

2006 Progress Report of Activities

June 2007

USDA-NRCS Brooksville Plant Materials Center

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Mission and Objectives

The Brooksville Plant Materials Center (PMC) is operated by the USDA, Natural Resources Conservation Service. The mission of the Plant Materials Program is to deliver effective state-of-the-art plant science technology to meet the nation's natural resource conservation needs. To this end, we identify superior accessions of adapted plants which are then tested and released for production by commercial growers. We also provide technical assistance in plant pro-

duction and management methodologies. The evaluation and use of native plant materials is emphasized.

The major conservation objectives we address at the Brooksville PMC are:

- Improve and maintain water quality
- Control erosion on cropland and stabilize critical areas
- Improve forage on pastures and rangeland
- Improve wildlife habitat

Conservation Concerns:

- Improve and Maintain Water Quality
- Control Erosion on Cropland and Stabilize Critical Areas
- Improve Forage on Pastures and Rangeland
- Improve Wildlife Habitat

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About the Brooksville Plant Materials Center

The PMC is located 7 miles north of Brooksville on US Highway 41, 15 miles inland from the Gulf of Mexico. Our service area includes all of Florida, Puerto Rico, and the US Virgin Islands; and the coastal areas of Georgia, South Carolina, and Alabama (right).

There are 43 acres under cultivation, which are used for the evaluation and production of plant materials. The remaining 139 acres of the property are native woodlands and planted pines. Structures include an office building and conference building, two greenhouses, a seed processing building, a laboratory for seed germination and tissue grinding, and an open educational shelter. Wildlife, such as deer and wild turkey, is abundant in the wooded areas and can be seen along the trails or around the edge of the fields.



Plant Releases Completed in 2006

Morning Mist Hairawn Muhly



Occasionally the plant selection process that the PMC undertakes can yield some unexpected results. We initially collected hairawn muhly (*Muhlenbergia capillaris*) plants in order to develop potential seed sources for rangeland and native area restoration; however, we found several accessions that had superior ornamental characteristics (see related story on page 5). One of these is Morning Mist (left). It hails from Citrus County, FL and was selected for release because it produced white flowers unlike the other accessions in the assembly, which produced pink to purple flowers that are typical for the species. The flowers begin to emerge in early October and the plants are generally in full flower by the middle to the end of the month. The flowers remain white throughout the flowering period and testing has shown that this characteristic remained stable through three generations of seed production. Limited quantities of Morning Mist plants (divisions) are currently available for interested nursery producers.

Ghost Rider Germplasm Purple Bluestem

Ghost Rider is a selected release of purple bluestem (*Andropogon glomeratus* var. *glaucopsis*, synonym *A. glaucopsis*). It is a composite of ten purple bluestem accessions collected in Florida that exhibited superior vigor and seed production. These accessions were allowed to cross-pollinate to produce the seed source for Ghost Rider.

Purple bluestem is an important component of Florida native rangeland and is generally found on wet flatwoods sites. It is one of two species of bluestem occurring in the state that have a powdery, glaucous coating on the leaves and stems. The other species is chalky bluestem (*A. capillipes*). Some previous NRCS literature inadvertently switched the common names for these two species. In this literature, purple bluestem was identified as a poor source of forage for livestock, while, in truth, chalky bluestem is the inferior forage source and purple bluestem is highly palatable.

Currently, there are few well adapted native seed sources that are available for use in reclaimed mined land (NRCS Conservation Practices 543, 544) and criti-

cally eroding areas (342), pasture (512) and rangelands (550) to provide wildlife habitat, species diversity, and forage. Ghost Rider is the first of several releases of Florida native grasses that will be made by the Brooksville PMC. Producers interested in growing these or any of our releases should contact the Florida Plant Materials Specialist (PMS), Mimi Williams, to obtain starter material.



Pending Plant Release

Blue Maidencane

A selection of blue maidencane (*Amphicarpum muehlenbergianum*) will be released in 2007. It was collected in northern Citrus County, FL and will be given the name Gator Germplasm blue maidencane. Blue maidencane, also known as goobergrass, is a wetland plant that spreads rhizomatously. We anticipate that Gator will be a good companion plant to Citrus Germplasm maidencane (*Panicum hemitomon*) which was released in 1998 for use in various freshwater wetland situations. Blue maidencane prefers a slightly drier hydrologic regime than common maidencane, so it occupies a slightly different niche. It has bluish foliage with a white leaf margin (right). It produces a few above-ground seedheads, but these are sterile. The fertile seed are produced below-ground, hence the name goobergrass. Since blue maidencane produces very few seed that are impossible to harvest from the soil, it needs to be established vegetatively from dug rhizomes. It spreads quickly after planting from these rhizomes. It

can be used in restored (657) or constructed wetlands (656) or aquaculture ponds (399) for bank stabilization, nutrient uptake (590), and wildlife food and cover (644).



Eastern Gamagrass Seed Production Management

Eastern gamagrass (*Tripsacum dactyloides*) is a large, native, bunch grass native to the eastern US. It is well adapted for erosion control (386, 601) and pasture and range plantings (512, 550). Its high palatability for livestock and great potential to address many conservation concerns has spurred much research in this species from several PMCs. Evaluations at the Brooksville PMC have shown that none of the seed sources that can be purchased commercially are well suited for use in Florida. We have selected an eastern gamagrass that was collected in Polk County, FL for seed increase and release. This accession performs well in Florida, but is poorly adapted to areas with colder winters. We plan to release this eastern gamagrass selection as soon as we are able to produce sufficient seed to supply potential seed producers. To facilitate this, we were able to purchase a combine in 2006 that will be used to harvest seed of this accession (see related story, page 7).

Eastern gamagrass plants are notoriously poor seed producers. In order to maximize seed production, we initiated a study to look at the effect of row spacing and fertility on seed production of our selected eastern gama-

grass accession (below). Row widths used in the planting were 2-, 4-, 6-, and 8-foot with a 3-foot spacing between plants in the rows. Fertility treatments consisted of 0, 50, 100, and 200 pounds of nitrogen per acre applied as 10-10-10 in the spring of the year. Numbers of fertile shoots per plant are determined for each treatment in the early summer, then seed is harvested when it ripens and germination percentages are recorded. Once the optimum plant spacing and fertility levels have been determined, this information will be incorporated in planting guides for this future release.



New Switchgrass Cultivar Development



Switchgrass (*Panicum virgatum*) is a warm-season native species that is fairly widely available commercially; however, most of these materials came from the Midwest, Great Plains, or the Northeastern US and are poorly adapted for use in Florida. Miami, Stuart, and Wabasso, three germplasm releases made by the Brooksville PMC in 1996 are all poor seed producers under Florida conditions and were released as vegetative material. There is little economic justification for vegetatively planting them in pastures (512), rangelands (550), and critical areas (342), and as a consequence, their use has been limited. The need to develop a seed-propagated switchgrass for use in Florida led the PMC to collect additional switchgrass accessions within the state. We collected seed from 101 sites, grew them in the greenhouse, and planted them in the field in 2001,

along with plants of the three releases mentioned previously.

Switchgrass plants exhibit a great deal of phenotypic variability in growth habit, with plants ranging from highly clump-forming to rhizomatous and varying in height, foliage color, and amount of pubescence (hairiness). Much of this variability is due to the fact that switchgrass is naturally polyploid (more than two sets of chromosomes), and accessions can contain different numbers of chromosomes. Most of the commercially available switchgrass cultivars have been found to be either tetraploid (4 sets of chromosomes) or octaploid (8 sets). Crossing switchgrass plants with different ploidy levels can lead to sterile offspring. You cannot just look at a switchgrass plant and determine its ploidy level, this has to be determined from tissue samples in the laboratory. PMC personnel and Mimi Williams, the Florida Plant Materials Specialist, are cooperating with Ken Quesenberry at the University of Florida and Brian Baldwin at Mississippi State University to conduct this research. Initial sampling was done in 2005, but the chromosome counts on some accessions were not conclusive. Plants need to be re-sampled to confirm their chromosome number and then we can proceed with grouping plants with like ploidy levels in crossing blocks to develop improved switchgrass selections for Florida.

Slender Woodoats

Florida's sub-tropical climate does not favor growth of many cool-season grasses. This means that livestock producers have little green forage available for their animals during the winter months. Greg Hendricks, the State Resource Conservationist, recognized this need and directed the PMC to begin working with slender woodoats (*Chasmanthium laxum*).

Slender woodoats is a clump-forming grass that produces slender spikes of flowers beginning in May or June (right). Initial testing by PMC personnel has shown that this species produces a high percentage of viable seed. Plant collections began in 2004 and were completed this year. We have 69 accessions and these will be compared to Kinchafoonee Germplasm Virginia wildrye (*Elymus virginicus*) released by the Georgia PMC, which is also a cool-season native adapted to Florida that produces its flowers later in the summer.



In addition to evaluating these accessions, the PMC will also initiate a clipping trial to determine if slender woodoats can tolerate defoliation. Clipping regimes to be tested will include a dormant clip in December and ones in February and April. If the results of this test are favorable, further testing will be conducted to refine harvesting recommendations for this species.

Lopsided Indiangrass Development

The PMC is working to evaluate, develop, and release a native Florida selection of lopsided indiangrass (*Sorghastrum secundum*) for conservation use, especially for erosion control (342, 391), native area restoration (327, 562), and wildlife cover (392, 645). Lopsided indiangrass differs from yellow indiangrass (*S. nutans*) in having spikelets that all hang to the same side of the panicle (right). Both species occur in Florida, but yellow is found mainly in the northern part of the state; lopsided is most common in the central and southern counties. There are currently two crossing blocks at the PMC. One consists of three accessions that are all stiff and upright, with a bluish coloration to the foliage, and the other includes plants from 21 superior accessions collected in peninsular Florida. These will be released in the next few years after seed supplies are sufficient to meet commercial demand.

We have experienced problems with stand persistence in production fields at the PMC. Whether the cause of this stand decline is biotic (insect or disease) or abiotic (irrigation, residue buildup, or nutrient deficiency) has

not been completely determined. The PMC is currently conducting research on residue management methods in order to improve stands of the blue-foliaged selections of lopsided indiangrass. Treatments we are evaluating are burning and clipping during the late winter and a summer clipping treatment compared to a control that is neither burned nor clipped. Information from this research will be included in planting guides for these releases.



Ornamental Hairawn Muhly



In 2006, the PMC began a cooperative study with Drs. Jeff Norcini and Gary Knox from the University of Florida North Florida Research and Education Center in Quincy to develop ornamental hairawn muhly releases. Hairawn muhly is commonly used in many municipal, roadside, and commercial plantings in Florida, but nurseries have done little selection for improved types. As a consequence, these plantings often have a non-uniform appearance due to differences in growth habit and other phenotypic characteristics.

During previous testing, we had selected eleven hairawn muhly accessions with what we considered to be superior ornamental characteristics. These accessions included ten with purple to pink flowers and one white-flowered one (Morning Mist Germplasm, see page 2). Our eleven accessions are being compared to a commercial purple (an unnamed one from Monrovia Nursery) and a white-flowered muhly (White Cloud from Superior Trees) to assess their commercial potential. We planted plots of these accessions in both locations in April and have been taking monthly visual quality ratings. We have also recorded plant measurements and flowering dates for each muhly being tested.

Drs. Knox and Norcini are extension researchers who both work with the commercial ornamental horticulture industry in the state and can provide us with vital assistance in selecting materials that should best meet the needs of the nursery industry. This testing will be completed in 2008, and we anticipate releasing the superior purple flowered muhlys cooperatively with the University of Florida after sufficient plant material has been increased to supply commercial growers.

Perennial Peanut Demonstration

The PMC released Brooksville 67 (below left) and Brooksville 68 (below right) germplasms of perennial peanut (*Arachis glabrata*) in 2002. These are both low growing, sod-forming selections that, due to their nitrogen-fixing ability and relative freedom from pests, require less management than many of the turfgrasses used in Florida. They both must be established using vegetative material (rhizomes).



The Plant Materials Specialist, Mimi Williams, was asked to install an urban demonstration planting of PMC perennial peanuts on the property of Erika Henderson (photo on right, rear, second from left) in Gainesville. Erika chose Brooksville 68 Germplasm (often called pointy-leaf or needlepoint) as the material that she preferred. Mimi applied several applications of

glyphosate (Roundup) to prepare the planting site. PMC staff dug 4 bushels of Brooksville 68 and Janet Grabowski, Mary Anne Gonter, and Ed Black traveled to Gainesville on September 21 to help install the planting. Donna Hopwood, Alachua County District Conservationist (below left), assisted and she recruited some local students (her daughter and one of her friends) to



serve on the planting crew. Bob Stobaugh and Gail Hendricks from the Florida NRCS Public Affairs Staff took pictures and video during the planting and they plan to take follow-up pictures of the planting in the future to chart its progress.

National Program Review

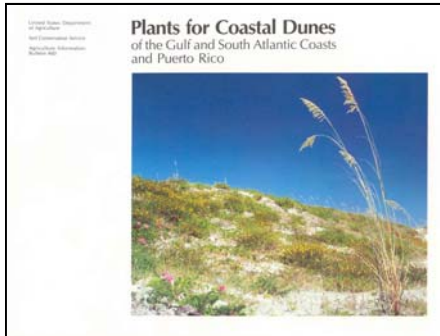


On April 25 and 26, the Brooksville PMC underwent a national program review. According to national policy, PMCs are to be reviewed every five years. The review team included Robert (Bob) Escherman, the National Plant Materials Program Leader; J.R. Flores, North Dakota State Conservationist;

Jim Briggs, Plant Materials Specialist at the West Region Technology Support Center; and Greg Hendricks, Florida State Resource Conservationist. The team reviewed the PMC facilities, research activities, and records. They also spoke with several of our cooperators who represented universities, private industries, state and federal agencies that utilize our services.

The PMC and Plant Materials Specialist received an overall favorable rating for our research activities. The need for field days and technical publications to document the results of our research were noted. The committee identified improvements in our greenhouses and seed processing equipment as major infrastructure items to be addressed when funding becomes available. The lack of a scientist staff person (i.e., agronomist or biologist) is a major limitation to improving PMC productivity. They suggested that reimbursable agreements with other government entities or private industries may be a way to generate funds to support this position. The committee was impressed by the favorable comments made by our cooperators. They commended the PMC staff for their knowledge of Florida natives and seed and plant production techniques. The Florida Native Seed Production Manual, published in 2002, was considered by all to be an extremely useful publication. We are currently implementing those recommendations that we can address and look forward to a productive future.

Florida Coastal Restoration Publications



The need for a revision to Agriculture Information Bulletin 460 "Plants for Coastal Dunes of the Gulf and South Atlantic Coasts and Puerto Rico" published by what was then

the Soil Conservation Service in 1991 (above) has long been recognized. Recently, several devastating hurricanes have highlighted the importance of coastal plantings to stabilize the highly dynamic ecosystems along our coasts and this publication was an important reference for individuals working in this field; however, it is no longer in print and the technical information and plant material recommendations need to be updated to reflect advances made in the field.

Mimi Williams began compiling information this year to prepare a manual that will convey recommendations

for coastal restoration activities in Florida. The manual will be published in 2007. Mimi was also asked by Bob Escherman to coordinate preparation of a more comprehensive manual to replace Bulletin 460. It will address coastal restoration issues in the southern US, from the mid-Atlantic states through the Gulf coast of Texas, as well as Puerto Rico and the US Virgin Islands. Information from the Florida manual will be incorporated in this new regional manual as will materials contributed by the other PMCs and Plant Materials Specialists that serve this part of the United States.



Major Improvements to the Infrastructure at the PMC

In 2006, the turbine pump for the PMC irrigation system that had been in continuous operation for almost 20 years finally reached the end of its useful life. The pump shaft had worn so much that it could not sustain enough pressure to run the sprinklers. There was no way to repair the existing pump to restore function, so the whole pump had to be replaced. During the summer, a local well company installed a new 60 hp turbine pump. Although we still have some minor repairs that need to be done to restore the system to optimum functional levels, our sprinklers now run as scheduled.



We were even more in need of replacing our 1962 Massey Ferguson combine (above right). It had not been operable for almost a decade, which severely hampered our ability to produce seed of many of our plant releases and materials being increased for release. During this time, we had relied on hand-harvests and occasional assistance from Steve Melton, a local seedsman and a member of the PMC Technical Advisory Committee, who brought his combine to the PMC to harvest our crops for us. We received funding this year that allowed us to purchase a John Deere 9560 combine (below right).



Alabama Coastal Restoration Workshop and Demo Planting



The PMC service area includes Alabama's two coastal counties. These counties were severely impacted by hurricanes Ivan, Katrina, and Rita. The damage to the beaches in the area was a conservation concern recognized by NRCS personnel in Alabama and that led to a request for Plant Materials assistance to conduct a coastal restoration workshop in the area. Gulf Shores was chosen as the site for the workshop. Mimi Williams, Larry Morris, District Conservationist in Baldwin County where Gulf Shores is located, and his staff or-

ganized the event. During the afternoon of May 24, the classroom portion of the workshop was held. Technical presentations were given by PMC Manager Janet Grabowski, Dr. John Hovanesian of CNPS (coastal restoration contractor and grower), Dr. Debbie L. Miller from the West Florida Research and Education Center, and Rob Tawes from the U.S. Fish and Wildlife Service. On the following morning, the field portion of the workshop was held. Janet, Mimi, and Mary Anne Gonter, PMC Biological Technician (Plants), provided plant establishment training to school students, local landowners, and other NRCS staff (left). The PMC provided bitter panicum, marshhay cordgrass, and some beach sunflower plants for the planting; CNPS provided sea oats, beach sunflowers, and some additional coastal species.

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Training, Meetings, and Tours

Training Held at the PMC

- January 23 - NRCS Orientation for New Employees - presentation given by Janet Grabowski and PMC tour given by Janet, Mimi Williams, and Mary Anne Gonter
- March 8 - Sumter County Master Gardeners - training and PMC tour given by Janet, Mimi, Mary Anne, and Ed Black
- November 29-30 - Florida Pastureland Ecology (field exercises held at the neighboring ARS SubTropical Agricultural Research Station - STARS) - presentations by Mimi and Janet and PMC tour by Janet, Mimi, and Mary Anne

Other Training

- March 15 - Conservation Planning - Marianna, FL - presentation by Mimi

Presentation Given at Meetings and Symposiums

- January 12 - New England Regional Dairy Program Travel Course - STARS - presentation by Mimi
- February 23 - Lucaena Research Summary - Gainesville, FL - presentation by Mimi
- March 13 - American Forage and Grassland Council - San Antonio, TX - presentation by Mimi

- April 19 - Plants for Citrus Windbreaks - Lake Alfred, FL - presentation by Mimi
- June 3 - Annual Peanut Producers Field Day - Milton, FL - presentation by Mimi
- October 11-13 - Eastern Native Grass Symposium - Harrisburg, PA - poster presentations by Janet and Mimi
- November 2-3 - Ecosystems Restoration and Creation Conference - Plant City, FL - presentation by Mimi

PMC Display

- February 23-25 - Tampa Bay Wholesale Growers - Tampa, FL - Janet and Mary Anne
- September 27-30 - Florida Nursery and Allied Trades Show - Orlando, FL - Janet and Mary Anne
- November 14 - Ag Lands Development and the Future of Florida - West Palm Beach, FL - Janet and Mimi

Other PMC Tours

- August 30 - Personnel from Florida Department of Environmental Protection, Bureau of Mine Reclamation - Mary Anne, Janet, and Mimi

PMC Information is Available Online at:
<http://www.fl.nrcs.usda.gov/programs/flplantmaterials.html>
 or
<http://plant-materials.nrcs.usda.gov>

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