Geophysical Research Abstracts, Vol. 8, 03531, 2006
SRef-ID: 1607-7962/gra/EGU06-A-03531

Comparison of chlorotoluron mobility and persistence in four different soil types during two years with varying atmospheric impact

M. Kocarek, **R. Kodesova**, J. Kozak

Czech University of Agriculture in Prague, Department of Soil Science and Geology, Czech Republic (kodesova@af.czu.cz, kocarek@af.czu.cz, kozak@af.czu.cz)

Mobility and persistence of chlorotoluron was studied during two years that are characterized by different atmospheric conditions after the herbicide application. The field and laboratory experiments were performed for four different soil types. The herbicide Syncuran was applied on a four square meter plot using an application rate of 2.5 kg/ha of active ingredient on 5th May 2004. Soil samples were taken after 5, 13, 21, 35, 62, 105 and 151 days to study the chlorotoluron distribution in the soil profile. The chlorotoluron mobility in the monitored soils increases as follows: Haplic Luvisol $<$ Haplic Cambisol $<$ Dystric Cambisol $<$ Greyic Phaeozem. The herbicide transport was in both Cambisols slightly affected by preferential flow and highly affected in Greyic Phaeozem. Total contents of remaining chlorotoluron in the soil profile correspond with the herbicide mobility. The highest herbicide degradations were at locations with lower observed mobility and herbicide was present mainly in the top layer. The experiments were repeated in 2005 at different experimental plots. Chlorotoluron was applied on 21st April in Haplic Luvisol, Haplic Cambisol and Greyic Phaeozem. Soil samples were taken after 7, 35, 65 and 152 days. In case of Dystric Cambisol the herbicide was applied on 5th May and soil samples were taken after 35, 137 days. Chlorotoluron mobility corresponded with those observed the previous year except in Greyic Phaeozem, where the effect of preferential flow was not so evident. The chlorotoluron persistence seems to be lower in 2005 compared to that in 2004 that was probably caused by high intensity rainfalls several days after the herbicide application in 2004. Chlorotoluron moved more quickly into the depth were degradation rate was lower then that at the top of the soil profile affected by solar radiation. The adsorption isotherms were obtained for two horizons (humic horizon and subsur-

face horizon) using a standard laboratory procedure. Adsorption isotherms obtained on soil samples taken in different years slightly differ. This is probably due to seasonal soil property changes and heterogeneity. The chlorotoluron mobility characterized by the adsorption isotherms corresponds with the chlorotoluron mobility observed in the field in 2004 and 2005 except for Dystric Cambisol. In spite of very high adsorption obtained for this soil type the field mobility appears to be higher due to a high content of fine and coarse gravel that causes reduction of the specific surface area of soil particles and reduction of a flow profile. The reduction of adsorption properties should be considered in numerical simulations of herbicide transport processes in such soils. Finally, comparison of chlorotoluron transport simulated using the capacity based BPS model (Kozak and Vacek, 1996) and the Richards equation based HYDRUS-1D model (Simunek et al., 2005) is presented.

Acknowledgement: This study was supported by the grant No. MSM 6046070901 and GA CR No. 103/05/2143.