

Effects of Tillage Systems on Triazine Herbicides Leaching on Guarany Aquifer in Brazil

A.L. Cerdeira¹, M.Dornelas-DeSouza¹, D.Bolonhesi², S.C.N. Queiroz¹, V.L. Ferracini¹, S.Smith Jr.³

¹Embrapa, Meio-Ambiente, Research Division of the Brazilian Ministry of Agriculture, C.P. 69, Jaguariuna, SP, 13820-000, Brazil.

²APTA-Agricultural Experiment Station, C.P. 271, Ribeirao Preto, SP, 14001-970, Brazil.

³USDA-ARS- National Sedimentation Laboratory, P.O. Box 1157, Oxford MS, 38655, USA.

The Guarany aquifer located in South America has a dimension of approximately 1,200,000 Km² and spreads to areas of eight Brazilian states plus parts of Argentina, Uruguay and Paraguay. The region of Ribeirao Preto City, located in Southeast of Brazil, Sao Paulo State, is a sugarcane, soybean, peanuts, and corn producing area. This region is also an important recharge area to the aquifer. Intensive farming on the area has demanded constant use of herbicides and fertilizers. Triazine herbicides such as atrazine, ametryn, and simazine are used on the area and are known to have potential for groundwater contamination. Currently most of the sugar cane crop is mechanically harvested without burning. This practice allows the straw to decompose in soil, maintain a better soil structure, and interferes with the movement and leaching of solutes. It is a common practice to sow peanuts after sugarcane harvest using no-tillage or conventional planting systems. To evaluate the effects of herbicide leaching into groundwater during no-tillage planting of peanut after mechanically harvested sugarcane, a soil leaching study using soil columns and analysis of water collected from wells of the Guarany aquifer have been conducted. The results showed a general trend of higher density and lower porosity in soils under no-tillage, mainly at the top layer. The Hydraulic Conductivity determined in soil columns was higher for soils under conventional system than no-tillage, 10.82 and 4.59 cm/h respectively, indicating higher leaching potential for conventional system. Furthermore, results of HPLC studies of triazine herbicides were performed in six wells located at the edge of the recharge area named as "Candido Portinari", "Palmares", "Iraja", "Sao Jose", "Juliana", and "Recreio Internacional" and no triazines were detected in groundwater.

Acknowledgements. Research funded by FAPESP, The State of Sao Paulo Research Foundation, Brazil. Project Number 2002/05067-1.