East Texas Plant Materials Center

2007 Technical Report

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Introduction

Who We Are

The East Texas Plant Materials Center (ETPMC) located at the Stephen F. Austin Experimental Forest near Nacogdoches, Texas is part of the Natural Resources Conservation Service (NRCS), United States Department of Agriculture. The Center is a joint venture between Soil and Water Conservation Districts in east Texas and northwestern Louisiana, NRCS, Stephen F. Austin State University, and US Forest Service.

What We Do

The mission of the NRCS Plant Materials Program is to develop and transfer plant materials and plant technology for the conservation of natural resources. In working with a broad range of plant species, including grasses, forbs, trees, and shrubs, the program seeks to address priority needs of field offices and land managers in both public and private sectors. Emphasis is focused on using native plants as a healthy way to solve conservation problems and protect ecosystems. Center personnel also develop research projects and technical reports for use in developing technical guides for agency personnel and landowners on the use of plant materials in various conservation practices.

The Center cooperates with other agencies and organizations to develop plant materials and technology. Cooperators include the US Forest Service, Soil and Water Conservation Districts in east Texas and western Louisiana, entities within NRCS, and the Arthur Temple College of Forestry and Agriculture at Stephen F. Austin State University at Nacogdoches, Texas.

Priorities of the East Texas Plant Materials Center:

PMC activities are directed to develop plant materials and corresponding technology for the following seven high priorities:

- Erosion control and improvement of water quality and quantity
- Domestic livestock and wildlife food and cover
- Revegetation, water quality improvement and erosion control following timber harvests.
- Revegetation and stabilization of surface mined areas
- Stream bank stabilization and frequently inundated bottomlands
- Saline areas and high water table soils
- Wetland environments using adapted herbaceous and woody aquatic species

Service Area

The Plant Materials Center serves 48.2 million acres in east Texas and northwestern Louisiana. The topography is diverse ranging from level floodplains to strongly sloping forestlands and prairies. Soils in the service area

range from deep, coarse textured sands to heavy clay bottomlands. Average yearly rainfall amounts vary from 32 inches to 56 inches near the Gulf coast. Humidity and temperature are usually high during the growing season. The average growing season ranges from 228 days to 260 days from north to south. The Center is one of 27 USDA, Natural Resources Conservation Service, Plant Materials Centers strategically located across the nation. Centers are located to serve areas with similar soils, plants, and climate.

PMC Site Information

The PMC is located at the US Forest Service Stephen F. Austin Experimental Forest about ten miles southwest of Nacogdoches, Texas. Presently, 26 acres are utilized for plant evaluation studies and foundation seed production. Soils at the PMC are acidic, but considered productive. The soils are: Attoyac fine sandy loam, Bernaldo fine sandy loam, Woden fine sandy loam, and Bernaldo-Besner complex. These soils are gently sloping (0 to 4 percent) and will develop fragipans.

Weather Information for 2007

Table 1. Temperature and Rainfall Information for East Texas PMC, Nacogdoches, Texas

Month	Avg.* High	Avg.* Low	2007 Month High	2007 Month Low	Avg.* Prec.	2007 Month Prec.	+/-Avg.
	----------F°----------				----------In ----------		
JAN	57	36	74	24	4.4	8.6	+4.2
FEB	62	40	82	20	3.9	1.7	-2.2
MAR	69	47	84	27	4.2	1.2	-3.0
APR	76	55	88	34	4.1	1.0	-3.0
MAY	83	64	90	52	4.8	4.4	-0.4
JUNE	90	71	94	63	4.1	5.7	+1.6
JULY	93	74	94	64	2.9	5.2	+2.3
AUG	94	73	101	72	3.1	1.0	-2.1
SEPT	88	67	94	62	3.7	1.5	-2.2
OCT	79	56	92	40	4.0	2.1	-1.9
NOV	68	45	84	32	4.6	4.6	0.0
DEC	65	42	74	24	4.6	4.1	-0.5

Progress Continues on Evaluation Area Expansion

The East Texas Plant Materials Center is currently working with the US Forest Service to expand the acreage available for evaluation and seed production activities. The original Memorandum of Understanding with the Forest Service allotted up to 75 acres for Plant Materials Center activities. Presently, twenty-six acres is being utilized by the PMC. During 2007, several steps were taken toward the expansion. An environmental assessment was completed by Kathy Duncan of the United States Forest Service. The completion of this assessment lead to several other steps including pre-cruise for timber volume, soils and wetland determinations, biological assessment, endangered species evaluation, archaeological survey, and boundary delineations .

Personnel

East Texas Plant Materials Center Staff

James Stevens
Plant Materials Center Manager

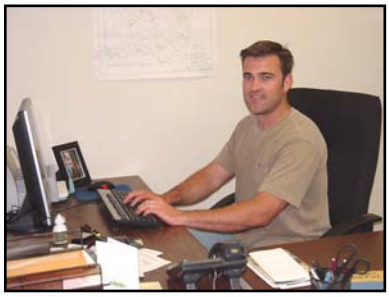
Melinda Brakie
Soil Conservationist

Alan Shadow
Soil Conservationist

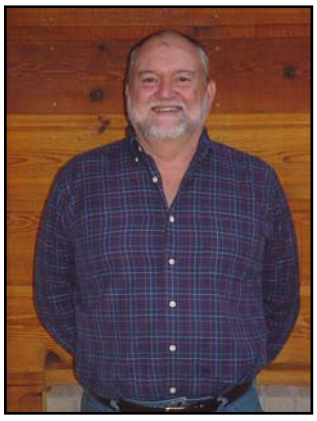
Tim Allen
Biological Technician (Plants)

Max McCormack
Biological Technician (Intermittent)

Alan Shadow and Max McCormack Join PMC Staff in 2007



Alan Shadow, a native of Shreveport, Louisiana, earned an undergraduate degree in biochemistry from LSU-Shreveport in 1995. Alan was then employed by the LSU AgCenter Red River Research Station where he aided in conducting a water quality project using chicken litter and municipal waste for fertilization in cotton production and variety trials of agronomic crops. He transferred to LSU Baton Rouge, Louisiana and earned a Master of Science degree in Agronomy with a wetland management emphasis while working for LSU as a research associate. In 2005 he was hired by the USDA/NRCS Plant Materials Program under the Career Intern Program. He transferred to the Manhattan Plant Materials Center in Manhattan, Kansas and trained for 22 months before moving to the East Texas Plant Materials Program in April of 2007.



Max McCormack earned his undergraduate degree in Agriculture Education from Stephen F. Austin State University. Then attended Louisiana State University and earned a Master of Science degree in Animal Science. After graduating, he was employed as a conservation planner by the Soil Conservation Service for seven years at the Rusk Field Office. Afterward, he taught agriculture at New Summerfield High School for thirty-one years.

The purpose of this publication is to present information from active studies conducted during 2007. These studies are ongoing and information is preliminary in nature. Past information about PMC studies is available at http://Plant-Materials.nrcs.usda.gov.

Plant Evaluation Studies

Title: Initial Evaluation of Little bluestem Accessions
Study Number: ETPMC-P-0565-PA
Study Leader: Melinda Brakie
Duration: 2005 - 2007

Introduction

Little bluestem (*Schizachyrium scoparium*) is a warm season native perennial grass found throughout the United States. This plant is considered one of the major grasses of the tall grass prairies. It grows on a variety of soils and is distributed throughout most of Texas. The objective of this initial evaluation is to choose the best performing accessions for advanced study and release of an adapted cultivar. Seed of little bluestem accessions were collected by NRCS personnel in Texas and Louisiana from 2002 to 2004.

Materials and Methods

Eighty-four accessions were seeded in transplant cones in the greenhouse during February 2005. The plants were then transplanted to the initial evaluation block from June 9th to 13th, 2005. Due to dry growing conditions, some transplants did not survive. These accessions were transplanted to the initial evaluation block again in 2006. Evaluations of the accessions began in 2006. Visual evaluations were recorded for foliage abundance, seed production amount and lodging. Ratings were scored from 1=best to 9=poor.

2007 Activity

Evaluation notes were taken in 2007 using the same criteria and scoring as 2006. Thirty-three of the accessions originally collected as little bluestem were identified as pinehill bluestem based upon phenotypic characteristics. In October 2007, five little bluestem accessions were chosen for advanced evaluation because of their foliage abundance, disease resistance, seed production, and lodging scores. They also exhibited better seed emergence and transplant survival when compared to the other accessions.

Table 1. Little bluestem accessions chosen for advanced evaluation at the East Texas Plant Materials Center

Accession #	County of Origin	Collector
9067237	Leon County, TX	Kim Wright
9067257	Robertson County, TX	Mike Stellbauer
9067279	Burleson County, TX	Preston Irwin
9067292	Guadalupe County, TX	George Clendenin
9067345	Robertson County, TX	Mike Stellbauer

Title: Initial Evaluation of Splitbeard bluestem Accessions
Study Number: ETPMC-P-0567-PA
Study Leader: Melinda Brakie
Duration: 2005 - 2007

Introduction

Splitbeard bluestem (*Andropogon ternarius*) is a native perennial grass which grows 80 to 120 cm. tall. This species has a light fluffy colored seed and flowers from August to November. Splitbeard bluestem is adapted throughout the southeastern United States. It is commonly associated with little bluestem on well drained sandy sites.

The objective of this initial evaluation study is to choose the best accessions for further evaluations and plant release. The intended uses of this plant are pasture/hay planting and wildlife habitat.

Materials and Methods

Twenty-three accessions were seeded in transplant cones in the greenhouse on March 5th, 2005. The young plants were transplanted to an initial evaluation block on June 2nd, 2005. No evaluation notes were taken during 2005 to allow for plot establishment. Evaluation notes were begun in 2006. Visual evaluations were recorded for foliage abundance, seed production amount, and lodging. Ratings were scored from 1= best to 9=very poor.

2007 Activity

On February 22nd, the evaluation plot was prescribed burned. Evaluation notes were taken using the same scoring as 2006. After comparing the accessions by the above criteria, five accessions were chosen for advanced evaluation. These accessions also exhibited better emergence in 2005 and good transplant survival during establishment.

Table 2. Splitbeard bluestem accessions chosen for advanced evaluation at the East Texas Plant Materials Center 2007

Accession #	County of Origin	Collector
9067344	Robertson County, TX	Mike Stellbauer
9067260	Robertson County, TX	Mike Stellbauer
9067326	San Augustine, TX	Ray Stoner
9067203	Nacogdoches, TX	Jim Stevens
9067265	Freestone, TX	David Polk

Title: Initial Evaluation of Pinehill bluestem Accessions
Study Number: ETPMC-P-0566-PA
Study Leader: Melinda Brakie
Duration: 2005 - 2007

Introduction

Pinehill bluestem, (*Schizachyrium scoparium* var. *divergens*) also known as eastern little bluestem, grows in open woods and forest margins. This species is apparently more shade tolerant than little bluestem. This species is common in eastern Texas, central Louisiana, and southern Arkansas.

Materials and Methods

Pinehill bluestem accessions were collected by NRCS personnel in Texas and Louisiana. These accessions were seeded in transplant cones in the greenhouse during March 2005. Three accessions did not produce seedlings for planting. Nine accessions were transplanted to the initial evaluation block on June 2, 2005. Due to dry growing conditions, five accessions did not survive the spring and early summer. These accessions were replanted in April 2006. Evaluation of the accessions began in 2006 and continued in 2007. Visual observations were recorded for foliage abundance, disease resistance, seed production, and lodging. Ratings were scored from 1= best to 9 = poor. Seed production stages and plant heights were recorded.

2007 Activity

The plot was burned on February 22, 2007. Regrowth began in early March. After the 2007 growing season, three accessions were chosen for advanced evaluation based upon seed production and disease resistance.

Table 3. Pinehill bluestem accessions chosen for advanced evaluation at the East Texas Plant Materials Center 2007

Accession #	County/Parish of Origin	Collector
9067206	Nacogdoches County, TX	Jim Stevens
9067310	San Augustine County, TX	Jim Stevens
9067691	Caldwell Parish, LA	Scott Edwards

Title: Initial Evaluation of Gayfeather
Study Number: ETPMC-P-0568-WL
Study Leader: Melinda Brakie
Duration: 2005 - 2007

Introduction

Gayfeather (*Liatris* spp.) are mostly showy, slender, erect narrow leaved perennials with stems originating from a base. The species are found in open to moderately timbered sites. Sandy soils are generally preferred. For species in Texas and Louisiana, heights range from 30 to 100 cm. tall. Livestock will graze on young plants, but mature plants are not as palatable.

Materials and Methods

Thirty-three accessions were collected by NRCS personnel during 2002 to 2004. These accessions were seeded in transplant cones in March 2005. Emergence of the accessions was not consistent. Most of the accessions were reseeded in August in anticipation of a fall planting. Twelve accessions were planted to the initial evaluation block on October 11th and 12th, 2005. Five more accessions were planted to the initial evaluation block on January 31, 2006. Replanting of accessions was completed in 2006 and 2007. Evaluation notes were taken in 2006 and 2007. Visual observations included seed amount, lodging, and seed development stages.

2007 Activity

On March 30, the following accessions were transplanted to the initial evaluation block: 9067296, 9067334, 9067333, 9067301, 9067306, 9067321, and 9067332. Evaluation notes were taken through the growing season. In October, two accessions were chosen for seed increase, 9067351 from Montgomery County, Texas (collected by Mike Stellbauer and T. Bethke) and 9067333 from Harrison County, Texas (collected by Nathan Orsak).

Plant Technology Studies

Title: Rust Resistance Screening of Indian Grass (*Sorghastrum nutans*)
Study Number: ETPMC-P-0774-WL
Study Leader: R. Alan Shadow
Duration: 2007-2010

Introduction:

Rust (*Puccinia sp.*), is a common fungal pathogen that attacks many warm season grasses, lowering productivity. In extreme cases, especially when coupled with other environmental stressors such as drought, it can lead to stand reduction and death. The East Texas Plant Materials center recently screened through a large, genetically diverse, collection of Indiangrass (*Sorghastrum nutans*) from the Native Prairie Association of Texas, NPAT. Many of the plants in this collection were highly susceptible to rust, however, some of the plants exhibited little to no infection. This material was collected for inclusion in a rust screening study in an attempt to discover a rust resistant Indiangrass for release and use in future breeding projects.

2007 Activity:

Plants from the NPAT collection of Indiangrass were screened visually for rust resistance. Plants that showed little to no infection were flagged. The flagged plants were visually screened a second time for rust resistance and other favorable qualities such as vigor, tiller density, size, and color. The best 23 plants were selected for use in the rust resistance screening study.

Individual clumps of plants were dug from the NPAT collection and split into four plugs of equal size, approximately 5"x5". This material was then planted on 4 foot centers in a Randomized Complete Block Design utilizing 4 replications on June 6-7, 2007. 'Lometa' Indiangrass was used as a control in this experiment. A highly susceptible plant was also selected as a control and rust spreader. This brought the total number of treatments to 25 plants per block. A border of rust susceptible

plants from the NPAT collection was planted around the study to minimize edge effect and to aid in spreading the rust pathogen. The study was irrigated as needed throughout the summer to minimize shock associated with transplanting. At the end of the growing season, notes were collected on the study. The seed heads were then clipped to eliminate seed from dropping into the study area and contaminating the study with hybridized seedlings.

Summary:

There was 100% survival rate on the transplants, and they did very well during the summer of 2007. Initial evaluation of data collected in 2007 shows many accessions performing as well or better than 'Lometa', with a couple accessions performing exceptionally well. This is encouraging; however, no in depth analysis will be done until multiple years of data are available for comparison. This will help eliminate variability associated with transplanting and establishment.

Title: Planting Rate of Harrison Florida paspalum germplasm
Study Number: ETPMC-T-0359-WL
Study Leader: Melinda Brakie
Duration: 2004 - 2009

Introduction

Planting rates are an important part of successful establishment of native warm season grass stands. These rates for individual species are given in pounds of pure live seed (PLS) per acre. Planting recommendations in PLS compensate for the normal variations in purity and germination of individual seed lots.

Harrison Florida paspalum germplasm was released to the commercial market in 2004 by the East Texas Plant Materials Center. This species is recommended for wildlife, especially gamebirds. Currently, there is no information concerning PLS seeding rates. The objective of this study is to determine an optimum seeding rate which is both economical and promotes successful stand establishment.

Materials and Methods

The plots were planted in the spring for three consecutive years (2004-2006). The study design was a randomized complete block with three replications and five seeding rates of 4,6,8,10 and 12 lbs./acre PLS. The subplots measured two by six feet with rows eight inches apart to simulate drill planting. The subplots were planted by hand to ensure accurate seed numbers per row. To simulate planting conditions, no chemicals were applied to the subplots during the study. The subplots received no irrigation water during the study. Percent cover of Florida paspalum in each subplot was determined using transect lines with marked points. Transects were taken in the spring and fall. Transect data was analyzed using STATS8®.

Results and Discussion

2007 Activity

Results from the 2004 seeded plots:

The 2004 plots were seeded on April 14, 2004. This year was conducive for plant emergence and growth. Soil moisture was adequate throughout the growing season. From April to October 2004 the Center received 36 inches of rain including 15.5 inches during the critical summer months of June to August.

During this study, two transects were completed on the 2004 plot. The first transect was completed in July of 2005 approximately 15 months after planting. Rate 1(4 PLS lbs/acre) showed significantly less percent cover than the heavier seeding rates.

The second transect was completed on April 24th, 2007 approximately three years after planting. Results indicate there was no significant difference (P = .5845) in percent cover among the planting rates three years after planting.

Table 4. Average percent cover of Harrison Florida paspalum germplasm approximately three years after planting. 2004 Seed Rate Plot

	Transect Dates	
	July 8, 2005	April 24, 2007
PLS pounds/acre	---------- ----------% Cover----------	
4	13 b*[1]	53a*
6	46 a*	76a*
8	41 a*	66a*
10	49 a*	63a*
12	40 a*	62a*

* Values followed by the same letter are not significantly different (Tukey's at 0.05)
1= Averaged over 2 replications

Results from the 2005 Seeded Plots:

The 2005 plots were seeded on April 28, 2005. In mid-May, no Florida paspalum seedlings had emerged in the subplots. Crabgrass seedlings were also prevalent in the subplots. The 2005 growing season was very dry. In contrast to 2004, only fifteen inches of rain fell at the Center during the growing season (April to October).

The first transect was completed on November 17, 2005. Percent cover was very low in most of the subplots ranging from 0 to 8%. There were five subplots which ranged from 21% to 41% cover. These subplots were all in the same area of the main plot and may have had more soil moisture available than the other subplots. This explanation would account for the difference in percent cover from the other subplots.

In 2007, two transects were completed. The first was on April 24th. The second was on December 7th. However, no significant difference was found between the seeding rates for the April (P = 0.9034) or December (P = 0.9807) transects.

Table 5. Average percent cover of Harrison Florida paspalum germplasm approximately two years after planting. 2005 planted plot. (all subplots)

	Transect Dates	
	April 24, 2007	December 7, 2007
PLS pounds/acre	----------% Cover----------	
4	27	36
6	18	32
8	28	35
10	14	26
12	30	37

Table 5. Average percent cover of Harrison Florida paspalum germplasm approximately two years after planting. 2005 planted plot. (The five subplots deleted as outliers).

	Transect Dates	
	April 24, 2007	December 7, 2007
PLS pounds/acre	----------% Cover----------	
4	12	25
6	12	21
8	11	15
10	14	26
12	9	17

Results from 2006 Seeded Plots:

The 2006 plots were planted on April 24, 2006. In December 2006, Florida paspalum plants were not readily visible in the subplots. Emergence of the plants may have been hindered by dry weather during the spring and early summer. Rainfall was greater than in 2005, but did not equal 2004 amounts. Twenty-four inches of rain fell during the 2006 growing season.

Two transects were completed in 2007. The April transect values ranged from 0 to 19% cover for all seeding rates. In November, percent cover improved in most subplots and varied from 0 to 46% for all seeding rates. Despite the variations among the subplots, there was no significant difference in percent cover for the April (P = 0.5048) or November (P = 0.2297) transects.

Table 6. Average percent cover of Harrison Florida paspalum germplasm approximately one year after planting. 2006 seeded plot.

	Transect Dates	
	April 24, 2007	November 5, 2007
PLS pounds/acre	----------% Cover----------	
4	5	8
6	13	19
8	13	21
10	14	21
12	21	29

Title: Effect of Age of Seed and Prechill on Germination of Two Florida paspalum Seed Lots
Study Number: ETPMC-T-0670 –WL
Study Leader: Melinda Brakie
Duration: 2006 - 2008

INTRODUCTION

Florida paspalum, (*Paspalum floridanum*), is a native warm season perennial grass adapted to the southeastern United States. This grass is a source of food and cover for various gamebirds (Grelen and Hughes, 1984). Florida paspalum seeds have shown varying degrees of dormancy, which hinders germination. Warm season grass dormancy is influenced by seed age (Shaidee et al, 1969). Prechilling has been shown to overcome dormancy in switchgrass (Douglas and Grabowski, 1995), which is another warm season perennial.

In 2006, a seed germination study of Harrison Florida paspalum germplasm was conducted at the East Texas Plant Materials Center. Study results indicated prechilling overcame seed dormancy in seedlots less than three years old. Germination of seedlots three years or older were influenced more by seed lot age than prechilling. Since information on Harrison Florida paspalum germplasm seed germination was limited to only the 2006 study, the experiment was continued in 2007. The objective of the 2007 study was to determine the effect of prechilling and seed age on the same two lots of Harrison Florida paspalum germplasm.

MATERIALS AND METHODS

Generation 0 and 1 seedlots were harvested from seed production fields at the USDA/NRCS East Texas Plant Materials Center. Generation 0 seed lots were harvested from 2000 to 2004 and represent seed ages three through seven years. Generation 1 seed was harvested from 2003 - 2006 and represent seed ages one through four years. The seed lots were stored in a controlled environment of ~50^{0}F and ~ 50% humidity. A South Dakota seed blower was used to separate the seed lots into heavy and light portions. Only the heavy portion was used for the germination tests. Replications of 100 seeds for each seed age and treatment were counted and placed on a paper substrate in germination boxes. Seed being prechilled was placed in a germinator for 14 days at 38^{0}F (AOSCA, 1993). Before beginning the germination test phase, the paper was moistened with a 2% KNO_3 solution. The seed was placed in a germinator for 28 days with alternating temperature of 86^0/68^{0}F and light for 8 hr. day/10 hr. night. The experimental design was a randomized complete block with four replications. Germinated seed was counted and discarded at 7, 14, 21, and 28 day intervals. Seed was considered germinated if both root and leaf were visible. Only the 28 day results will be discussed in this report.

2007 Activity

Generation 0

Germination of the seed lots was more influenced by seed age (R^2=0.89) than exposure to prechill treatment (R^2=0.77). Prechill overcame dormancy in the three year old seed lot. However, prechill did not influence germination in seedlots 4 to 7 years old. Therefore, storing seed in controlled environment for at least three and a half years was adequate to overcome seed dormancy. There was a noticeable reduction (~30%) in germination percentage between seed lot ages six and seven years for both prechill and no prechill. This suggests seed quality may be adversely affected by long term storage in a controlled environment (~50^{0}F and ~ 50% humidity).

Generation 1

Seed age had a greater influence (R^2=0.99) on germination of seedlots than prechill treatment (R^2=0.92). Seed dormancy was highest for the one year old seedlot. Prechill aided germination in the one and two year old seedlots. However, three and four year old seedlots did not respond to prechill. Given this result, it appears dormancy can be overcome by controlled storage for two and a half years.

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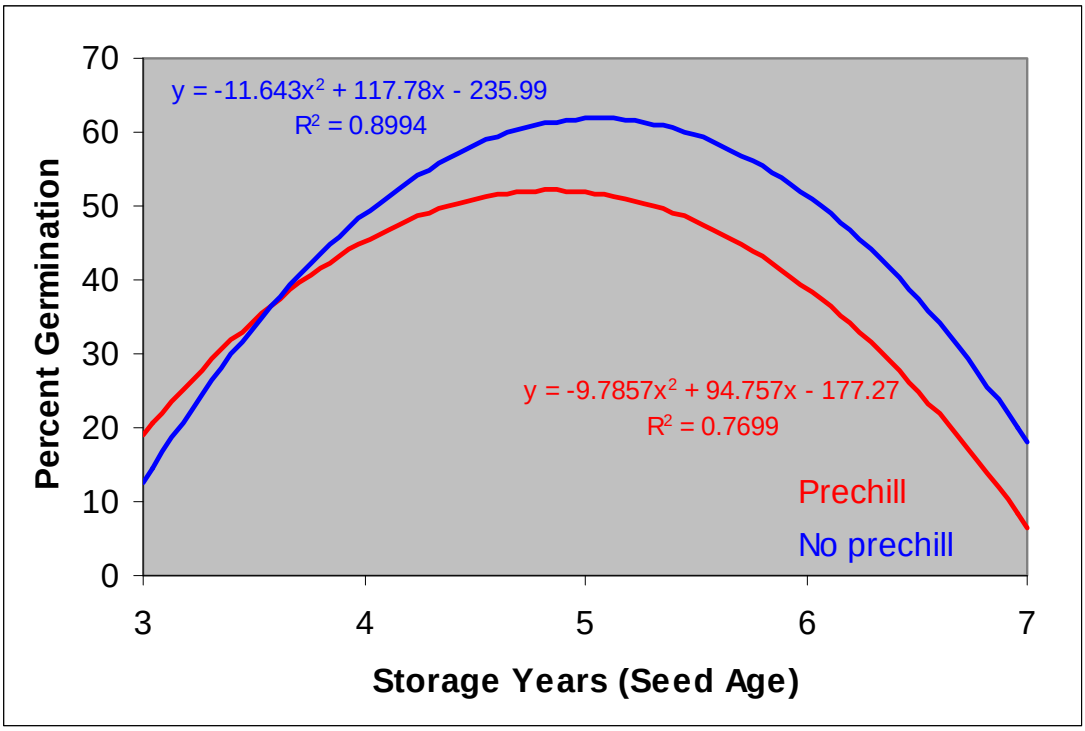

Figure 1. 2007 Seed germination of Harrison Florida paspalum germplasm Generation 0 seed lots

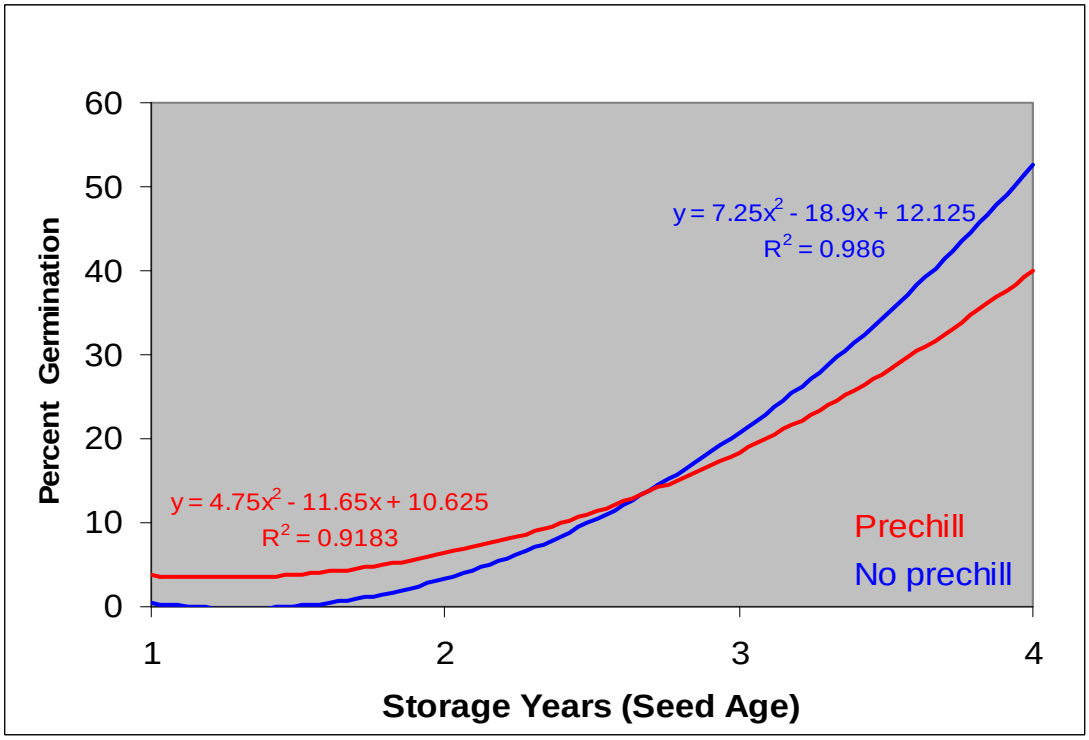

Fig. 2. 2007 Seed germination of Harrison Florida paspalum germplasm Generation 1seed lots.

Effect of Ambient and Cool Storage on Seed Germination of Harrison Germplasm Florida paspalum

Introduction

Florida paspalum, (*Paspalum floridanum)*, is a warm season perennial grass native to the southeastern United States. This species is used by gamebirds for food and cover (Grelen and Hughes, 1984). In 2004, the USDA-Natural Resources Conservation Service East Texas Plant Materials Center released Harrison germplasm Florida paspalum. Freshly harvested seeds of Harrison germplasm have exhibited various degrees of dormancy which can adversely effect stand establishment. In 2006 and 2007, studies were conducted to determine the effect of age of seed and prechill on seed germination (Brakie et al, 2006). However, no study had been conducted on the effect of ambient storage on the germination of freshly harvested seed of Harrison germplasm. Such information would be of interest to commercial seed growers. The objective of this study was to examine the effect of ambient and cool storage on the germination of Harrison germplasm Florida paspalum.

Materials and Methods

Seed of Harrison germplasm was collected in July 2006 from the seed production field at the USDA/NRCS East Texas Plant Materials Center near Nacogdoches, Texas. Seed was separated into heavy and light fractions with a South Dakota seed blower. Only the heavy fraction was used for germination tests and divided into two portions. One portion was stored in an ambient environment in the Plant Materials Center office at approx. 70^0 F. The other portion was stored in a controlled environment of ~50^0F and relative humidity of ~ 50%. One hundred seed of each treatment combination was placed on a kimpack substrate moistened with 2% KNO_3. The prechilled seed was stratified for 14 days at 38^0 F (AOSA, 1993) prior to germination testing. During germination testing seed was placed in a germinator for 28 days with alternating day/night temperatures of $86^0/68^0$F and 8 hour day/10 hour night. The experiment was arranged in a randomized complete block with four replications. Germinated seeds were counted and discarded at 7, 14, 21, and 28 days. Germination tests were conducted at 1, 5, 9, and 12 months. Germination data was subjected to an analysis of variance procedure in STATISTIX 8 (Analytical Software, 2003). Results presented in this report are 28 day totals and averages for each treatment.

2007 Activity

One Month Seed Age

Seed dormancy for both ambient and cool storage treatments was very high. There was no significant difference ($P > 0.61$) between treatments. Seed germination varied from 0.5% to 1.5%. This germination result is similar to Coukos (1944) of little bluestem (*Schizachyrium scoparium*) and side oats grama (*Bouteloua curtipendula*) collections with 0% and 4% respectively after 2 months of ambient storage.

Five Month Seed Age

Only the ambient stratified treatment exhibited a significant change ($P<0.0004$) in germination percentage. Dormancy appeared to be decreasing for this treatment.

Table 1. Germination Percentage of Harrison germplasm Florida paspalum at 5 Month Seed Age. East Texas Plant Materials Center 2007.

Treatment	Percent Germination*	
Ambient stratified	39	a
Ambient nonstratified	5	b
Cooler stratified	1	b
Cooler nonstratified	0.5	b

*Values followed by the same letter are not significantly different at P = 0.5

Nine Month Seed Age

The nine month germination tests showed a marked difference between the ambient and cooler treatments. The highest germination of 91% was exhibited by the ambient nonstratified treatment. Results indicate nine months of ambient storage is enough time to overcome seed dormancy. This is similar to results of a study conducted by Kalmbacher et al. (1999) which found six months of ambient storage increased seed germination of 'Suerte' atra paspalum (*Paspalum atratum* Swallen). Coukos (1944) also found seed germination of 'Aldous' little bluestem (*S. scoparium*) was increased after 6 months of ambient storage.

Table 2. Germination Percentage of Harrison germplasm Florida paspalum at 9 Month Seed Age. East Texas Plant Materials Center 2007

Treatment	Percent Germination*	
Ambient stratified	77	a
Ambient nonstratified	91	a
Cooler stratified	43	b
Cooler nonstratified	4	c

*Values followed by the same letter are not significantly different at P=0.5

Twelve Month Seed Age

Seed germination of the ambient treatments declined slightly. However, germination of the cooler treatments increased, but were still significantly ($P<0.000$) less than the ambient treatments.

Table 3. Germination Percentage of Harrison germplasm Florida paspalum at 12 Month Seed Age. East Texas Plant Materials Center 2007

Treatment	Percent Germination*	
Ambient stratified	53	b
Ambient nonstratified	87	a
Cooler stratified	23	c
Cooler nonstratified	11	c

*Values followed by the same letter are not significantly different at P=0.5

Conclusions

Seed age and storage conditions influenced seed germination. Dormancy was very pronounced in freshly harvested seed. However, as storage time increased, so did seed germination. At five months of storage, ambient storage treatments exhibited greater seed germination than cool storage treatments. The highest seed germination occurred at nine months of ambient storage of nonstratified seed. Results from this study suggest ambient storage for nine months overcomes seed dormancy in Harrison germplasm Florida paspalum. Seed germination of the ambient storage treatments decreased at the twelve month storage interval. The cool storage treatments did increase in germination percent, but were still significantly less than ambient storage treatments. The higher germination of ambient storage treatments may be due to after ripening effects occurring in the seed during storage. Given the results of this study and the method of ambient storage as described in this report, a commercial grower would be able to harvest seed, store it in ambient conditions, and sell the seed for planting the following spring.

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Title: Seed Production of Three Eastern Gamagrass Accessions in East Texas
Study No: ETPMC-T-0671-PA
Study Leader: R. Alan Shadow
Duration: 2006-2009

Introduction
Eastern gamagrass is a native warm season perennial adapted throughout most of the eastern United States. The primary use of this plant is as a livestock forage with potential uses in vegetative barriers and soil phytoremediation. Nitrogen fertilization increases seed production of grass species such as tall fescue (*Lolium arundinaceum* Schreb.) (Buckner,1985). Low seed yield by eastern gamagrass has limited its acceptance in the commercial market. Therefore, the objective of this study is to determine if N fertilization does effect seed production of 'Medina', 'Jackson', and #9043629 (Nacogdoches, Co.).

Materials and Methods
The study will be conducted at the East Texas Plant Materials Center near Nacogdoches, Texas. The study plot soil type is an Attoyac fine sandy loam. The experimental design is a randomized complete bock with three replications. Phosphorus and potassium fertility will be brought up to a medium level. Reproductive tillers will be counted and seed harvested from each plot. Evaluation will begin in 2007.

2006 Activity
On May 2, study plots were vegetatively planted. Water was applied to the plots to aid in transplant growth. Urea fertilizer (0-0-34) was applied to the accession plots at a per acre rate of 75 lbs. on June 7th.

2007 Activity
The plots were fertilized with ammonium nitrate (33-0-0) at a rate of 75 pounds per acre on April 12th. The number of vegetative and reproductive tillers was recorded on May 24, 2007. The number of axillary inflorescences was also recorded on this date. Seed from the axillary tillers was harvested when the plots reached 75% seed maturity. 'Medina' was the earliest maturing cultivar with a harvest date of July 3, 2007. #9043629 (Nacogdoches, Co.) was harvested on July 19, 2007. 'Jackson' was the latest maturing cultivar and was harvested on August 8, 2007. The seed collected was cleaned of anthers and stem material, and allowed to dry at ambient temperature until there was no change in the seed weight. The weight from each plot was then recorded. The seed was then fractionated using a South Dakota Seed Blower to separate the fill and unfilled seed. It was set at 70% open, (Ahring and Franks, 1968). Seed from the heavy and light fractions were randomly sampled and checked by dissection to insure adequate separation was achieved. The weight of each fraction was recorded. The heavy, or filled fraction, was then compared to the bulk weight of the sample to determine the percent fill. Statistical analysis using Statistix 8 did not detect any significant difference between accessions for percent fill; however, there was a trend showing increased percent fill for Medina and #9043629 (Nacogdoches, Co.). Larger sample size may be needed

to confirm no statistical differences between accessions for percent fill. Germination tests are scheduled for each accession to determine if there are any differences in seed quality.

Table 1. 2007 Seed Weight Data for Eastern gamagrass Releases and Accession. East Texas Plant Materials Center.

Rep	Accession	Bulk Wt (g)	Filled Wt (g)	Empty Wt (g)	% Fill
1	Nacogdoches	222	186	36	83.78
2	Nacogdoches	95	76	20	80
3	Nacogdoches	159	133	26	83.65
1	Jackson	103	79	24	76.7
2	Jackson	109	80	29	73.39
3	Jackson	106	72	34	67.92
1	Medina	29	22	7	75.86
2	Medina	90	81	9	90
3	Medina	115	98	17	85.22

Reference:

Buckner, R.C. 1985. The fescues. P.233-244 in M.E. Heath, R.B. Barnes and D.S. Metcalfe (ed.) Forage, the science of grassland agriculture. 4th ed. Iowa St. Univ. Press, Ames, IA.

Ahring, R. M. and H. Franks. 1968. Establishment of eastern Gamagrass from seed and vegetative propagation. J. Range Management. 21:27-30.

Title: Effects of Cold Season Legume N fixation on 'Alamo' Switchgrass for Biofuel/Biomass Production
Study No: ETPMC-T-0776-BF
Study Leader: R. Alan Shadow and Jim Stevens
Duration: 2007-2011

Introduction:

Biofuels are becoming increasing popular as the cost of fossil fuels and awareness of global warming potential increase. Currently, most biofuel production revolves around bio-diesel from vegetable oils and ethanol from corn (*Zea mays*) fermentation. However, with the discovery of new enzymes, ethanol production from cellulose is becoming more efficient and viable as a fuel source.

Switchgrass (*Panicum virgatum*) is a native, perennial, warm season grass that has a wide distribution throughout the United States and Canada. It is very prolific and produces vast quantities of bio-mass annually. Corn and vegetable oils are directly tied to the food industry. As demand for biofuels increases; so will the price of food products made from these materials. Corn is an annual and has large nitrogen and water inputs requirements to produce high yields. Nitrogen fertilizer, being directly tied to the petroleum industry, will rise in costs with fossil fuels. As a perennial, switchgrass does not require establishment every year. Once established, a stand can be used as a renewable resource, if properly managed, and carbon that is sequestered in standing crops will help offset carbon produced from burning ethanol as a fuel. Switchgrass requires far less in terms of fertilization and water inputs compared to corn. The use of cold season legumes for their nitrogen input will further offset the potential costs of production. The cultivar 'Alamo' from the Knox City Plant Materials Center has the greatest amount of cellulose of the released cultivars, and has the greatest potential for biofuel production from cellulose conversion.

2006 Activity

A small field of 'Alamo' switchgrass was planted in April 2006 using a grain drill. This field was allowed time to establish during the 2006 growing season.

2007 Activity

Soil samples were taken from this field and analyzed for N, P, K and micro nutrients in June 2007. This information will be used to establish a baseline comparison and to insure field uniformity. In mid October, the field was mowed to a height of 8 inches and a disc was used to lightly scratch the surface of the soil. 7'x20' plots were laid out for 4 cold season legumes and a control, and planted in a completely randomized design using 4 replications on October 29, 2007. The maximum seeding rate was doubled to insure a solid stand. The legumes used were, 'Dixie' Crimson Clover (*Trifolium incarnatum* L.), 'Apache' Arrowleaf Clover (*Trifolium vesiculosum* Sav), 'Patriot' White Clover (*Trifolium*

repens L.), and Austrian Winter Pea (*Lathyrus hirsutus*). After planting, a cultipacker was used to cover the seed, and to pack the seed bed to conserve moisture. A double tiered electric fence was then erected to minimize browse damage by white-tailed deer.

Evaluation Factors:

Biomass will be harvested from each plot by cutting a meter squared area 6 inches from the ground at the end of the growing season. The clipping from each plot will be labeled and dried to determine the amount of biomass produced in each plot. Soil samples will be taken from each plot and analyzed for N, P, K, and micro nutrients. This information will be analyzed statistically to determine any significant differences among treatments.

Title: Chasmogamous and Cleistogamous Seed Production of Velvet Panicum (*Dichanthelium scoparium*)
Study No: ETPMC-T-0773-CR
Study Leader: R. Alan Shadow
Duration: 2007-2009

Introduction

'Pilgrim' Velvet Panicum (*Dichanthelium scoparium*) was released from the ETPMC in 2007. It has great potential as a pioneer species in areas that are highly erodible, and provides ground cover for small mammals and birds. Velvet Panicum is capable of producing two seed crops, a chasmogamous, or open panicle, and a cleistogamous, or closed panicle. The chasmogamous seed production takes place during the summer and is the open panicle we typically see with warm season grasses. The cleistogamous seed is produced in the leaf sheaths, or rosettes, at the end of the growing season in early fall. The seed remains tightly held within the boot of the leaf sheath, and eventually shatters as the plant desiccates and is stressed by environmental factors such as winds and rains during the winter months. This experiment is an attempt to determine which seed crop has the greatest yield and seed quality.

Materials and Methods

Plots 10 feet in length were established randomly in the foundation field of 'Pilgrim' Velvet Panicum at the ETPMC. The location of each plot was flagged. The row number of its location and the distance from the end of the row were also recorded in case the flags were lost during the growing season. Chasmogamous and cleistogamous seed from the plots were harvested, cleaned, and analyzed for yield and germination.

2007 Activity

Plots were flagged and recorded in May of 2007. The chasmogamous or open panicle, seed was harvested by clipping the seed heads from the plant on June 5, 2007. The seed was allowed to dry at ambient temperature, and was then thrashed by hand and cleaned. It was noted during the thrashing and cleaning that the chasmogamous seed produced a sticky resin. This resin did not appear to hinder any of the cleaning processes. The seed from each plot was weighed and stored in the seed cooler.

The cleistogamous seed was harvested by clipping the plants 3 inches from the soil on September 12, 2007. The material was then run through the hammer mill to thrash out the seed. Cleaning was done on the desk top clipper machine. The seed had to be cleaned several times to remove all the plant residue and chaff produced by the hammer milling process. The yield weight for each plot was recorded, and the seed was stored in the seed cooler along with the chasmogamous seed.

Analysis was done using Statistix 8. That data for yield per acre was transformed using the log of the yield data. The data was normally distributed, but barely so with a P value of .0501 and a W value of .8230 for the Shapiro Wilk's test for normality. The transformation greatly improved the results with a P value of .5066 and a W value of .9290. The CV also improved from 53.32 to 19.48 with the transformation. A significant difference was detected between the chasmogamous and cleistogamous seed production. The chasmogamous seed production greatly out performed the cleistogamous seed production for yield in 2007. Germination tests are currently in progress.

Table 1. 2007 Chasmogamous and Cleistogamous Seed Production of Velvet panicum. East Texas Plant Materials Center.

Panicle Type	Rep	Cleaned Wt. (oz)	Wt. per Foot (oz)	Yield per Acre (lbs)
Chasmogamous	1	0.25	0.025	20.4
Chasmogamous	2	0.85	0.085	69.4
Chasmogamous	3	0.63	0.063	51.4
Chasmogamous	4	0.85	0.085	69.4
Cleistogamous	1	0.05	0.005	4.1
Cleistogamous	2	0.2	0.02	16.3
Cleistogamous	3	0.1	0.01	8.2
Cleistogamous	4	0.15	0.015	12.2

Seed Increase

Title: Coastal Prairie Plant Seed Increase

Study Number: LaPMS-S-0305-TE
Study Leader: Melinda Brakie

Introduction

The Center is participating in a project to increase seed of native Louisiana coastal species. Rod rows of five species (yellow wild indigo (*Baptisia sphaerocarpa*), eastern beebalm (*Monarda fistulosa*), slender mountain mint (*Pycnanthemum tenuifolium*), compass plant (*Silphium laciniatum*), and cluster bushmint (*Hyptis alata*) were planted in 2003. Seed from these species is hand harvested, cleaned, and stored for future use.

2007 Activity

Seed was harvested from these species this year:

Accession #	Species	Parish	Amt. of clean seed	Harvest Date
#9067241	Yellow wild indigo	Vermilion	1.25 lbs	07/25/2007
#9067243	Slender mountain mint	Lafayette	0.50 lbs	08/16/2007

Evaluation of Brownseed paspalum and Evaluation of Hooded windmillgrass and Shortspike windmillgrass

Introduction

These three species are being evaluated at the East Texas Plant Materials Center as part of an adaptation study for the Kika de la Garza Plant Materials Center in Kingsville, Texas.

Brownseed paspalum grows in forest openings, along roadways, and firebreaks. This grass prefers wet meadows, ditches, and disturbed areas. The seed is 1/8" long, medium brown color, and shiny coat. Foliage color is gray green or blue green.

Hooded windmillgrass is found in the plains and sandy areas of Texas, Oklahoma, and New Mexico. This grass spreads by rhizomes or seed.

Materials and Methods

The brownseed paspalum and windmillgrass plots are a randomized complete block design with four replications. The brownseed paspalum evaluation includes five accessions (#9064466, 9088647, 9088651, 9088681, and 9089219). The windmillgrass evaluation includes four accessions (260-shortspike, 313-hooded, 283-shortspike, and 301-hooded). Both plots were evaluated twice during 2007.

2007 Activity

Table 1. Average Ratings for Brownseed paspalum Accessions – East Texas Plant Materials Center 2007

Accession	9064466	9088647	9088651	9088681	9089219
% survival	83	98	89	79	91
Vigor	4	5	5	4	5
Seed prod.	5	4	3	3	5

Visual scoring: 1=excellent 3=good 5=fair 7=poor 9=very poor

Table 2. Average Ratings for Hooded windmillgrass and Shortspike Accessions – East Texas Plant Materials Center 2007

Accession	313	301	260	283
% survival	93	100	100	100
Vigor	5	5	4	4
Seed prod.	6	6	5	4
% cover	81	82	97	92

Visual scoring: 1=excellent 3=good 5=fair 7=poor 9=very poor

Harrison germplasm Florida paspalum

Introduction

Harrison germplasm Florida paspalum was released by the East Texas Plant Materials Center in 2004. The objective of these observational plantings is to determine the range of adaptation for this release.

2007 Activity

On April 30th, seed packets were mailed to Plant Materials Centers at Brooksville, Florida; Americus, Georgia; Coffeeville, Mississippi; and Booneville, Arkansas.

A three year old planting at the Knox City, Texas PMC performed well in 2007. The planting received an evaluation score on 08/15/2007 of excellent for stand vigor, stand density, and seed production. This may have been due in part to above average rainfall at the PMC from January to November 2007. Knox City PMC staff will continue evaluations in 2008.

The Americus Plant Materials Center in Georgia planted the Harrison germplasm on May 16th. Emergence was not good and could have been affected by a residual effect of a herbicide treatment in March. The Harrison germplasm was replanted on August 7th. The stand was rated fair in vigor in October. Evaluation will continue in 2008.

Observation / Demonstration Plantings

Plant Materials Center Plant Demonstration Block

In 2001, a plant demonstration block was established at the East Texas Plant Materials Center. The objective of this planting was to observe the performance and adaptation of various releases from Plant Materials Centers in the southeast and south central regions of the United States. Following is performance data at the ETPMC for 2007.

		Foliage				Seed Production			
Plant	Cultivar/ Accession	Abund.	Disease resist.	Height (cm)	Width (cm)	Amount	Lodging	Maturity Date	Height (cm)
Sand bluestem	Chet	5	5	56	51	5	7	25-Oct	178
Little bluestem	Aldous	5	5	33	38	5	5	17-Oct	127
Little bluestem	Cimarron	5	5	30	30	5	5	17-Oct	135
Little bluestem	OK Select	5	5	43	51	5	5	25-Oct	140
Eastern gamagrass	Pete	5	5	90	95	5	5	5-Jul	120
Indiangrass	Cheyenne	5	7	33	84	5	5	23-Oct	170
Indiangrass	Lometa	5	7	80	100	5	5	26-Oct	
Big bluestem	Kaw	5	7	43	51	5	5	10-Oct	170
Green sprangletop	Van Horn	7	7	64	71	7	7	10-Aug	117
Switchgrass	Blackwell	7	7	85	130	7	7	25-Jun	168
Switchgrass	Kanlow	5	5	64	102	5	7	12-Sep	254
Switchgrass	Alamo	5	5	81	109	5	7	15-Oct	229
Switchgrass	Cave in Rock	5	5	51	89	5	5	3-Jul	168
Switchgrass	Shawnee	5	5	51	97	5	5	20-Jul	170
Big bluestem	Booneville Accession	5	5	53	51	5	9	11-Oct	183
Indiangrass	514673	3	5	89	76	5	5	26-Oct	
Indiangrass	Rumsey	5	5	58	86	5	5	6-Oct	178
Indiangrass	Osage	7	7	74	41	7	5	20-Oct	165

Demonstration Planting
Native, Warm Season Grasses for Wildlife Habitat and Working Farms

Planting native species mix in March 2008.

Many pastures throughout the southeastern United States are dominated by bermudagrass (*Cynodon* spp.) or bahiagrass (*Paspalum notatum*). However, these grasses are not very beneficial to wildlife. Landowners considering converting these pastures to native species for wildlife habitat must deal with the grass sod and seed bank.

Recently, the Natural Resources Conservation Service (NRCS) and Agricultural Wildlife Conservation Center began a demonstration project to develop methods to convert pastures from introduced grasses to suitable wildlife habitat. The objective of this project is to show landowners the benefits to wildlife by establishing native grass and forb habitat. In 2007, demonstration sites were established in Alabama, Arkansas, Georgia, Louisiana, Mississippi, and Texas.

Jim Stevens evaluates stand in November.

One of the demonstration sites is in Nacogdoches County. Coincidentally, in the fall of 2006, the landowner treated the site with glyphosate herbicide to control the bermudagrass and bahiagrass before it was chosen as a project site. On March 27, 2007 the site was planted by PMC personnel and Melvin Adams, Nacogdoches Soil and Water Conservation District Technician. The site was planted in a mixture of switchgrass (*Panicum virgatum*), indiangrass (*Sorghastrum nutans*), little bluestem (*Schizachyrium scoparium*), big bluestem (*Andropogon gerardii*), and various forbs using a no-till drill. In November 2007, the site was evaluated by NRCS personnel. The grass and forbs had grown well during the spring and summer. The percent ground cover was greater than 50%.

Publications and Presentations

Publications

Plant Fact Sheets

Plant Fact Sheet for Sea oats (*Uniola paniculata*) – Alan Shadow
Plant Fact Sheet for Splitbeard bluestem (*Andropogon ternarius*) – Melinda Brakie
Plant Fact Sheet for Velvet panicum (*Dichanthelium scoparium*) – Melinda Brakie

Pilgrim Velvet panicum germplasm release materials

Release Notice for Pilgrim Velvet panicum germplasm
Release brochure for Pilgrim Velvet panicum germplasm
Plant Guide for Pilgrim Velvet panicum germplasm

Other Publications

2006 East Texas PMC Technical Report – Melinda Brakie / Jim Stevens
2006 East Texas PMC Activities Progress Report – Jim Stevens / Melinda Brakie
Effect of Seed Age upon Germination of Harrison germplasm Florida paspalum – Melinda Brakie, Jim Stevens

Presentations

Jim Stevens

Date	Title	Location
11/17/2006	Plant Materials Program Information	ETPMC
11/29/2006	Plant Attributes for Natural Resource Management	ETPMC
04/16/2007	Plant Materials Program Overview	ETPMC
04/21/2007	Information about Silvopastoral Practices	Maydelle, TX

Melinda Brakie

10/11/2006	Seed Germination of Florida paspalum	Fifth Eastern Native Grass Symposium
10/13/2006	N Usage by 'Medina' and 'Jackson' Eastern gamagrass	Fifth Eastern Native Grass Symposium
12/05/2006	Update on PMC Activities	ETPMC

Jim Stevens and Morris Houck (LaPMS)

08/21/2007	Native Plant Seed Collecting	Northeast Delta RC&D

PMC Staff, Rob Ziehr (TX PMS), Mike Stellbauer (Zone 4 Range Specialist)

07/18/2007	Plant Materials Program and Seed Collection	ETPMC

Other Activities

Effect of Age of Seed on Germination of Yellow Indiangrass Seed Lots

By: Melinda Brakie

Introduction

Yellow indiangrass (*Sorghastrum nutans*) is a warm season native grass adapted to the eastern United States and Great Plains. This species also occurs throughout the southern pine region. Yellow indiangrass produces large, showy panicles which vary in color from yellow to dark bronze. The plants grow from 4 to 5 feet tall, but will reach 8 feet. This plant is excellent as forage because of its high palatability.

From 2002 to 2005, the ETPMC increased seed of yellow indiangrass for the Native Prairies Association of Texas. The seed increase field included six seed collections that were bulked together. The mature seed was then harvested by combine at the end of the growing season. The objective of this test was to determine the approximate germination of several seed lots and the effect of seed age upon their germination.

Materials and Methods

Seed lots were harvested from a seed increase field at the USDA/NRCS East Texas Plant Materials Center. The 2002, 2004, and 2005 seed lots were chosen for testing and were five, three, and two years old respectively. These seed lots were stored in a controlled environment of ~50^{0}F and ~50^0 humidity. Four replications of 100 seeds each were counted and placed on paper substrate in germination boxes. The paper substrate was moistened with a 2% $KN0_3$ mixture. The seed boxes were placed in a germinator (Environmental Growth Chambers® - NQ1 incubator) for 14 days to prechill at 5^{0}C (41^{0}F) (AOSCA, 2001). After prechilling was completed, germinator temperature settings were adjusted to 20^{0}C (68^{0}F)/30^{0}C (86^{0}F) and light for 8 hr. day/ 16 hr. night. The experimental design was a randomized complete block with four replications for each harvest year. Germinated seed was counted and discarded at 7, 14, 21, and 28 days. Seed was considered germinated if both a root and coleoptile were visible.

Results and Discussion

The three year old seed lot exhibited the highest germination percentage. There was no significant difference (P=0.0946) in germination percentage between the three harvest years.

Table 1. Germination of Yellow Indiangrass Seed Lots. 28 Day Totals. 2007 East Texas Plant Materials Center.

Harvest Year	Seed Lot Age	% Germination
2002	5	39
2004	3	48
2005	2	30

On average, the 14 day germination was the highest among the weekly counts. Germination declined quickly for the 21 day counts. Below is a chart illustrating the average counts for each week during the germination test.

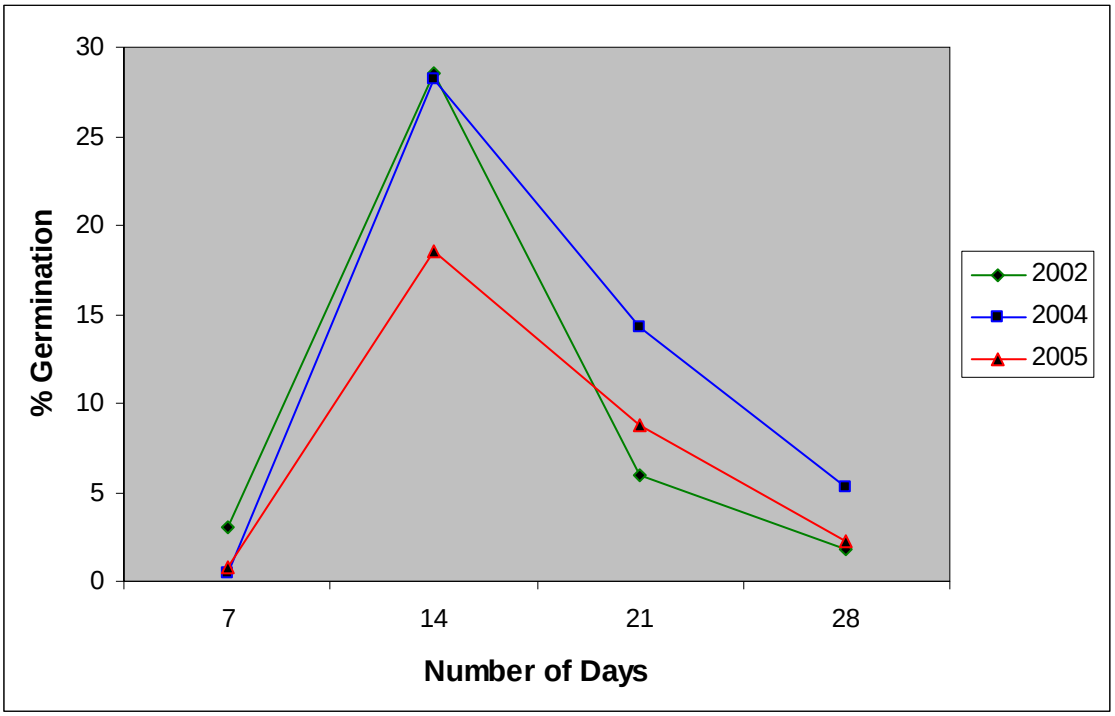

Figure 1. Germination of yellow indiangrass seed lots by weekly counts.

Reference

Association of Official Seed Analysts. 2001. Rules for testing seeds. P. 93d.

Effect of Age of Seed on Germination of Little Bluestem Seed Lots

By: Melinda Brakie

Introduction

Little bluestem (*Schizachyrium scoparium*) is a native warm season bunchgrass adapted throughout the United States. This species has many ecotypic variations including pinehill bluestem (*Schizachyrium scoparium* var. *divergens*) which is common in east Texas and Louisiana. Little bluestem grows well on deep, shallow, sandy, fine textured and rocky soils.

From 2002 to 2005, the ETPMC increased seed of little bluestem for the Native Prairies Association of Texas. Three accessions were bulked together and planted to a seed increase field. The objective of this test was to determine approximate seed germination of three seed lots and the effect of seed age upon their germination.

Materials and Methods

Seed lots were harvested from a seed increase field at the USDA/NRCS East Texas Plant Materials Center. The 2002, 2004, and 2006 seed lots were chosen for testing and were five, three, and one year old respectively. These seed lots were stored in a controlled environment of ~50^{0}F and ~50^0 humidity. Cleaned seed was used in the test, with no additional weight fraction separation. Four replications of 100 seeds each were counted and placed on paper substrate in germination boxes. The paper substrate was moistened with a 2% $KN0_3$ mixture. The seed boxes were placed in a germinator (Environmental Growth Chambers® - NQ1 incubator) for 14 days to prechill at 5^{0}C (41^{0}F) (AOSCA, 2001). After prechilling was completed, germinator temperature settings were adjusted to 20^{0}C (68^{0}F)/30^{0}C (86^{0}F) and light for 8 hr. day/ 16 hr. night. The experimental design was a randomized complete block with four replications for each harvest year. Germinated seed was counted and discarded at 7, 14, 21, and 28 days. Seed was considered germinated if both a root and coleoptile were visible.

Results and Discussion

The three year old seed lot germination was significantly (P = 0.0000) higher than the other two seed lots. Surprisingly, the five year old seed lot exhibited no germination in all four replications and weekly counts.

Table 1. Germination of Little Bluestem Seed Lots. 28 Day Totals. 2007 East Texas Plant Materials Center.

Harvest Year	Seed Lot Age	% Germination
2002	5	0 c*
2004	3	47 a
2006	1	23 b

*Germination values with different letters are significantly different at P = 0.000

On average, the 14 day germination was the highest among the weekly counts. Germination declined quickly for the 21 day counts. Below is a chart illustrating the average counts for each week during the germination test.

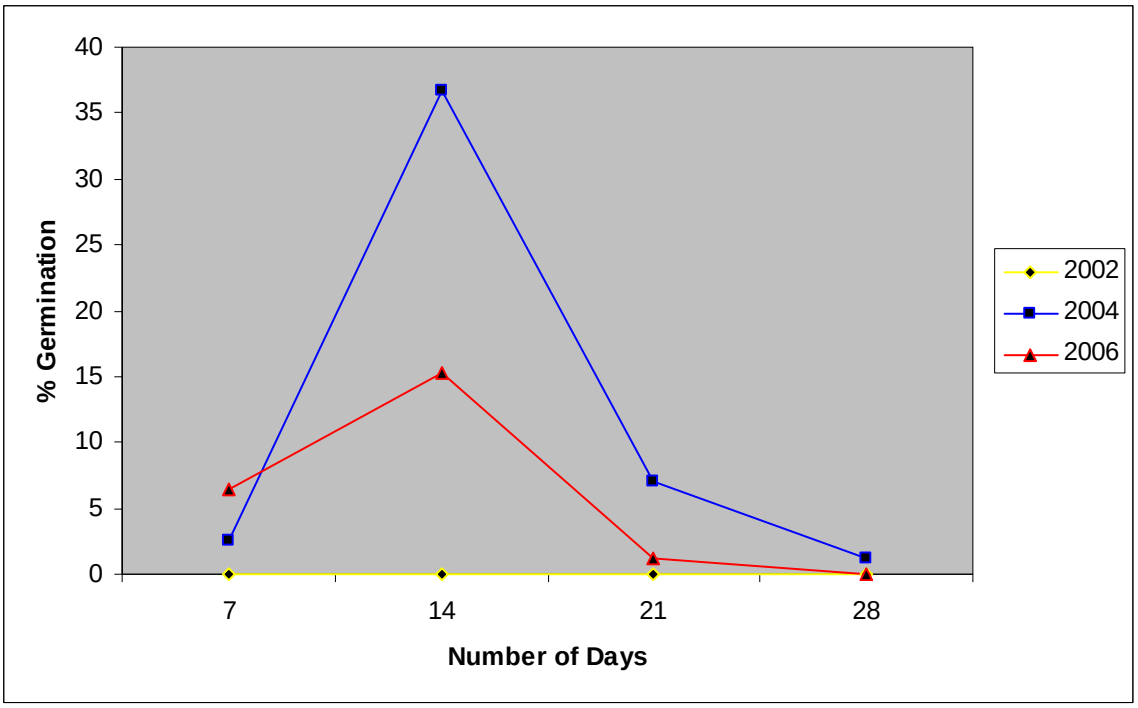

Figure 1. Germination of little bluestem seed lots by weekly counts.

Reference

Association of Official Seed Analysts. 2001. Rules for testing seeds. P. 93c.

Effect of Age of Seed on Germination of Longspike Tridens Seed Lots

By: Melinda Brakie

Introduction

Longspike tridens (*Tridens strictus*) is adapted to the Great Plains and the eastern half of the United States. This grass is a warm season perennial which is adapted to coarse and medium textured soils. Longspike tridens has medium value for palatability, high drought tolerance, and low fertility requirements.

Materials and Methods

Seed lots were harvested from a seed increase field at the USDA/NRCS East Texas Plant Materials Center. The 2003 and 2005 seed lots were chosen for testing and were four and two years old respectively. These seed lots were stored in a controlled environment of ~50^{0}F and ~50^0 humidity. Cleaned seed was used in the test, with no additional weight fraction separation. Since no germination procedure was given for long spike tridens, the AOSCA rules for little bluestem germination were followed. Four replications of 100 seeds each were counted and placed on paper substrate in germination boxes. The paper substrate was moistened with a 2% $KN0_3$ mixture. The seed boxes were placed in a germinator (Environmental Growth Chambers® - NQ1 incubator) for 14 days to prechill at 5^{0}C (41^{0}F) (AOSCA, 2001). After prechilling was completed, germinator temperature settings were adjusted to 20^{0}C (68^{0}F)/30^{0}C (86^{0}F) and light for 8 hr. day/ 16 hr. night. The experimental design was a randomized complete block with four replications for each harvest year. Germinated seed was counted and discarded at 7, 14, 21, and 28 days. A seed was considered germinated if both a root and coleoptile were visible.

Results and Discussion

The two year old seed lot germination was significantly (P = 0.0418) than the four year old seed lot. Seed germination for both seed lots was very good. Weekly counts are noted in figure 1 on the next page.

Table 1. Germination of Longspike Tridens Seed Lots. 28 Day Totals. 2007 East Texas Plant Materials Center.

Harvest Year	Seed Lot Age	% Germination
2003	4	83 b*
2005	2	94 a

*Germination values with different letters are significantly different at P = 0.0418

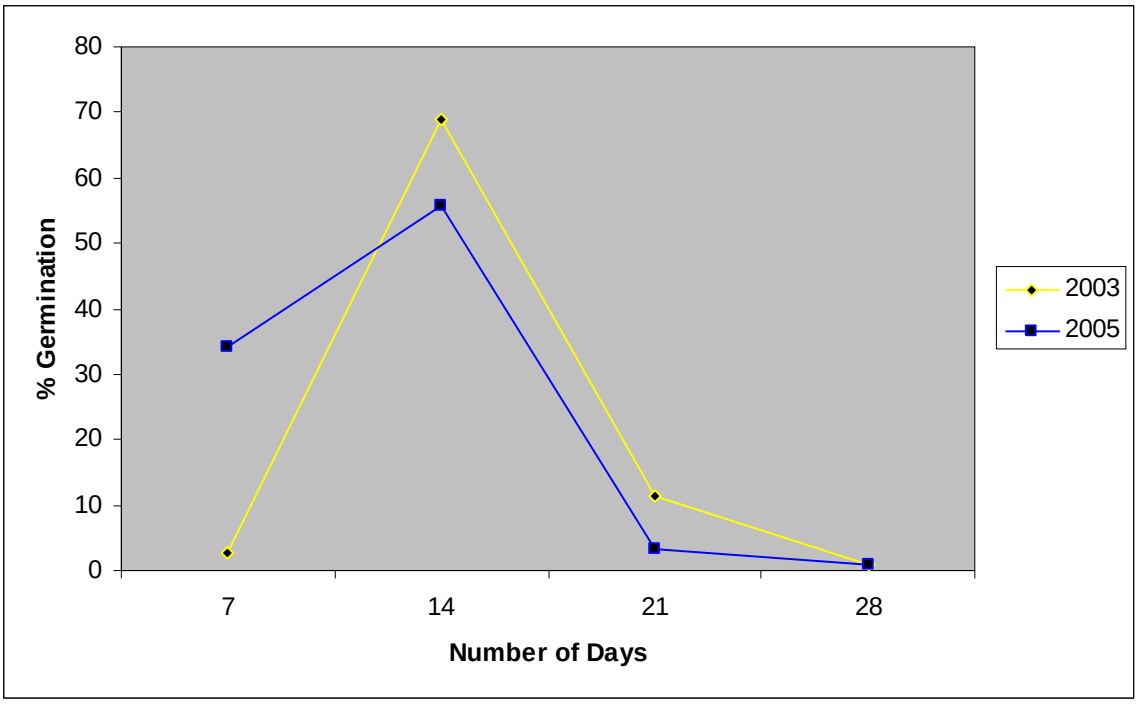

Figure 1. Germination of longspike tridens seed lots by weekly counts.

Reference

Association of Official Seed Analysts. 2001. Rules for testing seeds. p. 93c.

Appendix

2007 Performance Data Scores for Little Bluestem Initial Evaluation

Acc	Year	Vigor 1	Fabund	Disresist	Sdprod	Lodg	Folht (cm)	Folwd (cm)	Matht (cm)
67200	2007	5	5	5	5	6	58	81	175
67206	2007	5	5	5	5	4	51	86	152
67208	2007	5	5	6	5	5	61	86	175
67222	2007	5	4	5	5	5	58	91	155
67228	2007	5	5	5	5	5	66	74	185
67237	2007	5	5	5	4	6	56	84	180
67251	2007	5	4	6	*	*	64	91	*
67252	2007	5	5	6	*	*	53	84	*
67257	2007	5	5	5	4	6	56	76	188
67258	2007	5	5	5	4	6	58	74	180
67259	2007	5	4	5	4	6	64	89	191
67263	2007	6	5	6	5	7	51	79	185
67266	2007	5	5	5	5	4	38	69	165
67267	2007	5	5	5	5	5	38	69	155
67271	2007	5	5	5	5	6	41	74	155
67279	2007	5	4	5	4	5	66	79	185
67283	2007	5	5	6	5	6	58	81	178
67288	2007	7	6	7	7	4	38	61	127
67292	2007	4	5	5	5	6	64	81	180
67322	2007	5	5	5	6	5	36	71	*
67324	2007	5	5	5	5	5	41	84	*
67325	2007	5	5	5	5	5	41	74	142
67345	2007	4	5	5	4	6	51	84	183
67346	2007	5	5	5	5	5	48	81	170
67690	2007	5	5	5	5	5	38	71	137
67705	2007	6	5	6	6	5	43	84	137
67726	2007	7	5	6	7	5	43	84	147
67727	2007	7	5	7	6	5	43	94	140
67728	2007	6	4	7	6	5	58	94	*
67716	2007	7	5	6	5	5	38	74	150
67710	2007	6	5	6	5	5	38	79	145
67719	2007	6	5	7	5	5	46	89	165
67720	2007	6	5	6	5	5	43	81	160
67721	2007	5	4	6	5	4	61	89	152
67722	2007	5	5	5	5	4	48	71	135
67723	2007	6	5	6	5	5	43	79	135

67725	2007	6	5	6	7	5	64	84	155
67216	2007	6	4	7	8	5	61	99	130
Acc	**Year**	**Vigor 1**	**Fabund**	**Disresist**	**Sdprod**	**Lodg**	**Folht (cm)**	**Folwd (cm)**	**Matht (cm)**
67249	2007	6	5	6	5	5	43	79	155
67268	2007	5	5	6	6	6	61	91	152
67297	2007	5	5	5	5	6	46	74	145
67318	2007	5	6	5	6	5	38	61	145
67330	2007	6	6	6	6	5	43	69	160
67336	2007	5	5	5	4	7	43	86	180
67352	2007	5	4	5	5	5	41	36	142
67680	2007	6	6	6	5	5	30	28	122
67682	2007	6	5	7	5	5	33	34	142
67686	2007	6	6	6	6	5	46	31	150
67687	2007	5	5	5	5	5	28	20	135
67688	2007	6	5	6	6	4	38	28	150
67691	2007	5	5	5	5	4	41	34	142
67692	2007	5	5	5	5	5	38	33	152
67693	2007	5	5	6	5	5	36	32	152
67694	2007	6	5	5	6	5	28	31	142
67695	2007	5	5	5	5	5	51	33	163
67696	2007	5	5	5	5	5	33	32	157
67697	2007	5	5	5	5	5	48	36	122
67699	2007	6	5	6	6	4	41	34	140
67700	2007	6	5	6	5	5	28	25	130
67701	2007	5	5	5	5	5	58	35	157
67702	2007	5	5	5	4	5	30	32	142
67703	2007	5	5	5	5	5	41	30	150
67704	2007	6	5	6	6	5	41	30	152
67706	2007	7	5	7	6	6	38	29	155
67711	2007	6	5	7	5	5	30	33	147
67713	2007	6	5	6	5	6	36	31	160
67714	2007	5	5	5	5	5	36	28	150
67715	2007	6	6	6	5	5	28	27	140
67717	2007	6	5	6	5	5	30	25	132
67718	2007	5	6	6	5	5	65	31	112
67724	2007	5	5	5	5	5	40	35	100
67353	2007	5	5	6	5	6	33	30	175
67354	2007	5	5	6	5	6	41	27	157
67355	2007	5	6	5	5	6	38	28	183
67707	2007	5	6	5	6	6	28	29	150
OK sel	2007	5	5	5	5	5	36	29	155
Aldous	2007	5	6	5	6	5	25	21	109
Cim	2007	5	6	5	5	5	28	21	107

67709	2007	5	5	5	5	5	36	24	124

2007 Performance Data Scores for Splitbeard Bluestem Initial Evaluation

Access.	Year	Fabund	Disresist	Sdamount	Sdlodg	Fol ht (cm)	Fol wdth (cm)
7199	2007	5	5	5	6	62	60
7203	2007	5	6	5	4	70	76
7204	2007	5	6	5	6	73	73
7210	2007	6	6	5	5	73	76
7230	2007	5	5	5	5	53	62
7224	2007	5	6	5	6	70	63
7248	2007	5	6	5	6	77	79
7260	2007	5	5	5	5	75	64
7261	2007	6	6	5	5	64	54
7262	2007	5	6	5	6	76	68
7265	2007	5	6	5	5	77	60
7280	2007	5	5	5	5	66	60
7298	2007	5	4	5	5	60	58
7302	2007	5	6	5	6	73	65
7319	2007	4	5	5	5	63	80
7320	2007	5	5	5	5	70	74
7326	2007	5	6	5	4	77	73
7327	2007	5	5	5	6	72	72
7338	2007	5	6	5	6	55	62
7340	2007	6	6	5	5	63	60
7341	2007	5	5	5	6	70	65
7342	2007	5	5	5	6	77	62
7343	2007	5	6	5	7	81	62
7344	2007	4	4	5	5	70	80

2007 Performance Data Scores for Pinehill Bluestem Initial Evaluation

Access.	Year	Fabund	Disresist	Sdamount	Sdlodg	Fol ht (cm	Fol wdth	Mat ht
7206	2007	5	5	5	4	51	86	152
7266	2007	5	5	5	4	38	69	165
7267	2007	5	5	5	5	38	69	155
7322	2007	5	5	6	5	36	71	M
7324	2007	5	5	5	5	41	84	M
7325	2007	5	5	5	5	41	74	142
7690	2007	5	5	5	5	38	71	137
7705	2007	5	6	6	5	43	84	137
7727	2007	5	7	6	5	43	94	140
7710	2007	5	6	5	5	38	79	145
7719	2007	5	7	5	5	46	89	165
7722	2007	5	5	5	4	48	71	135
7723	2007	5	6	5	5	43	79	135
7725	2007	5	6	7	5	64	84	155
7216	2007	4	7	8	5	61	99	130
7226	2007	5	5	5	5	43	86	170
7249	2007	5	6	5	5	43	79	155
7318	2007	6	5	6	5	38	61	145
7682	2007	5	7	5	5	33	34	142
7686	2007	6	6	6	5	46	31	150
7687	2007	5	5	5	5	28	20	135
7688	2007	5	6	6	4	38	28	150
7691	2007	5	5	5	4	41	34	142
7697	2007	5	5	5	5	48	36	122
7699	2007	5	6	6	4	41	34	140
7701	2007	5	5	5	5	58	35	157
7702	2007	5	5	4	5	30	32	142
7703	2007	5	5	5	5	41	30	150
7704	2007	5	6	6	5	41	30	152
7711	2007	5	7	5	5	30	33	147
7718	2007	6	6	5	5	65	31	112
7707	2007	6	5	6	6	28	29	150
7709	2007	5	5	5	5	36	24	124

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