

DROUGHT, FIRE, AND SOIL CARBONATES REGULATE RANGELAND RESOURCES



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Abstract

Drought, fire, grazing, and geochemistry shape grasslands in the Northern Great Plains. These natural grasslands provide important ecosystem services, especially the production of forage that sustains a large livestock (cow-calf) industry. A growing interest is whether grazing management can be further optimized to sequester more carbon and decarbonize the atmosphere. Optimal management depends on understanding the direct and indirect effects (soil biota, nutrients) of natural disturbances on forage resources.

Nutrient content and stoichiometry of plant tissue are routinely used to assess nutrient deficiency and whether plants are likely to be responsive to mycorrhizal fungi. Plants in calcareous grasslands bend rules on forage quality, stoichiometric flexibility, nitrogen, mycorrhizal fungi, etc. Examples will draw on experiments that manipulated fire and rainfall with others conducted over natural droughts. We will discuss what it takes to be nutritious forage, an invasive annual grass, and cope with multiple stressors while living in a phosphorus deficient environment.

Biography

Dr. Kurt Reinhart is a Research Ecologist at the Fort Keogh Livestock & Range Research Laboratory.

Dr. Reinhart's research explores topics that intersect Plant and Soil Ecology. His focus has been on plant-soil feedbacks and plant-soil biota interactions with varying contexts (e.g. plant invasions) in grasslands and previously in forests. His current research programs involve geochemical factors that constrain plant-mycorrhizal interactions over an aridity gradient and grazing effects on soil carbon accrual. It is the aim of this work to i) understand how phosphorus acquisition strategies (root, mycorrhizal fungi) depend on soil geochemistry and ii) identify grazing management practices that can optimally sequester carbon and indicators of carbon accrual in grazing lands.