EVALUATION OF GROUNDWATER AND PHOSPHORUS TRANSPORT IN FRACTURED ALTERED WETLAND SOILS

Litaor, M.I., Sade, R., Shenker, M.*
**M. Iggy Litaor, Tel-Hai College, Dept. of Biotechnology and Environmental Sciences, Upper Galilee 12210, Israel. litaori@telhai.ac.il*
Rotem Sade, The Hebrew University of Jerusalem, P.O. Box 12, Rehovot 76100, Israel. rotem.sade@mail.huji.ac.il
Moshe Shenker, The Hebrew University of Jerusalem, P.O. Box 12, Rehovot 76100, Israel. shenker@agri.huji.ac.il

Nutrient loss from altered wetlands to waterways may influence the water quality of downstream water resources. To test potential nutrient transport from a highly fractured agricultural field of altered wetland to waterways, we computed water and solute budgets in a large field (320 ha) experiment. The water level was raised in a drainage canal for 28 days (raising stage) to generate water flow to the field and then lowered (drainage stage) to generate back flow to the canal. Differential sampling stations (DISS) equipped with an Eh-pH measuring system were installed to monitor and sample crack and matrix water separately. Water flowing in cracks exhibited Eh >250 mV and EC <1.5 ds m^{-1} while in the matrix, the Eh was <100 mV and EC exceeded 3.0 ds m^{-1}. Total P concentration in the cracks was <70 μg L^{-1}, and exceeded 150 μg L^{-1} in the matrix. High similarity was found between crack water measured in the DISS and water that drained directly into the drainage canal. We concluded that the groundwater flow is a dual-domain system, with most of the water flow occurring in the cracks. We also concluded that the crack and matrix domains are in chemical disequilibrium because of low transport rate from the matrix to the cracks relative to water flow rate in the cracks. During the drainage stage, only 0.64 kg P, compared with 3700 kg of the conservative sulfate ion, were transported from the field to the canal. The limited P mobility is ascribed to oxidized conditions in the crack walls which lead to Fe-hydroxide precipitation and P adsorption.