



Contributing Areas for Herbicide Losses to Surface Waters in a Small Agriculture Catchment

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Diffuse losses from agricultural fields are often the major contributors to the total herbicide loading in surface waters. Based on hydrological observations it may be expected that not all areas within a catchment contribute to such losses to the same extent. However, the prediction of contributing areas is not an easy task. We present the results from two experiments, carried out in a small agricultural catchment (2 km²), to quantify the contribution of different groups of fields to herbicide losses. For that purpose the herbicides were applied on all corn fields in the catchment on the same day. The first discharge event after application promoted the highest herbicide input to surface waters, indicating that fast flow transport processes (surface runoff and preferential flow) caused the herbicide losses. By monitoring at different sites we could quantify herbicide losses from different subcatchments under identical weather conditions. In the first study (2000), we observed a 56-fold load difference (normalized to applied amounts) between two neighbouring subcatchments. These large differences prevailed in the follow-up study (2003) under very different weather conditions. By using an additional herbicide as a tracer we observed that the wettest part (0.03 ha) of one field caused much higher relative losses (24%) compared to the average (0.7%) of both fields (3ha) in the subcatchment. The data suggest that avoidance of spraying on risk areas could strongly reduce herbicide losses to surface waters. The soil hydrology, topography and connectivity to the water channels were identified as crucial factors determining the contributing areas.