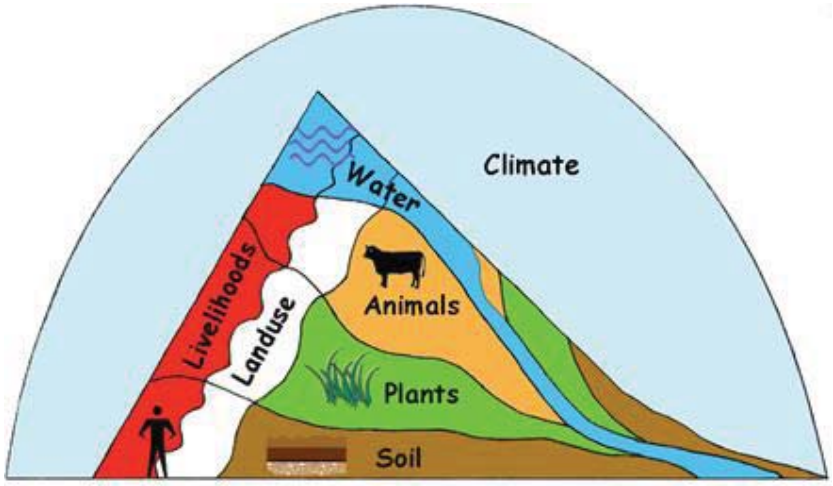

Soil Microbial Indicators for Different Land-Use Types in the Oasis Bulgan Sum, Mongolia

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1. Abstract

The problem of overgrazing and overusing in oasis within semi-arid regions leads to increasing soil degradation. In this study, six different land-use-types in the floodplain and hinterland of the river Bulgan, Mongolia were sampled as typical forms of land-use in this region. As soil microbial parameters react more sensitive to land-use change, soil microbial and physico-chemical parameters were examined to get more information on the ongoing processes and changes in these soils. Different land-uses types were compared with respect to their soil microbial biomass, basal respiration, the C_{mic}/SOC ratio, metabolic quotient, and ergosterol content. Microbial biomass C of the pastural sites ranged from 727.5 to 816.0 µg g^{-1} soil and formed 3.6 – 5.3 % of the total organic C. Pediment sites had C_{mic} values of 212.8 µg g^{-1} soil and showed very low organic carbon contents, but a high C_{mic}/SOC ratio of 11.7 %. For the irrigated agricultural sites microbial biomass C ranged from 232.3 to 542.4 µg g^{-1} soil and formed 1.8 – 3.6 % of the total organic C. A declining tendency of microbial biomass and of the availability of organic matter for microbes was observed with the increasing agricultural intensification. The part of saprotrophic fungi on the total microbial community was higher in agricultural sites. Our results showed that intensive cropping lead to decline in soil microbial biomass and subsequent soil organic C, which makes soil more vulnerable to wind and water erosion.

Keywords: *microbial biomass, microbial indicators, bio-chemical properties, sustainable land use, qCO_2, ergosterol*