

Perennial crop phase effects on soil fertility

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Use of perennial forages in crop rotations can increase subsequent yields of annual crops, reduce synthetic inputs, and improve soil quality. Despite these known benefits, there is limited information in the northern Plains regarding agronomic and environmental outcomes associated with the use of perennial forages in cropping systems.

Given this context, a study was initiated at the USDA-ARS Northern Great Plains Research Laboratory near Mandan, ND to evaluate effects of five perennial forages (alfalfa, intermediate wheatgrass, switchgrass,



intermediate wheatgrass-alfalfa mixture, switchgrass-alfalfa mixture) on soil properties.

Perennial forage effects on soil properties were modest, with treatments only affecting soil nitrate in the 0-12 inch depth. Unfertilized alfalfa and alfalfa-grass mixtures tended to possess greater soil nitrate compared to fertilized grasses, particularly as stand age increased. Correspondingly, spring wheat grain yield following alfalfa and alfalfa-grass mixtures tended to increase with longer perennial phases.

Preliminary findings from this study suggest incorporation of alfalfa and alfalfa-grass mixtures in northern Plains cropping systems can serve to improve soil fertility and increase grain yield of annual crops.

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