Soil Carbon Cycling and Microbial Activity in Subhumid Temperate Grasslands: Effects of Simulated Grazing and Seasonal Fires. (S07-harris161156-Poster)

Authors:

- W.N.Harris* Texas A+M University, College Station, Texas
- T.W.Boutton Texas A+M University, College Station, Texas
- R.J.Ansley Texas A+M University, College Station, Texas

Abstract:

In native grassland ecosystems, defoliation by livestock grazing and fire may affect cycling of soil C and N through modifications of soil microbial activity. We tested the hypotheses that cycling of C and N in southern Great Plains (USA) grasslands is slowed by fire and accelerated by simulated grazing (clipping). Seven factorial combinations of seasonal fire and clipping were applied to replicated plots. Soil respiration, soil microbial C and N (SMB-C and SMB-N), and net N mineralization were measured monthly. Seasonal climatic variation had the greatest influence on all response variables. Plant biomass decreased in all treatment combinations, and SMB-C decreased in winter fire treatments (381 mg C kg soil -1) relative to controls (424 mg C kg soil -1), suggesting a treatment-induced reduction in soil organic matter inputs. However, neither soil respiration nor net N mineralization showed significant treatment effects. These results support the hypothesis that fire reduces soil microbial C pools. The lack of corresponding shifts in soil respiration rates may be due to moisture limitation caused by below-average growing-season moisture during the study period.

Corresponding Author Information:

Wylie Harris Texas A+M University, College Station, Texas 2126 TAMU College Station, TX 77843-2126 phone: 979 845 1388 fax: 979 845 6430 e-mail: wnh7732@neo.tamu.edu

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