Geophysical Research Abstracts, Vol. 9, 11177, 2007
SRef-ID: 1607-7962/gra/EGU2007-A-11177

Constructed wetland to mitigate the impacts of subsurface drained watershed.

J. Tournebize (1), B. Vincent (1), **F. Birgand** (1), F. Painaut (3), P. Molle (2), JJ. Gril (2), Y. Nédélec (1)

1. Cemagref, Antony, France
2. Cemagref, Lyon, France
3. Chambre d'Agriculture Indre et Loire, France

Vulnerability of water resources to pesticides has become of major concern in France. This is true for groundwater, in which measurable concentrations are now too often measured. Several major aquifers serving as drinking water supply are particularly vulnerable since they are recharged, in part, by surface water in the Parisian basin. Indeed, some small streams locally "disappear" in sinkholes in agricultural areas. The quality of this water is usually far from desirable as it often flows from to artificial drainage pipes.

Limiting the vulnerability of such aquifers to pesticides application on agricultural fields may correspond, in our case, to treating drainage water before it contaminates aquifers. One mitigation solution may lye in the use of constructed wetland located downstream of the agricultural area. For that purpose design criteria were established on a 60 ha on farm experimental lay out assessing expected pesticide dissipation using acquired flow data and application dates.

Our knowledge on artificial drainage hydrology and water quality tells us that it is not necessary to process the totality of the effluent, but rather treat only part of it corresponding to strategic times in the hydrograph. It seems that concentrated water in the ascending phase of the hydrograph as well as that that has flowed some time after the peak could be technically treated for an acceptable efficiency. A consequence of this is that a restricted volume could be treated by the constructed wetland corresponding a relatively small surface of land allocated for that purpose, which should enhance farmers' acceptability of the structure.

The pesticide dissipation assessment shows that a ratio of 1% of wetland area to the total area is sufficient to reduce 50% of the total annual flux and to eliminate concentration peaks. This result is a first step and further improvement should found in farmer's involvement and BMP's.