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ANNUAL TECHNICAL REPORT

Jimmy Carter
Plant Materials Center
1998

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

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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 - 1998
69 YEARS(1929 - 1998)

	Temperature(F)		Precipitation(Inches)			
Month	1998 Max.	1998 Min.	Mo. Total	69 Year Average	69 Year High Mo.	69 Year Low Mo.
January	**73**	**23**	**5.32**	**4.46**	**11.19**	**.64**
February	**77**	**28**	**7.05**	**4.72**	**12.28**	**.75**
March	**85**	**22**	**6.22**	**5.30**	**12.11**	**.48**
April	**85**	**40**	**8.68**	**3.87**	**12.26**	**.00**
May	**95**	**46**	**2.46**	**3.36**	**8.35**	**.14**
June	**100**	**55**	**.75**	**4.21**	**11.43**	**.03**
July	**100**	**69**	**2.10**	**5.27**	**24.79**	**1.25**
August	**101**	**61**	**1.05**	**4.01**	**11.76**	**.99**
September	**100**	**55**	**8.65**	**3.41**	**11.54**	**.10**
October	**88**	**40**	**.20**	**2.13**	**9.60**	**.00**
November	**85**	**34**	**.75**	**3.03**	**10.63**	**.05**
December	**81**	**25**	**1.30**	**4.18**	**12.29**	**.42**
TOTAL			**44.53**	**47.95**		

The coldest day of the year was March 11. The last day of frost was March 23. The Hottest days of the year were August 29-31. The first killing frost was November 7.

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.

Seed will be collected from these "forage type" blocks for future increase and study.

In February 1998, the following entries of big bluestem were sent to Valerie Pickard for placement into a 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

Evaluation information will be gathered on this planting in the future. Evaluation criteria will include survival percent, esthetic value and urban usefulness..

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. In February 1999, switchgrass lines will be selected for urban landscape evaluation. These lines will be provided to Valerie Pickard for inclusion into the Atlanta urban landscape evaluation.

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 2)

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. (Table 3)

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 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. (Table 4)

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 5)

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 (Table 6). However, there was no significant difference between 'Lometa' grazed and ungrazed. (Table 6)

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

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

Final Stem Count 1998
Initial Stem Count 1995 X 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 7)

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 8)

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 (Table 9). Also there was again no significant difference between 'Lometa' grazed and ungrazed (Table 9).

To summarize 1996-1998, 'Pensacola' bahia expresses 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.

TABLE 1 JIMMY CARTER PMC STEM COUNT (1996)
GRAZED

Cultivar	Stem Ratio (Final Stem Count 1996 / Initial Stem Count 1995 X 100)
PI-514673	37.83
'Lometa'	51.58
'Pensacola' bahia	86.83
LSD (.05)	13.83

CV = 27.8%

TABLE 2 JIMMY CARTER PMC STEM COUNT (1996)
UNGRAZED

Cultivar	Stem Ratio (Final Stem Count 1996 / Initial Stem Count 1995 X 100)
PI-514673	124.8
'Lometa'	66.75
'Pensacola' bahia	90.58
LSD (.05)	31.42

CV = 39.45%

TABLE 3 JIMMY CARTER PMC STEM COUNT (1996)

	Stem Ratio (Final Stem Count 1996 / Initial Stem Count 1995 X 100)
Grazed PI-514673	37.833
Ungrazed PI-514673	124.83

LSD (.05)	22.78
Grazed ‘Lometa’	51.58
Ungrazed ‘Lometa’	66.75
LSD (.05)	22.78

TABLE 4 JIMMY CARTER PMC STEM COUNT (1997) GRAZED

Cultivar	Stem Ratio: Final Stem Count 1997 / Initial Stem Count 1995 X 100
PI-514673	25.74
‘Lometa’	32.89
‘Pensacola’ bahia	72.91
LSD (.05)	13.91

CV = 37.47%

TABLE 5 JIMMY CARTER PMC STEM COUNT (1997) UNGRAZED

Cultivar	Stem Ratio: Final Stem Count 1997 / Initial Stem Count 1995 X 100
PI-514673	57.31
‘Lometa’	34.02
‘Pensacola’ bahia	66.65
LSD (.05)	17.36

CV = 38.93%

TABLE 6 JIMMY CARTER PMC STEM COUNT (1997)

Cultivar	Stem Ratio: Final Stem Count 1997 / Initial Stem Count 1995 X 100
Grazed PI-514673	25.74
Ungrazed PI-514673	57.31
LSD (.05)	15.42
Grazed ‘Lometa’	32.89
Ungrazed ‘Lometa’	34.02
LSD (.05)	15.42

TABLE 7 JIMMY CARTER PMC STEM COUNT (1998) GRAZED

Cultivar	Stem Ratio: Final Stem Count 1998 / Initial Stem Count 1995 X 100
PI-514673	23.04
‘Lometa’	31.18
‘Pensacola’ bahia	69.08

LSD (.05)	15.63

CV = 44.92%

TABLE 8 JIMMY CARTER PMC STEM COUNT (1998) UNGRAZED

Cultivar	Stem Ratio: Final Stem Count 1998 / Initial Stem Count 1995 X 100
PI-514673	63.07
'Lometa'	37.92
'Pensacola' bahia	57.47
LSD (.05)	15.15

CV = 33.88%

TABLE 9 JIMMY CARTER PMC STEM COUNT (1998)

Cultivar	Stem Ratio: Final Stem Count 1998 / Initial Stem Count 1995 X 100
Grazed PI-514673	23.04
Ungrazed PI-514673	63.07
LSD (.05)	15.10
Grazed 'Lometa'	31.18
Ungrazed 'Lometa'	37.92
LSD (.05)	15.10

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, 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 will provide base line vegetative data to accompany any future experimentation and analysis. All growth means represent means of surviving material. Through 1998, the overall best growth data was expressed by the green ash block.

In June 1998, 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 will be analyzed for N & P content. This will provide baseline chemical information. PMC staff and ARS staff plan to fertilize the

blocks in 1999. Further analysis should determine which block of trees have the highest capacity for fertilizer uptake.

TABLE 1 MEAN % SURVIVAL OF FOREST BUFFER TREES

Tree Species	August 1994	August 1995	August 1996	September 1997	July 1998
Loblolly pine *	21	16	13	13	13
Yellow poplar *	14	14	8	8	8
Sycamore *	18	27	20	20	20
Blackgum	84	68	66	63	63
Cherrybark oak	91	89	89	89	88
Sweetgum	77	77	73	74	74
White oak	66	49	46	44	44
Bald cypress	81	71	70	68	68
Green ash	81	81	82	82	82
Red maple	88	76	71	72	71
Ogeechee lime	38	35	35	34	35
Water oak	75	73	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	27.3	52
White oak	24.78	41
Bald cypress	17.99	33
Green ash	65.83	94
Red maple	20.72	48
Ogeechee lime	40.10	78
Water oak	33.2	63

TABLE 3 MEAN HEIGHT (CM) OF FOREST BUFFER TREES

Tree Species	August 1994	August 1995	August 1996	September 1997	July 1998
Blackgum	56.7	79	155	270.3	308.9
Cherrybark oak	56.73	96	207	312.5	382.8
Sweetgum	61.54	129	261	383.2	464.3
White oak	38.94	78	105	158.0	194.6
Bald cypress	57.36	87	146	216.0	263.6
Green ash	169.98	263	399	543.2	613.8
Red maple	56.18	108	219	342.0	401.9
Ogeechee lime	84.15	170	281	412.9	467.6
Water oak	60.26	100	197	350.8	391.0

TABLE 4 TRUNK DIAMETER OF FOREST BUFFER TREES

Tree Species	Mean Diameter Main Trunk Ground Level (mm)				
	August 1994	August 1995	July 1996	September 1997	July 1998
Blackgum	7.232	14.4	26.6	35.2	54.4
Cherrybark oak	5.61	12.1	28.0	46.0	63.6
Sweetgum	10.54	24.5	42.3	65.5	88.9
White oak	6.73	11.0	19.4	24.5	35.6
Bald cypress	8.06	18.0	31.0	43.7	63.2
Green ash	25.49	46.4	69.7	82.7	107.8
Red maple	8.19	20.7	43.0	56.0	76.9
Ogeechee lime	16.57	35.6	64.3	110.5	126.6
Water oak	9.23	21.7	30.9	49.9	66.2

TABLE 5 CROWN WIDTH OF FOREST BUFFER TREES

Tree Species	Mean Crown Width (cm) at 1/2 Tree Height	
	September 1997	July 1998
Blackgum	170.6	220.3
Cherrybark oak	197.3	222.4
Sweetgum	165.3	205.7
White oak	97.5	106.0
Bald cypress	126.1	151.2
Green ash	298.4	319.7
Red maple	167.5	201.0
Ogeechee lime	315.2	347.1
Water oak	202.1	246.0

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.

MATERIALS AND METHODS:

In the spring of 1994, 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. The pasture was then divided into ten paddocks of equal size using one strand electrical fence. A portable water system was installed.

In 1996 an attempt to obtain cattle for a grazing demonstration failed, but in 1997, 15 heifers, weighing about 700 pounds each, were on loan from the University of Georgia Experiment Station in Tifton, Georgia. These heifers only grazed the Eastern gamagrass pasture for about one month in August before our water supply ran dry. We were still able to obtain nutritional information from fecal samples taken during this period.

On May 5, 1998, young stocker calves arrived at the center from the Kennedy farm in Tatnall County, Georgia. The Kennedys, cattle and row crop farmers, are cooperators with NRCS in a Eastern gamagrass rotational grazing demonstration. The Kennedys supplied 25 cross-bred cattle, heifers and steers, to the Jimmy Carter PMC to graze the 4.5 acre Eastern gamagrass pasture.

After arrival of the calves, they were fed hay and 12% sweet feed during a training period to familiarize the calves with electric fencing. The calves were then weighed on May 14, 1998. The average weight of the calves at this time was 342 pounds. After an extended training period, the calves were moved to the first paddock in the Eastern gamagrass pasture on June 8, 1998. Because of the small size of the calves, it was decided to supplement their diet with 50 pounds of 12% sweet feed and 50 pounds of cracked corn per day for the 25 head.

On June 16, 1998 the cattle were vaccinated, given growth implants, and pour on wormer and fly control applied by Dr. Mobeney and Dr. Hill of Fort Valley State University.

The cattle were rotated from paddock to paddock on a 3.5 day schedule. On June 26, 1998 the cattle were supplemented with a custom ground feed ration recommended by grazing specialist Sid Brantly, Auburn, Alabama. The ration was fed at 100 pounds per day.

The cattle were continually moved from paddock to paddock every 3.5 days and 50 units of N (Ammonium Nitrate), per paddock, applied immediately after each grazing. The exact number of days per paddock is not concrete, but determined by the amount of grass available.

On July 11, 1998 the supplemental feed was reduced to 50 pounds per day. The first rotation of the ten paddocks was completed July 13, 1998. The cattle were than moved to an indiangrass survival test area and allowed to graze until July 16, 1998. They were then returned to the Eastern gamagrass pasture to begin the second rotation. The cattle were again moved every 3.5 days to a new paddock.

The calves were weighed for the second time on July 30, 1998 and additional wormer and fly control applied. The second weighing indicated the calves had gained an average of 98 pounds each and now averaged 440 pounds each.

The cattle were continually moved from paddock to paddock and ammonium nitrate applied after each grazing. The second rotation was completed on August 19, 1998. The cattle were again allowed to graze the indiangrass survival test and then returned to the Eastern gamagrass on August 21, 1998 to begin the third rotation of the paddocks. The previous month had been very dry and the Eastern gamagrass was not recovering from the grazing as quickly as we would have liked, therefore, again we began supplemental feeding the cattle 100 pounds of 12% sweet feed per day. Because of the drought, the grazing period was reduced to only 1.5 days per paddock. September 8, 1998 the cattle were removed from the pasture and weighed for the final time.

The Grazing Animal Nutrition Laboratory at Texas A&M University (College Station, TX, USA) was utilized to determine diet quality, and NUTBAL Nutritional Balancer software was used to predict animal nutritional needs. We collected manure samples from the herd about 30 hours after entering a paddock and shortly after leaving the paddock (to account for digestion and passage time) and found that diet quality was falling off as diet selectivity was reduced, encouraging us to shorten the grazing period.

RESULTS AND DISCUSSION

Weights of calves May 5, 1998 - average 342.2 pounds
July 31, 1998 - average 440.68 pounds
Sep 8, 1998 - average 490.24 pounds

Data
GANLAB

Date	CP	DOM	Forage
8/15/97	8.83	59.21	Eastern gamagrass
8/18/97	7.77	57.34	Eastern gamagrass

8/19/97	11.31	58.38	Eastern gamagrass
8/21/97	10.11	59.84	Eastern gamagrass
6/02/98	10.1	65.5	Switchgrass
6/16/98	11.1	62.06	Eastern gamagrass
7/17/98	8.38	60.78	Bahiagrass/Indiangrass
7/30/98	11.72	63.62	Eastern gamagrass
9/03/98	11.67	62.25	Eastern gamagrass

SUMMARY

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. Vegetation observations suggest that the quantity of forage produced compared to the fertilizer inputs is adequate for practicable use of *Tripsacum dactyloides* as a forage crop in this region.

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 and 1995. In 1996, this field was utilized for indiangrass seed production.

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

In 1998, similar cultural practices were conducted. Following an extensive drought period, the indiangrass field yielded 550 pounds of seed.

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:

In 1996 the highest total dry matter yielding entries were Montgomery, TN, Williamsburg, SC, Jackson, TX, Hays, TX, and New Mexico (Table 2).

In 1997 the entry from Jackson, TX was the highest total dry matter yielding entry in the test (Table 3).

In 1998 nine entries produced the highest total dry matter yield. These entries include Hays, TX, Williamsburg, SC, Montgomery, TN, New Mexico, Jackson, TX, Medina, TX, FLR 3, ARK I, and Nacogdoches, TX. (Table 4) During the three year period 1996-1998, the highest total dry matter yield producers were Montgomery, TN, Jackson, TX, New Mexico, Williamsburg, SC, Medina, TX, Hays, TX and FLR 3. (Table 5)

Fertilization for this test was scheduled each spring and after each clip event (Table 6).

In 1998, forage quality data from 1996-1997 was analyzed. The 1996 data indicates there was no significant difference for % protein between entries for the first and second clips. The third clip indicated Pete, Hays, TX, Montgomery, TN, ARK I, and FLR 3 were the highest % protein producers (Table 7).

In 1997, Williamsburg expressed the highest % protein contact in the first clip. Pete had the highest % protein for the second and third cut. (Table 8)

In 1996, Jackson and ARK I produced some of the lower % ADF and % NDF readings (Tables 9-10).

In 1997, Pete produced some of the lowest % ADF readings (Table 11). ARK I produced some of the lowest % NDF readings (Table 12).

Since Pete is considered a standard of comparison, it was analyzed separately in each year of testing. Yield was plotted against days from greenup. The 1996 plot indicates a inverse relationship between yield and days from greenup with a coefficient of correlation r = -0.729. (graph 1) The same results are indicated in 1997 with a coefficient of correlation r = -0.883. (graph 2) This relationship was not expressed in 1998.

DISCUSSION:

Three years of data indicates the following entries produced the highest total dry matter yield, Montgomery, TN, Jackson, TX, New Mexico, Williamsburg, SC, Medina, TX, Hays, TX, and FLR 3.

Forage quality data is more difficult to analyze. However, Pete seems to produce a fairly consistent high % protein content. Low % ADF and % NDF readings were recorded by Jackson, TX, ARK I, and Pete.

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

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 - DRY MATTER YIELD OF EASTERN GAMAGRASS ENTRIES BY HARVEST DATE AND TOTAL AT JIMMY CARTER PMC - 1996

	DM Yield Harvest Dates #/AC			
Entry	5/22	7/9	8/27	Total Yield
Montgomery	8974.625	6275.85	4386.85	19,637.3
Williamsburg	5576.65	6764.28	5017.03	17,358.0
Nacogdoches	----------	---------	---------	----------
Jackson	3695.4	7376.2	6319.8	17,391.4
Medina	3422.83	6096.8	5091.08	14,6l0.7

Hays	5600.95	6627.47	4844.18	17,072.6
New Mexico	6827.08	7377.03	5062.88	19,267.0
Ark 1	5259.08	5535.08	4505.9	15,300.1
Ark 2	4224.75	6151.45	5786.3	16,162.5
Ark 3	3216.2	4352.73	3l48.05	10,717.0
Flr 1	856.6	3153.15	2525.6	6,535.4
Flr 2	2557.88	6429.1	4554.03	13,54l.0
Flr 3	3l4l.35	74l4.73	4762.3	15,3l8.4
Pete	785l.4	5031.2	3578.2	l6,460.8
LSD (0.05)	1551	1076	768.7	2657
CV	22.98%	12.41%	11.7%	12.08%

TABLE 3 - DRY MATTER YIELD OF EASTERN GAMAGRASS ENTRIES BY HARVEST DATE AND TOTAL AT JIMMY CARTER PMC - 1997

	DM Yield Harvest Dates #/AC			
Entry	5/20	7/15	9/4	Total Yield
Montgomery	8362.65	4646.80	4396.78	17,406.23
Williamsburg	4896.53	7258.08	4293.85	16,448.46
Nacogdoches	4335.68	3533.74	3379.20	11,248.62
Jackson	8497.65	8089.99	5811.56	22,399.21
Medina	6126.28	6067.40	4310.44	16,504.11
Hays	6963.80	5732.85	5006.13	17,702.78
New Mexico	7686.20	4947.75	4338.25	16,972.22
Ark 1	7726.83	5001.28	3345.86	16,073.96
Ark 2	6171.50	3500.58	3121.26	12,793.33
Ark 3	3605.93	1966.96	342.99	5,915.86
Flr 1	2416.35	3059.17	2219.57	7,695.09
Flr 2	5498.95	6324.82	4359.44	16,183.20
Flr 3	6589.70	6703.8	4659.28	17,952.78
Pete	6636.30	3585.31	2507.94	12,729.54
LSD (0.05)	1224	1001	1072	2846
CV	14.00%	13.91%	20.15%	13.39%

TABLE 4 - DRY MATTER YIELD OF EASTERN GAMAGRASS ENTRIES BY HARVEST DATE AND TOTAL AT JIMMY CARTER PMC - 1998

	DM Yield Harvest Dates #/AC				
Entry	6/17	7/29	9/10	10/20	Total Yield
Montgomery	6813.73	2460.73	2821.58	2069.11	14,165.18
Williamsburg	5896.84	3224.95	3001.05	2353.39	14,476.23
Nacogdoches	4790.05	2476.73	2235.10	2191.15	11,693.08
Jackson	5207.21	2644.42	1787.23	1555.95	11,194.85
Medina	5520.75	3163.30	2872.70	2324.93	13,881.66
Hays	6377.77	3240.33	3054.02	2376.77	15,048.96
New Mexico	5955.73	3308.93	2428.23	2408.62	14,101.52
Ark 1	5172.38	2697.65	2361.60	1640.60	11,872.22

Ark 2	3381.65	2391.28	2133.25	1966.75	9,872.94
Ark 3	554.32	530.20	919.75	642.30	2,646.34
Flr 1	2256.57	1078.68	1209.19	1177.28	5,721.72
Flr 2	4289.81	2412.50	1542.53	1618.16	9,863.00
Flr 3	4566.60	2856.88	1952.18	1727.63	11,103.25
Pete	3741.23	1761.63	1705.85	1351.60	8,560.29
LSD (0.05)	2132	837.8	952.1	778.0	4154
CV (%)	32.35	23.94	31.04	29.98	26.37

TABLE 5 - TOTAL DRY MATTER YIELD BY YEAR AND AVERAGE OF EASTERN GAMAGRASS ENTRIES AT JIMMY CARTER PMC 1996 - 1998

Entry	**DM Yield 1996**	**1997**	**1998**	**Avg.**
	----------#/acre----------			
Hays	17 073	17 703	15 049	16 608
Nacogdoches	*	11 249	11 693	11 471
Jackson	17 392	22 399	11 195	16 995
Medina	14 611	16 504	13 882	14 999
FLR 1	6535	7695	5722	6651
FLR 2	13 541	16 183	9863	13 196
FLR 3	15 318	17 953	11 103	14 791
ARK 1	15 300	16 074	11 872	14 415
ARK 2	16 162	12 794	9873	12 943
ARK 3	10 717	5916	2647	6427
Williamsburg	17 358	16 449	14 476	16 094
Montgomery	19 637	17 406	14 165	17 070
New Mexico	19 267	16 973	14 102	16 781
Mean	15 243	15 023	11 203	13 726
LSD (0.05)	2144	2910	4297	2623

*

Not harvested in 1996.

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

Date Applied	Fertilizer Type	Rate Applied (#/AC)
4-08-96	Murate of Potash	83.25
	Ammonium Nitrate	147
5-22-96	Murate of Potash	83.25
	Ammonium Nitrate	147
7-09-96	Murate of Potash	83.25
	Ammonium Nitrate	147
8-27-96	Murate of Potash	83.25
	Ammonium Nitrate	147
Total 1996	*Murate of Potash*	*333*
	Ammonium Nitrate	*588*

3-13-97	Murate of Potash	83.25
	Ammonium Nitrate	147
5-20-97	Murate of Potash	83.25
	Ammonium Nitrate	147
7-15-97	Murate of Potash	83.25
	Ammonium Nitrate	147
9-04-97	Did not apply any fertilizer	
Total 1997	*Murate of Potash*	*249.75*
	Ammonium Nitrate	*441*
3-25-98	Murate of Potash	83.25
	Ammonium Nitrate	147
6-17-98	Murate of Potash	83.25
	Ammonium Nitrate	147
7-29-98	Murate of Potash	83.25
	Ammonium Nitrate	147
9-10-98	Murate of Potash	83.25
	Ammonium Nitrate	147
10-20-98	None applied at last clipping	0
Total 1998	*Murate of Potash*	*333*
	Ammonium Nitrate	*588*

Entries with lower DM yield not represented by chemical analysis

TABLE 7 - PERCENT PROTEIN OF EASTERN GAMAGRASS ENTRIES BY HARVEST DATE AT JIMMY CARTER PMC 1996

	HARVEST DATES		
Entry	**5/22**	**7/9**	**8/27**
Montgomery	8.25	6.175	8.375
Williamsburg	11.475	6.05	6.775
Nacogdoches	-	-	-
Jackson	9.70	5.475	6.875
Medina	-	-	-
Hays	10.70	5.70	8.70
New Mexico	9.925	6.60	7.00
ARK 1	9.275	5.775	7.85
ARK 2	11.075	6.125	6.50
ARK 3	-	-	-
FLR 1	-	-	-
FLR 2	-	-	-
FLR 3	10.70	5.50	7.425
Pete	10.40	5.95	8.875
LSD (0.05)	NS	NS	1.454
CV (%)	14.78	17.04	13.12

TABLE 8- PERCENT PROTEIN OF EASTERN GAMAGRASS ENTRIES BY HARVEST DATE AT JIMMY CARTER PMC 1997

	HARVEST DATES		
Entry	**5/20**	**7/15**	**9/4**
Montgomery	7.425	7.95	8.025
Williamsburg	9.375	6.825	7.45
Nacogdoches	-	-	-
Jackson	6.625	6.225	6.625
Medina	6.55	6.375	6.125
Hays	7.55	7.50	7.775
New Mexico	6.225	6.90	6.625
ARK 1	6.825	6.85	7.95
ARK 2	-	-	-
ARK 3	-	-	-
FLR 1	-	-	-
FLR 2	7.10	5.775	6.30
FLR 3	7.00	6.575	6.40
Pete	5.875	9.525	9.80
LSD (0.05)	1.196	.8559	1.207
CV (%)	11.68	8.37	11.39

TABLE 9 PERCENT ADF OF EASTERN GAMAGRASS ENTRIES BY HARVEST DATE AT JIMMY CARTER PMC 1996

	HARVEST DATES		
Entry	**5/22**	**7/9**	**8/27**
Montgomery	38.75	41.75	40.00
Williamsburg	36.25	42.75	43.50
Nacogdoches	-	-	-
Jackson	35.75	40.25	38.50
Medina	-	-	-
Hays	38.00	42.75	41.50
New Mexico	38.75	42.00	42.50
ARK 1	35.75	40.75	41.25
ARK 2	36.50	41.50	41.75
ARK 3	-	-	-
FLR 1	-	-	-
FLR 2	-	-	-
FLR 3	35.75	45.25	43.75
Pete	37.75	41.00	44.25
LSD (0.05)	1.735	2.496	NS
CV (%)	3.21	4.07	9.36

TABLE 10 - PERCENT NDF OF EASTERN GAMAGRASS ENTRIES BY HARVEST DATE AT JIMMY CARTER PMC 1996

	HARVEST DATES		
Entry	**5/22**	**7/9**	**8/27**
Montgomery	70.50	72.25	67.76

Williamsburg	69.25	72.50	69.75
Nacogdoches	-	-	-
Jackson	66.00	71.00	69.50
Medina	-	-	-
Hays	69.50	73.75	70.00
New Mexico	74.00	73.25	70.25
ARK 1	68.00	70.25	68.00
ARK 2	71.25	73.50	71.50
ARK 3	-	-	-
FLR 1	-	-	-
FLR 2	-	-	-
FLR 3	70.00	75.50	71.50
Pete	69.00	73.00	69.00
LSD (0.05)	NS	1.956	2.261
CV (%)	4.79	1.84	2.22

TABLE 11- PERCENT ADF OF EASTERN GAMAGRASS ENTRIES BY HARVEST DATE AT JIMMY CARTER PMC 1997

	HARVEST DATES		
Entry	**5/20**	**7/15**	**9/4**
Montgomery	40.25	40.00	39.25
Williamsburg	35.00	42.00	40.00
Nacogdoches	-	-	-
Jackson	39.50	42.25	40.75
Medina	37.75	41.00	40.75
Hays	39.50	42.25	40.50
New Mexico	41.00	43.00	41.00
ARK 1	39.00	40.75	39.00
ARK 2	-	-	-
ARK 3	-	-	-
FLR 1	-	-	-
FLR 2	39.25	42.00	43.25
FLR 3	39.50	42.50	42.75
Pete	40.75	37.25	36.00
LSD (0.05)	1.964	2.152	1.719
CV (%)	3.46	3.59	2.94

TABLE 12- PERCENT NDF OF EASTERN GAMAGRASS ENTRIES BY HARVEST DATE AT JIMMY CARTER PMC 1997

	HARVEST DATES		
Entry	**5/20**	**7/15**	**9/4**
Montgomery	70.75	71.25	70.75
Williamsburg	69.75	73.50	71.25
Nacogdoches	-	-	-
Jackson	71.75	73.00	70.75
Medina	71.50	71.00	69.75
Hays	70.75	71.75	70.50

New Mexico	72.25	73.00	72.25
ARK 1	69.50	71.00	68.75
ARK 2	-	-	-
ARK 3	-	-	-
FLR 1	-	-	-
FLR 2	70.75	74.25	72.50
FLR 3	72.25	73.75	74.00
Pete	72.25	71.75	69.25
LSD (0.05)	1.777	1.213	1.503
CV (%)	1.72	1.15	1.46

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 June and July, 1996, 40 cows with calves, flash grazed this field for four days.

In June and July, 1997, 15 heifers averaging 650 lbs each were allowed to graze this field with free access at anytime. The heifers were moved to another pasture the first of August and on August 4 the pasture was mowed to a 10" height. On August 28 several basal axillary buds were observed sprouting. Also sprouting occurred from axillary buds on culms at the node. The majority of regrowth was from basal axillary buds and no intercalary merestematic growth was observed.

In 1999, we hope to demonstrate rotational grazing utilizing electric fencing, stockers, and GLA techniques.

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 and eventually species frequency and dry matter production. This will be 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, percent species composition was recorded for each burn regime plot. (Table 1) Starting in 1999, burn #1 plots will be burned every year and burn #2 plots will be burned every two years. The data from Table l will be used to track changes in species composition and frequency over time.

TABLE 1 - PERCENT SPECIES COMPOSITION BY TRANSECT - 10-15-98

BURN REGIME #2

PLOT	**MEAN COMPOSITION %**	
Big Bluestem	Big Bluestem	28.6
	Bahiagrass	52.9
	Sand Blackberry	1.4
	Crabgrass	16.6
	Little Bluestem	.5
Little Bluestem/Serala	Little Bluestem	21.6
	Bahiagrass	20.2
	Serala	57.7
	Crabgrass	.5
Coastal Bermudagrass	Bahiagrass	80.9
	Sand Blackberry	8.1
	Crabgrass	8.5
	Big Bluestem	1.4
Cave-In-Rock Switchgrass	Cave-In-Rock	28.4
	Sand Blackberry	9.5
	Bahiagrass	56.8
	Crabgrass	5.3
Pensacola Bahiagrass	Bahiagrass	95.7
	Crabgrass	3.3
	Sand Blackberry	1.0
Little Bluestem, Big Bluestem, Indiangrass, Switchgrass	Big Bluestem	2.4
	Indiangrass	42.1
	Cave-In-Rock	9.8
	Little Bluestem	15.7
	Bahiagrass	26.5

	Sand Blackberry	1.5
	Crabgrass	2.4

BURN REGIME #1

PLOT	MEAN COMPOSITION %	
Pensacola Bahiagrass	Bahiagrass	94.7
	Crabgrass	5.2
Little Bluestem, Big Bluestem, Indiangrass, Switchgrass	Indiangrass	41.7
	Cave-In-Rock	13.3
	Little Bluestem	13.1
	Bahiagrass	25.1
	Sand Blackberry	3.3
	Crabgrass	2.9
	Big Bluestem	.5
Cave-In-Rock Switchgrass	Cave-In-Rock	34.5
	Sand Blackberry	11.7
	Bahiagrass	48.9
	Crabgrass	1.9
	Bare ground	2.9
Coastal Bermudagrass	Bahiagrass	83.0
	Sand Blackberry	11.8
	Cave-In-Rock	.5
	Crabgrass	1.4
Little Bluestem/Serala	Little Bluestem	21.0
	Serala	51.7
	Bahiagrass	26.3
	Sand Blackberry	1.0
Big Bluestem	Big Bluestem	15.1
	Bahiagrass	70.9
	Crabgrass	14.0

LIST OF PUBLICATIONS IN 1993 - 1998 - JIMMY CARTER PLANT MATERIALS CENTER TEAM AND COOPERATORS

"Measures for Stabilizing Coastal Dunes". Publication of USDA-NRCS. 14 pages (1993). D.E. Surrency

"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, Rodrogo 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, and S. Roach.

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"AU GroundCover: New Caley Pea, A Boom 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 EarlyCover: A Full Benefit Cover Crop". Highlights of Agricultural Research, Vol. 41, No. 4, Winter 1994. Jorge Mosjidis, 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 GroundCover' Caley Pea. Progressive Farmer, Feb. 1995, p. 29 and p. 112.

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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.

Registration of 'AU GroundCover' Caley Pea. Crop Science 36:207 (1996). J.A. Mosjidis, C.M. Owsley, M.S. Kirkland, and K.M. Rogers.

Presentation of 'New Legume Cultivars for Conservation Tillage'. Southern Association of Agricultural Scientists, Greensboro, N.C. Feb. 3-7, 1996. C.M. Owsley and M.S. Kirkland.

'AU EarlyCover' and 'AU GroundCover': New Forage Legume Cultivars. Proceedings of the Fourteenth Trifolium Conference, Lexington, Kentucky. May 21-23, 1996. J.A. Mosjidis, C.M. Owsley, M.S. Kirkland, and K.M. Rogers.

1995 Annual Popular Report - PMC staff.

1995 Annual Technical Report - PMC staff.

"Guidelines for Establishing Aquatic Plants in Constructed Wetlands". Publication of USDA-NRCS and Ft. Valley State College, 9 pages (1996). D.E. Surrency, C.M. Owsley, and M. Latimore.

"Flageo Marshhay Cordgrass - A Special Grass for Special Conservation Needs". Publication of Ft. Valley State College, 8 pages (1996). M. Latimore, D.E. Surrency, and B.A. Lilja.

1996 Annual Popular Report - PMC staff.

1996 Annual Technical Report - PMC staff.

Presentation of "Inter-Center Strain Trial of Eastern Gamagrass at the Jimmy Carter PMC". Southern Association of Agricultural Scientists, Birmingham, Ala., Feb. 1-5, 1997. C.M. Owsley and M.S. Kirkland.

1997 Annual Technical Report - PMC staff

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Performance of Eastern Gamagrass (*Tripsacum dactyloides*) at the Jimmy Carter Plant Materials Center, Americus, Georgia, Technical Guide Note No. GA101 450-VI, Surrency, E.D., C.M. Owsley, M.S. Kirkland, and S.B. Brantly, 6 pages.

'AU Sunrise': A New Early Flowering Crimson Clover. Proceedings of the Fifteenth Trifolium Conference, Madison, Wisconsin. June 10-12, 1998. Mosjidis, J.A., C.M. Owsley, M.S. Kirkland, and K.M. Rogers.

"Plant Materials for the Wildlife Habitat Incentives Program (WHIP)". Publication of USDA-NRCS. 29 pages (June 1998). Surrency D., C. Maura, S. Sanders, J. Douglas, C. Owsley.

Plant Materials Specialist Report. Progress Report of USDA-NRCS. 14 pages (June 2, 1998). Donald Surrency.

SEED AND PLANT PRODUCTION IN 1998

SEED

NAME	POUNDS
'Americus' hairy vetch	161
Indiangrass	550

PLANTS

NAME	EACH
'Wetlander' giant cutgrass	` 500
'Restorer' giant bulrush	1500
'Big O' crabapple	270
'Ellagood' autumnolive	100
Ogeechee lime	140
Flageo' marshhay cordgrass	10,000
Sharp' marshhay cordgrass	5,000

'Sumter Orange' daylily	1,000
'Bankers' willow	240
Sawtooth oak 'Gobbler'	150
Big Bluestem	251
Vetiver	5,000
Eastern Gamagrass 'Pete'	1,000
'Alamo' switchgrass	2,000
'Halifax' maidencane	500
Arundo donax	4,000

SEED AND VEGETATIVE STOCK PRODUCERS

CROP	**PRODUCER**
Trifolium vesiculosum 'Amclo' Arrowleaf Clover	Georgia Crop Improvement Association 2425 S Milledge Ave 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	Georgia Crop Improvement Association

'Dove' Proso Millet	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
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
Dr. Mark Latimore	
	School of Agriculture Fort Valley State University Ft. Valley, GA 31030
	William Smith Rt. 2, Box 94A Wigham, GA 31719
Spartina patens (Continued) 'Flageo' Marshhay Cordgrass	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	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 - 1998

JANUARY

22	WHIP Training

FEBRUARY

18	N. LEAP
26	Conservation Tillage

MARCH

3-5	Water Quality

APRIL

14-15	RUSLE Training
21-24	Wetland Training
30	Area Staff Meeting

MAY

19	Composter Training
20-21	Peanut Short Course

JUNE

1-5	Conservation Skills
24	Satellite Broadcast - Civil Rights

AUGUST

3-7	FOCS
17	Civil Rights Satellite Broadcast
18-21	Train the Trainer

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.