



## **Study of the Hydrological and Geochemical Functioning of a Riparian Zone**

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Riparian wetlands are located along rivers at the interface between the aquatic environment and agricultural fields where fertilisers are used. Due to their location, they can act as buffers by removing nitrate through denitrification and plant uptake. The effects of soil parameters, hydrology and temperature on nitrate removal processes are not fully understood. Therefore, the objective of this study was to investigate the factors controlling the nitrate retention at the local scale.

We realised a hydrological and geochemical survey of a riparian wetland located in the large floodplain of the Seine river at 50 km of Troyes by monitoring 4 wells. The wells were located at equal distances along a transect across a topographic profile from calcareous cuestas down to the stream. From April 2004 to August 2005, weekly measurements of pH, redox potential, temperature and conductivity, and water samplings were performed at the 4 wells, at different depths, as well as in the stream. The water samples were analysed for major element concentrations and alkalinity.

The first hypothesis was that the denitrification occurred principally in high water period (i.e., in the winter) when the presence of water at the subsurface of the soil allowed the development of reductive conditions. However, we observed a decrease of nitrate concentration in the summer in the well near the stream and in the stream. The second hypothesis concerned the hydrologic functioning of the study site: directions of flow were thought to be from calcareous cuestas down to the stream. The observation of the major element concentrations indicated that the well near the river was supplied by the flows from both calcareous cuesta and the river.

The geochemical study of the riparian zone allowed us to understand the hydrological functioning with a key role being played by the river and to determine the factors

controlling the nitrate retention.