

## Preface

The present issue of the *Proceedings of the Estonian Academy of Sciences* is dedicated to the research into the ecosystem of Lake Võrtsjärv. Lake Võrtsjärv is a large (270 km<sup>2</sup>) shallow (mean depth 2.8 m, maximum depth 6.0 m) strongly eutrophic (total N 1600 mg m<sup>-3</sup>, total P 54 mg m<sup>-3</sup>, and Chl *a* 22 mg m<sup>-3</sup>) water body situated in central Estonia. Eighteen rivers and streams falling into the lake collect the water mainly from the cultivated catchment area (3374 km<sup>2</sup>). The outflow into Lake Peipsi occurs via the Suur Emajõgi River. The water of the lake is alkaline (pH ~8) with a high buffering capacity. The shallowness of the lake and the resuspension of bottom sediments by waves contribute to the formation of a high seston concentration and high turbidity of water during summer. The mean transparency does not exceed 1 m in the ice-free period. The gas regime of the lake is good owing to continuous mixing. Still, oxygen deficit sometimes occurs under the ice cover. Algal blooms are a common phenomenon in the lake. Exposure to winds, shallowness, and large fluctuations of water level (annual average 1.4 m) are the main factors determining the character of the lake's ecosystem.

Lake Võrtsjärv offers interest both from the economic aspect and as an object of research. The lake is considered to be 12 000–13 000 years old. Nevertheless, it was first mentioned in the Chronicle of Henry of Livonia only about 800 years ago. The first data on fishery in L. Võrtsjärv date back to the 18th century, and the first comprehensive investigation of L. Võrtsjärv was organized in 1911–13 by the Lake Commission of the Estonian Naturalists' Society. With the foundation of the Võrtsjärv Limnological Station in 1961 a qualitatively new period began in the investigation of the lake, characterized by all-year-round hydrochemical and hydrobiological monitoring, and the launching of several large projects, among them international projects on planktonology, ichthyology, production biology, and taxonomy. Lake Võrtsjärv is one of the few lakes in the world with a continuous monthly data set covering more than 35 years. In 1994, L. Võrtsjärv was included in the Data Book of World Lake Environments by the International Lake Committee Foundation.

Lake Võrtsjärv is used for fisheries, recreation (swimming, sport fishing, yachting), sightseeing, and tourism. Altogether about 900 animal species have been found in the lake, but fish remains the primary object of interest for man. The most important fishes in L. Võrtsjärv are the valuable eel (*Anguilla anguilla*) and pikeperch (*Stizostedion lucioperca*), which serve as the main articles of

export. A total of 39 t of eel and 30–40 t of pikeperch is caught annually in L. Võrtsjärv. The amount of eel caught in the lake has been even as large as 100 t (in 1988). About 50–70% of the whole eel catch in Estonia (including the amount caught from the sea) comes from L. Võrtsjärv, while the total amount caught from inland water bodies accounts for 95%. The good state of the fish fauna of L. Võrtsjärv has been achieved largely owing to the activities of the ichthyologists of the Võrtsjärv Limnological Station. In the 1950s and 1960s Võrtsjärv was classified as a ruffe lake, because the bulk of the fish caught here consisted of ruffe, young perch, and roach. Attempts to reduce the abundance of nonvaluable fishes by intensive trawling were unsuccessful. Fine-meshed trawls killed the juveniles of valuable fishes (first of all pikeperch), as a consequence of which their number fell notably. In 1958–61 only 0.45 t of pikeperch was caught from the lake. In order to increase the stocks of valuable commercial fishes, a number of measures, suggested by ichthyologists of the Võrtsjärv Limnological Station, have been taken. Trawling (fine-meshed trawls) was stopped, glass eels have been regularly introduced into the lake since 1956, and the protection of commercial fishes has improved. These measures resulted in a rapid growth of the stocks and catches of commercial fishes (mainly pikeperch and eel) and a marked decrease in the abundance of nonvaluable small fishes.

The in-depth ongoing research of the ecosystem of L. Võrtsjärv has aroused interest in Estonia as well as among foreign hydrobiologists. For a better access to information about the lake, it was considered reasonable to present the relevant materials in a special issue.

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