

Project Title: Reducing Manure Nutrient Loss with Cover Crops

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Science Collaborators: Paulo Pagliari, UM Dept. Soil, Water and Climate (SW ROC), and Jeff Coulter, UM Dept. Agronomy and Plant Genetics

Field Research and Education Coordination: Randy Pepin, UM Extension Educator, assisted by 13 Extension Educators and Brad Heins, UM Dept. Animal Science (WCROC)

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Project Timeline: 9/1/15 to 8/31/18 (EPA funds began 12/4/15)

Purpose: To increase livestock producer confidence in and adoption of cover crops where manure is applied in order to reduce nitrate loss to drainage tile water and groundwater, and transport of phosphorus and sediment in surface runoff.

Work Plan:

Objective 1: In collaboration with livestock producers in central and southern Minnesota, demonstrate and collect information on the effect of manure injected into a cover crop compared to application with no cover crop on nitrogen trapping by cover crops in fall and spring, and on nitrogen uptake by and yield of the subsequent corn crop.

On-Farm Research/Demonstrations. Ten on-farm trials, including data gathering, will be carried out in each of two years. The large-plot on-farm strip demonstrations will include treatments of fall manure application, with and without a cover crop, in three replications per farm. Field operations will be carried out with the host farmer's commercial scale equipment, and the manure will be applied according to University of Minnesota Extension rate guidelines. The cover crop will be drill-seeded immediately after harvest of corn silage or soybeans. Liquid swine manure after soybeans and liquid dairy manure after corn silage will be injected into the established cover crop. Soil nitrate will be measured to 24 inch depth at spring cover crop termination and at corn harvest in all plots. Nitrogen uptake by the cover crop in the fall and spring, and by corn plants at maturity will be measured, as will corn yield. Data will be analyzed and interpreted in preparation for Objective 2, delivery as an on-line Extension bulletin.

Objective 2: Provide livestock producers and agricultural industry professionals information obtained at the demonstration sites in Objective 1, as well as cover crop research results from other research and demonstration projects in Minnesota and the Upper Midwest. This will enable informed decisions about when and how to incorporate cover crops in their manure management systems.

Outreach. A minimum of four field days per year will be delivered in collaboration with local agency and Extension staff as well as staff from other cover crop and nutrient management projects. Results from the trials will be presented at Extension workshops (minimum of 15 per year for two years), and in newsletters of livestock producer organizations (MN Pork Board and MN Milk Producers Association). One UM Extension on-line bulletin will be produced from the results of the trials. The focus areas of outreach will be the approved TMDL watersheds listed for this project.