

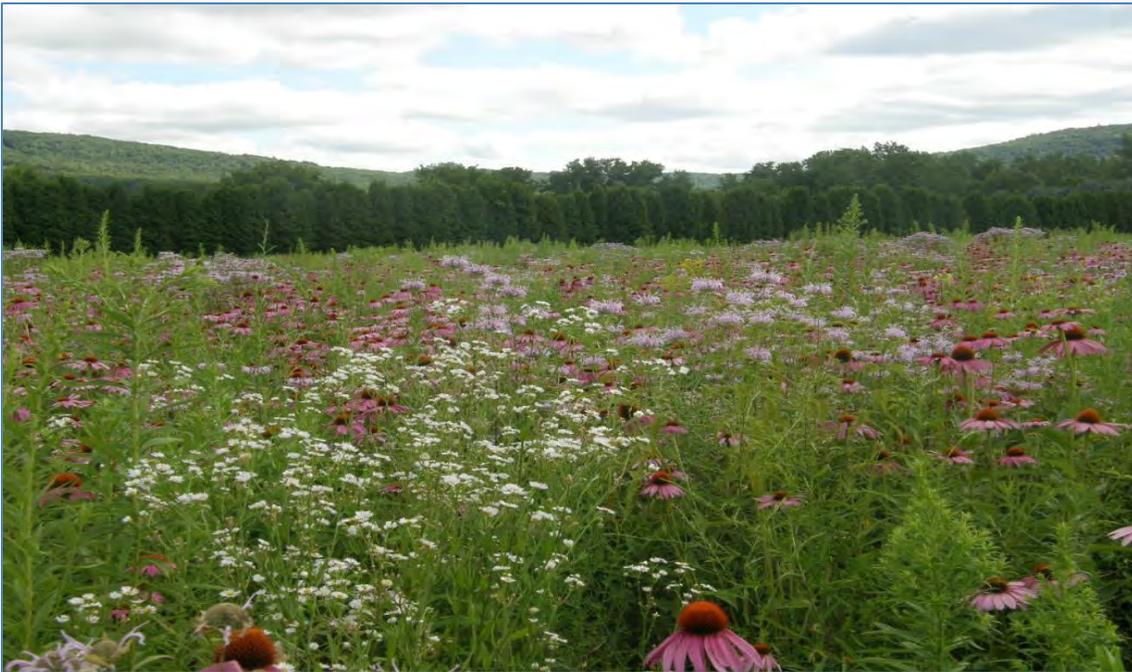


United States Department of Agriculture

Natural Resources Conservation Service

2013 Progress Report of Activities

Big Flats Plant Materials Center
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<http://plant-materials.nrcs.usda.gov/nypmc/>



This stunning photograph, taken in the summer of 2013, shows the .75 acre native wildflower planting at the Big Flats Plant Materials Center. This field was established in July 2010.

The Big Flats Plant Materials Center (PMC) is one of 27 plant materials centers operated by the United States Department of Agriculture, Natural Resources Conservation Service. Areas served by the center include the Northeast, from Maine to northern West Virginia. The center is located in the Finger Lakes region of Central New York State. It is our mission to develop plant materials and state-of-the-art plant science technology for the conservation of natural resources and meet the objectives of environmental programs. We focus on using native plants to solve conservation problems and protect ecosystems. Six major objectives addressed are:

- Cropland Erosion, Water Quality, Soil Health
- Native Plants for Conservation Systems
- Biofuels/Agroforestry
- Protecting and Improving Water Quality
- Wildlife Habitat Improvement
- Critical Area Stabilization
- Improving Air Quality

This is a brief summary of 2013 activities at the center. For additional information on the projects, please contact us at the center or visit our Plant Materials Program Website at <http://Plant-Materials.nrcs.usda.gov> to view Plant Fact Sheets on conservation plants, information on how to obtain conservation plants, publications and technology development from PMC's across the United States, and links to websites with additional or supporting information.

Cropland Erosion, Water Quality, Soil Health

Cover Crop Demonstration Plots

There are many benefits to the utilization of cover crops, such as reducing soil erosion, improving water quality and soil tilth, alleviating soil compaction, recycling of nutrients, providing nitrogen, weed suppression, early spring forage, and food and habitat for wildlife. In 2013, over 300 plots with different species of cover crops and several mixes were seeded throughout various dates from June to October 2013. The purpose of the planting is to evaluate the recommended seeding rates and timing in the updated NRCS-NY cover crop specification. Additionally, data from 2011-2014 will be used to compare spring biomass of cereal rye to other fall planted cereal grains and grasses for use in the Chesapeake Bay cover crop model. Data on planting dates, percent cover, and aboveground biomass were recorded throughout the season. The plots will be sampled in 2014 for spring biomass growth and percent cover, at different termination dates. These data will help determine the last allowable fall planting dates for the purposes of erosion control, nutrient cycling, and soil health.

Diverse Cover Crop Mix Trials

The use of diverse cover crop mixtures that contain two or more plants are often more effective than a monoculture planting. Cover crop mixtures adapt to variation in soils, increase biomass production, provide broader spectrum of weed control, have better winter survival and ground cover and attract a range of beneficial insects. The ability of a mix to achieve its purpose, will depend on the selection of the species as well as the performance of the individual species when grown in combination with the other species in the mix. Mixes can be a grass/legume, multiple cultivars of a single species, or a mix containing plants with different growth patterns. In addition, there are multiple factors to consider insuring compatibility such as seedling vigor, shade tolerance, mature plant height, and root characteristics. The selection of species and management of cover crops for their carbon to nitrogen ratio (C:N), is very important when developing cover crop mixtures. A low C:N ratio cover crop mix will provide a quicker release of nitrogen for the subsequent crop's uptake, where a high C:N ratio may build up carbon and organic matter, but may require additional fertilizer. With a field full of diverse plants attracting diverse organisms, the field can begin to accumulate all the needed components of a healthy and fully functioning soil system.

To evaluate the compatibility of species within mixes, 3 mixes of grasses, legumes, and brassica species were prepared. The species selected were based on planting date. In 2013, these mixes of 5 and 6 species, were planted on June 5, August 2nd, and September 4th, along with monocultures of the individual component species. Biomass samples were taken of each species within the mix to determine the total biomass and the contribution of each species in the mix. In addition, other mixes that are commercially available and 8- and 10-way mixes were also planted, unreplicated, to observe the interactions between the species and their performance in this region.

Penn State Interseeder Project



PSU 3-way interseeder, seeding cover crops into 18 inch corn.

The establishment of cover crops following corn silage in the Northeast is difficult in some years and is usually not possible following corn grain or soybeans. The Penn State Cover Crop Interseeder is capable of seeding the cover crops into standing corn, which is 18-24 inches tall, apply nitrogen, and post-emergent herbicide in a single pass. By establishing cover crops at this growth stage, the corn yields are not adversely affected. This 3-way interseeder offers benefits over other methods including enhanced cover crop establishment, the ability to interseed into no-till cash crops and decreased labor and fuel costs. On June 27, 2013, cover crops were seeded, in replicated plots, with the following treatments:

- annual ryegrass (20 lb/a)
- red clover (10lb/a), crimson clover (20 lb/a), hairy vetch (15 lb/a),
- annual ryegrass (10 lb/a), red clover (5 lb/a), crimson clover (10 lb/a), hairy vetch (7.5 lb/a).

In the spring of 2014, the cover crops will be evaluated for winter survival, their impact on soil health and soil nitrogen availability and corn will be no-till planted again as well.

Northeast Weed Emergence Periodicity Project

Knowledge of weed emergence periodicity is important for the timing and choice of weed management tactics that are not reliant on just herbicides. Cover crops improve weed suppression in both conventional and organic cropping systems but a better understanding of the interactions between cover crops and weed species is needed for successful weed management in reduced-tillage systems.

Weed species emerge in sequences depending on soil temperature and moisture prior weed and crop management. This research on emergence periodicity involves tracking weed species emergence as affected by the tillage date and documenting weed and cover crop species densities. Collaborating with Matt Ryan of Cornell University, 4 sites were established in the Northeast, including the PMC. Plots were replicated 4 times, at 12 different tillage dates, to assess the effects of tillage timing on weed communities and cover crop effects on weed control. Plots were tilled every 2 weeks starting April 29, 2013 until September 30, 2013. Half of the plots were just tilled, and the other half was tilled and seeded with cover crops, then cultipacked. Eight weeks after the initial tillage date, plots were sampled, using a 2 square foot quadrat. Weed density of each species were measured in both treatments.

Nitrogen for Winter Cereals as Double Crop in Corn Rotations

In cooperation with Dr. Quirine Ketterings, from Cornell University and Director of the Nutrient Management Spear Program, growing winter cereals as double crops, was evaluated at the Big Flats PMC. Farmers can grow winter cereals for erosion control and then have the option to harvest the cereals as forage, in May, prior to establishing the next crop, therefore increasing annual per acre crop yields. Interest in double cropping by farmers, in the Northeast US, has grown due to several years of drought when cover crops were harvested to supplement their forage needs. Properly managed, these crops can supply 2-4 tons of dry matter per acre of high quality forage, even with little growth in the fall. On-farm

trials, at 44 locations, were established to test how much nitrogen is needed, at green-up, for optimal yield.

‘Aroostook’ Rye was seeded, at the PMC, in September 2012. Soil samples were taken in each plot, in April 2013, and then fertilized with nitrogen rates of 0, 30, 60, 90, and 120 lb/acre. On May 6, 2013, ‘Aroostook’ cereal rye was harvested for biomass yields. Analysis of the 44 sites field data showed that 30% of the sites did not respond to the N fertilizer additions in terms of total dry matter yield, while 44% responded with greater yields to N additions of 75-100 pounds per acre. Soils and crop management practices are being documented and forage quality analysis is being conducted. This will determine under what conditions nitrogen application will be economical and what rate to apply.

Optimizing Cover Crop Mixtures for Nitrogen Supply and Cost-Effectiveness

Legume cover crops are a proven tool for supplying nitrogen to a subsequent cash crop. Charlie White, of Penn State University’s Crop and Soil Sciences, put in experimental plots, in July of 2012, at the Plant Materials Center, to test the various plant densities of a winter-killed legume (fava bean), a winter-hardy legume (red clover), and a winter-hardy grass (triticale) in monoculture, biculture, and triculture cover crop plantings, using addition series and response surface designs. Cover crop biomass, nitrogen content, and nitrogen fixation were measured along with subsequent cash crop yield response. On May 10, 2013, biomass samples of cover crops were harvested and plant counts were obtained. Cover crops were burned down using Roundup® and Banvel®. On May 30, 2013, corn was planted into plots, with fertilizer applied two days later. Corn was harvested on November 4th and grain yields of corn were recorded.

Native Plants for Conservation Systems

Release of Kingston Germplasm Prairie Cordgrass (*Spartina pectinata*)



Kingston Germplasm prairie cordgrass seed head in full bloom.

The Natural Resources Conservation Service (NRCS), Big Flats Plant Materials Center announces the naming and release of Kingston Germplasm prairie cordgrass (*Spartina pectinata* Bosc ex Link). It has been assigned the NRCS Accession number 9046805. This plant is released as a selected class vegetative release. It was selected due to its strong properties for erosion control and wildlife habitat uses along freshwater shorelines in the Northeast. Other uses for this release are created wetlands, critical area treatments on wet soils, wastewater renovation and as a potential biofeedstock source on marginal lands. It is being released as a vegetative propagated material, increased from the original seed source collection. The original seed increase block is still being maintained at the USDA-NRCS Big Flats Plant Materials Center.

Biofuels/Agroforestry

Big Bluestem and Switchgrass Breeding Project for Biofuels with Cornell University

Switchgrass and big bluestem have a lot of genetic diversity within native populations. It is important to collect, evaluate and store this germplasm. Northeast collections of native switchgrass and big bluestem were collected in 2008 and 2009. Approximately 80 collections each of switchgrass and big bluestem were made from 10 states. Samples of all collections were sent to the USDA National Plant Germplasm

System for storage and are being increased by NPGS, to be made available for other researchers. The seedlings were planted at both the Big Flats PMC and Cornell University. The collections were grown out to establish breeding evaluation blocks of 3,000 individual plants at both locations. Evaluations of flowering dates and growth form, heights, vigor, disease, stem and leaf abundance, and leaf widths were conducted through 2013. Plants were selected based on potential use for biofuel, (large statured plants), or wildlife habitat and critical area planting. The short statured plants will be moved into separate seed increase blocks in 2014 for potential native conservation plant releases.

Selecting Native Forbs for Pollinator Conservation

The Farm Bill of 2008 emphasized the development and conservation of native habitat for managed and native pollinators. After 4 years, working with over 53 species of native wildflowers, and mixes, seeded several times throughout the growing season as well as dormant seedings, species that performed consistently well based on vigor, ease of establishment, and survivability. These mixes were seeded in replicated plots in June, August, and October, for further evaluation.

Initial plots that were established in 2008, 2009, 2010, 2011, and 2012 will still be maintained and evaluated for long-term success as well as documenting other factors such as heights, flowering time, pollinator species present, and management techniques. Recommended species are as follows:

Drier Site Mix:

Wetter Site Mix:

Common Name	lb PLS/A	Common Name	lb PLS/A
purple bergamot	0.06	blue vervain	0.10
blue wild indigo	0.14	boneset	0.10
partridge pea	0.67	Virginia mountain mint	0.06
lanced-leaved coreopsis	0.75	dense blazing star	0.10
gray headed coneflower	0.50	great blue lobelia	0.08
early goldenrod	0.10	New England aster	0.15
purple coneflower	1.15	rough leaved goldenrod	0.06
tall white beard tongue	0.15	spotted joe pye weed	0.10
black-eyed susan	0.05	swamp milkweed	0.15
New England aster	0.10	wingstem	0.15
Virginia mountain mint	0.05	purplestem aster	0.10
wild bergamot	0.13	tall white beard tongue	0.10
narrow leaf mountain mint	0.05	Ohio spiderwort	0.05
oxeye sunflower	0.50	riparian wildrye	1.00
Virginia Wildrye	1.00		

Critical Area Stabilization/Improved Forages/Streambank Stabilization

Soil Bioengineering Time of Cutting Study

The use of willow for soil bioengineering continues to be a component in most streambank stabilization projects. With increase in and severity of hurricanes in the Northeast in the past couple of years, there has been an increase in use and questions concerning the timing of planting of willows for soil bioengineering. The use of additional engineering practices such as barbs, vanes and weirs has also increased the potential success and use of willow plantings as well.

Although it has been recommended to plant only dormant stock, there has been no published data in the Northeast quantifying the effectiveness of non-dormant plantings. A study was conducted with ‘Streamco’ purple osier willow (*Salix purpurea*) and ‘Greenbank’ sandbar willow (*Salix exigua*). The

study compared dormant harvested cuttings, stakes and fascines cut on March 15 and April 1 and stored in a moist refrigerated cooler to non-dormant plant material harvested just prior to the planting dates of: April 26, May 14, June 4, July 6, September 11 and December 4, 2012. A soaking treatment was also conducted, for some dates, to evaluate the effects of soaking on the cuttings and stakes. In 2013, a few additional plantings were conducted. Observations to date have supported the use of dormant planting stock and that extended refrigerated moist storage has had no detrimental effect on planting stock establishment.

Non-dormant stakes of ‘Streamco’ willow survived almost as well on all planting dates especially on April 26 and May 14 but produced less stems and were less vigorous when planted later in the season. There was a difference in survival, growth and vigor between species, ‘Streamco’ outperformed sandbar willow when planted on the non-dormant dates. Stakes performed better than cuttings for both species. Irrigation on July 6th improved growth and survival compared to the June 4th planting date, indicating that soil moisture conditions play a role in conjunction with plant physiology to rooting capability and that summer plantings would benefit from irrigation. The 4 day soaking treatment had minor differences in this study.



Non-dormant willow fascines planted on April 26, 2012.



Dormant willow fascines planted on April 26, 2012.

Low Cost Methods For Establishing Forest Riparian Buffer Plantings

In collaboration with The Stroud Water Research Center, the Chesapeake Bay Foundation, PA Department of Conservation and Natural Resources, Fruittown Land Stewardship Services, and Penn State University, a multi-state project will focus on developing low-cost methods for forested riparian buffer establishment. This project will study natural regeneration, direct seeding, and live-staking in comparison to small container stock. In addition, we will assess the use of double rows of low-stature fencing in lieu of tree shelters as means of protecting plants from deer, and the use of selective herbicides to help establish young woody plants from competing forbs and grasses. These techniques have the potential to increase planting success, decrease the costs of reforestation, provide options on sites not suited to current methods, and provide a more affordable way to increase stand density in existing marginal buffers.

There are 4 sites, participating in this research, 1 in New York, 1 in Maryland, and 2 in Pennsylvania. One third of the plots will be located in upland open pasture and adjacent to a forest (seed source), one third will be in upland open pasture greater than 300 feet from a forest, and one third in riparian land greater than 300 feet from a forest. On September 20, plots were established at Big Flats and plots will be evaluated in 2014 for percent survival, heights, vigor, weed densities, and other factors. Overall this project will develop methods that can improve reforestation success at low costs, demonstrate methods

that USDA can evaluate for possible CREP use, and with reforestation success, help improve the adoption of these management practices by others.

Native Willow Evaluation

Interest has arisen for propagating native species of shrub willow for restoration plantings in riparian areas, and wetlands and for soil bioengineering on streambanks. Native willows could also be used for living snow fences and windbreaks. Willows are used because they can grow quickly, stabilize soils and withstand flooding, improve water quality, and provide shade and cover for stream life. The species of interest are Bebb's willow, pussy willow, silky willow, shining willow and heart-leaved willow (*Salix bebbiana*, *S. discolor*, *S. sericea*, *S. lucida*, and *S. eriocephala*). A total of 122 collections, from VT, NH, PA, and NY, were planted July 2010 and have been evaluated for the past 4 years for survival, vigor, disease, and heights. Fencing had to be put around planting, due to very heavy browse from deer and other small mammals. After evaluations performed this year, *Salix sericea* (silky willow) has so far, performed the best. All surviving accessions will be evaluated in 2014.

Wildlife Food and Cover/Agroforestry Riparian Buffer Tree Establishment Trial



Establishing trees in riparian buffers areas is difficult due to weed competition, deer browse, and wildlife damage in these areas. In June 2012, a study was set up at the Big Flats PMC, to evaluate different treatments 9 different treatments for successfully establishing trees. These treatments compared planted small container stock with and without tree tubes, a fencing treatment, and several weed control methods including herbicides, mowing and mats alone and in combinations. We also evaluated 2 gallon planting stock without deer protection. Three seedlings of 7 species of trees were planted per treatment. The treatments were as follows:

1. tree tube + weed control mat +mowing (3x/year)
2. No tree tube + herbicide (as needed) + fencing
3. Tree tube + weed control mat + herbicide (only initial spraying, no follow up spraying)
4. RPM tree + herbicide (only initial application, no follow-up)
5. Control- just tree tubes
6. Tree tube + mowing (3x/year)
7. Tree tube + herbicide (apply as needed)
8. Tree tube + herbicide (only once) + weed control mat
9. RPM tree + mowing (3x/year) + initial herbicide application before planting

Species were evaluated in establishment year and in May 2013 and October 2013, for heights, vigor, disease and pests, deer browse, and survivorship. So far, in the 2nd year of evaluation, species with the herbicide treatments and tree tubes are putting on the most growth. Mowing alone changed the cover composition to grass, which may have resulted in more moisture competition. A side study evaluating direct fall seeding demonstrated that even after 2 application of roundup, weed seeds, from the soil, continue to be a serious problem.

Vegetative Buffers/Windbreaks for Improved Air Quality on Concentrated Animal Operations



Windbreaks for odor control in Pennsylvania.

What can be done to minimize the conflict between residential landowners living near a concentrated animal operation? There are problems with odors, flies, noise, dust and normal agricultural activities. A group of cooperators (including NRCS in PA, Penn State University Poultry Science, PA Bureau of Forestry, Cooperative Extension, , Big Flats and the National PMC and farmers), was organized to establish windbreak demonstration sites to evaluate potential benefits for windbreaks and air quality. More than 20 demonstration sites have been planted on poultry, dairy and swine operations. Many species of trees, shrubs, and grasses, such as ‘Northwind’ Switchgrass, ‘Streamco’ purple osier willow, Red Maple, Northern White Cedar, Miscanthus, and ‘Valley Forge’ Elm, were planted in front of large exhaust fans. This study will evaluate different

combinations of rows and species planted in front of exhaust fans to determine the best combination and which species can survive in these extreme conditions. Evaluation will continue in 2014.

Seed and Plant Production

Plant materials of released conservation plants and new plants under development were grown and processed at the Plant Materials Center. Any seed grower or nursery business interested in producing any of our plant releases should contact us directly at the center. Any landowners that need information on conservation uses of these varieties or local sources of plant materials can contact their local NRCS office. Seed that was harvested in 2013 was, ‘Aroostook’ rye, Canada and Virginia Wildrye, Canada Bluejoint, Sideoats grama, ‘Niagara’ Big Bluestem, New England collections of Little Bluestem, Big bluestem, and Indiangrass, ‘Tioga’ deertongue, ‘Copper’ Chinquapin, Bur oak, Glacial Lake Albany bush clover, lupine, and butterfly milkweed, and intermediate wheatgrass.

Tours/Workshops/Meetings

2013 Perennial Biofeedstock Energy Tour



On July 31, 2013, we put on our 9th biofeedstock tour and presentations. Over 100 participants enjoyed a morning tour of our field plots pertaining to biofuels. They received a great look into the many cooperative projects currently being conducted on site, including switchgrass breeding, bioenergy grass cultivar comparisons, willow breeding program for biomass production, seeding rates, seed treatments and establishment on marginal soils, and diseases and pests associated with bioenergy grasses that reduce plant vigor and seed yields. A demonstration of a small-scale biomass gasification and power generator by SUNY Morrisville was on-hand during lunch. For more

information on this workshop, please contact the Big Flats Plant Materials Center. Also, there will be another tour in 2014.

2013 Organic Cover Crop Tour and Presentations



On November 4, 2013, 90 participants attended our Organic Cover Crop Tour sponsored by the USDA-NRCS Plant Materials Program, Cornell Cooperative Extension, and the Northeast Farming Association of New York (NOFA) Upper Susquehanna Coalition and NY State Department of Ag. and Markets featuring:

~**Laurie Drinkwater** - Cornell University Department of Horticulture, Associate Professor: *Nitrogen Cycling and Soil Ecology overview.*

~**Jean-Paul Courtens** Roxbury Farm, a 1000 member CSA Organic Farm, *How I use cover crops, case study.*

~**Thomas Bjorkman**- Cornell University Department of Horticulture, Associate Professor: *Brassicas in rotation and for cover cropping, benefits and liabilities.*

~**Matt Ryan** - Cornell University Department of Crop and Soil Sciences, Assistant Professor: *Field demonstration of cover crop interseeder, time of tillage and cover crop planting effects on weed populations.*

~**Tour of Cover Crop Demonstration Plots:** with Presentations by **Paul Salon** (NRCS, Plant Materials Specialist), **Brian Caldwell** (Cornell University Dept. of Horticulture, Research Support Specialist), **Karen Hoffman** (NRCS, Resource Conservationist- Animal Science).

The outdoor tour included our cover crop demonstration plots with over 320 plots (species, varieties or mixes) seeded at several dates, cover crop mix seeding rate study, and cover crops for grazing pros and cons.

2013 Field Crop, Cover Crop Tour and Presentations



On November 14, 2013, over 130 participants attended our annual cover crop tour held at the USDA NRCS Big Flats Plant Materials Center. Attendees were shown the potential of using cover crops to improve soil health. Paul Salon started the morning by demonstrating the effects tillage has on soil health and function. These demonstration give an easy account to what is happening on a larger scale, out in the environment.

Dave Shearing, a consultant with the Western Crop Management Association, showed the group a zone-builder implement and discussed the comparisons

between conventional, no-till and the zone-builder on years with drought or excessive precipitation. Chris Houser, from Penn. State Extension, spoke about their 3-way interseeder and discussed its benefits in corn and soybeans rotations. The attendees were shown 320 cover crop demonstration plots with over 30 species and mixes, and saw first-hand the effects of planting date on establishment and success of cover crops and mixtures. The following presenters spoke in the afternoon:

- **Aaron Ristow** - Agriculture Coordinator, Upper Susquehanna Coalition (USC); *Cover Cropping within the Chesapeake Bay TMDL Framework.*

- **Dale Gates** - USDA-NRCS, Resource Conservationist- *Updated Cover Crop Specification for New York.*
- **Quirine Ketterings** - Cornell University Dept. of Animal Science, Associate Professor, Nutrient Management Spear Program; *Winter-Forage Small Grains to Boost Feed Supply: From Cover Crop to Double Crop, results from 2013 trials.*
- **Charlie White** - Extension Specialist Penn State University, *Cover crop mixtures: How many species and in what combination to achieve desired goals.*
- **Dave McLaughlin**- Vice President PA No-Till Alliance, (Dairy and Crop Farmer, Perry Co., Pa.), and **Jim Hershey** President and founding member of PA No-Till Alliance (Raises hogs, broilers and crops in Lancaster County, PA) and **Joel Myers** (Crop Farmer, Centre Co. Pa., no-till and soil health consultant, and former State Agronomist USDA-NRCS), *Introduction to the Alliance, how to form and maintain farmer networks.*

2013 Riparian Buffer Tour and Presentations

On Thursday, September 19, 2013 over 150 participants attended our Forest Riparian Buffer Plantings Workshop and Field Tour. This workshop was well attended by many professionals in a wide variety of fields, from multiple states. We would like to thank the following presenters for their outstanding presentations that captivated the audience:

- **Bern Sweeney- President, Director- Stroud Water Research Center;** *Ecology of streams, rivers and their watersheds; the role of forest riparian buffers for improved water quality.*
- **Dr. Don Leopold- Department Chair of Environmental and Forest Biology, SUNY ESF;** *Native tree and shrub selections determined by plant, soil and site characteristics.*
- **Art Gover- Research Support Associate, Penn State University, Plant Science Dept.;** *Before and after weed control for tree and shrub establishment and invasive species considerations.*
- **Mike Hanawalt-NRCS, District Conservationist, PA** and
- **Jenifer Johns -Chesapeake Bay Foundation, Stream Buffer Specialist;** *Methods for establishing trees and shrubs. CREP Experience, Lessons learned ordering, stock sizes, planting and protection.*
- **David Wise- Watershed Restoration Manger, Stroud Water Research Center;** *Post-planting care and maintenance. Explain their low cost methods for forested buffer plantings grant.*
- **Paul Salon-USDA-NRCS Plant Materials Specialist;** *Tree and Shrub planting projects at the Big Flats PMC.*
- **Karen Clifford-Delaware Co. SWCD Special Programs Tech** and
- **Brandon Dennis-NRCS Resource Conservationist NYC Watershed;** *NY CREP and lessons learned in the watershed riparian forest buffer program.*
- **Steve Doudt - Meadowview Nursery Naples, NY;** *perspective on bare root culture and care of planting stock.*
- **Jim Engel – White Oak Nursery, Geneva, NY;** *perspective on container culture; and seed collection and handling for nursery propagation and direct seeding.*
- **Shawwna Clark-** USDA NRCS Big Flats Plant Materials Center; *update on Root Production Method tree establishment study in Central New York.*

*For any additional information on the material presenter here please contact us at 607-562-8404.

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