

**INVESTIGATIONS ON THE BALTIC SEA  
CONDUCTED BY THE DEPARTMENT OF MARINE  
BIOLOGY, INSTITUTE OF ZOOLOGY AND  
BOTANY (TARTU, ESTONIA), 1975–90**

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**Abstract.** A brief review is given of the investigations conducted by the former Department of Marine Biology of the Institute of Zoology and Botany of the Academy of Sciences of the Estonian SSR, Tartu, Estonia. Major research projects and their results are presented, and the papers published on the materials collected in 1975–90 are listed.

**Key words:** Baltic Sea, Estonian coastal waters, hydrobiological investigations.

On 16 July 1974, a department of marine biology was founded at the Institute of Zoology and Botany of the Academy of Sciences of the Estonian SSR. The aim of its establishment was to concentrate efforts on the hydrobiological studies of the Baltic Sea, especially of the Estonian coastal waters. Although a large amount of data had been published by that time on the macrophytobenthos, macrozoobenthos, zooplankton, and fishes of the Estonian coastal waters, several research topics (bacterio- and phytoplankton, microphytobenthos, and primary production) were still poorly studied.

Hence there was an urgent need to develop comprehensive hydrobiological investigations besides fishery and ecological–sanitary research. The head and supervisor of the relevant scientific projects was A. Järvekülg. Investigations were made into water chemistry (V. Porgasaar, M. Viik) and various components of the biota: bottom invertebrates (A. Järvekülg, A. Seire, I. Lissenko, I. Tõlp), microphytobenthos (S. Vilbaste), macrophytes (T. Trei), phytoplankton and

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primary production (K. Piirsoo, V. Porgasaar, A. Randveer, K. Vilbaste), and zooplankton (K. Remm).

Among the numerous research projects carried out by the Department of Marine Biology during the period 1975–90, the following three deserve to be singled out:

1. *Influence of pollution and anthropogenic eutrophication on environmental conditions and biological productivity in the coastal waters of the north-eastern part of the Baltic Sea, 1975–79.*

In the first year the working group consisted only of researchers of zoobenthos and phytoplankton. Therefore, the period of 1976–79 when studies of macrophytes, zooplankton, and primary production were included in complex hydrobiological investigations was especially important. Seasonal investigations were carried out in the bays of Tallinn and Haapsalu, summer expeditions took place in the bays of Narva, Muuga, Kolga, Matsalu, Pärnu, and Kuressaare as well as in the vicinity of Vilsandi Island. According to our data, an increase occurred in the nutrient content, as well as in the species richness and biomass of phyto- and zooplankton, micro- and macrophytobenthos, and macrozoobenthos in weakly or moderately polluted coastal waters of Estonia. In strongly polluted areas a decrease was recorded in the quantitative variables of biota. In 1978 a joint Finnish–Soviet intercalibration of biological parameters was undertaken. The results, published in 1980, were used by the Soviet–Finnish working group for elaborating a scientific basis for preventing pollution in the Gulf of Finland. In 1975 A. Järvekülg promoted his D.Sc. thesis (Ecology of zoobenthos distribution in the eastern part of the Baltic Sea). In 1979 appeared the bulky monograph *Macrozoobenthos in the Eastern Part of the Baltic Sea*, which presented the ecological and zoogeographical characterization, and data on the dominant species, population density, and biomass, and elaborated a system of saprobic indicators for the benthos.

2. *Impact of natural and anthropogenic factors on the distribution, productivity, and succession of communities in the coastal waters of Estonia, 1981–85.*

Seasonal complex investigations were conducted in Matsalu Bay and summer expeditions continued in different bays of the Estonian coastal waters. From 1982, members of the department took part in 15 expeditions to the Gulf of Finland, the open Baltic, and the Skagerrak on board the research vessels *Aju-Dag* and *Arnold Veimer*. Two volumes of *Hydrobiological Researches* were edited by scientists of the department. One (1984) was devoted to the investigation of hydrochemical conditions and different components of biota in the Estonian coastal waters. The next volume (1985) focused on the application of hydrobiological data in the characterization of the ecological state of the Gulf of Finland.

3. *The Baltic Project: research into the variability of the biotic components of the ecosystem of the Baltic Sea; characterization of the state of the ecosystem by bioindication method and evaluation of eutrophication related trends, 1986–90.*

Spatio-temporal changes in the distribution of the content of nutrients, chlorophyll *a*, phytoplankton, and zoobenthos were studied in the Baltic Proper, the Gulf of Finland, and the Estonian coastal waters. Long-term changes of macrozoobenthos and macrophytobenthos were observed in Matsalu Bay. The bioindicators of macrozoobenthos and macrophytobenthos were elaborated for the benthal. Methods were developed for the estimation of water trophy on the basis of zooplankton and chlorophyll parameters. A monograph on the composition and dynamics of zooplankton in Matsalu Bay was published by K. Remm in 1986, and two popular scientific books dealing with the plants on the bottom of the Baltic Sea and the phytobenthos of Matsalu Bay were published by T. Trei in 1991. The researchers of the department took part in the international patchiness experiment PEX-86, carried out in the eastern Gotland Basin. The international experiment SKAGEX-90 was performed in the Skagerrak in 1990, and the results of the experiment were published in 1999.

Since the end of the 1980s, the department, restructured later into a group of river biology at the Institute of Zoology and Botany, has been engaged in complex investigations of the Estonian rivers, streams, and ditches.

A large number of macrozoobenthos samples, diatom slides, and a voluminous herbarium of bottom plants were collected in 1975–90. Some original data on hydrological and hydrochemical variables as well as on the chlorophyll content and phytoplankton and zooplankton biomass of the Estonian coastal waters and of the Baltic Proper are available in databases. Two Ph.D. theses, one in macrozoobenthos (A. Seire) and the other in zooplankton (K. Remm), and four M.Sc. theses, in microphytobenthos (S. Vilbaste), phytoplankton (K. Piirsoo and A. Randveer), and water chemistry (M. Viik), were completed at the department. Numerous papers were published on the material collected during the period 1975–90 (see Appendix for a list).

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## APPENDIX

### PAPERS PUBLISHED ON THE MATERIAL COLLECTED DURING THE PERIOD 1975–90

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**ZOOLOGIA JA BOTAANIKA INSTITUUDI MERE BIOLOGIA  
SEKTORI LÄÄNEMERE UURINGUD AASTATEL 1975–1990**

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On esitatud lühike ülevaade Zoologia ja Botaanika Instituudi merebioloogia sektori uuringutest Läänemerele aastatel 1975–1990 ning toodud ära olulisemad uurimisteemad ja tähtsamad publikatsioonid, mis on avaldatud nendel aastatel kogutud materjalide põhjal.