USDA NRCS
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Natural Resources Conservation Service

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# Elsberry Plant Materials Center 2012 Progress Report of Activities

*Technician is terminating wheat as part of termination timing study.*

## Current Studies

***Termination Timing of Selected Cover Crops Using a Roller Crimper***

*Study Leader: Ron Cordsiemon*

In October 2011, five winter cover crops were planted in four replications within a randomized complete block. The purpose of this study is to determine the most effective time to terminate each cover crop using a roller crimper. Soil moisture, biomass production, weed suppression and crop response were evaluated in 2012. Cereal Rye (Aroostook and VNS - variety not stated) were used in two of the five selected cover crop plots. Annual ryegrass along with VNS cereal rye were terminated using a non-selective herbicide as a comparison to the roller crimper termination. Wheat and hairy vetch were also selected as part of this study. The cover crops were allowed to establish and evaluations began in the spring depending on the phenological stage of each species and the termination treatment. Canopy cover, field composition and surface cover were taken at the time of termination using a 50-foot line transect in two directions across the plot. A ceptometer was also used as a comparison to the data collected by the line transect. Using a $m^2$ sampling square, dry matter yields of both weeds and cover crops were evaluated independently.

# 2012

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PMC Staff

Ron Cordsiemon – PMC Manager
Allen Casey – Soil Conservationist
Nick Adams – Biological Technician
Ronnie Vaughn – WAE
Garry Stewart – WAE

Jerry Kaiser – Plant Materials Specialist

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The PMC went through extreme drought conditions in 2012 and the establishment of the response crop (soybeans) was very poor. Even with the extremely dry conditions there were cover crop plots that did better than others. The visual appearance suggested that if the cover crop could hold moisture in the soil at the time of termination then it would allow the soybeans, in this case, to germinate and establish. The chemical treatment of VNS cereal rye appeared to have had the best success for soybean establishment. This could possibly have more to do with the time the drought conditions started rather than when the cover crop was terminated. This study will be repeated for 2-4 more years.

*Soybeans in cereal rye*

***NATIONAL STUDY - Effects of Mixed Species Cover Crops on Soil Health***
*Study Leader: Allen Casey*


*Nick Adams, Technician (left), and Allen Casey, Asst Mgr (right), collect bulk density data.*

Cover crop interest is again on the rise with the implementation of the Soil Health Initiative. The Elsberry PMC is one of six centers across the US and one of two within the central region involved in a study looking at cover crop mixtures on soil health. In late 2012, the staff at the Elsberry PMC planted four replications of three different mixtures of cover crops. The three mixtures were planted at three different rates (20, 40 and 60 PLS/sq ft) for a total of nine treatments per replication with a control plot. This study will take measurements of multiple cover crop species growth habits and parameters. Data collected will be included into the RUSLE2 (Revised Universal Soil Loss Equation 2) model. This fall the staff of the Elsberry PMC worked with Area Soil Scientist Dave Skaer and Soil Scientist Ralph Tucker to collect baseline soil data. In addition to the samples collected by the soil scientists, the PMC staff collected information regarding bulk density, soil temperature and moisture, soil resistance, biological assessment and soil indicators. This information will be collected each year. Evaluations and data collection will significantly increase in the spring as both above-ground and below-ground data will be collected.

**Collection of Plant Attributes from Plantings of Giant Miscanthus for RUSLE2**
*Study Leader: Allen Casey*

This study was initiated in 2011 to take growth and cover measurements from Giant Miscanthus at varying stages of establishment. Information will be used to create a vegetation file for giant miscanthus to be used by the RUSLE2 model. RUSLE2 is used by NRCS field offices to determine soil erosion compliance does not contain data for use with Giant Miscanthus. In the spring of 2012, a new planting of giant miscanthus was established at the PMC allowing for another year of data from an establishment year planting. Measurements were taken every four weeks on above-ground biomass, plant height, percent surface residue cover, stubble biomass, and surface canopy cover for each stage of maturity. The stages of maturity are established stands (4+ years), second year stands, and new stands. Data from each stage will be collected for two consecutive years. The PMC is working closely with Seth Dabney, research leader, from USDA-ARS in Oxford, Mississippi, to compile the data. In 2012, preliminary vegetation files were created and will be updated in 2013.

**Using Biological Approach (Sheep/Goats) to Control Invasive Species with Emphasis on Bush Honeysuckle, *Lonicera maackii,* and Buckthorn, *Rhamnus cathartica***
*Study Leader: Ron Cordsiemon*


*Goats in brush.*

The PMC has partnered with Dr. Charlotte Clifford-Rathert, research veterinarian with Lincoln University Research and Extension, for the ongoing study to use small ruminant animals to control invasive brush species in forested areas. Over the 2011-2012 winter, Missouri Field Technical Services Staff and PMC staff provided hands-on training on building electric fence to make two additional paddocks for this study. There are approximately 45 forested acres that are permanently fenced into five individual paddocks. These can be further sub-divided as needed with portable electric fences. In the spring of 2012, Lincoln University brought 15 Spanish goats, 15 Boar goats, and one donkey to the PMC. The donkey acts as the guard animal for the goats. They were rotated through the paddocks during the grazing season. In October 2012 the goats were moved onto a cereal rye and forage turnip cover crop pasture for a week

and the Lincoln University crew documented the animal response to that forage. The animals are staying over the winter at the PMC, and in preparation of that, some of the warm season grass plots were baled as hay for the goats over the winter. Ronnie Vaughn, part-time technician aid, who is also working part-time for Lincoln University, takes care of the goats and checks the fence on a day-to-day basis. Since the weather has turned colder and the leaves have fallen from the honeysuckle bushes, the goats have started to eat the bark off of some of the brush species that are in the stand. It is hoped that by overwintering the goats at the PMC they will eat the bark from the honeysuckle and buckthorn bushes, potentially killing many of those species.

**Cool-Season Cover Crop Evaluations**
*Study Leader Jerry Kaiser*

*Cool Season Cover Crop Study Plot showing mix with Cereal rye and Crimson clover.*

Cool season cover crop mixtures were planted in the fall of 2011 at the PMC to evaluate individual species growing within a mixture and determine how well they work together. This study will look at how selected cover crops grow together and how much biomass they produce, as well as when they should be terminated. The plots were planted in four replications in two separate plots based on planting type. Aerial seeding before soybean leaf drop and drilling were the two different application methods used in this study. Species and mixtures evaluated in this study were: annual ryegrass and ladino clover; annual ryegrass and forage turnip; cereal rye; cereal rye and crimson clover; cereal rye and hairy vetch; cereal rye, oats and forage turnip. In the spring of 2012, evaluations began on the cover crop mixture plots. Canopy cover density was measured at three different times; March 1, April 1, and May 1. Total dry matter yield and termination time was measured a month earlier because of the warm winter for both the aerial and drilled replicated plots. Dry matter yield was taken from plots with annual ryegrass mixtures starting on March 13, and then again two and four weeks later with completion on April 12. The cereal rye mixtures were cut for dry matter yield on March 27 and every two weeks with the third and final dry matter yield taken on April 25. Total dry matter yield was measured by clipping all planted species in a 3 sq. ft. circle. The clippings were collected randomly within each treatment for that time period.

The herbicide glyphosate was used to achieve termination of the cover crops at a rate of 2 quarts/acre. Also, 4 ounces of citric acid were added to reduce the pH level of the water mixed with the herbicide. The citric acid reduces the pH of hard water from 6.5 to 4.0 for the glyphosate to be more effective. The plots were divided into three different treatments of the herbicide and were scheduled for treatment on a two-week interval.

The first termination time for the annual ryegrass mixture plots was March 13. A two-week interval was the procedure for the evaluation rating starting on March 26. The annual ryegrass mixtures evaluation ratings were completed for the three glyphosate treatments on May 15. The first termination treatment of cereal rye mixtures started on March 27 followed up by a two week evaluation, starting on April 12th. The cereal rye mixtures evaluation ratings were completed for the three glyphosate treatments on May 30.

# Training and Tours

**Field Training for New Employees by Missouri Field Technical Service Staff and Plant Materials Staff**

Three-day training was offered in August to new employees from Iowa, Missouri, and Illinois to SWCD, NRCS, and Missouri Department of Conservation personnel. Participants were given hands on training for grazing management and fencing techniques, basic soils and soil health characteristics, plant materials program processes and functions, tree and plant identification, and an introduction to tillage equipment, spray equipment, planters, drills, and harvesting equipment. The training also included a tour of the fields and facilities of the PMC. The new employee basic field training will be offered again in the summer 2013.

# Outreach

- **Pollinator Planting at Brussels, Illinois Elementary School**
- **Missouri Tree Farm Conference Booth**
- **North American Butterfly Association (NABA)- Butterfly Count**
- **Radio Interview for Agriculture USA - http://audioarchives.oc.usda.gov/radnewsfeaturedetail.asp?ID=3107**

# New Publications

- **Rumsey Indiangrass brochure - *Updated***
- **OZ-70 Big Bluestem brochure**
- **Iowa Germplasm Horsemint brochure**

These and other publications can be accessed by going to the Plant Materials Website at http://plant-materials.nrcs.usda.gov.