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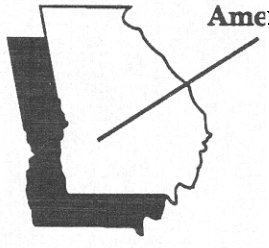
Americus Plant Materials Center

1993

A Technical Summary of Plant Materials Projects at the Americus Plant Materials Center



P R E F I X

Information about the Americus Plant Materials Center, such as purpose, history, climate data, MLRA's served, problems and priorities can be found in the 1992/1993 Annual Report.

AMERICUS PLANT MATERIALS CENTER

AMERICUS, GEORGIA

Annual Technical Report
1993

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PROJECT 13A114R - DETERMINATION OF FORAGE QUALITY AND QUANTITY OF SELECTED INDIANGRASS

INTRODUCTION

Indiangrass (Sorghastrum nutans) is a native warm season perennial grass. It has been utilized in the Midwestern United States as a forage for many decades. However, no Southeastern United States cultivar is available. This project attempts to compare a composite of four southeastern ecotypes (Americus PMC) to several standard indiangrass cultivars.

MATERIALS AND METHODS

The test compared the Americus PMC cultivar to widely used indiangrass cultivars called 'Lometa' and 'Rumsey'. Pensacola bahiagrass was included in the test as a check.

The test was established at the Americus PMC in May 1990. All treatments were hand seeded at 10# PLS/AC to six replications in RCB design.

Plots were harvested in July and at heading. Dry matter production and percent ground coverage of each treatment were measured. IVDMD determination was conducted on some samples. Each spring and fall stem counts were recorded.

Similar tests were conducted in Athens, Georgia on low and high fertility sites by University of Georgia Professor Dr. Joe Bouton.

RESULTS AND DISCUSSION

The low fertility test at Athens indicates that the APMC cultivar produced significantly more dry matter (Kg/ha) than Rumsey in (1989-1991). The Apmc cultivar also produced a significantly higher IVDMD value than Rumsey in 1989-1990. The same data indicates that the APMC produced more dry matter than Lometa in 1989-1991 but not at a significant level.. However, the APMC did produce a significantly higher IVDMD value than Lometa in 1989-1990. The low fertility site also indicates that the indiangrass entries, especially the APMC cultivar, increased dry matter production each year from 1989-1991. (Tables 3-7)

The high fertility test at Athens indicates that over two years (1990-1991) the July clipping of APMC cultivar produced significantly more yield (Kg/ha) than Rumsey. It also produced a higher yield than Lometa but not at a significant level. The clipping yield at heading shows that APMC produced significantly higher yield than Rumsey. However, Lometa produces significantly higher yield than APMC at heading. The total yield data (July and heading clippings) indicates that the APMC produces significantly more yield than Rumsey. The APMC entry produced a higher yield than Lometa also, but not at a significantly higher level. (Tables 8-10)

The Americus PMC test indicates that in the *1991* July and heading clippings, the APMC entry produced more yield (Kg/ha) than Rumsey and Lometa, but not at a significant level (LSD *5%).* The total yield data (July and heading clipping) indicates that APMC produced significantly (LSD 10%) more yield than Rumsey. APMC also produced more yield than Lometa but not at a significant level. (Table 11)

In *1992* at Americus the total dry matter yield was highest for Lometa. However there was no significant difference between APMC and Lometa. Also there was no significant difference between Rumsey and Americus. (Table *12)*

In *1993* at Americus it appears that dry matter yield is highest for Lometa July and heading. (Table *13)* This appears to be supported by a lower stem count and percent coverage of APMC compared to Lometa. (Table 1 & *2)*

It appears that APMC cultivar shows a greater potential in the Athens, Georgia tests than in the Americus, Georgia tests. This would be especially true in the low fertility tests at Athens.

TABU 1 AMERICUS PMC STEM COUNT DATA (1990-1993)

Cultivar	Stem Count						Mean Stem Count	Stem Count 1' x 1'
APMC	*19*	*55*	*44*	*20*	*39*	*19*	*33*	
Pen. Bahia	50	*45*	*60*	*45*	55	*45*	*50*	*9-13-90*
Rumsey	*19*	*40*	*12*	*19*	**15**	*2*	*18*	
Lometa	*52*	*42*	*46*	*39*	*48*	*24*	*42*	
APMC	*43*	*88*	*97*	*98*	*64*	*65*	*76*	
Pen. Bahia	*50*	*60*	*60*	*64*	*47*	*60*	*57*	*5/17/91*
Rumsey	*38*	***55***	*24*	*35*	*54*	*47*	*42*	
Lometa	*82*	*78*	*80*	*71*	*57*	*140*	*85*	
APMC	*39*	*54*	*46*	*25*	*79*	*69*	*52*	
Pen. Bahia	121	*78*	*138*	*96*	*105*	*121*	*110*	9/30/91
Rumsey	*38*	81	*80*	*56*	*61*	51	*61*	
Lometa	*45*	*78*	*81*	*73*	*77*	*20*	*62*	
APMC	*42*	*36*	*56*	*28*	*41*	*54*	*43*	
Pen. Bahia	*67*	*39*	*46*	*58*	**61**	*89*	*60*	*5/21/92*
Rumsey	*40*	*47*	*18*	*36*	55	*49*	*41*	
Lometa	*53*	*59*	51	*65*	*48*	*21*	*50*	
APMC	*24*	*29*	*30*	*28*	*36*	*49*	*33*	
Pen. Bahia	*51*	*59*	*38*	*62*	*38*	*66*	*52*	10/6/92
Rumsey	*25*	*27*	15	*22*	*50*	*21*	*27*	
Lometa	*28*	*30*	*27*	*41*	*46*	*32*	*34*	

TABLE 1 (Continued)

Cultivar	Stem Count						Mean Stem Count	Stem Count 1' X 1'
APMC	39	32	33	62	24	26	36	
Pen. Bahia	36	43	39	29	48	37	39	5/10/93
Rumsey	51	26	43	21	41	28	35	
Lometa	37	29	24	38	62	49	40	
APMC	40	40	36	52	19	24	35	
Pen. Bahia	67	46	40	66	47	46	52	9/15/93
Rumsey	53	28	39	26	32	30	35	
Lometa	46	40	22	40	74	69	49	

TABLE 2 AMERICUS PMC % GROUND COVERAGE DATA (1991-1993)

Cultivar	% Ground Coverage						Mean	
APMC	90	95	95	95	90	85	92	
Pen. Bahia	95	95	95	95	90	95	94	7/15/91
Rumsey	75	95	75	80	90	75	82	
Lometa	80	80	85	90	80	90	84	
APMC	70	60	70	50	80	70	67	
Pen. Bahia	75	80	80	75	80	80	78	9/30/91
Rumsey	50	45	45	45	70	50	51	
Lometa	65	75	80	75	85	45	71	
APMC	70	65	70	65	80	70	70	
Pen. Bahia	70	70	75	75	75	80	74	7/15/92
Rumsey	60	60	60	60	70	60	62	
Lometa	75	70	80	70	85	70	75	
APMC	45	50	60	60	55	45	53	
Pen. Bahia	75	75	80	80	75	85	78	9/17/92
Rumsey	45	45	45	45	50	40	45	
Lometa	70	70	75	80	75	60	72	
APMC	75	65	70	70	55	65	67	
Pen. Bahia	60	80	50	80	70	75	69	7/14/93
Rumsey	75	75	45	60	60	65	63	
Lometa	70	85	70	80	80	80	77	
APMC	70	65	75	60	40	55	61	
Pen. Bahia	80	85	75	85	75	75	79	9/15/93
Rumsey	70	55	35	45	45	50	50	
Lometa	80	85	80	80	80	75	80	

Summary and analysis of data *(1989-1993)* taken from Athens and Americus, Georgia for forage yield and quality determination.

TABLE3 LOW FERTILITY SITE YIELD & IVDMD DATA TAKEN AT READING ATHENS, GEORGIA TEST (1989)

Cultivar	Mean D.M. Yield(Kg/Ha)	Mean IVDMD Value
APMC	*1110*	*479.66*
Pen. Bahia	*364.5*	*502.96*
Rumsey	*276.66*	*435.08*
Lometa	*911.66*	*475.36*
LSD *(5%)*	*297.5*	*31.1*

TABLE 4 LOW FERTILITY SITE YIELD & IVDMD DATA TAKEN AT HEADING ATHENS, GEORGIA TEST (1990)

Cultivar	Mean D.M. Yield(Kg/Ha)	Mean IVDMD Value
APMC	*4599.66*	*522.26*
Pen. Bahia	*2025.16*	*442.15*
Rumsey	*3351.83*	*414.73*
Lometa	*4143.66*	*440.55*
LSD (5%)	*1104.5*	*46.2*

TABLE 5 LOW FERTILITY SITE YIELD DATA TAKEN AT READING ATHENS, GEORGIA TEST (1991)

Cultivar	Mean D.M. Yield(Kg/Ha)
APMC	*5471.5*
Pen. Bahia	*2636.83*
Rumsey	*3585*
Lometa	*4677.33*
LSD *(5%)*	*1032.9*

TABLE *6* LOW FERTILITY SITE YIELD & IVDMD DATA TAKEN AT HEADING ATHENS. GEORGIA TEST (1989-1990)

Cultivar	Mean D.M. Yield(Kg/Ha)	Mean IVDMD Value
APMC	*2854.83*	*500.96*
Pen. Bahia	*1194.83*	*472.55*
Rumsey	*1814.25*	*424.90*
Lometa	*2527.66*	*457.95*
LSD *(5%)*	*548.1*	*26.7*

TABLE 7 LOW FERTILITY SITE YIELD DATA TAKEN AT HEADING

ATHENS, GEORGIA TEST (1989–1991)

Cultivar	Mean D.M. Yield(Kg/Ha)
APMC	3727.05
Pen. Bahia	1675.50
Rumsey	2404.50
Lometa	3244.22
LSD (5%)	1005.9

TABLE 8 HIGH FERTILITY SITE YIELD & IVDMD DATA

ATHENS, GEORGIA TEST (1990)

Cultivar	Mean D.M. Yield(Kg/Ha) Taken in July	Mean IVDMD Value From July Clipping
APMC	3217.00	499.78
Pen. Bahia	2220.66	519.10
Rumsey	1750.66	550.25
Lometa	2574.33	469.93
LSD (5%)	865.1	48.2

	Mean D.M. Yield(Kg/Ha) Taken at Heading	Mean IVDMD Value From Heading Clipping
APMC	3905.83	468.81
Pen. Bahia	2658.33	528.35
Rumsey	2583.83	511.06
Lometa	4748.50	464.30
LSD (5%)	1117.3	39..4

	Total Mean D.M. Yield(Kg/Ha) From July and Heading Clipping
APMC	7122.83
Pen. Bahia	4879.00
Rumsey	4334.50
Lometa	7322.83
LSD (5%)	1660.2

TABLE 9 **HIGH** FERTILITY SITE YIELD DATA

ATHENS, GEORGIA TEST (1991)

Cultivar	Mean D.M. Yield(Kg/Ha) Taken in July
APMC	8929.16
Pen. Bahia	4157.50
Rumsey	5218.83
Lometa	7374.16
LSD (5%)	2097.3

	Mean D.M. Yield(Kg/Ha) Taken at Heading
APMC	3206.66
Pen. Bahia	2678.33
Rumsey	2328.50
Lometa	3791.83
LSD (5%)	828.9

	Total Mean D.M. Yield(Kg/Ha) from July and Heading Clipping
APMC	12,135.83
Pen. Bahia	6,836.33
Rumsey	7,547.33
Lometa	11,166.00
LSD (5%)	2,652.7

TABLE 10 HIGH **FERTILITY** SITE YIELD DATA

ATHENS, GEORGIA TEST (1990-1991)

Cultivar	Mean D.M. Yield(Kg/Ha) Taken in July
APMC	6073.08
Pen. Bahia	3189.08
Rumsey	3484.75
Lometa	4974.25
LSD (5%)	2373.8

	Mean D.M. Yield(Kg/Ha) Taken at Heading
APMC	3556.25
Pen. Bahia	2668.58
Rumsey	2456.16
Lometa	4270.16
LSD (5%)	666.5

	Total Mean D.M. Yield(Kg/Ha) from July and Heading Clipping
APMC	9,629.33
Pen. Bahia	5,857.66
Rumsey	5,940.91
Lometa	9,244.41
LSD (5%)	1.499.4

TABLE 11 AMERICUS PMC YIELD DATA TEST (1991)

Cultivar	Mean D.M. Yield(Kg/Ha) Taken in July
APMC	4233.33a
Pen. Bahia	2040.00b
Rumsey	2936.66b
Lometa	3476.66ab
LSD (5%)	1583.5

Cultivar	Mean D.M. Yield(Kg/Ha) Taken at Heading
APMC	1516.66
Pen. Bahia	1683.33
Rumsey	1136.66
Lometa	1320.00
LSD (5%)	411.9

Cultivar	Total Mean D.M. Yield(Kg/Ha) from July & Heading Clipping
APMC	5750.00a
Pen. Bahia	3723.33b
Rumsey	4073.33ab
Lometa	4796.66ab
LSD (10%)	1435.5

TABLE 12 AMERICUS PMC YIELD DATA TEST (1992)

Cultivar	Mean D.M. Yield(Kg/Ha) Taken in July
APMC	926.67a
Pen. Bahia	406.67b
Rumsey	916.67a
Lometa	1236.67a
LSD (5%)	355

Cultivar	Mean D.M. Yield(Kg/Ha) Taken at Heading
APMC	690.00
Pen. Bahia	593.33
Rumsey	425.00
Lometa	663.33
LSD (5%)	N.S.

Cultivar	Total Mean D.M. Yield(Kg/Ha) from July & Heading Clipping
APMC	1616.67ab
Pen. Bahia	1000.00c
Rumsey	1341.67bc
Lometa	1900.00a
LSD (5%)	473

TABLE 13 AMERICUS PMC YIELD DATA TEST (1993)

Cultivar	Dry Matter Production (Kg/Ha)						Mean	Date
APMC	960	820	480	400	560	620	640	
Pen. Bahia	440	520	100	180	220	320	297	7/14/93
Rumsey	1040	1080	280	340	620	600	660	
Lometa	800	1700	440	500	840	680	827	
APMC	620	760	620	660	340	360	560	
Pen. Bahia	440	840	420	460	480	460	517	**9/15/93**
Rumsey	640	460	280	280	220	440	387	(Heading)
Lometa	660	900	760	880	680	680	760	

PROJECT 13I128R - **ASSEMBLY** ANJJ **EVALUATION** OF BIG BLUESTEM ANDROPOGON **GERARDII**

INTRODUCTION

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

MATERIALS *AND* METHODS

In 1989/1990 the Americus PMC assembled 750 vegetative ecotypes of southeastern big bluestem. These ecotypes were placed into an initial evaluation block. Each entry was planted to 10 foot rows with one foot between clones. All entries were separated by three foot middles. Each entry was replicated twice.

In 1990/1991 the evaluation process began. The following were the evaluation criteria: 1) vigor, 2) stem color, 3) inflorescence color, *4)* foliage amount, 5) foliage height (cm), 6) foliage color, 7) forage potential, 8) disease/insect resistance, 9) boot date, bloom date, maturity date, 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 (Auburn University) began a cooperative big bluestem study with the Americus PMC. The following criteria were added to the existing evaluation process: percent stand, forage mass, greening up date, biomass at flowering (green weight and dry weight), surface area of plot, and morphological data.

In June 1993, four pairs of cow/calf units were allowed to graze the big bluestem evaluation area. Cattle were removed and Dr. van Santen evaluated the preference of cattle for specific ecotypes. After regrowth, cattle were again allowed to graze the vegetation down to 8" stubble residues. Dr. van Santen's data is being processed and will help determine which ecotypes will be selected for a crossing block in 1994. This block should produce germplasm for forage comparison testing against a standard big bluestem cultivar.

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

INTRODUCTION

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

MATERIALS *AND* METHODS

In 1990-1992 the Americus PMC assembled 1098 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 three foot middles. Each entry was replicated twice.

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

Panicum virgatum - Switchgrass

State Collected	County
Georgia	Baker
	Brooks
	Calhoun
	Chattahoochee
	Colquitt
	Coweta
	Crisp
	Decatur
	Early
	Emanuel
	Grady
	Greene
	Harris
	Heard
	Jasper
	Jenkins
	Lee
	Lowndes
	Marion
	Meriwether
	Miller
	Mitchell
	Monroe
	Morgan
	Muscogee
	Putnam
	Randolph
	Seminole
	Schley
	Stewart
	Sumter
	Taylor
	Telfair
	Terrell
	Thomas
	Troup
	Upson
	Webster
	Wilcox

//

Panicum virgatum - Switchgrass

State Collected	County
Alabama	Autauga
	Bullock
	Chambers
	Cherokee
	Chilton
	Cleburne
	Dallis
	DeKalb
	Elmore
	Greene
	Hale
	Jackson
	Lawrence
	Lee
	Macon
	Morgan
	Perry
	Pickens
	Russell
	Sumter
	Tuscaloosa
Arkansas	Lafayette
	Prairie
	Union
Mississippi	Calhoun
	Yalobusha

Alamo	1 - Standard
Trailblazer	1 - Standard
Cave In Rock	1 - Standard
Blackwell	1 - Standard
Pangburn	1 - Standard
Kanlow	1 - Standard

PROJECT - 13A132M - SCREWING OF CALEY PEA GERMPLASM FOR CONSERVATION TILLAGE

INTRODUCTION

Caley pea (Lathyrus hirsutus L.) is an introduced cool season legume from the Mediterranean region. In the Southeastern United States, caley pea has been utilized as a cattle forage as well as a cool season cover crop. Caley pea is mostly grown on wet clays of the lower Mississippi Delta area and on calcareous clays of the Alabama and Mississippi Black Belt. Currently there are no caley pea cultivars available and most commercial seed is a mixture of caley pea and hairy vetch.

The objective of this work was to make an evaluation of the variability within a selected group of caley pea entries for several agronomic traits with the purpose of developing a caley pea cultivar.

MATERIALS AND METHODS

In 1983, the Soil Conservation Service, Plant Materials Center, at Americus, Georgia planted caley pea seeds from 150 ecotypes collected from fields and roadsides in central and north Alabama and four foreign entries. This collection was grown in Americus, Georgia where they were screened for adaptation, growth, winter hardiness, reseeding ability and seed production.

In 1989, testing of 19 selected caley pea ecotypes was conducted in Georgia (Americus PMC) and Alabama (Winfield, Belle Mina, Marion Junction, Tallassee, and Monroeville). All entries were not evaluated in all locations because of limitations in the amount of available seed. The experimental design was a randomized complete block with four replications in each location. Fertilizers were applied according to soil test recommendations.

The plots were harvested individually when 75% of the plants were blooming. At that time, flowering date, canopy height measured at three places in the plot, and biomass fresh and dry yields were measured. Analyses of variance were performed to measure the response of the entries at each location. Maturity was measured as number of days to flowering date starting from April 1. (Refer to 1991 ATR)

In October 1991 similar testing of 23 caley pea ecotypes was begun at the Americus PMC in Georgia and the Tallassee, Winfield, Belle Mina, Marion Junction and Monroeville Experiment Stations in Alabama. The Americus work was conducted by the Soil Conservation Service, the Alabama sites and analysis was conducted by Dr. Jorge Mosjidis (Auburn University). (Refer to 1992 ATR)

In October 1992 ecotypes 9054235, 9048915 and 9039828 were dropped from the test. These ecotypes were replaced by the following combinations: (C1) 9052102 & 9052088, (C2) 9052101 & 9053012, (C3) 9052101, 9053012, 9054221 (lines with highest mean yield at six locations), 9052102 and 9052088 (among 20% top lines at three locations).

RESULTS AND DISCUSSION

Table one indicates that the mean yield of caley pea lines for 1992/1993 at six locations (Tallassee, Americus, Winfield, Belle Mina, Marion Junction, and Monroeville) contains no significant difference between lines tested. Tables two - six show no real difference exists between the canopy height, bloom date and crude protein data. Also all lines appear to be susceptible to various nematode infestations. (Table 7)

After data analysis it was decided to attempt a cooperative release between Auburn University and Soil Conservation Service. A caley pea composite of 9052101, 9053012, 9054221, 9052102 and 9052088 will be the germplasm for release. An increase field of this material was planted in October 1993 at the Americus PMC.

Table 1. Mean yield of caley pea accessions and hairy vetch at six locations in 1992 and 1993.

Accession	1992	1993
	----- g m^{-2} -------	
c3	---*	329.9
48912	292.3	313.5
c2	---	328.2
52084	283.2	306.5
52085	305.6	327.6
52086	315.1	371.1
52088	313.2	364.5
52097	301.5	336.9
52099	295.2	369.7
52101	---	333.8
52102	326.4	351.8
52658	294.9	330.9
52660	302.4	428.4
52969	306.0	334.9
52970	320.2	314.7
53011	317.2	321.0
53012	353.4	336.8
54213	311.8	343.6
54214	295.2	358.9
54223	299.9	338.7
54221	332.7	381.6
C1	---	326.4
54241	294.5	330.7
Hairy V.	419.7	317.7
54235	279.4	---*
48915	270.7	---
39828	261.1	---
MSD	ns	ns

* Not tested

Table 2-Canopy height of caley pea accessions and hairy vetch at six locations in 1992.

Accession	Tallassee	Americus	Winfield	Belle Mina	Marion Junction	Monroeville	Mean
				cm			
53012	72.8	68.4	73.7	74.9	73.4	73.7	63.0
52085	60.1	73.2	67.3	69.9	73.5	76.2	70.0
53011	66.5	77.5	62.2	69.2	69.4	74.9	70.0
Hairy v.	64.6	73.0	70.3	87.6	63.5	57.2	69.3
52969	66.3	72.8	60.3	71.1	66.3	73.7	68.4
52088	57.4	69.4	70.5	72.4	73.4	67.3	68.4
52101	63.3	63.3	67.8	73.7	64.3	71.1	66.7
54235	64.1	66.7	65.4	67.3	69.7	66.0	66.4
52102	55.5	70.5	61.0	69.4	70.9	69.8	66.3
52086	57.2	62.4	65.4	74.9	64.3	73.0	66.2
54221	63.5	72.2	55.9	68.6	65.4	71.1	66.1
52097	55.6	68.4	57.2	73.0	67.5	69.2	65.6
54213	55.5	65.8	59.7	73.7	69.0	68.6	73.3
54214	58.8	64.6	61.0	67.3	68.6	70.5	65.1
52084	47.6	65.2	66.0	78.1	67.7	66.0	65.1
52970	61.0	65.8	54.0	68.6	66.9	71.1	64.6
52099	51.2	56.3	67.3	72.4	65.6	74.3	64.5
54241	58.2	66.9	56.5	71.1	66.7	66.0	64.2
39828	48.5	66.5	64.8	62.2	67.3	71.1	63.4
52658	59.5	68.2	51.4	68.6	66.5	66.0	63.4
54223	46.4	68.4	62.2	64.8	67.9	68.6	63.0
48912	50.8	61.2	66.7	68.6	66.0	64.8	63.0
52660	60.3	68.2	57.2	71.1	60.1	52.1	61.5
48915	55.6	56.9	51.4	63.5	53.8	67.3	54.8
NSD (.05)	11.8	ns	10.2	9.4	11.8	12.6	

Table 3- Canopy height of caley pea accessions and hairy vetch at six locations in 1993.

Accession	'Tallassee	Americus	Winfield	Belle Mina	Marion Junction	Honroeville	Mean
				cm			
C3	87.2	63.9	93.3	86.4	38.5	76.2	74.3
48912	87.8	52.3	73.7	73.7	29.8	82.6	66.6
C2	99.1	63.7	88.3	83.8	33.4	82.6	75.1
52084	92.7	64.3	88.9	80.6	33.9	82.6	73.8
52085	91.7	68.8	87.0	84.5	40.0	74.9	74.5
52086	85.1	49.5	85.1	78.1	38.7	85.1	70.3
52088	89.7	51.0	85.7	92.1	35.6	73.7	72.9
52097	72.2	62.2	85.1	87.0	37.7	80.0	70.7
52099	86.4	63.1	85.1	73.7	35.1	69.9	68.9
52101	80.9	63.7	88.3	84.5	35.8	71.1	70.7
52102	93.8	41.9	91.4	84.5	36.0	80.0	71.3
52658	90.6	53.3	90.2	87.0	44.2	82.6	74.6
52660	83.4	53.3	72.4	79.4	42.8	76.2	67.9
52969	81.3	62.9	80.0	81.9	40.0	72.4	69.7
52970	92.3	47.0	76.8	75.6	37.3	78.7	67.9
53011	96.7	57.8	83.2	81.3	38.7	80.0	73.0
53012	112.4	60.3	87.0	85.7	34.7	82.6	77.1
54213	87.4	67.3	76.8	84.5	34.5	72.4	70.5
54214	99.1	58.2	81.9	91.4	**39.6**	92.7	77.2
54223	82.6	63.5	83.8	85.7	37.0	73.7	71.0
54221	84.9	57.2	77.5	83.2	45.5	73.0	70.2
C1	88.7	50.8	80.6	80.0	36.4	76.2	68.8
54241	78.7	56.9	85.1	79.4	33.0	80.0	68.9
Hairy V.	61.4	56.3	50.2	68.6	46.1	61.0	57.3
MSD (.05)	12.0	20.6	15.6	15.5	7.6	11.7	

Table 4- Number of days to 75% bloom (counted from April 1) of caley pea accessions and hairy vetch at six locations in 1992.

Accession	Tallassee	Americus	Winfield	Belle Mina	Marion Junction	Monroeville	Mean
				d			
52660	35.0	37.0	44.0	41.3	37.0	28.3	37.1
53011	33.5	35.5	44.0	38.5	36.8	27.5	36.0
52658	33.3	37.0	44.0	41.0	30.0	28.0	35.5
48915	35.0	32.8	44.0	35.0	31.3	27.3	34.2
52970	27.0	34.8	44.0	38.8	32.8	25.0	33.7
Hairy v.	31.5	37.0	31.0	35.5	37.0	27.0	33.3
52969	29.8	33.5	39.0	38.3	32.0	26.0	33.1
52085	31.5	35.3	36.5	35.5	28.5	27.0	32.4
52102	26.8	32.3	44.0	35.0	31.0	24.8	32.3
54221	26.8	32.3	41.5	38.3	30.8	23.5	32.2
54241	26.0	34.0	41.5	34.5	29.0	22.8	31.3
54235	26.0	33.5	34.0	36.5	31.3	24.8	31.0
52099	29.8	30.3	39.0	35.5	26.5	24.8	31.0
52086	25.0	30.5	39.0	34.5	31.0	23.3	30.5
52101	25.0	31.8	34.0	35.5	29.0	26.5	30.3
54214	26.0	32.3	39.0	35.0	27.3	21.5	30.2
52088	24.3	32.3	39.0	34.8	27.8	21.3	29.8
54213	27.0	27.3	39.0	35.0	27.8	21.8	29.6
53012	23.0	31.5	36.5	34.5	24.0	24.3	29.0
54223	22.0	31.0	35.8	34.5	25.5	21.5	28.4
52084	23.0	27.3	33.0	34.5	29.0	21.3	27.8
52097	16.7	29.0	34.0	35.5	27.3	21.0	27.7
48912	20.0	27.0	31.8	34.0	25.3	17.3	25.9
39828	22.0	24.5	32.5	34.0	26.8	14.8	25.8
MSD (.05)	ns	ns	2.0	1.9	2.9	2.7	

Table 5- Number of days to 75% bloom (counted from April 1) of caley pea accessions and hairy vetch at six locations in 1993.

Accession	Tallassee	Americus	Winfield	Belle Mina	Marion Junction	Monroeville	Mean
				d			
c3	41.5	35.0	47.5	47.0	35.5	28.5	39.2
48912	41.5	34.8	40.8	47.0	28.5	26.0	36.4
c2	41.0	34.0	52.3	47.0	34.5	29.5	39.7
52084	41.0	34.5	47.5	47.0	30.8	26.8	37.9
52085	41.0	35.3	46.8	47.0	36.0	29.5	39.3
52086	41.0	34.0	46.8	47.0	41.0	28.3	39.7
52088	41.5	34.0	46.3	47.0	34.3	31.0	39.2
52097	41.5	34.5	46.8	47.0	42.5	30.8	40.5
52099	41.0	34.8	47.5	47.0	31.3	29.0	38.4
52101	41.0	35.0	49.5	47.0	32.0	31.0	39.3
52102	41.0	35.0	55.0	47.0	42.5	32.0	42.4
52658	42.0	34.8	44.0	49.3	41.0	35.0	41.0
52660	41.0	33.5	52.3	47.0	41.0	33.5	41.4
52969	41.5	33.5	47.5	47.0	37.0	32.5	39.8
52970	41.5	34.8	46.8	48.5	42.0	31.5	40.8
53011	41.5	35.5	44.8	47.0	40.5	33.5	40.5
53012	41.0	34.8	49.5	47.0	35.5	29.5	39.5
54213	41.0	35.3	49.3	47.0	42.5	27.8	40.5
54214	41.5	35.3	49.5	47.0	31.8	29.5	39.1
54223	41.0	33.0	46.5	47.0	42.0	28.5	39.7
54221	41.0	35.0	47.5	47.0	41.5	31.5	40.6
C1	41.0	35.5	44.0	47.0	31.5	31.0	38.3
54241	41.5	35.3	52.3	47.0	36.5	29.3	40.3
Hairy V.	41.0	38.5	36.0	47.0	40.0	28.0	38.4
MSD 1.05)	ns	1.2	ns	0.7	1.3	2.0	

Table 6-Crude protein content and production at Tallassee, Alabama, in 1992.

Accession	Content	Production
	%	g m^{-2}
52101	21.6	29.7
Hairy v.	25.1	60.9
53012	21.2	86.4
54221	21.1	30.9
52102	20.4	26.9
52970	20.3	27.4
53011	19.4	26.5
52086	21.1	28.5
52088	19.9	31.0
54213	22.0	34.4
52969	20.3	28.0
52085	20.0	28.3
52660	19.8	36.5
52097	20.0	25.8
54223	22.4	24.1
52099	20.0	21.9
54214	21.6	29.6
52658	20.4	25.7
54241	21.8	33.6
48912	21.0	26.1
52084	21.4	23.3
54235	22.4	33.3
48915	18.9	20.1
39828	21.6	23.5
MSD (.05)	2.6	ns

Table 7-Parametere of resistence to Meloidogyne arenaria race 2 and peterodera alvcines race 4 measured for 21 caley pea entries and 'Davis' soybean (experimental control) in an 8-week greenhouse experiment.

Entry	Overall plant growth: Shoot weight (g)	Overall plant growth: Root weight (g)	Overall plant growth: Root condition[x] (1-5)	M. arenaria: Gall rating[y] (0–10)	M. arenaria: Galls per gram of root	M. arenaria: Juveniles per gram of root	H. glycines: cysts per gram of root
Davis soybean	.60[z]	.85[z]	3.6'	4.3	65	3 599	59
Commercial hairy vetch	.11[z]	.15[z]	4.8'	6.6	298	4 472	0
Caley pea							
T 39828	.18	.21	4.0	5.4	203	203	0
T 48912	.20	.18	4.4	5.9	148	73	0
T 48915	.18	.13	3.8	3.4	123	196	0
T 52084	.15	.16	4.4	6.0	186	67	0
T 52085	.15	.12	4.6	7.3	131	69	0
T 52086	.12	.07	4.9	8.1	191	102	0
T 52088	.13	.09	4.9	7.8	145	565	0
T 52097	.17	.12	4.0	5.5	109	101	0
T 52099	.10	.54	4.8	6.8	236	559	0
T 52101	.11	.07	4.8	7.3	178	124	0
T 52102	.13	.12	4.3	6.7	151	264	0
T 52658	.11	.09	4.2	6.7	182	132	0
T 52660	.16	.13	4.8	7.2	161	1 220	0
T 52969	.15	.11	4.3	5.7	137	265	0
T 52970	.15	.14	4.3	6.5	122	217	0
T 53011	.16	.14	4.5	7.3	162	291	0
T 53012	.15	.11	4.5	6.6	120	312	0
T 54213	.12	.09	4.4	6.5	119	288	0
T 54214	.19	.13	4.1	4.7	88	113	0
T 54221	.15	.11	4.6	6.7	167	243	0
T 54223	.26	.09	4.5	6.3	141	70	0
T 54235	.18	.10	4.6	5.0	113	118	0
T 54241	.15	.07	4.0	3.6	98	369	0
LSD (0.05)	.06	.05	0.6	1.6	70	728	

[x] Root condition scale: 1 = best, 5 = worst.
[y] Gall rate scale: 0 = no galls, 10 = maximum galling.
[z] Data not included in the analysis.

PROJECT 13A137M - DEVELOPMENT AND COMPARATIVE TESTING OF EARLY BLOOMING HAIRY VETCH CULTIVAR FOR CONSERVATION TILLAGE

INTRODUCTION

Hairy vetch (Vicia villosa Roth.) is a cool season annual legume. It naturalized to the United States from Europe and Asia. It has been utilized as a cover crop for generations. An early blooming hairy vetch could provide for flexibility in future conservation tillage systems.

MATERIALS AND METHODS

In 1983 the Americus PMC began to collect and evaluate cool season legumes. One goal was to select and develop a new early blooming hairy vetch. In 1987, an early blooming hairy vetch, accession 9053961 was observed growing in the Americus PMC initial evaluation block. Seed from this accession was entered into a replicated breeding evaluation block. In 1990, seed from line 8, line 12 and line 26 was selected and harvested for further testing.

The first test measured the dry matter and canopy height of the three hairy vetch lines plus a commercial hairy vetch and PI-383803. The test was planted to a RCB design with four replications at Americus PMC and five Alabama sites (Dr. Mosjidis, Auburn University). Each plot in the test was clipped during the first week in April.

The second test measured the reseeding ability of lines 8, 12 and 25 and commercial hairy vetch and PI-383803. These plots were sprayed with herbicide and disced, then measurements of ground cover, forage yield, bloom date and foliage height will be taken. These measurements will give a quantitative reading for reseeding ability. This test was planted in a RCB design with four replications at Americus PMC and five Alabama sites (Dr. Mosjidis, Auburn University).

The third test measured the dry matter, canopy height and blooming time of the three hairy vetch lines plus a commercial hairy vetch and PI-383803. The test was similar to the first test except clipping time was at 75% bloom of each plot. This test was established at Americus PMC and Tallassee Alabama (Dr. Elosjidis, Auburn University).

In October 1992 a new test was added to the project at Tallassee and Americus. This test measured canopy height and biomass yields harvested in mid-February. Also synthetic 3, composed of lines 8, 12 and 26 was added to the test.

RESULTS AND DISCUSSION

Tables 1-3 indicate that Synthetic 3 and the lines that constitute Synthetic 3 produce comparable or superior amounts of forage yield around April when compared to commercial hairy vetch.

No reseeding ability was observed in the projects second test.

Commercial hairy vetch and the lines that constitute Synthetic 3 produce similar amounts of crude protein (Table 4).

Table 5 shows that Synthetic 3 and its constituents produce significantly more biomass yield than commercial hairy vetch during February 15 harvest.

Due to its later maturing characteristics, commercial hairy vetch produces more forage yield at flowering than the early maturing entries (Tables 6 & 7).

Tables 8 & 9 show Synthetic 3 and its constituents bloom significantly earlier than commercial hairy vetch.

The lines that formed Synthetic 3 contain no particular resistance to nematodes beyond those commonly found in the species (Table 10).

Auburn University Alabama Agricultural Experiment Stations and USDA-SCS plan to joint release Synthetic 3 for conservation tillage. This release will provide farmers with the flexibility of early blooming and early developing hairy vetch cover crops. An increase field of this material was planted in October 1993 at the Americus PMC.

Experiments harvested from the end of March to middle April in 1992 and 1993.

Table.1 Forage yield of hairy vetch accessions at six locations in 1992.

Accession	Tallassee	Americus	Winfield	Belle Mina	Marion Junction	Monroeville	Mean
	----------	----------	----------	g m^{-2}	----------	----------	
LINE 26	98.3	148.1	61.5	178.5	141.1	379.1	172.4
LINE 12	75.5	139.7	73.4	187.1	154.1	336.3	161.1
LINE 8	97.7	144.9	60.6	158.6	154.5	316.3	155.5
COMMERCIAL	85.4	122.0	48.3	287.9	90.2	220.0	142.3
MSD (.05)	ns	ns	12.9	57.9	30.6	ns	

Table.2 Estimated forage yield (average of 3 lines) of Synthetic 3 and actual yield of commercial type at six locations in 1992.

Accession	Tallassee	Americus	Winfield	Belle Mina	Marion Junction	Monroeville	Mean
	----------	----------	----------	g m^{-2}	----------	----------	
Synthetic 3	90.5	144.2	65.2	174.7	149.9	343.9	163.0
COMMERCIAL	85.4	122.0	48.3	287.9	90.2	220.0	142.3

Table.3 Forage yield of hairy vetch Synthetic 3 and commercial type at six locations in 1993.

Accession	Tallassee	Americus	Winfield*	Belle Mina	Marion Junction	Monroeville	Mean
	----------	----------	----------	g m^{-2}	----------	----------	
Synthetic 3	101.9	125.2	--	303.0	138.2	233.4	180.4
COMMERCIAL	67.7	80.8	--	297.1	93.4	306.8	161.9
Probability	0.052	0.18	--	0.49	0.018	0.21	
MSD (.05)	ns	ns		ns	42.8	ns	

* Plants were kill by frost, except commercial that was damaged.

Table. 4 Mean crude protein content and production of hairy vetch accessions at Tallassee and Americus in **1992**. Plants were harvested around April 1.

Accession	Content	Production
	%	g m^{-2}
LINE **26**	**27.7**	**33.5**
LINE **12**	**26.6**	**29.0**
LINE 8	**26.7**	**32.1**
COMMERCIAL	28.7	**29.6**
MSD (.05)	ns	ns

Experiments Harvested On February 15, 1993

Table. 5 Canopy height and biomass yield of vetches grown at Tallassee and Americus in **1993**.

Accession	Tallassee		Americus	
	Canopy Height	Yield	Canopy Height	Yield
	cm	g m^{-2}	cm	g m^{-2}
Synthetic **3**	**27**	**23.1**	**33.7**	**17.2**
LINE **26**	**27**	**24.2**	**36.0**	**19.8**
LINE **12**	**32**	31.1	**31.1**	**17.4**
LINE 8	**32**	**24.0**	**30.5**	**14.9**
COMMERCIAL	**14**	**1.3**	10.0	**5.4**
MSD (.05)	**7.6**	**9.2**	**4.1**	**6.2**

Experiments harvested at flowering time.

Table. 6 Mean canopy height and forage yield of vetch lines grown at Tallassee and Americus in 1992.

Accession	canopy Height	Yield
	cm	g m^{-2}
LINE 26	49	294.4
LINE 12	48	258.9
LINE 8	58	346.1
COMMERCIAL	71	515.4
MSD (.05)	ns	103.7

Table. 7 Mean canopy height and forage yield of vetch accessions grown at Tallassee and Americus in 1993.

Accession	Canopy Height	Yield	
		Tallassee	Americus
	cm	--- g m^{-2} ---	
Synthetic 3	101	174.0	295.5
LINE 26	122	235.3	263.0
LINE 12	109	275.0	321.5
LINE 8	126	242.1	336.1
COMMERCIAL	148	659.5	*
MSD (.05)	ns	182.7	ns

* Plots were lost

TABLE. 8 Number of days (counted from March 1) of vetch accessions to 75% bloom at Tallassee and Americus in 1992.

Accession	Tallassee	Americus	Mean
LINE 26	49.3	32.5	40.9
LINE 12	48.7	31.5	38.9
LINE 8	41.2	32.8	37.4
COMMERCIAL	69.5	68.8	69.1
MSD (.05)	5.9	10.8	

TABLE. 9 Number of days (counted from March 1) of vetch accessions to 75% bloom at Tallassee and Americus in 1993.

Accession	Tallassee	Americus	Mean
Synthetic 3	42.3	32.5	36.7
LINE 26	45.0	32.0	37.6
LINE 12	46.7	32.3	38.4
LINE 8	44.8	32.3	38.5
COMMERCIAL	74.0	*	74.0
MSD (.05)	11.0	ns	

* Plots were *lost*

Table 10. Parameters of resistance to Weloidosvne arenaria race 2 and Heterodera glycines race 4 measured for hairy vetch entries, and 'Davis' soybean (experimental control) in an 8-week greenhouse experiment.

Entry	Overall plant growth			M. arenaria			H. glycines
	Shoot weight (g)	Root weight (g)	Root condition[x] (1-5)	Gall rating[y] (0-10)	Galls per gram of root	Juveniles per gram of root	cysts per gram of root
Davis soybean	.91[z]	.70[z]	4.0	3.7	36	374	62
Hairy vetch							
Commercial hairy vetch	.12	.17	4.5	7.7	207	665	0
Line 26	.23	.21	4.4	6.4	133	624	0
Line 12	.17	.19	4.8	8.0	170	737	0
Line 8	.17	.16	4.5	6.9	196	922	0
Common vetch							
Cahaba White	.31	.22	2.7	0.0	0	0	0
Vantage	.39	.22	2.9	0.0	0	31	0
Vanguard	.28	.13	3.5	0.0	0	0	0
Nova II	.34	.10	3.6	0.0	0	0	0
Warrior	.38	.11	3.9	0.0	0	0	0
LSD (0.05)	.10	.07	0.5	0.8	31	600	

[x] Root condition scale: 1 = best, 5 = worst.
[y] Gall rate scale: 0 = no galls, 10 = maximum galling.
[z] Data not included in the analysis.

PROJECT 13A142R - HAY *AND* GRAZING MANAGEMENT OF EASTERN GAMMAGRASS

INTRODUCTION

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

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

MATERIALS AND METHODS

In April 1993, cold stratified 'Pete' Eastern gammagrass seed was planted to five acres on the southern end of the Americus PMC. A two row corn planter set on 36" rows was used to plant approximately four seed per linear foot of row. Seed was planted 1½ inches deep. Six-hundred pounds of 0-14-14 fertilizer was applied at planting and 75 pounds of N per acre was applied in June. Weeds were primarily controlled by cultivation.

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

In *1994* the area will be fenced to allow rotational grazing (as per Ft. Worth NTC range conservationist recommendations).

RELEASE OF NEW CULTIVARS IN 1993

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

SEED AND PLANT PRODUCTION IN 1993

SEED

NAME	POUNDS
'Amquail' bush lespedeza	200 if
PI-514673 indiangrass	100 *
'Doncorae' brunswickgrass	30
'Dove' proso millet	1804
PI-436971 virginia wildrye	37
'Americus' hairy vetch	335
Caley peas (5 lines)	72
Hairy vetch line 8	281
line 12	245
line 26	339

* Estimate

PLANTS

NAME	EACH
Ogeche lime	300
'Flageo' marshhay cordgrass	100,000
Vetivera grass	20,000
Giant reed	10,000
'Big O' crabapple	850
'Sumter Orange' daylily	2,500

LIST OF PUBLICATIONS IN 1993 – AMERICUS PLANT MATERIALS CENTER

1992 Annual Technical Report – APMC Staff

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

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

"Release of 'Big Θ' Wild Crabapple". American Nurseryman, Dec 15, 1992. Mike Owsley.