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Seasonal herbicide monitoring in soil, runoff and sediments of an olive orchard under conventional tillage

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Several pollution episodes in surface and groundwaters with pesticides have occurred in areas where olive crops are established. For that reason, it is necessary to know the evolution of some pesticides in olive trees plantation depending on their seasonal application. This is especially important when conventional tillage is used.

A monitoring of two herbicides (terbuthylazine and oxyfluorfen) in the first cm of soil and, in runoff and sediment yield was carried out after several rainfall events. The rainfall occurred during the study was higher in winter than in spring giving rise more runoff in winter. However, no differences in sediment yields were observed between spring and winter. Terbuthylazine depletion from soil is associated to the first important rainfall events in both seasons (41 mm in spring and 30 mm in winter). At the end of the experiment, no terbuthylazine soil residues were recovered in winter whereas 15% of terbuthylazine applied remained in spring. Oxyfluorfen showed a character more persistent than terbuthylazine remaining 48% of the applied at the end of the experiment due to its low water solubility. Higher percentage from the applied of terbuthylazine was recovered in runoff in winter (0.55%) than in spring (0.17%). Nevertheless, no differences in terbuthylazine sediments yields between both seasons were observed. That is in agreement with the values of runoff and sediment yields accumulated in tanks in both seasons. Due to the low water solubility of oxyfluorfen very low amount of this herbicide was recovered in runoff. Whereas, in sediment yields the 39.5% of the total applied was recovered.

These data show that the dissipation of terbuthylazine from soil is closely related with leaching processes and in less extent with runoff. However, oxyfluorfen dissipation is more affected by runoff processes since this herbicide is co-transported in sediment yields.

Keywords: olive crop, pesticide, runoff, sediments, surface water, groundwater

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