Options for Management of Rangeland Carbon and Nitrogen Content. (S07-martens134850-Poster)

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Abstract:

Rangelands account for a large percentage of the United States landmass, but a proportional research effort into C and N cycling in rangeland soils is lacking compared to agricultural soils. This study evaluated water infiltration rates (WIR), total C and N, C and N isotope fractions, microbial activity and biochemical fractions in four sites in Arizona rangeland that had different management such as grazed vs. not grazed, not cleared vs. cleared and revegetated or cleared with no grazing since the 1940's. Substrate induced respiration measurements found cleared sites had 2-fold higher microbial activity compared with noncleared sites and total N contents were nearly 3 times higher in certain sites presumably due to activity of microbiotic crusts. Evidence of N-fixation by certain grass species may also increase soil N in revegetated sites. Soil mineralization studies found residue mineralization was N limited in the not cleared sites and N additions resulted in not cleared mineralization rates comparable to the cleared sites, but the cleared sites did not show a response to N addition. Each of the locations also showed greater WIR in the not grazed sites than in the grazed sites with a pronounced layer of high density in the grazed sites that limited WIR. Soil C isotope values were related to the isotope values of the plant biomass, and careful comparisons found the C content was higher in the grazed vs. not grazed sites.

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