

Zooplankton of Lake Koroneia (Macedonia, Greece)

Evangelia MICHALOUDI¹ & Marta KOSTECKA²

¹ Aristotle University of Thessaloniki, School of Biology, Laboratory of Ichthyology, Box 134, GR-54124, Thessaloniki, Greece; e-mail: tholi@bio.auth.gr

² Ul. Politechniczna 3, PL-32020 Wieliczka, Poland

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Twenty four species (19 Rotifera, 4 Cladocera, 1 Copepoda) were recorded in the zooplankton of Lake Koroneia from June 1999 to June 2000. The dominant species were the Cladocera *Daphnia magna* and the rotifers *Brachionus dimidiatus* and *B. rubens*. Total abundance ranged from 13 to 32,426 ind. L⁻¹ and its seasonal dynamics resembled those of hypertrophic lakes, but attaining much higher numbers due to the absence of predation pressure from fish. Rotifers prevailed (up to 100%) during the warm months (June–October) and their seasonal dynamics were governed by temperature and the presence of large *Daphnia* individuals. Cladocera were absent during the summer due to high pH values (9.32–11.10) and/or the composition of the phytoplankton community where *Anabaenopsis milleri* prevailed.

Key words: lake, hypertrophic, fishless, zooplankton, Greece.

Introduction

Lake Koroneia (23°04'–23°14' E, 40°7'–40°43' N) (Fig. 1) is located near the city of Thessaloniki in N Greece, at an altitude of 75 m a.s.l. It is a highly eutrophic lake, characterised by low transparency (0.20–0.60 m) and high phytoplanktonic biomass (max. dry weight 5.6 gm⁻³), dominated by blue-green algae and diatoms (KILIKIDIS et al., 1984). It receives water from small streams and torrents within a drainage area of about 780 km². The lake and the areas around it are protected by the RAMSAR convention and have been proposed to be included in the protected areas of NATURA 2000. However, water quality of the lake has been declining due to negative water balance and huge amounts of pollutants received from point and diffuse sources.

In the 1970's the lake occupied an area of about 46.2 km² with a maximum depth of 8.5 m (PSILOVIKOS, 1977), while it used to be one

of the most productive lakes in Greece concerning fisheries production. During recent decades its water volume has decreased dramatically, due to the overexploitation of water for agricultural and industrial purposes and changes in climatic conditions (in particular lack of rain). In August 1995, an acute change in environmental parameters in combination with the low water volume (depth 1 m, area 30 km²) killed all the fish in the lake, while any efforts since then to re-establish fish populations have failed. Currently the lake has a maximum depth < 1 m, has no macrophytes, no fish and is under a restoration program (which has not started yet) for an increase in its water volume and improvement of water quality, although it still receives agricultural and industrial effluents as well as domestic sewage from the surrounding area. The changes in water quality of the lake can be seen in Table 1, where some of the main physicochemical parameters are presented.

thermore, in Lake Balaton when *Anabaenopsis* was in bloom *Daphnia* species practically disappeared (ZANKAI & PONYI, 1986). Thus, the phytoplankton community in combination with the high pH seems to be the controlling factors for the Cladocera community in Koroneia.

As for the population of *Acanthocyclops robustus*, its seasonal dynamics are quite variable. Mostly, it is present in the pelagic zone for a limited period of 5–7 months from April/May until December (MAIER, 1998), but it can also be perennial with peaks in spring, summer and autumn (LACROIX et al., 1989; OLTRA & MIRACLE, 1992). In the present study it was totally absent during three months (August–October) and abundance showed two peaks in winter and spring, while no parameter was found to affect its seasonal variations.

Finally, the community structure of zooplankton in Lake Koroneia was clearly depicted with the diversity indices. Shallow productive waters have low diversity and high population densities, which was clearly the case in Koroneia. It is well known that diversity decreases with the presence of a few highly predominant species and that it is controlled and determined by predation and/or competition (ODUM, 1975; KERFOOT & PASTOROK, 1978). Consequently, in Koroneia since there were no fish, the zooplankton community was regulated by competition, which is the determining factor in the absence of predation leading to the dominance of a few species, i.e. the decrease of diversity. Following ODUM'S (1975) classification, Koroneia may be classified as a very unstable ecosystem subjected to severe stress, since evenness *J* was generally very low with values lying mainly between 0.0 and 0.5.

In conclusion, we could say that the structure and dynamics of the zooplankton community in Lake Koroneia was governed by the absence of fish and the extreme summer conditions.

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