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Effect of saline water from the Oder River on the yield and mineral composition of reed canary grass (*Phalaris arundinacea* L.)*

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Abstract

Salinity of surface waters is an increasing environmental problem that may limit their agricultural use and negatively affect ecosystems. Following the 2022 ecological disaster in the Oder River, there has been a growing interest in the effects of saline river water on plants and the potential use of tolerant species in remediation systems. The aim of this study was to determine the effect of saline water from the Oder River on the yield and mineral composition of reed canary grass (*Phalaris arundinacea* L.). A pot experiment was conducted under controlled conditions using four irrigation treatments based on different proportions of the Oder River water in the applied water mixture: 0, 25, 50, and 100%. Plant biomass was harvested in two cuts, and the contents of selected macronutrients (N, P, K, Ca, Mg) and sodium (Na) were determined. Increasing proportions of saline water had a positive effect on biomass yield. Total dry matter yield increased by 17%, 29%, and 35% in the 25%, 50%, and 100% treatments, respectively, compared with the control. Nitrogen and phosphorus contents generally decreased with increasing salinity, whereas calcium and magnesium contents remained relatively stable. Sodium concentration in plant biomass increased significantly with increasing salinity, indicating active uptake and accumulation of this ion. The results demonstrate that reed canary grass shows high tolerance to saline water and may be considered a promising species for phytoremediation and management of saline waters including nature-based solutions in water restoration.

Keywords: reed canary grass, mineral composition (N, P, K, Mg, Ca, Na), salinity, phytoremediation

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