

---

# Wastewater effects from a pulp and paper mill on the oligochaetes community structure

Maria Baturina\*<sup>†1</sup>

<sup>1</sup>Institute of Biology of Komi Science Centre of the UB of the RAS 167982 – Syktyvkar,  
Kommunisticheskaya str., 28, Russia

## Abstract

Studies receiving pulp and paper mill effluents (Mondi Syktyvkar JSC) on the Vychegda River (European North) were initiated in 2018/2020 to address questions about effects of wastewater effluents on biodiversity aquatic communities. The investigated section is 55 km long, located in the zone of wastewater influence and control section is 72 km upstream. Sediment assays and water concluded that no significant toxicity effects were observed from pulp mill discharges of river. But there is an increased temperature regime, excess of biogenic elements and the predominance of uncharacteristic substrates (artificial pebbles, gravel, silt). In the zone of influence 40 species and forms of oligochaetes have been identified (Baturina et al., 2021a, b). We found species having been earlier identified only in tributaries, in flood-plain water bodies and in lakes of the Vychegda River basin (Lastochkin, 1955). According to the calculations of the diversity index (Shannon index (HN) and Simpson index (DS)), evenness index (Pielow index (E)), and Whittaker ( $\beta_w$ ) indices, the studied section of the river exceeds the control section by the species diversity, there is also a significant increase abundance and biomass of oligochaetes. The correlation analysis between the quantitative development indicators of oligochaetes with the environmental parameters (type of substrate, presence of algal and macrophyte, depth, chemical composition), the assessment of biotopic confinement of species (Fj) and conjugate between species (rA) showed that the distribution of oligochaetes in the study area largely depends on the substrate type. This study indicated that effluent-loadings to the river greatly increase benthic riverine productivity and associated with severe eutrophication. Nutrients (phosphorus and nitrogen) the effluent have enrichment effect on the river food web immediately below pulp mill discharges and on technogenic substrates algae rapidly accumulated. This increases the availability of food for secondary producers, changes the structure of zoobenthos, including oligochaetes community structure.

**Keywords:** Oligochaeta, biodiversity, pulp and paper mill treated wastewater, European North

---

\*Speaker

<sup>†</sup>Corresponding author: baturina@ib.komisc.ru