Short-term soil responses to late-seeded cover crops in a semi-arid environment

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Cover crops can improve nutrient-use efficiency, reduce pests, and increase yields and yield stability. Documenting such potential benefits within semi-arid cropping systems remains elusive.

Researchers from the USDA-ARS Northern Great Plains Research Laboratory quantified agroecosystem responses to late-summer seeded cover crops under no-till management, with particular emphasis on soil properties. The study was conducted from 2008-2011 on the Area IV Soil Conservation Districts Research Farm near Mandan, North Dakota.

Aboveground cover crop biomass was highly variable throughout the study (86-1276 lb/ac), and was strongly affected by precipitation received within two weeks of cover crop seeding. Late-summer seeded cover crops were effective in reducing the amount of available soil N in the spring, particularly during 2009 and 2011 when biomass production the preceding year was abundant. Cover crops did not induce soil water deficiencies for cash crops in the following spring, nor did they affect near-surface soil properties or soil coverage by residue.

Based on conditions observed during the study, late-summer seeded cover crops may provide forage production and N conservation within semi-arid cropping systems, but achieving such outcomes consistently depends on timely precipitation after cover crop seeding.

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