

Cover Crop and Nitrogen Management for Sustainable Potato Production

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Rationale: Potato is an important crop in the United States and rates fourth among world crops in terms of production. There are over 2700 potato fields in the Northeast United States and potato growers often over-apply nitrogen fertilizer to ensure against loss of yield. High mobility of nitrate in the soil profile makes it susceptible to leach to the lower soil levels leading to ground water contamination and environmental concerns. Regardless of costs of fertilizers, nitrate-contaminated water causes serious illnesses for infants and pregnant woman which could not be tolerated by public. Obviously, nitrogen management practices which adjust nitrogen fertilizer application are necessary to reduce nitrate contamination of water resources. Management practices such as tailoring nitrogen fertilizer rates and selecting appropriate type of cover crops, as nitrogen scavengers, in rotation with potato can not only reduce nitrate leaching but enhance profitability by cutting fertilizer costs in potato production. By scavenging such large quantities of nitrate, cover crops contribute to protecting water quality and decrease enormous health care costs caused by nitrate contaminated water. In addition, cover crops can provide nutrients for the following crop, increase soil organic matter, reduce soil erosion, suppress weeds, and enhance wildlife habitat.

Research Goals: The objectives of this study are to 1) Evaluate influence of different cover crop mixtures on minimizing nitrate leachate caused by excess nitrogen fertilizer application 2) Assess cover crops' decomposition rate and its synchronization with potato nutrient demands 3) Study nutrient density and tuber yield of potatoes as affected by cover crop mixtures and nitrogen fertilizer.

Treatments: Treatments include five cover crop mixtures: oat/peas, rye/peas, daikon/peas, daikon/rye, daikon/oat, along with no-cover crops, and four nitrogen fertilizer rates (0, 50, 100, and 150 lb/N/A). This experiment will be repeated in 2014-2015 cropping season.

Results: They first year of this study is ongoing and the covercrop and soil samples are being analyzed in the lab. Potato tubers will be analyzed after harvest to determine yield, nutrient density, and tuber quality parameters.



Planting Cover crops, Sep 2013



Cover crop plots, Oct 2013



Cover crop plots, Nov 2013



Winter killed plants, Mar 2014



Planting potatoes, May 2014



Potato plots, July 2014

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