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**Impact of simulated floods on structural and functional biodiversity
of the microbiome of selected river muds**

*Summary*

**Key words:** biodiversity, flood, microbiome, microcosm, river muds, soil, soil quality

The aim of this dissertation was to assess changes in the structural and functional biodiversity of soil bacterial communities affected by short-term flooding.

As part of the research objective, a microcosm experiment was carried out during which a 14-day flood was simulated under controlled conditions in relation to selected river muds using river water. The research material consisted of three species of river muds (fluvisols) taken from natural floodplains of the Vistula River in the Lublin Province, which are meadows located in the area of the Lesser Poland Gorge of the Vistula. Soils in the form of blocks together with vegetation were placed in containers and then flooded with water taken from the Vistula to a level 5 cm above the soil surface. Fresh soil samples, water from the Vistula and soil samples after 7 and 14 days of water standstill were taken for analyses. In the course of the experiment, comprehensive analyses of soil quality were performed, i.e., physicochemical parameters, enzymatic activity, metabolic potential of microorganisms and structural diversity of soil bacteria communities were determined.

A statistically significant decrease in pH value and phosphatase activity was found, with a parallel increase in dehydrogenase activity as a result of flooding conditions. The analysis of NGS 16S rRNA allowed to detect numerous unidentified bacterial sequences in the examined soils. As a result of the floods in river muds the number of anaerobic and facultative anaerobic bacterial families increased. An increase in structural diversity of bacterial communities and their metabolic potential under hydrological stress conditions was observed.

The results obtained allowed to confirm the research hypothesis - extreme soil moisture conditions lead to significant differences in the composition and function of soil bacteria communities.