



## Estimating the loss of C, N and microbial biomass from Biological Soil Crusts under simulated rainfall

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Most areas where biological soil crusts (BSC) develop undergo a climate with heavy but sparse rainfall events. The hydrological response of the BSC, namely the amount of runoff, is highly variable. Rainfall simulation experiments were conducted in Sadoré, south-western Niger. The aim was to estimate the influence of the BSC coverage on the quantity and quality of water, particles and solutes exported during simulated rainfall events.

Ten 1 m<sup>2</sup> plots were selected based on their various degree of BSC cover (4-89%) and type of underlying physical crust (structural or erosion crusts). The plots are located on similar sandy soil with moderate slope (3-6%). The experiments consisted of two rainfall events, spaced at 22-hours interval: 60 mm/h for 20 min, and 120 mm/h for 10 min. During each experiments particles detached and runoff water were collected and filtered in the laboratory. C and N content were determined both in water and sediments samples.. These analyses were completed by measurements of phospholipid fatty acids and chlorophyll a contents in sediments and BSC samples collected before and after the rainfall. Mineral N and microbial biomass carbon of BSC samples were also analysed.

The results confirmed that BSC reduce the loss of particles and exert a protective effect on soils with regard to particle detachment by raindrop. However there is no general relationship between the BSC coverage and the loss of C and N due to runoff. Contrarily, the C and N content in the sediments is negatively correlated to their mass. The type of physical crust on which the BSC develop also has to be taken into account. These results will contribute to the region-wide modeling of the role of BSC in biogeochemical cycles.