



United States Department of Agriculture

# 2014 Progress Report of Activities

## Manhattan, Kansas, Plant Materials Center



PMC Field Day participants reviewing cowpea cover crop study

Soil health studies dominated the Manhattan Plant Materials Center (PMC) activities in 2014. Natural Resources Conservation Service (NRCS) program needs, along with producer interest, have shifted the work of the PMC toward soil health activities. The PMC still maintains and provides industry with foundation native grass and forb seed, but that priority has diminished.

### 2014 cover crop studies:

- Warm- and cool-season cover crop planting, documenting yield, carbon, and nitrogen
- Cover crop broadcasting into corn and soybeans
- Cowpea study
- Radish variety study
- All studies used for the PMC Field Day and meeting demonstrations

### Cover Crop Study

The planting of 25 cover crop species in replicated blocks were planted again in 2014 to evaluate plant production, carbon, and nitrogen. Planting of the cool-season species was completed on April 1, and again on September 17. Warm-season species were planted June 25. All plots were no-till planted at a rate of 30 seeds per square foot without the addition of supplemental fertilizer. Cool-season species did not do well in 2014, so clippings were not completed on the plots. Results from the plots where data was collected follows:

Forage yield and carbon/nitrogen (C/N) ratios for 13 warm-season cover crop entries

Entry	Planting Date	Average (4 reps) Forage Yield (lbs/acre)		Average (4 reps) C/N Ratio	
		7/30/14	8/27/14	7/30/14	8/27/14
Buckwheat	6/25/14	495	2,012	19.1	23.7
Cowpeas		1,004	5,879	17.1	14.0
Millet, German		590	5,932	20.4	25.7
Millet, pearl		1,707	11,217	22.6	37.9
Mung bean		1,749	4,886	19.1	18.9
Radish, nitro		1,457	2,031	20.4	15.4
Safflower		726	4,338	14.8	20.8
Sorghum-sudangrass		2,503	12,831	40.7	66.1
Sorghum-sudangrass, BMR		1,989	13,369	37.4	55.3
Soybean, non GMO		1,570	3,618	17.4	18.5
Sudangrass		2,897	10,571	41.7	56.2
Sunn hemp		1,561	8,758	11.5	18.1
Cover Mix (5 reps)		3,177	8,728	21.7	37.1
Rainfall: June—7.11 inches      July—0.95 inches      August—3.6 inches					



Cover crop mix in study area



Standing corn used for broadcast cover crop study

### Broadcasting Study

There is increasing interest from producers for information on broadcasting cover crop mixes into standing corn and soybeans. With very little information on broadcasting, the PMC initiated a study to develop field office technical guidance.

Broadcasting of a cover crop mix consisting of annual rye, barley, radish, red clover, and collards began when corn plants showed browning to the ear and continued through October. A hand-broadcast spreader was used to distribute seed in 15-foot wide by 40-foot long replicated plots. Effective broadcasting width was about 6-foot wide with remaining plot serving as a buffer between replications. A broadcasting rate of 30 and 60 seeds per square foot was used.

Broadcast Date	Corn		Soybean	
	30 Seeds /sq ft	60 Seeds/sq ft	30 Seeds /sq/ft	60 Seeds/sq ft
	Plant Count	Plant Count	Plant Count	Plant Count
9/08/14	12	27	11	17
9/17/14	13	23	25	20
9/25/14	12	23	13	24
10/02/14	15	25	16	20
10/07/14	10	26	10	21
10/16/14	14	21	9	19
Rainfall: August—3.6 inches    September—0.59 inches    October—2.87 inches				

## Radish Variety Study

Four varieties of radishes: defender, tillage, graza, and nitro were planted in six replications for the purpose of observing growth characteristics and rooting depth. Radishes were planted July 9. Final evaluations were completed December 3, with the excavation of the plants to determine rooting depth. There were differences in size and shape of the radish tubers, but no significant differences in rooting depth. Roots of each variety exceeded six feet.



Radishes in study plots



Nitro radish



Two varieties of radish



Rooting depth similar between varieties

## Cowpea Study

Cowpeas planted in study plots in 2013 showed significant improvement in the aggregate stability test in a matter of just a few months. On June 4, a plot of cowpeas was planted to determine if cowpeas were as good for soil health as they appeared to be. The possibility of producing seed crossed our minds for future cover crop mixes at the PMC. Results in 2014 were different than the previous year. There were fewer nitrogen producing nodules on the roots, the plants spent the summer growing, vining to a height of 4 foot before falling over, and the plants never bloomed resulting in no seed production. Varieties and planting dates may have an impact and will be reviewed. Cowpeas are an excellent species to include in mixes and provide many soil health benefits.



Mark Janzen, Plant Materials Specialist

## PMC Field Day

Soil health and cover crops were the hot topics at the PMC Field Day. Participants were able to view many cover crop species, mixes, and were able to dig-up a plant or two to view the roots. The PMC no-till drill and crimper were on display for participants to view. The field day allowed participants to ask cover crop questions of the PMC staff and fellow producers.



Participants review cover crop study plots



Candy Thomas, State Agronomist, demonstrates the slake test

## Who We Are

The PMC is one of 27 centers nationwide that uses plants to solve natural resource problems. It is owned and operated by the NRCS. The PMC offers services to a diverse region of the Heartland including Kansas, Nebraska, northern Oklahoma, and northeastern Colorado (see map at right). It is located on 169 acres of sandy loam soil in the Kansas River Valley, south of Manhattan, Kansas.



## What We Do

The mission of the Plant Materials Program (PMP) is to develop and deliver plant science technology to meet the nation's natural resource conservation needs. The PMP vision is "Productive Lands—Healthy Environment." The PMP is recognized as the nation's leading technical source of plant solutions and plant technology. This includes the production of improved varieties of plants for commercial use and the development of plant science technology for incorporation into the Field Office Technical Guide (FOTG). Plant and technology development objectives of the PMC include:

- Water quality improvement
- Erosion control
- Range and pasture improvement
- Native American outreach
- Plant variety selection and production
- Soil health

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## Plant Materials Program Web site:

<http://www.plant-materials.nrcs.usda.gov>

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