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## **EXPERIMENTAL LABORATORY STUDIES ON CAPILLARY FRINGE BEHAVIOR**

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### **Abstract**

This paper describes laboratory experiments conducted to investigate groundwater flow and solute transport within the capillary fringe (CF) and exchanges between the CF and the region below the water-table. An experimental bench was developed in order to simulate an unconfined aquifer, to observe the development of the CF and to study nitrates transfer from groundwater to CF, and also the fate of nitrates into the CF.

The experimental bench has three compartments, the middle one being filled with sand and simulating an unconfined aquifer. Both sides of the middle compartment are edged by water reservoirs, which allows to develop a longitudinal flow into the sand reservoir and, as a result, a homogenous, isotropic, unconfined aquifer is obtained. The simulated water table (WT) was established at 10 cm above the bottom of the sand tank and a CF of 8 cm height have been obtained. Two soil solution extracting tube were installed in the sand tank. A continuous and diffused source of pollution has been simulated by filling the supply reservoir with water containing dissolved nitrate-ammonium with a concentration of 232.5 mg/L. The concentration values of soil extract shows a vertical upward flux of nitrates transported by capillarity from the water-table towards soil surface.

*Key words:* capillary fringe, groundwater, nitrates

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