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A COMPARATIVE ANALYSIS OF THE VERTICAL STRUCTURE OF PHYTOPLANKTON
IN THREE MEROMICTIC WATER BODIES: THE ROLE OF LIGHT CLIMATE,
HYDROLOGICAL FACTORS AND PREDATORS

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Meromictic reservoirs are defined as aquatic systems in which the water column remains partially or completely unmixed during circulation periods. This leads to the formation of layers with varying densities and distinct ecological parameters. This feature makes meromictic lakes excellent model objects for studying the factors that determine the vertical structure of phytoplankton (PhP). Our study examines three meromictic lakes with different climatic and geomorphological characteristics. Lake Skurcha is connected to the Black Sea, while lakes Kislo-Sladkoe and Elovoe are partially isolated from the White Sea. Salinity, temperature, spectral characteristics of transmitted sunlight, and total illuminance were measured and the abundance of the dominant predatory dinoflagellates was assessed for the White Sea lakes. We then determined how these parameters affect the vertical distribution of PhP structure, specifically species composition and abundance. According to the multiple regression analysis the factors determining changes in PhP structure varied across water bodies. In Lake Skurcha, temperature was the most significant factor for overall PhP distribution (31.5%, $p = 0.002$). The 560–580 nm light spectral range was crucial for fucoxanthin-containing algae (45%, $p = 0.003$), and the 600–650 nm range for the phycobilin-containing Cryptista group (76%, $p = 0.063$). In Lake Kislo-Sladkoe, the 481–550 nm range was the leading factor for PhP distribution (54%, $p = 0.034$), due to the dominant species *Rhodomonas* sp. contains PE545. In Lake Elovoe, salinity and predators explained 79% of the variance in PhP structure ($p < 0.05$). The vertical changes in these environmental parameters led to development of distinct PhP communities in specific layers of each lake. In Lake Skurcha, diatoms and small algal species dominated the surface layer. Dinoflagellates prevailed at 2–3 m depth, and cryptophyte algae occupied the bottom of the photic zone. Cyanobacteria dominated in the upper layer of Lake Kislo-Sladkoe, and *Rhodomonas* sp. prevailed in the highly productive zone just above the chemocline. In Lake Elovoe, diatoms prevailed in the freshwater zone. The brackish zone contained two layers of small cryptophytes. These layers were separated by the thin zone dominated by the predatory dinoflagellates *Oxyrrhis marina* and the euglenoid alga *Euglena proxima*, which is likely too large for this predator.

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