



East Texas Plant Materials Center

2003 Technical Report

June 2004

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Study Number: ETPMC-P-0053-PA

Study Name: Cooperative Study with Agricultural Research Service-
Evaluation of Sand Bluestem Cultivars and Experimental Lines

Introduction:

This study is in cooperation with Dr. Tim Springer of the Agriculture Research Service. It is a regional study with other Plant Materials Centers in Texas, Missouri, Kansas, Mississippi, and Oklahoma and the Southern Plains Range Research Station in Woodward, Oklahoma. The purpose is to evaluate experimental lines of big (*Andropogon gerardii*) and sand bluestem (*Andropogon hallii*) for use as forage on the southern Great Plains. The study compares the adaptation and forage production of 'Kaw' big bluestem, 'Woodward' sand bluestem, and experimental bluestem lines. With the adaptation and production data provided by this study we will know the performance of any bluestem lines released by Dr. Springer.

Experimental Design:

Forage Production: Each line or cultivar plot measured 9' x 18' and was transplanted in a randomized complete block design with four replications. Bluestem transplants were spaced on 3' centers within the plot.

Seed Production: Each line or cultivar plot measured 3' x 30' and was transplanted in a randomized complete block design with three replications. Plants were a single row of ten plants.

Results and Discussion:

This was the final year of conducting forage clippings and collecting seed production data. Forage plots were harvested on 07/01/2003 and 10/10/2003. No fertilizer was applied to the plots in 2003. In July, most of the lines were harvested in the

vegetative growth stage. By the October clipping, the lines were either dormant or finished with seed production. Forage production per plot is included in Table 1 of the Technical Report Appendix.

Spring regrowth of the seed production plots began in mid March and continued until the second week in April. Seed production plots were harvested in the first week of October. Line #3 (Syn-1 big bluestem, early maturity) yielded the most amount of seed per plant.

Study Number: ETPMC-P-0054-WL

Study Name: Advanced Evaluation of Beaked panicgrass Accessions

Introduction:

Beaked panicgrass (*Panicum anceps*) is a warm season native perennial, one of sixty-four species in the genus *Panicum*. It varies in height from 2 to 4 feet. This grass reproduces by seeds, tillers, or short rhizomes. The seed resembles the curved beak of a bird, hence its common name.

Beaked panicgrass is adapted from New York to Kansas and southeastern US. In Texas, it grows in the eastern part of the state. It is found on wet sites and occurs on poorly drained flats, depressions, and bottomlands.

Conservation uses for beaked panicgrass include revegetation of surface mined lands, timber roads, and other critical erosion sites.

The plant is utilized by wildlife. Deer graze on the foliage and the seeds are eaten by birds and waterfowl.

Materials and Methods:

Six accessions from Texas and Louisiana are being evaluated: #9067079-Smith County, Texas; #9067071-Grimes County, Texas; #9067094-Walker County, Texas; #9067121-Rapides Parish, Louisiana; #28510-MS PMC; #9067102-Harrison County, Texas. The plot layout

contains three replications with a randomized complete design. Performance dates for spring regrowth, boot, bloom, seed maturity, and dormancy were noted. Seed was harvested to estimate total seed production for each of the accessions.

Results and Discussion:

This was the third year of evaluation. Spring regrowth was first noted on March 10 and continued until March 21. Booting began in late June and ended in July. Bloom was noted beginning on July 14 and ending on August 3. Most of the plants reached seed maturity in August and dormancy was recorded in October.

Seed was collected in August and September to evaluate seed production of the accessions. Again in 2003, #9067121 (Rapides Parish) and #9067094 (Walker County) produced the most seed.

This year, to prevent cross pollination, #9067102 (Harrison Cty.) was moved away from the other accessions. Forty-five plants were moved and replanted on April 16. Accession #9067102 has a more turf like appearance than the other accessions. Because of its shorter stature and finer foliage, this accession would be well suited for use in roadside vegetation.

Tables 2 and 3 in the appendix summarize information for seed production and performance dates respectively.

Study Number: ETPMC-S-0155-WL

Study Name: Seed Increase of Native Warm Season Grasses-a Cooperative Study with the Native Prairies Association of Texas

Introduction:

The East Texas Plant Materials Center is cooperating with the Native Prairies Association of Texas to increase source identified seed sources for future prairie restorations. The East Texas Plant Materials

Center is working with eight native species (little bluestem (*Schizachyrium scoparium*), indiangrass (*Sorghastrum nutans*), big bluestem (*Andropogon gerardii*), switchgrass (*Panicum virgatum*), eastern gamagrass (*Tripsacum dactyloides*), Florida paspalum (*Paspalum floridanum*), gulfcoast muhly (*Muhlenbergia capillaris*), longspike tridens (*Tridens strictus*)). These species were collected from stands in Harris County, Texas. This was the third year for seed production.

Results and Discussion:

This year the indiangrass and little bluestem were harvested with a flail vac. The flail vac has several advantages versus using the combine. The indeterminate grass species were harvested twice instead of only once. Clean out of the flail vac was fast and efficient when compared with the combine.

Gulfcoast muhly (*Muhlenbergia capillaris*) was hand harvested on 10/23 and 10/30/03. The panicle was stripped of seed. The panicle material air dried for 14 days. The dried material was cleaned using a hammer mill. The hammer mill was faster than hand rubbing the material. The panicle material did not break up during processing. Therefore, the material clogged the screen and had to be periodically removed. The seed was not damaged by the machine. Even after cleaning, the seed continued to stick together. Running the seed through the hammer mill a second time was not successful. The small seed continued to stick together and quickly formed a mat over the hammer mill screen.

Longspike tridens (*Tridens strictus*) was hand harvested on 11/05/03. To reduce seed shattering, the seed heads were harvested before they fully dried. The harvested seed heads were air dried for 10 days. Much of the seed fell off the seed head during that time. The seed

heads were shaken to loosen the remaining seed. After drying, the seed was cleaned using hand screens.

Study Number: ETPMC-T-0356-NU

Study Name: Nutrient Uptake of Selected Woody Species

Introduction:

The East Texas Plant Materials Center is cooperating with the Arthur Temple College of Forestry-Stephen F. Austin State University in an agroforestry project. Using fast growing trees in riparian areas provides a filter area to take up phosphorus and other nutrients before they reach water bodies and streams. This project addresses adaptation of six species to high phosphorus levels. The trees will be annually measured for growth and compared with a control plot to measure response to phosphorus.

Results and Discussion:

Six species of commercially available tree cultivars were purchased from nurseries in Texas, Louisiana, and Oklahoma. These species were cottonwood (*Populus deltoids*), black locust (*Robinia pseudoacacia*), loblolly pine (*Pinus taeda*), sweetgum (*Liquidambar styraciflua*), green ash (*Fraxinus pennsylvanica*), and sycamore (*Platanus occidentalis*). The trees were planted in February of 2003. During the same month, the diameters of the transplants were measured. Tables 5 and 6 in the Appendix include diameter measurements of the control and high phosphorus plots.

Study Number: ETPMC-S-9947-CR
Study Name: Seed Increase of Deertongue
(Accession #9057334 – Camp County, Texas)

Introduction:

Deertongue (*Dichanthelium clandestinum*) is a perennial native bunchgrass. It is one of thirty-nine species in the genus *Dichanthelium*. It grows to a height of approximately three feet. The growth habit is erect or semi-erect. Plant reproduction is by seed. Deertongue is widely distributed throughout the eastern United States to the Great Plains.

This grass is considered a pioneer plant. Pioneer plants provide initial soil stabilization but allow other plants to increase on the site. Deertongue is able to grow in pH of 4.0 to 7.5. The plant grows on low fertility sites and is drought tolerant. These characteristics make it a suitable plant for revegetation of surface mined lands and disturbed areas. The East Texas Plant Materials Center service area has many acres of surface mined land and timber lands which would benefit from a lower successional species.

Currently, “Tioga” is the only commercially available variety of deertongue. “Tioga” was developed for the northeast and released in 1975. During the initial evaluations “Tioga” did not perform as well as the collections from the East Texas Plant Materials Center service area.

Results and Discussion:

Accession # 9057334 from Camp County, Texas is being developed for use in the East Texas Plant Materials Center service area and possible utilization in the southeastern U.S.

In 2003, a new seed production field was started using transplants. Seed was planted in the greenhouse in late January. By May, East Texas Plant Materials Center staff planted approximately 2900 nine week old transplants. A month later, survival was over 95%. On

7/24, 8/6, and 8/18/03 seed was harvested with a hand held seed stripper.

Study Number: 59S025D

Study Name: Seed Increase of Crockett select germplasm herbaceous mimosa

Introduction:

Herbaceous mimosa (*Mimosa strigillosa*) is a warm season perennial legume native to the southeastern United States. The plant grows to a height of 6-8". This legume is also a good seed producer. It spreads by stems which root at the nodes and form new plants. Stems can grow up to four feet in length during the growing season. Herbaceous mimosa resembles catclaw sensitive briar (*Schrankia nuttallii*) but does not have thorns. One of the most notable characteristics of the plant is its bright pink bloom, hence another common name of powder puff. The plant prefers full sun and once established is drought tolerant. Herbaceous mimosa is tolerant of lower pH conditions. Germination can occur at pH of 4.1. The optimum pH appears to be between 6.2 and 7.1.

Discussion and Results:

Greenup of the stand was noted on 04/08/03. However, the plants begin coming out of dormancy in February as their stems begin to turn green. Bloom was recorded on 06/03/03. Not long afterward, seed maturity was recorded on 07/12/03. Seed was harvested on 07/21/03.

Study Number: ETPMC-T-0257-CR

Study Name: Herbaceous mimosa Seeding Rates for Roadsides and
Critical Areas

Introduction:

This study is a joint effort with the Texas Department of Transportation. The objective of this study was to determine the optimum seeding rate to use on highway right of ways. As noted in the previous study write up, herbaceous mimosa is drought resistant, tolerant of low pH, and low growing. Given these factors, herbaceous mimosa would be good to use for highway revegetation.

Methods and Materials:

On December 12, 2002 six plots measuring 10'x5' were seeded using two seed rates of 10 lbs. or 20 lbs. pls. The plots were hand seeded to simulate broadcast seeding. The plots were raked and tamped to enhance seed to soil contact.

Discussion and Results:

The plots were monitored for seed emergence. Results were disappointing for 2003. Only one plot had any plants emerge. Six plants in this plot emerged, however they did not grow to maturity. One possible explanation for the failure may be the seed were scarified too long and the endosperm was damaged during the scarification process.

Study Number: 59S034G

Study Name: Seed/Plant Increase of Eastern gamagrass

Introduction:

Eastern gamagrass (*Tripsacum dactyloides*) is a native perennial warm season grass. This grass is adapted throughout the Great Plains and eastern half of the United States. Eastern gamagrass is a robust rhizomatous plant. It grows on moist soil types except deep sands. Being a warm season grass, this species is dormant during the winter. Eastern gamagrass can be used for forage production, natural area restoration, and vegetative barriers.

Discussion and Results:

The PMC produces two releases for seed increase. However, no seed was harvested from the 'Jackson' seed production block in 2003. Ergot is suspected, but could not be positively identified. Medina seemed unaffected by the disease. In mid July, the seed production plot was harvested.

Study Number: 59S035G

Study Name: Seed Increase of Harrison select germplasm Florida paspalum

Introduction:

Florida paspalum (*Paspalum floridanum*) is a native warm season grass adapted to the southeastern and Midwestern United States. It averages about 3 to 4 feet tall. The grass is found on moist well drained sandy soils in woods and savannas.

During the advanced evaluation phase, accession #9043874 from Harrison County, Texas was chosen for release. In December 2003, this accession was released as Harrison select germplasm Florida paspalum.

Discussion and Results:

The breeder's seed production field reached the boot stage on June 19. Seed development quickly progressed from that point. Bloom was noted on July 9 and the field was harvested on July 29.

In March 2003, a new field was established to increase seed production amounts. The field performed well during the growing season. Seed ripening was more uniform than in the breeders block. On October 3, this block was harvested. The first year planting yielded 212 pounds of dry bulk seed.

Study Number: LaPMS-S-0305-TE

Study Name: Coastal Prairie Plant Increase

Introduction:

The Plant Materials Center is cooperating with Scott Edwards, Natural Resources Conservation Service Louisiana Plant Materials Specialist, and Larry Allain, United States Geological Service, to produce seeds of six native coastal plant species (Yellow wild indigo (*Baptisia sphaerocarpa*), eastern beebalm (*Monarda fistulosa*), slender mountain mint (*Pycnanthemum tenuifolium*), compass plant (*Silphium laciniatum*), cluster bushmint (*Hyptis alata*), meadow beauty (*Rhexia mariana*)).

Results and Discussion:

The transplants were planted on April 14 and 15, 2003. The yellow wild indigo and compass plant suffered disease problems during the summer. The slender mountain mint, cluster bushmint, and meadow beauty performed the best. Hand harvesting of these species was completed during October and November.

Intercenter Strain Trials

MSPMC-P-0207-WL- Partridge Pea Evaluation

This trial was to determine the adaptive range of partridge pea (*Chamaecrista fasciculata*) selections of Lark from the Jamie Whitten PMC and Riley Germplasm from the Manhattan Kansas PMC. “Comanche” was the commercial standard for comparison. The plots were evaluated two times during the growing season. The first evaluation (1) was in mid-summer (7/28/2003) and the other (2) (09/18/2003) was at seed production.

Below are the evaluation scores for the accessions and “Comanche”

Figure 1 – Evaluation Results

Evaluation	Riley		Lark		Comanche	
	(1)	(2)	(1)	(2)	(1)	(2)
Rep 1 Plant stand	3	3	9	9	3	3
Plant vigor	3	3	3	3	1	1
Seed Production	xx	7	xx	3	xx	2
Est. Seed Maturity	xx	8/10	xx	--	xx	9/14
Rep 2 Plant Stand	9	7	1	1	1	1
Plant vigor	3	3	3	3	1	3
Seed Production	xx	5	xx	1	xx	4
Est. Seed Maturity	xx	--	xx	--	xx	09/12
Rep 3 Plant Stand	3	3	5	5	1	1
Plant vigor	1	1	3	3	1	1
Seed Production	xx	3	xx	5	xx	1
Est. Seed Maturity	xx	--	xx	--	xx	--

A. Visual Observations

(1=Excellent 3=Good 5=Fair 7=Poor 9=Very Poor
0=None)

Evaluation of Blue Eastern gamagrass

This intercenter trial was an adaptability study for St. Lucie (accession #9059278) and Martin (accession #9056069) releases from the

Brooksville, Florida PMC. The third year of evaluation was completed on 07/15/2003. Below is the evaluation data.

Figure 2 - Adaptation Data for St. Lucie and Martin eastern gamagrass

		St. Lucie	Martin
Was mulch applied	Y or N	N	N
Soil amendments applied	Y or N	N	N
Fertilizer applied (date of appl.)	Y or N	N	N
Amount of N-P-K	Lbs./acre	N/A	N/A
Was moisture adequate at planting	Y or N	N/A	N/A
Approx. rainfall received	Inches	59.5	59.5
Was irrigation applied	Y or N	N	N
Severity of weed competition	B	1	1
Plant survival	No.	10	1
Winter hardiness	A	5	5
Date of new growth	Date		
Average plant height	cm.	86	74
Average plant canopy width	cm.	34	40
Average plant base width	cm.	13	11
Plant vigor	A	5	5
Resistance to: Drought	A	5	5
Flooding	A	---	---
Disease	A	5	5
Insect	A	5	3
Frost	A	5	5
Visual quality	A	5	3

A. Visual observation: 1=excellent 3=good 5=average 7=fair
9=poor 0=none

B. Rating by severity: 1=slight 3=mod severe 9=severe

Plant Materials Center Demonstration Rows

In 2002, a plant materials demonstration plot was established at the Plant Materials Center. Different releases were sent by various Plant Materials Centers. The objective of this plot is to observe and note the adaptation of these perennial plants to east Texas. The performance data for 2003 is in the appendix.

References:

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Nuruddin, A and Chang, M. Responses of herbaceous mimosa (*Mimosa strigillosa*), a new reclamation species, to soil pH. *Resources Conserv Recycl* 1999;27:287-98.

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Appendix

Table 1 – Forage Production (ETPMC-P-0053-PA)

Project # ETPMC-P-0053-PA

Cooperative Project with Agricultural Research Service

Evaluation of Big Bluestem and Sand Bluestem Cultivars and Experimental Lines

Forage Harvest

Stubble height = 6 inches

Plants harvested/plot = 6

Rep	Cultivar	Date: 07/01/03			Date: 10/08/03		
		Bulk Forage Weight (lbs.)	Harvest #1		Bulk Forage Weight (lbs.)	Harvest # 2	
			Green Weight (oz.)	Dry Weight (oz.)		Green Weight (oz.)	Dry Weight (oz.)
1	1	6.30	17.3	5.60	5.65	10.30	5.00
1	2	15.35	16.75	4.55	3.75	8.40	3.85
1	3	5.65	10.00	3.60	7.75	11.55	5.40
1	4	3.40	15.00	4.85	4.40	12.20	5.95
1	5	8.45	14.55	4.25	4.85	11.80	5.50
1	6	14.05	19.30	5.10	5.10	11.35	4.65
2	1	7.30	14.95	5.00	5.30	12.40	5.95
2	2	7.20	19.6	5.55	5.15	14.30	6.70
2	3	6.25	11.95	4.05	8.10	11.75	5.80
2	4	6.35	9.60	3.35	9.75	15.35	7.05
2	5	3.80	13.65	4.50	3.30	10.55	5.25
2	6	7.15	13.90	4.35	4.80	13.25	6.05
3	1	8.70	15.55	4.15	8.70	14.15	5.80
3	2	11.00	17.2	4.80	4.35	13.25	6.45
3	3	8.95	16.2	5.10	7.60	13.60	6.70
3	4	11.40	14.70	4.40	13.45	13.10	6.00
3	5	3.05	10.70	3.05	2.95	12.00	5.75
3	6	8.30	11.70	3.15	4.85	11.65	5.20
4	1	13.55	18.9	6.35	6.80	9.15	4.45
4	2	2.60	14.00	4.30	2.65	7.20	4.00
4	3	12.75	17.1	4.95	9.65	13.45	6.60
4	4	11.90	13.85	4.15	8.40	11.75	5.40
4	5	10.60	15.40	4.50	5.95	11.15	5.35
4	6	10.10	19.7	5.25	3.80	16.35	7.60

Table 2 – Performance Dates (ETPMC-P-0054-WL)

Study # ETPMC-P-0054-WL
 Beaked panicum Advanced Evaluation
 Performance Dates - 2003

Plot #	Acc #	Origin	Rep.	Regrowth	Growth Stage				Mature	Foliage	
					Boot	Bloom	Maturity	Dorm.	Ht (cm.)	Ht. (cm.)	Wth (cm.)
1	9067094	Walker Co., TX	1	3/10/03	6/28/03	7/21/03	8/18/03	10/20/03	108	52	90
2	28510	MS PMC	1	3/13/03	6/23/03	7/21/03	8/13/03	10/20/03	100	51	105
3	9067121	Rapides Par., La.	1	3/13/03	7/6/03		8/22/03	11/5/03	103	83	80
4	9067102	Harrison Co., TX	1	3/13/03	6/23/03	7/14/03	8/13/03	10/22/03	55	58	22
5	9067079	Smith Co., TX	1	3/13/03	7/6/03	7/21/03	8/22/03	10/20/03	107	52	87
6	9067071	Grimes Co., TX	1	3/17/03	7/9/03	8/3/03	9/8/03	10/30/03	95	41	85
7	9067121	Rapides Par., La.	2	3/21/03	7/1/03	7/21/03	8/22/03	10/30/03	100	43	70
8	9067071	Grimes Co., TX	2	3/17/03	7/6/03	8/2/03	9/2/03	10/16/03	105	42	75
9	9067079	Smith Co., TX	2	3/13/03	7/9/03	8/2/03	9/5/03	10/30/03	110	52	90
10	9067094	Walker Co., TX	2	3/10/03	7/4/03	7/24/03	8/26/03	10/20/03	110	44	90
11	28510	MS PMC	2	3/17/03	6/23/03	7/21/03	8/13/03	10/16/03	105	40	82
12	9067102	Harrison Co., TX	2	3/13/03		see plot	#4				
13	9067071	Grimes Co., TX	3	3/17/03	7/8/03	7/26/03	9/5/03	10/16/03	110	45	75
14	9067121	Rapides Par., La.	3	3/17/03	7/7/03	8/1/03	8/29/03	10/30/03	90	38	70
15	9067102	Harrison Co., TX	3	3/17/03		see plot	#4				
16	28510	MS PMC	3	3/21/03	6/23/03	7/17/03	8/13/03	10/16/03	90	30	62
17	9067094	Walker Co., TX	3	3/13/03	7/1/03	7/21/03	8/18/03	10/16/03	110	41	67
18	9067079	Smith Co., TX	3	3/13/03	7/9/03	7/21/03	8/29/03	10/16/03	110	54	90

Table 3 – Seed Production (ETPMC-P-0054-WL)

Beaked Panicum Advanced Evaluation 2003

Seed Harvest Study # ETPMC-P-0054-WL

Plot #	Replication	Accession	Origin	Plants/ row	Weight (gms)
1	1	67094	Walker Co., TX	10	366
2	1	28510	MS PMC*	9	152
3	1	67121	Rapides Par., La.	9	263
5	1	67079	Smith Co., TX	10	130
6	1	67071	Grimes Co., TX	11	193
7	2	67121	Rapides Par., La.	7	149
8	2	67071	Grimes Co., TX	12	206
9	2	67079	Smith Co., TX	10	108
10	2	67094	Walker Co., TX	10	221
11	2	28510	MS PMC	9	123
13	3	67071	Grimes Co., TX	10	191
14	3	67121	Rapides Par., La.	8	243
16	3	28510	MS PMC	10	32
17	3	67094	Walker Co., TX	8	165
18	3	67079	Smith Co., TX	10	127
15	combined*	67102	Harrison Co., TX	4	62

* MS PMC = Mississippi Plant Materials Center, Coffeeville, MS

*combined - reps. of 9067102 were combined into one plot

Table 4 – Diameter Measurements of Control Plots (cm. and inches)
Diameter measurements were taken 1” above root collar. Red numbers denote replacements planted at bud initiation.

Control Plots

Agroforestry Project

Row 1	M1		M2		M3		M4		M5		M6		M7		M8		M9		M10	
Plot 1	0.9	0.9	0.7	0.7	0.7	0.7	1.6	1.6	0.8	0.8	0.6	0.6	1	0.7	0.8	0.7	0.8	0.8	0.8	0.8
inches	0.39	0.39	0.29	0.29	0.29	0.26	0.63	0.63	0.33	0.3	0.26	0.26	0.4	0.29	0.3	0.29	0.3	0.3	0.33	0.33
Plot 2	0.4	0.4	0.4	0.4	0.5	0.5	0.4	0.4	0.5	0.5	0.4	0.4	0.4	0.3	0.5	0.4	0.4	0.4	0.4	0.4
Inches	0.19	0.16	0.16	0.16	0.19	0.19	0.16	0.16	0.19	0.2	0.19	0.16	0.16	0.16	0.19	0.16	0.16	0.16	0.16	0.19
Plot 3	0.4	0.4	0.5	0.4	0.6	0.5	0.4	0.5	0.4	0.4	0.4	0.4	0.4	0.4	0.5	0.5	0.5	0.5	0.4	0.5
Inches	0.19	0.19	0.19	0.19	0.23	0.2	0.19	0.2	0.19	0.19	0.16	0.19	0.16	0.19	0.19	0.19	0.2	0.2	0.19	0.2
Plot 4	1	1.2	1.3	1.4	1	1	1.3	1.2	1.1	1.1	1	1.1	0.9	0.9	0.9	0.9	0.9	0.9	1	1
Inches	0.4	0.49	0.53	0.56	0.4	0.4	0.5	0.49	0.46	0.46	0.39	0.43	0.36	0.39	0.39	0.39	0.39	0.36	0.4	0.43
Plot 5	0.6	0.6	0.6	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
Inches	0.23	0.26	0.23	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23
Plot 6	0.9	0.9	0.7	0.8	0.8	0.7	1	1	1	0.9	0.7	0.8	1.6	1.6	1.1	1.1	0.7	0.7	0.8	0.8
Inches	0.33	0.36	0.3	0.3	0.3	0.3	0.39	0.39	0.4	0.36	0.3	0.3	0.66	0.63	0.46	0.46	0.29	0.29	0.33	0.3
Plot 7																				
Row 2																				
Plot1	0.4	0.4	0.5	0.5	0.5	0.5	0.5	0.4	0.4	0.5	0.6	0.7	0.5	0.4	0.4	0.4	0.3	0.3	0.5	0.6
Inches	0.19	0.19	0.2	0.19	0.2	0.19	0.19	0.19	0.19	0.19	0.23	0.19	0.16	0.16	0.16	0.16	0.13	0.13	0.2	0.23
Plot 2	0.8	0.8	0.7	0.8	0.8	0.9	0.7	0.8	0.8	0.7	0.9	0.9	1	1	0.9	0.9	1	1	0.7	0.7
Inches	0.3	0.3	0.29	0.33	0.33	0.36	0.33	0.33	0.3	0.29	0.39	0.36	0.4	0.4	0.39	0.39	0.4	0.4	0.3	0.29

Plot 3	0.9	0.9	0.7	0.7	0.6	0.6	1	1	0.8	0.8	0.8	0.8	0.6	0.6	0.7	0.8	0.8	0.7	0.8	0.8
Inches	0.39	0.36	0.29	0.29	0.26	0.23	0.4	0.39	0.3	0.3	0.3	0.3	0.26	0.26	0.26	0.29	0.3	0.29	0.3	0.3
Plot 4	0.5	0.5	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.3	0.4	0.3	0.3	0.4	0.3	0.3
Inches	0.2	0.2	0.16	0.16	0.16	0.16	0.19	0.19	0.16	0.19	0.19	0.19	0.16	0.13	0.16	0.13	0.13	0.16	0.13	0.13
Plot 5	0.8	0.7	0.7	0.7	1	0.9	0.7	0.9	0.8	0.8	0.7	0.7	0.8	0.8	1	0.9	0.9	0.9	1	0.9
Inches	0.33	0.3	0.29	0.29	0.4	0.39	0.33	0.36	0.3	0.33	0.29	0.29	0.33	0.33	0.4	0.36	0.39	0.36	0.4	0.39
Plot 6	0.6	0.6	0.7	0.8	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.8	0.7	0.7	0.7	0.7	0.7	0.7
Inches	0.23	0.23	0.29	0.3	0.29	0.29	0.29	0.29	0.3	0.29	0.29	0.26	0.29	0.3	0.29	0.3	0.29	0.29	0.29	0.29
Plot 7																				
Row 3	M 1	M2	M3	M4	M5	M6	M7	M8	M9	M10										
Plot1	0.4	0.4	0.4	0.4	0.5	0.5	0.5	0.6	0.5	0.5	0.5	0.5	0.5	0.4	0.4	0.5	0.5	0.5	0.5	0.5
Inches	0.16	0.19	0.19	0.19	0.2	0.2	0.2	0.23	0.19	0.19	0.2	0.2	0.2	0.19	0.19	0.19	0.19	0.19	0.2	0.2
Plot 2	0.5	0.5	0.4	0.4	0.5	0.4	0.6	0.6	0.4	0.5	0.4	0.4	0.4	0.5	0.4	0.4	0.5	0.5	0.5	0.5
Inches	0.2	0.2	0.16	0.16	0.19	0.19	0.23	0.26	0.19	0.19	0.16	0.16	0.19	0.19	0.19	0.19	0.2	0.2	0.2	0.2
Plot 3	0.4	0.4	0.4	0.4	0.5	0.5	0.4	0.4	0.4	0.4	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Inches	0.16	0.16	0.16	0.19	0.2	0.19	0.16	0.16	0.19	0.19	0.2	0.2	0.19	0.2	0.2	0.2	0.23	0.2	0.16	0.19
Plot 4	0.4	0.4	0.4	0.4	0.5	0.5	0.4	0.4	0.4	0.4	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Inches	0.16	0.16	0.16	0.19	0.2	0.19	0.16	0.16	0.19	0.19	0.2	0.2	0.19	0.2	0.2	0.2	0.23	0.2	0.16	0.19
Plot 5	0.5	0.5	0.4	0.4	0.4	0.4	0.5	0.4	0.4	0.4	0.4	0.4	0.4	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Inches	0.2	0.2	0.16	0.16	0.19	0.19	0.19	0.19	0.16	0.16	0.19	0.16	0.19	0.2	0.2	0.2	0.19	0.19	0.2	0.2
Plot 6	0.7	0.6	0.5	0.5	0.6	0.5	0.6	0.6	0.5	0.5	0.5	0.5	0.5	0.5	0.6	0.6	0.6	0.6	0.6	0.5
Inches	0.29	0.26	0.19	0.2	0.26	0.2	0.23	0.23	0.2	0.23	0.2	0.2	0.2	0.2	0.23	0.26	0.23	0.23	0.23	0.2
Plot 7																				

Row 4	M 1		M 2		M 3		M 4		M 5		M 6		M 7		M 8		M 9		M10	
Plot 1	0.5	0.5	0.6	0.6	0.6	0.6	0.6	0.5	0.5	0.5	0.4	0.4	0.5	0.5	0.5	0.5	0.6	0.6	0.5	0.5
inches	0.2	0.2	0.23	0.23	0.23	0.23	0.23	0.2	0.19	0.2	0.19	0.19	0.2	0.19	0.2	0.2	0.23	0.23	0.2	0.2
Plot 2	0.7	0.9	0.9	0.8	1.4	1.4	0.9	0.9	1.6	1.6	1	0.9	1.5	1.5	1.1	1.1	1	0.9	1.8	1.9
inches	0.3	0.33	0.36	0.3	0.56	0.56	0.36	0.36	0.6	0.63	0.4	0.39	0.6	0.6	0.43	0.43	0.4	0.36	0.73	0.73
Plot 3	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.3	0.4	0.4	0.4	0.5	0.5	0.5	0.4	0.5	0.4	0.5	0.4
inches	0.2	0.2	0.19	0.19	0.2	0.2	0.19	0.2	0.13	0.16	0.19	0.16	0.19	0.2	0.2	0.19	0.2	0.16	0.2	0.19
Plot 4	1.1	1	1.2	1.1	1.1	1.1	1	1	1.1	1.1	1.1	1.1	0.9	0.9	1	1	1	0.9	1	0.9
inches	0.43	0.4	0.46	0.43	0.46	0.43	0.39	0.4	0.43	0.43	0.46	0.46	0.39	0.36	0.4	0.4	0.39	0.39	0.4	0.39
Plot 5	1.1	1.1	1.3	1.4	1	1.1	1.2	1.1	1.2	1.2	1.2	1.2	1.6	1.8	1.4	1.4	1.4	1.2	1.2	1.2
inches	0.46	0.46	0.53	0.56	0.4	0.43	0.49	0.46	0.49	0.49	0.49	0.49	0.63	0.7	0.59	0.56	0.56	0.49	0.49	0.49
Plot 6	0.6	0.6	0.5	0.5	0.7	0.8	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.7	0.5	0.6	0.5	0.5	0.5
inches	0.23	0.23	0.19	0.2	0.29	0.3	0.19	0.19	0.2	0.2	0.2	0.19	0.2	0.19	0.3	0.2	0.23	0.2	0.2	0.2

Table 5 – Diameter Measurements of High Phosphorus (cm. and inches)

Diameter measurements were taken 1” above the root collar. Red numbers denote replacements planted at bud initiation.

Individual Seedling Measurements -
Agroforestry Project

High P plot

Replacements denoted in red

Row 1	M1		M2		M3		M4		M5		M6		M7		M8		M9		M10	
Plot 1 inches	1.5 0.6	1.5 0.6	1.2 0.49	1.2 0.49	1.6 0.63	1.6 0.63	1.4 0.56	1.5 0.56	1.5 0.6	1.5 0.59	1.4 0.56	1.4 0.56	1.8 0.7	1.8 0.7	1 0.4	1 0.4	1.3 0.53	1.3 0.53	1.2 0.49	1.2 0.46
Plot 2 inches	0.6 0.23	0.6 0.23	0.5 0.2	0.4 0.19	0.6 0.26	0.6 0.26	0.5 0.2	0.5 0.2	0.5 0.2	0.5 0.2	0.6 0.23	0.7 0.26	0.6 0.26	0.6 0.26	0.4 0.19	0.4 0.19	0.5 0.2	0.5 0.2	0.6 0.26	0.7 0.26
Plot 3 inches	1.6 0.66	1.7 0.69	1.5 0.6	1.5 0.6	1.5 0.6	1.5 0.6	2.2 0.89	2.3 0.93	1.8 0.7	1.8 0.7	2 0.8	2 0.8	1.9 0.76	1.7 0.69	2.1 0.83	1.9 0.76	1.5 0.6	1.4 0.59	1.8 0.7	1.9 0.73
Plot 4 inches	0.6 0.23	0.5 0.2	0.5 0.2	0.5 0.2	0.4 0.16	0.4 0.16	0.5 0.19	0.4 0.16	0.5 0.2	0.5 0.2	0.4 0.19	0.5 0.2	0.5 0.2	0.5 0.2	0.5 0.2	0.5 0.19	0.4 0.16	0.4 0.16	0.4 0.2	0.4 0.19
Plot 5 inches	0.4 0.16	0.5 0.16	0.4 0.16	0.4 0.16	0.3 0.13	0.4 0.16	0.4 0.16	0.4 0.16	0.5 0.2	0.5 0.2	0.3 0.13	0.3 0.13	0.6 0.23	0.5 0.2	0.3 0.13	0.3 0.13	0.4 0.16	0.4 0.16	0.4 0.19	0.4 0.19
Plot 6 inches	1.7 0.79	1.7 0.79	1 0.43	1.2 0.49	1.2 0.49	1.2 0.49	1.3 0.53	1.4 0.56	1.5 0.59	1.7 0.59	1.5 0.6	1.6 0.63	1.2 0.49	1.2 0.49	1.1 0.43	1.1 0.46	1.3 0.53	1.3 0.5	1.1 0.43	1.2 0.49
Plot 7 inches	0.5 0.2	0.6 0.23	0.4 0.19	0.4 0.19	0.5 0.2	0.5 0.2	0.5 0.19	0.4 0.19	0.5 0.2	0.5 0.2	0.5 0.23	0.4 0.19	0.5 0.2	0.5 0.19	0.5 0.2	0.5 0.2	0.4 0.19	0.4 0.16	0.6 0.23	0.5 0.2
Row 2																				
Plot1 inches	0.5 0.2	0.5 0.2	0.5 0.2	0.6 0.23	0.5 0.2	0.5 0.2	0.5 0.2	0.5 0.23	0.5 0.2	0.6 0.23	0.5 0.19	0.5 0.2	0.5 0.19	0.4 0.19	0.5 0.2	0.5 0.2	0.6 0.23	0.6 0.23	0.4 0.19	0.5 0.19
Plot 2 inches	0.5 0.2	0.5 0.2	0.5 0.2	0.5 0.2	0.5 0.19	0.5 0.2	0.5 0.2	0.5 0.2	0.5 0.2	0.6 0.23	0.5 0.2	0.5 0.2	0.5 0.2	0.5 0.2	0.5 0.2	0.5 0.2	0.5 0.2	0.5 0.2	0.5 0.2	0.6 0.23

Plot 3 inches	0.4 0.19	0.5 0.19	0.3 0.13	0.3 0.13	0.4 0.16	0.4 0.16	0.4 0.16	0.4 0.16	0.4 0.19	0.4 0.19	0.4 0.16	0.4 0.19	0.5 0.2	0.5 0.2	0.4 0.16	0.4 0.16	0.4 0.19	0.5 0.19	0.6 0.23	0.6 0.23
Plot 4 inches	0.4 0.19	0.4 0.16	0.4 0.16	0.4 0.16	0.4 0.19	0.5 0.19	0.4 0.19	0.4 0.19	0.4 0.16	0.4 0.16	0.5 0.2	0.4 0.19	0.4 0.16	0.4 0.16	0.3 0.13	0.3 0.13	0.4 0.16	0.3 0.13	0.3 0.13	0.4 0.16
Plot 5 inches	0.4 0.16	0.4 0.19	0.4 0.19	0.4 0.19	0.4 0.16	0.4 0.16	0.5 0.2	0.5 0.2	0.4 0.19	0.4 0.19	0.4 0.19	0.4 0.16	0.4 0.19	0.4 0.16	0.4 0.19	0.4 0.19	0.5 0.19	0.5 0.2	0.4 0.19	0.4 0.16
Plot 6 inches	0.5 0.19	0.5 0.19	0.6 0.23	0.6 0.26	0.5 0.19	0.5 0.19	0.4 0.19	0.5 0.2	0.4 0.16	0.4 0.16	0.4 0.16	0.4 0.16	0.5 0.2	0.5 0.2	0.6 0.23	0.7 0.23	0.5 0.2	0.5 0.2	0.6 0.23	0.5 0.23
Plot 7 inches	0.5 0.2	0.5 0.2	0.5 0.2	0.5 0.19	0.5 0.2	0.5 0.2	0.7 0.23	0.5 0.2	0.5 0.2	0.5 0.2	0.6 0.23	0.5 0.23	0.5 0.2	0.5 0.2	0.5 0.23	0.6 0.23	0.5 0.19	0.6 0.23	0.5 0.2	0.6 0.2
Row 3	M 1	M2	M3	M4	M5	M6	M7	M8	M9	M10										
Plot1 inches	0.6 0.26	0.7 0.26	0.6 0.26	0.7 0.26	0.6 0.26	0.7 0.29	0.6 0.23	0.6 0.26	0.7 0.29	0.7 0.29	0.6 0.26	0.7 0.26	0.6 0.26	0.6 0.26	0.7 0.29	0.8 0.3	0.6 0.26	0.7 0.26	0.6 0.26	0.6 0.26
Plot 2 inches	0.9 0.39	1 0.39	1 0.39	1 0.4	1.2 0.49	1.2 0.49	1.1 0.46	0.9 0.36	1 0.4	0.9 0.39	1.3 0.5	1.2 0.46	1.1 0.46	1.1 0.43	1.3 0.53	1.3 0.53	1 0.4	0.9 0.39	1.1 0.43	1.1 0.43
Plot 3 inches	1.3 0.5	1.3 0.5	1.1 0.43	1.1 0.43	0.9 0.36	0.9 0.36	1.2 0.49	1.2 0.49	1 0.4	1 0.4	1.1 0.46	1.1 0.46	1.3 0.5	1.1 0.46	1.3 0.53	1.4 0.53	0.9 0.33	0.9 0.39	1 0.4	1 0.4
Plot 4 inches	0.6 0.23	0.6 0.23	0.5 0.2	0.5 0.2	0.5 0.2	0.5 0.2	0.5 0.23	0.5 0.2	0.5 0.2	0.6 0.23	0.7 0.39	0.6 0.23	0.5 0.2	0.5 0.2	0.5 0.2	0.5 0.2	0.5 0.2	0.5 0.2	0.5 0.23	0.5 0.2
Plot 5 inches	0.4 0.16	0.4 0.19	0.4 0.19	0.4 0.19	0.4 0.16	0.4 0.19	0.4 0.16	0.4 0.16	0.4 0.16	0.4 0.16	0.4 0.19	0.4 0.19	0.4 0.16	0.4 0.16	0.4 0.19	0.4 0.19	0.4 0.16	0.4 0.16	0.4 0.16	0.4 0.16
Plot 6 inches	0.6 0.26	0.7 0.26	0.8 0.3	0.7 0.39	0.8 0.3	0.8 0.29	0.9 0.33	0.9 0.36	0.7 0.29	0.7 0.29	0.7 0.29	0.7 0.29	0.6 0.23	0.6 0.23	0.6 0.26	0.6 0.26	0.8 0.33	0.8 0.33	1 0.4	1 0.4
Plot 7 inches	1.7 0.66	1.6 0.66	1.6 0.63	1.6 0.66	1.4 0.56	1.4 0.56	1.5 0.6	1.8 0.7	1.4 0.59	1.4 0.56	1.4 0.59	1.5 0.6	1.5 0.6	1.6 0.63	1.6 0.63	1.5 0.59	1.3 0.5	1.2 0.49	1.3 0.53	1.5 0.59

	M1		M2		M3		M4		M5		M6		M7		M8		M9		M10	
Row 4																				
Plot1	0.7	0.8	0.7	0.7	0.7	0.7	0.7	0.7	0.8	0.8	0.9	0.9	0.8	0.9	0.8	0.8	0.8	0.8	0.9	0.9
inches	0.29	0.3	0.29	0.29	0.29	0.29	0.26	0.26	0.3	0.33	0.39	0.39	0.32	0.36	0.33	0.33	0.3	0.3	0.36	0.36
Plot 2	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.9	0.9	0.8	0.8	0.7	0.6	0.7	0.8	0.8	0.8
inches	0.29	0.29	0.29	0.3	0.26	0.29	0.29	0.29	0.29	0.26	0.36	0.36	0.33	0.3	0.26	0.26	0.29	0.3	0.3	0.3
plot 3	0.3	0.3	0.4	0.4	0.4	0.3	0.4	0.4	0.5	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.3	0.3	0.4	0.4
inches	0.13	0.13	0.16	0.16	0.16	0.13	0.16	0.16	0.2	0.19	0.16	0.16	0.16	0.16	0.16	0.16	0.1	0.13	0.19	0.16
Plot 4	0.4	0.4	0.4	0.5	0.4	0.4	0.4	0.3	0.4	0.4	0.3	0.3	0.3	0.3	0.5	0.5	0.4	0.5	0.4	0.4
inches	0.19	0.19	0.16	0.2	0.19	0.19	0.16	0.13	0.16	0.19	0.1	0.13	0.13	0.13	0.2	0.19	0.19	0.19	0.19	0.19
Plot 5	0.7	0.7	0.8	0.8	0.7	0.7	0.7	0.7	0.7	0.7	0.8	0.8	0.6	0.7	0.8	0.8	0.8	0.8	0.7	0.7
inches	0.3	0.29	0.3	0.3	0.29	0.29	0.3	0.3	0.29	0.29	0.33	0.33	0.26	0.26	0.3	0.3	0.33	0.33	0.29	0.29
Plot 6	1.9	1.8	1.7	1.6	1.8	1.8	2	1.8	1.5	1.4	1.5	1.8	1.9	1.7	1.4	1.5	2	2	1.5	1.6
inches	0.73	0.7	0.69	0.66	0.7	0.7	0.79	0.7	0.59	0.53	0.59	0.7	0.73	0.69	0.66	0.59	0.8	0.79	0.6	0.66
Plot 7	0.5	0.3	0.3	0.3	0.4	0.4	0.4	0.4	0.3	0.3	0.3	0.3	0.4	0.3	0.3	0.4	0.3	0.4	0.3	0.3
inches	0.16	0.13	0.13	0.13	0.19	0.19	0.16	0.19	0.13	0.1	0.13	0.13	0.16	0.13	0.13	0.16	0.16	0.16	0.13	0.13
Row 5																				
Plot1	0.5	0.5	0.4	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.4	0.4	0.4	0.4	0.5
inches	0.2	0.2	0.16	0.19	0.2	0.2	0.19	0.19	0.19	0.19	0.2	0.2	0.19	0.2	0.2	0.19	0.19	0.19	0.19	0.19
Plot 2	0	0.9	0.9	1	1.2	1.2	0.8	0.9	1.1	1.1	1	1	1.1	1.1	1	1	1	1.1	1	1.1
inches	0.36	0.36	0.36	0.39	0.49	0.49	0.33	0.36	0.43	0.43	0.4	0.4	0.43	0.43	0.4	0.4	0.4	0.43	0.4	0.43
Plot 3	1	1	1.3	1.3	1.1	1.1	1.1	1.1	1	1	1.2	1.4	1	1	1	1	1.3	1.3	1	1
inches	0.4	0.4	0.53	0.5	0.46	0.46	0.43	0.43	0.4	0.4	0.49	0.56	0.4	0.4	0.4	0.39	0.5	0.5	0.4	0.4
Plot 4	0.4	0.4	0.4	0.4	0.6	0.6	0.5	0.5	0.4	0.4	0.5	0.5	0.5	0.5	0.5	0.4	0.4	0.4	0.4	0.4
inches	0.16	0.16	0.19	0.19	0.23	0.23	0.2	0.2	0.19	0.19	0.2	0.2	0.2	0.2	0.2	0.19	0.19	0.19	0.19	0.16

Plot 5 inches	0.9 0.39	0.9 0.36	0.9 0.36	0.8 0.33	0.9 0.36	0.9 0.36	0.9 0.36	0.9 0.36	0.7 0.33	0.8 0.33	0.8 0.3	0.8 0.33	0.8 0.33	0.8 0.33	1 0.39	0.9 0.36	1 0.4	1 0.4	0.8 0.33	0.9 0.36
Plot 6 inches	1.1 0.43	1.1 0.43	1.2 0.49	1.2 0.49	1.1 0.46	1 0.43	1.2 0.39	1.3 0.5	1.2 0.49	1.2 0.49	1.2 0.49	1 0.4	1 0.39	1.1 0.43	1.4 0.59	1.4 0.56	1.2 0.46	1.1 0.43	0.8 0.33	0.8 0.33
Plot 7																				
Row 6	M1	M2	M3	M4	M5	M6	M7	M8	M9	M10										
Plot1 Inches	0.9 0.39	1 0.39	1 0.4	0.9 0.39	0.8 0.33	0.9 0.36	0.8 0.3	0.8 0.3	0.8 0.33	0.8 0.33	0.7 0.3	0.7 0.29	0.7 0.29	0.7 0.3	0.7 0.29	0.7 0.29	0.8 0.3	0.8 0.33	0.6 0.23	0.6 0.23
Plot 2 Inches	0.3 0.13	0.4 0.16	0.4 0.16	0.4 0.16	0.4 0.16	0.4 0.16	0.4 0.16	0.4 0.16	0.4 0.16	0.4 0.16	0.4 0.16	0.4 0.16	0.4 0.16	0.4 0.16	0.5 0.2	0.5 0.2	0.4 0.19	0.4 0.16	0.3 0.13	0.4 0.16
Plot 3 Inches	0.4 0.19	0.4 0.16	0.4 0.16	0.3 0.13	0.4 0.16	0.4 0.19	0.4 0.19	0.4 0.19	0.4 0.16	0.3 0.13	0.4 0.16	0.3 0.13	0.4 0.16	0.4 0.16	0.3 0.13	0.4 0.16	0.4 0.16	0.4 0.16	0.4 0.16	0.4 0.19
Plot 4 Inches	1.2 0.49	1.2 0.49	1.1 0.43	1 0.4	1.3 0.5	1.4 0.56	1.1 0.43	1.1 0.43	1 0.4	1 0.4	1.1 0.43	1.1 0.43	1 0.4	1 0.43	1 0.39	0.9 0.39	1.1 0.43	1 0.4	1.1 0.43	1 0.4
Plot 5 Inches	0.5 0.2	0.5 0.2	0.4 0.19	0.5 0.19	0.5 0.2	0.4 0.19	0.5 0.2	0.6 0.23	0.5 0.2	0.5 0.2	0.6 0.23	0.5 0.2	0.5 0.2	0.5 0.2	0.5 0.19	0.5 0.2	0.4 0.16	0.4 0.19	0.4 0.19	0.5 0.2
Plot 6 inches	0.6 0.23	0.5 0.2	0.4 0.16	0.4 0.16	0.5 0.19	0.5 0.19	0.5 0.19	0.5 0.2	0.5 0.2	0.5 0.2	0.5 0.2	0.5 0.2	0.5 0.2	0.5 0.2	0.5 0.2	0.4 0.19	0.6 0.23	0.6 0.26	0.6 0.26	0.6 0.26

Table 6 – Performance Dates for Plant Materials Center Releases

Demonstration Rows from Other PMC's

Species	Cultivar	Regrowth	Foliage Height cm	Foliage Width cm.	Date	Boot	Bloom	Seed Maturity/Harvest	Mature Height cm.	Dormancy
Little Bluestem	Aldous	3/21/2003	26	28	5/27/2003	7/14/2003	8/19/2003	9/26/2003	100	10/24/2003
	Cimmarron	3/21/2003	26	32	5/27/2003	7/9/2003	8/13/2003	9/26/2003	110	10/24/2003
	Knox City	3/21/2003	29	35	5/27/2003	7/2/2003		9/24/2003	95	
Big bluestem	Kaw	3/17/2003	40	43	5/27/2003	7/7/2003	8/21/2003	9/20/2003	180	
	Rountree									
Indiangrass	Lometa	3/13/2003	55	85	5/27/2003		9/26/2003			
	Cheyenne	3/13/2003	60	81	5/27/2003	7/9/2003	8/16/2003	9/16/2003	160	10/16/2003
	Osage	3/25/2003	42	42	5/27/2003	7/25/2003		9/26/2003	150	11/5/2003
	Rumsey	3/21/2003	26	34	5/27/2003	8/19/2003		9/26/2003	150	11/5/2003
	PI514673	3/13/2003	62	50	5/27/2003	9/26/2003		11/5/2003		
Switchgrass	Alamo	3/10/2003	140	100	5/27/2003	6/26/2003	8/19/2003	9/20/2003	190	
	Kanlow	3/21/2003	145	100	5/27/2003	6/20/2003	7/30/2003	9/6/2003	180	10/16/2003
	Blackwell	3/17/2003	90	67	5/27/2003	5/19/2003	6/5/2003	8/21/2003	140	10/16/2003
	Shawnee	3/17/2003	85	50	5/27/2003	5/20/2003	7/9/2003	8/30/2003	160	10/20/2003
	Cave in Rock	3/17/2003	85	50	5/27/2003	5/17/2003	7/2/2003	9/24/2003	150	10/20/2003
Green sprangletop	Van Horn	3/13/2003	55	53	5/27/2003	5/30/2003	6/16/2003	7/9/2003	120	9/26/2003
Eastern gamagrass	Pete	3/13/2003	115	95	5/27/2003	4/12/2003	5/2/2003	5/23/2003	160	10/30/2003

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