



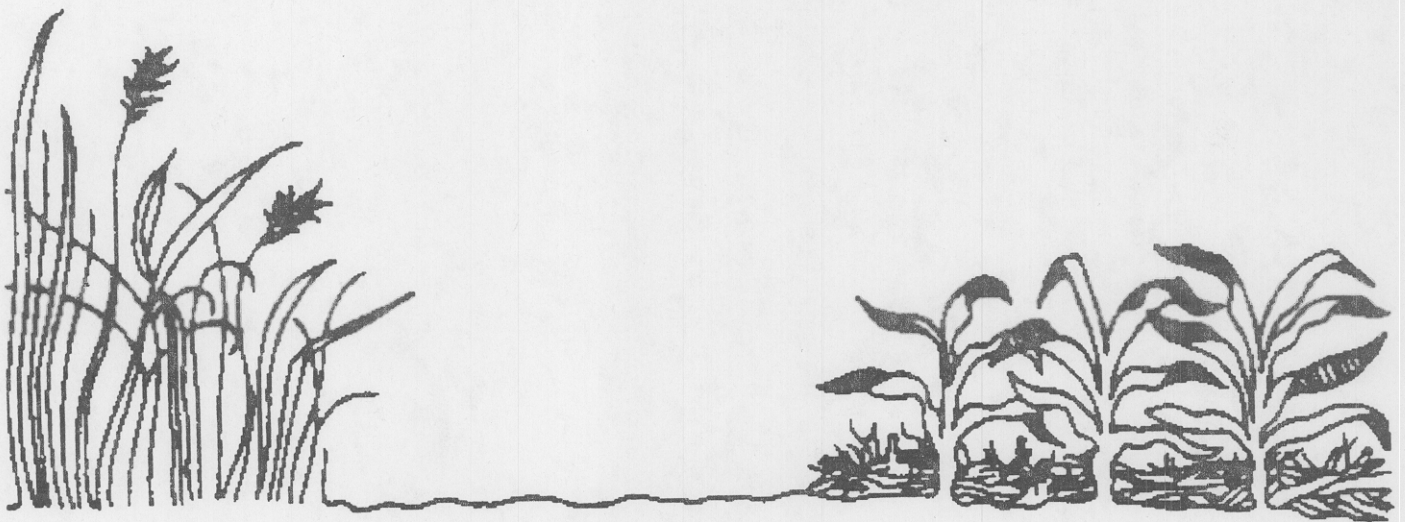
United States  
Department of  
Agriculture

Natural Resources  
Conservation Service

Americus, Georgia

# Jimmy Carter Plant Materials Center

## 1996 Annual Activity Report



## **JIMMY CARTER PLANT MATERIALS CENTER AMERICUS, GEORGIA**

### **INTRODUCTION:**

The Jimmy Carter Plant Materials Center, located at Americus, Georgia, is operated by the United States Department of Agriculture (USDA), Natural Resources Conservation Service (NRCS). The center consists of 327 acres and serves the states of Alabama, Georgia, South Carolina, North Carolina, and parts of Tennessee and Florida.

The purpose of the plant materials program is to assemble, evaluate, and release new plant materials for conservation use. This involves identifying plants for conservation use, releasing new plant materials, developing techniques for increase, and promoting their acceptance in resource conservation and other environmental programs.

PMC activities are guided by a five-year program which focuses on the development of the following high-priority items:

1. Evaluation of native plants for grazing lands that support sustainable agriculture
2. Evaluation of native plants for water quality (riparian areas, filter strips, and constructed wetlands).
3. Evaluation of plants for conservation tillage.

### **PLANT MATERIALS TESTING PROCESS**

The PMC has established a systematic testing process which provides plants to solve conservation problems. The process involves plant performance determination, plant adaptiveness evaluation, and release of plants for conservation use. The following is a description of each step involved in the testing process:

#### **STEP 1 - ASSEMBLY**

Once a conservation problem has been targeted and a plant species selected, the search for a superior plant is initiated. Plant collections are made from native or naturalized plant stands throughout the PMC service area.

Collections may also originate from foreign sources coordinated through the plant introduction stations. Seed and/or vegetative materials of grasses, forbs, legumes and woody species are collected in order to provide adequate numbers for initial evaluation plantings.

#### **STEP 2 - INITIAL EVALUATIONS**

Individual collections are either direct seeded into initial evaluation plots or established in the greenhouse and later transplanted to initial evaluation plots. Visual comparison of plant characteristics such as vigor, foliage amount, seed production, percent stand, disease and insect resistance are recorded. Plants are then measured and dates of flowering and maturity recorded. At the end of this phase, superior accessions are selected for increase and advanced testing. The following projects for priority #1 are currently under initial evaluation.

## Big Bluestem - Andropogon gerardi

Big bluestem is a tall native perennial warm season forage grass. Collections of vegetative material of 750 different ecotypes were assembled from southeastern states in the winter of 1988 and 1989, and transplanted in the spring of 1989 and 1990. Preliminary forage characteristics data was collected in 1990 and 1991.

In 1992, Dr. Edzard van Santen, of Auburn University, began a cooperative effort with the PMC to develop a new big bluestem cultivar.

In June 1993, cow/calf units were allowed to graze plots to determine cattle's preference for specific ecotypes. This data was processed to determine which ecotypes would be selected for crossing blocks in 1994.

In **May** 1994, **three** crossing **blocks of** selected materials were planted. In 1994-1996 seed **was** collected for use in future advanced studies.

## big bluestem - Andropogon gerardi



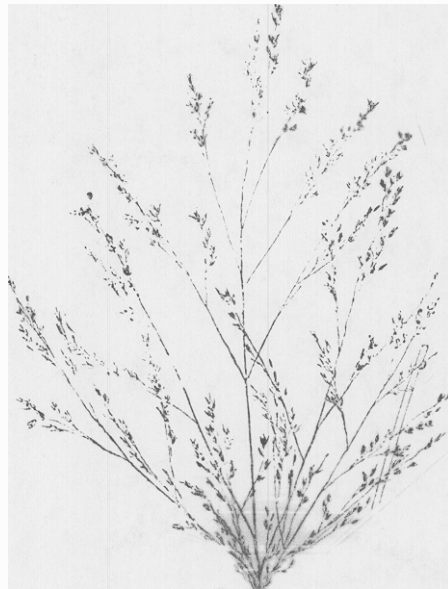
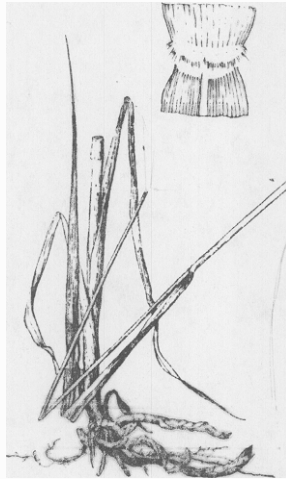
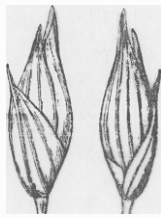
Switchgrass - Panicum virgatum

Switchgrass is a common, native perennial warm season forage grass. Collections of vegetative material of 1098 different ecotypes were assembled from the Southeastern United States and transplanted in the spring of 1991 and 1992.

Preliminary forage **data** was collected in 1993 - 1996. **Also** in 1994, a greenhouse compatibility test was conducted with cooperation from Dr. Jorge Mosjidis of Auburn University.

Seed was collected from selected ecotypes in 1995 and 1996. Plant breeding and evaluation techniques are needed for future studies.

switchgrass - Panicum virnatum





Eastern Gamagrass - Tripsacum dactyloides

Eastern gamagrass is a native perennial warm season forage bunchgrass. Collections of vegetative material of 91 different ecotypes were assembled from sites in Georgia and transplanted during the spring of 1994. Preliminary forage data **was** collected in 1994-1996.

In 1995, vegetative clippings were conducted on each ecotype and dry matter samples collected for forage quality analysis.

In 1996, 143 seed samples were sent to the seed **lest** lab for germ analysis. When both clipping and seed **data** were combined, one line (line 39) was selected as having most potential for future forage germplasm development.



eastern gamagrass - Tripsacrim dactyloides

### STEP 3: INITIAL SEED/PLANT INCREASE

Before advanced evaluations are conducted and/or large scale increase fields established, initial seed increase blocks of superior accessions are established. After a sufficient amount of seed or vegetative material is available, advance evaluation plantings are made. The following plant is being increased for future study:

Indiangrass - Sorghastrum nutans

Another native perennial warm season forage grass called indiangrass has been increased for priority #1-grazing lands that support sustainable agriculture.



indiangrass Sorghastrum nutans

#### STEP 4: ADVANCED EVALUATIONS

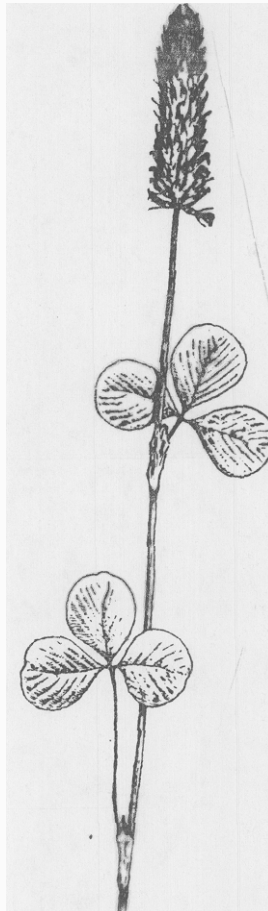
Selected superior accessions undergo more intense testing. These accessions are compared to commercial materials, when available. Advanced evaluations may include comparative clipping trials to evaluate yield and **quality** of **grasses** and legumes. Usually in advanced evaluations, plants are placed in replicated blocks and tested for forage production, ground covering ability, nitrogen fixing potential, etc. This data provides a basis for further selection of superior plants. The following plantings are under advanced evaluation:

##### Crimson Clover - Trifolium incarnatum

Crimson clover is a cool season annual legume being evaluated for priority #3, conservation tillage use.

In **1996**, the **fourth** and final year of advanced testing was done on crimson clover. Tests were conducted to determine bloom date, dry matter/% N content of three experimental lines of early blooming populations. Tests were also conducted at five Alabama Agriculture Experiment Station sites. A seed increase of the best selection (Cycle 2) is planned for **1997** along with a formal release of a new early developing cultivar of crimson clover. This new cultivar will be called 'AU Sunrise'.

##### crimson clover - Trifolium incarnatum



Indiangrass - Sorghastrum nutans

Indiangrass is being evaluated under priority #1. A survivability study of indiangrass cultivars under grazing conditions was established in 1994. Evaluations were begun in the summer of 1995. Results from 1995 and 1996 indicate some interesting trends, however, it is too early in the test to reach a conclusion.

Also a three acre field of indiangrass germplasm developed at the PMC has been planted to determine establishment, management, and grazing techniques under southeastern conditions.

Eastern Gamagrass - Tripsacum dactyloides

Grazing Demonstration

This highly productive forage grass is being evaluated to determine management criteria for production of forage. In April 1993, a five acre field was established as a cultural management tool **and** demonstration area of rotational grazing technique. A stocker cattle utilization study is planned for spring and summer of 1997.

Inter-Center Strain Trial of Eastern Gamagrass

Eastern gamagrass, a native warm season forage bunchgrass shows great potential for forage production.

The Jimmy Carter *PMC* at Americus, Georgia is involved in a multicenter trial of Eastern gamagrass. The trial includes five other centers from Texas to Florida. The centers are looking for one or possibly two selections that will best **serve** the entire Southern United States.

In the spring of 1995, best selections from each center were planted at each of the centers involved in the trial, in a randomized complete block.

In the spring of 1996, clippings were taken to determine dry matter production, and forage quality. Results from one years data of a three year study indicates a selection from New Mexico expressed superior forage characteristics at Americus.

eastern gamagrass - Tripsacum dactyloides

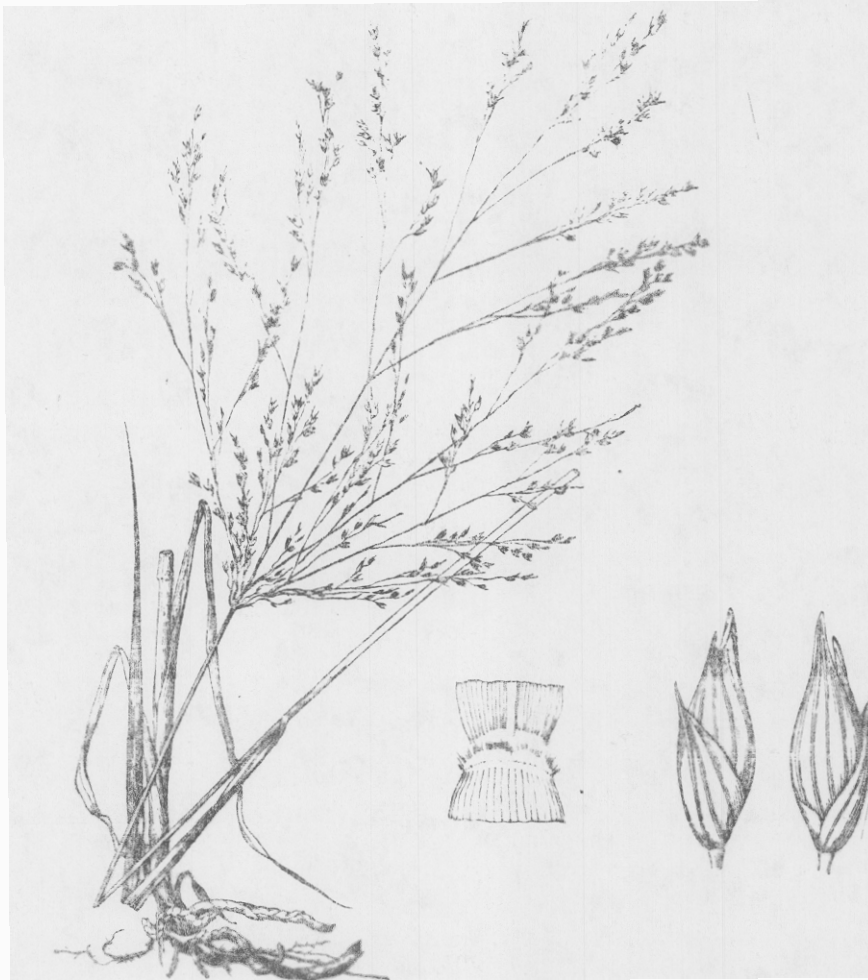


Switchgrass - Panicum virgatum

In June of 1995, a six acre field of switchgrass, 'Alamo' variety, was planted at the center to develop plant technology that is needed for effective management of native grasses.

A rotational grazing study for priority #1 is planned for 1998 or 1999, using cow/calf pairs to demonstrate management techniques and cow/calf utilization of this native forage

switchgrass - Panicum virgatum



## Shrubs and Trees for Streambank Stabilization

Soil erosion from streambanks and adjacent areas has become an increasing problem in the Southeastern United States, mainly due to human development around these streams.

This priority #2 project was initiated to address this problem by selecting species normally found in these areas and testing the ability of these species to establish quickly.

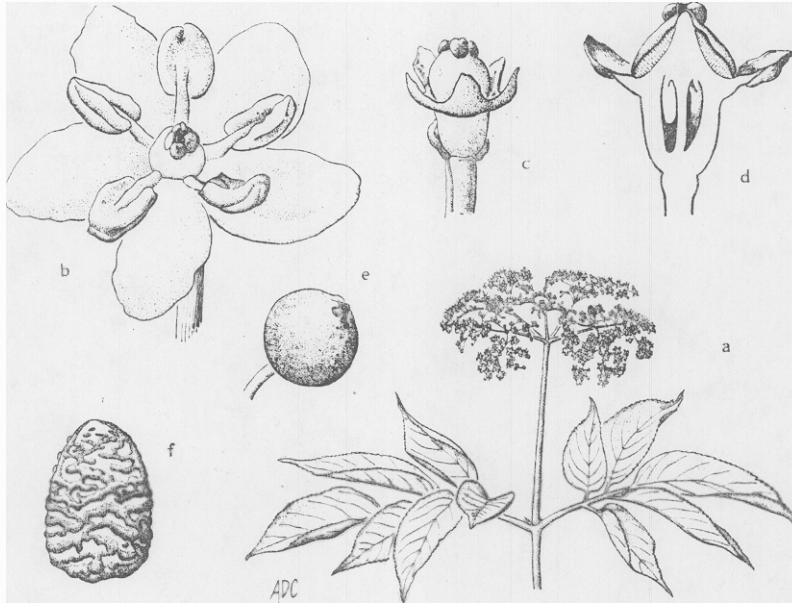
In March of 1996, 15 different species, plus 'Bankers' willow as a standard, were collected and cuttings were treated with hormone and potted to containers in the greenhouse. These cuttings were allowed to develop until June 1996 at which time cuttings were stripped of all roots and the roots weighed.

The most outstanding plants tested were species native to Georgia. Analysis of the data indicates one black willow, Salix nigra, produced as much root weight as the 'Bankers' willow. Other black willow, Salix nigra, elderberry, Sambucus canadensis, and swamp dogwood, Cornus foemina, produced excellent root weight yields. The test indicates the above species should be emphasized in future streambank revegetative projects.

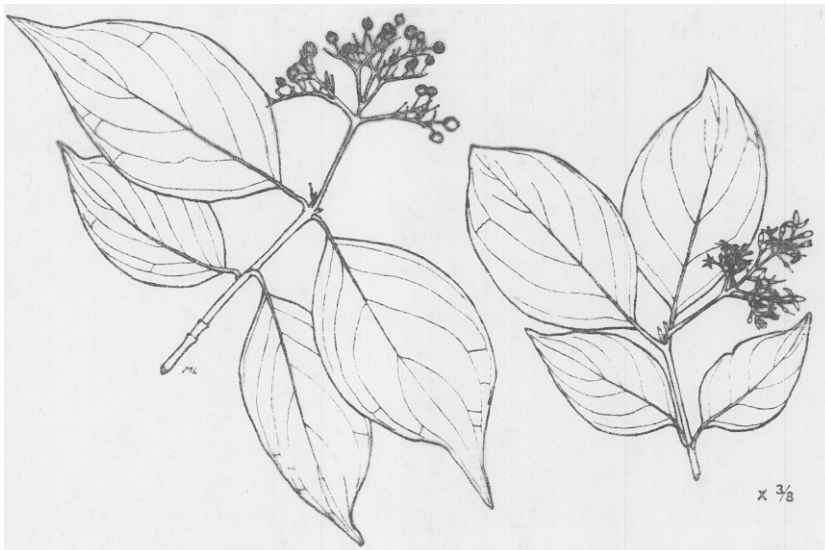


black willow - Salix nigra

elderberry - Sambucus canadensis



swamp dogwood - Cornus foemina



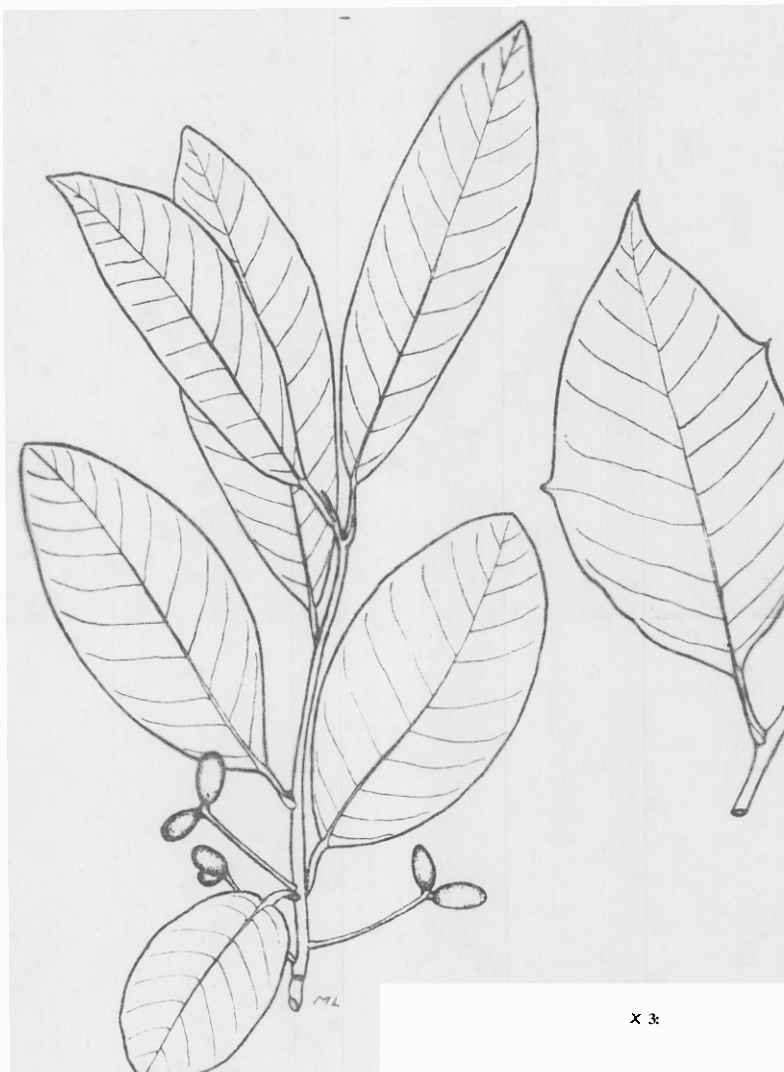
## Riparian Trees

Loblolly pine, yellow poplar, sycamore, blackgum, cherrybark oak, sweetgum, white oak, bald cypress, **green ash**, red maple, ogeechee lime and water oak are being grown at the center for priority #2. All of these trees are native to the Southeastern United States. The PMC is evaluating these woody species for riparian and filter strip use.

In the winters of 1993 and 1994, 160 trees of each species listed above were planted in a forest buffer environment. This test should determine the ability of each species to function as a forest buffer component in the southeastern forest systems. Preliminary growth and survival data was collected in 1994 - 1996.

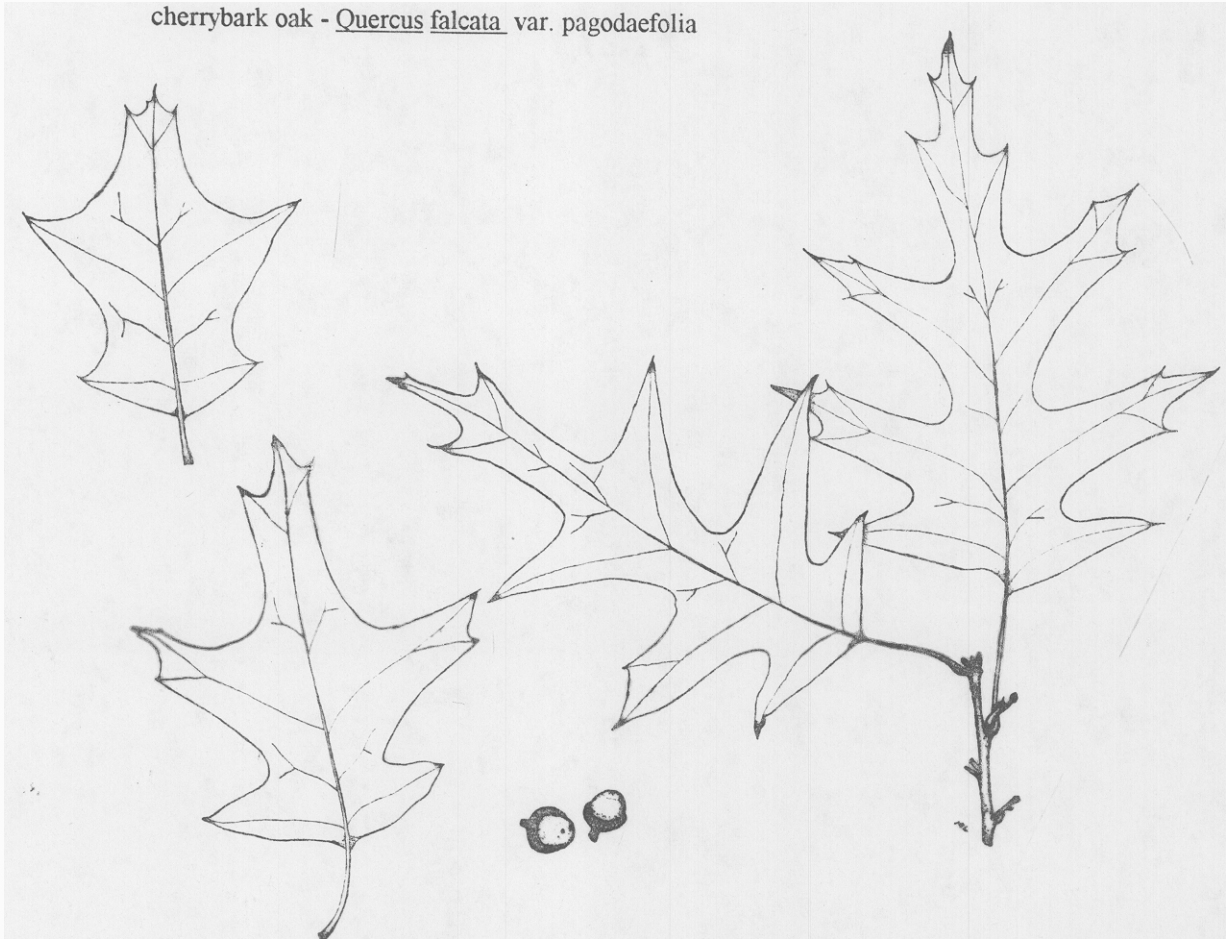
Green ash has produced the most growth and expressed the highest survival rate of any riparian tree species in the test.

blackgum - *Nyssa biflora*

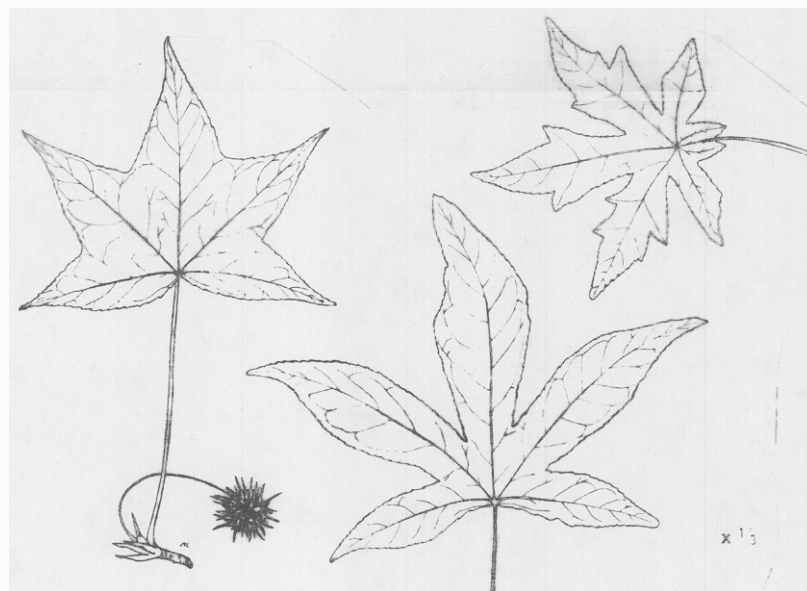




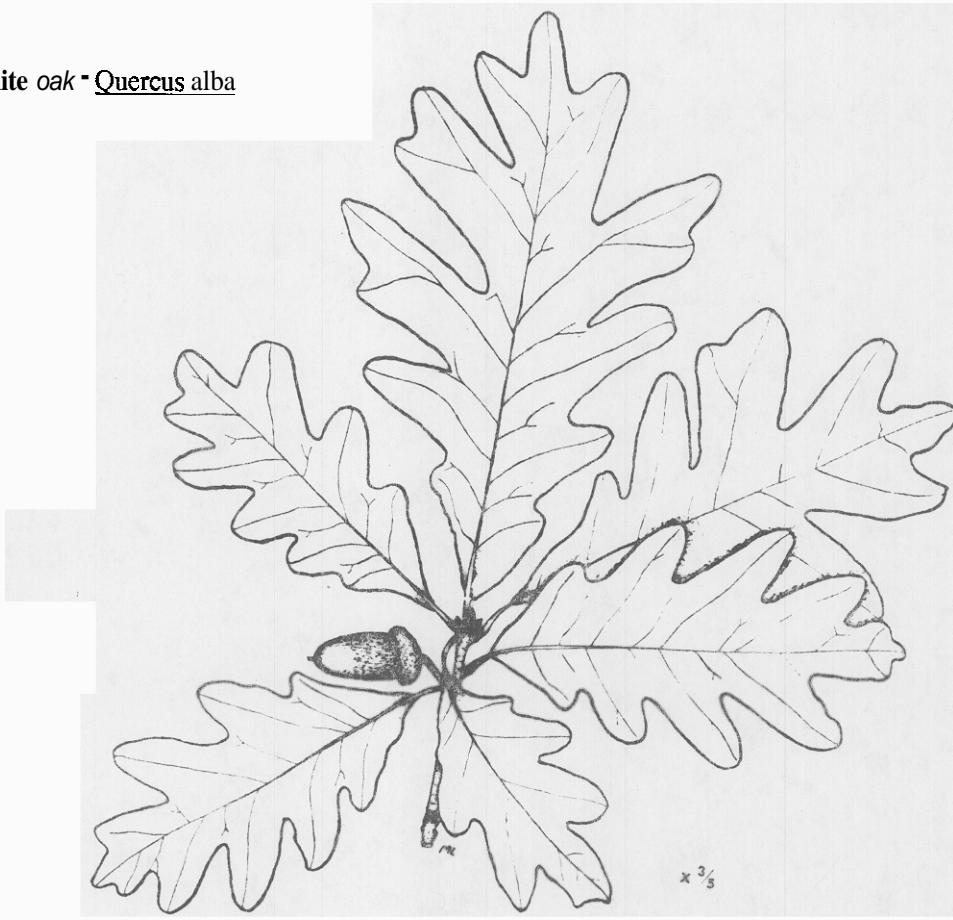
cherrybark oak - Quercus falcata var. pagodaefolia



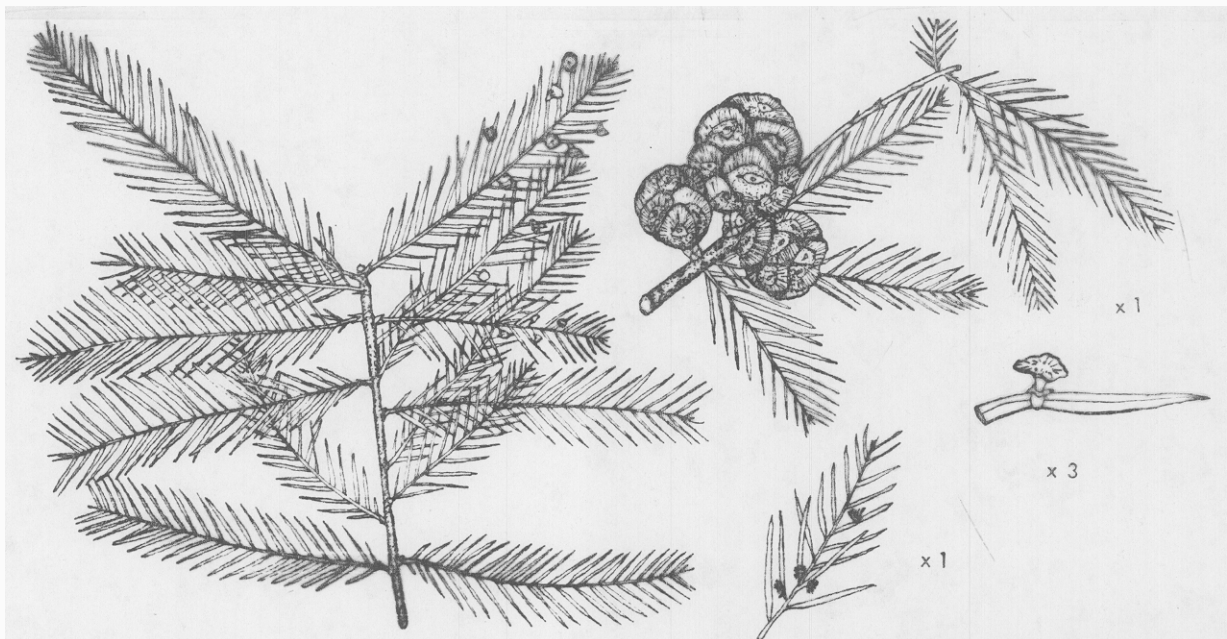
sweetgum - Liquidambar styraciflua



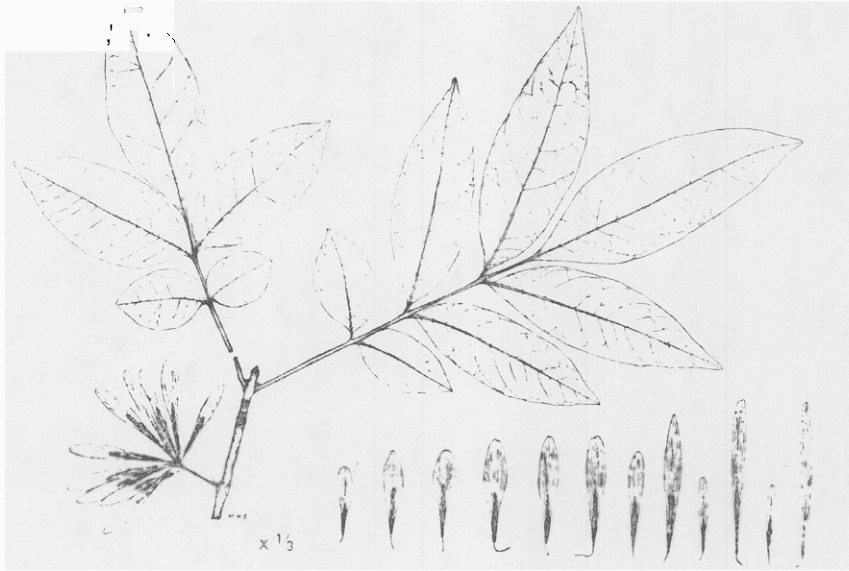
white oak - Quercus alba



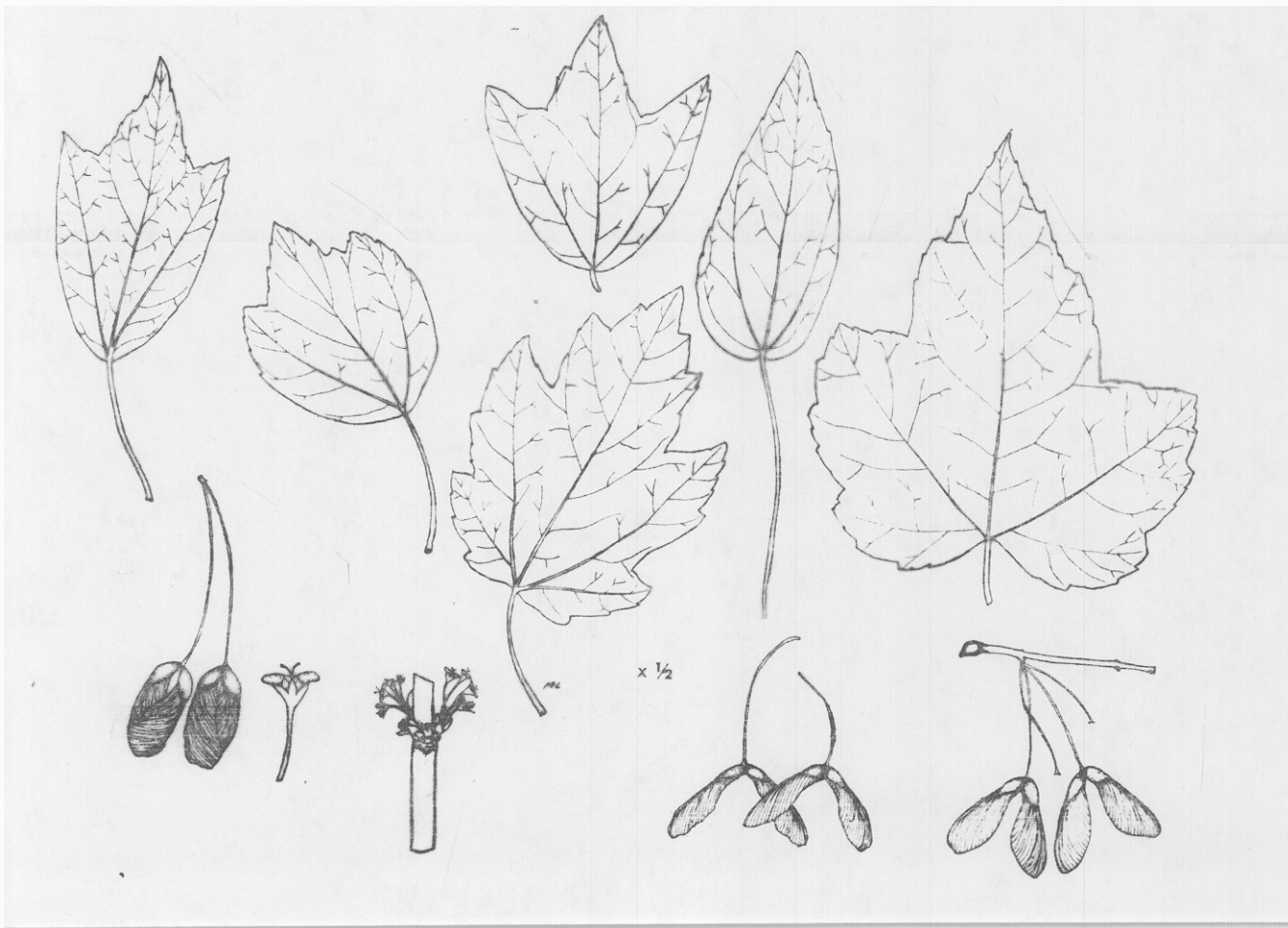
bald cypress - Taxodium distichum



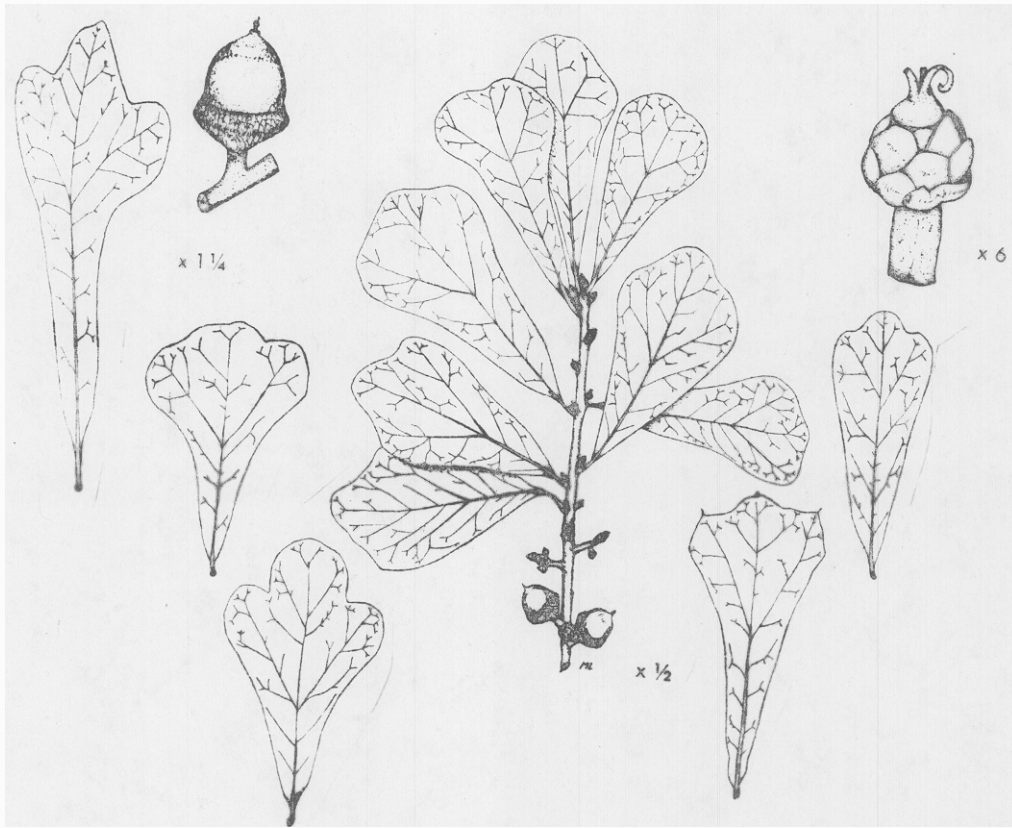
green ash - Fraxinus pennsylvanica



red maple - Acer rubrum



water oak - Quercus nigra



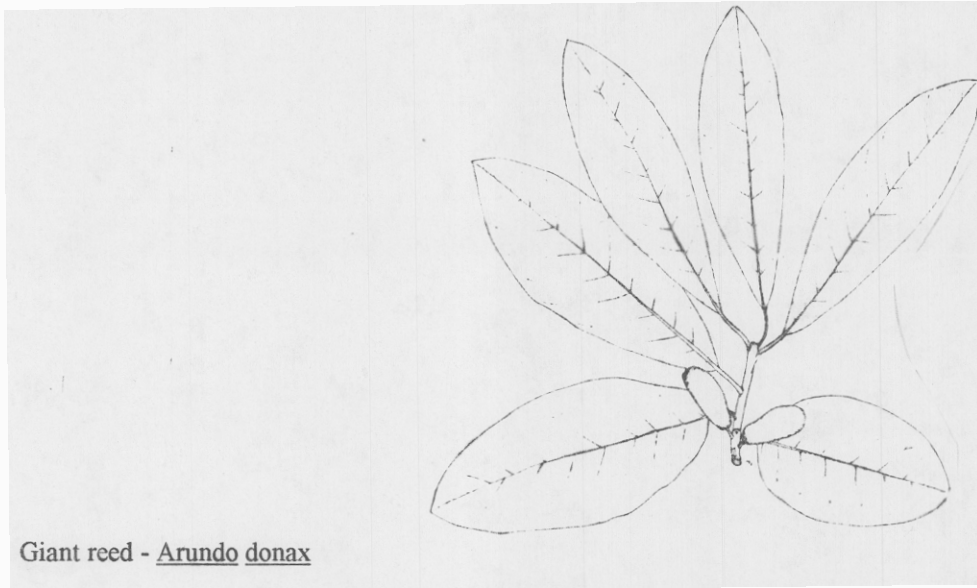
## STEP 5: LARGE SCALE INCREASE

During or following advanced evaluation, an accession with potential is established in a production field at the center. Seed or vegetative materials are harvested for field planting use. The following are examples of this procedure:

Ogeechee lime ▪ Nyssa ogeche

Ogeechee lime is a native small tree that grows along certain drains and creeks of the Southeastern United States. It is being grown at the center for priority #2.

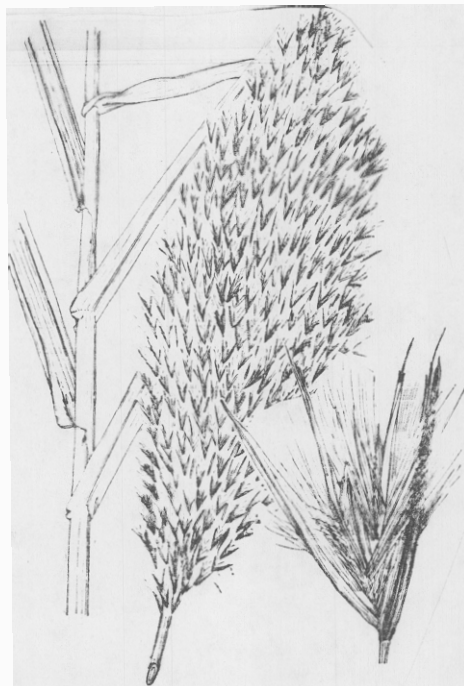
ogeechee lime - Nyssa ogeche



Giant reed - Arundo donax

Giant reed is a fast growing tall grass native to Europe. It has been used extensively for **gully** restoration **in** the southeast. It is being grown for priority #2.

giant reed ▪ Arundo donax



## STEP 6: FIELD PLANTINGS

Field plantings are the final step in the testing process. Various sites are selected by the plant materials specialist to test the potential new cultivar under actual field conditions.

Eastern gamagrass - *Tripsacum dactyloides*

Field plantings of 'Pete' and 'Iuka' for grazing demonstration have proven **to** be successful. The establishment techniques for eastern gamagrass have been developed for use in the southeast. Plant guides will be available on the internet when system is functioning.

## STEP 7: NAME AND RELEASE

Plants that prove themselves are then cooperatively named and released for commercial production and use. The PMC does not supply seed directly to the general public. We maintain a small "foundation" block to provide genetically pure stock to qualified growers who supply the public.

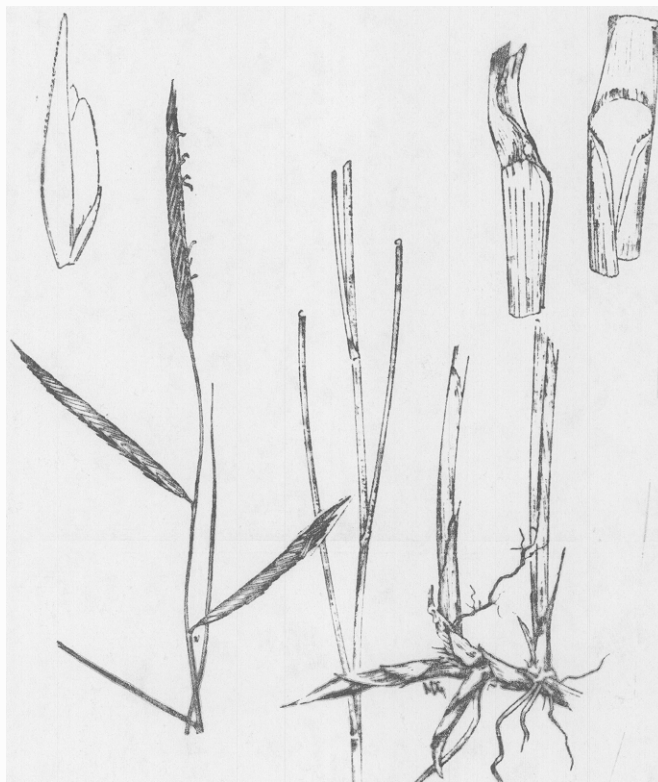
No formal releases were made in **1996**. However, since 1987, 13 plants have been released from the center for conservation use.

The following is a list of plants released since 1990:

PLANT RELEASE	CONSERVATION USE	YEAR
'Flageo' Marshhay Cordgrass	Coastal dune stabilization	1990
'Big O' Crabapple	Wildlife food & cover, screens, & beautification of landscape	1992
'Georgia 5' Tall Fescue	Cool-season forage for the Coastal Plain region	1992
'Sumter Orange' Daylily	Roadside beautification, constructed wetland, beautification	1992
'Doncorae' Brunswickgrass	Grass w/w establishment, buffer & filter strips, <b>and</b> other critical areas in the Coastal Plain region	1993
'Wetlander' Giant Cutgrass	Constructed wetlands, wetland creation and restoration	1993
'Restorer' Soft Stem Bulrush	Constructed wetlands, wetland creation and restoration, fisheries habitat improvement	1993
'Americus' Hairy Vetch	Cover crop, conservation tillage	1993

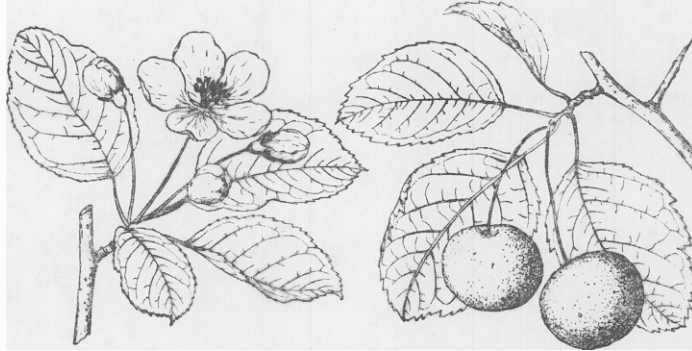
PLANT RELEASE	CONSERVATION USE	YEAR
'AU GroundCover' Caley Pea	Cover crop, conservation tillage	1994
'AU EarlyCover' Hairy Vetch	Cover crop, conservation tillage	1994
'Sharp Marshhay' Cordgrass	Coastal Dune Stabilization	1994
'AU Sunrise' Crimson Clover	Cover crop, conservation tillage	1997

marshhay cordgrass - Spartina patens

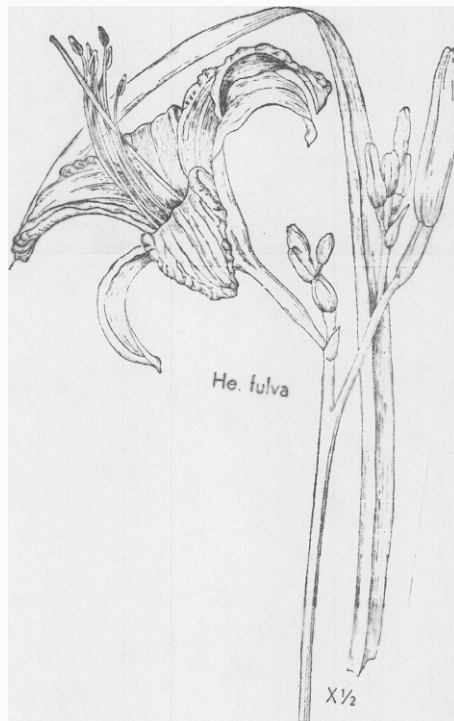




crabapple - Malus coronaria

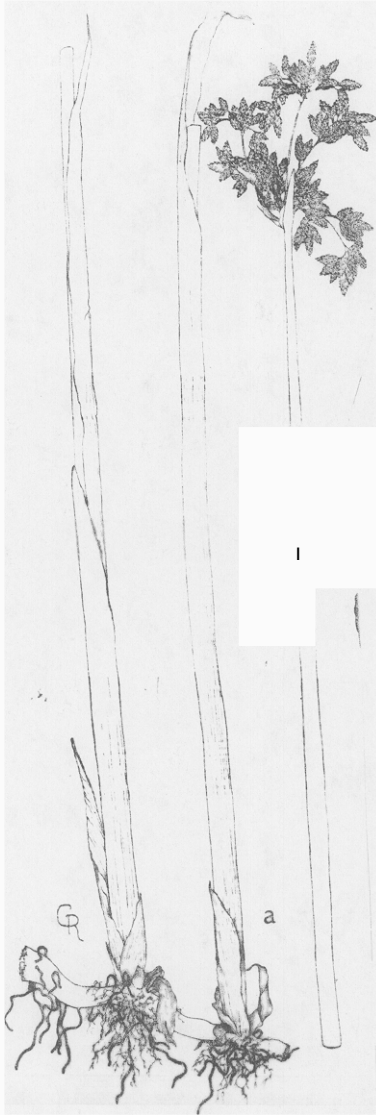


daylily - Hemerocallis fulva

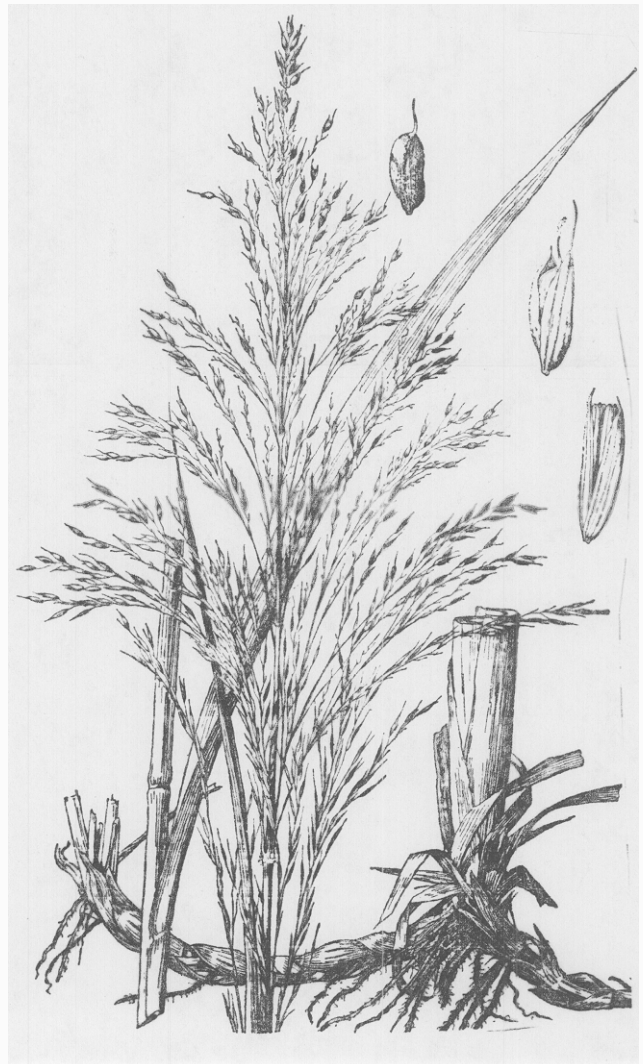


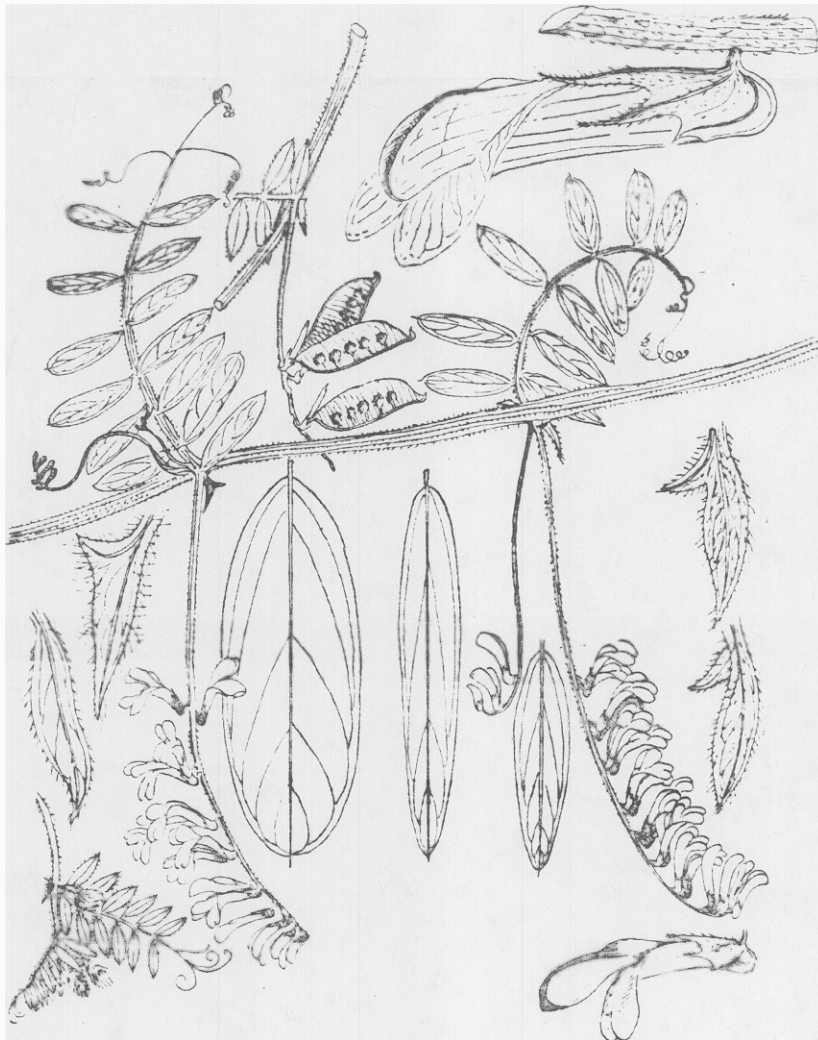


bulrush - Scirpus califamicus



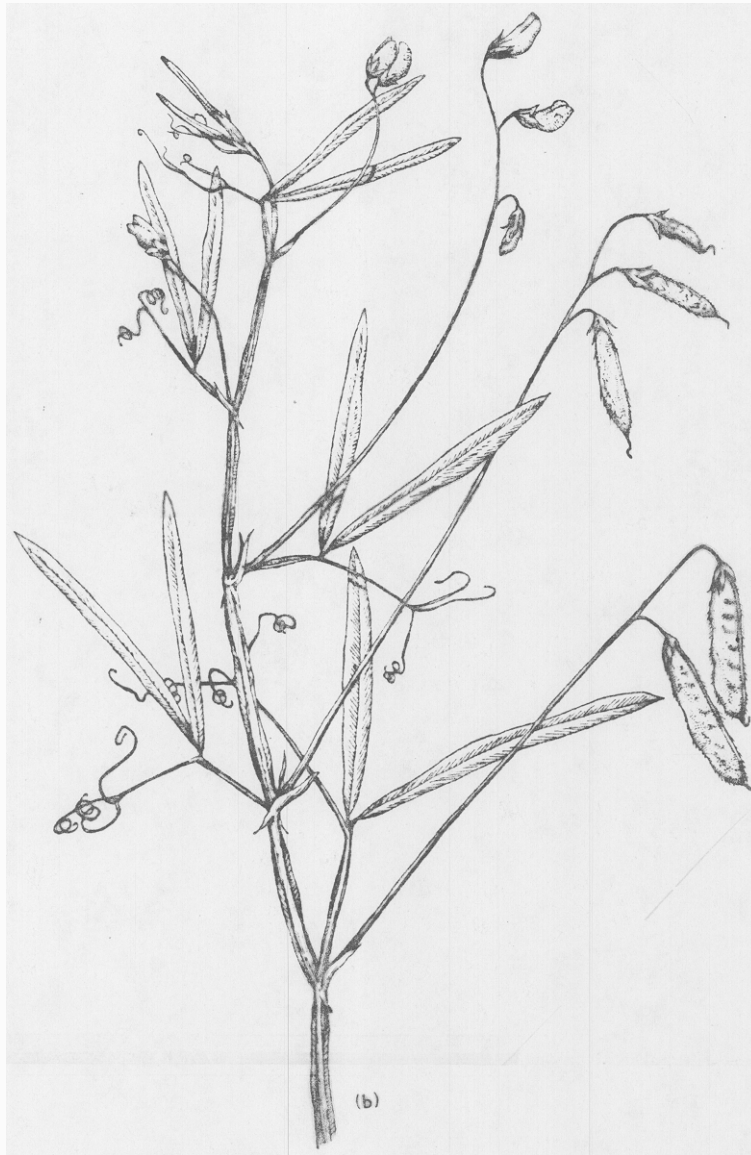
giant cutgrass - Zizaniopsis miliacea





hairy vetch - *Vicia villosa*

caley pea • Lathyrus hirsutus



For more information concerning the plant materials center and its conservation efforts, contact the center's manager at 295 Moms Drive, Americus, Georgia 31709. Phone: (912) 924-4499 or 924-7003.

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