakups.

Three replicate water samples were taken from each site (Krogarviken: 0−3 m; Storfjärden: 0−15 m) using 3 and 15 m long hose samplers (6 cm internal diameter). A cutoff of 15 m at Storfjärden was chosen as a typical lower depth for the euphotic zone (Luhtala & Tolvanen 2013). Water samples were collected in 2 l transparent plastic bottles without any pre-filtration. After sea ice had formed, three replicate ice samples were collected using a motorized CRREL-type ice-coring auger (9 cm internal diameter; Kovacs Enterprises).

At the beginning of the study, the water temperature was approximately +11°C at both sites. The water temperature was close to 0°C throughout the water column during the ice-covered season. After ice melt, the water temperature increased, and on 20 May 2013 thermal stratification was established at both sites with 12°C surface water temperature (see Fig. S2 in Supplement 2 of Enberg et al. 2018 for details).

Before ice formation, the salinity was approximately 5.5 at Krogarviken and 6.0 at Storfjärden. Salinity decreased during the ice-covered season and was 3.5–5 at Krogarviken and 4.7–5.7 at Storfjärden. After the ice breakup, the salinity rose (to 4.6–5.6 at Krogarviken and 5.5–5.9 at Storfjärden, see Fig. S3 in Supplement 2 of Enberg et al. 2018 for details).

The concentrations of NH_4-N, NO_2+NO_3-N, PO_4-P, SiO_4-Si and tot-N and tot-P in the ice were lower compared with those in the water column, except for NH_4-N, which was higher in the ice and Under-ice water compared with the surface water. After ice breakup, the PO_4-P and SiO_4-Si concentrations decreased in the water column and the NO_2+NO_3-N concentration was zero. The tot-N and tot-P concentrations showed a small decrease after ice breakup (see Table S1 in Supplement 2 of Enberg et al. 2018 for details).

References

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