Abstract

Desertification is a problem in the Sahel which delimits water infiltration due to changes in the structural stability of the topsoil. Fine scale research was done to understand relations between soil physical properties and surface response to water. Controlled infiltration experiments were accomplished in the dry season of the Soudano-Sahelian zone of Burkina Faso. Different homogeneous response units (RU's) in semi-natural and agricultural settings were chosen, and differences were made between vegetated and bare areas. Soil physical properties and response to simulated rainfall were determined on fine scale plots. Different hydrological responses on different surfaces indicate that vegetation/bare cover distributions are very important. It was observed that bare semi-natural surfaces have the lowest total infiltration percentage with a mean of 66%. This value is significantly different from vegetated semi-natural (86%) and agricultural sites (92.5%). Land use shows strong significant relations with dry bulk density (-0.423), initial soil water content (0.515) and horizontal (-0.657) and vertical shear strength (-0.562). The patches of vegetation within the semi-natural RU's showed a significant deeper mean infiltration compared to bare areas. Termite activity was found on a small scale on vegetated sites and some of the agricultural sites. Compared to sites with no termite activity there was a significant better infiltration on the sites with termite activity. It seems that stone coverage in the form of desert pavement negatively influences the water infiltration. The surfaces with the biggest change in erodibility, which means the best stabilizing effect upon wetting, were the old surfaces of the inselbergs.

Keywords: Sahel, Burkina Faso, Rain Simulations, Response Unit, Aggregate Stability, Infiltration, Vegetation Patches, Erodibility