

# 2007 Progress Report of Activities

July 2008

## 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 (NRCS). 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

production and management methodologies. 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:

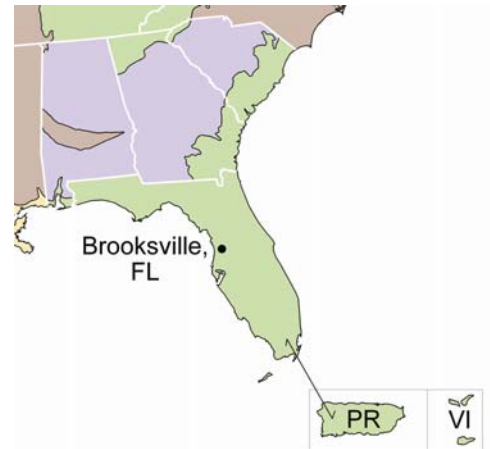
- Improve and Maintain Water Quality
- Control Erosion on Cropland and Stabilize Critical Areas
- Improve Forage on Pastures and Rangeland
- Improve Wildlife Habitat

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### About the Brooksville Plant Materials Center

The PMC is located 7 miles north of Brooksville, FL 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, indicated in green on the map (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 office and conference buildings, two greenhouses, a seed processing building, a laboratory, a shop with equipment storage barns, and an open educational shelter. Wildlife, such as deer and wild turkey, is abundant in the wooded areas and can be seen along trails or around the edge of the fields.



## Plant Release Completed in 2007

### Gator Germplasm Blue Maidencane

Gator, a tested germplasm of blue maidencane (*Amphicarpum muehlenbergianum*), was released in 2007. This selection was collected in northern Citrus County, FL. Blue maidencane, also known as goobergrass, is a rhizomatous wetland plant. Gator is a good companion plant for Citrus Germplasm maidencane (*Panicum hemitomon*), which was released by the PMC in 1998. Blue maidencane prefers a slightly drier hydrologic regime than common maidencane, so it occupies a slightly different ecological niche.

Gator has bluish foliage with a white leaf margin (right). It produces above-ground seedheads, but these are sterile. The fertile seed are produced below-ground (inset, right), hence the name goobergrass. There is no practical way to harvest these fertile seed, so Gator must be established vegetatively from rhizomes. It spreads quickly after planting. Gator can be used in constructed or restored wetlands (NRCS Conservation Practices 656 and 657) or aquaculture ponds (399) for bank stabilization (580), nutrient uptake (590), and wildlife food and cover (395 and 644). It is also a highly palatable grass and can be in range and pasture settings (550 and 512).



In 2008, Gator Germplasm will undergo further evaluation at the Jimmy Carter PMC in Americus, GA and the Golden Meadow PMC in Galliano, LA as part of an NRCS Plant Materials Program observational evaluation process to determine its potential for use in the service areas of these PMCs.

## Pending Plant Release

### Splitbeard Bluestem

In 2008, the PMC will release a splitbeard bluestem (*Andropogon ternarius*) germplasm. It will be released as a source-identified material that has not undergone extensive testing for adaptation and performance. However, the PMC has determined that it produces fairly good quantities of moderately to highly viable seed. This plant was collected in Fort Cooper State Park, which is also located in Citrus County, FL. It will be named Fort Cooper after its source location.

Splitbeard bluestem produces fluffy, white flowers (right) and can be distinguished from other bluestems by the tuft of silver hairs that remain at the base of the inflorescence after the seeds disperse. Splitbeard bluestem can be planted by broadcasting the seed. Seed can also be drilled, but this will require a planter with a fluffy seedbox or the seed must be debearded to allow them to pass through a conventional seeder. Splitbeard bluestem is a common component of many Florida

rangelands and can be used for rangeland restoration (550). It also provides excellent habitat and forage for wildlife (643, 645). It is very well adapted for use on poor sandy soils. The seedheads are quite attractive, so this plant also has some value as an ornamental.



### Cogongrass Plant Competition Study

Cogongrass (*Imperata cylindrica*), a native of Southeast Asia, is ranked as one of the worst invasive weeds in the World. It is a major problem along roads, and in pastures and natural areas in Florida. Dr. Oghenekome Onokpise (Dr. Kome) of Florida A&M University (FAMU) in Tallahassee observed a patch of hairawn muhly (*Muhlenbergia capillaris*) that was surrounded by, but not being invaded by, cogongrass while driving through St. Marks National Wildlife Refuge in northern Florida. His preliminary greenhouse research showed that muhly had competitive and possibly chemical properties that affected growth of cogongrass. He wanted to see if other native grasses also possessed this ability and contacted the PMC about obtaining plants of two of our releases, Citrus Germplasm maidencane (*Panicum hemitomon*) and Miami Germplasm switchgrass (*Panicum virgatum*) for similar greenhouse testing.

In August of 2007, we began cooperative field studies (right) to determine if the competitive ability shown by these three species in the greenhouse is also demonstrated in the field. Small transplants of each species were planted in monocultures and mixed in all possible combinations in four preplant treatment strips. Plant-

ing strips were either mowed (control), rotovated, or sprayed with imazapyr or glyphosate two weeks before planting. Two planting locations were used, one in Brooksville at the USDA-ARS Subtropical Agricultural Research Station and the other in Tallahassee. Each site had a good existing stand of cogongrass when treated. Survival of the transplants and stands of cogongrass in the plots are being rated quarterly by PMC personnel and Dr. Susan Bambo of FAMU. We anticipate that this research could potentially result in a novel technique that can be used to manage this terrible weed.



### Eastern Gamagrass Seed Production Management

Eastern gamagrass (*Tripsacum dactyloides*) is a large, bunch grass native to the eastern US. Its high palatability for livestock and great promise for addressing many conservation concerns has created a great deal of interest in this species. We have selected an eastern gamagrass accession that was collected in Polk County, FL, for seed increase and release (below). It is well adapted for erosion control (386, 601) and pasture and range plantings (512, 550). This accession performs well in Florida, but is thought to be poorly adapted to areas with colder winters.



In 2008, seed will be sent to PMCs in Americus, GA, Coffeeville, MS, Nacogdoches and Kingsville, TX, to determine its exact range of adaptation. Also in 2008, we will install demonstration plantings throughout Florida, comparing our selection to 'Pete', 'Iuka' and 'Highlander', which are eastern gamagrasses from other parts of the US, to gather additional adaptation data and promote awareness of this grass among potential users.

Because eastern gamagrass is a notoriously poor seed producer, we began a study in 2003 looking at the effect of row spacing and fertility on seed production of our accession. Row widths used 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. Numbers of fertile shoots per plant were determined for each treatment in the early summer, then seed was harvested when ripe and germination percentages were determined. The final seed harvest year for this study was completed in 2007. This information will be incorporated in planting guides for this future release.

## New Switchgrass Cultivar Development



Switchgrass (*Panicum virgatum*) is a warm-season native grass that has recently made a name for itself as a biofuel crop. Seed that is available from commercial sources originated in the Midwest, Great Plains, or the northeastern US and is poorly adapted for use in Florida. Miami, Stuart, and Wabasso, three germplasm releases made by this 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 switchgrass 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 us to make additional collections within the state. We collected seed from 101 sites, grew them in the greenhouse, and planted them, along with plants of the three releases mentioned previously, in the field in

2001. Our objective is to develop Florida lines of switchgrass with commercially acceptable levels of viable seed production.

Quickly it was observed that plants in this collection exhibited a great deal of phenotypic variability in growth form and appearance, with plants ranging from highly clump-like to rhizomatous and varying in height, foliage color, and amount of pubescence (hairiness). Much of this variability is thought to be due to the fact that switchgrass is naturally polyploid (more than two sets of chromosomes). Most commercially available switchgrass cultivars have been found to be either tetraploid (4 sets of chromosomes) or octaploid (8 sets). Because crossing switchgrass plants with different ploidy levels can lead to sterile offspring and ploidy level can not be determined based on visual appearance, PMC personnel and Dr. M.J. (Mimi) Williams, the Florida Plant Materials Specialist, are cooperating with Dr. Ken Quesenberry at the University of Florida and Dr. Brian Baldwin at Mississippi State University to determine ploidy levels of plants in the collection. Initial sampling was done in 2005, but the chromosome counts on some accessions were inconclusive. Plants will be re-sampled in 2008 to confirm their chromosome numbers and then we can proceed with grouping plants with like ploidy levels in crossing blocks to develop improved switchgrass selections for Florida.

## Slender Woodoats Testing

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, Florida State Resource Conservationist, recognized this need and directed the PMC to begin working with slender woodoats (*Chasmanthium laxum*), a Florida native cool-season grass.

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 grass produces a high percentage of viable seed. Plant collections began in 2004 and were completed in 2006. Slender woodoats accessions 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.

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



### Lopsided Indiangrass Research

The PMC has been working to develop improved sources of lopsided indiangrass (*Sorghastrum secundum*) for commercial production. Lopsided indiangrass differs from yellow indiangrass (*S. nutans*) in having spikelets that all hang to the same side of the panicle (below, right). Both species occur in Florida, but yellow is found mainly in the northern part of the state and lopsided is most common in the central and southern counties. Two accessions of lopsided indiangrass will be released by the PMC in the near future. The first, the result of crossing three accessions which all had stiff, upright foliage with a bluish coloration, will be released as an ornamental. The second is the product of crossing 21 accessions that demonstrated superior vigor and seed production characteristics. This accession will be released for conservation use, especially for erosion control (342, 391), native area restoration (327, 562), and wildlife cover (392, 645).

In the course of this work, we have experienced problems with stand persistence in lopsided production fields at the PMC. Whether the cause of this stand de-

cline is biotic (insect or disease) or abiotic (irrigation, residue buildup, or nutrient deficiency) is not known. This year, the PMC completed a study examining residue management methods to improve persistence of the blue-foliaged accession of lopsided indiangrass. Treatments evaluated were burning and clipping during the late winter and a summer clip compared to a control that was neither burned nor clipped. Knowledge gained from this research will be included in management recommendations for these releases.



### Ornamental Hairawn Muhly Final Evaluations



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 evaluate ornamental hairawn muhly (*Muhlenbergia capillaris*) accessions for release. 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, flowering, and other phenotypic characteristics.

During previous testing, we had selected eleven hairawn muhly accessions that we considered to have superior ornamental characteristics. These accessions included ten with purple to pink flowers and one white-flowered one, which was released as Morning Mist Germplasm in 2006. Our eleven accessions are being compared to a commercial purple (an unnamed one from Monrovia Nursery) and another white-flowered muhly (White Cloud from Superior Trees) to assess their commercial potential. We planted plots of these accessions in both locations 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.

## South Carolina Sweetgrass Restoration Efforts

The PMC was approached by Tommy Socha, who works with the US Army Corps of Engineers in Charleston, SC, about officially entering a South Carolina accession of sweetgrass (*Muhlenbergia filipes*) into our system. Having an accession number assigned will allow the Corps to specify this exact material when planning coastal restoration projects. This sweetgrass was collected on islands along the Outer Banks by Dr. Robert Dufault of Clemson University. We began increasing this material in 2007 and plan to formally release it as a source-identified material in the near future.

Sweetgrass or gulfhairawn muhly is quite similar in appearance to hairawn muhly (see article on previous page), but is found on moist pine barrens along the coast. It is a native grass that holds special significance to the Gullah/Geechee community around Mt. Pleasant, SC, because it serves as the foundation material for their African-coiled basketry. The local populations of this grass have been almost decimated by harvesting and hurricanes. In recent years, they have resorted to importing materials for their baskets from Florida.

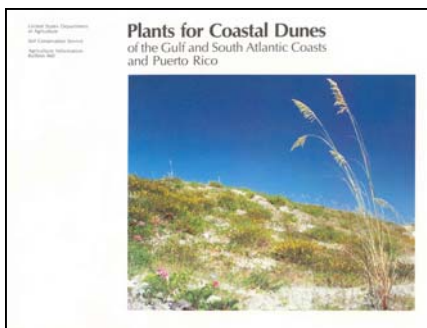
As a natural component of coastal communities in this



area (left), sweetgrass plants work to stabilize sand movement in this dynamic soil system. Mimi Williams is working with Dr. Charles Gresham, also from Clemson, to determine the potential of the SC sweetgrass, as well as nine other Florida sweetgrass/hairawn muhly accessions, selected by the PMC

for their high vigor and seed production, to revegetate areas treated to control beach vitex (*Vitex rotundifolia*). Beach vitex is an introduced exotic ornamental woody shrub from the Pacific Rim. It was widely planted in the Carolinas to control soil erosion, but has proved to be harmful to natural coastal plant communities and detrimental to sea turtle nesting. A task force was developed and funding secured to begin eradicating beach vitex plantings in the Carolinas. Plots of the ten muhly accessions were planted at nine locations in South Carolina in 2007 and Dr. Gresham is monitoring plant survival and growth.

## Florida Coastal Planting Publication

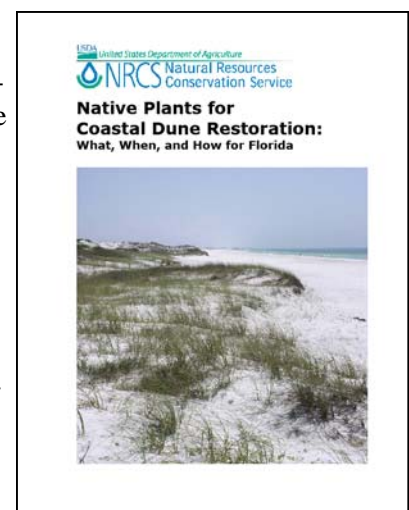


The need for a revision to Agriculture Information Bulletin 460 "Plants for Coastal Dunes of the Gulf and South Atlantic Coasts and Puerto Rico" published by what was then the Soil Conservation Service in 1991 (above, left) has long been recognized. Several devastating hurricanes have highlighted the importance of coastal plantings to stabilize the fragile ecosystems along our coasts and protect critical infrastructure. This publication was an important reference for individuals carrying out coastal restoration work in the southern US and the Caribbean; however, it is out-of-print and the technical information and plant materials recommendations needed to be updated to reflect advances made in the field.

In 2006, Mimi Williams was given the task to develop a manual to provide recommendations for coastal dune

plantings in Florida (below, right). Only limited hard copies of this publication were printed; however, it is available for downloading at [ftp://ftp-fc.sc.egov.usda.gov/FL/news/publications/flpmc\\_coast07.pdf](ftp://ftp-fc.sc.egov.usda.gov/FL/news/publications/flpmc_coast07.pdf).

The Florida publication is envisioned to be the first step in the preparation of a more comprehensive manual to replace Bulletin 460. This publication will address coastal restoration issues from the mid-Atlantic states through the Gulf coast to Texas, including Puerto Rico and the US Virgin Islands. Plant Materials Center personnel and Plant Materials Specialists that serve this part of the US will contribute to the new manual.



## Alabama Coastal Restoration Workshop and Planting Field Day

The Brooksville 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 was a major conservation concern recognized by NRCS personnel in Alabama. This led to a request for Plant Materials assistance to conduct coastal restoration workshops in the area in 2006 and 2007.

Dauphin Island, AL, was chosen as the site for this year's workshop. The classroom portion was held on the afternoon of May 14. Technical presentations were given by PMC Manager Janet Grabowski, Mimi Williams, Dr. Debbie L. Miller from the West Florida Research and Education Center in Milton, FL, and Rob Tawes from the U.S. Fish and Wildlife Service in Daphne, AL. On the following morning, the field portion of the workshop was held. Janet, Mimi, and Mary Anne Gonter, PMC Biological Technician (Plants), provided hands-on plant establishment training to two classes of elementary school students, Soil Conservation



District, and NRCS staff members (above). The PMC provided bitter panicum (*Panicum amarum*), marshhay cordgrass (*Spartina patens*), and some beach sunflower (*Helianthus debilis* spp. *debilis*) plants and the Montgomery County Soil Conservation District purchased plants of sea oats (*Uniola paniculata*) for the project.

## Major Infrastructure Improvements at the Brooksville PMC

The PMC was able to address two major needs using funding that became available at the end of fiscal year 2007. One was the old fiberglass greenhouse (below, left). Poor light transmission due to weathering made it unusable for growing healthy plants. It was replaced with a new, single-wall polycarbonate-covered greenhouse (bottom, center) that includes automatic environmental controls (below, right) that were lacking in the old greenhouse.



The other major concern was storage for the combine. The opening on the existing PMC pole barns (below, left) is 10 feet tall. This provides enough clearance for our tractors but is much too short for the combine, which measures 14.5 feet tall. A new metal barn was constructed which provided plenty of room to house the combine and several additional pieces of equipment (below, right). Construction of both structures was completed in early 2008.



## Training, Meetings, and Tours

### Training Held at the PMC

- November 13 - Sumter County Master Gardeners - Training Sessions on Seed Cleaning and Plant Propagation - Ed, Janet, Mary Anne and Mimi

### Other Training

- May 14-15 - Alabama Coastal Restoration Planting (see previous page)
- September 27 - Botanic Nomenclature Review for Grass/Sedge Identification Training - Sarasota, FL - Janet

### Presentation Given at Meetings and Symposiums

- March 12 - PMC Information presented at the FL Native Plant Society, Sumter County Chapter - Sumterville, FL - Mary Anne and Mimi
- May 30 - Poster on Brooksville Plant Materials Center: Developing Sources of Native Grass Seed for Florida, Southern Pasture and Forage Crop Improvement Conference, Tallahassee, FL - Mimi
- June 12 - Plant Materials Program Information presented at NRCS Area 3 Meeting - Plant City, FL - Janet
- June 19-20 - Poster on the MS Wildflower Program presented at Native Wildflower Seed Production Research Symposium - Orlando, FL - Janet
- June 19-20 - Display on FL Seed Technology Development - Native Wildflower Seed Production Research Symposium - Orlando, FL - Mary Anne
- June 26 - Developing Sources of Native Grasses for Revegetation in Florida, Part. 2: Wetland Species presented at the American Forage and Grassland Council Annual Conference, State College, PA - Mimi

### PMC Display

- February 23-24 - Tampa Bay Wholesale Growers - Tampa, FL - Janet and Mary Anne
- July 23-24 - National Plant Materials Booth - Soil and Water Conservation Society International Meeting - Wesley Chapel, FL - Mimi and Mary Anne
- October 4-6 - Florida Nursery and Allied Trades Show - Orlando, FL - Janet and Mary Anne

- October 19 - UF/IFAS Bobwhite Quail Shortcourse - Arcadia, FL - Janet and Mimi

### Other PMC Tours

- March 21 - Federal Women's Program Office-Bound Employees - Mary Anne, Janet, and Mimi
- July 25 - Tours of the Brooksville PMC and the Subtropical Agricultural Research Station - Soil and Water Conservation Society International Meeting - Janet, Mimi, and Mary Anne (below)
- November 13 - Sumter County Master Gardeners - Mary Anne, Ed, Janet, and Mimi
- November 29 - Florida Fish and Wildlife Conservation Commission - Janet and Mimi



Attendees of the Soil and Water Conservation Society Annual Meeting who toured the PMC and the Subtropical Agricultural Research Station on July 25, 2007

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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