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The Contribution of Termites on Water Repellence affected Infiltration of a crusted Soil in Sanmatenga, Burkina Faso

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Termites are an important component of soil macrofauna in Sahelian regions. The effect of termite activity on infiltration and runoff has been well studied over many years. All results suggest that termite activity is a key element in the effectiveness of mulching and infiltration of crusted soils in the Sahel. On the long term termite activity results in a statistically significant increase of water infiltration, soil water storage and drainage. However, many of the previous investigations were based on rainfall experiments, carried out on pre-wetted soils.

This research focuses on the effect of termite activity on rainfall and runoff infiltration and hydro-physical soil properties, applying rainfall simulations under field dry soil surface conditions. The topsoils in the study area are strongly crusted and have a loamy sand texture underlain by a sandy loam Bt horizon. Classical soil and water conservation techniques have been applied in the area of study (stone bunds and narrow grass strips on the agricultural fields, with crops of millet, sorghum and hibiscus). The results turn out to be in contrast with results reported in previous work. Rainfall simulation experiments show that infiltration is strongly reduced on the termite plots

when compared to control plots with no visible termite or other surface faunal activity. Preliminary field water repellency tests indicated that the topsoil is more water repellent than the topsoil of the control plots, which may explain the reduction of infiltration rates and increased runoff. The water repellency of the topsoil is assumed to be related to the presence of organic hydrophobic compounds, which are present as coatings on soil particles. These could be derived from organic material incorporated in the soil by the termites. Dispersion and or flocculation of termite micro-aggregated B-horizon material, brought to the surface by termites, may also play a crucial role in the reduction of the soil surface infiltration capacity.

It is anticipated that the reduced infiltration capacity of these crusted soils under dry conditions at the very beginning of the rainy season will lead to increased overland flow and runoff. This may lead to accelerated soil erosion and hence soil degradation and soil quality loss.