

The summary of the doctoral thesis

Nikodem Szymański, M.Sc

The efficiency of the photosynthetic apparatus of algae as a bioindicator of the trophic state of waters in agricultural areas

Key words: surface water eutrophication, chlorophyll fluorescence, mineral components, agricultural areas.

The eutrophication of surface water is a global problem and concerns about 40% of the world's waters. The phenomenon of eutrophication is a complex natural-anthropogenic process, in which natural factors play a major role, while factors resulting from economic human activity significantly accelerate this process. Therefore, there is a need for research aimed at better understanding of the water eutrophication process and the search for a method useful for its evaluation in surface waters from agricultural areas.

The aim of the study was to determine the relationship between physicochemical parameters of water and the efficiency of the photosynthetic apparatus of algae in surface water in rural areas with diverse intensity of land use near watercourses.

The samples were taken for surface water samples in the period from May 2018 to October 2019 from five water reservoirs located in the masovian voivodeship, pruszkowski district, in the Raszyn commune. The assessed reservoirs were located in the rural area and differed from each other with the intensity of agricultural use of land directly adjacent to them.

The research showed that the parameter of the efficiency of the photosynthetic apparatus of algae, which was strongly correlated with the physicochemical parameters in the water of the tested reservoirs, was the initial fluorescence of chlorophyll *a* (F_0) in algae. It was shown that the significant value of the F_0 parameter was characteristic for reservoirs located near agricultural land, in which there was a significant concentration of some minerals and total organic carbon

(OWO) in water. The low value of F_0 was characterized by a group of reservoirs located in the protected area of the "Raszyńskie Stawy" Nature Reserve. The obtained results show that the initial fluorescence of chlorophyll *a* (F_0) in algae can be a bioindicator of the trophic state of waters in rural areas.