

## Hydro-edaphic characterization in Vertisols under different land use systems

The impact of use of natural resources associated with anthropogenic activities has increased evidently, not only land use changes modify the chemical properties of the soils, but can also alter their physical properties like compaction reducing porosity and negatively affecting infiltration rates. The objective of this study was to evaluate differences among four land use systems in northeast Mexico. Undisturbed soil samples were collected in a Vertisol under different land uses: grassland, agricultural, Eucalyptus plantation and thornscrub, samples were analyzed by triplicate for bulk density ( $\text{g.cm}^{-3}$ ) and hydraulic conductivity  $K$  ( $\text{cm.s}^{-1}$ ), in each sampling site the mechanical resistance to penetration ( $\text{kg cm}^{-2}$ ) by Yamanaka-type penetrometer, cumulative infiltration (cm) and infiltration rate ( $\text{cm.h}^{-1}$ ) were measured. The results of the hydro-edaphic characteristics were: Bulk density 1.0, 1.1, 1.1 and 1.2  $\text{g.cm}^{-3}$  for thornscrub, agricultural, eucalyptus and grassland, respectively. Mechanical resistance to penetration ranged from 0.5  $\text{kg.cm}^{-2}$  (agricultural) to 5.2  $\text{kg.cm}^{-2}$  (grassland). In terms of hydraulic conductivity the agricultural, Eucalyptus and thornscrub systems presented good permeability values of  $k= 0.0137$ , 0.018 and 0.0133  $\text{cm.s}^{-1}$  respectively, while grassland system showed a poor permeability value of  $k= 0.0001 \text{ cm.s}^{-1}$ . Cumulative infiltration and infiltration rates ranged from 5.9 to 10.8  $\text{cm.h}^{-1}$  for grassland, from 26.5 to 43.7  $\text{cm.h}^{-1}$  in thornscrub, from 32.2 to 55.5  $\text{cm.h}^{-1}$  in Eucalyptus and 36.1 to 58.5  $\text{cm.h}^{-1}$  in agricultural system. The analysis of variance showed significant differences ( $p \leq 0.05$ ) among land use systems for all investigated variables. The grassland system showed the highest values for bulk density and mechanical resistance to penetration, likewise shown the lowest infiltration rate. This may due to the continuous grazing with livestock in the area. Thus, it can conclude that land use changes in Vertisols modify the soil properties.

Bulk density, hydraulic conductivity, Infiltration, land use systems, Vertisols.