2015 MCCC Report
University of Wisconsin

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Determining the nitrogen credit from berseen and crimson clover

In summer of 2013, 2014, and 2015 three cover crop species were planted after winter wheat harvest: oat, berseem clover, and crimson clover. This is a replicated study on a farmer field. Nitrogen rates were then applied to the subsequent corn crop. Preliminary results from the 2015 growing season indicate that there is both a yield gain and N credit attributed to the clovers. The study will be replicated again in 2015.

Assessing the impact of fall grass cover crops in dairy production systems

A three-year research project was conducted to assess the effect of growing rye as a cover crop or as a silage crop on the subsequent year's corn silage yield. The system is a continuous corn silage rotation with fall liquid dairy manure application (10,000 gal/ac). Biomass samples were collected in the spring prior to killing of cover crop and harvest of the silage crop. Soil nitrate samples were collected pre-plant and at sidedress. While results varied slightly from year to year, rye as a cover crop never led to yield losses in corn silage and may have led to yield increases in later years. Rye as a forage crop typically reduced subsequent corn silage yields, but the additional silage biomass produced from the rye often led to greater overall yields from the system. Currently, economic analyses are being performed to evaluate the sustainability of the system. In addition, measures of mineralizable C and N are being conducted to determine if four years of continuous cover cropping are having any short term effects on biological soil properties.

Spring-seeded cover crops on sandy soil for in-season N supply or control

The objective of this study was to determine the effect of spring seeded oat, berseem clover, or chickling vetch on sweet corn yield and N dynamics on an irrigated sand. Both the oat and chickling vetch grew well in the spring of 2015, and berseem clover did not produce much biomass. Soil samples were collected every 10 days and analyzed for nitrate and ammonium to evaluate N dynamics. In situ mineralization columns (i.e. PVC columns with anion/cation resins placed at the bottom) were used to quantify mineralization rates in 30 day intervals. Results are currently being analyzed.

Dan Smith, UW Nutrient and Pest Management Program

Herbicide and Cover Crop Interactions in Corn, Soybean, and Wheat Cropping Systems

Graduate student research project, Dan Smith, full project description at http://wcws.cals.wisc.edu/research/projectprofileherbicideandcovercropinteractions/

Objective 1: To determine whether common soil applied herbicides with

residual weed control properties applied during the establishment of corn, soybean, and wheat crops affect the subsequent establishment of cover crops in the fall.

Objective 2: To determine the best spring termination method for overwintering cover crops grown in Wisconsin. Results: Two years of the herbicide carryover in corn and soybean have been completed. One of the two years of the winter wheat carryover study and the termination study have been completed.

Potential for Cover Crop Weed Suppression of Pigweeds, Amaranthus spp.
This is a collaborative project funded by the United Soybean Board led by the Ohio State University with collaborators at the University of Wisconsin, Southern Illinois University,
Purdue University, University of Arkansas, University of Tennessee, University of Missouri, and University of Nebraska.

Objective: To establish the value of cover crops for suppressing pigweed populations in Roundup Ready and Liberty Link soybeans. Results: The first of two years of this study is completed. We will be assessing cover crop biomass, weed densities, and soybean yield again in 2015.

Erin Silva, Dept. of Plant Pathology

Increasing Varietal Suitability and Availability of Cowpea Cover Crop Seed for Northern Climates

The cowpea (Vigna unguiculata), or blackeye pea, is an important food and fodder legume in semiarid regions of the world including Asia, Africa, Southern Europe, and Central and South America. Cowpeas are a drought- and shade-tolerant, warm-season crop that performs well in poor soils and are able to fix atmospheric nitrogen. All of these attributes recommend cowpeas for areas affected by global climate change, in worn-out soils, as a cover crop in a rotation or an intercrop within a planting, or as a potentially lucrative food-grade staple. Impressed by the potential applications of Cowpeas in cropping systems of the Upper Midwest, Frank Kutka, Northern Plains Sustainable Agriculture Society (NPSAS) Coordinator, began with 96 varieties sourced from all over the world and through field trials found only 15 that were able to produce seed at our latitude. Subsequent field seasons in North Dakota, here at the Arlington Research Station in collaboration with Dr. Erin Silva, and at other sites throughout our region have reduced this number to twelve varieties in 2013 and eight varieties planted in 2015. Two plantings were initiated in each of the 2014 and 2015 field seasons, the first planted in early-to-mid June for seed-increase and the second in mid-to-late July as a cover crop. The cover crop planting strategically follows the small grain harvest in our region as an option for a nitrogen-fixing and weed-smothering cover crop. Data is still being compiled from the 2015 growing season and will be made available by mid-2016. For more information about this project contact Dr. Erin Silva at emsilva@wisc.edu or Dr. Frank Kutka at fkutka@npsas.org

2015 SARE Radish Demonstrations

Five varieties of Radish were grown in a demonstration plot at the Arlington Agricultural Research Station in collaboration with Dr. Frank Kutka, Northern Plains Sustainable Agriculture Society (NPSAS), with funding from Sustainable Agriculture Research and Education (SARE). Though no data was collected, numerous interested groups visited the planting during field days and station visits.

Reduced-tillage cover crop-based soybean production in the Midwest.
"Rolling Rye in the Upper Midwest"

Weeds are a constant challenge in organically managed systems due to the prohibition of herbicides. In organic grain crops, particularly corn and soybeans, weeds can be a particularly vexing problem with large acreages, limited options for in-row weeds, and the potential for yield reductions caused by interspecific competition. To address this problem, a Winter Rye-based reduced-tillage soybean system has been trialed at Arlington for each of the last seven years to compare weed pressure, nodulation, and yield between conventionally-tilled plots and plots where soybeans are planted directly into a roll-crimped rye mat. The rye provides a suppressive mulch layer as well as allelopathic inhibition of weed growth. Yields in the cover crop no-till plots were generally slightly below, but comparable with those found in the tilled plots, averaging 45 bu/ac. However, weed pressure was drastically reduced in the cover crop no-till plots, requiring no post-planting cultivation whereas many targeted cultivations were needed to control weeds in tilled plots. In 2015 a concurrent trial was conducted with variable rates of composted chicken manure applied at planting to potentially off-set any suppressive effects of the rye mat on soybean growth. Yield was unaffected by the addition of nitrogen; however, nodulation was negatively affected, diminishing as N rates increased. For more information contact Dr. Erin Silva at emsilva@wisc.edu or to watch a video about organic no till at UW Madison: www.youtube.com/watch?v=Aiocr_icrfw