



BIG FLATS PLANT MATERIALS CENTER PROGRESS REPORT OF ACTIVITIES FOR YEAR 2007

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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.

PLANT MATERIALS PROGRAM

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 and Water Quality
- Native Plants for Conservation Systems
- Biofuels/Agroforestry
- Protecting and Improving Water Quality
- Wildlife Habitat Improvement
- Critical Area Stabilization

This is a brief summary of 2007 activities at the center. For additional information on the projects, please contact us at the center.

Visit our Plant Materials Program Website at <http://www.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; new improved plant uses and technology, and links to websites with additional or supporting information.

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Establishing Cover Crops in Corn at Time of Corn Planting

The establishment of cover crops following silage corn is a problem in the Northeast due to late harvest and short growing seasons. An alternative method for establishing cover crops in the spring is being continued. Seeding cover crops at corn planting has not been feasible due to commonly used residual pre-emergence herbicides. Now, with the use of imidazolinone herbicides, such as Pursuit, and corn hybrids resistant to them, the option of seeding cover crops at corn planting is possible. This study is finding that this cover crop system works well with red clover, white clover, orchard grass and perennial ryegrass. In 2007 this system was approved as a national CSP enhancement for on farm demonstration. A demonstration was conducted in Erie Co., New York, on the Leonard Janinga farm, in cooperation with the Western NY Crop Management Association. There were no differences in corn yields with average yields of 19.45 and 19.55 t/ac for the cover crop treatments and the control respectively. There was 85-100% cover on all cover treatments measured on 11/14/07. A farmer is able to seed cover crops under silage corn, have good corn yield and have a cover crop well established.

Aerenchyma Root Study with USDA, ARS Pasture Lab, Cape May PMC and ARS Beckley Lab

Native warm season grasses are a potentially important component of riparian buffers designed to reduce non-point source pollution (nutrient, pesticides and pathogens) of eastern streams and rivers.

The objective of this study was to quantify differences in root production among warm season grass cultivars in anaerobic saturated soil conditions such as those that would be commonly found along bottomlands adjacent to field streams. This study was completed in early 2007. This study focused on the development of aerenchyma in the roots of plants. Suitable plant materials for inclusion in riparian buffers were found to be prairie cordgrass (Red River), 'Hightide' switchgrass, 'Meadowcrest' eastern gamagrass and 'Shelter' switchgrass, of the species tested.



Intermediate Wheatgrass Evaluation



Thinopyrum intermedium

There is a need to develop production systems which reduce both farmer inputs and soil erosion. This evaluation is to develop an intermediate wheatgrass adapted to the Northeast as an alternative perennial grain crop. This study involves a recurrent phenotypic selection breeding program in cooperation with Rodale Research Institute in Pennsylvania. Intermediate wheatgrass, a perennial relative of wheat, was selected to be evaluated for grain producing attributes. After the second cycle of selection, yields were increased by more than 30%. Once developed, this perennial grain can provide year-round soil protection, increase wildlife benefits and can be utilized for human nutrition.

Biofuel Projects at the Center

Panicum virgatum



Species Evaluation for Biofuels: New York

A New York Farm Viability Institute Grant, “Accelerated Evaluation of Perennial Grass and Legume Feedstocks for Biofuel Production in New York State” was accepted in cooperation with Cornell University. This project evaluated warm and cool season grasses for potential use as a biofuel. There are 24 entries of warm season grasses consisting of switchgrass, big bluestem, indiangrass and eastern gamagrass and 9 cool season entries of tall wheatgrass, tall fescue, reed canarygrass and smooth brome grass, at 4 locations including one site at the Big Flats PMC. Larger farm plots were planted utilizing the Big Flats PMC Truax native seed drill. Warm season grass calibration and establishment training was given to Cornell Plant Breeding Department personnel prior to the plantings.

Switchgrass Seed Treatment Study:

A seed treatment study was conducted to evaluate the potential to improve switchgrass establishment utilizing fungicides, insecticides and biological control seed treatments. This study was conducted in cooperation with Cornell University and the NYS Agricultural Experiment Station. The plots were established in the spring of 2007 as well as a dormant seeding in November. Plots will be monitored in 2008.

Warm Season Grass Herbicide Study:

A study to evaluate herbicides on warm season grasses was established in 2007 that included switchgrass, big bluestem, indiangrass and eastern gamagrass. Eight herbicides were selected for this test.

Tall Wheatgrass Evaluation for Biofuel:

An evaluation of four tall wheatgrass cultivars and two reed canarygrass cultivars was established in a small replicated trial in cooperation with Cornell University. Larger plots of Hungarian and ‘Alkar’ tall wheatgrass were established for agronomic studies. Tall wheatgrass is being used in Hungary as a Bioenergy crop for direct combustion for heating.

Biomass Yields of Warm Season Grasses:

A stand of ‘Kanlow’ and ‘Cave-In-Rock’ switchgrass was established to develop a study on time of cutting to evaluate the persistence of switchgrass when harvested during the growing season. Established plantings of warm season grasses at the PMC were harvested for yield to get preliminary information for the New York Farm Viability Institute.

Cell Wall Characterization for Bioethanol Production:

A Northeast SunGrant collaborative with Cornell University was funded: “A Biofuel Screening Program for Grass Feedstocks: Diversity, Physiological traits and Compositional Characteristics for Optimal Yield”. Initial plant material for evaluation was supplied by the Big Flats PMC to evaluate characterization of the cell wall composition and bioethanol production potential. Cooperation will continue in 2008, supplying material of the different warm season grasses at different stages of maturity. Plant samples from other PMC’s studies will be evaluated as a part of this study.

Warm Season Grass Breeding for Biofuels:

A germplasm collection of switchgrass, big bluestem, indiangrass and prairie cordgrass was initiated to start a cooperative breeding program with Cornell University.

Eastern Gamagrass as a Forage Crop

Eastern gamagrass (*Tripsacum dactyloides* L.), is a highly productive, digestible, native warm season perennial grass, being developed as a forage crop. Eastern gamagrass may prove useful for hay, haylage or intensively managed pastures. Eastern gamagrass could be used in place of corn silage on highly erodible lands and on marginal corn producing soils.



'Meadowcrest' eastern gamagrass, a tetraploid cultivar, was released in 2006. In 2007, a nitrogen fertilizer study was initiated to determine optimum rates and time to fertilize, to get optimum yields of eastern gamagrass.

Japanese Knotweed Control Study with ARS Pasture Lab, USA-COE and Penn State University

Japanese knotweed is a tall growing perennial herbaceous plant that forms dense monocultures on many different sites, from roadcuts to streambanks. This invasive plant grows to 8-10 foot heights, smothering out all vegetation. Herbicide studies have been done to determine the best method to try to control this plant. Japanese knotweed has a rhizomenous root system, so controlling this plants rhizome system is the key. Once the knotweed is knocked back, what can be planted? The objective of this study is to test different warm season grasses and methods of establishment to rehabilitate sites after controlling Japanese knotweed with herbicides. A site at the Corps of Engineers Tioga-Hammond Dam, near Mansfield, PA, was sprayed in 2006 and plots established in the spring of 2007. First year results look good and plots will continue to be evaluated in 2008. Part of the study involves treating the plots with herbicide for two years (2006 and 2007) and then establishing plots in the spring of 2008.

Native Prairie Cordgrass and Indiangrass for the Northeast

Prairie Cordgrass (*Spartina pectinata*), is a tall, perennial, warm season grass that is native to the Northeast States. Its anticipated conservation uses are erosion control along fresh water shorelines, as well as potential uses in created wetlands, critical area treatment on wet soils, waste water renovation, and biomass production. It can grow in both sandy and heavier soils and does not require wet conditions to grow. A collection of prairie cordgrass was made in the Northeast. Two groupings have been selected for vigor and density and are in the seed increase stage at this time. The first group from Long Island, NY, consists of 3 accessions and the second group consists of 1 accession from Northampton, NH, and 2 accessions from Seabrook, ME. Our plans are to release these two groups as source-identified releases for use in the New England and the Mid-Atlantic States.



Indiangrass (*Sorghastrum nutans*), is an upright, perennial warm season grass.

It has short creeping rhizomes that can product a sod. PI-591811 was selected from a collection of 137 indiangrass accessions collected in the east and evaluated from 1986 to 1991. It was selected for its vigor, early flowering date, and source identified for eastern origin. Its leaf color varies from green to blue and flowers in early to mid August.

Accession, PI-591811, is a combination of three accessions from Steuben County, NY, Erie County, PA and Allegany County, MD. We are advancing the seed to the third generation for field testing. PI-591811

Indiangrass can be used for mid-summer grazing systems in the Northeast, wildlife seedings, and for use in areas where eastern source identified indiangrass plant material is desired.



Beachgrass for Great Lake Dune Ecosystem



The release of 'Cape' American beachgrass (*Ammophila breviligulata*) has proven useful in the Great Lake dunes as well as the Atlantic Ocean. 'Cape' originated from Cape Cod, Massachusetts. A recent study at the University of Vermont found the Champlain type (Great Lake) is genetically different from the North Atlantic type (includes 'Cape'), and the South Atlantic type. Champlain appears to be a sub-species. Therefore, the use of 'Cape' may pose a situation to the Champlain species by occupying sites that were originally populated by the local native type. Collections were made of the Champlain sub-species in 2002, with the Nature Conservancy at El Dorado Preserve, Southwick State Park and Sandy Island Beach (all on eastern shore of Lake Ontario.) The culms were planted on the PMC and their performance continues to be evaluated.

Native Cool Season Grasses for Conservation Systems

There has been increased emphasis in recent years to use native plants for conservation planting projects. Native species of cool season grasses are almost non-existent in the commercial seed trade. The Big Flats PMC, in conjunction with the Cape May, NJ and Beltsville, MD PMC's, is developing new native grasses for the eastern U.S. The following cool season grasses are being evaluated: Canada wildrye (*Elymus canadensis*), Virginia wildrye (*Elymus virginicus*), hairy wildrye (*Elymus villosus*), Canada bluejoint (*Calamagrostis canadensis*), crinkled hairgrass (*Deschampsia flexuosa*), poverty oatgrass (*Danthonia spicata*), bottlebrush (*Hystrix patula*), and red fescue (*Festuca rubra*). These grasses will be released as source identified seed to meet the need for native eastern eco-types to be utilized in conservation seedings for farm bill practices, wildlife habitat, critical area stabilization, wetland plantings and ecological restoration.



RPM Trees Study

The "Root Production Method" (RPM) a proprietary process for producing trees, is very visible in the nursery trade. RPM process includes air pruning of seedlings grown in well aerated soil medium to encourage a dense fibrous root system that promotes rapid growth of the plant. Planting tree seedlings in agroforestry practices can be a problem with weed competition, wildlife browsing and possible flooding and wet soils. The question "should RPM trees be utilized instead of regular nursery seedlings, understanding that the RPM trees are much more expensive?" This study was initiated in the fall of 2006 where 5 species of hardwoods: Pine Oak, Red Oak, Swamp White Oak, Sugar Maple and Shadbush Serviceberry were compared to 3 types of nursery stock: RPM trees, 1 year-old seedlings and 2 year old seedlings. These trees will be evaluated for a number of years to monitor the rate of growth and performance. Also, a field evaluation planting was established in the spring of 2007 on a Wetland Reserve Program site in Madison County, NY, to evaluate RPM hardwood trees of wetland species. Their performance will be compared to regular nursery seedlings.



Vegetative Buffers for Improved Air Quality



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. There is information from the Midwest that needs to be adapted to the east where space is limited. A group of cooperators (including NRCS in PA, Penn State University Poultry Science and Horticulture departments, PA Bureau of Forestry, Cooperative Extension, Wenger Feed, Big Flats 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. Studies at Penn State University are being conducted to evaluate the effect of trees to absorb ammonia, dust and other pollutants. Fast growing species, as 'Streamco' purpleosier willow and 'Spike' hybrid poplar are being studied to establish visual screens in 2-4 years, while also acting as an air filter and a living snowfence. Windbreaks may have the ability to reduce odor concentrations and this cooperative group will be monitoring the plantings to determine their effectiveness.

Evaluation of Sideoats Grama

Sideoats grama, a native warm season grass, is a medium size perennial bunchgrass growing 15 to 30 inches tall. This plant is adapted to dry/droughty conditions, grows under a wide variety of climate conditions, and is adapted to a broad spectrum of soils. It often occurs on shallow limestone or dolomite soils, growing in partial to full sun. This grass is a nice addition in a warm season grass mix for wildlife seedings. In cooperation with the NYS Department of Environmental Conservation Natural Heritage Program, collections were made of native stands of Sideoats grama and currently are under evaluation on the Center. Selections were made in 2007 and seed increase block will be established in 2008.

Native Plants for National Parks



Ensuring the integrity of vegetative ecosystems within the National Parks is an increasing concern for the USDI, National Park Service (NPS). The USDA, NRCS Plant Materials Program and NPS, have set a cooperative agreement to develop native plant materials for use in planting of disturbed areas within our National Parks. The Big Flats PMC has cooperated with Acadia National Park in Maine, in developing plants to revegetate disturbed areas. This work involved collecting, propagating and producing 25 native species of grasses, forbs, shrubs and trees.

Native Plants for Albany Pine Bush Preserve

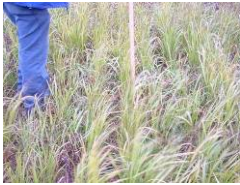
The Albany Pine Bush is a common name applied to the last remnants of the once vast pitch pine-scrub oak barrens, which covered most of the Upper Hudson River Valley, in New York. The Albany Pine Bush Preserve Commission manages the globally rare 2,500 acre preserve and they are active in using native plants for restoration work on the preserve. The Big Flats PMC worked with the Commission to



release a source identified wild blue lupine and a butterfly weed, which are referred to as the Glacial Lake Albany germplasms. The federally endangered Karner blue butterfly is found in the Albany Pine Bush and these two plant species are essential in maintaining their butterfly population. Seed increases are underway at the PMC. There is also a cooperative agreement on a germplasm release of Roundhead Bush Clover with the Preserve Commission.

Native Grass Studies at Cornell University Arnot Research Forest

Three studies were started at the Cornell University Arnot Research and Training Forest in cooperation with Cornell University, Dept. of Natural Resources in 2006. The first is a Native Cool Season Grass Mix study to determine optimum seeding rates of the mixes and evaluate their establishment. The grasses were: bentgrass, fringed bromegrass, fowl bluesgrass, intermediate wheatgrass, red fescue and rough bentgrass. Evaluations of the site will continue through the summer of 2008 and the plots will be used for field training by the PMC and Cornell University. Second is a Native Cool Season and Warm Season Grasses Mix study. The warm season grass mix that was seeded consisted of big bluestem, indiagrass, switchgrass, and deertongue with the cool season grasses consisting of Virginia wildrye, Canada wildrye, Riparian wildrye and intermediate wheatgrass. This study will also be evaluated until the summer of 2008 and be used for field training. The third study at the site is a Switchgrass Variety Trial for biofuels.



Ash Germplasm Preservation Project

Emerald Ash Borer has been attacking and killing ash trees in the Great Lake States and is spreading. A cooperative project was developed to preserve ash germplasm with NRCS, USFS and ARS Genetic Resource Preservation Unit in Fort Collins, CO. If ash tree populations are decimated by the ash borer, the stored seed can be used as a genetic base to re-establish ash trees for future generations. The website is www.ashseed.org.

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.

Tours/Workshops

New York Grassland Evaluation Contest



The second Grassland Contest for 4-H and FFA high school students was held at the Big Flats PMC on April 30, 2007. This contest was developed by the Seneca Trail RC&D Council. We had 19 teams of 4 students per team from three counties. The contest was designed to test the student's knowledge of agriculture, grazing, soils and plant materials. Troy Bishop, chairman of NYS Grazinglands Conservation Initiative Steering Committee awarded Penn Yan Academy the first place finish.

USDA Undersecretary Press Conference at PMC

USDA, Undersecretary, Mark Rey held a press conference on June 27, 2007 at the Big Flats PMC, to announce the awarding of a million dollar Conservation Innovation Grant to the Environmental Credit Corp of State College, PA. The grant is to reduce greenhouse gas emissions and explore cutting-edge technologies while maintaining a viable agricultural operation. Eight dairy farms in NY will be involved.



New York NRCS Leadership Team Tour

On July 16, 2007, the New York NRCS Leadership Team visited the PMC for a field tour of our plant testing and research plots. The PMC appreciated this opportunity and the participants now have a better understanding on how the plant materials program assists our field people in putting conservation on the land.

Conservation Field Day

The Big Flats PMC conducted a Conservation Field Day Tour on July 18th for 70 people (both NRCS and others). The participants were taken by wagons to tour stops which included: Invasive Plants – Issues and Identifications; Warm Season Grass Establishment/Dormancy Seeding Study; Cover Crop Establishment at Corn Planting; Aerenchyma Root Study/Wetland Reserve Program; Switchgrass for Biofuels; Eastern Gamagrass/Prairie Cordgrass; Woody Bed Propagation; Soil Quality and Tillage; Soil bioengineering, Windbreaks for Odor Control; Native Cool Season Grass Mix Study; and Wildlife Habitat Improvement/Warm Season Grasses.



Biofuel Field Day



The Big Flats PMC conducted a Biofuel Field Day on August 1, 2007 for 100 people. The tour observed on-center studies of establishing warm and cool season grasses with different herbicides, seed technique studies, warm season grass cultivar and seed treatment studies, management of willows by SUNY-ESF and new tree production methods (RPM), as well as observing seed production studies. Presentations were given by Larry Walker, Director of NE Sun Grant Institute at Cornell on cellulosic ethanol; Steve Rigoni, a farmer growing grasses for energy; Matt McArdle, President of Mesa Reduction Engineering and Processing on handling biomass of wood and grass in coal power generation plants, and Calvin Ernst of Ernst Conservation Seeds on economics of establishing switchgrass.



Cornell University Seed Science Class/Alfred State College Agronomy Class

Dr. Alan Taylor brought his Cornell Seed Science Technology class to the plant materials center in September to learn about the seed harvesting and seed cleaning process of diverse types of seeds.

Professor Matt Harbur of Alfred State College brought his agronomy class to the plant materials center in October for a tour of our plant testing projects and our seed harvesting/seed processing operations.

Permanent Exhibit at the NYS Fairground in Syracuse

NRCS New York developed a permanent exhibit site at the New York State Fairgrounds in Syracuse, NY. The Big Flats PMC staff was recruited to construct the site in 2005. Retired Plant Materials Specialist, John Dickerson and Bob Eschemann, our National Plant Materials Leader, helped design the site layout and the Big Flats PMC staff planted trees, built stone walls and developed a pond area at the site. In 2007, the site was mulched before the fair and new plants installed. A plot map and a plant identification book was available for thousands of viewers as they walked through the area which promotes conservation of our natural resources.



Empire Farm Days Conservation Garden and Biofuel Demo Plot

A permanent conservation garden located behind the USDA tent at the Empire Farm Days, is maintained by Plant Materials Specialist Paul Salon. This is an opportunity for farmers and landowners attending the farm show to observe and learn about our conservation plants. A large demonstration plot of switchgrass was established at this site to promote warm season grass for use as a biofuel.

For more detailed information, contact the PMC at (607) 562-8404.

