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Study of seasonal influences on algal biodiversity in the River Yarqon (central Israel) by bio-indication and canonical correspondence analysis (CCA)

Sophia BARINOVA, Moti TAVASSI

Institute of Evolution, University of Haifa, Mount Carmel, Haifa 31905 ISRAEL

 [Keywords](#)
[Authors](#)



bot@tubitak.gov.tr

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Abstract: In our research conducted in the River Yarqon during 2003-2006, we identified 313 taxa of algae and cyanobacteria belonging to 8 taxonomical divisions. Out of these 313 taxa, 268 taxa (85.6%) were indicators of environmental conditions that characterised the river water as alkaline with medium mineralisation. In the rainy and dry seasons the algal taxonomic compositions were very different, with prevailing diatoms in the winter and cyanobacteria and greens in summer. Bio-indication shows that the taxonomic preference for the self-purification process was more intensive during the rainy season, while the low level of river water in the dry season stressed the algal community. By employing CCA analysis some indicators of highly mineralised water with high pH, anthropogenic pollution, and eutrophication were revealed. CCA analyses also helped to reveal various biosensor species sensitive to the advent of anthropogenic pollution. We therefore conclude that the combination of bioindicational methods with statistics is effective in the determination of the main factors influencing algal diversity. This combination is also helpful in indicating which biosensing species will influence the most important environmental parameters. The obtained results can be used for water quality assessment and in monitoring systems of Israeli and other Mediterranean coastal rivers.

Key words: Algae, biodiversity, ecology, CCA, seasonal, River Yarqon, Israel

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