lake restoration measures in parallel with recurrent absence of holomixis due to lake warming may lead to similar undesired effects that have formerly emerged from fertilization.

Backscatter estimates agreed well with the density of phantom midge larvae (Chaoborus flavicans) and the volume measurements of its air sacs

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Phantom midge larvae (Chaoborus flavicans) co-occur with fish in many lakes and can cause significant errors in acoustic estimates of fish. We compared acoustic backscatter measurements from a 614 kHz Acoustic Doppler Current Profiler (ADCP) with density of Chaoborus and measured gas volume of its air sacs. The transparent animal is a strong acoustic target because of two pairs of air sacs for buoyancy regulation. In order to sample Chaoborus net hauls were collected from nine large lakes in River Vuoksi basin in the Eastern Finland within a week (from 27 July to 2 August 2010) together with ADCP transects. We were using MultiNet plankton sampler equipped with five nets of length 2.5 m, mesh size 100 µm, and the opening frame of the sampler was 50*50 cm (0.25 m2). Horizontal tows from the epi-, meta-, and hypolimnion of each lake were taken.
The density of Chaoborus explained over 50% and measured gas volume of two pairs of air sacs of phantom midge larvae nearly 70% of variation in ADCP backscatter estimates (r2=0.52 and 0.66, respectively). Chaoborus can represent a major source of backscattering signals in daytime in the metalimnion. We conclude that ADCP backscatter measurements can be used to monitor phantom midge larvae distributions. Using ADCP to estimate Chaoborus abundance may also be helpful to prevent significant errors in acoustic estimates of fish.

Study of akinetes in the sediments of large European lakes, and hatching experiments to infer long-term colonization dynamics by cyanobacteria

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Distinct cyanobacteria belonging to Nostocales have the ability to form resting cells, which provide a mean to persist in harsh environmental conditions. Previous studies carried out in long-sediment cores, showed that akinetes could survive for long-time (up to over 60 years). Studying akinetes in lake sediments may provide a more comprehensive knowledge of past phytoplankton assemblages. The aim of this contribution is to study the colonization history of Nostocales by examining the vertical distribution of akinetes in the sediments of 4 European lakes included in the project EULAKES, namely lakes Garda (oligo-mesotrophic; Italy), Neusiedler (meso-eutrophic; Austria), Balaton (meso-eutrophic; Hungary), and Charzykowskie (eutrophic; Poland). Viability of akinetes was investigated by putting sediment taken from several sections of the core in ASM-1 culture medium at 18° for 16-21 days. The subsequent microscopic examination showed a very low diversity in Lake Garda, with the development of Dolichospermum lemmermannii in the first 10 cm (which correspond to the period since the 1980s). Lake Balaton showed a more diversified group of Nostocales, which included Aphanizomenon cf. gracile, followed by Aphanizomenon issatschenkoi, Aphanizomenon cf. capricorni, and Cylindrospermopsis raciborskii. A. cf. gracile was observed down to ca. 50 cm (>100 yr), whereas A. issatschenkoi and A. cf. capricorni were reported in the more recent sediments and more discontinuously. Anabaena viguieri was a typical representative in Lake Neusiedler down to 50 cm of core sediment (corresponding to the last ca. 60 years), along with Aphanizomenon gracile (in the first 10 cm, around 2000) and some unidentified Anabaena (between 20-60 cm, since early 1900s). In Lake Charzykowskie, the only Nostocales were Anabaena solitaria down to 60 cm of core sediment (late 1940s) along with an unidentified Anabaena sp. The observed differences provide an important platform to interpret the distribution of cyanobacteria in European lakes, which are characterized by different physiographic, climatic and trophic characteristics.