



## **Lateral Water Flow and Transport of Pesticides in a Sloped Soil under Litchi in Northern Thailand**

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The land use change that occurred in the mountainous regions of Northern Thailand during the last decades has been accompanied by an increased input of agrochemicals. Particularly in sloped areas agrochemicals may be lost to the streams by lateral flow and transported to the lowlands, thereby contaminating ecosystems and water for human consumption. We investigated water flow and agrochemical transport at the hill slope scale. Special emphasis was put on lateral surface and subsurface water flow as well as on the fate of pesticides in soil.

To identify the transport pathways in the soil and assess the extent of pesticide leaching to the stream, a series of field scale experiments was conducted with the low sorbing insecticide methomyl and the stronger sorbing fungicide chlorothalonil. The two pesticides were repeatedly applied on the whole orchard (2 ha area). In two flumes, up- and downstream of the orchard, water flow was measured and water samples were taken automatically in the downhill stream as a function of water flow and analyzed for their pesticide concentrations. Separation between pesticide masses transported by interflow and surface runoff was achieved based on threshold values for rain amount and intensities obtained from plot scale experiments. The recovery of methomyl was between 8-15%, that of chlorothalonil 2%. Both pesticides appeared shortly before or at the same time with the first discharge peaks after application. Later on they were found mainly at the decreasing shoulders of the discharge peaks. The pesticides were

detected in the river in short, repeated peaks which did not show any tailing. Between 15 and 75 % of the recovered pesticide mass could be identified as having been transported by interflow. After periods of strong rainfall the amount of rain inducing lateral subsurface flow decreased from about 15-20 mm/day to 1 mm/day.

Our results show that lateral transport is an important pathway for pesticides from soil to surface water in sloped areas. Lateral flow strongly depends on the antecedent soil wetness. The observation of the short pesticide peaks suggests that the subsurface flow takes place almost exclusively along preferential flow paths. The differences of the recoveries between the two pesticides indicate a dependence of the lateral subsurface flow on the sorption behavior of the chemical.