



Dynamics of soil nutrients in abandoned sheep corrals in semi-arid forested regions

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Herbivores play an important role in the cycling of nutrients through the soil-plant-animal system, and grazing management has a large effect on the spatial distribution of nutrients and the fertility of pasture soils. Sheep grazing in open spaces is based on night penning in seasonal corrals. Herders usually keep the livestock in corrals at nighttime in order to prevent their scattering and protect them from predation and theft. A direct consequence of this traditional management is the gradual accumulation of excreted feces and urine in the corrals, locally increasing the content of organic matter and minerals in the soil, instead of being distributed in the range. Lack of planning and unawareness of the long-term effect of abandoned corrals is negatively affecting the landscape and grazing value of the forest soils. The aim of our research was to study the time course of changes in levels of soil nutrients in an abandoned sheep corrals in two Mediterranean forested semi-arid regions in Southern part of Israel, with different rainfall regimes, in order to assess the time span required for the recovery of the initial and natural soil conditions. Our results showed that in semi-arid sites sheep penning has long lasting effects on corral soil. Dung decomposition was a slow process lasting 5-10 years. Underneath the dung layer, initial high levels of EC_{sat}, soluble N, P and K in the soil showed a faster decrease in the rainier site compared to a gradual decrease in the dryer site. Yet, 15-20 years after corral abandonment K and P were still 2 to 3 times higher compared to the surrounding range, while soluble N already decreased 10-15 years after abandonment. The corrals act as sinks of soil nutrients that are lost to the grazed forested pasture soils. We propose that a steady-state between nutrients inputs (i.e. atmospheric deposition, N-fixation) and outputs (i.e. grazing and night penning) is reached in the grazed forest range at a low level of soil nutrients, which may constrain vegetation productivity.