USDA United States Department of Agriculture


Norman A. Berg Plant Materials Center ca. 1940s

**Norman A. Berg Plant Material Center**
**Natural Resources Conservation Service**
**8791 Beaver Dam Road**
**Building 509 BARC East**
**Beltsville, MD 20705**
**(301) 504-8175**

***Staff***
**Graham Davis, *PMC Manager***
**Shawn Belt, *Horticulturist***
**R Jay Ugiansky, *Resource Conservationist***
**Julie DePue, *Data Manager/Secretary***
**Dan Dusty, *Farm Manager***

The Norman A. Berg Plant Materials Center (MDPMC) located in Beltsville, Maryland is one of 27 Plant Materials Centers (PMCs) in the Plant Materials Program of USDA's Natural Resources Conservation Service. The mission and activities of the MDPMC are twofold: (1) to provide assistance to and coordination for the National Plant Materials Program, and (2) to assist with high-priority conservation issues in the Mid-Atlantic region of the U.S.

The MDPMC is currently participating in a national study evaluating the effects of cover crop mixes on soil health, collecting plant attribute data to refine managed grazing systems, and designing vegetative buffers to control poultry house emissions. These studies combined with our other activities support our development and distribution of up to date conservation technical information to NRCS field staff, partners, and the public.

# EFFECT OF MIXED COVER CROP SPECIES ON SOIL HEALTH

**Figure 1. Soil Health Study plots 230 days after seeding cover crop mixes, just prior to termination**

The MDPMC has completed the second of three planting cycles of cover crop mixes followed by corn. The MDPMC no-till drilled cover crop mixes (2, 4 and 6 species at densities of 20, 40 and 60 seed/ft$^2$; Table 1) into replicated plots on September 30$^{th}$, 2013. Cover crop treatments were terminated and corn was planted on May 21$^{st}$, 2014 with one pass over the field (Figures 1-2). The roller crimper was again very effective in killing the cover crop, and the weed suppression provided by the rolled cover crops was excellent. Weeds were also controlled in the control plots without planted cover crop. The cover crops and the corn received ample precipitation throughout the second cycle.

**Table 1. Cool season annual cover crop species and mixes, percentages of species per mix, and seeding rate.**

| |
|---|
| No cover crop control |
| 2 species mix – cereal rye (50%) + crimson (50%) at 20, 40, 60 seeds/ft$^2$ |
| 4 species mix – cereal rye (45%) + crimson clover (23%) + hairy vetch (23%) + radish (10%) at 20, 40, 60 seeds/ft$^2$ |
| 6 species mix –cereal rye (23%) + crimson clover (23%) + hairy vetch (23%) + oats (23%) + radish (5%) + rapeseed (5%) at 20, 40, 60 seeds/ft$^2$ |

Cover crop growth was significantly less in the second cycle. Colder temperatures in the fall and spring greatly reduced the days warm enough for cover crop growth. The less hardy oats, radish and rapeseed provided little cover prior to being winter-killed. Rye provided most of the cover over the winter with hairy vetch a close second and surpassing rye within the last 20 days prior to termination.

**Figure 2. Rolling cover crops and planting corn in the Soil Health Study**

In year two, there was little difference in plant canopy cover between seeding rates. At termination the 4 and 6 species mixes had greater cover than the 2 species mixes due to vigorous spring growth of hairy vetch planted in the 4 and 6 species mixes. Total plant cover was lower in year two, with only the 6 species 60 seeds/ft$^2$ achieving greater than 90% cover. Plant residue (litter) cover for all treatments at 30 days after planting (DAP) were about 60-85% and dropped to 5-42% at 230 DAP. Total plant and residue cover for all cover crop treatments ranged between 89-100% whereas the unplanted control ranged between 84-90% cover.

At cover crop termination, above ground biomass was very similar between cover crop treatments. Heavy cover crop biomass in all plots left very little room for weeds to grow. Corn yield samples were collected in September and the results are being compiled, but are clearly lower on average than the first year (Figure 3). Beginning the next cycle, cover crop treatments were replanted September 24$^{th}$, 2014.

**Figure 3. Soil Health Study plots just prior to corn harvest**

## BERMUDAGRASS FOR HIGH USE AREAS AND HAY

It has been another very successful year demonstrating the value of bermudagrass in high use areas. Trials are being conducted cooperatively with Maryland Cooperative Extension, with assistance from forage expert and University of Maryland professor emeritus Dr. Les Vough.

This summer, seven new bermudagrass trial/demonstrations were established at 5 farms in Anne Arundel, Calvert, Cecil, and Queen Anne's Counties in Maryland and Chester County Pennsylvania. Based on previous results, the cultivar 'Quickstand' was installed on the heavy use areas and the cultivar 'Ozark' bermudagrass on pastures. All sites received adequate rainfall following planting ensuring good establishment. However, persistence was poor at the Anne Arundel County site due to inadequate rainfall throughout the summer. The wet summer was very good for crabgrass and goosegrass which easily outcompete establishing bermudagrass if not mowed or grazed. Therefore, establishment was excellent at the sites where there was adequate mowing or grazing to control overtopping weeds. Poor establishment at one site illustrated the importance of following recommendations for heavy and close grazing or mowing during establishment.

Landowners may be unfamiliar with management of young bermudagrass plantings and our demonstration underscores the need to provide guidance and training on managing a new planting.Many livestock owners that express an interest in bermudagrass are unfamiliar with its special establishment and maintenance considerations.  To educate landowners and planners the PMC provided two all day training sessions at two separate sites (Figures 4-5).

**Figure 4.  Bermudagrass training at Wye Angus farm winter feeding area**

Successes and failures were shared and planting sites were visited, evaluated, and discussed. Site visits were greatly appreciated by participants and it was great year to illustrate the importance of weed control during establishment as well as maintaining a stand after establishment.

**Figure 5. Bermudagrass training at site planted in spring of 2014; 'Quickstand' Bermudagrass shown in right half of photo and 'Ozark' Bermudagrass in top left corner behind participants**

## POULTRY AIR AND WATER QUALITY IMPROVEMENT

Poultry farm vegetative environmental buffers (VEBs, or windbreaks) foster good neighbor relations, mitigate emissions by reducing odors, dust, and ammonia, and improve the visual attractiveness of the farms. MDPMC is working to develop vegetative environmental buffers that can absorb gaseous ammonia, trap dust and mitigate odors expelled by poultry farms.

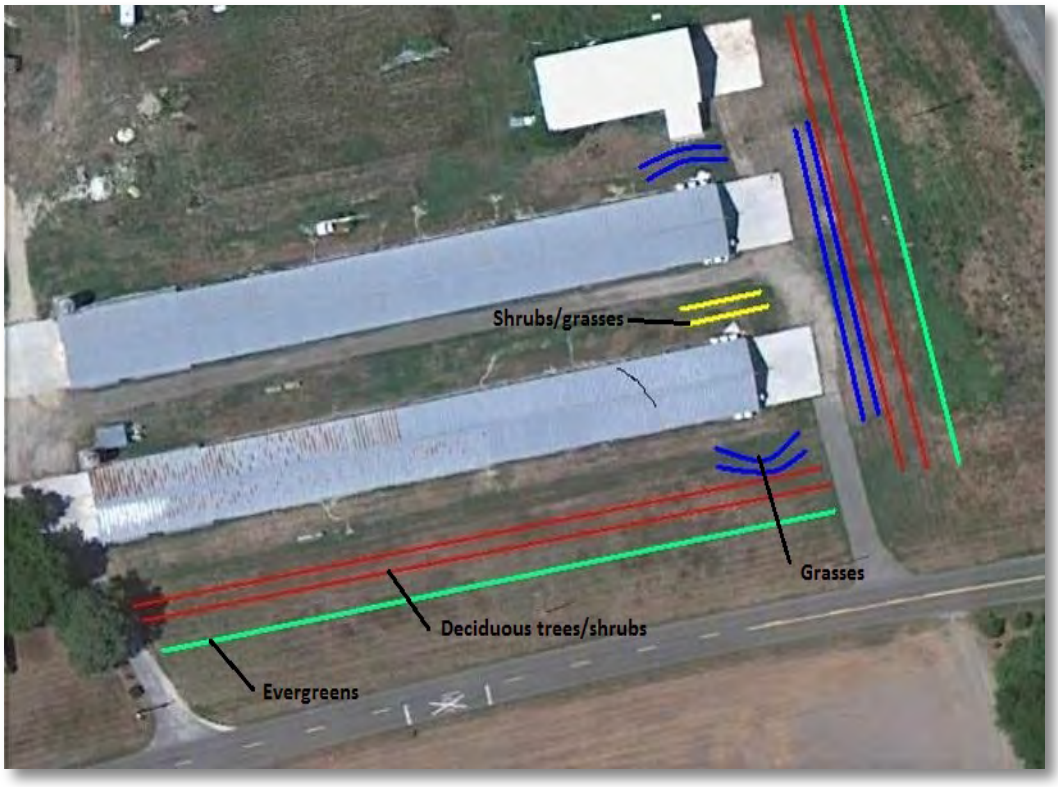


**Figure 6. A map showing a vegetative environmental buffer design with the different rows of vegetation labeled.**

The National Plant Materials Center is testing six different grass and 14 tree/shrub species on eight different mid-Atlantic farms using the design in Figure 6. Woody plants must survive three seasons and grasses two seasons before being recommended for use. Preliminary data shows that grasses (both warm and cool-season) are the most tolerant to these conditions (Figure 6). Switchgrass, eastern gamagrass, prairie cordgrass, and Indian sea oats all survived over 90%. Deciduous shrubs and trees (black locust, scholar tree, red oak, hackberry, red maple, chestnut oak, bald cypress, and chinkapins) also survived in high percentages. Intolerant plants include big bluestem, Indiangrass, mountainmint, Emory's sedge, bayberry, southern magnolia, American elm (due to growth challenges), and smooth alder.


**Figure 7. A Lancaster County, PA organic poultry farm showing differing growth of giant cane (*Arundinaria* gigantea) and 'Timber' switchgrass.**

In the buffer depicted in Figure 7, the primary and secondary fans are on the right, where ammonia concentrations are higher; this may have led to increased growth. Regular grass mowing, weed control (mechanical), and irrigation are critical to this buffer's establishment. The grasses (one season old) are not yet large enough to effectively filter emissions, but should be within 2 additional growing seasons.

## SEED PRODUCTION FOR THE GREAT SMOKY MOUNTAINS NATIONAL PARK

The Great Smoky Mountain National Park (GRSM) restores disturbed areas (road cuts, eradicated invasive plant areas, power transmission lines) with seed collected from populations closely related genetically and ecologically to park populations. GRSM harvests seed from populations indigenous to the park, and the MDPMC provides the expertise and equipment needed to clean, process, test and store the seed. In 2014, The MDPMC cleaned over 980 lbs. of grass, legume and wildflower seed. Twelve different species yielded over 300 lbs. of pure live seed (PLS). Seed totaling over 1100 lbs. were used on two major projects, the Foothills Parkway (FHP) and Chilogate Creek Stream (Figure 8 and 9).

**Figure 8. Seed mixture being hydro seeded onto the Foot Hills**

**Figure 9. Heavy equipment staged near Chilogate Creek**

# 2014 Technology Transfer

## *Publications*

- National Soil Health Study Progress Report – Year 1
- Native Plants for Summer and Fall Honey Bee Forage
- Great Smoky Mountains National Park, Annual Progress Report

## *Presentations/Trainings*

- Bermudagrass for High Use Areas (x 2)
- Plant Identification Training
- Bee forage training and black locust propagation training to the Maryland State Beekeepers
- Presentation to The Maryland Envirothon Teams
- Career presentation to USDA Agricultural Outlook Forum Students
- Propagation Basics Training – Montgomery County Maryland Master Gardeners

**Summer cover crop mixture of sunflower, cowpea, vetch, and foxtail millet**

The U.S. Department of Agriculture (USDA) prohibits discrimination against its customers, employees, and applicants for employment on the bases of race, color, national origin, age, disability, sex, gender identity, religion, reprisal, and where applicable, political beliefs, marital status, familial or parental status, sexual orientation, or all or part of an individual's income is derived from any public assistance program, or protected genetic information in employment or in any program or activity conducted or funded by the Department. (Not all prohibited bases will apply to all programs and/or employment activities.)

If you wish to file an employment complaint, you must contact your agency's EEO Counselor (PDF) within 45 days of the date of the alleged discriminatory act, event, or in the case of a personnel action. Additional information can be found online at http://www.ascr.usda.gov/complaint_filing_file.html.

If you wish to file a Civil Rights program complaint of discrimination, complete the USDA Program Discrimination Complaint Form (PDF), found online at http://www.ascr.usda.gov/complaint_filing_cust.html, or at any USDA office, or call (866) 632-9992 to request the form. You may also write a letter containing all of the information requested in the form. Send your completed complaint form or letter to us by mail at U.S. Department of Agriculture, Director, Office of Adjudication, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410, by fax (202) 690-7442 or email at program.intake@usda.gov.

Individuals who are deaf, hard of hearing or have speech disabilities and you wish to file either an EEO or program complaint please contact USDA through the Federal Relay Service at (800) 877-8339 or (800) 845-6136 (in Spanish).

Persons with disabilities who wish to file a program complaint, please see information above on how to contact us by mail directly or by email. If you require alternative means of communication for program information (e.g., Braille, large print, audiotape, etc.) please contact USDA's TARGET Center at (202) 720-2600 (voice and TDD).

For any other information dealing with Supplemental Nutrition Assistance Program (SNAP) issues, persons should either contact the USDA SNAP Hotline Number at (800) 221-5689, which is also in Spanish or call the State Information/Hotline Numbers.

For any other information not pertaining to civil rights, please refer to the listing of the USDA Agencies and Offices for specific agency information.

***USDA is an Equal Opportunity Provider and Employer.***