

ARCTIC ENVIRONMENTAL CHANGES INFLUENCE THE NUTRITIONAL QUALITY OF ICE ALGAE

E. Leu¹, J. Wiktor², J. Soreide³, S. Falk-Petersen¹, J. Berge³

1 - Norwegian Polar Institute, Tromsø, Norway

2 - Institute of Oceanology, Polish Academy of Science, Marine Ecology Department, Sopot, Poland

3 - The University Centre in Svalbard, Arctic Biology, Longyearbyen, Norway

leu@npolar.no

In seasonally ice covered marine ecosystems ice algae represent an important early food source for sympagic amphipods and herbivorous zooplankton. The onset, extension and quality of algal blooms will supposedly alter in the future due to the rapid decrease of Arctic sea ice extent and thickness. We followed the seasonal changes in algal food quantity and quality, together with their major determinants light, nutrients and hydrography in a high Arctic fjord (80° N) from March to October. We measured ice thickness, snow cover, light transmission, and nutrients. Quantitative samples of ice algae were obtained from ice cores, and analyzed for fatty acid composition, stoichiometry, pigments and taxonomy. Ice algae were found from March until June. Their fatty acid composition changed profoundly over time, reflecting biochemical and physiological responses to increasing light intensities and nutrient limitation. By the end of April, polyunsaturated fatty acids (PUFAs) accounted for up to 40% of total lipids, whereas samples from June contained only 20% PUFAs. The dominating fatty acid during the late phase was 16:1 n-7 (almost 50%), probably indicating storage lipid formation. We discuss which factors determine mainly the algal fatty acid composition and how these may change in a warming Arctic.