USDA

United States
Department of
Agriculture

Natural Resources
Conservation Service

Americus, Georgia

Annual Technical Report

Jimmy Carter
Plant Materials Center

1995

A Technical Summary of Plant Materials Projects
at the Jimmy Carter Plant Materials Center
Americus, Georgia

STAFF

Charles M. Owsley	PMC Manager
Malcome S. Kirkland	Asst. PMC Manager
Glenda G. Roach	Biol. Sci. Tech.(Plants)
Robert Bennefield, Jr.	Biol. Sci. Tech.(Plants)
Arnie Jones, Jr.	Biol. Sci. Aid(Plants)

STATE CONSERVATIONISTS ADVISORY COMMITTEE

Earl Cosby	Athens, GA - Chairman
Mark Berkland	Columbia, SC
Ronnie D. Murphy	Auburn, AL

PLANT MATERIALS CENTER TECHNICAL COMMITTEE

Ronald G. Barton, SRC	Athens, GA
Cliff Jones, SRC	Auburn, AL
Ronnie Feaster, SRC	Columbia, SC
H. Wayne Everett, PMS	Ft. Worth, TX
Edward D. Surrency, PMC	Athens, GA
Samuel Sanders, PMS	Gainesville, FL
Dr. Joe Bouton, Agronomist	UGA, Athens, GA
Gilbert Lovell, Coordinator	Griffin, GA
Charles M. Owsley, PMC Mgr.	Americus, GA
Malcome S. Kirkland, Asst.	Americus, GA

JIMMY CARTER PLANT MATERIALS CENTER
AMERICUS, GEORGIA

ANNUAL TECHNICAL REPORT
1995

TABLE OF CONTENTS

TOPIC	PAGE
Introduction - Mission - Cooperative Agreements	1
Description of the Area - Major Land Resource Areas Served	2
Summary of Weather Conditions	3
Project 13I128R - Assembly and Evaluation of Big Bluestem (Andropogon Gerardi)	4-5
Project 13I131R - Assembly and Evaluation of Switchgrass (Panicum virgatum)	6
Project 13A136M - Development and Comparative Testing of Early Blooming Crimson Clover Cultivar for Conservation Tillage	7-13
Project 13A139R - Grazing Test of Indiangrass Cultivar for Plant Survival	14-15
Project 13A140S - Evaluation and Selection of Plant Materials for Forest Buffers in the Southeastern United States	16-19
Project 13A142R - Hay and Grazing Management of Eastern Gamagrass	20
Project 13I143R - Assembly and Evaluation of Eastern Gamagrass (Tripsacum dactyloides)	21-25
Project 13A144R - Hay and Grazing Management of Yellow Indiangrass (Sorghastrum nutans)	26
Project 13A148R - Grazing Management of Switch-grass (Panicum virgatum)	27
Release of New Cultivars in 1993 and 1994	28
Seed and Plant Production in 1995	29
Seed and Vegetative Stock Producers	30-32
List of Publications in 1993, 1994, and 1995	33-34

JIMMY CARTER PLANT MATERIALS CENTER

INTRODUCTION

The Jimmy Carter PMC, formerly known as the Americus PMC was established in 1936 to produce planting materials, mainly pine seedlings, for use by the CCC Camps and the former Soil Conservation Service (SCS) demonstration projects. The center's land includes seven soil types, with Orangeburg predominating on its 327.39 acres. Approximately two-thirds of the land is open for cultivation, and Muckalee Creek runs through the southwest corner, furnishing water for irrigation. The center was operated on contract by the University of Georgia Experiment Station's from 1954 to 1975, and was SCS operated from 1976-1994. In 1994 the PMC was transferred to the Natural Resources Conservation Service (NRCS).

The real property holdings at the facility consist of 327.39 acres of land with 19 buildings, an underground irrigation system that covers about 85 acres, a water supply system, and a sewage disposal system.

MISSION

The mission of the NRCS-PMC program is to assemble, test, and release plant materials for conservation use; determine techniques for their successful use; provide for their commercial increase; and promote the use of plant materials needed to meet the objectives and priorities of the National Conservation Program.

COOPERATIVE AGREEMENTS

The PMC works cooperatively with the University of Georgia, Auburn University, and Fort Valley State College on several mutually beneficial projects. The plant materials program also works with the Environmental Protection Agency (EPA), Georgia Department of Natural Resources (DNR), Department of Defense (DOD), and other state and federal agencies.

The PMC works with the Georgia and Alabama Crop Improvement Associations regarding foundation seed fields and seed processsing facilities.

DESCRIPTION OF THE AREA

The Jimmy Carter PMC serves Alabama, Georgia, South Carolina, North Carolina, and parts of Tennessee and Florida. These states present a wide range of climatic and soil conditions.

Elevations range from sea level to over 6,000 feet. Low temperatures will vary from -20 degrees F at the higher elevations to 10 degrees F along the coast while summer high temperatures range from 70 degrees F in the mountains to 110 degrees F at lower elevations.

Frost free days vary from 260 days near the coast to 130 days at the higher elevations.

Annual rainfall over the area ranges from 45 to 80 inches.

The states served by the center are represented by the eleven major land resource areas.

MAJOR LAND RESOURCE AREAS SERVED:

123 Nashville Basin
128 Southern Appalachian Ridges and Valleys
129 Sand Mountain
130 Blue Ridge
133A Southern Coastal Plain
134 Southern Mississippi Valley Silty Uplands
135 Alabama and Mississippi Blackland Prairies
136 Southern Piedmont
137 Carolina and Georgia Sandhill
152 Gulf Coast Flatwoods
153 Atlantic Coast Flatwoods

Soil conditions vary widely -- deep droughty sand, heavy plastic clay subject to excessive intermittent wetness and drying, highly acid to alkaline extremes, and swamps and marshes - fresh and salt. Farming enterprises also vary widely. The area contains a number of heavily populated suburban areas surrounding centers of industry and commerce. The mountains, seashore, and other areas of natural beauty are being rapidly developed to meet the demand for recreation.

Such diversity of climate, soil, and enterprises requires many different types and kinds of vegetation to prcvide for protecting the land when it is properly treated for soil and water conservation.

SUMMARY OF WEATHER CONDITIONS - AMERICUS, GEORGIA - 1995
66 Years(1929 - 1995)

	Temperature(° F)			Precipitation(Inches)		
Month	1995 Max.	1995 Min.	Mo. Total	66 Year Average	66 Year High Mo.	66 Year Low Mo.
January	75	23	3.95	4.41	11.19	.64
February	76	14	6.10	4.69	12.28	.75
March	86	30	3.00	5.35	12.11	.48
April	88	37	.40	3.82	12.26	.00
May	96	45	1.05	3.36	8.35	.14
June	97	55	4.17	4.28	11.43	.03
July	99	66	3.28	5.36	24.79	1.25
August	103	67	8.22	4.11	11.76	.99
September	93	54	3.50	3.34	11.54	.10
October	86	38	3.32	2.13	9.60	.00
November	80	28	2.67	2.99	10.63	.05
December	75	20	3.18	4.16	12.29	.42
TOTAL			**42.84**	**48.00**		

The coldest day of the year was February 9th. The last day of frost was April 2nd. The hottest day of the year was August 16th. The first day of frost was November 9th. The first killing frost was November 15th.

PROJECT 13I128R - ASSEMBLY AND EVALUATION OF BIG BLUESTEM ANDROPOGON GERARDI

INTRODUCTION

Big Bluestem (Andropogon gerardi) is a perennial, warm season grass. It is cross-pollinated and has several ploidy levels X = 20, 40, 60. Big bluestem is photoperiod sensitive. It is widely distributed in the United States. It occurs in tall grass prairies of the midwest as well as in forested areas of the southeast. It has been utilized for forage and hay production.

MATERIALS AND METHODS

In 1989-1990, the PMC assembled 750 vegetative ecotypes of southeastern big bluestems. These ecotypes were placed into an initial evaluation block. Each entry was planted to ten foot rows with one foot between clones. All entries were separated by three foot middles. Each entry was replicated twice.

In 1990 and 1991, the evaluation process began. The following were the evaluation criteria: 1) vigor, 2) stem color, 3) inflorescence color, 4) foliage amount, 5) foliage height (cm), 6) foliage color, 7) forage potential, 8) disease/insect resistance, 9) boot date, bloom date, maturity date and percent germ, 10) seed amount, 11) uniformity, 12) leaves height on stem, 13) total height, 14) stem size, 15) tillering, 16) steminess, 17) basal foliage, 18) lodging, 19) late maturity.

In spring 1992, Dr. Edzard van Santen of Auburn University began a cooperative big bluestem study with the Americus PMC. The following criteria were added to the existing evaluation process: 1) percent stand, 2) forage mass, 3) greening up date, 4) biomass at flowering (green weight and dry weight), 5) surface area of plot, and 6) morphological data.

In June 1993, four pairs of cow/calf units were allowed to graze the big bluestem area. Cattle were removed and Dr. van Santen evaluated the cattle's preference for specific ecotypes. After regrowth, cattle were again allowed to graze the vegetation down to 8-inch stubble residues.

Dr. van Santen's data was processed and helped to determine which ecotypes should be selected for crossing blocks in 1994. These blocks should produce germplasm for comparison

testing against a standard big bluestem cultivar. The first three blocks consisted of early maturing ecotypes, late maturing ecotypes and medium maturing ecotypes (biomass selections):

Early maturing crossing block
Lines - 23, 52, 54, 62, 71, 78, 81, 84, 94, 97, 140, 142, 161, 231, 260, 305, 322, 336, 351, 368, 481, 484, 542, 561, 578, 595, 624, 661, 676, 704, 719

Late maturing crossing block
Lines - 4, 14, 32, 42, 46, 48, 50, 58, 59, 66, 73, 76, 98, 99, 106, 107, 122, 123, 124, 126, 127, 130, 131, 134, 143, 366, 399, 406, 692

Medium maturing crossing block
Lines - 1, 7, 10, 18, 20, 38, 44, 57, 61, 69, 75, 77, 85, 88, 89, 91, 93, 111, 116, 159, 200, 204, 223, 373, 432, 438, 452, 496, 497, 513, 532, 560, 580, 592, 598, 627, 689, 691, 709, 738

Each line was represented by three replications per crossing block to ensure proper pollination.

In 1995, seed was collected from the three crossing blocks. All seed collected expressed high dormancy characteristics. Dr. van Santen is currently working to resolve this seed dormancy problem.

PROJECT 13I131R - ASSEMBLY AND EVALUATION OF SWITCHGRASS *PANICUM VIRGATUM*

INTRODUCTION:

Switchgrass (*Panicum virgatum*) is a perennial, warm season grass. It is cross-pollinated and has several ploidy levels X = 18, 36, 54, 72, 90 and 108. Switchgrass is photoperiod sensitive. It is widely distributed in the United States. It occurs in tall grass prairies of the midwest as well as in forested areas of the southeast. It has been utilized for forage and hay production.

MATERIALS AND METHODS:

In 1990-1992, the PMC assembled 1,098 vegetative ecotypes of southeastern switchgrass. These ecotypes were placed into an initial evaluation block. Each entry was planted to 13-foot rows with three plants per row. All entries were separated by 3-foot middles. Each entry was replicated twice.

In 1993, the evaluation process began. The following are the evaluation criteria: 1) greenup date, 2) forage mass, 3) vigor, 4) stand, 5) leafiness, 6) disease/insect resistance, 7) foliage height, 8) stem size, 9) boot date, 10) leaf texture, 11) leaf size, 12) leaf/stem ratio (steminess), 13) bloom date, 14) foliage color, 15) maturity date, and 16) seed amount.

In 1994, we emphasized regrowth, height, blooming, maturity and seed collection. Also a greenhouse compatibility study was conducted to help determine crossing compatibility of lines with like and unlike morphological characteristics.

In 1995, seeds from the following lines were collected for future germplasm work: (Biomass type) 1079, 1080, 1083, 421901, 422001, 2091, and 2083; (forage type) 396, 407, 936, 619, 995, 1012, 1063, 810, 998, 2092, 915, 916, and 422003.

PROJECT 13A136M - DEVELOPMENT AND COMPARATIVE TESTING OF EARLY BLOOMING CRIMSON CLOVER CULTIVAR FOR CONSERVATION TILLAGE USE

INTRODUCTION

Crimson clover (Trifolium incarnatum L.) is a cool season annual legume. It is naturalized to the United States from Europe. It has been utilized extensively as a forage and cover crop. It is cross pollinated primarily by bees (non-ploidy).

MATERIALS AND METHODS:

This project will compare experimental lines Cycle 1, Cycle 2, and Cycle 3 (developed by Jimmy Carter PMC and Auburn University) to Robin, Tibbee, and other common southeastern crimson clovers. The project will evaluate dry matter production at various dates, including bloom date. It will also compare cultivar bloom dates. The tests will follow a RCB design with four replications. The tests were conducted at five Alabama Agricultural Experiment Station sites and the Jimmy Carter PMC.

RESULTS AND DISCUSSION:

In 1993, at the Jimmy Carter PMC site, D.M. production test during the first week of March indicates Cycle 3, Cycle 2, Dixie, and Cycle 1 were not significantly different for D.M. production. However, Cycle 3 did produce more D.M. than Robin. (Table 1)

In 1994, at the Jimmy Carter PMC site, D.M. production during flowering date indicates Dixie, Tibbee, and Chief were not significantly different. The early bloomers all produced less D.M. (Cycle 1, Cycle 2, Cycle 3, Robin). (Table 2)

In 1994, at the Americus site, all three experimental lines bloomed significantly earlier than other lines including Robin. (Table 3)

In 1994, at the Americus site, there were no significant differences among lines for D.M. harvest the first week of March. (Table 4)

In 1994, at the Americus site, D.M. production resulting from regrowth showed no significant differences due to cultivar at February 22 and April 21 clippings. The regrowth test shows no real trend for cultivar D.M. production. (Table 5)

Analysis of 1995 data at the Jimmy Carter PMC, for D.M. production during flowering, indicates no significant difference between Cycle 1, Cycle 2, Cycle 3, or AU Robin. (Table 6)

Analysis of 1995 data at the Jimmy Carter PMC, for bloom date, indicates all three experimental lines (Cycle 1, Cycle 2, and Cycle 3) bloomed significantly earlier than other lines including AU Robin. (Table 7)

Analysis of variance table, for Jimmy Carter PMC, yield data the first week of March, indicates no significant differences among the entries tested. (Table 8)

Analysis of 1995 data at Jimmy Carter PMC, for D.M. production April 3, following regrowth after March clipping, indicates AU Robin with significantly more yield than the three experimental lines by LSD comparison. However, Tukeys HSD test shows no difference between AU Robin, Cycle 1, Cycle 2, and Cycle 3. (Table 9)

Analysis of April 13 regrowth yield, after March and April 3 clippings, indicates no yield difference between the three experimental lines (Cycle 1, Cycle 2, and Cycle 3), and AU Robin. (Table 9)

TABLE 1 JIMMY CARTER PMC YIELD DATA (1993)

Cultivar	Mean D.M. Yield (#/Ac) 1st Week of March
Dixie	230.4 abc
Tibbee	191.6 bcd
Chief	168.71cd
Cycle 2	321.08ab
Cycle 3	359.88a
KY C-1	62.99d
Robin	206.21bc
Cycle 1	289.04abc
Tukey's HSD(5%)	137.69

TABLE 2 JIMMY CARTER PMC YIELD DATA (1994)

Cultivar	Mean D.M. Yield (#/Ac) at Flowering Date
Dixie	4959.5 a
Tibbee	3798.2 abc
Cycle 1	2529.21cd
Cycle 2	2761.2 bcd
Chief	3940.1 ab
Flame	3642.9 bcd
Cycle 3	2386.3 d
Robin	3641.9 bcd
Tukey's HSD(5%)	1279.4

TABLE 3 JIMMY CARTER PMC BLOOM DATE DATA (1994)

Cultivar	Mean Days to Bloom from March 1st
Dixie	33.75c
Tibbee	32.5 c
Cycle 1	13 a
Cycle 2	13 a
Chief	32.5 c
Flame	30 c
Cycle 3	13 a
Robin	22 b
Tukey's HSD(5%)	3.82

TABLE 4 JIMMY CARTER PMC YIELD DATA (1994)

Cultivar	Mean D.M. Yield (#/Ac) 1st Week of March
Dixie	727.6
Tibbee	669.4
Cycle 1	604.9
Cycle 2	673.4
Chief	649.2
Flame	746.5
Cycle 3	654.8
Robin	682.3
Tukey's HSD(5%)	N.S.

TABLE 5 JIMMY CARTER PMC YIELD DATA (1994) YIELDS RESULTING FROM REGROWTH CLIPS

Cultivar	Mean D.M. Yield (#/Ac) Feb 22
Dixie	416.3
Tibbee	528.1
Cycle 1	423.1
Cycle 2	501.7
Chief	422.6
Flame	245.8
Cycle 3	363.3
Robin	282.3
Tukey's HSD(5%)	N.S.

Cultivar	Mean D.M. Yield (#/Ac) Mar 23
Dixie	1219.1a
Tibbee	844.1ab
Cycle 1	512.6b
Cycle 2	514.2b
Chief	966.6ab
Flame	918.6ab
Cycle 3	441.9b
Robin	887.5ab
Tukey's HSD(5%)	628.2

Cultivar	Mean D.M. Yield (#/Ac) Apr 21
Dixie	1127.2
Tibbee	1261.6
Cycle 1	1276.9
Cycle 2	1266.2
Chief	1273.3
Flame	1569.3
Cycle 3	1343.5
Robin	1057.2
Tukey's HSD(5%)	N.S.

TABLE 6 JIMMY CARTER PMC YIELD DATA (1995)

Cultivar	Mean D.M. Yield (#/Ac) at Flowering Data	
Tibbee	6487	
Chief	5970	
Flame	5637	
Dixie	5222	
AU Robin	4355	
Cycle 3	3575	
Cycle 2	3354	
Cycle 1	3240	
LSD (.05)	1410	
Tibbee	6487	a [1]
Chief	5970	a
Flame	5637	ab
Dixie	5222	abc
AU Robin	4355	abc
Cycle 3	3575	bc
Cycle 2	3354	bc
Cycle 1	3240	c

[1] Means followed by the same letter are not significantly different ($P \leq 0.05$) based on Tukey's honestly significant difference test. CV = 20.3%

TABLE 7 JIMMY CARTER PMC BLOOM DATE DATA (1995)

Cultivar	Mean Days to Bloom from March 1st	
Chief	37	
Tibbee	36	
Dixie	36	
Flame	34.25	
AU Robin	26	
Cycle 1	21.5	
Cycle 3	21	
Cycle 2	20.5	
LSD (.05)	2.14	
Chief	37	a [1]
Tibbee	36	a
Dixie	36	a
Flame	34.25	a
AU Robin	26	b
Cycle 1	21.5	c
Cycle 3	21	c
Cycle 2	20.5	c

Table 7 (Continued)

[1]Means followed by the same letter are not significantly different ($P \leq 0.05$) based on Tukey's honestly significant difference test. CV = 5.02%

TABLE 8 JIMMY CARTER PMC YIELD DATA (1995)

Cultivar	Mean D.M. Yield (#/Ac) 1st Week of March
Tibbee	2568
Cycle 2	2436
AU Robin	2407
Cycle 1	2350
Dixie	2782
Chief	2246
Flame	2119
Cycle 3	2542
LSD (.05)	NS
CV = 13.69%	

TABLE 9 JIMMY CARTER PMC YIELD DATA (1995) RESULTING FROM REGROWTH AFTER MARCH CLIPPING

Cultivar	Mean D.M. Yield (#/Ac) April 3	
Flame	286	
AU Robin	219	
Chief	208	
Tibbee	198	
Dixie	135	
Cycle 1	0	
Cycle 2	0	
Cycle 3	0	
LSD (.05)	160	
Flame	286	a[1]
AU Robin	219	ab
Chief	208	ab
Tibbee	198	ab
Dixie	135	ab
Cycle 1	0	b
Cycle 2	0	b
Cycle 3	0	b

Table 9 (Continued)

[1]Means followed by the same letter are not significantly different ($P \leq 0.05$) based on Tukey's honestly significant difference test. CV = 83.41%

Cultivar	Mean D.M. Yield (#/Ac) April 13
Flame	141
Dixie	102
Chief	90
Tibbee	75
Cycle 1	0
Cycle 2	0
AU Robin	0
Cycle 3	0
LSD (.05)	97

Flame	141	a [1]
Dixie	102	a
Chief	90	a
Tibbee	75	a
Cycle 1	0	a
Cycle 2	0	a
AU Robin	0	a
Cycle 3	0	a

[1] Means followed by the same letter are not significantly different ($P \leq 0.05$) based on Tukey's honestly significant difference test. CV = 129%

PROJECT 13A139R - GRAZING TEST OF INDIANGRASS CULTIVAR FOR PLANT SURVIVAL

INTRODUCTION:

Yellow indiangrass, (Sorghastrum nutans), is a native perennial warm season grass. It has been utilized for forage and hay production. This test attempts to determine the survivability of PI-514673 indiangrass, 'Lometa' indiangrass, and 'Pensacola' bahiagrass in a controlled grazing test.

MATERIALS AND METHODS:

This test is a split-plot design with main-plots called grazed and ungrazed. Within the main-plots are 12 replications each of the three grasses. These plots, called sub-plots are 10' x 10' in size. Survivability is determined by taking stem counts during the life of the test. The grazed main-plot is grazed when indiangrass reaches 18" in height. Cattle are allowed to graze the indiangrass to an 8" stubble.

RESULTS AND DISCUSSION:

In 1995, the grazed main-plot was grazed only once (July). An analysis of covariance was run using early July stem count (initial stem count), as a covariant, and September stem count (final stem count), as the response. This should reflect the effect of the July grazing on the grasses survivability. However, the analysis of covariance indicated there was no grazing effect, there was no interaction between grazing and the grasses. There was a significant difference between grasses and a significant covariate.

The analysis indicates Pensacola bahiagrass produced significantly more final stem counts than PI-514673 or 'Lometa'. Also, 'Lometa' produced significantly more final stem counts than PI-514673. (Table 1)

It is not surprising that there was no grazing effect, since only one grazing event occurred in 1995. It is also not surprising that Pensacola bahia, which produces many stolons along the ground surface, produced more final stem counts than either indiangrass.

TABLE 1 JIMMY CARTER PMC STEM COUNT (1995)

Cultivar	Adjusted Final Stem Count Means
PI-514673	212.2
'Pensacola' bahiagrass	568.4
LSD (.05)	97.63
PI-514673	212.2
'Lometa'	278.1
LSD (.05)	39.8
'Lometa'	278.1
'Pensacola' bahiagrass	568.4
LSD (.05)	86.4

CV = 18.4%

PROJECT 13A140S - EVALUATION AND SELECTION OF PLANT MATERIALS FOR FOREST BUFFERS IN THE SOUTHEASTERN UNITED STATES

INTRODUCTION:

This test will consist of the following species: ogeechee lime, red maple, blackgum, green ash, cheery bark oak, loblolly pine, yellow poplar, bald cypress, water oak, sweetgum, white oak, and sycamore.

MATERIALS AND METHODS:

Plantings were established by use of dibbles in the winter of 1993/1994. One 54 foot x 100 foot block per species was planted on 6 foot spacings. Each block runs perpendicular to the slope, and was planted with 160 trees.

RESULTS AND DISCUSSION:

Information contained in Tables 1-6 will provide base line vegetative data to accompany any future surface or water well data.

TABLE 1 % SURVIVAL OF FOREST BUFFER TREES TAKEN AUGUST 1994

Tree Species	Mean % Survival
Loblolly pine	21
Yellow poplar	14
Sycamore	18
Blackgum	84
Cherrybark oak	91
Sweetgum	77
White oak	66
Bald cypress	81
Green ash	81
Red maple	88
Ogeechee lime	38
Water oak	75

TABLE 2 TRUNK DIAMETER AND CROWN WIDTH OF FOREST BUFFER TREES - AUGUST 1994

Tree Species	Mean Dia. Main Trunk (mm) (at Ground Level)
Blackgum	7.232
Cherrybark oak	5.61
Sweetgum	10.54
White oak	6.73
Bald cypress	8.06
Green ash	25.49
Red maple	8.19
Ogeechee lime	16.57
Water oak	9.23

Tree Species	Mean Crown Width (cm)
Blackgum	22.13
Cherrybark oak	25.59
Sweetgum	27.3
White oak	24.78
Bald cypress	17.99
Green ash	65.83
Red maple	20.72
Ogeechee lime	40.10
Water oak	33.2

TABLE 3 HEIGHT OF FOREST BUFFER TREES - AUGUST 1994

Tree Species	Mean Height in (cm)
Blackgum	56.7
Cherrybark oak	56.73
Sweetgum	61.54
White oak	38.94
Bald cypress	57.36
Green ash	169.98
Red maple	56.18
Ogeechee lime	84.15
Water oak	60.26

TABLE 4 % SURVIVAL OF FOREST BUFFER TREES TAKEN AUGUST 1995

Tree Species	Mean % Survival
Loblolly pine	16 -
Yellow poplar	14 -
Sycamore	27 -
Blackgum	68
Cherrybark oak	89
Sweetgum	77
White oak	49
Bald cypress	71
Green ash	81
Red maple	76
Ogeechee lime	35
Water oak	73

TABLE 5 TRUNK DIAMETER AND CROWN WIDTH OF FOREST BUFFER TREES - AUGUST 1995

Tree Species	Mean Diameter Main Trunk Ground Level(mm)
Blackgum	14.4
Cherrybark oak	12.1
Sweetgum	24.5
White oak	11.0
Bald cypress	18.0
Green ash	46.4
Red maple	20.7
Ogeechee lime	35.6
Water oak	21.7

Tree Species	Mean Crown Width (cm)
Blackgum	54
Cherrybark oak	58
Sweetgum	52
White oak	41
Bald cypress	33
Green ash	94
Red maple	48
Ogeechee lime	78
Water oak	63

TABLE 6 HEIGHT OF FOREST BUFFER TREES - AUGUST 1995

Tree Species	Mean Height (cm)
Blackgum	79
Cherrybark oak	96
Sweetgum	129
White oak	78
Bald cypress	87
Green ash	263
Red maple	108
Ogeechee lime	170
Water oak	100

PROJECT 13A142R - HAY AND GRAZING MANAGEMENT OF EASTERN GAMAGRASS

INTRODUCTION:

Eastern gamagrass (Tripsacum dactyloides) is a native perennial warm season bunch-grass. It is widely distributed in the United States. It occurs in most states east of the Mississippi River. It can be utilized for forage and hay production. It is a monoecious grass with morphology similar to maize. The diploid plants reproduce sexually. However, the tetraploids are faculative apomicts and the hexaploid plants are obligate apomicts. The mechanism for apomixis is displospory followed by pseudogamy. A gynomonoecious sex form with the potential of increased seed production has been identified. Gamagrass root stalk is a proliteration of tillers.

This project attempts to define management criteria for the production of Eastern gamagrass forage.

MATERIALS AND METHODS:

In April, 1993, cold stratified 'Pete' Eastern gamagrass seed was planted to five acres on the southern end of the Jimmy Carter PMC. A two row corn planter set on 36 inch rows was used to plant approximately four seed per linear foot of row. Seed was planted 1 1/2 inches deep. Six hundred pounds of 0-14-14 fertilizer was applied at planting and 75 pounds of N per acre was applied in June. Weeds were primarily controlled by cultivation.

The center suffered a severe drought in the summer of 1993, however, the field produced an excellent stand of Eastern gamagrass.

In 1994 and 1995, the gamagrass grew and covered the pasture area with lush growth. Plans are to begin rotational grazing with grazing lands initiative partnerships.

PROJECT 13I143R - ASSEMBLY AND EVALUATION OF EASTERN GAMAGRASS (TRIPSACUM DACTYLOIDES)

INTRODUCTION:

Eastern gamagrass is a native perennial warm season bunchgrass. It is widely distributed in the United States. It occurs in most states east of the Mississippi river. It can be utilized for forage and hay production. It is a monoecious grass with morphology similar to maize. The diploid plants reproduce sexually. However, the tetraploids are faculative apomicts and the hexaploid plants are obligate apomicts. The mechanism for apomixis is diplospory followed by pseudogamy. A gynomonoecious sex form with the potential of increased seed production has been identified. Gamagrass rootstalk is a proliteration of tillers.

This project will assemble local ecotypes of gamagrass for possible development into new germplasm releases.

MATERIALS AND METHODS:

In the spring of 1994, 91 South Georgia ecotypes were planted to an initial evaluation area. In 1995, each accession, (Rep I and Rep II) was clipped and samples sent to the Coffeeville, Mississippi laboratory, for analysis.

RESULTS AND DISCUSSION:

Clipping data from August 2, 1995 was assembled on dry matter production, DM #/Ac, percent protein content, and percent TDN content. Based on these criteria, the following accessions were selected for possible future germplasm development: 31, 63, 75, 89, and 39.

REP I

ACC.	DM #/AC	% PROTEIN	% TDN
1	4,851.9	10.6	52
2	9,479.0	6.8	46
3	3,148.9	10.7	56
4	2,192.8	8.2	46
5	14,629.0	9.7	49
6	12,868.3	11.7	56
7	14,702.2	6.7	46
8	7,470.4	10.7	52
9	18,181.8	6.3	46
10	19,767.4	7.0	46
12	16,509.9	10.8	55
13	10,643.6	12.7	58
14	20,684.2	9.5	55
16	7,002.9	9.1	49
17	13,740.8	9.2	52
18	7,460.8	10.0	49
19	1,793.7	13.9	58
20	15,553.6	8.3	38
21	7,849.3	9.8	52
22	5,882.4	11.2	56
23	8,492.5	11.5	56
24	7,299.8	10.4	55
26	8,231.4	10.0	56
27	9,128.6	7.3	49
28	6,503.7	8.5	52
29	3,023.3	6.7	49
30	8,904.1	11.4	56
31	17,211.1	9.0	52
32	5,705.3	13.2	58
33	2,842.8	12.9	58
35	1,569.9	9.8	55
36	4,828.0	8.4	52
37	23,816.4	7.0	49
38	10,781.9	10.8	56
39	13,941.1	12.7	56
40	2,230.7	10.2	52
41	10,576.6	11.5	56
43	22,928.3	7.9	55
44	9,832.6	10.2	55
45	6,177.4	9.2	52
46	10,860.0	9.0	52
47	15,982.4	10.2	55
48	17,812.2	8.1	52
49	9,500.0	6.4	49
50	13,949.8	6.4	49
52	6,129.7	8.9	56

ACC	DM #/AC	% PROTEIN	% TDN
53	3,125	8.9	56
54	7,931.0	12.2	58
56	10,452.9	9.6	52
57	13,810.4	9.3	55
58	8,913.6	8.2	56
59	11,046.0	11.5	56
60	10,130.7	10.1	56
61	14,183.3	11.4	55
63	18,975.9	8.3	52
64	10,643.6	10.5	56
65	10,967.7	12.3	58
66	10,396.0	7.3	49
67	12,462.3	11.4	58
68	29,263.6	11.9	58
69	8,495.1	11.4	58
70	9,109.9	10.7	56
71	11,572.0	10.4	56
72	21,858.6	9.0	52
75	19,484.2	7.6	56
76	13,101.9	10.7	56
77	5,857.7	10.2	56
78	7,976.9	12.4	58
79	23,642.9	9.2	56
80	8,640.8	10.1	56
81	10,000.0	9.7	55
82	8,630.9	10.7	58
83	9,498.4	9.9	56
84	6,776.1	10.0	56
85	8,362.4	10.5	56
86	12,357.1	10.8	58
88	8,132.5	10.4	58
89	32,751.9	9.0	58
91	15,223.9	7.8	55

REP II

ACC.	DM #/AC	% PROTEIN	% TDN
2	9,402.9	7.5	46
3	7,709.4	9.5	55
4	8,683.5	10.6	55
5	5,400.7	9.1	55
7	12,852.7	8.4	52
8	13,430.2	7.3	49
9	6,480.8	6.1	49
10	9,780.0	10.4	56
12	6,153.8	9.2	55
13	10,431.6	6.6	49
15	5,815.3	10.9	58
16	11,963.7	7.3	49
17	8,986.4	8.3	52
18	7,777.8	10.2	56
19	5,749.1	10.9	56
20	15,987.5	9.0	55
21	8,777.4	8.4	52
22	7,977.2	11.2	55
23	11,830.6	11.7	58
24	9,304.3	9.2	52
26	12,071.4	8.9	52
27	5,328.5	7.5	49
28	12,951.8	8.3	52
30	12,010.1	9.1	52
31	19,642.8	7.7	49
32	7,151.9	11.1	58
33	10,480.3	11.3	56
35	4,853.6	11.0	56
36	23,433.0	8.7	52
38	12,511.4	8.5	49
39	22,283.5	10.4	56
40	3,703.7	7.1	52
41	15,728.6	7.6	52
42	24,400.9	9.9	58
44	25,000.0	7.4	52
45	11,742.2	7.8	52
46	4,895.1	11.2	55
47	7,355.4	9.8	52
48	8,690.5	8.9	52
49	10,819.7	8.5	52
51	6,904.8	9.0	55
52	9,570.9	9.0	55

ACC	DM #/AC	% PROTEIN	% TDN
53	9,500.0	9.5	49
54	7,009.3	9.9	55
55	14,432.9	7.4	49
56	24,205.4	6.6	55
57	7,423.6	7.9	52
58	19,484.9	7.6	56
59	6,230.4	10.2	55
60	15,056.5	8.6	58
63	25,783.9	8.7	56
66	20,219.4	8.6	52
67	10,120.5	11.9	58
68	5,488.4	12.7	58
69	6,370.8	11.9	56
70	17,952.8	9.6	56
71	4,015.7	8.3	56
72	10,251.6	8.9	52
75	17,944.3	9.4	55
76	12,571.4	9.5	52
77	8,071.9	12.0	58
78	10,151.0	11.0	52
79	9,651.7	12.1	56
80	5,744.1	11.1	49
81	6,788.5	10.6	49
82	6,112.6	9.9	52
83	8,308.8	11.7	52
84	5,240.2	10.5	56
85	3,722.1	11.6	59
86	3,916.1	11.5	59
87	20,604.7	12.2	56
88	12,284.9	11.3	52
89	13,771.4	9.9	52
90	8,805.9	10.0	52

PROJECT 13A144R - HAY AND GRAZING MANAGEMENT OF YELLOW INDIANGRASS (SORGHASTRUM NUTANS)

INTRODUCTION:

Yellow indiangrass (Sorghastrum nutans) is a native perennial warm season grass. It can be utilized for forage and hay production. This test attempts to demonstrate the use of a PMC selection known as PI-514673. Emphasis will be placed upon establishment and management techniques for forage production.

MATERIALS AND METHODS:

In the fall of 1993, a three acre bahia grass pasture was sprayed with Roundup. In February, 1994, the pasture was disced. In March, 1994, 450#/Ac of 0-14-14 fertilizer was applied. On May 5, 1994, the pasture area was disced and cultipacked to firm the seedbed. Then the indiangrass seed was applied with a Solo fertilizer spreader set on No. 24 for a 12-14 foot swath. The rate of seeding was 25#/Ac or 10# pls/Ac. The area was then cultipacked perpendicular to original cultipacking for proper seed covering. In June, 1994, broadleaf weeds were sprayed with 2-4-D at a rate of 1 qt/Ac. A good stand of indiangrass was observed during the summers of 1994 and 1995.

Rotational grazing techniques are planned for implementation in future years.

PROJECT 13A148R - GRAZING MANAGEMENT OF SWITCHGRASS (PANICUM VIRGATUM)

INTRODUCTION:

Switchgrass is a native perennial warm season grass. It can be utilized for forage and hay production. This test attempts to demonstrate the use of 'Alamo' switchgrass. Emphasis will be placed upon establishment and management techniques for forage production.

MATERIALS AND METHODS:

In May, 1995, a six acre field was bottom plowed and disked. In June, 1995, the field was leveled with a field cultivator. The field was fertilized with 30#/Ac of phosphorus and potassium. Switchgrass seed was applied to a cultipacked field, using a fertilizer spreader. Seeding rate was approximately 10 pounds pls/Ac. After seeding, the field was cultipacked perpendicular to the first cultipacking. Depth of seed was approximately 1/4 inch. A dry period delayed germination, however, a good stand was observed by the fall of 1995. Pigweed was controlled with one qt/Ac of 2-4-D.

In future years, we hope to demonstrate rotational grazing techniques.

RELEASE OF NEW CULTIVARS IN 1993

NAME	USE
'Doncorae' brunswickgrass *Paspalum nicorae*	Grassed waterways & filter strips
'Sumter Orange' daylily *Hemerocallis fulva*	Beautification
'Wetlander' giant cutgrass *Zizaniopsis miliacea*	Constructed wetlands
'Restorer' giant bulrush *Scirpus californicus*	Constructed wetlands
'Americus' hairy vetch *Vicia villosa* (cooperative with UGA)	Conservation tillage

RELEASE OF NEW CULTIVARS IN 1994

NAME	USE
'AU Early Cover' hairy vetch *Vicia villosa* (cooperative with Auburn Univ)	Conservation tillage
'AU Ground Cover' caley pea *Lathyrus hirsutus* (cooperative with Auburn Univ)	Conservation tillage
'Sharp' marshhay cordgrass *Spartina patens* (cooperative with Brooksville PMC)	Coastal stabilization

SEED AND PLANT PRODUCTION IN 1995

SEED

NAME	POUNDS
'Dove' proso millet	2,000
'Americus' hairy vetch	272

PLANTS

NAME	EACH
Ogeche lime	200
'Flageo' marshhay cordgrass	1,025
'Sharp' marshhay cordgrass	2,935
Vetivera grass	4,692
Giant reed	700
'Big O' crabapple	118
'Sumter Orange' daylily	5,021
'Wetlander' giant cutgrass	775
'Restorer' giant bulrush	975
'Ellagood' autumnolive	192
'Bankers' willow	2,460
'Pete' Eastern gamagrass	700

SEED AND VEGETATIVE STOCK PRODUCERS

CROP	PRODUCER
Trifolium vesiculosum 'Amclo' Arrowleaf Clover	Georgia Crop Improvement Assoc 2425 S Milledge Ave. Athens, GA 30605
Lespedeza virgata 'Ambro' Virgata Lespedeza	Georgia Crop Improvement Assoc 2425 S Milledge Ave. Athens, GA 30605
Paspalum notatum 'Pensacola' Bahiagrass	Georgia Crop Improvement Assoc 2425 S Milledge Ave. Athens, GA 30605 Conlee Seed Company Star Route, Box 8A Plainview, TX 79073 Douglas W. King Co., Inc. 4627 Emil Rd, PO Box 200320 San Antonio, TX 78220 Texas Seed Company, Inc. PO Drawer 599 Kenedy, TX 78119
Panicum miliaceum 'Dove' Proso Millet	Georgia Crop Improvement Assoc 2425 S Milledge Ave. Athens, GA 30605 Adams Briscoe Seed Company P O Box 18 Jackson, GA 31634 Turner Seed Company Route 1, Box 292 Breckenridge, TX 76024
Elaeagnus umbellata 'Ellagood' Autumn Olive	McCorkle Nursery Rt. 1 Dearing, GA 30808 Hamilton Nursery P O Box 871 Thomson, GA 30824

Hemerocallis fulva 'Sumter Orange' Daylily	Hamilton Nursery Othello Hamilton P.O. Box 871 Thomson, GA 30824
Lespedeza thunbergii 'Amquail' Thunberg Lesp.	Julian Brown 126 Court St. P.O. Box 8 Monrow, GA 30655
	Alabama Crop Improv. Assoc. S. Donahue Dr. Auburn Univ, AL 36849
	Adams-Briscoe Seed Co. P. O. Box 18 Jackson, GA 30733
	Lambert Seed & Supply Hwy 28 W. P. O. Box 128 Camden, AL 36726
	Morgan Dunn Rt. 5 Box 105 Troy, AL
	Edwin Hammond Rt. 2 Box 270 Reform, AL 35481
	Ronnie Forbis Rt. 1 Box 666 Mt Crogham, SC 29727
	P.K. & Allen Newton Rt. 4 Box 198 Sylvania, GA 30467
Spartina patens 'Flageo' Marshhay Cordgrass	Jimmy Carter Plant Materials Center, 295 Morris Dr. Americus, GA 31709
	Dr. Mark Latimore School of Agriculture Fort Valley State College Fort Valley, GA 31030
	William Smith Rt. 2 Box 94A Wigham, GA 31719

Spartina patens 'Sharp' Marshhay Cordgrass	Jimmy Carter Plant Materials Center, 295 Morris Dr Americus, GA 31709 Brooksville Plant Materials Ctr 14119 Broad St. Brooksville, FL 34601
Scirpus californicus 'Restorer' Giant Bulrush	Varn Companies P. O. Box 4488 Jacksonville, FL 32201 Flowerwood Nursery Inc. 6470 Dauphin Island Parkway Mobile, AL 36605
Zizaniopsis miliacea 'Wetlander' Giant Cutgrass	Varn Companies P. O. Box 4488 Jacksonville, FL 32201 Flowerwood Nursery Inc. 6470 Dauphin Island Parkway Mobile, AL 36605
Festuca arundinacea 'GA-5' Tall Fescue	Pennington Seed Company Madison, GA

LIST OF PUBLICATIONS IN 1993, 1994, AND 1995 - JIMMY CARTER PLANT MATERIALS CENTER AND COOPERATORS

"Yield and Persistence of Tall Fescue in the Southeastern Coastal Plain after Removal of its Endophyte". Agronomy Journal 85: 52-55 (1993). J.H. Bouton, R.N. Gates, D.P. Belesky and M. Owsley.

"Reaction of Three Cool-Season Annual Legume Species to Meloidogyne Arenaria and Heterodera Glycines". Nematropica Vol. 23, No. 1, 1993. J.A. Mosjidis, Rodrigo Rodriquez-Kabana and Charles M. Owsley.

"Registration of 'Georgia -5' Tall Fescue". Crop Science 33: 1405 (1993). J.H. Bouton, R.N. Gates, G.M. Hill, M. Owsley, and D.T. Wood.

Research on Special Purpose Legumes. J.A. Mosjidis. 1994.

"Cover Crops to Watch". Progressive Farmer. Jan 1994, pp 36-37.

"An Early Developing Hairy Vetch for Cover Crop Use". SCS Technical Note. Sep. 94. No. 19. C.M. Owsley, M. Kirkland, S. Roach.

"New Cool Season Annual Legume for Use in Conservation Tillage". SCS Technical Note. Sep. 94. No. 20. C.M. Owsley, M. Kirkland, S. Roach.

1993 Annual Technical Report - PMC Staff.

1992/1993 Annual Report - PMC Staff.

"AU Ground Cover: New Caley Pea, A Boon for Producers". Highlights of Agricultural Research, Vol. 41, No. 4, Winter 1994. J.A. Mosjidis, C.M. Owsley, M.S. Kirkland, D.M. Ball, and K.M. Rogers.

"AU Early Cover: A Full Benefit Cover Crop". Highlights of Agricultural Research, Vol. 41, No. 4, Winter 1994. Jorge Modjidis, Charles Owsley, Malcome Kirkland, Don Ball, and Kenneth Rogers.

New Releases - 'Sharp' Marshhay Cordgrass, American Nurseryman, December 1994. p. 82.

Article on Joe Bouton and 'AU Ground Cover' Caley Pea. Progressive Farmer, Feb. 1995 p. 29 and p. 112.

Registration of 'AU Early Cover' Hairy Vetch. Crop Science 35:1509 (1995). J.A. Mosjidis, C.M. Owsley, M.S. Kirkland, and K.M. Rogers.

Registration of 'Americus' Hairy Vetch. Crop Science 35:1222 (1995). Surrency, Owsley, Kirkland, McCracken, Raymer, Hargrove, Day, and Mosjidis.

1994 Annual Popular Report - PMC Staff

1994 Annual Technical Report - PMC Staff