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EFFECT OF SLOPE POSITION ON TRANSPORT OF BROMIDE UNDER DRY LAND FARMING

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Differential rate of erosion from different slope positions of Palouse region have changed physical, biological, and hydraulic properties of the soil. The differences in soil hydraulic properties are believed to control the rate and movement of infiltrated water which influences the transport of agrochemicals. Leaching plots were sprayed with bromide at the top-and bottom-slope positions to assess the impact of slope positions on the vertical and horizontal movement of a conservative solute. The simulation of computer model (FEMWATER) revealed that the lateral flow is dominant at the top-slope position indicating low potential of groundwater contamination. Because of lateral flux at the top-slope position, significant amounts of bromide had moved about 7 m down-slope outside the leaching plots. Downward movement at the bottom-slope position, was predominant which increased the potential of bromide teaching to groundwater.

INTRODUCTION

The agricultural iand in the Palouse prai- rie of eastern Washington is highly productive. However, the landscape is also prone to soil erosion with accompanying seasonally heavy loading of sediments and agrochemicals in the‘ surface waterways. Erosion from upper slope positions had led to loss of topsoil, organic matter. and chemicals. Lower slope positions are the zones of depositions and exhibit thick surface horizons with high organic matter con- tent. Pathways of agrochemical transport from the surface of these soils are poorly understood. On the basis of pesticide’s tendency to migrate to water tablcs thal are 20 m below the surface with percolation to the water table, the Wash- ington State Department of Ecology ranked them as a high potential source of contamina- tion (Hall and Associates. 1986). Prior to this study it was not known whether the main path- way of loss is due to vertical leaching, surface runoff and erosion, or subsurface lateral flow. Effect of slope steepness, subsoil horizonation, and tillage practices on agrochemical transport need to be studied in order to develop best management practices that can minimize sur- face and groundwater contamination. The main hypothesis of the study was that surface runoff and/or subsurface lateral transport of agrochemicals. Accumulation of these solutes in lower slope positions at a time when rooting systems are poorly developed leads to potential for leaching and runoff losses of agrochemicals to ground and surface water, respectively. The potential for contamination of groundwater at upper slope positions 1s low duc to deep water tablcs thal are 20 m below the surface and low soil permeability.

METHODOLOGY

Experiments were conducted in the Mis- souri Flat Creek watershed to study transport of bromide tracer al top and bottom-slope posi- tions managed with different tillage practices. A