



## **Infiltration and groundwater recharge processes of water and solutes through a ditch in a farmed Mediterranean catchment.**

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Farmed catchments in the Mediterranean area often exhibit dense networks of ditches created for the drainage of water excess at the field scale. These ditches are also preferential zones of surface water percolation (Marofi, 1999), and thereby of pollutant transport to shallow watertables (Louchart et al., 2001). This study aimed at evaluating the impact of infiltration in ditches on the level, shape and quality of a shallow watertable. An infiltration experiment was conducted on a 10 m long ditch, 1 m wide and 0.8 m deep, located in the Roujan catchment (43°30'N, 3°19'E) in south-France. Water was injected on the ditch during almost 4 hours when the watertable was initially at a depth of almost 2 m below the soil surface. Bromide was added as a tracer to water. A dense network of monitoring points was installed at the field site. Piezometers and tensiometers allowed to monitor the evolution of watertable shape and the evolution of soil potential along three transects perpendicular to the ditch. Sampling points were also installed in the ditch and at distance from the ditch to depth of 0.5 to 2.8 m below the soil surface for evaluating the repartition of the infiltration bulb. Measurements were done during 10 hours. At this time the watertable returned to its initial level.

The field observations indicated two major points: i) the infiltration rates were large and induced a significant evolution of the watertable shape and height. At the maximum, watertable level rose by 1 m below the ditch whereas it rose by 0.1 m at a distance of 16 m from the ditch. ii) Water infiltrated during the experiment remained within a small volume around the ditch. In effect, Bromide was only detected to a distance of 2.5 m from the ditch but not further.

These two points indicate that whereas infiltration through ditches induce a strong change in watertable level and shape, the spread of pollutant from the surface to shallow groundwater by the way of infiltration through ditches might be limited. It also suggests that the watertable rise by infiltration in the ditch is partly due to a piston flow process.

Louchart, X., M. Voltz, P. Andrieux, and R. Moussa. 2001. Herbicide transport to surface waters at field and watershed scales in a Mediterranean Area. *Journal of Environmental Quality* 30:982-991.

Marofi, S. 1999. Dynamique des échanges hydrologiques entre réseau de fossés et nappes superficielles dans un bassin versant méditerranéen. Thèse de doctorat, ENSA de Montpellier, Montpellier.