Cheatgrass Invasion Alters Soil Morphology and Organic Matter Dynamics in Shrub-Steppe Grasslands. (S07norton174335-Oral)

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Abstract:

Cheatgrass (Bromus tectorum) is an invasive annual grass that increases wildfire frequency and degrades ecosystems and forage production in the western U.S. Cheatgrass may increase near-surface microbial activity and decomposition of soil organic matter (SOM), enlarging the active (mineral and microbial) SOM fraction at the expense of humus. Analyses of soil morphology and organic matter at seven paired cheatgrass-dominated and native shrub-steppe grassland sites in Utah and Idaho show that cheatgrass soils had: 1) thinner, lighter colored, and more porous surface horizons, 2) higher nitrate-N concentrations throughout soil profiles at the time of sampling, and 3) upper subsoils with lower mineral C:N ratios after 12-day aerobic incubations. These results suggest that labile, low-N roots and litter deposited annually on or near the soil surface, without inputs of deeper, more recalcitrant material, may facilitate mineralization of SOM stored during centuries of shrub-steppe cover. Over time this rapid, shallow SOM turnover and mining of soil humus could impoverish soil, making reestablishment of diverse perennial plant communities difficult.

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