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Jimmy Carter
Plant Materials Center
1999

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

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JIMMY CARTER PLANT MATERIALS CENTER
AMERICUS, GEORGIA

ANNUAL TECHNICAL REPORT
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TABLE OF CONTENTS

TOPIC	PAGE
Introduction - Mission - Cooperative Agreements - Description of the Area	1
Major Land Resource Areas Served - Summary of Weather Conditions	2
Project 13I128R - Assembly and Evaluation of Big Bluestem (*Andropogon gerardi)*	3-5
Project 13I131R - Assembly and Evaluation of Switchgrass (*Panicum virgatum*)	5-6
Project 13A139R - Grazing Test of Indiangrass Cultivar for Plant Survival	6-9
Project 13A140S - Evaluation and Selection of Plant Materials for Forest Buffers in the Southeastern United States	10-14
Project 13A142R - Grazing Management of Eastern Gamagrass	15-18
Project 13A144R - Hay and Grazing Management of Yellow Indiangrass (*Sorghastrum nutans*)	19
Project 13A147R - Eastern Gamagrass Inter-Center Strain Trial	20-26
Project 13A148R - Grazing Management of Switchgrass (*Panicum virgatum*)	26-29
Increase of Native Plants for the US Forest Service	30
Project 13A150R - Quantitative and Qualitative Response of Native Grasses Versus Introduced Warm Season Pasture Plants as Influenced by Different Burn Regimes	31-32
List of Publications in 1999 – Jimmy Carter Plant Materials Center Team and Cooperators	33
Seed and Plants – 1999	34
Seed and Vegetative Stock Producers	35-37
PMC Conference Room Activities – 1999	38
Information on Contacting the Center	39

JIMMY CARTER PLANT MATERIALS CENTER

INTRODUCTION

The Jimmy Carter 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 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. Refer to the 1998 Jimmy Carter PMC Annual Activity Report for more details on PM programs and priorities.

COOPERATIVE AGREEMENTS

The PMC works cooperatively with the University of Georgia, Auburn University, Fort Valley State University, Tuskegee University, and Alabama A&M University 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 processing 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 F in the mountains to 110 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 provide for protecting the land when it is properly treated for soil and water conservation.

SUMMARY OF WEATHER CONDITIONS - AMERICUS, GEORGIA - 1999
70 YEARS(1929 - 1999)

	Temperature (°F)				Precipitation (Inches)	
Month	1999 Max.	1999 Min.	Mo. Total	70 Year Average	70 Year High Mo.	70 Year Low Mo.
January	78	12	5.45	4.47	11.19	.64
February	79	22	2.52	4.69	12.28	.75
March	80	28	3.05	5.27	12.11	.48
April	91	36	3.16	3.86	12.26	.00
May	91	44	1.83	3.34	8.35	.14
June	96	58	3.15	4.19	11.43	.03
July	100	65	2.55	5.23	24.79	1.25
August	102	65	1.95	3.98	11.76	.99
September	100	45	1.00	3.38	11.54	.10
October	90	30	1.28	2.12	9.60	.00
November	80	28	.75	3.00	10.63	.05
December	78	21	2.75	4.16	12.29	.42
TOTAL			29.44	47.69		

The coldest day of the year was January 5. The last day of frost was March 4. The Hottest day of the year was August 13. The first killing frost was November 4.

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. This study attempts to evaluate big bluestem ecotypes for cultivar development.

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.

RESULTS AND DISCUSSION:

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, maturing 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 Jimmy Carter 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, 6) morphological data, and 7) % ADF of stem.

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

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

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

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

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

In March 1998, Dr. van Santen determined which ecotypes should constitute crossing blocks for production of big bluestem "forage type" germplasm. The first crossing block consisted of early maturing ecotypes, the second consisted of median maturing ecotypes and the third consisted of late maturing ecotypes. Each line was replicated three times per crossing block to ensure proper pollination.

Early maturing crossing block
Lines - 15, 84, 105, 110, 135, 136, 140, 154, 166, 179, 198, 215, 216, 218, 245, 247, 260, 290, 297, 361, 364, 385, 389, 397, 436, 439, 455, 484, 488, 500, 548, 561, 568, 641, 661, 693, 707, 743.

Median maturing crossing block
Lines - 7, 17, 18, 26, 77, 114, 155, 181, 200, 214, 228, 234, 252, 266, 296, 328, 334, 377, 414, 420, 446, 447, 472, 482, 505, 510, 520, 524, 537, 559, 569, 584, 649, 651, 689, 700, 717, 725.

Late maturing crossing block
Lines - 3, 4, 14, 42, 46, 49, 59, 60, 66, 90, 98, 122, 124, 126, 131, 144, 170, 206, 219, 249, 254, 261, 298, 312, 325, 333, 341, 362, 366, 406, 426, 540, 575, 635, 658, 678, 679, 747.

In February 1998, the following entries of big bluestem were sent to Valerie Pickard for placement into an urban landscape evaluation area in Marietta and Griffin, Georgia:

Entry - 45, 198, 96, 341, 352, 361, 6, 42, 52, 90, 482, 109, 88, 127, 122, 589, 620, 680, 693, 695, 158, 188, 284, 610, 722 and 562

September 1999 data was collected on the urban landscape evaluation area in Griffin, Georgia. The following information can be used to support development of a new big bluestem for urban landscape use. Key: Group I = plants 4 to 6 feet tall. Group II = plants 5 to 8 feet tall. No major disease or insect damage to any accession. Vigor of 3 or 4 is high vigor. Inflorescence color – Gr = green, Yel = yellow, Pur = purple, and Blu = blue. No fertilizer or irrigation was added to the evaluation area.

GROUP	ID #	VIGOR	STEM COLOR	BASAL SHAPE OPEN/CLOSED	STEM THICKNESS	INFLORESCENCE COLOR	REMARKS
I	341	3	Red	Open	Fine	Gr/Yel	
I	620	3	Reddish	Closed	Large	Pur/Blu	
I	620	3	Reddish	Closed	Large	Pur/Blu	
I	158	3	Reddish / Brown	Closed	Fine	Gr/Blu	Bluish Leaves
I	603	3	Lt. Brown	Open	Medium	Yel	
I	6	3	Reddish / Brown	Closed	Large	Gr/Yel	
I	603	3	Lt. Brown	Open	Medium	Yel	
I	122	4	Green-ish	Open	Medium		
I	361	3	Brown Red	Closed	Medium	Yel/Gr	
I	722	3	Reddish	Open	Medium	Yel/Gr	
I	284	3	Yellow	Closed	Fine	Gr	

GROUP	ID #	VIGOR	STEM COLOR	BASAL SHAPE OPEN/CLOSED	STEM THICKNESS	INFLORESCENCE COLOR	REMARKS
II	42	3	Yellow	Closed	Large	Blu/Pur	Bluish Leaves

II	352	3	Reddish Brown	Closed	Medium	Blu/Pur	
II	127	3		Closed	Medium		
II	693	3	Reddish	Closed	Fine	Red/Gr	
II	589	3	Reddish Brown	Closed	Medium	Blu/Pur	
II	6	3	Reddish Brown	Closed	Medium		
II	284	3	Brown	Closed	Medium	Blu/Pur	
II	127	3		Closed	Medium		
II	109	3	Red	Closed	Medium	Gr/Blu	
II	158	3	Yellow	Closed	Medium	Blu/Gr	Very hairy sheath
II	122	3		Open	Medium		
II	722	3	Reddish Yellow	Open	Medium	Gr/Yel	
II	109	3	Red	Closed	Medium	Gr/Blu	
II	352	3	Brown	Open	Fine	Yel/Gr	

Additional data is scheduled to be collected in 2000.

In October 1999, seed was collected from the "forage type" crossing blocks. Seed lab results indicated very high inert matter content of all three crossing block seed collections.

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. This study attempts to evaluate switchgrass ecotypes for cultivar development.

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.

RESULTS AND DISCUSSION:

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) maturing date, and 16) seed amount.

In 1994, we emphasized regrowth, height, blooming, maturing 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.

These procedures were repeated in 1996. In 1997 all seed was cleaned and processed for future germplasm tests. In 1998 the switchgrass nursery block was maintained for vegetative utilization. The nursery has reduced in size over the years to about 40 lines in 1999.This is due to lowland ecotypes inability to adapt to an upland setting. In February 1999, switchgrass lines were selected for urban landscape evaluation. These lines were planted at land between the lakes in Henry Co., Georgia. Tall form – 421901, 915, Pangburn 422001, 140, and 422005; short form – 636, 173, 86, 1011, and 188. Evaluation of these lines will begin fall 2000.

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:

The grazed main-plot was grazed twice in 1996 (June and August).

In 1996 data was analyzed utilizing survivability stem ratio =

$$\frac{\text{final stem count 1996}}{\text{initial stem count 1995}} \times 100$$

as the response. Analysis of variance indicated an interaction between grazing and the grasses. Therefore, we analyzed grazed and ungrazed separately. Analysis of grazed indicated 'Pensacola' bahia had a higher ratio than 'Lometa' or PI-514673. However, there was no significant difference between 'Lometa' and PI-514673. (Table 1)

Analysis of ungrazed indicated PI-514673 produced a higher stem ratio than 'Lometa' and a higher ratio than 'Pensacola' bahia. (Table 1)

Using Saithewaite method to determine degree of freedom of error, we calculated an LSD for stem ratio of PI-514673 at grazed and ungrazed and 'Lometa' at grazed and ungrazed. The ratio was higher for the ungrazed PI-514673 than for the grazed PI-514673. However, there was no significant difference between the 'Lometa' grazed and 'Lometa' ungrazed. (Table2)

In 1997, the grazed main-plot was grazed twice (July and August).

The data was analyzed utilizing stem ratio to determine survivability.

$$\frac{\text{final stem count 1997}}{\text{initial stem count 1995}} \times 100$$

This ratio was the response variable.

Analysis of variance indicated a significant interaction between grazing and the grass types. Therefore, grazed data and ungrazed data were analyzed separately.

Analysis of grazed data indicated 'Pensacola' bahia had a higher ratio than 'Lometa' or PI-514673. However, there was no significant difference between 'Lometa' and PI-514673. (Table 3)

Analysis of ungrazed data indicated no significant difference between PI-514673 and 'Pensacola' bahia. However, PI-514673 produced a higher stem ratio than 'Lometa'. (Table 3)

Using Saithewaite method to determine degree of freedom of error, an LSD value was calculated for stem ratio of PI-514673 at grazed and ungrazed and 'Lometa' at grazed and ungrazed. The survival ratio was higher for ungrazed PI-514673 than for grazed PI-514673 . However, there was no significant difference between 'Lometa' grazed and ungrazed. (Table 4)

In 1998, the grazed main-plot was grazed twice (July and August).

The data was again analyzed utilizing stem ratio to determine survivability.

$$\frac{\text{Final Stem Count 1998}}{\text{Initial Stem Count 1995}} \times 100$$

Analysis of variance indicated a significant interaction between grazing and grass types, therefore as in previous years, grazed data and ungrazed data was analyzed separately.

Analysis of grazed data indicated 'Pensacola' bahia had a higher ratio than 'Lometa' or PI-514673. However, there was no significant difference between 'Lometa' and PI-514673 under grazed conditions (Table 5)

Analysis of ungrazed data indicated no significant difference between PI-514673 and 'Pensacola' bahia. PI-514673 produced a higher stem ratio than 'Lometa' under ungrazed conditions (Table 5)

The Saithewaite method was again employed to determine degree of freedom of error, and an LSD value was calculated for stem ratio of PI-514673 at grazed and ungrazed and 'Lometa' at grazed and ungrazed conditions. The survival ratio was again higher for ungrazed PI-514673 than for grazed PI-514673 . Also there was again no significant difference between 'Lometa' grazed and ungrazed (Table 6).

To summarize 1996-1998, 'Pensacola' bahia expressed good survival ratios whether under grazed or ungrazed conditions. Under grazed conditions, there is no difference between PI-514673 and 'Lometa' survivability. However, under ungrazed conditions the survivability of PI-514673 is higher than 'Lometa'. PI-514673 produces a better survival ratio ungrazed than it does under grazed. While 'Lometa' shows no difference in survival ratio between grazed or ungrazed.

The PMC plans to assemble data for cultivar release of PI-514673 in 2000.

TABLE 1 Jimmy Carter PMC Survivability Stem Ratio (1996)

Cultivar	Grazed Survivability Stem Ratio	Ungrazed Survivability Stem Ratio
PI-514673	**37.83**	**124.80**
Lometa	**51.58**	**66.75**
Pensacola bahiagrass	**86.83**	**90.58**
LSD(0.05)	**13.83**	**31.42**

TABLE 2 **Jimmy Carter PMC Survivability Stem Ratio (1996)**

Cultivar	Survivability Stem Ratio
Grazed PI-514673	37.83
Ungrazed PI-514673	124.83
LSD (0.05)	22.78
Grazed Lometa	51.58
Ungrazed Lometa	66.75
LSD (0.05)	22.78

TABLE 3 **Jimmy Carter PMC Survivability Stem Ratio (1997)**

Cultivar	Grazed Survivability Stem Ratio	Ungrazed Survivability Stem Ratio
PI-514673	25.74	57.31
Lometa	32.89	34.02
Pensacola bahiagrass	72.91	66.65
LSD (0.05)	13.91	17.36

TABLE 4 **Jimmy Carter PMC Survivability Stem Ratio (1997)**

Cultivar	Survivability Stem Ratio
Grazed PI- 514673	25.74
Ungrazed PI- 514673	57.31
LSD (0.05)	15.42
Grazed Lometa	32.89
Ungrazed Lometa	34.02
LSD (0.05)	15.42

TABLE 5 Jimmy Carter PMC Survivability Stem Ratio (1998)

Cultivar	Grazed Survivability Stem Ratio	Ungrazed Survivability Stem Ratio
PI-514673	23.04	63.07
Lometa	31.18	37.92
Pensacola bahiagrass	69.08	57.47
LSD (0.05)	15.63	15.15

TABLE 6 Jimmy Carter PMC Survivability Stem Ratio (1998)

Cultivar	Survivability Stem Ratio
Grazed PI-514673	23.04
Ungrazed PI-514673	63.07
LSD (0.05)	15.10
Grazed Lometa	31.18
Ungrazed Lometa	37.92
LSD (0.05)	15.10

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

INTRODUCTION:

This test consists of the following species: ogeche lime, red maple, blackgum, green ash, cherry bark oak, loblolly pine, yellow poplar, bald cypress, water oak, sweetgum, white oak, and sycamore. They will be monitored for growth and survival as a forest buffer. The ultimate goal of the project is to determine which tree buffer uptakes the most applied fertilizers.

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 1-5 and Graphs 1-2 will provide vegetative data to accompany chemical analysis. All growth means represent means of surviving material. Through 1999, green ash maintains the lead in height growth. Ogeche lime has the greatest trunk diameter growth and has the greatest crown width; however, it also has a low percent survival reading.

In June 1998 and June 1999, the PMC staff in cooperation with Dr. Richard Lowrance of ARS (Tifton, Ga.) took soil, stem, leaf, and fruit samples from selected specimens in the tree blocks. These were analyzed for N & P content. PMC staff fertilized the blocks in May 1999 (158 lbs N/Ac and 30 lbs P/Ac). Dr. Lowrance is evaluating and analyzing the N & P data for future reports. Further analysis should determine which block of trees has the highest capacity for fertilizer uptake.

TABLE 1 MEAN % SURVIVAL OF FOREST BUFFER TREES

Tree Species	Aug 1994	Aug 1995	Aug 1996	Sep 1997	Jul 1998	Aug 1999
Loblolly Pine *	**21**	**16**	**13**	**13**	**13**	**13**
Yellow Poplar *	**14**	**14**	**8**	**8**	**8**	**8**
Sycamore *	**18**	**27**	**20**	**20**	**20**	**20**
Blackgum	**84**	**68**	**66**	**63**	**63**	**62**
Cherrybark Oak	**91**	**89**	**89**	**89**	**88**	**87**
Sweetgum	**77**	**77**	**73**	**74**	**74**	**74**
White Oak	**66**	**49**	**46**	**44**	**44**	**43**
Bald Cypress	**81**	**71**	**70**	**68**	**68**	**68**
Green Ash	**81**	**81**	**82**	**82**	**82**	**82**
Red Maple	**88**	**76**	**71**	**72**	**71**	**71**
Ogeche Lime	**38**	**35**	**35**	**34**	**35**	**35**
Water Oak	**75**	**73**	**70**	**70**	**70**	**70**

* Low survival trees were not included in further data tables

TABLE 2 MEAN CROWN WIDTH (CM) OF FOREST BUFFER TREES IN AUGUST

Tree Species	(1994)	(1995)
Blackgum	22.13	54
Cherrybark Oak	25.59	58
Sweetgum	27.30	52
White Oak	24.78	41
Bald Cypress	17.99	33
Green Ash	65.83	94
Red Maple	20.72	48
Ogeche Lime	40.10	78
Water Oak	33.20	63

TABLE 3 MEAN HEIGHT (CM) OF FOREST BUFFER TREES

Tree Species	Aug 1994	Aug 1995	Aug 1996	Sep 1997	Jul 1998	Aug 1999
Blackgum	56.7	79	155	270.3	308.9	370.3
Cherrybark Oak	56.73	96	207	312.5	382.8	588.5
Sweetgum	61.54	129	261	383.2	464.3	648.4
White Oak	38.94	78	105	158.0	194.6	253.0
Bald Cypress	57.36	87	146	216.0	263.6	315.9
Green Ash	169.98	263	399	543.2	613.8	693.8
Red Maple	56.18	108	219	342.0	401.9	439.6
Ogeche Lime	84.15	170	281	412.9	467.6	545.2
Water Oak	60.26	100	197	350.8	391.0	480.4

TABLE 4 TRUNK DIAMETER OF FOREST BUFFER TREES

Mean Diameter Main Trunk Ground Level (mm)

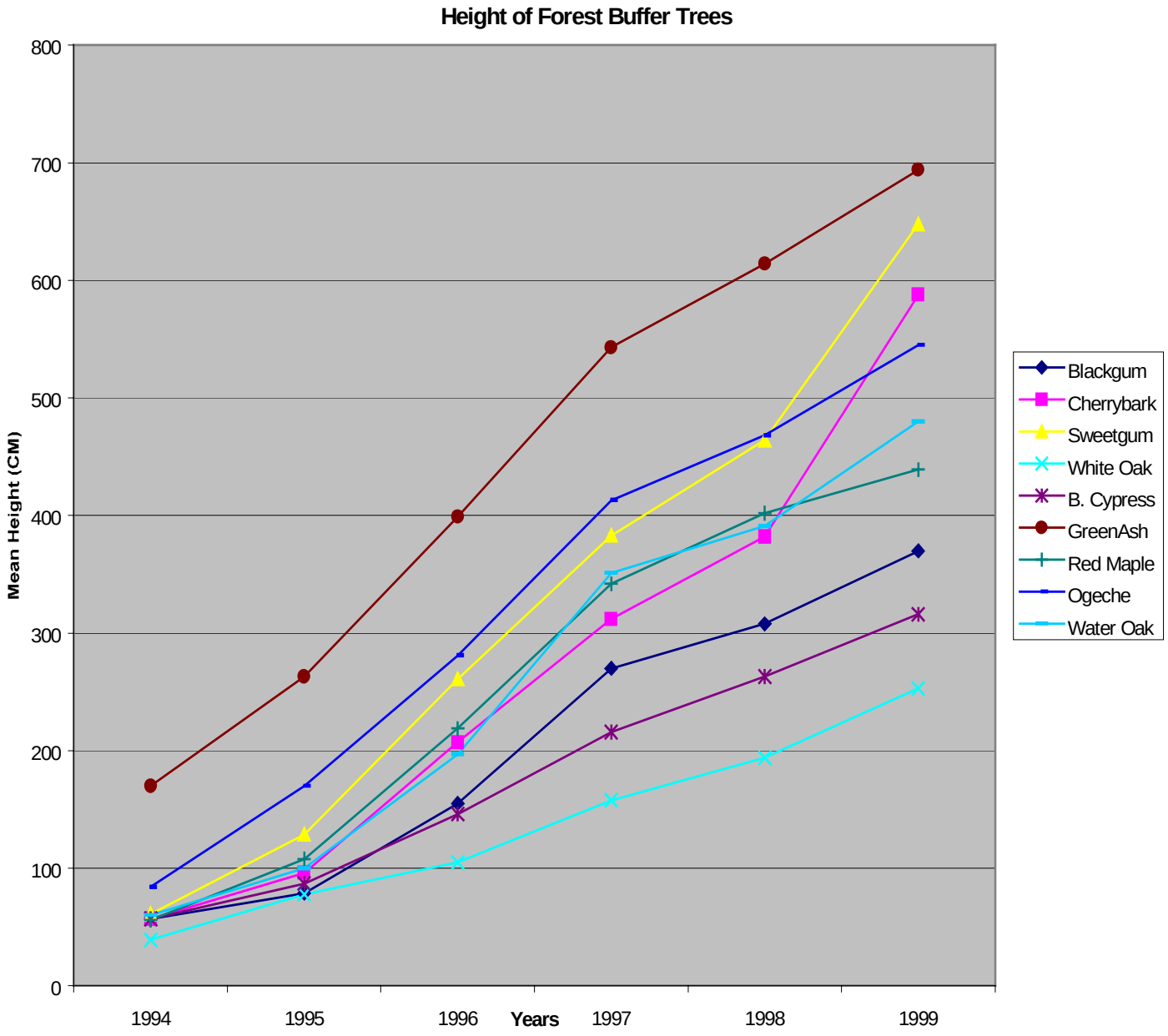
Tree Species	Aug 94	Aug 95	Jul 96	Sep 97	Jul 98	Aug 99
Blackgum	7.232	14.4	26.6	35.2	54.4	84.5
Cherrybark Oak	5.61	12.1	28.0	46.0	63.6	96.5
Sweetgum	10.54	24.5	42.3	65.5	88.9	116.1
White Oak	6.73	11.0	19.4	24.5	35.6	52.1
Bald Cypress	8.06	18.0	31.0	43.7	63.2	76.5
Green Ash	25.49	46.4	69.7	82.7	107.8	1l5.9
Red Maple	8.19	20.7	43.0	56.0	76.9	90.6
Ogeche Lime	16.57	35.6	64.3	110.5	126.6	149.7
Water Oak	9.23	21.7	30.9	49.9	66.2	86.9

TABLE 5 CROWN WIDTH OF FOREST BUFFER TREES

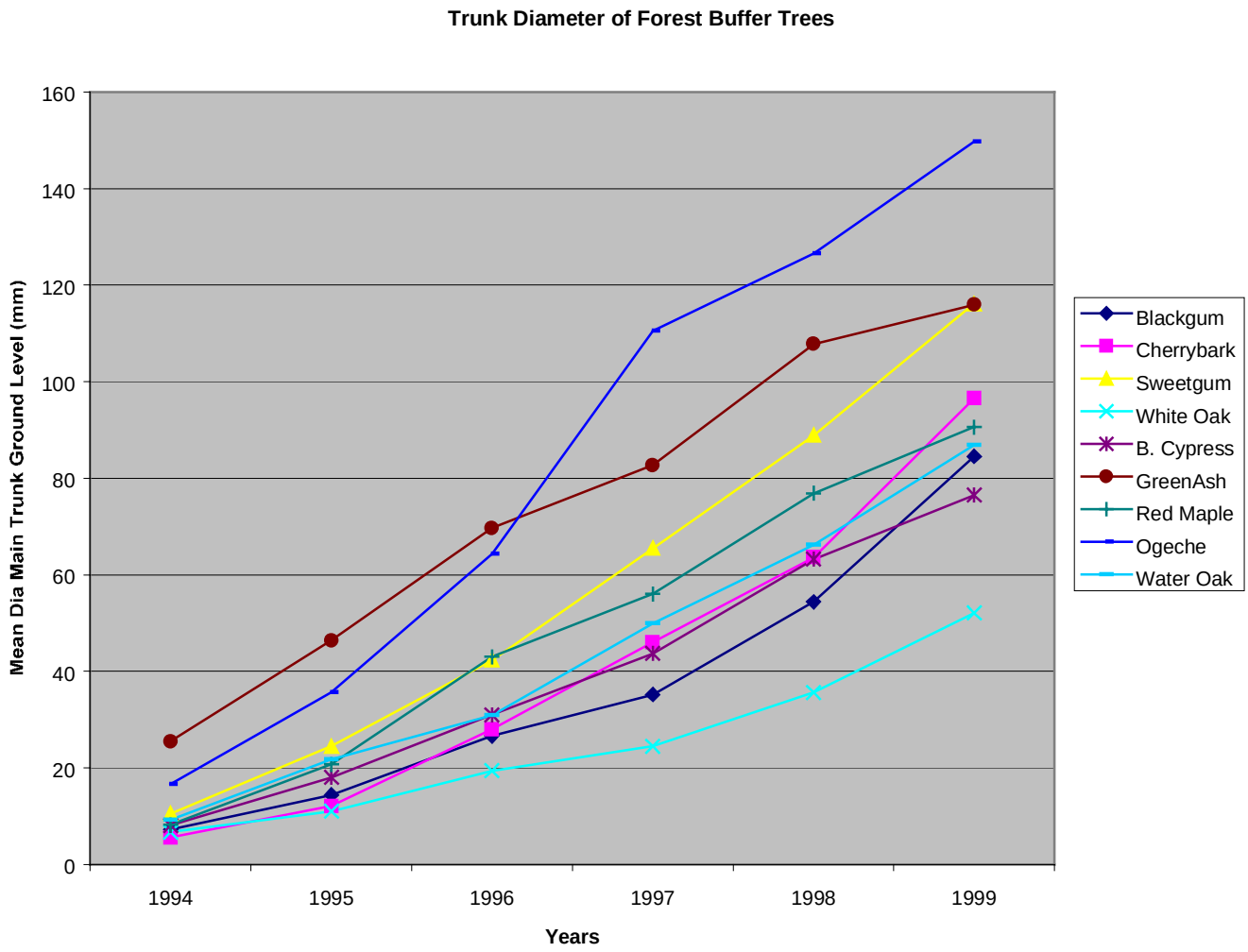
Mean Crown Width (cm) at 1/2 Tree Height

Tree Species	Sep 1997	Jul 1998	Aug 1999
Blackgum	170.6	220.3	283.7
Cherrybark Oak	197.3	222.4	303.8
Sweetgum	165.3	205.7	291.7
White Oak	97.5	106.0	148.4
Bald Cypress	126.1	151.2	179.3
Green Ash	298.4	319.7	337.5
Red Maple	167.5	201.0	213.7
Ogeche Lime	315.2	347.1	376.6
Water Oak	202.1	246.0	261.3

Graph 1


Height of Forest Buffer Trees
800
700
600
500
400
300
200
100
0
Mean Height (CM)
1994
1995
1996
Years
1997
1998
1999
Blackgum
Cherrybark
Sweetgum
White Oak
B. Cypress
GreenAsh
Red Maple
Ogeche
Water Oak

Graph 2


Trunk Diameter of Forest Buffer Trees
Mean Dia Main Trunk Ground Level (mm)
160
140
120
100
80
60
40
20
0
1994
1995
1996
1997
1998
1999
Years
Blackgum
Cherrybark
Sweetgum
White Oak
B. Cypress
GreenAsh
Red Maple
Ogeche
Water Oak

PROJECT 13A142R - GRAZING MANAGEMENT OF EASTERN GAMAGRASS

INTRODUCTION:

Eastern gamagrass, *Tripsacum dactyloides,* is a warm-season, native, perennial grass suited to most of the Eastern United States. One of its potential uses is forage for livestock. The Jimmy Carter Plant Materials Center in Americus, Georgia is demonstrating intensive grazing management of this plant. The Lamar County Soil and Water Conservation District is cooperating by providing cattle for the demonstration.

MATERIALS AND METHODS:

In the spring of 1993, a 4.5 acre field of Eastern gamagrass, (variety 'Pete'), was planted in 36 inch rows using a corn planter. This 4.5-acre pasture was allowed to establish through 1994 and into 1995.

This demonstration is located on the northwest side of the town of Americus, Georgia, where annual precipitation mean is 125 cm (about 49"), and the annual mean temperature is 18.5 degrees Celsius (about 65.3 degrees Fahrenheit).

The demonstration site is divided into ten paddocks, approximately 0.2 hectares (about 0.45 acre) each, using a single strand of electric fence wire about 90 cm high. Water was provided in each paddock using one inch black plastic pipe and 60 gallon portable water trough. The water source was a nearby creek.

On April 1, 1999 twelve steers, provided by the Lamar County Soil and Water Conservation District, weighing about 575 pounds each were brought to the plant materials center.

April 22, 1999 the steers were weighed, vaccinated, wormed, dusted, and ear tagged.

On May 5, 1999 the steers were moved into the first Eastern gamagrass paddock to begin a 3.5 day grazing period in each paddock.

Approximately 150 pounds of ammonium nitrate was applied to each paddock after the cattle completed grazing.

Manure samples were taken on a periodic basis to determine crude protein and digestible organic matter of the Eastern gamagrass consumed by the animals. The Grazing Animal Nutrition Laboratory at Texas A&M University was utilized to determine these readings. The NUTBAL Nutritional Balancer software was used to predict animal nutritional needs.

RESULTS AND DISCUSSION:

Cattle were rotated successively through the ten paddocks with the 3.5 days grazing period in each paddock. The cattle were rotated through the entire ten paddocks three times and then on the fourth cycle the grazing time in the paddocks was shortened to 2 days per paddock. The grazing period change was determined by forage quantity and growth stage.

Quality of Eastern gamagrass forage after intensive rotational grazing produced 1.74 lbs./day average gain

The results from the manure samples taken from the steers were as follows:

DATE	% CRUDE PROTEIN	% DIGESTIBLE ORGANIC MATTER
05-27	8.02	62.62
06-07	9.55	63.00
06-24	10.72	62.02
07-06	12.65	63.83
08-23	10.71	62.14
09-15	10.85	62.84

WEIGHTS

	DATE	WEIGHT	TOTAL GAIN	AVG. DAILY GAIN
Beginning	Apr 1st	573 lbs	-	-
Ending	Sep 15th	866 lbs	293 lbs	1.74 lbs/day

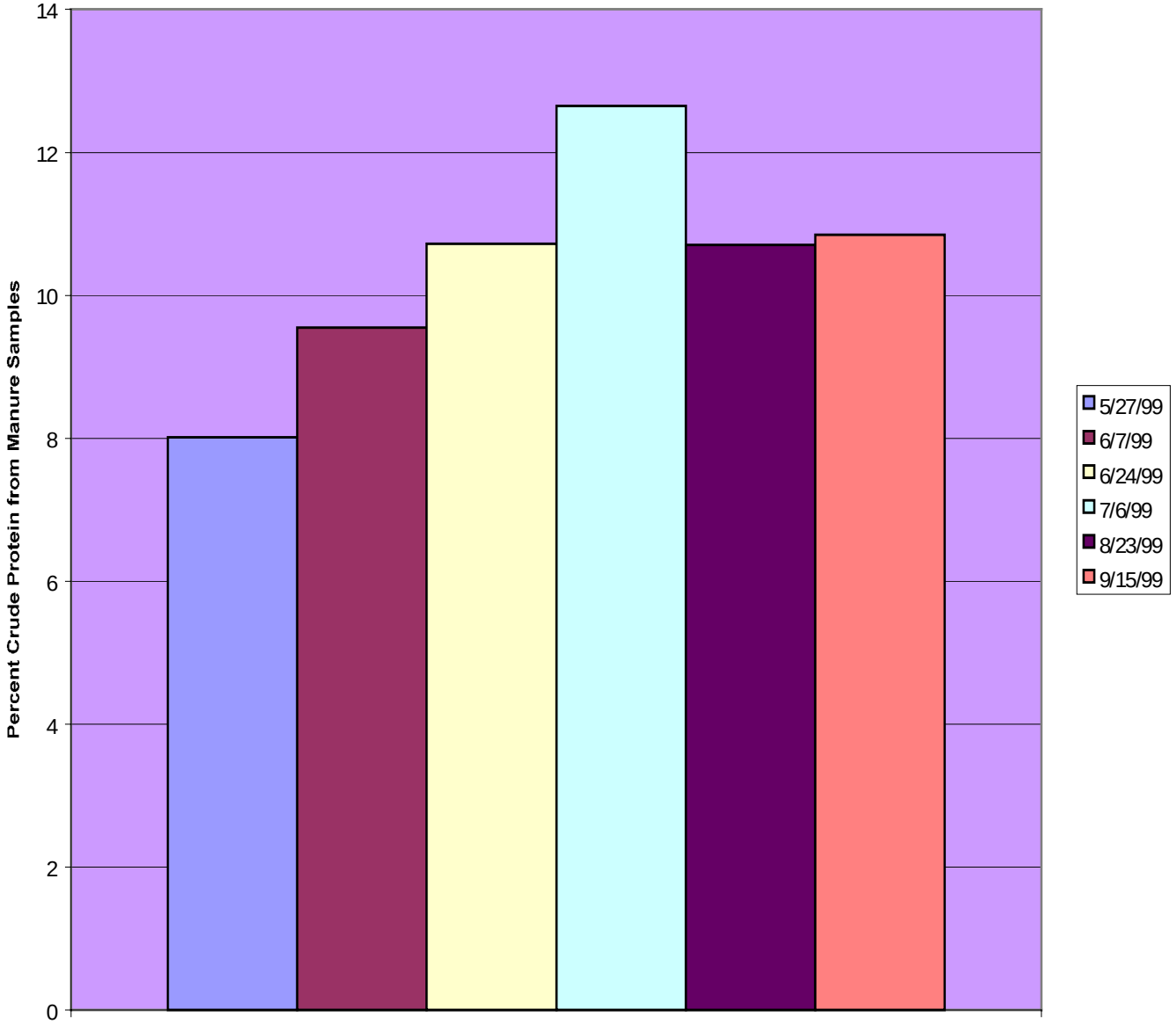
The steers showed a total average weight gain of 293 pounds in 168 days of grazing the Eastern gamagrass at the Jimmy Carter Plant Materials Center in Americus, Georgia. Also refer to Graph 1 and Graph 2.

Observations and results of NIRS analysis of fecal samples for crude protein suggest that forage quality is adequate for typical livestock operations in this region.

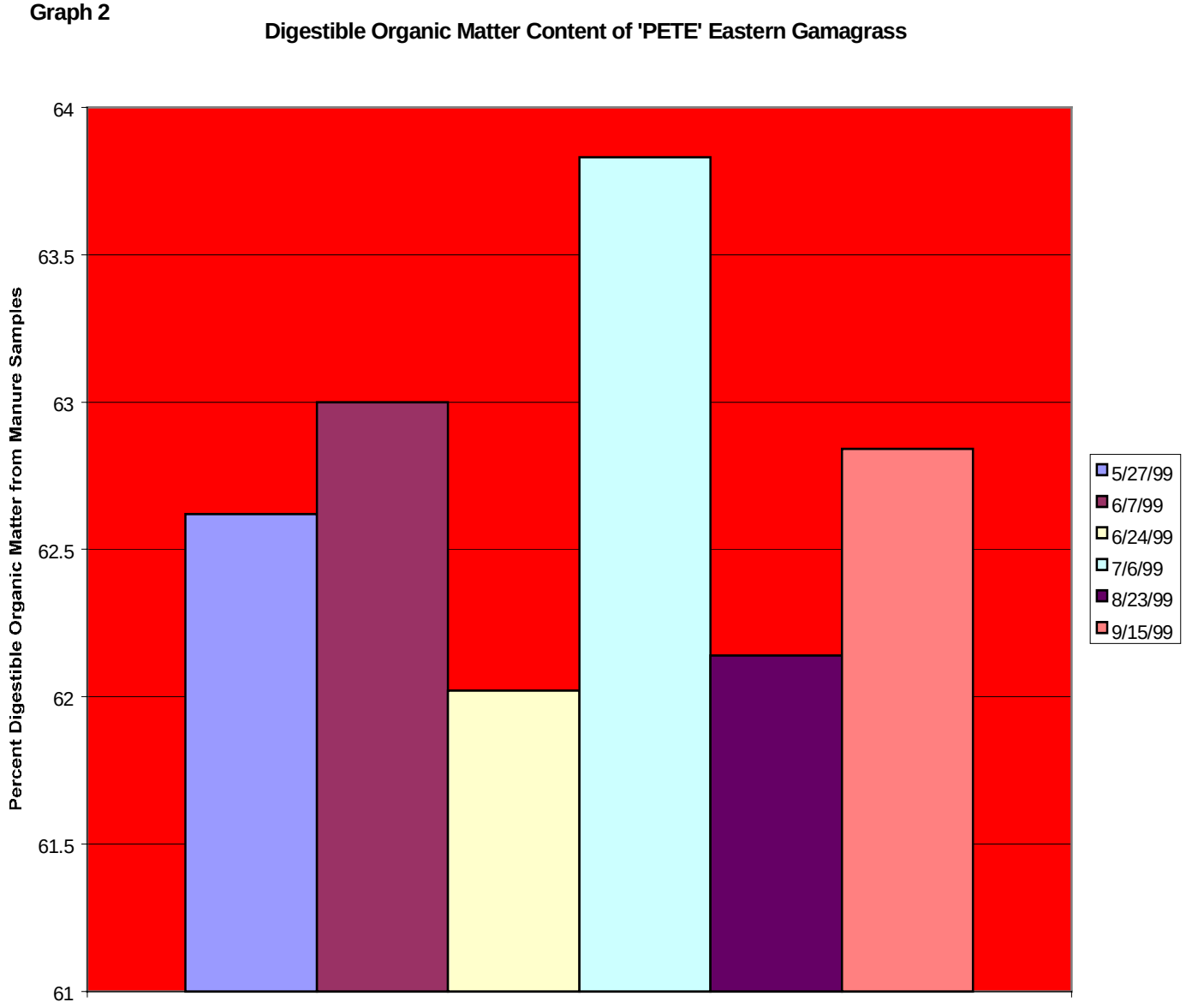
After each grazing period cattle were moved to a new paddock

Graph 1

Crude Protein Content of 'PETE ' Eastern Gamagrass



Graph 2


Digestible Organic Matter Content of 'PETE' Eastern Gamagrass
Percent Digestible Organic Matter from Manure Samples
64
63.5
63
62.5
62
61.5
61
5/27/99
6/7/99
6/24/99
7/6/99
8/23/99
9/15/99

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 disked. In March 1994, 450#/Ac of 0-14-14 fertilizer was applied. On May 5, 1994 the pasture area was disked 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, 1995, and 1996.

In May 1997, 10-10-10 fertilizer was applied at the rate of 600 #/Ac. The first week of June, 150 #/Ac of ammonium nitrate, 34-0-0, was spread on the area. On May 27, 2, 4-D herbicide was sprayed at 1 qt/Ac rate to control broadleaf weeds and again on June 10 because of poor results from first spraying. Similar cultural practices were followed in 1998 and 1999.

RESULTS AND DISCUSSION:

October 28 1997 seeds were combined with a poor yield of only 28 pounds.

In 1998, following an extensive drought period, the indiangrass field yielded 550 pounds of seed. In February 1999 the area was burned. In July 1999 forage samples were taken from the indiangrass field for quality analysis:

	% CP	% ADF	% NDF
Top half of plant	6.2	38.2	70.3
Bottom half of plant	4.4	40.9	72.6

Samples from the upper part of the plant have better forage quality characteristics than samples from the lower portions. This difference is due to a higher leaf/stem ratio in the upper portion. Also in 1999, 88 pounds of seed were harvested from the three-acre field.

Rotational grazing techniques are planned for implementation in future years.

PROJECT 13A147R - EASTERN GAMAGRASS INTER-CENTER STRAIN TRIAL

INTRODUCTION: Eastern gamagrass (*Tripsacum dactyloides*) is a native warm season (C4) perennial bunchgrass. It has long been recognized as a highly productive and palatable forage plant. Eastern gamagrass is a monoecious grass with morphology similar to corn. Diploid plants reproduce sexually while most tetraploids are facultative apomicts and hexaploids are obligate apomicts. A gynomonoecious sex form with the potential of increased seed production has been identified.

Eastern gamagrass is adapted to a wide variety of growing conditions. Its native range extends from Massachusetts, west to Michigan, Iowa and Nebraska, south to Florida, Oklahoma, and Texas. In addition to a wide range of adaptation, eastern gamagrass shows potential for a wide range of agricultural uses.

Since corn silage is such a large contributor to cropland erosion in the nation, the NRCS Big Flats PMC in New York is developing eastern gamagrass as a perennial silage that could reduce soil erosion and water quality problems.

There is growing interest in eastern gamagrass as a forage plant for the Southern United States. Several NRCS plant materials centers in the south are making progress in developing new eastern gamagrass cultivars. They have screened large populations of eastern gamagrass ecotypes for forage characteristics. The best materials from these screenings have been incorporated into a multi-regional study known as an Inter-Center Strain Trial (ICST). The ICST was initiated in 1995 at six southeastern PMC locations, (Knox City, Texas, Booneville, Arkansas, Coffeeville, Mississippi, Americus, Georgia, Brooksville, Florida, and Nacogdoches, Texas).

Since little information has been gathered in the south concerning eastern gamagrass forage quantity and quality, these two evaluation criteria are being emphasized in the ICST study. The results of this study should provide data for new eastern gamagrass cultivar releases adapted to the Southern United States. This report details the establishment and three-year results of the ICST conducted at the Jimmy Carter PMC in Americus, Georgia.

MATERIALS AND METHODS:

In 1995, plots were established with vegetative material from 13 accessions and one standard called ‘Pete’ (released by NRCS in 1988). Table 1 lists the plant materials and their origin. Plots were arranged in a randomized complete block design with four replications. In the spring, after most accessions were in boot stage, the test was clipped to 8” from the ground. Additional clippings were taken each year on an approximate 45-day schedule. Dry matter yields were determined for each clip and yearly total clip. Forage quality measurements were also determined. An analysis of variance was generated for each clip stage by utilizing MSTAT.

RESULTS AND DISCUSSION:

Three years of data indicates the Montgomery line produced some of the highest total dry matter yields (Table 2).

Three years of forage quality data indicates the Montgomery line has some of the better forage quality characteristics in the test (Tables 3-5).

In the future, the plant materials program plans to release the Montgomery line as a new Eastern gamagrass for use in the Southeastern United States.

During the first two years of the study, Pete, a standard for comparison, displayed reduced dry matter yield results as the growing season progressed (Graphs 1 and 2).

Fertilizer applications are recorded in Table 6.

TABLE 1 - EASTERN GAMAGRASS ENTRIES

Accession	State	County	PMC Origin
434493	TX	Hays	James E. “Bud” Smith, Knox City, TX
9066165	TX		Los Lunas, NM
9043762	TX	Medina	East TX, Nacogdoches, TX
9043629	TX	Nacogdoches	TX
9043740	TX	Jackson	TX
9062680	TN	Montgomery	Jamie L. Whitten, Coffeeville, MS
9062708	SC	Williamsburg	Jamie L. Whitten, Coffeeville, MS
9055975	FL1		Brooksville, FL
9059213	FL2		Brooksville, FL
9059215	FL3		Brooksville, FL
9058465	AR1		Booneville, AR
9058495	AR2		Booneville, AR
9058569	AR3		Booneville, AR
‘Pete’			Commercial

TABLE 2 - TOTAL DRY MATTER YIELD BY YEAR OF EASTERN GAMAGRASS ENTRIES AT JIMMY CARTER PMC 1996 - 1998

	Dry Matter Yield #/acre		
Accession	1996	1997	1998
Hays	17073	17703	15049
Nacogdoches	*	11249	11693
Jackson	17392	22399	11195
Medina	14611	16504	13882
Flr 1	6535	7695	5722
Flr 2	13541	16183	9863
Flr 3	15318	17953	11103
Ark 1	15300	16074	11872
Ark 2	16162	12794	9873
Ark 3	10717	5916	2647
Williamsburg	17358	16449	14476
Montgomery	19637	17406	14165
New Mexico	19267	16973	14102
Pete	16461	12729	8560
LSD (0.05)	2657	2846	4154

* Not harvested in 1996

Table 3 - Forage quality estimates of eastern gamagrass accessions by harvest dates and average Jimmy Carter PMC, Americus, GA 1996.

Accession	Forage quality estimates											
	Harvest dates											
	05/22			07/09			08/27			Average		
	CP[1]	ADF[2]	NDF[3]	CP	ADF	NDF	CP	ADF	NDF	CP	ADF	NDF
	--- % ---			--- % ---			--- % ---			--- % ---		
Hays	10.7	38.0	71	5.7	42.8	74	8.7	41.5	70	8.4	40.8	71
FLR3	10.7	35.8	70	5.5	45.2	75	7.4	43.8	71	7.9	41.6	72
Jackson	9.7	35.8	66	5.5	40.2	71	6.9	38.5	70	7.4	38.2	69
ARK1	9.3	35.8	68	5.8	40.8	70	7.8	41.2	68	7.6	39.3	69
ARK2	11.1	36.5	71	6.l	41.5	74	6.5	41.8	71	7.9	39.9	72
Williamsburg	11.5	36.3	69	6.0	42.8	73	6.8	43.5	70	8.1	40.9	70
Montgomery	8.2	38.8	70	6.2	41.8	72	8.4	40.0	68	7.6	40.2	70
New Mexico	9.9	38.8	74	6.6	42.0	73	7.0	42.5	70	7.8	41.4	72
Mean	10.1	37.0	70	5.9	42.1	73	7.4	41.6	70			
LSD (0.05)[4]	NS[5]	1.7	NS	NS	2.5	2	1.4	NS	2.3			

1 – crude protein; 2 – acid detergent fiber; 3-neutral detergent fiber; 4 – least significant difference; 5 – not significant.

Table 4 - Forage quality estimates of eastern gamagrass accessions by harvest dates and average Jimmy Carter PMC, Americus, GA 1997.

Accession	Forage quality estimates											
	Harvest dates											
	05/20			07/15			09/04			Average		
	CP[1]	ADF[2]	NDF[3]	CP	ADF	NDF	CP	ADF	NDF	CP	ADF	NDF
	--- % ---			--- % ---			--- % ---			--- % ---		
Hays	7.6	39.5	71	7.5	42.2	72	7.8	40.5	70	7.6	40.7	71
FLR3	7.0	39.5	72	6.6	42.5	74	6.4	42.8	74	6.7	41.6	73
Jackson	6.6	39.5	72	6.2	42.2	73	6.6	40.8	70	6.5	40.8	72
ARK1	6.8	39.0	70	6.8	40.8	71	8.0	39.0	69	7.2	39.6	70
Medina	6.6	37.8	71	6.4	41.0	71	6.1	40.8	70	6.4	39.9	70
Williamsburg	9.4	35.0	71	6.8	42.0	73	7.4	40.0	71	7.9	39.0	72
Montgomery	7.4	40.2	70	8.0	40.0	71	8.0	39.2	70	7.8	39.8	71
New Mexico	6.2	41.0	72	6.9	43.0	73	6.6	41.0	72	6.6	41.7	72
FLR2	7.1	39.3	70	5.8	42.0	74	6.3	43.2	72	6.4	41.5	72
Mean	7.2	39.0	71	6.8	41.7	72	7.0	40.8	71			
LSD (0.05)[4]	1.2	2.0	1.8	0.8	2.2	1.2	1.2	1.7	1.5			

1 – crude protein; 2 – acid detergent fiber; 3-neutral detergent fiber; 4 – least significant difference; 5 – not significant.

Table 5 - Forage quality estimates of eastern gamagrass accessions by harvest dates and average Jimmy Carter PMC, Americus, GA 1998.

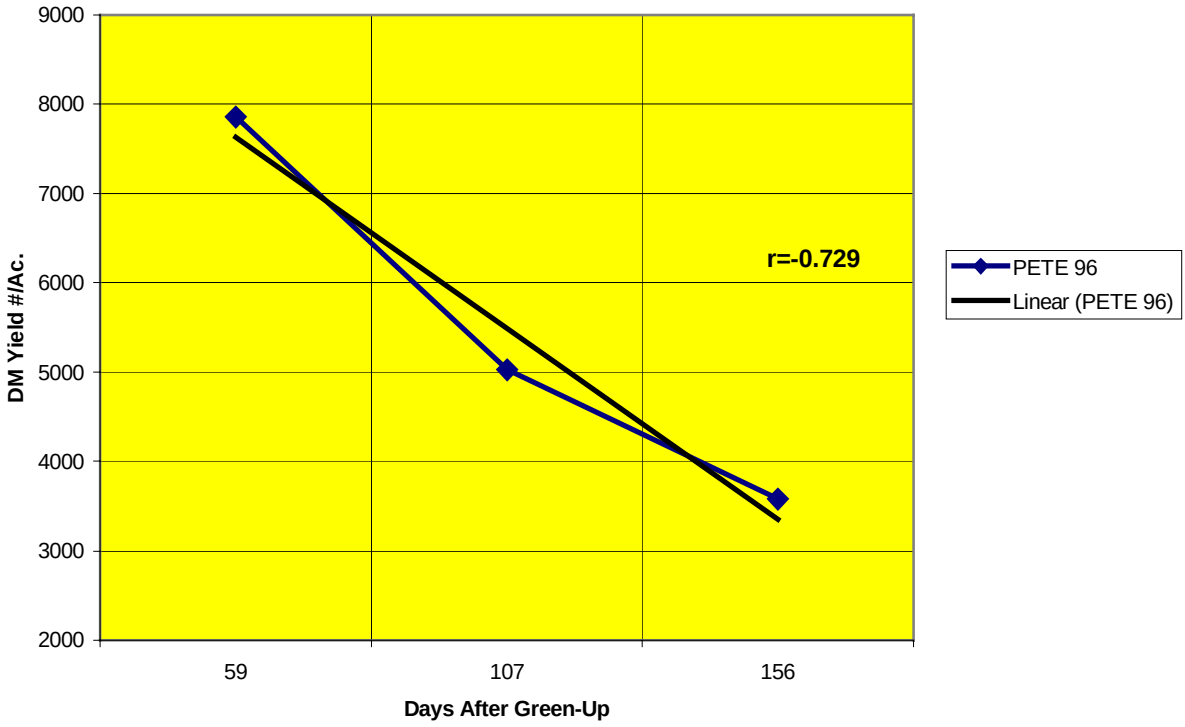
Accession	Forage quality estimates								
	Harvest dates								
	06/17			07/29			09/10		
	CP[1]	ADF[2]	NDF[3]	CP	ADF	NDF	CP	ADF	NDF
	--- % ---			--- % ---			--- % ---		
Hays	5.4	42.8	75	9.2	36.8	70	10.4	36.8	67
Jackson	5.2	41.2	74	8.0	37.5	72	11.0	33.8	65
ARK1	5.0	40.0	70	8.7	37.0	70	9.9	34.8	66
Medina	4.4	41.0	73	8.4	37.8	71	10.6	34.0	65
Williamsburg	5.4	39.2	72	10.0	35.8	70	11.1	36.0	67
Montgomery	4.2	42.0	71	10.6	35.5	69	10.2	38.0	69
New Mexico	5.4	41.0	74	10.4	37.0	70	11.4	36.0	68
Nacogdoches	4.6	41.2	74	9.6	35.8	69	11.3	34.0	65
Mean	5.0	41.0	73	9.4	36.6	70	10.7	35.4	66
LSD (0.05)[4]	NS[5]	NS	2.5	1.8	1.6	1.7	NS	2.7	1.5

Accession	Forage quality estimates					
	Harvest dates					
	10/20			AVERAGE		
	CP[1]	ADF[2]	NDF[3]	CP	ADF	NDF
	--- % ---			--- % ---		
Hays	11.1	38.5	70	9.0	38.7	71
Jackson	10.1	37.8	69	8.6	37.6	70
ARK1	10.5	38.0	68	8.5	37.4	69
Medina	10.0	38.5	69	8.4	37.8	70
Williamsburg	10.8	36.8	69	9.3	37.0	70
Montgomery	10.8	37.8	67	9.0	38.3	69
New Mexico	10.9	39.0	70	9.5	38.2	70
Nacogdoches	11.1	37.5	68	9.2	37.1	69
Mean	10.7	38.0	69			
LSD (0.05)[4]	NS	NS	NS			

1 – crude protein; 2 – acid detergent fiber; 3-neutral detergent fiber; 4 – least significant difference; 5 – not significant.

Graph 1

'PETE" DRY MATTER Forage Yield (1996)



Graph 2

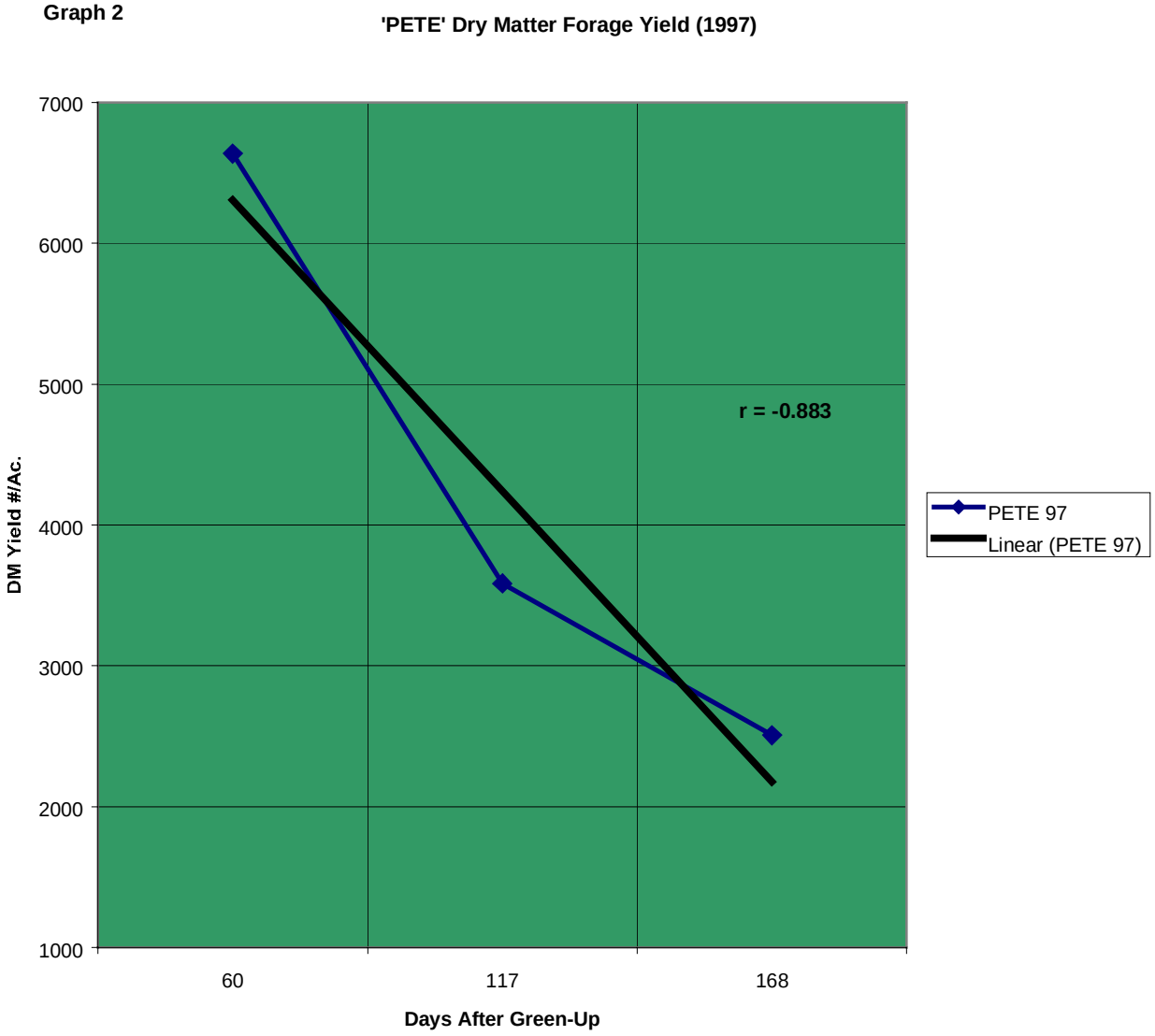

'PETE' Dry Matter Forage Yield (1997)
7000
6000
5000
4000
3000
2000
1000
DM Yield #/Ac.
r = -0.883
PETE 97
Linear (PETE 97)
60
117
168
Days After Green-Up

TABLE 6 - EASTERN GAMAGRASS FERTILIZATION RECORD AT JIMMY CARTER PMC FOR 1996 - 1998

Dates Applied	Fertilizer Type	Rate Applied (#/Ac)
4/8/96, 5/22/96, 7/9/96, 8/27/96	Muriate of Potash	83
	Ammonium Nitrate	147
1996 Total =	Muriate of Potash	333
	Ammonium Nitrate	588
3/13/97, 5/20/97, 7/15/97	Muriate of Potash	83
	Ammonium Nitrate	147
1997 Total =	Muriate of Potash	250
	Ammonium Nitrate	441
3/25/98, 6/17/98, 7/29/98, 9/10/98	Muriate of Potash	83
	Ammonium Nitrate	147
1998 Total =	Muriate of Potash	333
	Ammonium Nitrate	588

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 demonstration.

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.

The field is divided by electric wire into ten separate paddocks with accompanying water tanks.

On February 22 1999, 600 lbs/Ac of 10-10-10 fertilizer was applied to the Alamo field.

On May 7 1999, seven Brangus heifers from Fort Valley State University (Dr. Glenwood Hill) began grazing the switchgrass demonstration. The animals were wormed, vaccinated, and dusted by personnel of Fort Valley State University.

RESULTS AND DISCUSSION:

The heifers were rotated through the ten-paddock system on a seven-day grazing period per paddock.

Results from manure samples and weights from the heifers are as follows:

DATE	% CRUDE PROTEIN	% DIGESTIBLE ORGANIC MATTER
June 7	11.78	67.82
June 24	9.89	65.23
July 6	13.77	66.05
August 23	9.04	63.32
September 16	10.81	64.85

WEIGHTS

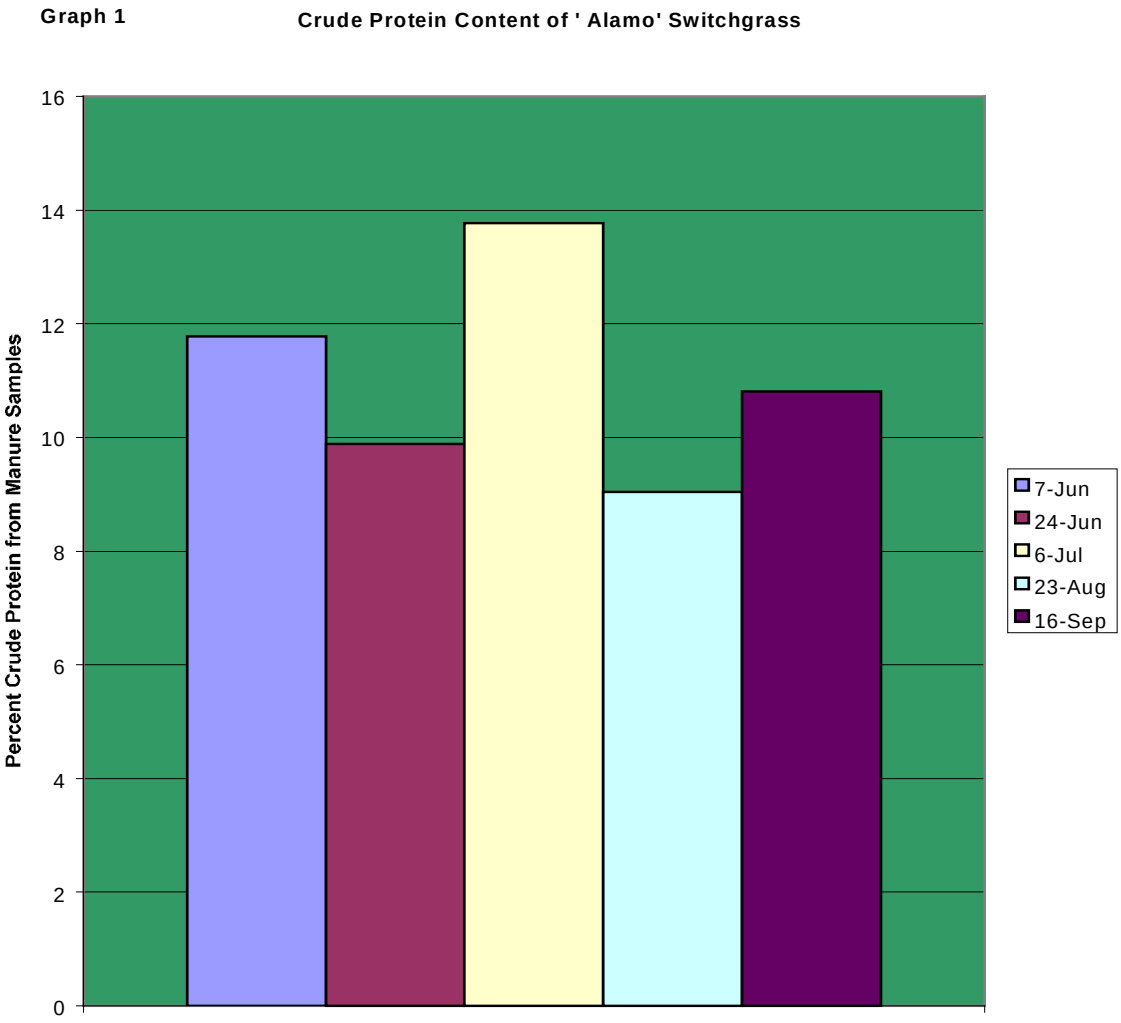
	DATE	AVERAGE WEIGHT	TOTAL GAIN	AVERAGE DAILY GAIN
Beginning	Jun 7	687 lbs	-	-
Ending	Oct 27	831.43 lbs	144.4 lbs	1.0 lbs/day

Also refer to Graphs 1 and 2

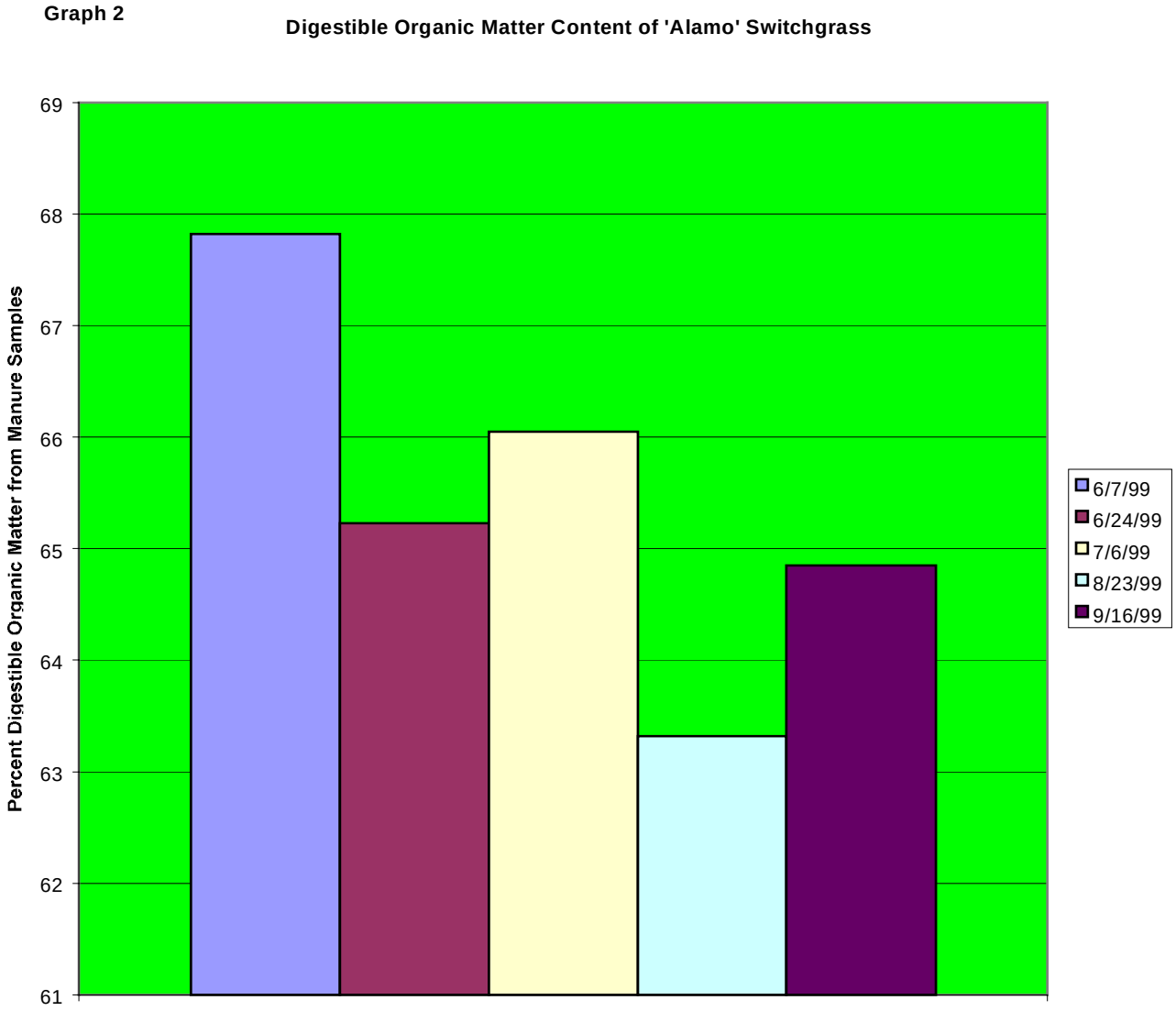
Cattle selectively grazed leaves and attempted to avoid the stemy growth of the Alamo.

Forage quality data and weight gain seems to indicate ‘Alamo’ can sustain heifers under a rotational grazing system.

Graph 1


Crude Protein Content of ' Alamo' Switchgrass
Percent Crude Protein from Manure Samples
16
14
12
10
8
6
4
2
0
7-Jun
24-Jun
6-Jul
23-Aug
16-Sep

Graph 2


Digestible Organic Matter Content of 'Alamo' Switchgrass
Percent Digestible Organic Matter from Manure Samples
69
68
67
66
65
64
63
62
61
6/7/99
6/24/99
7/6/99
8/23/99
9/16/99

Increase of Native Plants for the US Forest Service

INTRODUCTION:

The USFS in South Carolina is developing technology to vegetate disturbed areas on forest service lands with local native plant species. The Jimmy Carter PMC and plant materials program are cooperating with the USFS in this endeavor.

MATERIALS AND METHODS:

In the fall of 1998 and 1999, the Jimmy Carter Plant Materials Center received seed collections of native plant species from the USFS in South Carolina for process and increase. Seeds generated from this increase will be used to revegetate bare or disturbed areas of USFS land in South Carolina.

The first step in the project after seed collection was seed cleaning and processing. Therefore, in the fall of 1998 and 1999, the PMC cleaned and processed all the native specie collections. These seed were subsequently distributed to USFS officials.

Since little is known about the establishment of these native species, the PMC and the USFS decided to plant ½ of the seeds in the fall and the other ½ in the spring. Seeds planted in the fall are stratified naturally while the ones planted in the spring receive artificial stratification.

The spring planted seeds were soaked in water for 24 hours. They were than removed, drained, and immediately placed into a plant cooler for five weeks at 40° F. Seeds were also sprayed twice with a fungicide to prevent molding. They were removed from the cooler and planted by hand in 36” rows to a well-prepared seedbed. All seeds were planted at approximately l/4” to 1/8” depth and irrigated for optimal germination conditions.

RESULTS AND DISCUSSION:

Results from the PMC indicated better germination and establishment from the spring planted seeds. The fall planting was slow to germinate and winter weeds quickly overwhelmed the natives.

The PMC will conduct a new spring increase planting in the spring of 2000. Seed collected from this increase will be processed and delivered to South Carolina for revegetation projects on USFS lands.

PROJECT 13A150R - QUANTITATIVE AND QUALITATIVE RESPONSE OF NATIVE GRASSES VERSUS INTRODUCED WARM SEASON PASTURE PLANTS AS INFLUENCED BY DIFFERENT BURN REGIMES

INTRODUCTION:
Very little comparative testing between native and introduced warm season forage plants has been documented in the Southeastern United States. This test attempts to establish, evaluate, and analyze different warm season pasture plants and mixtures subjected to different burn regimes. Data should provide qualitative and quantitative information relative to native and introduced pasture species performance in different burn management regimes. Response variables will include species composition, species frequency, and dry matter production. This is a cooperative effort between the NRCS and Dr. Mary Miller-Goodman of Auburn University.

MATERIALS AND METHODS:
On May 6, 1997, the following experimental split plot design was established:

Split plot (cultivars) with main plots (burn regime) in RBD with three (3) reps. Main plots (50' x 300') are burn #1 and burn #2. Split plots (50' x 50') are six cultivar and cultivar mixes. (1) pure 'Cave-In-Rock' switchgrass (2) pure big bluestem (Knox City PMC), (3) pure 'coastal' bermudagrass, (4) pure 'Pensacola' bahiagrass, (5) a mixture of 30% little bluestem, 25% big bluestem, 20% indiangrass, and 25% switchgrass, (6) a mixture of 50% little bluestem and 50% 'Serala' lespedeza. Grass seeds were planted at a rate of 10 # PLS/Acre and coastal bermuda was planted at a rate of .15 Bu/120 sq. ft. Serala lespedeza was seeded at 20 #/Acre.

RESULTS AND DISCUSSION:
In 1998, all plots were burned. In 1998 and 1999, percent species composition was recorded for each plot. In 1999, burn #1 plots were designated to be burned every year and burn #2 plots burned every two years. Also in 1999, species frequency was recorded for each plot. The 2000 annual report will contain analysis of percent species composition and species frequency.

Burn #1 main plot day of burning (late Feb.)

Burn #1 main plot one day after burning

Burn #1 main plot two weeks after burning

LIST OF PUBLICATIONS IN 1999 - JIMMY CARTER PLANT MATERIALS CENTER TEAM AND COOPERATORS

1998 Annual Technical Report – PMC staff.

“An Early Crimson Clover for Cover Crop Use”, NRCS technical note, 1999, 2 pages. C.M. Owsley, Don Surrency and Malcome Kirkland.

“AU Sunrise Crimson Clover Trifolium Incarnatum Planting Guide”, 1999, 2 pages. C.M. Owsley, E.D. Surrency, and M.S. Kirkland.

“Constructed Wetlands for Urban Stormwater Management in Mobile, Alabama”, 1999 standalone publication, 5 pages, E.D. Surrency.

“Cover Crops for Conservation Tillage”, 1999 fact sheet, 3 pages. E.D. Surrency, and C.M. Owsley.

“Evaluation of Native Grasses”, 1999 progress report, 26 pages. E.D. Surrency, C.M. Owsley, M.S. Kirkland, Larry Vanzant and Glenda Roach.

“Native Warm Season Grasses for Georgia, Alabama, and South Carolina”, 1999 standalone publication, 14 pages. E.D. Surrency, C.M. Owsley, Sid Brantly, and Valerie Pickard.

“Performance of Woody Species for Riparian Forest Buffers at the Jimmy Carter Pant Materials Center”, 1999 progress report, 4 pages. C.M. Owsley, E.D. Surrency, and M.S. Kirkland.

“Plant Materials Briefs – The latest news on plant materials from the GA Plant Materials Team – July 1999”, progress report, 5 pages. E.D. Surrency, Mike Owsley, and Malcome Kirkland.

“Plant Materials Buffers to Control Dairy Loafing Area Runoff”, 1999 standalone publication, 14 pages. E.D. Surrency.

“Plant Materials for Small Farms”, 1999 fact sheet, 2 pages. E.D. Surrency.

“Seasonal Grazing of Tripsacum Dactyloides in the Southeastern USA”, 1999 progress report, 5 pages. M.S. Kirkland and Sid Brantly.

“Special Constructed Wetlands Project in South Carolina”, 1999 progress report, 2 pages. E.D. Surrency.

“Water Authority Creates another Local Wetlands”, 1999 popular article, 1 pages. Will Kiser, Clayton Neighbor Staff Writer.

SEED AND PLANTS - 1999

SEED PRODUCTION

NAME	POUNDS
Brunswickgrass 'Doncorae'	14
Indiangrass	88

PLANT SHIPMENT

NAME	EACH
'Wetlander' giant cutgrass	5
'Big O' crabapple	170
Flageo' marshhay cordgrass	8,080
Sharp' marshhay cordgrass	100
'Sumter Orange' daylily	50
'Bankers' willow	700
Big Bluestem	19
Vetiver	4,075
Eastern Gamagrass 'Pete'	130
'Cave-N-Rock' switchgrass	24
'Halifax' maidencane	200

SEED AND VEGETATIVE STOCK PRODUCERS

'Amclo' Arrowleaf Clover *Trifolium vesiculosum*	2425 S Milledge Ave Georgia Crop Improvement Association Athens, Georgia 30605 R & R Seeds Inc. 724 Beall Springs Rd Gibson, Georgia 30810
Lespedeza virgata 'Ambro' Virgata Lespedeza	Georgia Crop Improvement Association 2425 S Milledge Ave Athens, Georgia 30605
Paspalum notatum 'Pensacola' Bahiagrass	Georgia Crop Improvement Association 2425 S Milledge Ave Athens, Georgia 30605 Adams-Briscoe Seed Co. P O Box 19 Jackson, Georgia 31634 Conlee Seed Co. Star Route, Box 8A Plainview, TX 79073 Douglas W. King Co., Inc. 4627 Emil Rd., P O Box 200320 San Antonio, TX 78220 Texas Seed Company P O Drawer 599 Kennedy, TX 78119
Panicum miliaceum 'Dove' Proso Millet	*G*eorgia Crop Improvement Association 2425 S Milledge Ave Athens, Georgia 30605 Adams-Briscoe Seed Company P O Box 19 Jackson, Georgia 31634 Turner Seed Company Rt. 1, Box 292 Breckenridge, TX 76024
Elaeagnus umbellata 'Ellagood' Autumnolive	McCorkle Nursery Rt. 1 Dearing, Georgia 30808

CROP	PRODUCER
Elaeagnus umbellata (Continued) 'Ellagood' Autumnolive	Hamilton Nursery P O Box 871 Thomson, Georgia 30824
Festuca arundinacea 'GA-5' Tall Fescue	Adams-Briscoe Seed Company P O Box 19 Jackson, GA 31634 Pennington Seed Company Madison, GA
Hemerocallis fulva 'Sumter Orange' Daylily	Hamilton Nursery Othello Hamilton P O Box 871 Thomson, Georgia 30824
Lespedeza thunbergii 'Amquail' Thunberg Lespedeza	Alabama Crop Improvement Association S. Donahue Dr. Auburn, AL 36849 Julian Brown 125 Court St., P O Box 8 Morrow, Georgia 30655 Adams-Briscoe Seed Co. P O Box 19 Jackson, Georgia 30733 Lambert Seed and 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

CROP	PRODUCER
Spartina patens (Continued) 'Flageo' Marshhay Cordgrass	Dr. Mark Latimore School of Agriculture Fort Valley State University Ft. Valley, GA 31030 William Smith Rt. 2, Box 94A Wigham, GA 31719 Okefenokee Growers Maybluff Rd Folkston, GA 31537
Spartina patens 'Sharp' Marshhay Cordgrass	Jimmy Carter Plant Materials Center 295 Morris Dr. Americus, GA 31709 Brooksville Plant Materials Center 14119 Broad St. Brooksville, FL 34601 Okefenokee Growers Maybluff Rd Folkston, GA 31537
Scirpus californicus 'Restorer' Giant Bulrush	Varn Companies P O Box 4488 Jacksonville, FL 32201 Flowerwood Nursery, Inc. 6470 Dauphin Island Parkway Mobile, AL 36605
Trifolium incarnatum 'AU Sunrise' Crimson Clover	Alabama Crop Improvement Association S. Donahue Dr. Auburn, AL 36849
Zizaniopsis miliacea 'Wetlander' Giant Cutgrass	Varn Companies P O Box 4488 Jacksonville, FL 32201 Flowerwood Nursery, Inc. 6470 Dauphin Island Parkway Mobile, AL 36605

PMC CONFERENCE ROOM ACTIVITIES - 1999

FEBRUARY

9-12	Water Quality Assessment
18	Longleaf Pine Training

MARCH

26	Irrigation Training
27-28	Plant Materials Meeting

JULY

19-20	Plant Materials Meeting

AUGUST

12	Wetland Delineation Training
16-20	Wetland Delineation Training
25-26	Area Road Map Training
30	PMC Tour

SEPTEMBER

27	EPA Tour

OCTOBER

18-21	Wetland Delineation Training

NOVEMBER

8-10	Toolkit Training

DECEMBER

6-8	Toolkit Training
15-16	Roadmap Training

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