Oklahoma Panhandle Research & Extension Center

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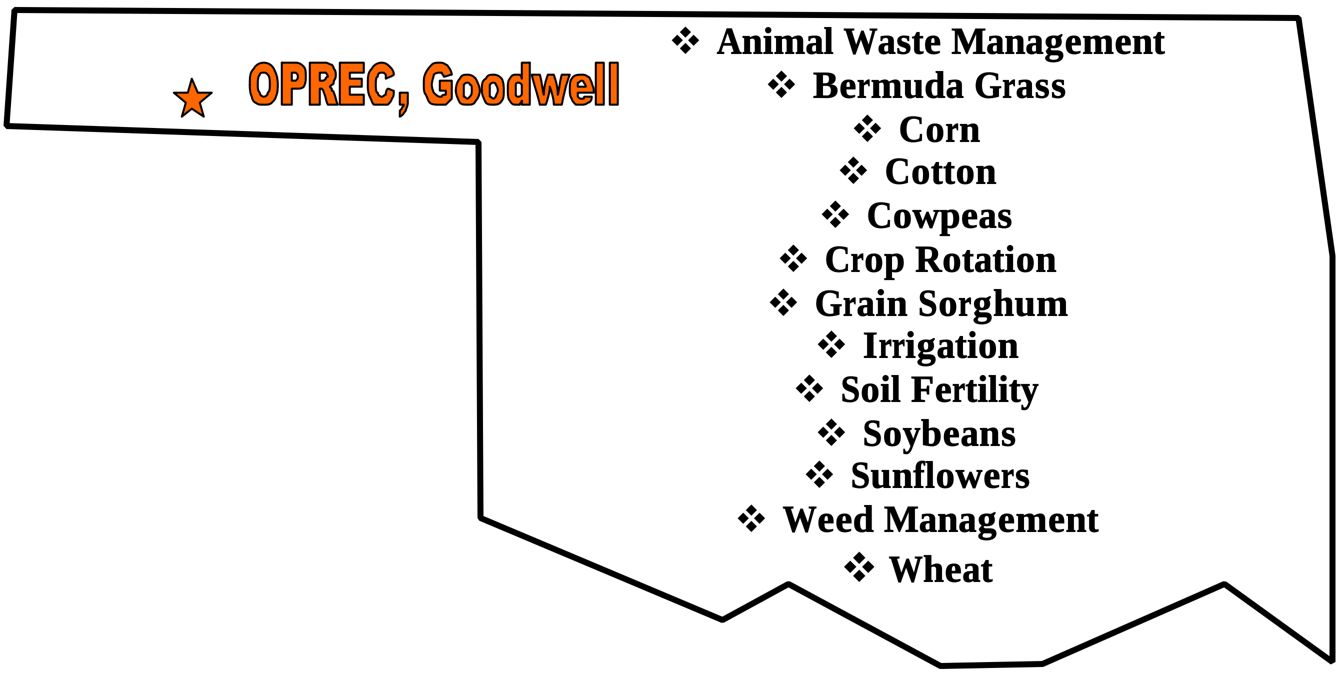
http://oaes.pss.okstate.edu/goodwell



2003 Research Highlights

Division of Agricultural Sciences and Natural Resources
Oklahoma Panhandle Research and Extension Center
Oklahoma State University
Department of Animal Science
Department of Entomology and Plant Pathology
Department of Plant and Soil Sciences
Department of Biosystems and Agricultural Engineering
USDA – ARS

THE OKLAHOMA PANHANDLE RESEARCH AND EXTENSION CENTER
Division of Agricultural Sciences and Natural Resources
Department of Plant and Soil Sciences
Oklahoma Agricultural Experiment Station
Oklahoma Cooperative Extension Service
Oklahoma State University

The Division of Agricultural Sciences and Natural Resources (DASNR)/Oklahoma Agricultural Experiment Station (OAES)/Oklahoma Cooperative Extension Service (OCES) at Oklahoma State University (OSU) have a long history of working cooperatively with Oklahoma Panhandle State University (OPSU). A Memorandum of Agreement that outlined the major missions of each entity strengthened this cooperative effort in July 1994. OPSU's primary role is teaching. OAES is the research arm of the DASNR and is responsible for the fundamental research. OCES transfers technology generated for the research programs to clientele. These three entities complete the spectrum and constitute a true partnership in solving problems related to Panhandle agriculture.

The Department of Plant and Soil Sciences with support from OAES and OCES has staffed the Oklahoma Panhandle Research and Extension Center (OPREC) with people who are making a difference in research, extension, and teaching in the panhandle area. Jose Sanchez as Director, Rick Kochenower as Area Crop-Soil Research/Extension Specialist, Curtis Bensch as Assistant State Specialist and Lecturer, Chuck Strasia as Area Livestock Extension Specialist, and Lawrence Bohl, as Senior Station Superintendent are addressing critical production issues that are facing Oklahoma producers. Donna George, Senior Office Assistant, a Field Foreman, a Field Assistant/Equipment Operator, several wage payroll and part-time OPSU student laborers also play important roles in making OPREC what it is today.

OSU faculty from Plant and Soil Sciences, Entomology and Plant Pathology, Horticulture, Biosystems and Agricultural Engineering, Agricultural Economics, Animal Science, and USDA/ARS use OPREC to conduct research and extension efforts in the panhandle area. Commodity associations and agriculture industries use OPREC to hold meetings and other activities. Oklahoma agriculture, especially in the Panhandle, is a powerful but rapidly changing economic sector. Agricultural industries are being challenged to maintain competitive market positions. Farm prices, competition for water, insect and disease, sensitivity to environmental stewardship, animal waste issues, and a shrinking supply of qualified labor are among some of the complex factors that are fundamentally reshaping agriculture in Oklahoma. Development of management practices to achieve maximum efficiency in crop production, judicious use of animal wastes, as well as identification of potential new crops adapted to the area have been the focal point of both research and extension programs at OPREC. Variety development of both hard red and hard white, winter wheat and performance evaluations of bermudagrass, buffalograss, alfalfa, soybean, wheat, grain sorghum, cow peas, corn, sun hemp, and canola are being conducted. Conservation tillage, irrigation management, efficient use of fertilizer and pesticides, and sustainable crop production is also being studied.

Progress made in development of research and education programs adapted to the panhandle area has been significant since establishing the Center. However, as the agriculture landscapes changes much more work will need to be initiated. Your continued support in our research and extension programs will help us better serve the clientele of the panhandle area.

James H. Stiegler
Professor and Head

James H. Stiegler

Oklahoma Panhandle Research and Extension Center

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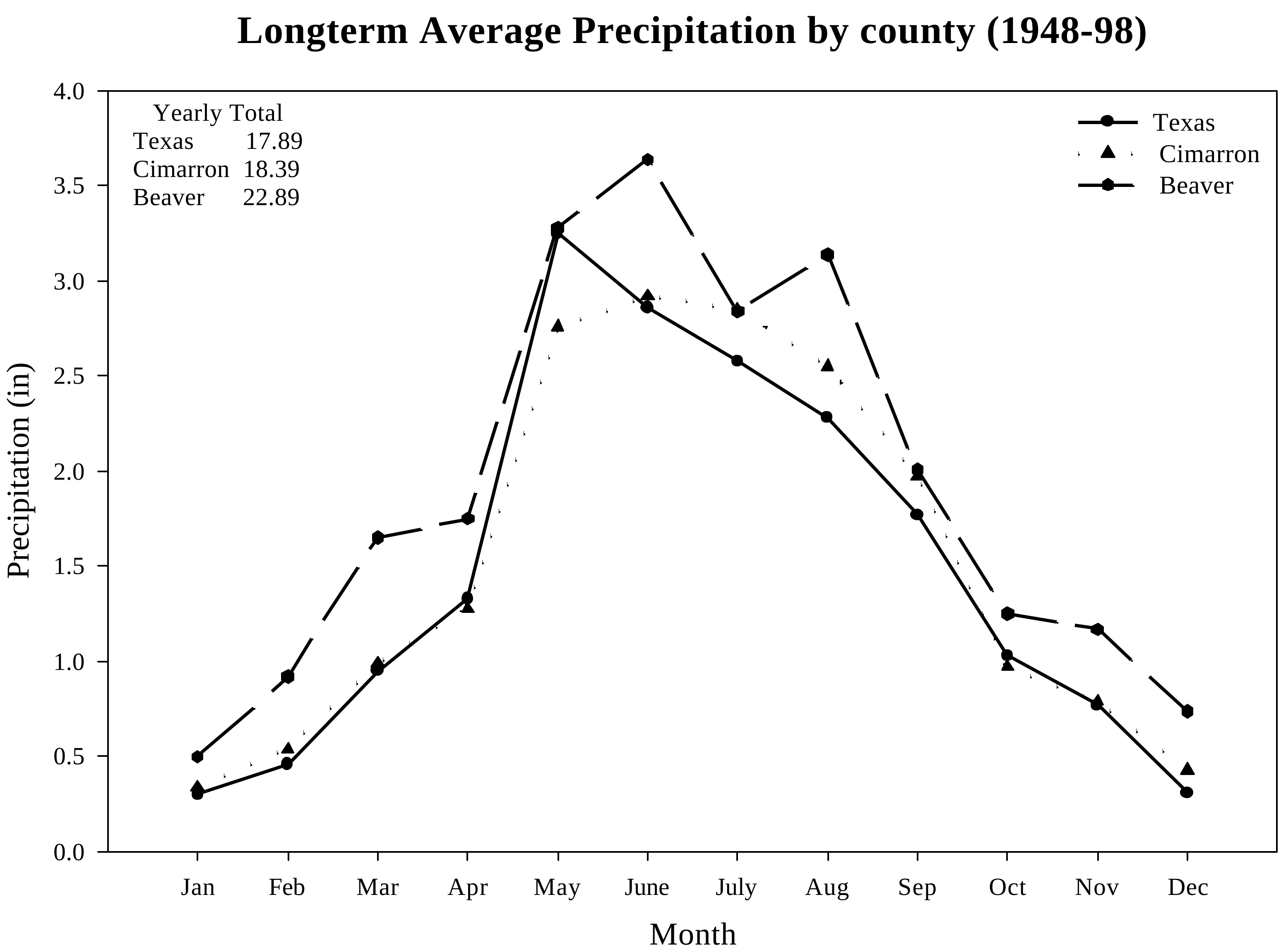
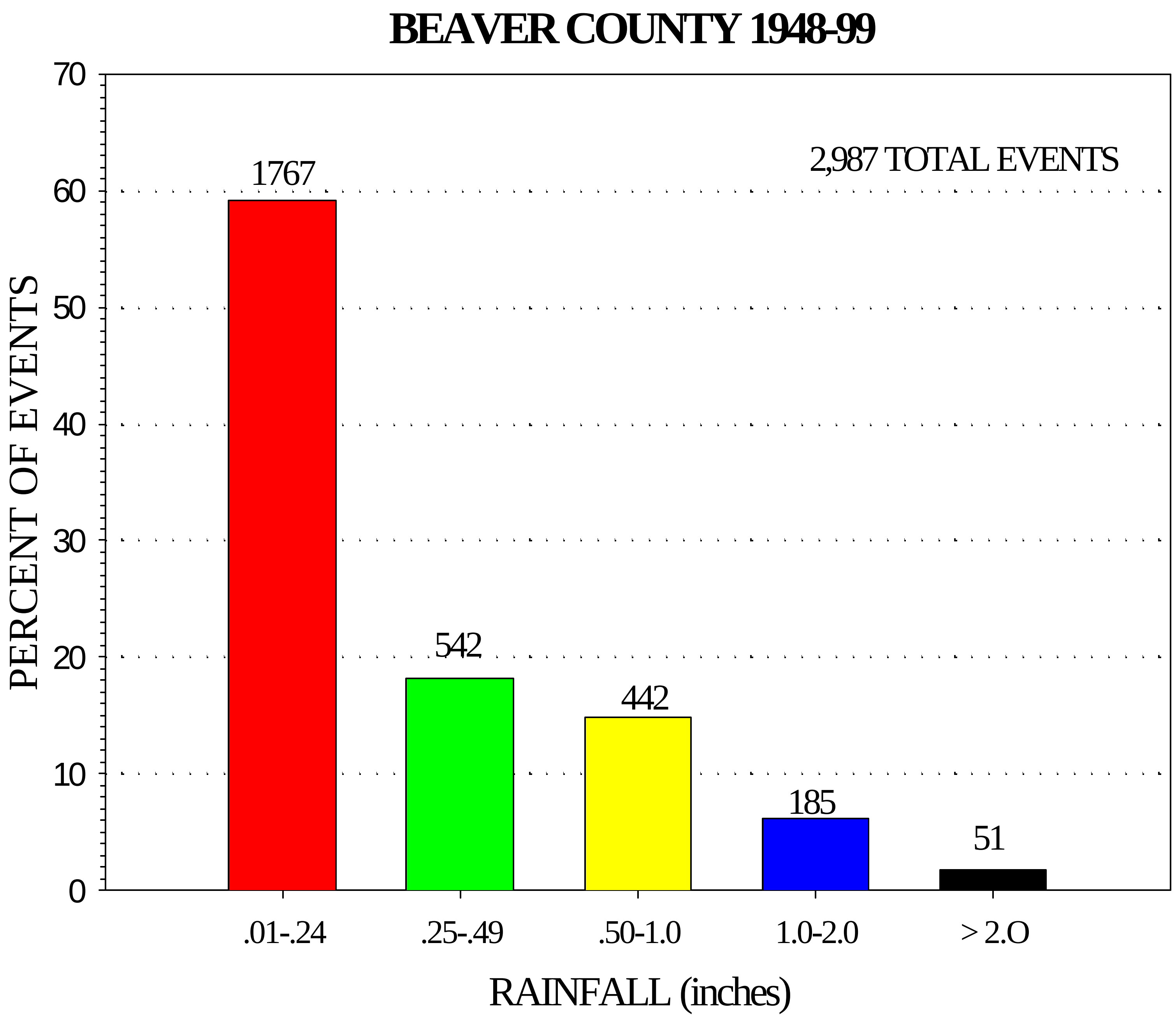
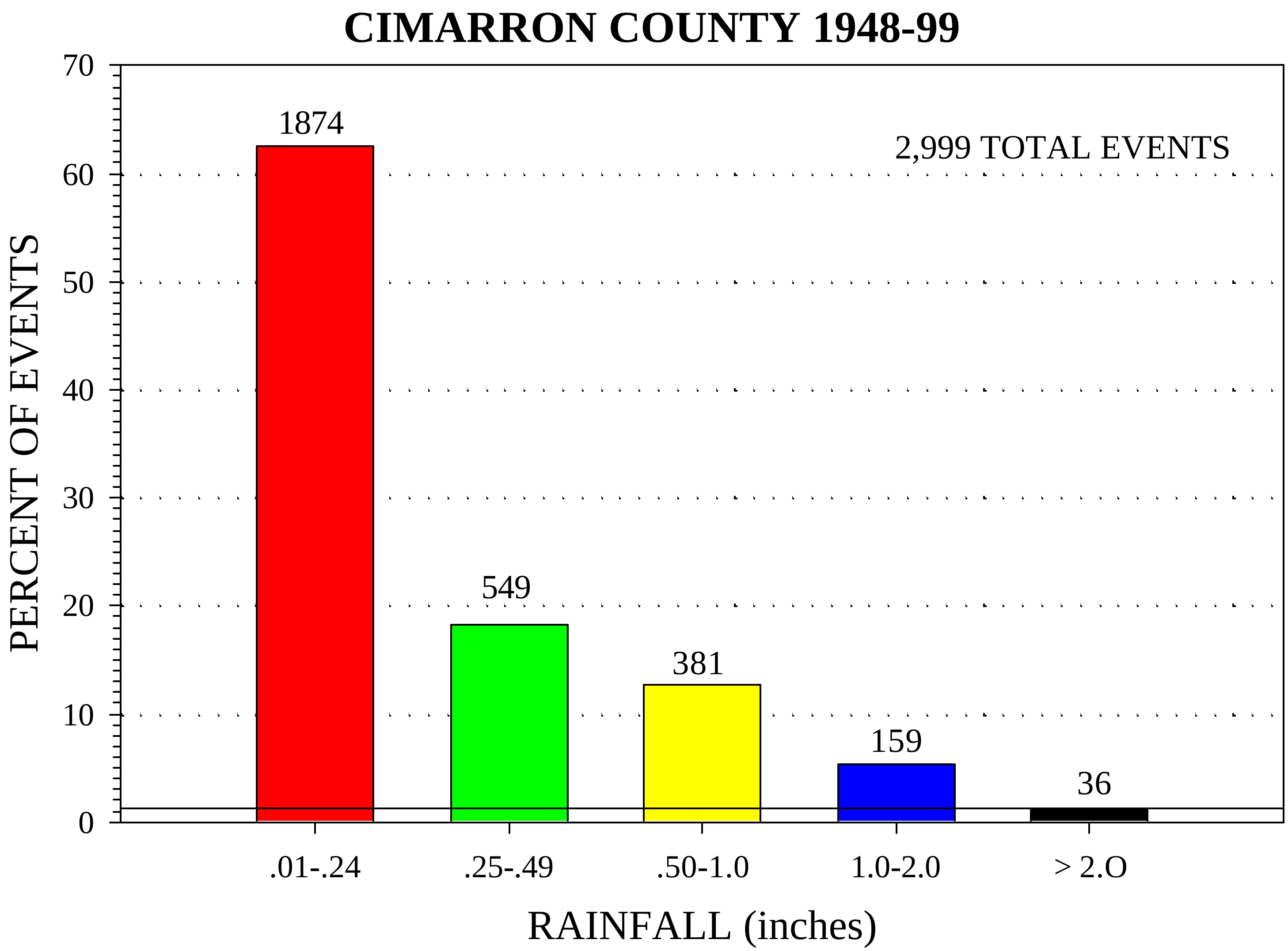
Climatological data for Oklahoma Panhandle Research and Extension Center, 2003.

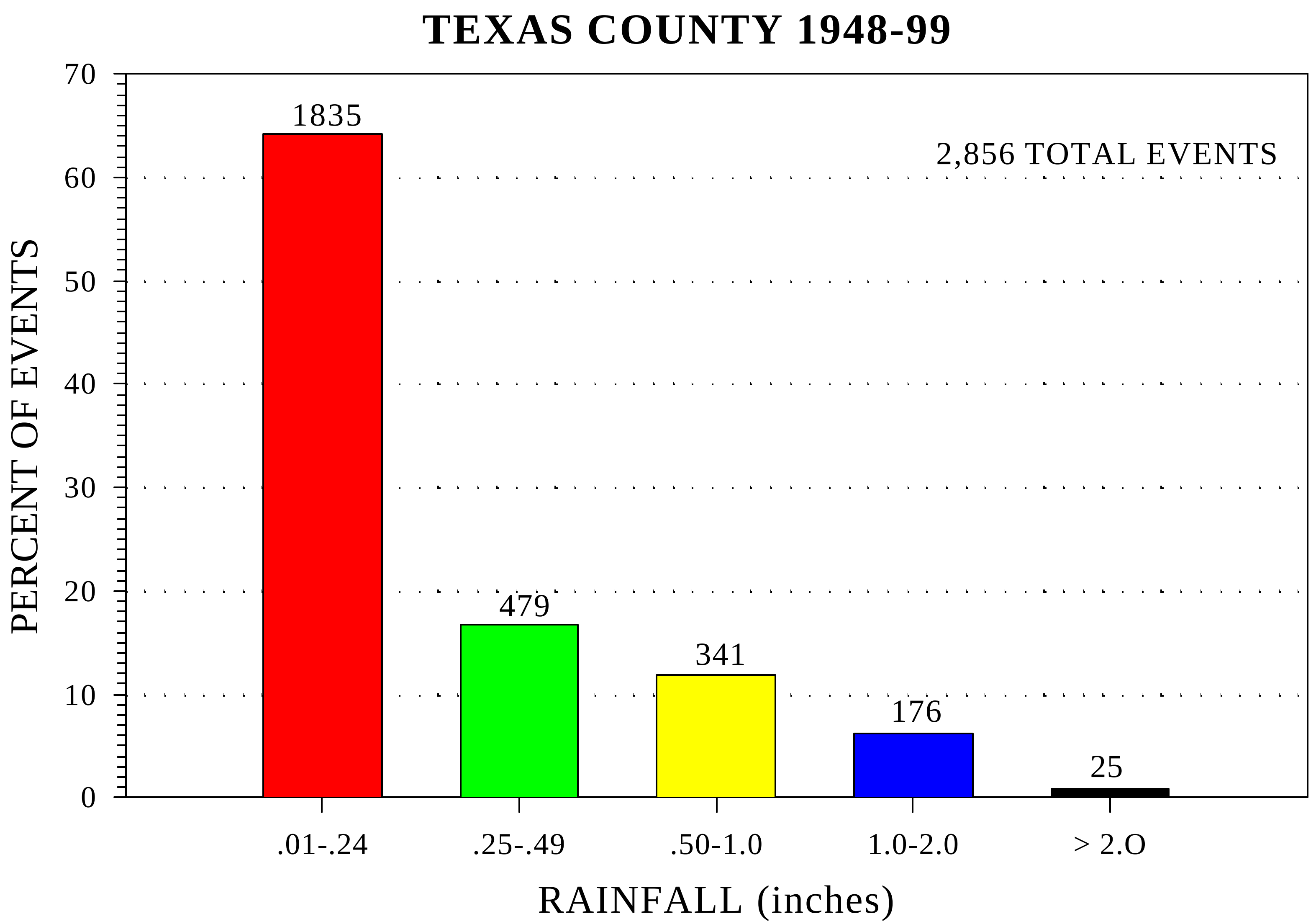
	Temperature				Precipitation			Wind	
Month	Max	Min	Max. mean	Min. mean	Inches	Long term mean	One day total	AVG mph	Max mph
Jan	74	13	52	24	0.03	0.30	0.03	10.0	47.0
Feb	80	3	48	21	0.21	0.46	0.10	11.5	51.4
March	82	14	61	31	1.33	0.95	1.10	12.1	51.1
April	87	23	72	41	0.55	1.33	0.37	15.1	67.3
May	98	36	80	51	1.84	3.25	0.52	13.3	55.1
June	95	47	82	58	5.26	2.86	1.04	11.6	53.9
July	108	58	97	66	1.87	2.58	1.41	12.7	43.0
Aug	103	55	93	65	1.19	2.28	0.52	10.9	60.0
Sept	96	37	81	53	1.62	1.77	0.56	12.2	53.4
Oct	93	23	75	45	0.14	1.03	0.09	11.1	44.5
Nov	81	11	58	31	0.56	0.77	0.56	12.0	49.6
Dec	72	12	52	24	0.18	0.31	0.09	12.3	59.3
Annual total			71	43	14.78	17.9	NA	NA	NA

Data from Mesonet Station at OPREC


Longterm Average Precipitation by county (1948-98)
Yearly Total
Texas 17.89
Cimarron 18.39
Beaver 22.89
Texas
Cimarron
Beaver
Precipitation (in)
Month
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
Jan
Feb
Mar
Apr
May
June
July
Aug
Sep
Oct
Nov
Dec


BEAVER COUNTY 1948-99
2,987 TOTAL EVENTS
PERCENT OF EVENTS
70
60
50
40
30
20
10
0
1767
542
442
185
51
.01-.24
.25-.49
.50-1.0
1.0-2.0
> 2.O
RAINFALL (inches)


CIMARRON COUNTY 1948-99
PERCENT OF EVENTS
70
60
50
40
30
20
10
0
1874
549
381
159
36
2,999 TOTAL EVENTS
.01-.24
.25-.49
.50-1.0
1.0-2.0
> 2.O
RAINFALL (inches)


TEXAS COUNTY 1948-99
2,856 TOTAL EVENTS
PERCENT OF EVENTS
70
60
50
40
30
20
10
0
1835
479
341
176
25
.01-.24
.25-.49
.50-1.0
1.0-2.0
> 2.O
RAINFALL (inches)

Oklahoma Panhandle Research & Extension Center
2003 Research Highlights

Crops

Appendix

Corn Planting Date

Rick Kochenower, Oklahoma Panhandle Research and Extension Center, Goodwell

Previous research indicates that planting corn before the optimum date reduces yields less than planting after the optimum date (Fig. 1). Therefore, in 2000, a long-term study was initiated to determine the effect of planting date and starter fertilizer on corn ensilage, grain yield, and test weight. Six planting dates were selected April (1, 10, 20, 30) and May (10 and 20). On each selected date, corn was planted with and without a starter fertilizer (5 gal/ac 10-34-0) in the row. No yield increases have been observed with starter fertilizer in 2000 - 2002. Therefore, starting in 2003 a 107-day maturity corn hybrid NC^{+} 3721B was utilized to determine if similar planting date effects exist for shorter season hybrids. Pre-plant fertilizer applications were based on soil test N levels of 250 lb/ac (soil test + applied). P and K will be applied to 100% sufficiency based on soil test. The Dekalb hybrid DK 647BtY was planted in 2000, in 2001 the hybrid was switched to Pioneer 33B51. Plots were planted in four 30-inch rows by 30 feet long with a target plant population of 32,000 plants per acre. Ten feet of one outside row is harvested for ensilage production and the two middle rows harvested for grain production.

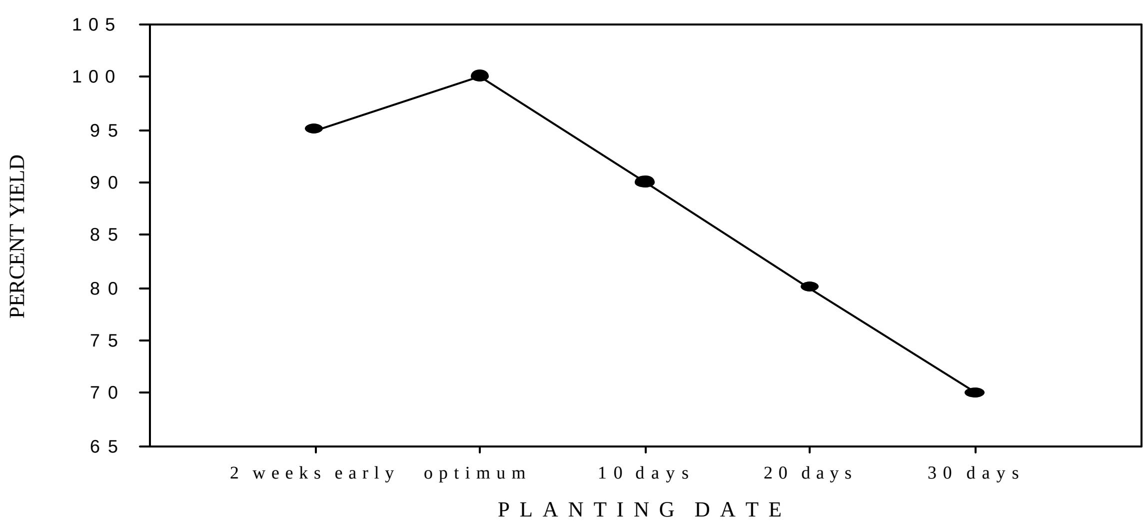


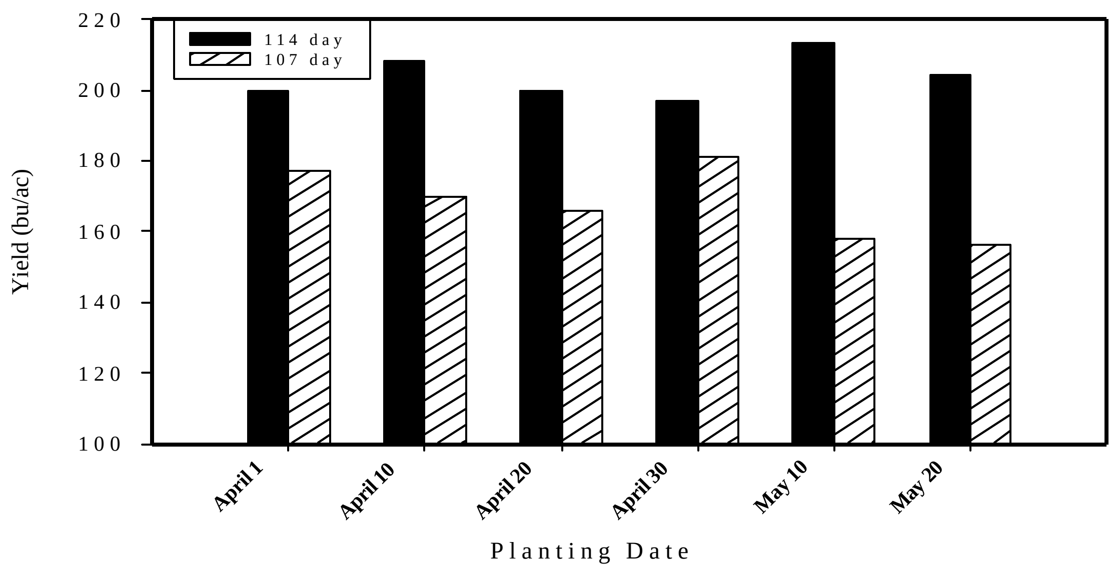
Figure 1. Ten years of grain yields at Lansing, Michigan. Source modern corn production

Aldrich, S.A., W.O. Scott, and R.G. Hoeft. Modern Corn Production. 1986, A & L Publications.

Results

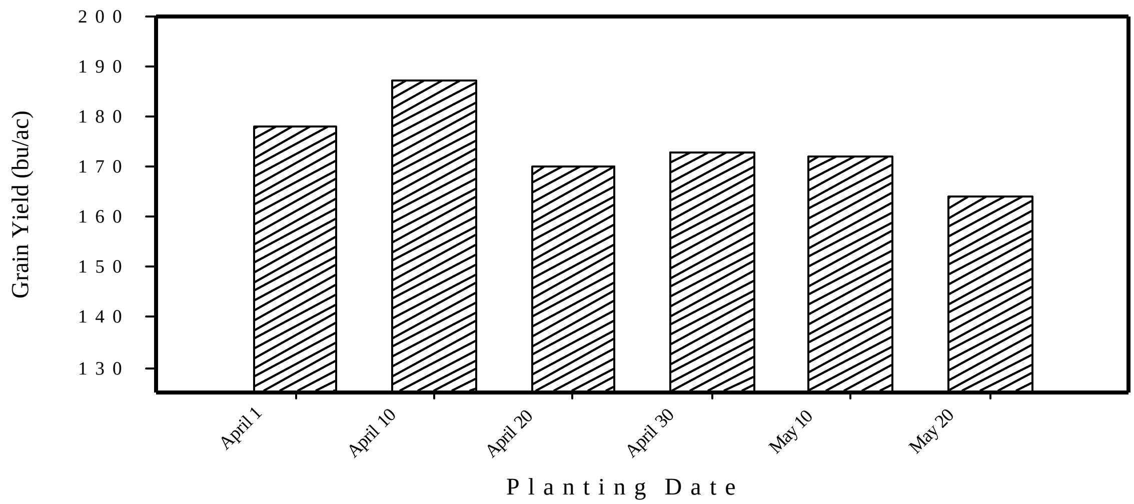
2003 was the first year that no difference was found between planting dates, although there was a difference between hybrid maturities (Fig. 2). The mean yield for the 114-day hybrid was 35.5 bu/ac higher than for the 107-day, 203.6 and 168.1 respectively. In 2003 the highest yield was not on April 10 for the first time in four years, although the trend for the shorter season hybrid was lower yields with later planting dates.

Figure 2. 2003 corn grain yields by planting date at OPREC



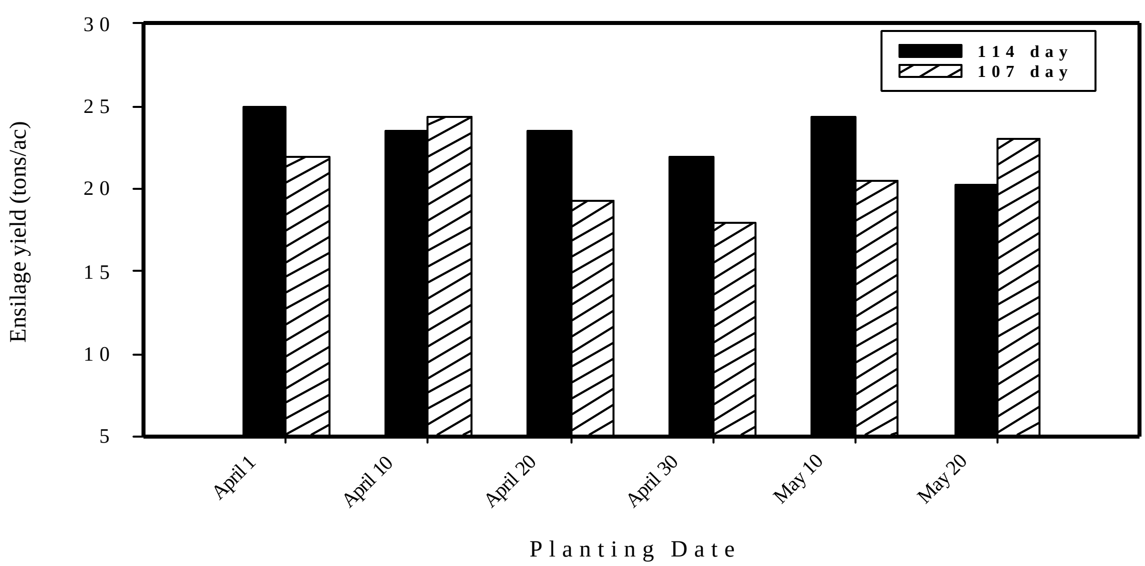
April 10 appears to be the optimum date for planting with the highest grain yield 186.7 bu/ac obtained on this date after four years of study. Planting April 1 reduced yields 4.3% compared to a 5% reduction for Michigan data. Yields were reduced 8.4% when planted April 20 versus planting on April 10. Yields hold consistent for plantings on April (20, 30) and May 10, with another 3.5% reduction in yield for the May 20 planting (Fig. 3). Test weight also decreased when planted after April 10 but remained above the 56 lb/bu level until the April 20 planting, but lower test weights can be attributed to higher moisture at harvest for the later planting dates.

Figure 3. Three year mean corn grain yields by planting date for 114-day hybrid at OPREC.



In 2003, like grain yields, no difference was found in planting date for ensilage production. The mean yield for all planting dates for the 114-day hybrid was 1.8 ton/ac higher than the 107-day hybrid (Fig 4.). As with grain yields for the 107-day hybrid yields tended to be lower the later it was planted.

Figure 4. 2003 corn ensilage yields by planting date at OPREC



When comparing yields for the 114-day hybrid over three years the April 1 planting date has the highest yields at 26.2 tons/ac (Fig. 4). The largest drop in ensilage production, 13.6%, was observed with the May 20 planting when compared to May 10. Soil temperatures at two inches on April 1 were above 60° F in 2000 - 2003, and may differ in subsequent years with different environmental conditions. In 2002 ensilage yields could not be collected so data reported is for years 2000, 2001, and 2003. This is long-term project to determine the optimum planting date for ensilage and grain yields when environmental changes occur.

Figure 4. Three year mean corn ensilage yields by planting date for 114-day hybrid at OPREC.

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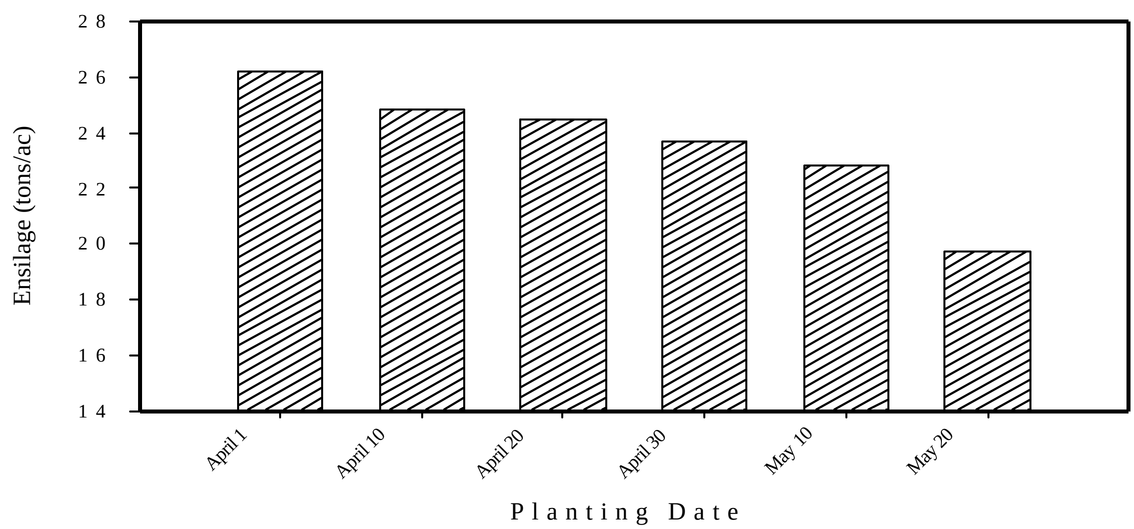


LIMITED IRRIGATED CORN

Rick Kochenower, Oklahoma Panhandle Research and Extension Center, Goodwell

In the winter of 2000-01 natural gas prices increased dramatically. This increased the interest in growing corn with limited sprinkler irrigation. A study was initiated at OPREC to determine if corn maturity affected yield and test weight when irrigation was limited. Limited irrigation has been described as one half of full irrigation by other researchers, most corn in the region is grown utilizing 18-22 inches of irrigation. In this study irrigation was applied at four rates (3, 6, 9, and 12) inches with one inch applied at each irrigation. Applications were scheduled (Table 1) where all treatments received water at or near pollination. This is the most critical time for corn production. Three hybrids with different maturities Dekalb DKC 57-72 (107 day), Dekalb DK 647 (114 day), and Pioneer 3162 (118 day) were planted. In 2002 Pioneer 3162 was replaced with a shorter maturity hybrid, Pioneer 36F30 (99 day). Plots were planted in four 30-inch rows by 25 feet long at a target population of 25,000 plants per acre in 2001 with the two middle rows harvested for grain yield and test weight. In 2002 target populations were adjusted for each irrigation rate (4-inch 16,800, 6-inch 18,500, 9-inch 22,900, and 12-inch 25,200 plants/ac). By adjusting plant population to irrigation rates higher grain yields for lower irrigation rates may be possible.

Table 1. Date of irrigation application for limited irrigated corn at OPREC.

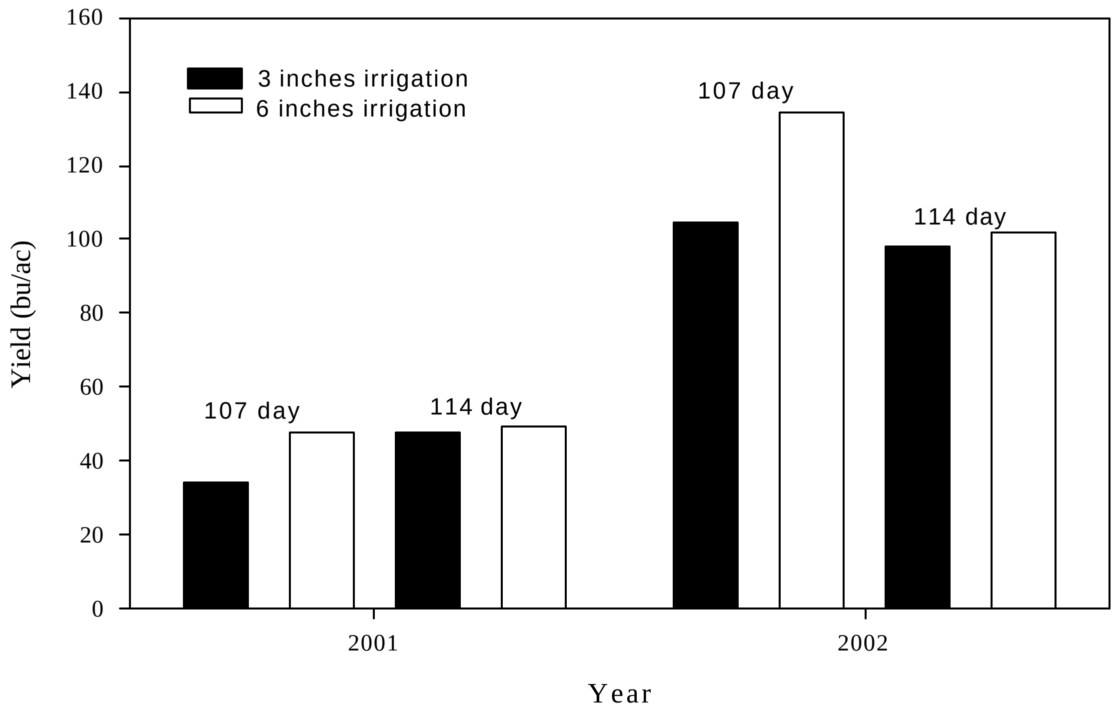
---3 inches ---	--- 6 inches ---	--- 9 inches ---	--- 12 inches ---
6-23	6-11	6-20	6-13
6-30	6-23	6-27	6-20
7-2	6-30	7-4	6-27
	7-2	7-7	7-4
	7-7	7-9	7-7
	7-16	7-13	7-9
		7-17	7-13
		7-22	7-17
		7-28	7-22
			7-28
			7-31
			8-6

* New water well had to be drilled so limited to 8 inches of irrigation

Results

Based on Oklahoma Climatological Service data the summer (June, July, and August) of 2001 was the second driest in the last 51 years at OPREC. Rainfall of 1.27 inches was received from June 1 until plots were harvested September 10 therefore yields were not significantly affected by rainfall. In 2002 rainfall was significantly higher 9.39 inches for the same period, therefore the yield for the 3 and 6-inches irrigation rates were 64 and 51% higher in 2002 for the 107 and 114-day hybrids respectively (Fig. 1).

Figure 1. Grain yield for 3 and 6-inch irrigation rates 2001-02 OPREC limited irrigation.



In 2001 maturity and irrigation rates did affect yields with the highest yields being with the 107 and 114-day hybrids (Table 2). The shorter maturity hybrids were able to make more grain with less water than the fuller season 118-day hybrid, therefore in 2002 it was replaced with a 99-day hybrid. In 2002 yields for 9 and 12-inch irrigation rates were reduced when a new well had to be drilled in late July and early August, therefore 12 inch yields will not be reported. Maturity had no effect on grain yield in 2002 although irrigation rates did, therefore means of irrigation rates are reported (Table 3). The highest yields 125.7 bushels per acre were obtained with the 8-inch irrigation rate. Maturity did have an effect on test weight in 2002, but irrigation rate did not, therefore means of hybrids are reported (Table 4). The highest test weight was the 107-day hybrid at 54.1 pounds per bushel. The dramatic difference in grain yields between 2001 and 2002 for the 107 and 114-day hybrids illustrate the importance of collecting more years of data.

Table 2. Corn grain yields for 2001 from limited irrigation study at OPREC.

Maturity day	Irrigation inches	Grain Yield bu/ac
107	12	92.6
107	9	90.6
114	12	89.6
118	12	77.3
114	9	76.5
118	9	73.2
107	6	51.4
114	6	49.3
114	3	48.0
118	3	38.7
118	6	38.0
107	3	34.0
	Mean	63.3
	L.S.D.	10.7
	CV%	11.8

Table 3. Grain yield 2002 limited irrigation study at OPREC.

Irrigation inches	Yield bu/ac
3	101.4
6	115.5
8*	125.7
Mean	114.2
L.S.D.	10.2

* 9 and 12-inch rates limited to 8 inches in 2002

Table 4. Test weight 2002 limited irrigation study at OPREC.

Maturity day	Test weight lb/bu
107	54.1
114	52.6
99	51.7
Mean	52.8
L.S.D.	0.7

EVALUATION OF INTREPID RATES FOR CONTROL OF SOUTHWESTERN CORN BORER IN CORN, 2003

Tom Royer, Kristopher Giles, and Dennis Kastl, Dept. of Entomology & Plant Pathology, Oklahoma State University, Stillwater
Rick Kochenower, Oklahoma State University, Panhandle Research and Extension Center, Goodwell
Vernon B. Langston, Dow Agrosciences, 314 N. Maple Glade Circle, The Woodlands, TX

Four rates of Intrepid insecticide were evaluated for control of second generation southwestern corn borer (SWCB) on irrigated corn at the Panhandle Research Station, Goodwell, OK. Plots were planted on 14 April with a John Deer Max emerge planter at 34,000 plants per acre into a Richfield clay loam soil. Each treatment was applied to plots measuring 7 ft x 25 ft and replicated 4 times in a RCB design. On 2 Aug, 10 plants/plot received approximately 15 newly hatched SWCB larvae that were mixed in with corn grits and delivered with a bazooka gun dispenser. The larvae were placed on the collars of the leaf just above, and just below the ear. Insecticide treatments were applied on 6 Aug with a CO2-charged hand held sprayer through 0015 flat fan nozzles at 40 psi for a total volume of 25 gpa. On 3 September, the 10 infested plants per plot were examined for the number and length of borer-induced tunnels and borer larvae in the stalks and ears. Treatments were compared using ANOVA and individual means distinguished using Fisher's Protected LSD.

Natural SWCB infestations were nearly non-existent in adjacent untreated corn. Artificially-infested larval survival was relatively low. All treatments reduced ear tunneling compared to the untreated check; however the highest rate of intrepid was less effective than the lower rates. Ear tunneling, and live larval counts were not significantly ($P \leq 0.05$) different from the untreated check.

Treatment/ formulation	Rate lb (AI)/acre	Tunnel (cm/plant)	Ear Tunnel (cm/plant)	# borers/ (10 plants)
Mustang 0.8 EC	0.02	0.1c	0.00	0.0
Capture 2 E	0.063	0.3c	0.00	0.0
Intrepid 2 SC	0.031	0.1c	0.00	0.0
Intrepid 2 SC	0.066	0.0c	0.00	0.0
Intrepid 2 SC	0.94	0.3c	0.00	0.0
Intrepid S C2	0.125	1.4b	0.00	0.0
Untreated	---	2.8a	0.00	1.0
P > F		0.001	1.00	0.59
LSD (P = 0.10)		0.56	n.s.	n.s.

Means in a column followed by the same letter are not significantly different, LSD $\leq$ 0.10.

EVALUATION OF XR-225 FOR CONTROL OF SOUTHWESTERN CORN BORER IN CORN, 2003

Tom Royer, Kristopher Giles, and Dennis Kastl, Dept. of Entomology & Plant Pathology, Oklahoma State University, Stillwater
Rick Kochenower, Oklahoma State University, Panhandle Research and Extension Center, Goodwell
Vernon B. Langston, Dow Agrosciences, 314 N. Maple Glade Circle, The Woodlands, TX

Three rates of XR-225 insecticide were evaluated for control of second generation southwestern corn borer (SWCB) on irrigated corn at the Panhandle Research Station, Goodwell, OK. Plots were planted on 14 April with a John Deer Max Emerge planter at 34,000 plants per acre into a Richfield clay loam soil. Each treatment was applied to plots measuring 7 ft x 25 ft and replicated 4 times in a RCB design. On 2 Aug, 10 plants/plot received approximately 15 newly hatched SWCB larvae that were mixed in with corn grits and delivered with a bazooka gun dispenser. The larvae were placed on the collars of the leaf just above, and just below the ear. Insecticide treatments were applied on 6 Aug with a CO2-charged hand held sprayer through 0015 flat fan nozzles at 40 psi for a total volume of 25 gpa. On 3 September, the 10 infested plants per plot were examined for the number and length of borer-induced tunnels and borer larvae in the stalks and ears. Treatments were compared using ANOVA and individual means distinguished using Fisher's Protected LSD.

Natural SWCB infestations were nearly non-existent in adjacent untreated corn. Artificially-infested larval survival was relatively low. All treatments reduced ear tunneling compared to the untreated check, and there were no significant differences among rates. Ear tunneling and live larval counts were not significantly different from the untreated check.

Treatment/ formulation	Rate lb (AI)/acre	Tunnel (cm/plant)	Ear Tunnel (cm/plant)	# borers/ (10 plants)
XR-225 0.5 CS	0.0075	0.9 b	0.00	0.0
XR-225 0.5 CS	0.0125	0.1 b	0.00	0.0
XR-225 0.5 CS	0.015	0.0 b	0.00	0.0
Warrior 1CS	0.0075	0.2 b	0.00	0.0
Warrior 1CS	0.0125	0.2 b	0.00	0.0
Warrior 1CS	0.015	0.5 b	0.00	0.0
Untreated	---	4.5a	0.08	1.0
P < F		0.005	0.45	1.00
LSD (P = 0.10)		1.85	n.s.	n.s.

Means in a column followed by the same letter are not significantly different, LSD $\leq$ 0.10.

UTILIZING GRAIN SORGHUM IN IRRIGATED CROP ROTATIONS

Rick Kochenower, Oklahoma Panhandle Research and Extension Center, Goodwell

In 1999, an irrigated crop rotation study was established to determine if the crop rotation effect reported by researchers in dry-land systems exist under a high yield environment. In 2000, problems with insects, birds, and water well were encountered so data was not collected. Researchers at Kansas State University have reported 12 bu/ac yield increases in grain sorghum rotated yearly with soybeans when proper fertilization is used (Gordon, B., et al., 1999). Researchers at the University of Minnesota have reported yield increases of 12% (138 vs. 122 bu/ac) in corn rotated with soybeans when compared to continuous corn (Porter, P.M., et al., 1997). The crop rotation effect is not clearly understood and has many possible explanations. What is understood are the benefits in weed management, breaking of insect and disease cycles, improved soil physical properties, and increased water use efficiency. Rotations include corn-soybean (CS), corn-sorghum (CM), soybean-sorghum (SM), along with continuous corn (CC), soybeans (SS), and grain sorghum (MM). Plots size was 10 feet by 30 feet long, planted with a John Deere 1710 Maxemerge 4-row 30-inch planter.

Results

Due to herbicide drift all crop results were affected in 2003 and therefore not reported.

The crop rotation effect appears to exist for corn when grown with irrigation (Table 1). Although in years with higher yields the effect is less than for years with lower yields. All grain yields were higher in 2002 than 2001 for the highest yielding rotation, with grain sorghum at 26.9%, corn 14.1%, and soybeans 4.1% higher. With the higher yields, difference among rotations was less for two-year data when compared to 2001. Corn rotated with soybeans in 2001 was 24.7% higher yielding compared too 15.6% for two years. Corn rotated with grain sorghum had yields 29.6% higher in 2001 and only 14.3% higher for two years. The higher yields associated with the corn-grain sorghum rotation was unexpected, but the higher yields associated with the corn-soybean rotation has been shown by other researchers. 2002 corn plant and ear heights were determined (Table 2). No significant difference exist, however continuous corn heights were shorter with lower ear placement. Rotations have had no effect on test weight of any crop. In 2001 soybeans yields were affected by rotations with yields 15.7% higher when grown in rotation with corn when compared to soybeans grown continuously for 3 years. Although for 2002 and when looking at two years of data no difference exist, but the trend is for lower yields for continuous soybeans. Test weight of soybeans was also affected when comparing the continuous soybeans to soybeans grown in rotation with corn in 2001, but no effect was present in 2002 or for two-year means. Grain sorghum yields or test weight was not affected by any of the rotations, however yields tend to be higher when rotated with soybeans. More years of data are needed to determine if the rotations effect does exist in a high yield environment, specifically the benefits of grain sorghum in rotation with corn.

Table 1. Grain yield and test weights in Irrigated Crop Rotation Study at OPREC.

Treatment	Corn		Soybean		Grain sorghum	
	Yield	Test weight	Yield	Test weight	Yield	Test weight
CM	153.6	56.4			122.3	56.8
SC	152.2	56.8	54.7	52.3		
CC_3	130.5	55.6				
MM_3					130.6	57.2
SM			54.2	52.5	141.2	56.9
SS_3			51.3	53.0		
Mean	145.4	56.5	53.4	52.6	110.2	57.0
L.S.D.	17.2	NS	NS	NS	NS	NS

Note: subscripted number indicates number of years in continuous crop
Yield: bushels/acre; Test Weight pounds/bushel

Table 2. Corn plant and ear height irrigated crop rotation for 2002 at OPREC.

Rotation	Corn plant height (inches)	Ear height (inches)
SC	70.0	31.9
CM	69.3	33.8
CC_3	64.6	31.9
Mean	67.6	32.0
CV %	5.1	11.6
L.S.D	NS	NS

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EVALUATION OF VARIOUS HERBICIDES IN A ROUNDUP READY CORN SYSTEM

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An experiment was conducted at the Oklahoma Panhandle Research and Extension Center at Goodwell, OK to examine efficacy of various premix and tank mix combinations in a Roundup Ready corn system. Treatment particulars were:

Crop/Variety: corn / Golden Harvest H-9226Bt/RR
Location: Goodwell, OK
Planting Date:
Experimental Design: RCB
# of reps: 4
plot size: 10' x 25'
row spacing: 30"
Planting Rate/Depth: 32,000 / 1.5"

Harvest Date: October 2, 2003
Soil Type: Gruver clay loam
% sand/silt/clay: 23-40-37
% OM: 0.8
pH: 7.7
Uniform std. treatment:

Application type	PRE	EPOST	POST	LPOST
Datebapplied [mm/dd/yy]	04/29/03	05/23/03	05/30/03	06/10/03
Time [hh:mm – hh:mm]	07:00 – 07:15 am	06:30 – 06:45 am	06:30 – 06:45 am	07:00 – 07:15 am
Incorporation equipment	na	na	na	na
Incorporation depth [in]	na	na	na	na
Air/ 4" Soil temperature [F]	65 / 65	83 / 76	75 / 80	80 /
Relative humidity [%]	65	54	50	52
Wind [mph, direction]	5-8, SW	2-8, NE	3-8, W	2-8, NE
Weather [sunny, etc.]	partly cloudy	partly cloudy	partly cloudy	partly cloudy
Soil moisture	adequate	adequate	adequate	adequate
Crop stage/Height	na	3 lf / 4-5"	5 lf / 8"	
Sprayer type/mph	CO_2 backpack, 3	CO_2 backpack, 3	CO_2 backpack, 3	CO_2 backpack, 3
Nozzle type/Size	TeeJet 8002vs	TeeJet 8002vs	TeeJet 8002vs	TeeJet 8002vs
Boom ht/# Noz/Spacing (in)	19" / 4@19"	19" / 4@19"	19" / 4@19"	19" / 4@19"
GPA/PSI	20 / 40	20 / 40	20 / 40	20 / 40
Applied by	Bensch	Bensch	Bensch	Bensch
Rainfall (in)				
0-24 hr/ 1-3 days	0/0	0/0.97	0/0.16	0/0.38
4-7 days/2nd week	0.0.25	0/1.94	1.79/0.38	0/1.82
Weed Species	Size/leaf/density			
AMAPA	na	0.5-2" / 2-5	1-3" / 3-6	2-5" / 4-8

EVALUATION OF VARIOUS HERBICIDES IN A ROUNDUP READY CORN SYSTEM 2003								
				AMAPA Control	AMAPA Control	AMAPA Control	AMAPA Control	GRAIN YIELD
	Weed Stage							
	Weed Density							
	Rating Date			5/23/03	5/30/03	6/6/03	6/20/03	10/02/03
#	Treatment	Rate	Appl	%	%	%	%	bu/A
1	Cinch ATZ Steadfast Callisto Atrazine	2 pts 0.75 oz 2 fl oz 16 oz ai	PRE POST POST POST	100	100	100	100	151
2	Cinch ATZ Steadfast Distinct	2 pts 0.75 oz 2 oz	PRE POST POST	100	100	100	100	168
3	Cinch ATZ Rimsulfuron Roundup WM	2 pts 0.75 oz 26 fl oz	PRE POST POST	100	100	100	100	158
4	Rimsulfuron Roundup WM	0.75 oz 26 fl oz	EPOST EPOST	0	100	100	100	171
5	Roundup WM	26 fl oz	EPOST	0	100	97	97	163
6	Roundup WM Rounup WM	22 fl oz 22 fl oz	EPOST LPOST	0	100	99	100	155
7	Lumax	4 pt	PRE	100	100	100	100	168
8	Lumax	5 pt	PRE	100	100	100	100	140
9	Bicep II Magnum Callisto	2.1 qt 3 fl oz	PRE POST	100	100	100	100	164
10	Dual II Magnum Callisto Aatrex	1.33 pt 3 fl oz 0.5 pt	PRE POST POST	100	100	100	100	155
11	Expert	3 qt	EPOST	0	100	100	100	162
12	Untreated check			0	0	0	0	122
LSD (P=.05)				0	0	0.8	0.9	32
CV				0	0	0.6	0.7	14

OSU WINTER WHEAT VARIETY DEVELOPMENT: RELEVANCE TO THE OKLAHOMA PANHANDLE

The Wheat Improvement Team

The Wheat Improvement Team (WIT) unites nine OSU and USDA-ARS scientists, with more than 35 scientists on and off campus, to develop winter wheat varieties custom-fit for Oklahoma's wheat industry. Some of the significant breakthroughs realized in 2003 included placing two HRW breeding lines (OK94P549-11 and OK98690) under foundation seed increase with the prospect for OAES release in spring 2004; advancing a highly novel set of germplasms featuring resistance to leaf rust by a gene that confers resistance to all leaf rust races in North America; successful insertion of a transgene for drought tolerance into winter wheat materials fit for field evaluation in Oklahoma; creation of DNA "libraries" that are beginning to provide genetic solutions for building resistance to root-rot pathogens; and the development of Clearfield candidate wheat varieties with proven adaptation across the state, including the panhandle.

Our team is committed to developing new, improved varieties with adaptation to all wheat-production zones in Oklahoma. The panhandle area, or the High Plains region, is considered one of those zones, unique from others in rainfall pattern, temperature, and disease pressure. Depending on adaptation characteristics, improved varieties are targeted for either the central corridor of the wheat acreage in Oklahoma, the High Plains, or possibly both. We now have nine candidates under final breeder-seed increase at OPREC, one of which is targeted specifically for the High Plains, OK00618W. This is a new hard white line derived from crossing Intrada with a white wheat experimental from AgriPro. In addition to retaining some of the desirable agronomic and quality characteristics of Intrada, OK00618W provides a significant yield boost over Intrada that is expressed specifically in the panhandle.

Importance of the Oklahoma Panhandle to OSU Wheat Breeding

The Oklahoma Panhandle offers a unique environment for testing and selecting new varieties. With reduced pressure from foliar diseases, the irrigated breeding trials located at the OPREC provide critical information on "yield potential" of breeding lines, reflecting the upper range of performance. Without irrigation, grain production is primarily limited by drought stress, reflecting the lower end of the yield distribution. Yield potential, however, only partially explains performance under drought. Our breeding strategy is to identify and select lines having improved yield potential in irrigated trials and improved water-use efficiency or drought tolerance in dryland trials, before they are promoted for release.

Approximately 3000 irrigated field plots and 400 dryland plots are dedicated to breeding line evaluation at the Center in 2003-2004. This includes a USDA-ARS sponsored regional nursery containing candidate varieties from public and private breeding programs throughout the Great Plains. This nursery, labeled the Southern Regional Performance

Nursery (SRPN), contained 50 entries in 2003, four of which were long-term check varieties and four others were OSU-inserted checks.
Grain yield results of the 2003 SRPN are summarized in the following table for irrigated plots at OPREC and three other Oklahoma locations. Six of the 42 breeding lines included candidate varieties from the OSU breeding program, designated by an "OK" prefix. Tied for the highest yielding slot in the 2003 SRPN at Goodwell was the OSU check variety, Ok101 (109 bu/ac). Only 1 bu/ac off was the experimental, OK95548-98-6654, at 108 bu/ac. However, this candidate was not released in 2003 due to concerns over bread baking quality. TAM 107 (a long-term check variety) performed unusually well, and at the same yield level. The OSU candidate variety, OK94P549-11, performed very well at the Center and across the entire region, where it ranked second among 46 entries. Though the SRPN was not evaluated under dryland conditions, breeder nurseries containing OK94P549-11 showed this line to be highly adapted to dryland conditions at the Center, with a yield of 60+ bu/ac recorded in 2003. The full SRPN report for all regional locations can be found on the USDA-ARS website at http://www.ianr.unl.edu/arslincoln/wheat/default.htm.

For the first time in 2003, we expanded a pivotal mid-generation nursery called the DPON (Dual-Purpose Observation Nursery) to include Goodwell as one of the testing sites, in addition to the traditional sites at Stillwater and Lahoma. Nearly 2000 lines comprise this nursery each year, and they are evaluated under dual-purpose and grain-only conditions as the nursery name implies. Our intent each year is to identify about 250 lines worthy of statewide yield testing in subsequent years. With the proportion of hard white lines in the DPON gradually increasing over the past five years, we decided to relocate the hard white portion of the DPON at Lahoma to Goodwell. Hence, our initial look at hard white breeder lines in conventional yield plots now occurs in the panhandle where this component of our breeding program is targeted. We expect this shift in selection strategy to increase the probability of identifying hard white lines best adapted to the panhandle.

Finally, the Center continues to serve a critical function to the wheat improvement program by supplying a high-yielding environment for breeder seed multiplication of candidate varieties. In addition to the one mentioned above (OK00618W), we have placed the following candidates under final breeder seed increase in 2004:

OK99212 (Tomahawk/2174//Tonkawa), a high-quality HRW wheat with statewide adaptation,
OK00514 (KS93U206/Jagger), a large-kernel, high test weight HRW wheat with statewide adaptation,
OK00614 (OK90604/Rio Blanco), another HRW wheat adapted statewide but excelling in western OK,
OK00611W (KS93U206/Jagger), a hard white wheat with unusual adaptation to central Oklahoma, and
four Clearfield HRW wheat varieties, all with statewide adaptation and partly derived from either 2174, Jagger, or Custer (only one will be eventually released).

Large plots of these nine candidates are available for observation by visitors to the Center.

Southern Regional Performance Nursery 2003

Entry	Selection	Regional Rank	OK Mean	Stillwater Yield		Lahoma Yield		Altus Yield		Goodwell-Irr Yield	
16	G980411W	22	73.6	58.6	(4)	77.5	(3)	57.0	(7)	101.2	(14)
22	OK95548-98-6654	13	72.9	57.0	(6)	73.7	(9)	53.1	(21)	107.6	(4)
13	G980122	19	71.7	59.6	(1)	71.2	(12)	56.6	(10)	99.5	(18)
30	KS940786-6-9	1	71.5	53.3	(19)	79.9	(2)	52.6	(23)	100.3	(16)
25	OK94P549-11	2	71.4	59.5	(2)	64.0	(27)	57.3	(6)	104.6	(8)
12	G980039	5	71.2	59.5	(3)	72.3	(11)	47.9	(39)	105.0	(7)
7	T136	12	71.1	53.6	(15)	74.1	(8)	55.6	(11)	100.8	(15)
26	OK98690	4	70.6	52.2	(23)	76.5	(5)	56.9	(9)	96.9	(23)
28	KS940748-2-2	7	69.9	57.6	(5)	76.4	(6)	50.6	(30)	94.9	(31)
4	Trego	20	69.8	54.7	(10)	68.6	(15)	59.1	(3)	96.7	(24)
34	W96x1311-01	18	69.5	52.0	(24)	63.3	(28)	59.1	(4)	103.7	(9)
44	TX96D1073	6	69.4	53.6	(16)	84.3	(1)	49.0	(34)	90.7	(41)
50	Nova		69.4	50.1	(40)	73.5	(10)	47.7	(41)	106.2	(6)
29	Overly	9	69.1	51.9	(25)	76.9	(4)	48.7	(36)	99.1	(19)
36	CO980607	24	68.9	51.2	(29)	57.1	(36)	65.0	(1)	102.5	(12)
37	CO980630	10	68.6	52.8	(21)	53.7	(41)	64.4	(2)	103.6	(10)
14	G982163	21	68.4	51.1	(30)	66.3	(23)	47.7	(40)	108.6	(3)
48	Ok101		68.3	56.0	(8)	53.3	(42)	54.9	(12)	108.9	(2)
11	G982241	25	68.1	51.4	(28)	70.1	(14)	50.6	(29)	100.2	(17)
39	CO99314	14	66.9	51.1	(31)	62.4	(30)	50.8	(28)	103.1	(11)
47	AP01T2429		66.8	50.6	(38)	74.8	(7)	48.5	(37)	93.4	(35)
5	T133	40	66.5	51.8	(26)	67.3	(21)	52.6	(25)	94.3	(32)
10	G982159	16	66.5	54.3	(11)	67.6	(19)	52.8	(22)	91.1	(39)
31	W99-194	3	66.3	53.9	(13)	68.6	(16)	50.5	(31)	92.1	(37)
23	OK98699	31	66.2	51.4	(27)	65.9	(25)	53.5	(19)	93.7	(33)
8	T137	23	66.1	46.7	(47)	67.4	(20)	51.6	(26)	98.6	(21)
17	NE99543	32	65.4	50.9	(33)	70.7	(13)	47.4	(43)	92.4	(36)
9	KS00HW175-4	28	65.3	53.8	(14)	68.3	(17)	49.3	(33)	89.7	(42)
24	OK94P549-21	11	65.2	50.6	(37)	61.0	(33)	53.3	(20)	95.7	(26)
42	TX98V9628	8	65.1	50.0	(41)	60.6	(34)	54.3	(13)	95.4	(28)
6	T139	42	65.0	54.8	(9)	68.0	(18)	46.6	(45)	90.8	(40)
43	TX97V5300	33	65.0	50.5	(39)	54.3	(39)	57.0	(8)	98.2	(22)
35	CO980376	17	64.6	46.2	(48)	48.9	(45)	54.3	(14)	109.0	(1)
33	W96x1375-06	15	64.5	47.0	(44)	66.4	(22)	49.5	(32)	95.2	(30)
3	TAM-107	41	64.5	54.1	(12)	45.4	(49)	51.0	(27)	107.5	(5)
18	NE00429	34	64.3	53.3	(18)	53.9	(40)	53.6	(18)	96.4	(25)
49	Ok102		64.0	53.3	(17)	62.7	(29)	52.6	(24)	87.2	(44)
46	TX99U8618	35	63.4	46.9	(46)	47.3	(48)	58.1	(5)	101.2	(13)
41	TX99A0155	30	62.7	53.1	(20)	48.1	(46)	54.0	(15)	95.4	(29)
15	G980129W	36	62.5	49.3	(42)	47.9	(47)	54.0	(16)	98.8	(20)
21	OK96705-99-6738	26	62.0	47.0	(43)	56.1	(38)	53.8	(17)	91.3	(38)
45	TX98D2316	29	61.5	50.9	(34)	61.2	(31)	47.7	(42)	86.4	(45)
19	NE00544	38	61.5	52.3	(22)	65.5	(26)	45.3	(46)	82.7	(47)
20	NE00564	39	61.1	43.7	(50)	56.5	(37)	48.5	(38)	95.5	(27)
32	W96x1080-21	27	61.0	51.1	(32)	66.1	(24)	42.9	(47)	84.1	(46)
27	OK99215	37	60.2	56.6	(7)	59.7	(35)	35.4	(50)	88.9	(43)
38	CO99141	43	59.6	50.7	(36)	61.2	(32)	47.0	(44)	79.6	(48)
40	CO99W192	44	57.8	44.4	(49)	52.6	(43)	40.8	(48)	93.5	(34)
2	Scout 66	45	55.3	50.8	(35)	49.0	(44)	48.9	(35)	72.6	(49)
1	Kharkof	46	46.4	46.9	(45)	41.8	(50)	38.7	(49)	58.0	(50)
	OK Mean		65.7	52.1		63.6		51.6		95.7	
	CHECK MEAN		64.7	52.5		66.1		50.9		98.9	
	CV		10.7	15.2		7.2		6.8		10.5	
	LSD		8.0	10.7		6.2		4.8		13.6	

SEEDING RATE FOR DRY-LAND DUAL PURPOSE WHEAT IN THE OKLAHOMA PANHANDLE

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Gene Krenzer, Dept. of Plant and Soil Sciences, Oklahoma State University, Stillwater
Scott Gillen, Oklahoma Cooperative Extension Service, Boise City, Oklahoma

Dry-land wheat producers in the Oklahoma panhandle utilize wheat in a dual-purpose system when adequate fall moisture is present. In the fall of 2001 a dry-land seeding rate study was established near Keyes, to determine the effect of seeding rate on dual-purpose wheat. The most widely grown dry-land wheat variety (TAM 110) was planted at rates of (30, 45, 60, 90, and 120) pounds per acre. Most producers utilize the 30 and 45 pounds per acre rates. The 60, 90, and 120 pounds per acre rates were used to determine if higher forage production found with increased seeding rates in irrigated systems, would also be exhibited in a dry-land system. In 2003 a planting date in mid October was added. The planting date will help determine if increased seeding rates are necessary for later planted wheat. Plot size was 5 feet wide by 25 feet long planted with a Hege plot planter, with a planting date in early September. In mid December one meter of row from each end of a plot was hand clipped to soil surface and placed in drying oven for 48 hours to determine forage production. After clipping, fencing was removed and cattle were allowed to graze plots until first hollow stem stage. Grain will be harvested in the summer of 2003.

Results

Forage

In the fall of 2001 plots were dusted in and never received enough precipitation to sprout and emerge, therefore no data was collected. In the fall of 2002 plots were planted on September 3 with excellent soil moisture, and fall forage was collected December 16. With the excellent planting conditions, and rainfall throughout the fall, forage yield was higher than expected (Table 1). In 2003 planting was delayed until mid September due to rainfall earlier in the month. Forage data was collected on December 18. Forage yields were lower in 2003 with a mean across seeding rates of 950 lbs/ac compared to 3600 lbs/ac in 2002. The yields wee so variable that conclusions could not be drawn for 2003 or two-year data.

Table 1. Fall forage production and grain yield at selected seeding rates for dry-land wheat 2002.

Seeding rate (lb/ac)	Forage yield (lb/ac)	Grain Yield (bu/ac)
120	4,830	10.9
90	4,220	12.1
60	3,780	11.9
45	3,290	12.0
30	2,700	12.6
Mean	3,760	11.9
CV%	13.7	16.1
L.S.D.	970	3.0

Yields for the fall of 2002 were as high as what has been obtained in irrigated trials in the past at OPREC. As with an irrigated system, increasing seeding rate increased fall forage production in dry-land environment. The value of increased forage far exceeded the cost of additional seed even between the 90 and 120 pound seeding rates**.**

Grain

With the dry spring of 2003 grain yields were very low (Table 1). There was only a 1.7 bu/ac difference in yield between seeding rates, which was not significant. There also was no difference in test weights among seeding rates with a mean of 55.4 lbs/bu. This study will be continued to determine optimum seeding rates for dryland production in the panhandle region.

PLANTING DATE, SEEDING RATE, AND VARIEY DIFFERENCES IN IRRIGATED DUAL PURPOSE WHEAT

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Irrigated wheat is planted in the panhandle region each year to be utilized as fall forage for cattle as well as harvested for grain the next spring. In the fall of 2000, an experiment was initiated to determine the effects of seeding rate, planting date, and variety on fall forage and grain production. Three seeding rates used are 60, 120 and 180 pounds per acre. The three most widely grown Hard Red Winter Wheat varieties (HRW) (TAM 107, Custer, and Jagger) and Hard White Winter Wheat (HWW) (Intrada) were used. Plots were 5 feet wide by 22 feet long planted with a Hege plot planter. Planting dates were September 1, October 1, and November 1 in 2000. In 2001 planting dates where changed to September 1, and two plantings on October 1, one for forage plus grain and the other for grain only. The September 1 planting date coincides with planting wheat following corn ensilage production. The October 1 planting date is reflective of planting wheat following corn for grain harvest. The November 1 planting date was selected to determine grain production on late-planted wheat. After 2000 yields were so low for the November 1 planting, another October 1 planting was added to determine yield loss from forage removal. Forage harvest dates are listed in Table 1. One meter of row from each end of a plot was hand clipped to soil surface and placed in drying oven for 48 hours to determine forage production. Plots were then mowed with a 5-foot finishing mower to simulate forage removal by grazing. After mowing, the September 1 planting area that was hand clipped was marked so the same area could be hand clipped again for subsequent harvest. Irrigation applied in the fall of 2000, 2001, and 2002 was 5, 7, and 1 inches respectively.

Table 1. Forage harvest dates by planting dates for OPREC irrigated dual-purpose wheat.

--- Planted September 1 ---		--- Planted October 1 ---	
2000	2001	2000	2001
Oct. 12	Oct. 1	Dec. 15	Dec. 19
Nov. 1	Nov. 6		
	Dec. 6		

Results

Due to packaging errors no data was collected in 2002-03. No differences in forage yields have been associated with varieties, therefore reported forage yields are an average of all varieties. Seeding rate and planting date have the largest impact on fall forage production (Fig. 1). The 180 lb/ac seeding rate planted on September 1 resulted in the highest forage production at 3,040 lbs/ac of dry matter. The increased forage production from the 180 lb/ac seeding rate appears to occur during the early period of growth (Fig 2). The difference in forage production between seeding rates does not increase after first harvest as approximately the same difference is observed after final harvest (Fig 1). The 180 lb/ac seeding rate will also allow earlier grazing due to increased early forage production.

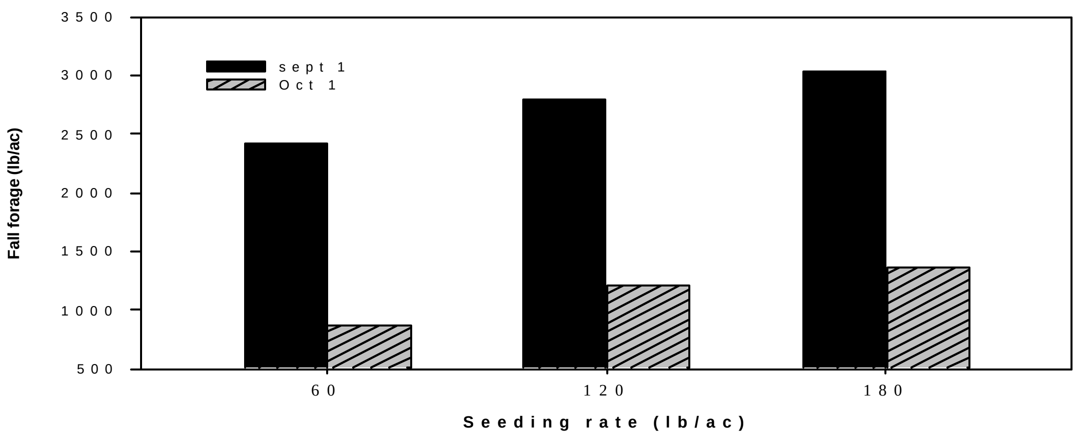

Figure 1. Total fall forage produced by mid-December in irrigated dual-purpose wheat at OPREC.

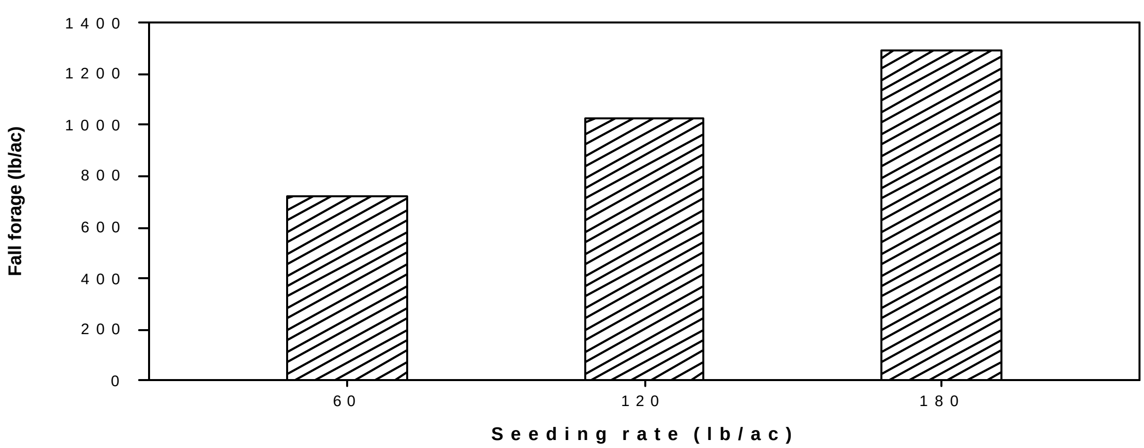

Figure 2. Forage production averaged across variety and year for first harvest (early October for the September 1 planting date in irrigated dual-purpose wheat at OPREC.

Grain yields (Table 2), for the first planting date were affected by winterkill in the plots in both 2001 and 2002. In 2001 forage was 14 inches tall before the second harvest, and with the cold temperatures following removal of large amounts of forage explains damage in the plots. In 2002, in late February, a week of day time temperatures between 55 - 69° F was followed by a week of night time lows below 10° F. This resulted in extensive freeze damage. It appears that variety and planting date affect grain yields. The highest yield, 67.7 bu/ac, was obtained with TAM 107 planted October 1, and not grazed (Table 2). When averaged across varieties and planted October 1, grazing reduced wheat yield 12 bu/ac compared to ungrazed wheat. The combination of winter kill, grazing, and earlier planting reduced grain yield 11.4 bu/ac when comparing September 1 planting grazed and October 1 ungrazed (Table 3).

Table 2. Mean grain yield for variety and planting date for irrigated dual-purpose wheat at OPREC.

Variety	Planting date	Grazed	Yield bu/ac
TAM 107	October 1	No	67.7
TAM 107	September 1	Yes	54.6
TAM 107	October 1	Yes	49.9
Custer	October 1	No	67.4
Custer	October 1	Yes	54.5
Custer	September 1	Yes	48.5
Intrada	October 1	No	54.4
Intrada	September 1	Yes	50.0
Intrada	October 1	Yes	49.0
Jagger	October 1	No	54.3
Jagger	September 1	Yes	45.0
Jagger	October 1	Yes	42.1
		Mean	53.1
		L.S.D.	8.4

Table 3. Grain yields averaged across varieties and seeding rates in the irrigated dual-purpose wheat trial at OPREC.

Planting date	Grazed	Yield
October 1	No	60.9
September 1	Yes	49.5
October 1	Yes	48.9
	Mean	53.1
	L.S.D.	7.7

Test weights were most affected by variety selection with Intrada having test weights 2.7 pounds per bushel higher than next highest variety. When evaluating test weight, varieties reacted differently, Jagger, Custer, and Intrada had lowest test weight at September 1 planting date and grazed while TAM 107 had lowest test weight for October 1 planting date and grazed (Table 4). This trial is being continued at OPREC with an additional location added at the Plainsman Research Center at Walsh, CO in 2001. Due to extreme winter kill at Walsh location data was unreliable in 2001-02.

Table 4. Test weight averaged across seeding rates for the irrigated dual-purpose wheat trial at OPREC.

Variety	Planting date	Grazed	Test weight lb/bu
Intrada	October 1	Yes	61.1
Intrada	October 1	No	61.0
Intrada	September 1	Yes	60.4
Jagger	October 1	Yes	58.4
Jagger	October 1	No	58.4
Jagger	September 1	Yes	57.5
Custer	October 1	No	58.4
Custer	October 1	Yes	58.0
Custer	September 1	Yes	57.5
TAM 107	October 1	No	57.8
TAM 107	September 1	Yes	57.4
TAM 107	October 1	Yes	56.8
		Mean	58.6
		L.S.D.	0.5

NO-TILL VS MINIMUM-TILL DRY-LAND CROP ROTATIONS

Rick Kochenower, Oklahoma Panhandle Research and Extension Center, Goodwell

In 1999, a study was started to evaluate four different dry-land cropping rotations and two tillage systems for their long-term sustainability in the panhandle region. Rotations include Wheat-Sorghum-Fallow (WSF), Wheat-Corn-Fallow (WCF), Wheat-Soybean-Fallow (WBF), and Continuous Sorghum (CS). Soybean and corn have not been successful, therefore beginning in 2004 cotton will replace soybean and sunflower will replace corn. Tillage systems include no-till and minimum tillage. All crops will be planted no-till and minimum tillage. Beginning in 2004 one half of the no-till plots will be strip-tilled for planting of summer crops. Two maturity classifications were used with all summer crops in the rotations until 2001 at which time all summer crops were planted with single maturity hybrids. Most dry-land producers in the panhandle region utilize the WSF rotation. Other rotations would allow producers flexibility in planting, weed management, insect management, and marketing.

Results

No corn or soybean data was collected in 2001 – 03, no crops were harvested in 2002 due to drought.

Data from the Oklahoma Climatological Service indicated the summers (June – August) of 1999 through 2002 have been some of the driest in the last 51 years. Precipitation for these years has averaged 43% of the long-term mean, with 2001 at 16.5% (Table 1). In 2003 precipitation was 107% of long-term mean, but with the extended dry period subsoil moisture was depleted. With corn and soybean requiring more water than grain sorghum no grain was harvested from either crop. Enough soil moisture has been available to grow significant biomass for corn, but not enough for grain production. In 2003 grain sorghum was harvested with an average yield of 23.3 bu/ac with no differences between tillage treatments. For the first time differences were found in wheat yields, with the WBF having the highest yield at 66.1 bu/ac (Table 2). The WBF rotation having higher yield may be attributed to having no biomass grown in the summer of 2001, while corn and grain sorghum both had significant biomass. Therefore more soil moisture may have been stored. There was no difference in wheat yields in 2000 and 2001 among rotations or tillage treatments with a yield of 27 and 40 bushel per acre respectively. The year 2000 was the first year of continuous grain sorghum and a crop has yet to be harvested. With the drier than normal summers grain sorghum yields have been lower than expected ranging from 18.0 – 52.0 bu/ac. A yield increase for grain sorghum has been observed due to tillage with a 5.0 bushel/ac increase for no-till for 1999 - 2002. Grain sorghum yields for 2000 were reduced by poor weed control. Due to lack of rainfall the herbicide was never activated. The best corn yield was 15.6 bu/ac in 1999 so after five year corn will be replaced with sunflowers. The best soybean yield was 12.3 bu/ac in 1999, with no crop being harvested in 2000 – 2003, so in 2004 soybean will be replaced with cotton. It appears after five years of the study that the WSF rotation is best suited for the panhandle region, however with new crops being introduced in 2004 other rotations may succeed.

Table 1. Summer growing season precipitation at OPREC

Month	1999	2000	2001	2002	2003	Long-term mean
June	2.85	2.29	0.61	1.32	5.26	2.86
July	0.20	0.76	0.00	2.52	1.87	2.58
August	0.75	1.09	0.66	0.27	1.19	2.28
Total	3.80	4.14	1.27	4.11	8.32	7.72

Table 2. Wheat yields (bu/ac) dry-land tillage and crop rotation study at OPREC.

Rotation	Tillage	2003	3-year
WBF	No-till	66.1 a	42.6 a
WBF	Tilled	63.8 ab	43.2 a
WCF	No-till	51.8 bc	40.4 ab
WSF	No-till	48.8 c	39.0 ab
WCF	Tilled	44.5 cd	37.7 b
WSF	Tilled	31.7 d	33.8 b
	Mean	51.1	39.5
	L.S.D.	13.6	8.0

Southern Pea Trial
Southern Cooperative Trial June, 2003, Texas County, Oklahoma

Oklahoma Panhandle Research and Extension Center

L. Brandenberger, L. K. Wells, J. Sanchez, R. Kochenower

Materials and Methods: Southern peas i.e. cowpeas (*Vigna unguiculata*) are a major vegetable crop grown within the state of Oklahoma. They are produced primarily for the processing market, but there is some acreage produced for fresh market. The Southern Cooperative trials are an ongoing effort by scientists at 5 Land Grant Universities and the U.S.D.A. These trials provide for the collection of performance data in a wide variety of production environments in the Southern U.S. The objective of this trial was to provide Oklahoma producers with information on crop flowering, growth habit and yield potential of breeding lines that may become available in the near future. Plots consisted of one row 20 feet long with 30 inches of space between rows. Seed were spaced 8 to 10 seed per foot and were inoculated with *Rhizobium* at planting. The trial was planted on 6/16/03 and included 4 replications for the 15 replicated lines and 2 replications for the 18 observational lines (Table 1). Plots were rated on 8/07/03 for percent flowering and growth habit. Harvest data was collected by machine harvesting on 9/16/03.

Results and Discussion: The earliest flowering lines in the replicated trial were TX 123 BE, LA 96-4, US-1076, TX 158PEgc, LA 94-55 and LA 94-61 (Table 2). These had between 66-83 percent flowering on 8/07/03 compared to industry standards that had 10-21 percent flowering. Flowering on 8/07/03 in the observational trial ranged from 0-90 percent (Table 2) with TX 158BEgc, LA91-30cr, LA 94-1 and LA 96-18 being the earliest flowering lines. The most upright growing replicated lines included US-1031 and AR 96-868 (Table 2). The observational lines that were most upright included US-1080 and LA 94-1 (Table 3). Dry and imbibed yields for a majority of lines corresponded to one another in the trials. TX 116BE, LA 96-4 and AR 01-1293 compared favorably with the industry standards and ranged from 2122-2432 lbs/acre imbibed yield (Table 2). Observational lines had imbibed yields that ranged from 440-3384 lbs/acre and the highest yields were from US-1084, AR 96-854 and AR 01-633, (Table 3).

In past years the Southern Cooperative Trial has been carried out at the Bixby Vegetable Station, this year it was decided to try a different area of the state to determine how this crop would respond in another environment. The most obvious difference between the last two years was the speed at which the crop developed. In 2002 at Bixby, the industry standards in the trials i.e. ARK Blackeye #1, Early Acre and Coronet recorded 70-78 percent flowering 47 days after planting. In 2003 the same three industry standards recorded 10-21 percent flowering 51 days after planting. After just one year in the Panhandle it is difficult to determine if this can be attributed to location or variation from year to year due to weather, but in either case the authors believe that further testing is warranted.

Acknowledgements: The authors thank Lawrence Bohl, Matthew LaMar and Mike LaMar for support and assistance in completing this study. We also want to thank Curtis Bensch for sharing harvesting machinery.

Table 1. Spring 2003 Southern Pea Trial entries at Goodwell, OK.

Replicated Trial		*Observational Trial*	
Variety	**Source**	**Variety**	**Source**
US-1031	USDA	US-1080	USDA
US-1076	USDA	US-1084	USDA
US-1071	USDA	US-1086	USDA
AR96-868	U of Arkansas	US-1088	USDA
AR01-1293	U of Arkansas	AR96-854	U of Arkansas
AR01-1657	U of Arkansas	AR01-633	U of Arkansas
TX123BE	Texas A & M	AR01-874	U of Arkansas
TX116BE	Texas A & M	AR01-1237	U of Arkansas
TX158PEgc	Texas A & M	TX160BE	Texas A & M
LA94-55	Louisiana State	TX162PE	Texas A & M
LA94-61	Louisiana State	TX158BEgc	Texas A & M
LA96-4	Louisiana State	LA91-30cr	Louisiana State
Coronet	Industry Standard	LA94-1	Louisiana State
ARK Blackeye #1	Industry Standard	LA95-17	Louisiana State
Early Acre	Industry Standard	LA96-18	Louisiana State
		Coronet	Industry Standard
		ARK Blackeye #1	Industry Standard
		Early Acre	Industry Standard

Table 2. Spring 2003 Southern Pea Trial, Goodwell, OK. Replicated Trial

					Shelled yield lbs./acre			
Variety	**Flowering**[z]		**Growth habit**[y]		**Dry**[x]		**Imbibed**[w]	
Blackeye types								
US-1071	15	cd[v]	3.1	b	479	c	1066	b
AR01-1657	21	cd	2.4	bcde	529	bc	1220	b
TX123BE	66	ab	2.6	bcd	823	ab	1834	ab
TX116BE	6	d	4.0	a	1078	a	2432	a
ARK Blackeye #1	10	d	2.5	bcd	998	a	2242	a
Cream types								
US-1031	5	d	1.6	ef	421	b	961	b
LA96-4	73	ab	1.9	def	1004	a	2377	a
Early Acre	18	cd	2.8	bc	1161	a	2602	a
Pinkeye types								
US-1076	83	a	2.6	bcd	244	c	538	c
AR96-868	63	b	1.4	f	715	ab	1555	ab
AR01-1293	29	c	2.8	bc	919	a	2122	a
TX158PEgc	68	ab	2.1	cdef	434	bc	989	bc
LA94-55	69	ab	2.3	cde	377	c	899	c
LA94-61	70	ab	2.0	cdef	431	bc	1001	bc
Coronet	21	cd	4.6	a	978	a	2091	a

[z]Flowering=estimated percent flowering on August 7, 2003

[y]Growth habit=1-5 rating, 1=erect, 5=trailing or prostrate

[x]Dry shelled wt.=mechanically harvested on 9/16/03 yield in lbs./acre.

[w]Imbibed wt.=Imbibed weight in lbs./acre.

[v]Numbers in a column followed by the same letter exhibit no significant differences based on Duncan's Multiple Range Test where P=0.05.

Table 3. Spring 2003 Southern Pea Trial, Goodwell, OK. Observational Trial				
			Shelled yield lbs./acre	
Variety	**Flowering**[z]	**Growth habit**[y]	**Dry**[x]	**Imbibed**[w]
Blackeye types				
AR01-633	35	2.3	1337	2854
TX160BE	53	2.3	579	2023
TX158BEgc	70	2.3	1067	2207
ARK Blackeye #1	13	3.0	1180	3432
Cream types				
US-1080	3	1.0	749	1779
LA91-30cr	85	1.5	662	1879
Early Acre	33	2.5	1233	3872
Pinkeye types				
US-1084	13	5.0	1089	3384
US-1086	10	4.3	266	440
US-1088	8	4.3	501	1015
AR96-854	23	2.0	1307	3355
AR01-1237	5	3.5	1124	2736
TX162PE	0	3.8	470	1264
LA94-1	90	1.0	727	1340
LA95-17	0	2.5	775	2549
LA96-18	75	2.0	688	1780
Coronet	40	5.0	1237	3563
***Other types** (Red Holstein)*				
AR01-874	0	2.3	1599	3944

[z]Flowering=estimated percent flowering on August 7, 2003
[y]Growth habit=1-5 rating, 1=erect, 5=trailing or prostrate.
[x]Dry shelled wt.=mechanically harvested on 9/16/03 yield in lbs./acre.
[w]Imbibed wt.=Imbibed weight in lbs./acre.

Cowpea Forage Trial
June, 2003, Texas County, Oklahoma

Oklahoma Panhandle Research and Extension Center

L. Brandenberger, L. K. Wells, J. Sanchez, R. Kochenower, D. Redfearn

Materials and Methods: Cowpeas can rapidly establish and produce forage during warm summer months. Forage types include both (*Vigna unguiculata)* and (*Vigna sinensis*). They are native to the African continent, vary considerably genetically and in general are heat and drought tolerant. Because of this, they have potential for use in the Panhandle region of Oklahoma particularly as dry-land forage. During 2003, efforts were initiated on cowpea research at the Goodwell station. The objective of the trial was to provide Oklahoma producers with information on crop flowering, growth habit and yield potential of varieties and breeding lines that are available commercially or may become available in the future. Seven different forage cowpeas were included in this first year's trial. Plots consisted of one row 20 feet long with rows on 30 inch row-centers. Seed were spaced 1 seed per foot due to seed availability and were inoculated with *Rhizobium* at planting. The trial was planted on 6/16/03 and included 4 replications in a randomized block design (Table 1). Plots were rated on 8/07/03 for percent flowering, growth habit and forage quality samples were also collected. Harvest data was collected by hand harvesting forage from each plot and recording fresh and dry weights.

Results and Discussion: Flowering ratings were zero for all entries in the trial (Table 1). Growth habit ratings ranged from 1-5. Of the six varieties in the trial, GC-86L-98 and Red Ripper had an average growth habit rating of 5 and Iron had 4.4, indicating high levels of vegetative growth. Crude protein ranged from 15.6 for GC-86L-98 to a high of 22.7 percent for Poona. Total digestible nutrients (TDN) were relatively uniform with only Caloona having TDN lower than 60 percent. GC-86L-98 and Victor had the highest yields both for fresh and dried forage. GC-86L-98 had fresh and dried yields of 14.2 and 4.2 tons/acre, respectively, and Victor had 12.3 and 3.6 tons/acre, respectively. This was a first year trial for forage cowpeas and further study is needed to determine how varieties will perform during different seasons. Based upon the data, the authors would conclude that of the varieties tested this season Victor appears to have several of the attributes that are needed for forage production and would warrant more testing.

Acknowledgements: The authors thank Lawrence Bohl, Matthew LaMar and Mike LaMar for support and assistance in completing this study.

Table 1. Spring 2003 Southern Pea Trial, Goodwell, OK. Forage Trial.

Variety	Source	Flowering[z]	Growth habit[y]	Crude Protein[x]	TDN[w]	Forage yield tons/acre[v]	
						Fresh	Dry Matter
Poona	USDA	0 b[u]	1.0 d	22.7 a	60.6 ab	8.6 bc	2.7 bc
Iron	USDA	0 b	4.4 a	20.4 ab	63.1 a	6.0 cd	2.0 c
Clay	USDA	0 b	2.9 b	19.7 ab	63.9 a	5.3 cd	1.8 c
GC-86L-98	USDA	0 b	5.0 a	15.6 c	61.1 ab	14.2 a	4.2 a
Victor	OPREC	0 b	3.4 b	20.0 ab	63.9 a	12.3 ab	3.6 ab
Red Ripper	OPREC	4 a	5.0 a	17.4 bc	61.6 ab	4.1 d	1.5 c
Caloona	USDA	0 b	1.9 c	21.7 a	59.3 b	7.8 cd	2.4 bc

[z]Flowering=estimated percent flowering on August 7, 2003

[y]Growth habit=1-5 rating, 1=erect, 5=prostrate growth habit.

[x]Crude protein=dry basis percent.

[w]TDN=total digestible nutrients percent.

[v]Yield=Tons/acre for fresh green weight and dry matter weight.

[u]Numbers in a column followed by the same letter exhibit no significant differences based on Duncan's Multiple Range Test where P=0.05.

Minimum Irrigated Cotton Variety Trial – Texas County

J.C. Banks, Shane Osborne, and Rick Kochenower

Six cotton varieties were planted both on the 10th and again on the 30th of May. Two row by 25' plots were seeded at a rate of 14 lbs/A and managed for optimum yield. Plots received 5 inches of overhead irrigation from a pivoting sprinkler system. Interest in cotton continues to grow in the northern parts of Oklahoma, Texas and Southern Kansas. As indicated by the results below, planting date and variety selection can be important factors to consider for these areas.

Trial ID:	OSUVP0304	Location:	OPREC
Planting Date:	May 10 & 30	Seeding Rate:	14 lbs/A
Row Spacing:	30 inches	Plot Size:	2 r x 25'
Replications:	4	Soil Type:	Sandy Clay Loam
Harvest Date:	December 15		

Trt No.	Treatment Name	Grow Stg	Appl Code	GIN PERCENT		LINT LBS/ACRE	
1	DP 555 B/R	EARLPLAN	A	31	a	664	fg
2	PM 2280 B/R	EARLPLAN	A	25	d	746	efg
3	PM 2266 RR	EARLPLAN	A	28	bc	1029	ab
4	ST 2454 R	EARLPLAN	A	28	bc	859	cde
5	PM 2145 RR	EARLPLAN	A	30	abc	1087	a
6	PM 2167 RR	EARLPLAN	A	30	ab	1033	ab
7	DP 555 B/R	LATPLANT	B	28	abc	613	g
8	PM 2280 B/R	LATPLANT	B	27	cd	747	efg
9	PM 2266 RR	LATPLANT	B	27	bcd	885	cde
10	ST 2454 R	LATPLANT	B	28	abc	795	def
11	PM 2145 RR	LATPLANT	B	29	abc	923	bcd
12	PM 2167 RR	LATPLANT	B	30	abc	998	abc
LSD (P=.05)				2.9		140	
Standard Deviation				2		96.9	
CV				6.99		11.21	

Means followed by same letter do not significantly differ (P=.05, LSD)

Irrigated Variety Trial – Texas County

Trial ID:	OSUVP0304	**Location:**	Panhandle St.
Planting Date:	May 10 & 30	**Seeding Rate:**	14 lbs/A
Row Spacing:	30 inches	**Plot Size:**	2 r x 25’
Replications:	4	**Soil Type:**	Sandy Clay Loam
Harvest Date:	December 15		

Trt No.	Treatment Name	Grow Stg	Appl Code	FIBER MIC		FIBER LENGTH		FIBER STRENGTH	
1	DP 555 B/R	EARLPLAN	A	2.45	g	1.132	a	25	e
2	PM 2280 B/R	EARLPLAN	A	2.83	f	1.13	a	27.7	abc
3	PM 2266 RR	EARLPLAN	A	3.2	cde	1.102	b	27.33	abc
4	ST 2454 R	EARLPLAN	A	2.95	ef	1.08	cd	26.7	bcd
5	PM 2145 RR	EARLPLAN	A	3.75	a	1.053	e	28.2	a
6	PM 2167 RR	EARLPLAN	A	3.6	ab	1.025	f	26.85	abc
7	DP 555 B/R	LATPLANT	B	2.53	g	1.135	a	25.35	de
8	PM 2280 B/R	LATPLANT	B	3.08	def	1.093	bc	28.1	ab
9	PM 2266 RR	LATPLANT	B	3.2	cde	1.097	bc	27.25	abc
10	ST 2454 R	LATPLANT	B	3.05	def	1.067	de	26.3	cde
11	PM 2145 RR	LATPLANT	B	3.32	bcd	1.02	f	27.1	abc
12	PM 2167 RR	LATPLANT	B	3.43	bc	1.027	f	26.25	cde
LSD (P=.05)				0.298		0.0216		1.497	
Standard Deviation				0.207		0.015		1.037	
CV				6.63		1.39		3.86	

Means followed by same letter do not significantly differ (P=.05, LSD)

ALFALFA HERBICIDE STUDY

Curtis Bensch, Oklahoma Panhandle Research and Extension Center, Goodwell

A field experiment was conducted at the Oklahoma Panhandle Research and Extension Center in Goodwell, OK to examine crop injury and efficacy of 9 alfalfa herbicides in alfalfa. Herbicides examined were Karmex, Sinbar 80W, Velpar, Sencor DF, Raptor, and Buytyrac (Table 1). The experiment was established as a randomized complete block design with four replications. The plot size was 10 feet by 25 feet. The alfalfa stand was located at an irrigated site owned by Oklahoma Panhandle State University. The alfalfa variety was Cimarron VR, and the stand was 6 years old in excellent condition. The alfalfa was irrigated throughout the growing season as needed. The herbicides were applied postemergent on March 26, 2003 using a CO^2 hand boom sprayer with 4 nozzles on 19 inch spacing, 20 GPA, and 35 PSI. The alfalfa had just begun to break dormancy at application time. Application timing was targeted for alfalfa just breaking dormancy to better assess crop injury associated with the later than traditionally recommended application. Tansymustard and downy brome were the dominant weed species present. The tansymustard was 2-6" tall at a density of 2-4 per ft^2, and 3-5 leaf at application time. Downy brome was 3-4" tall at a density of 0-5 per ft^2, and 4-9 leaf. Alfalfa was 2-3 inches tall and had broken winter dormancy approximately 3 weeks earlier. Soil moisture conditions were excellent. Tansymustard and downy brome control was determined at 14 and 30 days after treatment (DAT). Crop injury was also determined at 14 and 30 DAT. Alfalfa forage yield was determined for the first 2 harvests (May 14 and June 25). Data analysis was conducted using SAS and Proc mixed.

Table 1. Herbicide treatments and rates applied with surfactants.

HERBICIDE	RATE
Karmex	1# product/A
Karmex	2# product/A
Sinbar 80W	0.5# product/A
Sinbar 80W	1.0 # product/A
Velpar L	2 pints product/A
Velpar L	3 pints product/A
Sencor DF	1 # product/A
Raptor NIS UAN	5 fluid oz/A 0.25% v/v 1.25% v/v
Butyrac (2,4-DB)	2 qts product/A

RESULTS

Downy brome and tansymustard control varied with herbicide and rate (Table 2). Velpar at 3 pts/acre gave the highest downy brome control at both 14 and 30 days after treatment. Velpar at 2 and 3 lb/A, Raptor, Sencor DF, and Sinbar at 1 lb/A all gave better than 90% control of downy brome at 30 DAT. Sinbar, Velpar, Sencor, and Raptor all gave better than 90% control of tansymustard 30 DAT. 2,4-DB provided very poor control of tansymustard, and no control of downy brome as expected.

Karmex, Sinbar, Velpar, and Sencor all caused slight visible crop injury 14 DAT (Table 2), although the crop injury did not seem to significantly affect yield (Table 3). Little crop injury was evident 30 DAT. Raptor gave excellent control of both downy brome and tansymustard and caused no crop injury. Karmex, Sinbar, Velpar, and Sencor are all chemically related compounds with the photosynthetic inhibition mode of action. Raptor's mode of action is inhibition of amino acid synthesis, specifically targeting the ALS enzyme functioning in production of branched chain amino acids.

Table 2. Downy brome control, tansymustard control, and Alfalfa injury 2 weeks and 30 days after treatment.

HERBICIDE	RATE	DOWNY BROME CONTROL		TANSY MUSTARD CONTROL		ALFALFA INJURY	
		14 DAT	30 DAT	14 DAT	30 DAT	14 DAT	30 DAT
Karmex	1# product/A	13	25	69	81	4	0
Karmex	2# product/A	0	13	73	88	4	3
Sinbar 80W	0.5# product/A	0	81	54	99	3	1
Sinbar 80W	1.0 # product/A	13	94	70	100	5	1
Velpar L	2 pints product/A	25	92	84	100	18	1
Velpar L	3 pints product/A	45	97	90	100	20	1
Sencor DF	1 # product/A	18	94	58	96	14	8
Raptor	5 fluid oz/A	28	96	93	97	0	0
Butyrac (2,4-DB)	2 qts product/A	0	0	45	0	0	0
Check		0	0	0	0	0	0
LSD		26	16	20	6	6	3

Table 3. Alfalfa yield for first and second cutting.

		ALFALFA YIELD (Pounds DM/acre)	
HERBICIDE	RATE	1ST CUTTING	2ND CUTTING
Karmex	1# product/A	5770	3566
Karmex	2# product/A	4877	2775
Sinbar 80W	0.5# product/A	5408	3053
Sinbar 80W	1.0 # product/A	4858	2775
Velpar L	2 pints product/A	5249	3190
Velpar L	3 pints product/A	5469	3431
Sencor DF	1 # product/A	5166	3580
Raptor	5 fluid oz/A	5820	3039
Butyrac (2,4-DB)	2 qts product/A	4163	2921
check		3201	2391
LSD		1614	982

OKLAHOMA CORN PERFORMANCE TRIALS, 2003

PRODUCTION TECHNOLOGY CROPS

OKLAHOMA COOPERATIVE EXTENSION SERVICE
DEPARTMENT OF PLANT AND SOIL SCIENCES
DIVISION OF AGRICULTURAL SCIENCES & NATURAL RESOURCES
OKLAHOMA STATE UNIVERSITY

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TRIAL OBJECTIVES AND PROCEDURES

Each year the Oklahoma Cooperative Extension Service conducts corn performance trials in Oklahoma's corn producing areas. In 2003 a dryland trial was added at Blackwell. These trials provide producers, extension educators, industry representatives, and researchers with information on corn hybrids marketed in Oklahoma. Company or brand name, entry designation, plant characteristics, and maturity information, was provided by the companies (Table 3,4). Oklahoma State University did not verify this information. For disease resistance consult company representatives. Company participation was voluntary, therefore some hybrids marketed in Oklahoma were not included in the test.

Irrigated test plots were established at the Oklahoma Panhandle Research and Extension Center (OPREC), Goodwell, Joe Webb farm, near Guymon, and a dryland trial near Blackwell. Fertility levels, herbicide use, and soil series (when available) are listed with data. At OPREC and the Webb location, two rows 25 feet long were seeded at the target population of 32,000 plants/ac, and 20 feet of both rows were harvested. At the Blackwell location two rows 25 feet long were seeded at target population of 25,000 plants/ac, 20 feet of both rows were harvested. The ensilage trial was seeded the same as grain trial at OPREC and 10 feet of one row was harvested for yield Experimental design was a randomized complete block with four replications. Grain yields are reported as bu/ac of shelled grain (56 lbs/bu) adjusted to moisture content of 15.5%. This is consistent with U.S. No. 1 grade corn standards. Corn ensilage was harvested at the early dent stage with average moisture content of 70.8 %. Ensilage production is reported as tons/ac adjusted to 65% moisture. This is consistent with current ensiling practices.

GROWING CONDITIONS

Panhandle

The planting period was characterized by less than desirable topsoil moisture. Most producers used some pre-irrigation to obtain desired soil moisture levels. Soil temperature of 61° F on April 1 at the two-inch depth was consistent with observations in previous years. Most corn in the region was planted in April without delays due to rainfall. During the growing season rainfall was excellent from mid May until July 1 (Table 1) with some areas receiving more rain than OPREC. With the abundant precipitation most producers in the area did not start irrigation until early July. The panhandle region had several yield reducing hailstorms from mid May until early July, although OPREC didn't have hail for the first time in 5 years. Pollination period (July 1 through July 15) temperatures for 2003 were higher than in 2002, but not as severe as 2001 (Fig. 1) although yields in most instances were not affected. High moisture corn was cut with minor delays from weather in late August and early September. However, delays of 3 weeks or more were common for dry corn harvest due to cool temperatures and rain in late September and October.

Blackwell

The planting period had ideal soil moisture and soil temperatures, followed bye adequate rainfall until the first of July. Lack of rainfall in the month of July adversely affected grain fill therefore test weights were low. Most corn was harvested in August and without major delays.

RESULTS

Grain yields, test weight, harvest moisture, and plant populations for the Blackwell, OPREC, and Webb trials are presented (Tables 5-7). Yields in the panhandle trials were excellent in 2003. Yields for the Blackwell trial were lower than expected. Plant populations at both the Blackwell and Webb trials were higher than target due to better than expected emergence. Yields at Blackwell were not adversely affected by high seeding rate, highest yields in a seeding rate study at same location were observed at 27,000 plants/ac.

Ensilage yields ADF, TDN, and energy values are reported (Table 8). Crude protein is not reported, because no difference existed between hybrids, the average was 7.3%. No two-year data is reported because silage was not harvested in 2002.

Small differences in yield or other parameters should not be overemphasized. Least Significant Differences (L.S.D.) are shown at the bottom of each table. Unless two entries differ by at least the L.S.D. shown, little confidence can be placed in one being superior to another. The coefficient of variability (C.V.) is provided as an estimate of the precision of the data with respect to the mean. To provide some indication of yield stability, 2-year means are provided in tables 5, 6, and 7. Producers interested in comparing hybrids for consistency of yield should consult these tables.

The following people have contributed to this report by assisting in crop production, data collection, and publication; Donna George, Lawrence Bohl, Matt LaMar, Mike LaMar, Chad Fowler, and James Shepard. Their efforts are greatly appreciated.

Figure 1. Daily OPREC high temperatures for July 1 through July 15, 2001, 2002, 2003, and long-term mean.

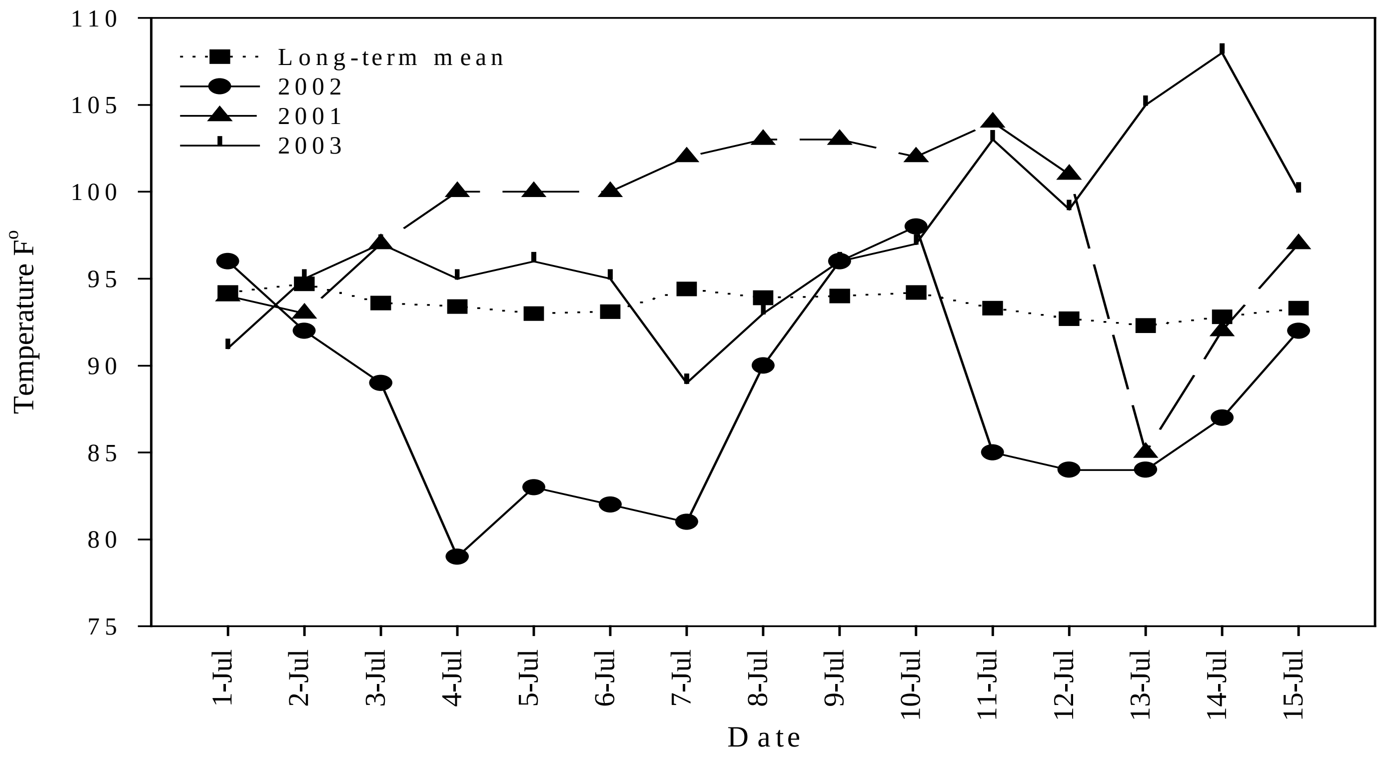


Table 1. Rainfall and irrigation for irrigated corn performance trial locations, 2003.

Location	April	May	June	July	Aug	Total
Long-term mean	1.33	3.25	2.86	2.58	2.28	12.3
Texas county	0.55	1.84	5.26	1.87	1.19	10.71
Irrigation						
OPREC	2.0	2.0	1.0	6.0	5.0	16.0
Joe Webb*	0.0	2.0	1.5	7.5	5.0	16.0

* Joe Webb trial 4 inches of pre-irrigation

Table 2. Rainfall at Blackwell dryland corn performance trial, 2003.

Location	April	May	June	July	Aug	Total
Long-term mean	3.28	5.83	4.05	2.68	3.19	19.03
2003	4.34	5.43	4.13	0.01	3.17	17.08

Table 3. Characteristics of Corn Hybrids in Blackwell Corn Performance Trial, 2003.

Company	Hybrid	Plant Characteristics				MATURITY	
		SV	SS	SG	EP	Days	GDD*
Garst Seed Company	8543Bt/IT	5	3	4	M	90-110	<2600
Garst Seed Company	8590RR	3	1	3	M	90-110	<2600
Garst Seed Company	9476Bt	3	2	2	M	90-110	<2600
NC+ Hybrids	4573B	3	3	3	M	111-120	2600-2699
NC+ Hybrids	5021B	3	3	3	M	111-120	2600-2699

Table 4. Characteristics of Corn Hybrids in Panhandle Corn Performance Trials, 2003

Company	Hybrid	Plant Characteristics				MATURITY	
		SV	SS	SG	EP	Days	GDD*
Garst Seed Company	8383YGI	2	3	3	M-H	110-120	2600-2699
Garst Seed Company	8288	2	3	2	H	110-120	2600-2699
Garst Seed Company	8270 RR	3	2	2	H	110-120	2600-2699
Garst Seed Company	8371	2	3	3	M	110-120	2600-2699
Frontier Hybrids, Inc.	F-3175	1	1	2	M	110-120	2600-2699
Frontier Hybrids, Inc.	F-3250	1	1	2	M	110-120	2600-2699
Dekalb Genetics	DKC 63-79 YGCB	3	4	2	M	110-120	2600-2699
Dekalb Genetics	DKC 69-70 YGCB	3	2	3	H	110-120	2600-2699
Dekalb Genetics	DKC 60-17 RR	3	4	5	M-S	110-120	2600-2699
Asgrow Seed	RX730YG	2	4	4	M	110-120	2600-2699
Asgrow Seed	RX752YG	3	4	5	M	110-120	2600-2699
Triumph Seed Co., Inc	1866Bt	2	2	2	H	110-120	2600-2699
Triumph Seed Co., Inc	1416 Bt	2	2	2	M	110-120	2600-2699
Triumph Seed Co., Inc	1302 Rw	2	2	2	M	110-120	2600-2699
NC+ Hybrids	6962R	3	1	3	M	110-120	2600-2699
NC+ Hybrids	4992RB	3	3	4	M	110-120	2600-2699
NC+ Hybrids	5433RB	3	2	3	M	110-120	2600-2699

* Plant Characteristics: SV - Seedling Vigor; SS - stalk strength; SG - stay green; EP - ear placement (Low, Medium, High)
Rating scale for above characteristics except ear placement 1 = excellent - 9 = poor

Table 5. Grain Yield and Harvest Parameters from Blackwell location Oklahoma Corn Performance Trials, 2003

Company Brand Name	Entry Designation	Maturity	Grain Yield bu/ac	Test Weight lb/bu	Harvest Moisture	Plant Population plants/ac
Garst Seed Company	8590RR	106	69.3	52.1	11.7	27,200
Garst Seed Company	8543Bt/IT	108	57.4	51.4	12.1	25,500
NC+ Hybrids	4573B	111	56.6	52.5	13.8	28,200
Garst Seed Company	9476Bt	108	55.0	49.3	10.3	28,200
NC+ Hybrids	5021B	111	48.4	50.5	13.0	27,800
		Mean	57.3	51.2	12.2	27,400
		CV%	18.9	0.8	7.6	8.0
		L.S.D.	NS	0.8	1.7	NS

Cooperator: Larry Young
Soil Series: Tabler Silt Loam No-Tillage Practices: Following soybean in 2002
Soil Test: N: 32 lbs/ac P: 93 lbs/ac K: 366 lbs/ac pH: 4.9 Fertilizer: N: 75 lbs/ac P: 0 K: 0
Planting Date: April 2, 2003 Harvest Date: Grain August 18, 2003 Herbicide: Gallon Fieldmaster/ac (Preemergence)

Table 6. Grain Yield and Harvest Parameters from OPREC location Oklahoma Corn Performance Trials, 2003

Company Brand Name	Entry Designation	Grain Yield bu/ac		Test Weight lb/bu		Harvest Moisture	Plant Population plants/ac
		2003	Two year	2003	Two year		
Garst Seed Company	8288	196.5	186.9	56.1	56.1	20.5	28,500
Garst Seed Company	8383YGI	198.7	170.9	57.6	56.8	17.9	29,300
Triumph Seed Co., Inc	1866Bt	206.8	166.1	58.9	57.2	17.6	26,800
Dekalb Genetics	DKC 60-17 RR	186.1	165.7	57.7	56.4	16.6	27,800
Asgrow Seed	RX730YG	180.7	164.6	56.4	55.1	16.9	30,900
Frontier Hybrids, Inc.	F-3250	192.9	161.8	58.9	57.2	18.2	28,800
Frontier Hybrids, Inc.	F-3175	184.1	157.1	59.2	56.8	18.0	27,600
NC+ Hybrids	5433RB	211.8	----	57.9	----	17.9	30,300
Garst Seed Company	8371	207.9	----	55.9	----	18.3	27,900
Triumph Seed Co., Inc	1416 Bt	202.5	----	56.9	----	16.3	29,100
Asgrow Seed	RX752YG	202.2	----	57.8	----	16.9	28,600
Dekalb Genetics	DKC 69-70 YGCB	187.6	----	56.1	----	21.8	25,400
Dekalb Genetics	DKC 63-79 YGCB	185.5	----	60.0	----	15.7	26,700
Garst Seed Company	8270 RR	184.5	----	56.4	----	17.8	28,200
Triumph Seed Co., Inc	1302 Rw	181.2	----	57.6	----	14.9	30,300
NC+ Hybrids	4992RB	179.2	----	58.2	----	17.3	28,600
	Mean	193.0	167.6	57.6	56.5	17.7	28,400
	CV%	8.0	----	1.2	----	3.4	10
	L.S.D.	22.0	NS	1.0	1.3	0.9	NS

Cooperator: Oklahoma Panhandle Research and Extension Center
Soil Series: Richfield Clay Loam Convention tillage Practices: Following soybean in 2002
Soil Test: N: 45 lbs/ac P: 26 lbs/ac K: 1192 lbs/ac pH: 7.5 Fertilizer: N: 200 lbs/ac P: 40 lbs P_2O_5/ac K: 0
Planting Date: April 14, 2003 Harvest Date: Grain September 24, 2003 Herbicide: Cinch ATZ Lite @ 1.5qt/ac (Preemergence

Table 7. Grain Yield and Harvest Parameters from Joe Webb location Oklahoma Corn Performance Trials, 2003

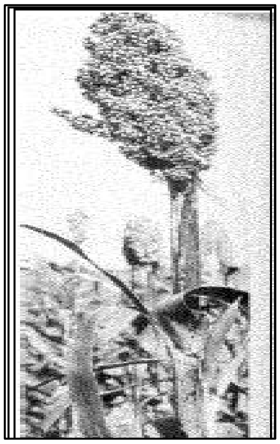
Company Brand Name	Entry Designation	Grain Yield bu/ac		Test Weight lb/bu		Harvest Moisture	Plant Population plants/ac
		2003	Two year	2003	Two year		
Frontier Hybrids, Inc.	F-3175	177.9	199.2	57.9	57.6	19.9	37,500
Asgrow Seed	RX730YG	192.0	197.1	57.3	57.6	18.7	37,800
Dekalb Genetics	DKC 60-17 RR	195.1	194.8	57.4	57.9	18.9	38,600
Garst Seed Company	8288	183.0	192.9	54.7	55.7	24.2	36,500
Triumph Seed Co., Inc	1866Bt	167.5	184.9	56.9	56.9	20.2	36,400
Frontier Hybrids, Inc.	F-3250	168.4	171.6	57.4	57.7	19.9	36,000
Garst Seed Company	8383YGI	156.0	169.3	56.9	57.3	19.6	37,800
Dekalb Genetics	DKC 63-79 YGCB	190.1	----	57.5	----	20.2	38,200
Triumph Seed Co., Inc	1416 Bt	182.0	----	57.3	----	18.7	37,500
Triumph Seed Co., Inc	1302 Rw	178.5	----	56.9	----	17.6	35,400
Asgrow Seed	RX752YG	176.0	----	56.3	----	20.6	37,200
Garst Seed Company	8371	168.0	----	56.7	----	19.2	36,300
NC+ Hybrids	4992RB	162.5	----	57.3	----	18.9	39,000
NC+ Hybrids	5433RB	161.6	----	56.6	----	20.7	38,700
Garst Seed Company	8270 RR	160.7	----	54.3	----	22.5	36,200
Dekalb Genetics	DKC 69-70 YGCB	154.2	----	54.6	----	25.3	36,800
	Mean	173.3	187.1	56.6	57.2	20.3	37,200
	CV%	7.9	----	1.1	----	4.2	7.2
	L.S.D.	19.6	19.5	0.85	0.9	1.2	NS

Cooperator: Joe Webb
Soil Series: Richfield Clay Loam Conventional Tillage Practices: Grain sorghum in 2002
Soil Test: None
Fertilizer: N: 200 lbs/ac P: 15 tons/ac Manure applied fall of 2002 K: 0
Planting Date: April 17, 2003 Harvest Date: Grain September 17, 2003
Herbicide: Harness Extra @ 1.7qt/ac (Preemergence)

Table 8. Ensilage Yields and Quality Panhandle Corn Performance Trial, 2003.

Company Brand Name	Entry Designation	YIELD Tons/ac	ADF * %	TDN * %	Energy Values *Mcal/lb		
					Maint.	Lact.	Gain
Garst Seed Company	8270 RR	28.0	37.5	59.7	0.59	0.61	0.33
NC+ Hybrids	6962R	27.0	38.9	58.6	0.57	0.60	0.32
Triumph Seed Co., Inc	1866Bt	25.9	31.6	64.3	0.66	0.66	0.39
NC+ Hybrids	5433RB	25.7	29.3	66.1	0.69	0.68	0.42
Triumph Seed Co., Inc	1416 Bt	25.3	28.8	66.5	0.69	0.69	0.42
NC+ Hybrids	4992RB	24.6	30.7	65.0	0.67	0.67	0.40
Garst Seed Company	8383YGI	24.5	34.7	61.9	0.62	0.64	0.36
Frontier Hybrids, Inc.	F-3175	24.4	35.4	61.4	0.61	0.63	0.35
Dekalb Genetics	DKC 60-17 RR	24.3	29.1	66.2	0.69	0.68	0.42
Frontier Hybrids, Inc.	F-3250	24.1	34.1	62.3	0.63	0.64	0.37
Dekalb Genetics	DKC 69-70 YGCB	24.0	37.3	59.8	0.59	0.61	0.33
Triumph Seed Co., Inc	1302 Rw	23.4	31.0	64.7	0.67	0.67	0.40
Dekalb Genetics	DKC 63-79 YGCB	23.3	28.7	66.6	0.69	0.69	0.42
Garst Seed Company	8371	23.0	29.3	66.0	0.68	0.68	0.42
Asgrow Seed	RX752YG	22.8	30.7	65.0	0.67	0.67	0.40
Asgrow Seed	RX730YG	21.5	31.4	64.4	0.66	0.66	0.39
Garst Seed Company	8288	20.5	28.9	66.4	0.69	0.69	0.42
	Mean	24.3	32.2	63.8	0.65	0.66	0.39
	CV%	8.9	12.4	4.9	7.1	5.3	10.8
	L.S.D.	3.6	6.6	5.2	0.08	0.06	0.07

* Dry Matter Basis



GRAIN SORGHUM PERFORMANCE TRIALS IN OKLAHOMA, 2003

PRODUCTION TECHNOLOGY CROPS

OKLAHOMA COOPERATIVE EXTENSION SERVICE
DEPARTMENT OF PLANT AND SOIL SCIENCES
DIVISION OF AGRICULTURAL SCIENCES & NATURAL RESOURCES
OKLAHOMA STATE UNIVERSITY

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TRIAL OBJECTIVES AND PROCEDURES

Each year, performance trials for hybrid grain sorghums are conducted by the Oklahoma Cooperative Extension Service to provide producers, extension educators, industry representatives, and researchers with information for hybrid grain sorghums marketed in Oklahoma.

Performance trials are conducted at six locations in Oklahoma: Altus, Blackwell, Enid, Goodwell, Keyes, and Tipton. Dry-land trials are conducted at all locations, with an additional irrigated trial at Goodwell. The Enid location is a unique trial to evaluate certain hybrids (generally early and medium maturity) for planting in late April. In 2003 the trial was abandoned because of poor weed control, since the herbicide was not activated due to lack of precipitation. The Blackwell trial was planted later than desired. The short season hybrids were not planted at an ideal time; they should have been planted either earlier or later. Therefore, the short season hybrids didn't perform as well as expected. **Seed companies would not recommend short season hybrids planted at this date so consult with seed representative when utilizing yield data from this trial location.**

NEW IN 2003

Two hybrids Dekalb Genetics Corp. DK-44 and Sorghum Partners Inc. KS-585 were planted at all locations with and without seed applied insecticide treatments (Gaucho and Cruiser). In 2002 at the Blackwell location, DK-44 had a yield 35.6 bu/ac higher in a seeding rate study than in the hybrid performance trial at the same location. Chinch bug activity was severe in 2002 and was determined to cause the yield reduction. DK-44 in performance trial had no insecticide treatment, while seeding rate seed trial was treated with insecticide.

Grain sorghum hybrids entered (Table 1) were assigned by companies to their respective maturity groups (early, medium, and late) and trial locations, therefore, all hybrids are not in all locations. Hybrids tested at the Enid location where determined by Oklahoma State University. Companies submitted all hybrid characteristics presented in Table 1. This information was not determined or verified by Oklahoma State University. Company participation was voluntary; therefore some hybrids marketed in Oklahoma were not included in the test. Each maturity group was tested in a randomized complete block design with four replications. Plots were 2 rows: (40-inches wide at Tipton and Altus, with 30-inch rows at all other locations) by 25 feet. Plots are trimmed to 20 feet prior to harvest.

Target populations are listed with results of respective locations. Cooperating producers, fertilization, cultural practices, soil series, and herbicide use on all trials are listed with the results tables. Rainfall data from the nearest Mesonet site are also listed. All trials are within five miles of a mesonet site except for the Enid and Keyes locations. Tractor powered cone planters were used to plant all trials with seeding rates adjusted for trial location. Trials were harvested with a (Massey-Ferguson 8) plot combine.

GROWING CONDITIONS

Moisture

Soil moisture conditions were good during the planting season for most of the state. In the panhandle, planting delay's occurred due to rainfall in late May and June, this period is when most sorghum is planted. As the season progressed rainfall was spotty statewide with some areas receiving enough for outstanding yields (Blackwell location). Other areas received little or no rainfall after the first of July and yields were adversely affected or trials not harvested at all (Altus, Keyes, Tipton). **When looking at rainfall totals at each location notice the extreme differences between June and July.** Weed problems occurred in areas due to lack of rainfall after planting to activate herbicide and some post emergence chemical treatments were used.

Insects

Statewide no major insect problems occurred or were reported in 2003.

RESULTS

Lodging and drought reduced yields at the Altus location. Lodging was due to charcoal rot. Grain yields and test weights were outstanding at the Blackwell location with the highest yields obtained since 1999. The Enid location was not harvested due to weed pressure, which severely reduced growth. The Keyes location was planted and emerged but due to drought conditions was later abandoned. The dry land trial at OPREC had significant bird damage, which made some of the yield data too variable to report. The irrigated trial at OPREC had outstanding yields. The trial at Tipton had acceptable yields for the environmental conditions that occurred.

Grain yields are reported both as pounds per acre and bushel per acre threshed grain, adjusted to moisture content of 14.0% (Tables 2-6). Test weight, plant population, and the number of heads per acre at harvest are also reported. Bird damage and lodging are also reported when present at a location. Different plant populations at each location precluded comparison between locations. Comparisons across maturity groups were not conducted. Producers should note that late maturing hybrids will generally yield more than early and medium maturity hybrids. However, the availability of moisture at critical crop development periods often influences yield more than the yield differences associated with maturity groups.

When choosing a maturity group, the type of cropping system, planting date, planting rate and potential moisture should be taken into consideration. For more information consult Fact Sheet **No. 2034** Grain Sorghum Planting Rates and Dates, and Fact Sheet No. **2113** Grain Sorghum Production Calendar.

Small differences in yield or other characteristics among hybrids should not be overemphasized. Least Significant Difference (L.S.D.) is a statistical test of yield differences and are shown at the bottom of each table. Unless two hybrids differ by at least the L.S.D. shown, little confidence can be placed in one hybrid being superior to another and the difference is probably not real.

The coefficient of variation (C.V.) is provided as an estimate of the precision of the data with respect to the mean for that location and maturity group. To provide some indication of yield stability, 2 and 3-year mean for yield and test weight is provided where trials have been conducted more than one year (Tables 8-10) and more than 3 entries per maturity group. Producers interested in comparing hybrids for consistency of yield in a specific area should consult these tables.

The following people have contributed to this report by assisting in crop production, data collection, and publication: Dona George, Lawrence Bohl, Rocky Thacker, Toby Kelly, Alton Young, Mike LaMar, Roger Don Gribble, Chad Fowler, Scott Gillen, Bart Cardwell, and Chuck Strasia. Their efforts are greatly appreciated. Also would like to thank the ***Oklahoma Grain Sorghum Commission*** *for their financial support.*

Table 1. Seed source and hybrid characteristics of grain sorghums in the Oklahoma Grain Sorghum Performance Trials, 2003. All hybrids are susceptible to birds and are single cross.

Company Brand Name	Hybrid	Seed Color	Endo-sperm	Days to Mid-bloom	Greenbug Resistance	Trial Location
Early Maturity						
Frontier Hybrids, Inc	F-303C	C	Y	59	E	1
Asgrow Seed	Seneca	Bz	HY	59	C	2
Sorghum Partners Inc	KS 310	BZ	HY	58	C&E	1
Sorghum Partners Inc	K35-Y5	Y	HY	59	C&E	1
Dekalb Genetics Corp.	DKS 36-00	Bz	HY	59	C,E,I	2
Asgrow Seed	Pulsar	Bz	HY	60	C,E,I	2
Monsanto	X210	Bz	HY	60	C,E,I	2
Frontier Hybrids, Inc	F-270E	Bz	Y	58	E	1
Medium Maturity						
Sorghum Partners Inc	KS 585	Bz	HY	67	C, E	1
Garrison & Townsend Inc.	SG-97619	R	HY	65	C & E	3
Garrison & Townsend Inc.	SG-99478	R	N	68	E	1
Dekalb Genetics Corp.	DK 44	Bz	HY	67	C, E	1
Seed Resource	SR 251	Bz	Hy	62	C & E	1
Seed Resource	SR 420	Bz	HY	66	C & E	1
NC+ Hybrids	5B89	Bz	HY	61	C	1
NC+ Hybrids	6B50	Bz	HY	62	None	1
NC+ Hybrids	7C22	C	HY	68	None	1
Dekalb Genetics Corp.	DK 40y	Y	Y	63	C,E	2
Garst Seed Company	5460	Bz	HY	68	E	4
NC+ Hybrids	7W51	W	N	69	C,E	1
NC+ Hybrids	6B73	Bz	HY	65	C	1
Garrison & Townsend Inc.	SG-22612	Bz	HY	63	E	3
Sorghum Partners Inc	NK 5418	Bz	HY	66	C,E	1
Sorghum Partners Inc	1486	Y	HY	63	C,E,I	1
Seed Resource	SR 510	BZ	HY	66	C,E	1
Late Maturity						
Frontier Hybrids, Inc	F-700E	R	R	70	E	1
Sorghum Partners Inc	K 73-J6	R	Y	73	C & E	1
Dekalb Genetics Corp.	DKS 54-00	Bz	HY	72	C,E,I	4
Asgrow Seed	A571	Bz	HY	72	None	4
NC+ Hybrids	8R18	R	W	75	None	4
Sorghum Partners Inc	NK 8828	W	HY	75	C & E	1
Seed Resource	SR 544	R	HY	70	C & E	4
Dekalb Genetics Corp.	DKS 53-11	Bz	HY	71	C,E,I	4
Garst Seed Company	0479	Bz	HY	70	E	4
NC+ Hybrids	7R83	R	N	72	None	4
Sorghum Partners Inc	KS 955	R	N	75	None	1
Sorghum Partners Inc	NK 7633	Bz	HY	73	None	1
Sorghum Partners Inc	NK 7655	Y	HY	72	C	1

Trial locations: 1 – all; 2 – panhandle only; 3 – (Altus, Tipton, Blackwell); 4 – irrigated only
Seed Color: Br – Brown; W – White; Y – Yellow; Bz – Bronze; R – Red; C – Cream
Endosperm: HW – heterowaxy; W – waxy; HY – Heteroyellow; Y – Yellow; N – Non-waxy
Maturity group: Early (less than 60 days to mid-bloom); Medium (60 – 70 days to mid-bloom); Late – (70+ days to mid-bloom)
Greenbug Resistance: Biotype hybrid is resistance too

Table 2. Results from Altus Grain Sorghum Performance Trial, 2003

Company Brand Name	Entry Designation	Grain Yield bu/ac		Test weight lb/bu		Head Population heads/ac	Harvest Moisture
		2003	Two-year	2003	Two-year		
Early							
Sorghum Partners Inc	KS 310	44.3	47.6	53.6	54.9	39,600	10.8
Sorghum Partners Inc	K35-Y5	27.9	39.4	52.5	54.8	39,400	10.0
Frontier Hybrids, Inc	F-303C	21.3	36.8	51.8	54.3	30,300	10.5
Frontier Hybrids, Inc	F-270E	27.8		50.9		30,600	11.0
	Mean	30.3	41.3	52.2	54.7	35,000	10.6
	C.V.%	16.9	19.0	2.9	2.4	15.6	5.1
	L.S.D.	8.2	8.4	NS	NS	NS	NS

Note: No plant count from Altus in 2003

Company Brand Name	Entry Designation*	Grain Yield bu/ac		Test weight lb/bu		Head Population heads/ac	Harvest Moisture	Lodging %
		2003	Two-year	2003	Two-year			
Medium								
Garrison & Townsend Inc.	SG-99478	34.2	47.7	55.4	57.1	32,100	11.0	0.0
Dekalb Genetics Corp.	DK 44w	39.8	47.5	53.8	55.7	35,100	12.2	0.0
NC+ Hybrids	6B50	31.4	47.1	48.7	51.4	37,600	10.4	0.0
Sorghum Partners Inc	KS 585w	33.4	39.2	55.3	55.2	37,100	10.7	15.0
Seed Resource	SR 251	37.1	38.4	53.5	54.9	36,000	10.9	52.5
Garrison & Townsend Inc.	SG-97619	33.0	38.0	51.6	54.1	37,100	10.9	50.0
NC+ Hybrids	5B89	30.3	37.5	51.3	53.0	41,600	10.4	7.5
NC+ Hybrids	7C22	25.1	36.7	51.4	54.3	35,000	10.5	17.5
Seed Resource	SR 420	30.3	36.4	52.1	54.9	36,800	10.9	37.5
Dekalb Genetics Corp.	DK 44	36.7		52.4		40,300	10.6	0.0
Sorghum Partners Inc	KS 585	36.6		53.4		37,000	10.1	27.5
Garrison & Townsend Inc.	SG-22612	34.8		53.0		37,000	11.5	17.5
NC+ Hybrids	6B73	34.7		52.4		37,200	10.2	0.0
Sorghum Partners Inc	1486	33.1		51.0		34,000	11.2	0.0
Sorghum Partners Inc	NK 5418	30.1		52.1		37,900	10.7	5.0
Seed Resource	SR 510	25.0		53.1		33,200	13.0	52.5
	Mean	32.9	40.9	52.4	54.5	36,600	10.9	----
	C.V.%	14.6	46.9	2.5	2.2	11.5	6.3	----
	L.S.D.	6.8	6.9	1.8	1.2	NS	1.0	----

* Hybrid with w following is treated with insecticide

Table 2. Results from Altus Grain Sorghum Performance Trial, 2003 continued.

Company Brand Name	Entry Designation	Grain Yield bu/ac		Test weight lb/bu		Head Population heads/ac	Harvest Moisture	Lodging %
		2003	Two-year	2003	Two-year			
Late								
Sorghum Partners Inc	K 73-J6	42.7	55.1	48.7	52.8	39,000	9.6	0.0
Frontier Hybrids, Inc	F-700E	26.9	38.2	53.5	55.5	32,900	11.2	19.0
Sorghum Partners Inc	NK 8828	15.5	29.3	53.0	54.8	28,300	11.6	5.0
Sorghum Partners Inc	NK 7633	31.1		50.9		36,500	10.1	0.0
Sorghum Partners Inc	KS 955	29.1		52.7		39,400	11.4	0.0
Sorghum Partners Inc	NK 7655	21.1		51.9		32,300	10.5	0.0
	Mean	27.7	40.9	51.8	54.4	34,800	10.7	----
	C.V.%	19.0	14.0	2.7	3.3	18	4.5	----
	L.S.D.	8.0	6.1	2.1	1.9	NS	0.7	----

Cooperator: Southwest Research and Extension Center

Soil Series: Tillman Hollister Clay Loam

No-till Practices: Sorghum-wheat-fallow rotation

Soil Test: N: 54 lbs/ac P: 70 lbs/ac K: 966 lbs/ac pH: 5.6

Fertilizer: N: 69 lb N/ac P: none K: none

Herbicide: Preplant Roundup WeatherMax 30 oz/ac + DyneAmic Nonionic Adjuvant 0.5 % v/v
Preemergence Peak 0.75 oz/ac

Planting Date: May 7, 2003 Target Population: 35,000 plants/ac

Harvest Date: August 28, 2003

Monthly Rainfall (in.)

	2002			2003									
	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	**Total**
	4.89	0.62	2.70	0.00	0.71	0.59	2.52	0.76	7.26	0.07	4.66	0.48	**25.26**
Long term mean:	2.37	1.31	0.91	0.84	1.10	1.56	1.92	4.23	3.51	1.76	2.45	3.44	**25.40**

Table 3. Results from Blackwell Grain Sorghum Performance Trial, 2003.

Company Brand Name	Entry Designation	Grain Yield bu/ac	Test weight lb/bu	Plant Population plants/ac	Head Population heads/plant	Harvest Moisture
			Early			
Monsanto	X210	87.0	55.6	35,100	1.17	15.6
Asgrow Seed	Pulsar	73.6	54.4	34,600	1.19	15.0
Frontier Hybrids, Inc	F-303C	72.6	54.7	34,600	1.35	14.9
Asgrow Seed	Seneca	72.5	56.8	38,100	1.23	14.7
Dekalb Genetics Corp.	DKS 36-00	69.8	54.5	39,100	1.08	15.1
Sorghum Partners Inc	K35-Y5	60.3	53.2	32,500	1.14	14.8
Frontier Hybrids, Inc	F-270E	57.7	53.6	33,000	1.21	15.6
Sorghum Partners Inc	KS 310	44.0	52.4	35,700	1.20	16.4
	Mean	67.2	54.4	35,300	1.19	15.2
	C.V.%	10.4	1.1	9.6	10.4	1.9
	L.S.D.	10.3	0.9	NS	NS	0.4

Note: No two-year data because some hybrids had insecticide treatment in 2002 and others did not.

Company Brand Name	Entry Designation*	Grain Yield bu/ac	Test weight lb/bu	Plant Population plants/ac	Head Population heads/plant	Harvest Moisture
			Medium			
Seed Resource	SR 510	105.1	57.4	34,200	1.21	15.4
Sorghum Partners Inc	KS 585w	94.1	58.7	38,400	1.16	15.3
NC+ Hybrids	6B73	92.3	56.9	36,500	1.18	15.4
NC+ Hybrids	7C22	91.9	57.0	32,600	1.28	15.5
Dekalb Genetics Corp.	DK 44w	90.7	57.1	36,100	1.21	14.6
Sorghum Partners Inc	NK 5418	90.7	56.2	36,600	1.08	15.0
Garrison & Townsend Inc.	SG-97619	89.6	57.0	34,300	1.29	16.5
Garrison & Townsend Inc.	SG-22612	87.8	56.8	39,200	1.12	15.7
Sorghum Partners Inc	KS 585	85.9	58.0	33,200	1.14	15.4
Seed Resource	SR 420	84.2	58.7	29,300	1.08	15.2
NC+ Hybrids	6B50	84.0	53.3	39,600	1.13	15.2
Dekalb Genetics Corp.	DK 40y	83.6	56.2	34,000	1.21	15.0
Seed Resource	SR 251	83.3	56.8	39,000	1.15	15.8
Dekalb Genetics Corp.	DK 44	79.6	57.6	36,200	1.11	15.1
NC+ Hybrids	5B89	75.6	54.4	39,800	1.18	15.6
Sorghum Partners Inc	1486	64.8	53.9	37,100	1.15	14.8
Garrison & Townsend Inc.	SG-99478	55.6	53.5	33,600	1.08	19.4
	Mean	84.6	56.4	35,900	1.16	15.6
	C.V.%	9.9	2.0	9.6	9.1	5.0
	L.S.D.	11.9	1.6	4,900	NS	1.1

* Hybrid with w following is treated with insecticide

Table 3. Results from Blackwell Grain Sorghum Performance Trial, 200 continued.

Company Brand Name	Entry Designation	Grain Yield bu/ac	Test weight lb/bu	Plant Population plants/ac	Head Population heads/plant	Harvest Moisture
Late						
Frontier Hybrids, Inc	F-700E	94.6	57.9	31,700	1.25	15.0
Sorghum Partners Inc	K 73-J6	99.4	57.2	40,000	1.11	14.9
Sorghum Partners Inc	NK 8828	79.1	56.3	39,100	1.00	16.9
Sorghum Partners Inc	KS 955	68.0	51.7	38,500	1.11	22.5
Sorghum Partners Inc	NK 7633	93.9	57.0	36,500	1.21	16.3
Sorghum Partners Inc	NK 7655	98.4	56.0	40,600	1.09	14.8
	Mean	88.9	56.0	37,700	1.13	16.8
	C.V.%	14.0	2.2	7	9.9	7.3
	L.S.D.	18.8	1.9	3,900	0.17	1.8

Cooperator: Bill and Louise Rigdon

Soil Series: Kirkland Silt Loam

No-till Practices: Followed Soybean in 2002

Soil Test: N: NA P: NA K: NA pH: NA

Fertilizer: N: 80 lbs/ac P: 0 K: 0

Herbicide: 56 oz/ac Leadoff (Preemergence)

Planting Date: June 11, 2003 Target Population: 35,000 plants/ac

Harvest Date: November 8, 2003

Monthly Rainfall (in.)

	2002			2003									
	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	**Total**
	4.99	0.31	1.74	0.12	0.87	2.94	4.34	5.43	4.13	0.01	3.17	3.67	**31.72**
Long term mean:	2.60	2.59	1.19	1.08	1.27	2.38	3.28	5.83	4.05	2.68	3.19	3.59	**34.11**

Table 4. Results from OPREC dryland Grain Sorghum Performance Trial, 2003.

Company Brand Name	Entry Designation	Grain Yield bu/ac	Test weight lb/bu	Plant Population plants/ac	Head Population heads/plant	Harvest Moisture	Bird Damage %
Early							
Asgrow Seed	Seneca		58.6	21,700	1.46	12.2	40.0
Asgrow Seed	Pulsar		56.1	23,700	1.69	13.4	50.0
Frontier Hybrids, Inc	F-303C		55.9	20,600	1.61	13.2	37.0
Monsanto	X210		54.6	23,400	1.15	17.9	37.0
Dekalb Genetics Corp.	DKS 36-00		53.9	26,700	1.29	16.0	50.0
Sorghum Partners Inc	K35-Y5		53.1	18,700	2.64	13.4	67.0
Frontier Hybrids, Inc	F-270E		52.7	19,900	1.32	12.8	70.0
Sorghum Partners Inc	KS 310		46.0	20,100	2.23	19.7	87.0
	Mean	39.8	53.9	21,900	1.68	14.8	----
	C.V.%	24.5	5.0	7.7	15.3	14.8	----
	L.S.D.	----	4.7	3,000	0.45	3.9	----

Note: When no data is present variability is to high to use

Company Brand Name	Entry Designation*	Grain Yield bu/ac	Test weight lb/bu	Plant Population plants/ac	Head Population heads/plant	Harvest Moisture	Bird Damage %
Medium							
Seed Resource	SR 420		58.0	17,000		11.2	13.0
Sorghum Partners Inc	KS 585		56.9	21,200		11.3	0.0
NC+ Hybrids	6B73		56.9	19,800		11.8	0.0
Seed Resource	SR 510		56.8	21,100		11.1	17.0
Dekalb Genetics Corp.	DK 44w		56.4	22,400		11.3	20.0
NC+ Hybrids	7C22		56.1	18,900		10.5	7.0
Sorghum Partners Inc	KS 585w		55.6	21,000		10.0	17.0
Seed Resource	SR 251		55.6	22,100		11.8	63.0
Dekalb Genetics Corp.	DK 40y		55.5	21,900		11.3	30.0
Dekalb Genetics Corp.	DK 44		55.2	19,800		12.6	7.0
NC+ Hybrids	6B50		54.9	19,400		10.3	17.0
Sorghum Partners Inc	NK 5418		54.9	22,400		10.1	13.0
Sorghum Partners Inc	1486		52.3	17,000		14.6	17.0
Garrison & Townsend Inc.	SG-99478		50.9	2,400		19.9	7.0
NC+ Hybrids	5B89		48.5	20,700		12.9	17.0
* Hybrid with w following is treated with insecticide	Mean	38.5	55.0	20,600	1.4	12.0	----
	C.V.%	32.4	3.3	10.3	21.3	10.9	----
	L.S.D.	----	3.0	3,600	----	2.2	----

Table 4. Results from OPREC Grain Sorghum Performance Trial, 2003 continued

Company Brand Name	Entry Designation	Grain Yield bu/ac	Test weight lb/bu	Plant Population plants/ac	Head Population heads/plant	Harvest Moisture
			Late			
Frontier Hybrids, Inc	F-700E	58.1	57.7	19,800	1.47	10.7
Sorghum Partners Inc	K 73-J6	28.6	56.9	20,500	1.09	14.2
Sorghum Partners Inc	NK 8828	32.0	54.8	21,500	0.84	10.4
Sorghum Partners Inc	KS 955	10.7	49.0	20,900	0.31	24.1
Sorghum Partners Inc	NK 7633	67.8	57.5	20,500	1.96	11.3
Sorghum Partners Inc	NK 7655	39.0	55.0	19,900	1.39	12.6
	Mean	39.4	55.1	20,500	1.18	13.9
	C.V.%	15.2	1.1	8.0	9.1	4.1
	L.S.D.	10.9	1.1	NS	0.19	1.0

Cooperator: Oklahoma Panhandle Research and Extension Center

Soil Series: Richfield Clay Loam

No-Till Practices: Wheat-Sorghum-Fallow

Soil Test: N: 128 lbs/ac P: 55 K: 1058 pH: 7.8

Fertilizer: N:0 P: 0 K: 0

Herbicide: Cinch ATZ Lite 1.5qts/ac (Preemergence)

Planting Date: May 23, 2003 Target Population: 18,000 plants/ac

Harvest Date: October 21, 2003

Monthly Rainfall (in.)

	2002			2003									
	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	**Total**
	3.41	0.11	0.89	0.03	0.21	1.33	0.55	1.84	5.26	1.87	1.19	1.62	**18.31**
Long term mean:	1.03	0.77	0.31	0.30	0.46	0.95	1.33	3.25	2.86	2.58	2.28	1.77	**17.89**

Table 5. Results from OPREC irrigated Grain Sorghum Performance Trial, 2003

Company Brand Name	Entry Designation	Grain Yield bu/ac	Test weight lb/bu	Plant Population plants/ac	Head Population heads/plant	Harvest Moisture
Early						
Frontier Hybrids, Inc	F-303C	154.3	59.3	49,500	1.38	13.6
Frontier Hybrids, Inc	F-270E	136.3	58.3	40,800	1.82	13.9
Sorghum Partners Inc	K35-Y5	118.8	58.4	45,100	1.74	13.5
Sorghum Partners Inc	KS 310	113.8	57.1	50,100	1.43	13.2
	Mean	130.8	58.3	46,400	1.59	13.5
	C.V.%	5.3	1.2	13.5	19.8	4.3
	L.S.D.	11.1	1.1	NS	NS	NS

Note: Not enough entries for two-year data

Company Brand Name	Entry Designation	Grain Yield bu/ac		Test weight lb/bu		Plant Population plants/ac	Head Population heads/ac	Harvest Moisture
		2003	Two-year	2003	Two-year			
Medium								
Seed Resource	SR 420	151.5	151.5	59.5	58.5	48,800	1.10	14.4
Sorghum Partners Inc	KS 585w	148.4	151.1	60.5	59.4	44,300	1.51	13.6
Dekalb Genetics Corp.	DK 44w	148.7	148.0	58.9	58.4	50,300	1.08	14.4
Seed Resource	SR 251	149.4	144.6	60.2	59.8	46,200	1.35	12.9
NC+ Hybrids	7W51	168.7		57.2		47,700	1.41	14.7
Garst Seed Company	5460	167.6		58.6		48,400	1.15	15.0
Seed Resource	SR 510	163.0		59.3		47,800	1.25	14.0
Sorghum Partners Inc	KS 585	158.0		60.7		48,300	1.31	13.5
NC+ Hybrids	6B73	152.8		59.5		47,700	1.38	13.6
NC+ Hybrids	7C22	151.5		59.9		50,400	1.10	14.1
Garrison & Townsend Inc.	SG-99478	151.2		58.4		47,500	1.26	14.8
Dekalb Genetics Corp.	DK 44	146.2		59.2		49,400	1.08	14.2
NC+ Hybrids	6B50	146.0		58.5		44,300	1.32	13.6
Sorghum Partners Inc	1486	132.2		57.3		47,000	1.34	14.3
Sorghum Partners Inc	NK 5418	131.3		58.4		46,400	1.56	13.8
NC+ Hybrids	5B89	124.8		58.4		47,000	1.34	13.2
	Mean	149.5	148.8	59.0	59.0	47,600	1.29	14.0
	C.V.%	5.7	6.2	0.8	2.2	11.0	16.60	2.6
	L.S.D.	12.2	NS	0.7	NS	NS	NS	NS

* Hybrid with w following is treated with insecticide

Table 5. Results from OPREC Grain Sorghum Performance Trial, 2003 continued.

Company Brand Name	Entry Designation	Grain Yield bu/ac		Test weight lb/bu		Plant Population plants/ac	Head Population heads/ac	Harvest Moisture
		2003	Two-year	2003	Two-year			
Late								
Dekalb Genetics Corp.	DKS 54-00	167.7	163.5	58.3	58.0	50,000	1.28	14.5
NC+ Hybrids	8R18	166.3	160.5	58.5	58.2	48,600	1.14	14.8
Seed Resource	SR 544	152.4	151.8	59.0	59.0	53,900	1.04	14.1
Asgrow Seed	A571	155.0	148.4	57.6	55.9	49,000	1.20	14.0
Sorghum Partners Inc	K 73-J6	154.9	146.4	58.8	58.3	47,900	1.15	14.8
Frontier Hybrids, Inc	F-700E	148.6	141.3	59.1	58.7	49,500	1.18	14.0
Sorghum Partners Inc	NK 8828	141.5	136.0	58.2	57.8	50,600	1.12	14.5
Dekalb Genetics Corp.	DKS 53-11	165.0		59.6		53,700	1.05	14.5
NC+ Hybrids	7R83	161.7		58.1		52,400	1.14	13.8
Sorghum Partners Inc	KS 955	157.3		56.8		51,300	1.16	15.5
Sorghum Partners Inc	NK 7633	151.7		59.4		48,200	1.27	14.1
Sorghum Partners Inc	NK 7655	149.4		58.3		50,500	1.07	13.9
Garst Seed Company	0479	140.2		58.1		49,000	1.18	14.4
	Mean	154.8	149.7	58.4	58.0	50,300	1.15	14.4
	C.V.%	6.1	7.1	0.9	1.8	8.2	13.9	3.9
	L.S.D.	13.6	10.8	0.8	1.1	NS	NS	0.8

Cooperator: Oklahoma Panhandle Research and Extension Center

Soil Series: Richfield Clay Loam

Conventional Tillage Practices: Planted on fallow soil

Soil Test: N: 45 lbs/ac P: 26 K: 1192 pH: 7.5

Fertilizer: N: 200 lbs N/ac P: 40 lbs P_2O_5/ac K: 0

Herbicide: Cinch ATZ Lite 1.5qts/ac (Preemergence)

Planting Date: June 17, 2003 Target Population: 70,000 plants/ac

Harvest Date: November 4, 2003

Monthly Rainfall (in.)

	2001			2002									
	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	**Total**
	3.41	0.11	0.89	0.03	0.21	1.33	0.55	1.84	5.26	1.87	1.19	1.62	**18.31**
Long term mean:	1.03	0.77	0.31	0.30	0.46	0.95	1.33	3.25	2.86	2.58	2.28	1.77	**17.89**

Irrigation (in.)

May	Jun.	Jul.	Aug.	Sept.
0.0	0.0	3.0	5.0	5.0

Table 6. Results from Tipton dry land Grain Sorghum Performance Trial, 2003.

Company Brand Name	Entry Designation	Grain Yield bu/ac		Test weight lb/bu		Head Population heads/ac	Harvest Moisture
		2003	Two-year	2003	Two-year		
Early							
Sorghum Partners Inc	K35-Y5	43.9	80.5	51.9	55.5	56,300	8.8
Frontier Hybrids, Inc	F-303C	41.9	68.8	52.7	55.9	37,700	8.9
Sorghum Partners Inc	KS 310	58.4	63.5	54.8	56.6	46,100	9.3
Frontier Hybrids, Inc	F-270E	51.2		53.1		36,000	9.1
	Mean	48.8	70.9	53.1	56.0	44,000	9.0
	C.V.%	15.4	19.9	1.6	2.2	14.2	4.8
	L.S.D.	12.1	17.2	1.4	NS	10,000	NS

Note: No plant count from Tipton in 2003

Company Brand Name	Entry Designation*	Grain Yield bu/ac		Test weight lb/bu		Head Population heads/ac	Harvest Moisture	Lodging %
		2003	Two-year	2003	Two-year			
Medium								
NC+ Hybrids	6B50	62.9	85.4	50.7	54.0	47,500	8.1	15.0
Garrison & Townsend Inc.	SG-99478	52.1	77.1	53.7	56.3	41,300	9.5	0.0
Dekalb Genetics Corp.	DK 44w	56.0	76.9	52.8	55.8	41,500	8.8	0.0
NC+ Hybrids	5B89	60.9	75.8	52.1	55.3	51,800	8.6	0.0
Sorghum Partners Inc	KS 585	55.2	75.0	54.2	56.7	49,100	8.3	0.0
NC+ Hybrids	7C22	50.8	73.3	51.7	55.6	46,000	8.7	6.0
Seed Resource	SR 251	58.8	68.3	54.5	56.2	42,700	8.3	6.0
Seed Resource	SR 420	46.9	67.6	54.1	56.9	47,400	9.3	19.0
Garrison & Townsend Inc.	SG-97619	45.9	66.6	52.7	55.3	50,700	8.4	39.0
Sorghum Partners Inc	KS 585w	67.8		56.3		51,900	9.9	0.0
Dekalb Genetics Corp.	DK 44	63.9		53.0		40,600	8.9	0.0
Garrison & Townsend Inc.	SG-22612	63.2		53.2		42,600	9.2	5.0
Sorghum Partners Inc	1486	54.3		51.2		45,600	8.7	0.0
Sorghum Partners Inc	NK 5418	53.0		51.8		55,000	8.0	0.0
NC+ Hybrids	6B73	50.1		52.9		42,300	8.4	0.0
Seed Resource	SR 510	46.8		54.3		49,400	9.4	44.0
	Mean	55.5	73.9	53.1	55.8	46,600	8.8	----
	C.V.%	14.8	12.2	2.1	1.9	10.6	8.1	----
	L.S.D.	11.7	9.0	1.6	1.1	7,000	1.0	----

* Hybrid with w following is treated with insecticide

Table 6. Results from Tipton dry land Grain Sorghum Performance Trial, 2003 continued.

Company Brand Name	Entry Designation	Grain Yield bu/ac		Test weight lb/bu		Head Population heads/ac	Harvest Moisture	Lodging %
		2003	Two-year	2003	Two-year			
Late								
Sorghum Partners Inc	K 73-J6	68.5	90.2	53.6	56.2	49,200	8.9	0.0
Frontier Hybrids, Inc	F-700E	48.9	66.3	55.0	56.1	46,100	8.8	26.0
Sorghum Partners Inc	NK 8828	46.6	54.6	51.6	55.0	39,000	8.2	8.0
Sorghum Partners Inc	NK 7633	69.8		55.5		47,900	9.1	0.0
Sorghum Partners Inc	KS 955	57.0		52.7		44,800	9.2	0.0
Sorghum Partners Inc	NK 7655	56.8		51.0		46,700	8.5	0.0
	Mean	57.9	70.4	53.2	55.8	45,600	8.8	----
	C.V.%	9.3	17.8	1.8	2.5	6.3	5.6	----
	L.S.D.	8.1	13.5	1.5	NS	4,400	NS	----

Cooperator: Southwest Research and Extension Center

Soil Series: Tipton Silt Loam

Conventional Tillage Practices: Sorghum-fallow-sorghum rotation

Soil Test: N: 12 lbs/ac P: 53 K: 639 pH: 6.2

Fertilizer: N: 120 lbs/ac P: 0 K: 0

Herbicide: Preplant Roundup WeatherMax 30 oz/ac + DyneAmic Nonionic Adjuvant 0.5 % v/v
Preemergence Peak 0.75 oz/ac

Planting Date: May 6, 2003 Target Population: 30,000 plants/ac

Harvest Date: August 27, 2003

Monthly Rainfall (in.)

	--------- 2002 --------			------------------------------- 2003 --------------------------------------									
	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	**Total**
	5.02	0.65	2.86	0.03	0.81	0.85	1.63	2.56	6.93	0.15	1.53	0.41	**23.43**
Long term mean:	2.65	1.60	1.03	0.91	1.29	2.07	2.30	4.30	3.45	2.08	2.71	3.58	**27.97**

OKLAHOMA PANHANDLE WHEAT VARIETY TRIALS, 2002-03

PRODUCTION TECHNOLOGY CROPS

OKLAHOMA COOPERATIVE EXTENSION SERVICE
DEPARTMENT OF PLANT AND SOIL SCIENCES
DIVISION OF AGRICULTURAL SCIENCES & NATURAL RESOURCES
OKLAHOMA STATE UNIVERSITY

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The 2002-03 Panhandle wheat crop may have been one of the most variable in recent history. Dryland and irrigated yields both were highly variable, with reported dryland yields ranging from 10 to 50 bu/ac and irrigated yields ranging from 55 to 104 bu/ac. Most wheat was planted with good to excellent soil moisture, and with fall precipitation outstanding fall forage yields were obtained **(PT 2003-2)**. The lack of rainfall in February, March, and April reduced dryland yields of earlier planted wheat.

Trial Locations

There were 5-variety tests in the panhandle region this year. The dry-land variety test at the Oklahoma Panhandle Research and Extension Center (OPREC, Goodwell) was a wheat-grain sorghum-fallow rotation. The dry-land grain trial at Balko was wheat-fallow-wheat. One irrigated trial was established at Boise City as grain only. Two trials were established in Guymon, one grain only and the other a dual-purpose trial. The trials at Balko, OPREC dryland, and at Boise City were abandoned due to drought stress and hail damage.

Growing Conditions

Most wheat was planted with excellent soil moisture in September or early October. With excellent growing conditions outstanding fall forage yields were obtained and many dryland acres were grazed. With the amount of fall forage produced, many acres of dryland wheat exhibited nitrogen deficiency symptons when growth resumed in the spring. Irrigated wheat required less irrigation than normal in the fall due to rains in the August through October time frame (Table 1). Producers that irrigated in February, March, and April reported yields over 100 bu/ac.

Grain-filling Conditions

Temperatures were near the long-term averages during the grain-filling period. The mean high temperature for Goodwell was 80° F while the long-term mean is 78.5° F. The long-term mean number of days with high temperatures above 90° F is 4.5. In 2003 there were 4 days above 90° F. Test weights were outstanding (65 lb/bu for Intrada) for wheat harvested before delays due to rain, test weights were lower when harvesting resumed. Trial test weights were lower than expected due to delays in harvesting.

New Varieties for 2002-03

Varieties included in the trials for the first time were AgriPro AP 502 CL - a Clearfield® wheat, Avalanche - a Colorado released hard white wheat, AgriPro Platte - another hard white wheat, Cisco - a Goertzen red wheat, and TAM 111.

Experimental Lines Included

For the fifth year, we included several OSU candidate cultivars that have potential for release in the next year or two. These were included to evaluate their capability at sites not normally used as test locations in the OSU wheat breeding program. Five hard red winter wheat lines called OK94P549-11, OK94P549-21, OK95616-56, OK96705-38, and OK98699 were included. Characteristics of each of these are available by selecting candidate cultivars on the web at http://www.wit.okstate.edu.

Testing and Reporting Procedures

All plots were planted in 7.5-inch rows with seeding rate indicated in the tables. The purpose of this testing program is to provide Oklahoma wheat producers with performance data on varieties that are presently grown or available in Oklahoma. Within each table varieties are listed in decreasing order for 3-year grain yield average, if available, followed by varieties with 2-year averages, and then varieties having data only for the current year. It is recommended that specific emphasis be given to multi-year averages when selecting varieties. Varieties that consistently rank high over 3-year averages are good choices.

Small differences in yield should not be overemphasized. Least Significant Differences (L.S.D.) are a statistical test of yield differences and are shown at the bottom of each table. Unless two entries differ by at least the L.S.D. shown, little confidence can be placed in one being superior to the other.

Additional Information on Web

For information on coleoptile length and other characteristics of varieties grown in Oklahoma see the "Wheat Variety Characteristic Chart" under Variety information on the Wheat Improvement Team web page at **http://clay.agr.okstate.edu/wheat/wit.html.** This information is updated regularly to give the latest in disease ratings. From the above address you can also connect to the latest fall and full-season forage data.

Cooperation Acknowledged

These data result from cooperative efforts of the Oklahoma Agricultural Experiment Station, Oklahoma Cooperative Extension Service, Oklahoma Wheat Commission, and cooperating producers. The following people have contributed to this report by assisting in crop production, data collection, and publication: Lawrence Bohl, Craig Chesnut, Matt LaMar, Mike LaMar Chad Fowler, and Josh Morris. Their efforts are greatly appreciated.

Table 1. Long-term average and 2001-02 panhandle precipitation data.

PERIOD	JULY	AUG	SEPT	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUNE	TOT
BEAVER													
Average	2.84	3.14	2.01	1.25	1.17	0.74	0.50	0.92	1.65	1.75	3.28	3.64	22.89
2002-03	2.31	5.32	1.03	3.54	0.17	0.76	0.00	0.43	1.11	1.93	1.67	6.41	24.68
CIMARRON													
Average	2.85	2.55	1.97	0.97	0.79	0.43	0.34	0.54	0.99	1.28	2.76	2.92	18.39
2002-03	0.36	4.75	1.82	2.54	0.26	0.73	0.00	0.22	0.94	0.75	1.08	2.93	16.38
TEXAS													
Average	2.58	2.28	1.77	1.03	0.77	0.31	0.30	0.46	0.95	1.33	3.25	2.86	17.89
2002-03	4.02	4.00	2.46	3.41	0.11	0.89	0.03	0.21	1.33	0.55	1.84	5.26	24.11

Financial Support by the Oklahoma Wheat Commission

Guymon Irrigated Grain-Only Wheat Variety Trial

Cooperator: Larry Wiggins, Soil Type: Richfield clay loam

		PROTEIN[1]	TEST WEIGHT (LB/BU)			YIELD (BU/A)		
SOURCE	ENTRY	%	2002-03	2-YEAR	3-YEAR	2002-03	2-YEAR	3-YEAR
KANSAS	TREGO (W)[2]	12.6(28)	58.3(3)[3]	59.5(2)	59.8(3)	73.9(6)	73.0(1)	70.4
AGRIPRO	CORONADO	12.7(27)	56.4(25)	58.0(15)	58.2(14)	72.5(8)	63.4(8)	65.7
OKLAHOMA	Ok101	12.1(32)	57.2(17)	58.5(11)	58.8(8)	74.8(5)	66.5(3)	65.4
KANSAS	LAKIN (W)	13.3(21)	57.2(17)	58.2(14)	58.4(12)	77.3(3)	65.0(5)	65.4
OKLAHOMA	Ok102	14.6(4)	57.6(12)	58.8(8)	59.1(7)	65.4(25)	63.9(7)	65.4
TEXAS	TAM 302	13.6(17)	55.1(32)	56.4(24)	56.5(20)	68.4(14)	66.3(4)	64.8
OKLAHOMA	CUSTER	13.2(23)	58.3(3)	58.5(11)	58.7(11)	76.8(4)	64.7(6)	64.0
OKLAHOMA	2174	13.7(16)	57.5(14)	59.0(5)	59.5(5)	66.6(20)	60.2(9)	61.6
TEXAS	TAM 110	12.5(30)	55.4(31)	56.8(22)	57.0(19)	66.6(20)	59.5(11)	61.4
AGRIPRO	DUMAS	13.5(20)	57.8(10)	59.1(4)	59.5(5)	65.2(26)	56.1(17)	60.1
KANSAS	2137	12.6(28)	56.1(28)	57.8(16)	58.0(15)	63.1(30)	59.2(12)	59.6
OKLAHOMA	CHISHOLM	13.3(21)	57.7(11)	58.3(13)	58.8(8)	67.7(16)	59.0(13)	58.7
OKLAHOMA	INTRADA (W)	14.4(8)	58.1(6)	59.4(3)	60.0(1)	63.4(29)	56.6(16)	58.2
GOERTZEN	KALVESTA	14.7(3)	56.2(27)	56.5(23)	57.2(18)	67.2(18)	54.9(18)	58.2
AGRIPRO	CUTTER	14.3(9)	55.5(29)	57.6(19)	58.4(12)	66.2(22)	54.8(19)	57.3
GOERTZEN	ENHANCER	13.0(25)	56.5(23)	57.7(18)	57.4(17)	66.1(24)	56.7(15)	56.2
GOERTZEN	G1878	15.4(1)	58.2(5)	59.6(1)	59.9(2)	59.0(33)	51.9(21)	56.0
KANSAS	JAGGER	14.5(7)	56.3(26)	57.3(21)	57.7(16)	66.2(22)	52.5(20)	54.6
GOERTZEN	VENANGO	14.6(4)	57.4(16)	59.0(5)	58.8(8)	53.0(34)	46.0(23)	51.6
AGRIPRO	THUNDERBOLT	14.6(4)	58.1(6)	59.0(5)	59.6(4)	60.6(32)	42.7(24)	46.2
COLORADO	ABOVE	12.2(31)	55.5(29)	57.4(20)	-	81.2(1)	70.6(2)	-
GOERTZEN	COSSACK	14.2(10)	57.0(20)	58.6(10)	-	64.9(27)	59.9(10)	-
AGRIPRO	JAGALENE	13.9(15)	58.0(8)	58.8(8)	-	70.2(10)	56.9(14)	-
KANSAS	2145	14.2(10)	56.9(21)	57.8(16)	-	62.3(31)	51.7(22)	-
OKLAHOMA	OK94P549-21	13.2(23)	58.4(2)	-	-	80.2(2)	-	-
OKLAHOMA	OK95616-56	12.1(32)	54.0(34)	-	-	73.8(7)	-	-
OKLAHOMA	OK94P549-11	12.9(26)	56.5(23)	-	-	70.8(9)	-	-
AGRIPRO	PLATTE (W)	15.2(2)	58.0(8)	-	-	69.7(11)	-	-
TEXAS	TAM 111	13.6(17)	57.6(12)	-	-	69.1(12)	-	-
COLORADO	AVALANCHE (W)	14.0(13)	57.2(17)	-	-	69.1(12)	-	-
AGRIPRO	AP 502 CL	12.0(34)	54.9(33)	-	-	68.1(15)	-	-
OKLAHOMA	OK98699	14.2(10)	56.7(22)	-	-	67.6(17)	-	-
GOERTZEN	CISCO	13.6(17)	57.5(14)	-	-	66.8(19)	-	-
OKLAHOMA	OK96705-38	14.0(13)	58.7(1)	-	-	64.1(28)	-	-
	MEAN	13.3	57.0	58.2	58.6	68.2	58.8	60.0
	LSD(0.05)	1.1	1.1	0.9	0.7	9.0	6.7	5.5

[1]Wheat protein on 12% moisture basis. [2](W) = White wheat variety.
[3]Number in() is rank within column.
Planted 10/17/02 at 94 lb/a, received 8" of irrigation, harvested 6/30/03.

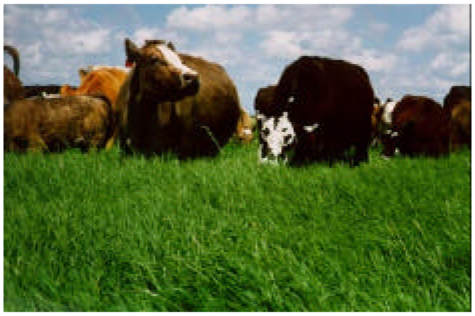
Partial financial suport by the Oklahoma Wheat Commission

Guymon Irrigated Graze Plus Grain Wheat Variety Trial
Cooperator: Joe Webb, Soil Type: Richfield clay loam

SOURCE	ENTRY	LODGING %	HEIGHT INCHES	PROTEIN[1] %	TEST WEIGHT (LB/BU)	YIELD (BU/A)
KANSAS	2137	20	31.8	10.7(27)[2]	57.7(17)	95.1
TEXAS	TAM 302	0	31.0	12.0(20)	56.2(25)	94.5
KANSAS	LAKIN (W)[3]	0	31.5	12.1(17)	58.7(10)	93.1
KANSAS	TREGO (W)	6	30.5	12.1(17)	59.1(7)	92.8
OKLAHOMA	OK94P549-21	6	30.3	12.3(15)	58.4(12)	92.2
OKLAHOMA	Ok101	2	31.0	11.3(25)	57.6(19)	90.7
GOERTZEN	ENHANCER	18	32.5	12.0(20)	57.6(19)	90.5
GOERTZEN	CISCO	0	31.0	13.5(2)	58.1(15)	89.9
OKLAHOMA	CHISHOLM	0	32.3	12.7(11)	59.4(3)	88.9
TEXAS	TAM 111	0	32.0	11.8(22)	59.0(8)	88.4
GOERTZEN	VENANGO	0	33.3	12.3(15)	58.8(9)	86.5
OKLAHOMA	OK94P549-11	0	30.8	11.3(25)	57.7(17)	86.1
COLORADO	AVALANCHE (W)	18	32.8	12.5(13)	58.3(13)	86.0
OKLAHOMA	OK96705-38	0	32.8	12.9(6)	60.5(1)	85.7
KANSAS	2145	0	29.3	12.8(8)	58.1(15)	85.6
TEXAS	TAM 110	6	33.0	11.6(24)	56.5(23)	84.3
OKLAHOMA	Ok102	0	32.5	13.2(4)	58.2(14)	83.8
OKLAHOMA	OK98699	2	30.8	12.5(13)	57.0(22)	83.6
GOERTZEN	G1878	0	35.3	12.9(6)	59.9(2)	82.5
OKLAHOMA	OK95616-56	2	30.3	11.7(23)	54.6(27)	81.7
GOERTZEN	KALVESTA	20	32.8	13.5(2)	57.5(21)	81.4
KANSAS	JAGGER	25	30.5	12.6(12)	56.2(25)	81.4
OKLAHOMA	2174	0	33.8	13.0(5)	59.2(4)	79.9
OKLAHOMA	CUSTER	0	33.0	12.8(8)	59.2(4)	79.8
GOERTZEN	COSSACK	0	33.5	12.8(8)	58.5(11)	79.7
COLORADO	ABOVE	0	30.8	12.1(17)	56.5(23)	72.1
OKLAHOMA	INTRADA (W)	26	31.7	13.7(1)	59.2(4)	72.0
	Mean	5	31.9	12.4	58.1	85.5
	LSD(0.05)	22.5	3.8	0.6	1.1	12.2

[1]Wheat protein on 12% moisture basis. [2]Number in() is rank within column.
[3](W) = White wheat variety.
Planted 9/3/02 at 94 lb/a, grazed from 11/1/01 until 3/10/03, removing about 200 lb of beef per acre, harvested 6/27/03.

Partial financial support by the Oklahoma Wheat Commission



PERFORMANCE OF FORAGE BERMUDAGRASS VARIETIES IN OKLAHOMA TESTS, 1998-2003

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BERMUDAGRASS, *Cynodon dactylon* (L.) Pers., is used for pasture and hay over much of the southern USA. This introduced, perennial, sod-forming grass serves as the principal forage base for many livestock enterprises because of its high forage production capability and the management flexibility that it provides. Bermudagrass varieties may differ in performance characteristics relating to establishment, adaptation, forage production and forage quality. Varieties poorly adapted to an area decline in stand density and productivity one or more years following establishment. Conversely, stands of well-adapted varieties will last indefinitely. Varieties also may differ substantially in forage production capability, and to a lesser degree, in forage quality characteristics. Consequently, deciding which bermudagrass variety to plant is important. To aid in selecting varieties, comparative performance data are reported from field tests conducted over the past few years. Data are also reported for experimental bermudagrass varieties included in performance testing.

DESCRIPTION OF THE TESTS

Forage yield data are reported from five field tests conducted at three sites. Locations and details of the tests are given in Table 1. Information about the bermudagrass varieties in the tests is given in Table 2. The recently released Midland 99 and Ozark varieties were listed in reports preceding their release by their experimental designations 74X 21-6 and 74X 12-6, respectively. Plots in all tests were started by transplanting greenhouse-grown plants about 2 feet apart in each of two rows. The rows were spaced 2 feet apart equidistant from the center of the plot. Yield determinations were made by harvesting growth from an area about 3 feet in width and 10 to 15 feet in length through the middle of each plot. All tests were dryland except Test 1997-1 at the Oklahoma Panhandle Research and Extension Center at Goodwell, OK. Test 1997-1 was irrigated with approximately six acre-inches of water per month through the growing season. All tests received nitrogen fertilizer in the amount of 300 pounds N/acre/year, split into three applications of 100 pounds N/acre. Nitrogen was first applied when the bermudagrasses initiated growth in the spring, usually in mid-April. The second and third N applications followed the first and second harvests, respectively, which usually occurred in early June and early July. Soil pH, phosphorus, and potash levels were maintained at recommended levels based on soil test results. This fertilizer program provided a high yield environment in the absence of yield limiting factors such as low soil moisture, disease and winter injury. The high yield environment was provided so that the bermudagrass varieties could express their genetic potential for forage yield.

RESULTS

Weather Data. Precipitation amounts received at the respective test sites during the reported test years (1998-2003) are given in Table 3. Precipitation received during 2003 at both the Chickasha and Haskell dryland sites was slightly over 13 inches below their respective normals of 34.8 and 47.2 inches. Dry periods occurred at each site during the growing season that resulted in reduced growth. However, prolonged severe drought has not occurred at either site over the duration of the tests. Severity of winters has been mild to average. The 1998-99, 1999-2000, and 2002-2003 winters at all three locations were mild resulting in minimal low temperature stress to the bermudagrass varieties. The severity of the 2000-2001 and 2001-2002 winters was closer to normal, resulting in substantially greater low-temperature stress to plants compared to the previous few winters.

Winter Survival. Visual ratings of 2003 early-season growth (green-up and height) of bermudagrass varieties are given in Tables 4, 7, and 12 for Test 1997-1 at Goodwell and Tests 1998-1 and 2001-1 at Haskell, respectively. Differences among varieties in date and rate of green-up following stressful winters generally are predictive of the relative cold tolerance of the varieties. However, differences among varieties in green-up may vary among locations because of variety by location interactions. Goodwell typically has the coldest winters of the test sites.

Forage Yields. Forage yield data are given in Tables 5 and 6 (Test 1997-1), 8 and 9 (Test 1998-1), 10 and 11 (Test 1998-2), 13 and 14 (Test 2000-1), and 15 and 16 (Test 2001-2). The high biomass yields reflect the high yield environment management imposed on the tests. Bermudagrass varieties differed significantly ($P<0.05$) for seasonal total forage yield in all tests for all test years. In Test 1997-1 at Goodwell, the 6-year mean yield of Ozark (12.11 tons/dm/ac/yr) was significantly higher than those of all other commercial varieties. Midland 99 and Hardie had respective mean yields of 10.94 and 10.83 tons dm/ac/yr that significantly exceeded the yields of all other commercial varieties except Ozark. The experimental varieties at Goodwell with the highest 6-year mean yields were ERS 94X 2-8, 84X 16-66, and LCB 84X 19-16. In Test 1998-1 at Haskell, the 5-year mean forage yield of Midland 99 was greater than that of Tifton 44, which was greater than Greenfield. The 5-year mean yields in Test 1998-2 for the three commercial varieties were Midland 99=Tifton 44>Greenfield. Midland 99 and Tifton 44 have yielded approximately 4 tons/acre/year more dry matter than Greenfield in Test 1998-2. Midland 99 and Tifton 44 have similar 2-year mean yields in Tests 2001-1 (Haskell) and 2001-2 (Chickasha). In Test 2001-1 the mean 2-year yield of Ozark was significantly higher than that of Tifton 44, but not significantly different from that of Midland 99. The yields of Midland 99, Ozark, and Tifton 44 did not differ significantly in 2003 in Test 2001-2 at Chickasha. The experimental variety A12245 has performed exceptionally well in Tests 2001-1 and 2001-2.

DISCUSSION

Of the commercial varieties tested, Midland has been grown in Oklahoma since the 1950's and is a proven dependable variety, particularly for central and western portions of the state. Greenfield, also released in the 1950's, has been grown most extensively in the eastern half of the state. Its popularity stems from good establishment capability and sustained productivity over many soil types and management conditions. In eastern Oklahoma, producers generally feel that Midland is suited for production on well-drained soils, but performs less well than Greenfield on finer textured soils that tend to be less well drained. Hardie has high yield potential and superior forage quality, but is limited by susceptibility to leaf spotting disease and intolerance to low soil pH (<5.5). Each of these conditions can result in stand thinning and loss of productivity of Hardie. Tifton 44 has high yield potential and relatively broad adaptation to the state. Midland 99 is a new variety indicated by extensive testing to have good adaptation to Oklahoma, high forage production potential, and good forage quality. Ozark is a new variety indicated by extensive testing to have good adaptation to the northern part of the bermudagrass use zone where it has demonstrated high forage yield capability and good stand persistence.

Quickstand and Greenfield have excellent cold tolerance, aggressive establishment capability, and form dense sods. These are often referred to as “grazing type” varieties because of their shorter stature and denser sod relative to varieties like Midland, Midland 99, Tifton 44, and Ozark, which are referred to as “hay types”. The “grazing type” and the “hay type” varieties are used both for grazing and haying. The shorter stature “grazing type” varieties will typically spread faster during establishment and achieve a complete cover more rapidly than the named “hay type” varieties. However, once mature stands are achieved the “grazing type” varieties have lower forage yield potential than the “hay type” varieties. The greater yield potential of the “hay type” varieties compared to the “grazing type” varieties is realized to the greatest extent in high yield environments. Mature stands of the more dense “grazing type” varieties generally resist weed invasion better than mature stands of the less dense “hay type” varieties. Faster stands of varieties like Midland, Midland 99, Tifton 44, and Ozark are usually achieved by planting 30 or more bushels of sprigs per acre in comparison to lower sprig planting rates.

The substantial differences among seeded bermudagrass varieties in cold tolerance and forage yield potential are important considerations for producers. Guymon and Wrangler have a level of cold tolerance sufficient for the northern part of the bermudagrass use zone. Many seeded bermudagrass varieties currently being marketed have moderate to low freeze tolerance and are less well adapted to northern latitudes where bermudagrass is used. The choices of using a seeded vs. clonal variety and which seeded variety to use should be made taking into account the average severity of winters for a given site and the forage yield goal. Seed of bermudagrass varieties is frequently blended in an attempt to combine the desirable traits of the different varieties. Such blends are usually sold under a brand name. Some additional information on seeded bermudagrass variety performance was included in previous reports (PT 2002-3 and PT 2003-3).

Table 1. Location and characteristics of the bermudagrass tests from which data are reported herein.

Test 1997-1	
Location	Oklahoma Panhandle Research and Extension Center, Goodwell, OK
Date Planted	June 3, 1997
Soil Type	Richfield clay loam
Treatments	19 varieties
Experimental Design	Randomized complete block, 4 replications
Irrigated or Dryland	Irrigated
Test 1998-1	
Location	Eastern Research Station, Haskell, OK
Date Planted	May 12, 1998
Soil Type	Taloka silt loam
Treatments	12 varieties
Experimental Design	Randomized complete block, 4 replications
Irrigated or Dryland	Dryland
Test 1998-2	
Location	South Central Research Station, Chickasha, OK
Date Planted	May 6, 1998
Soil Type	McLain silt loam
Treatments	12 varieties
Experimental Design	Randomized complete block, 4 replications
Irrigated or Dryland	Dryland
Test 2001-1	
Location	Eastern Research Station, Haskell, OK
Date Planted	May 16, 2001
Soil Type	Taloka silt loam
Treatments	17 varieties
Experimental Design	Randomized complete block, 4 replications
Irrigated or Dryland	Dryland
Test 2001-2	
Location	South Central Research Station, Chickasha, OK
Date Planted	May 24, 2001
Soil Type	McLain silt loam
Treatments	17 varieties
Experimental Design	Randomized complete block, 4 replications
Irrigated or Dryland	Dryland

Table 2. Information on commercial and experimental varieties included in bermudagrass tests.

Variety or Brand	Date Released	How Planted	Origin/Owner
COMMERCIAL VARIETIES - AVAILABLE FOR FARM USE			
CD90160	2000	Seed	Cebeco International Seeds, Halsey, OR
Greenfield	1954	Sprigs	Oklahoma AES[1]
Guymon	1982	Seed	Oklahoma AES
Hardie	1974	Sprigs	Oklahoma AES
Midland	1953	Sprigs	Oklahoma AES & USDA-ARS[2]
Midland 99	1999	Sprigs	Oklahoma, Arkansas, Kansas, & Missouri AESs; USDA-ARS & Noble Foundation
Ozark	2001	Sprigs	Missouri, Oklahoma, Arkansas & Kansas AESs; Noble Foundation & USDA-ARS
Quickstand	1993	Sprigs	Kentucky AES & USDA-NRCS[3]
Tifton 44	1978	Sprigs	USDA-ARS & Georgia AES
Wrangler	1999	Seed	Johnston Seed Co., Enid, OK
EXPERIMENTAL VARIETIES – NOT AVAILABLE FOR FARM USE			
A12199	NA	Sprigs	Oklahoma AES
A12244	NA	Sprigs	Oklahoma AES
A12245	NA	Sprigs	Oklahoma AES
A12246	NA	Sprigs	Oklahoma AES
ERS-C	NA	Sprigs	Oklahoma AES
ERS 16S-1	NA	Sprigs	Oklahoma AES
ERS 16S-2	NA	Sprigs	Oklahoma AES
ERS 16S-3	NA	Sprigs	Oklahoma AES
ERS 16S-4	NA	Sprigs	Oklahoma AES
ERS 16S-5	NA	Sprigs	Oklahoma AES
ERS 16S-6	NA	Sprigs	Oklahoma AES
ERS 16S-7	NA	Sprigs	Oklahoma AES
ERS 16S-8	NA	Sprigs	Oklahoma AES
ERS 16S-9	NA	Sprigs	Oklahoma AES
ERS 16S-10	NA	Sprigs	Oklahoma AES
SCRS-C	NA	Sprigs	Oklahoma AES
LCB 84X 16-66	NA	Sprigs	Oklahoma AES
LCB 84X 19-16	NA	Sprigs	Oklahoma AES
ERS 94X 2-8	NA	Sprigs	Oklahoma AES
ERS 94X 5-12	NA	Sprigs	Oklahoma AES
ERS 94X 6-13	NA	Sprigs	Oklahoma AES
ERS 94X 13-9	NA	Sprigs	Oklahoma AES

[1]AES=Agricultural Experiment Station. [2]ARS=Agricultural Research Service. [3]NRCS=Natural Resources. Conservation Service. [4]Blend of Cheyenne and Giant seed. [5]Blend of Common and Giant seed.

Table 3. Precipitation amounts (inches) received by month for the test locations and test years.

Month	1998	1999	2000	2001	2002	2003	1998	1999	2000	2001	2002	2003
	ERS[1]						**OPREC[2]**					
January	4.91	2.62	0.71	4.20	2.41	0.15	0.10	0.73	0.20	0.47	0.22	0.03
February	0.63	2.25	1.52	4.97	0.80	2.79	0.70	0.05	0.05	1.04	0.36	0.21
March	5.17	5.05	4.03	0.89	3.12	3.62	1.69	1.96	5.39	1.82	0.00	1.28
April	2.25	8.86	3.20	2.19	4.46	1.37	0.81	4.77	1.93	1.00	0.52	0.53
May	3.70	11.07	1.53	9.13	8.70	6.20	0.73	1.82	1.01	1.09	2.06	1.84
June	3.08	6.81	6.88	2.64	2.32	3.12	0.87	2.85	2.29	0.61	1.37	5.26
July	2.14	0.00	1.72	0.04	3.46	0.29	4.13	0.20	0.76	0.00	2.63	1.87
August	2.63	2.07	0.00	2.50	3.54	5.36	2.57	0.75	1.09	0.66	0.28	1.19
September	6.32	7.66	2.61	2.43	1.14	3.49	0.24	0.36	0.03	0.27	2.46	1.62
October	8.43	2.07	10.85	6.86	4.18	3.16	6.77	2.27	5.68	0.00	3.41	0.14
November	3.61	1.45	3.32	5.96	1.03	2.19	0.87	0.00	0.02	0.72	0.11	0.56
December	2.30	3.61	1.45	2.66	3.76	1.86	0.47	0.27	0.14	0.12	0.89	0.18
	SCRS[3]											
January	6.29	1.92	1.99	3.35	2.23	0.06						
February	0.54	1.29	3.05	2.87	0.89	1.13						
March	5.96	3.90	3.25	0.79	1.98	1.55						
April	4.11	6.61	3.96	0.71	4.97	2.23						
May	0.86	3.69	8.31	5.12	2.12	2.99						
June	2.10	4.66	9.20	0.61	4.03	5.32						
July	0.00	0.42	2.98	0.49	3.18	1.01						
August	0.68	1.98	0.00	3.39	1.67	4.38						
September	0.92	2.26	3.12	2.45	3.32	1.02						
October	3.82	2.06	5.30	1.56	8.05	0.40						
November	3.40	0.04	4.46	1.07	0.49	0.78						
December	1.58	3.35	1.26	1.19	2.35	0.84						

[1]Eastern Research Station, Haskell, OK; [2]Oklahoma Panhandle Research & Extension Center, Goodwell, OK.
[3]South Central Research Station, Chickasha, OK.

Table 4. Notes taken on bermudagrass Test 1997-1, Oklahoma Panhandle Research & Extension Center, Goodwell, OK. 2003.

Variety				
Commercial Varieties – Available for Farm Use				
Greenfield	5	18	100	8.50
Guymon	18	28	93	7.75
Hardie	10	30	65	2.25
Midland	28	45	95	5.75
Midland 99	10	15	75	6.50
Ozark	8	23	90	8.50
Quickstand	5	8	80	7.50
Tifton-44	18	35	75	3.25
Wrangler	20	40	90	8.00
Experimental Varieties – Not Available for Farm Use				
A-12199	0	8	80	8.00
CD 90160	18	33	75	7.00
ERS 94X 13-9	5	10	68	6.25
ERS 94X 2-8	8	20	63	2.75
ERS 94X 5-12	3	3	50	5.00
ERS 94X 6-13	5	10	53	3.75
ERS-C	5	18	98	8.75
LCB 84X 16-66	13	33	85	8.25
LCB 84X 19-16	28	45	90	7.00
SCRS-C	13	28	83	6.25
Mean	11	23	79	6.37
CV (%)	74	49	15	22
5% LSD	12	16	17	2.03

[1]Visually estimated percent of plot area with new growth.
[2]Overall appearance related to growth, stand density and cover, absence of weeds, etc. using a rating scale 1 to 9, with 9 being best.

Table 5. Forage yields (tons dry matter/acre) of commercial and experimental bermudagrass varieties in Test 1997-1, Oklahoma Panhandle Research and Extension Center, Goodwell, OK. 2003.

Variety	2003 Harvest Dates[1] 6/12	7/8	8/5	9/9	Total
Commercial Varieties – Available for Farm Use					
Ozark	1.92	4.93*	5.79*	2.47	15.11*
Midland 99	1.52	4.54*	4.91	2.50	13.47
Greenfield	1.71	5.26**	4.19	1.99	13.15
Midland	1.83	4.10*	4.16	2.57	12.66
Tifton 44	1.71	3.47	5.11	2.05	12.34
Guymon	1.64	4.36*	3.88	2.31	12.19
Hardie	1.35	2.48	5.32	2.67	11.82
Wrangler	1.59	4.35*	3.60	2.12	11.66
Quickstand	1.62	4.12*	2.70	2.30	10.74
Experimental Varieties – Not Available for Farm Use					
ERS 94X 2-8	1.68	4.63*	6.90**	2.75	15.96**
ERS 94X 13-9	1.82	5.20*	6.24*	2.27	15.53*
LCB 84X 16-66	1.88	4.69*	5.48*	2.44	14.49*
LCB 84X 19-16	1.80	4.38*	5.47*	2.37	14.02*
ERS 94X 5-12	1.60	4.68*	4.84	2.45	13.57
CD 90160	2.11	4.46*	4.58	2.20	13.35
ERS-C	1.79	5.17*	4.01	2.16	13.13
SCRS-C	1.55	3.85*	4.06	2.47	11.93
A-12199	1.38	5.06*	3.05	2.04	11.53
ERS 94X 6-13	1.32	3.67	3.60	2.69	11.28
Mean	1.67	4.39	4.62	2.35	13.05
CV (%)	18	23	23	15	13
5% LSD	N.S.	1.44	1.53	N.S.	2.39

[1]All plots were mowed in mid-May because of cool-season grass infestation in some plots. Consequently, the 6/12/03 harvest yields of varieties were reduced, with the greatest reductions likely for the varieties with the best early growth.

**Highest numerical value in column.

*Not significantly different from the highest numerical value in the column based on 5% LSD.

N.S. = No significant difference among varieties at the 95% confidence level.

Table 6. Forage yields (tons dry matter/acre) of commercial and experimental bermudagrass varieties in Test 1997-1, Oklahoma Panhandle Research and Extension Center, Goodwell OK. 1998-2003.

Variety	Harvest Year 1998	1999	2000	2001	2002	2003	6-yr Mean
Commercial Varieties – Available for Farm Use							
Ozark	11.84*	8.00*	9.94*	14.53*	13.25*	15.10*	12.11*
Midland 99	10.16	7.60	8.53	13.00	12.86	13.48	10.94
Hardie	12.99**	8.03*	7.98	13.21	10.94	11.82	10.83
Midland	8.64	5.32	7.47	11.85	12.06	12.66	9.66
Guymon	9.65	4.49	5.51	11.16	11.60	12.20	9.23
Tifton 44	9.23	5.48	6.98	10.39	11.00	12.34	9.10
Wrangler	10.00	4.59	5.55	10.25	11.76	11.66	8.97
Quickstand	9.86	5.77	6.04	10.76	9.17	10.74	8.72
Greenfield	8.91	4.18	5.24	9.73	10.86	13.15	8.68
Experimental Varieties – Not Available for Farm Use							
ERS 94X 2-8	11.65*	8.99*	10.29**	13.10	14.80**	15.97**	12.46**
LCB 84X 16-66	11.93*	8.60*	8.86	16.07*	14.51*	14.49*	12.41*
LCB 84X 19-16	11.59*	9.74**	8.51	16.24**	13.89*	14.02*	12.33*
CD 90160	11.75*	6.85	7.56	13.30	13.67*	13.35	11.08
ERS 94X 13-9	9.48	6.45	7.95	13.00	13.30*	15.53*	10.95
SCRS-C	10.61	5.85	7.39	11.43	10.98	11.93	9.70
ERS 94X 5-12	9.23	5.57	6.31	11.10	12.29	13.57	9.66
ERS-C	8.82	4.76	5.50	9.75	11.00	13.14	8.83
A-12199	7.61	5.03	5.20	9.95	9.94	11.53	8.21
ERS 94X 6-13	8.08	5.07	6.13	7.69	9.04	11.28	7.88
Mean	10.11	6.33	7.21	11.91	11.94	13.05	10.09
CV (%)	16	20	11	15	13	13	15
5% LSD	2.34	1.77	1.09	2.60	2.14	2.39	0.85

**Highest numerical value in column.
*Not significantly different from the highest numerical value in the column based on 5% LSD.

Table 7. Spring growth of bermudagrass varieties in Test 98-1, Eastern Research Station, Haskell, OK. 2003.

Variety	April 17 Greenup[1]	April 17 Height (In)[2]	May 20 Greenup[1]	May 20 Height (In)[2]
Commercial Varieties – Available for Farm Use				
Midland 99	85	2.50	100	13.50
Tifton 44	93	2.00	99	11.00
Greenfield	100	2.00	100	6.50
Experimental Varieties – Not Available for Farm Use				
ERS 94X 2-8	55	2.50	76	13.50
LCB 84X 19-16	93	9.00	100	16.00
ERS 94X 13-9	90	2.00	99	10.50
LCB 84X 16-66	70	2.25	93	7.00
SCRS-C	100	2.00	100	7.50
ERS 94X 5-12	80	2.25	95	5.50
ERS 94X 6-13	6	0.50	78	3.75
ERS-C	100	2.00	100	6.50
A12199	100	1.75	100	3.00
Mean	81	2.56	95	8.69
CV (%)	8	14	4	18
5% LSD	9	4.23	6	2.21

[1]Visually estimated percent of plot area with new growth.
[2]Mean height of new growth in inches.

Table 8. Forage yields (tons dry matter/acre) of commercial and experimental bermudagrass varieties in Test 1998-1, Eastern Research Station, Haskell, OK. 2003.

Variety	2003 Harvest Dates 5/27	7/1	8/27	10/15	Total
Commercial Varieties – Available for Farm Use					
Midland 99	2.44*	2.63	2.39	1.64	9.10*
Tifton 44	2.43*	2.31	2.54*	1.07	8.35
Greenfield	1.91	1.86	0.60	0.98	5.35
Experimental Varieties – Not Available for Farm Use					
ERS 94X 13-9	2.27*	2.43	2.84**	1.82	9.36**
ERS 94X 2-8	1.55	2.61	2.39	2.10*	8.65*
LCB 84X 19-16	2.61**	2.35	1.90	1.75	8.61*
ERS 94X 6-13	0.52	3.22**	1.47	2.33**	7.54
SCRS-C	2.32*	2.35	1.61	1.17	7.45
ERS 94X 5-12	1.66	2.17	2.00	1.49	7.32
LCB 84X 16-66	1.37	1.89	1.29	1.88	6.43
ERS-C	2.09	1.92	0.72	0.98	5.71
A-12199	1.14	2.23	0.76	0.63	4.76
Mean	1.86	2.33	1.71	1.48	7.38
CV (%)	13	7	14	12	8
5% LSD	0.34	0.23	0.36	0.26	0.89

** Highest numerical value in column.
* Not significantly different from the highest numerical value in the column based on 5% LSD.

Table 9. Forage yields (tons dry matter/acre) of commercial and experimental bermudagrass varieties in Test 1998-1, Eastern Research Station, Haskell, OK. 1999-2003.

Variety	Harvest Year 1999	2000	2001	2002	2003	5-Yr Mean
Commercial Varieties – Available for Farm Use						
Midland 99	9.03*	8.47	7.38**	8.73**	9.10**	8.54**
Tifton 44	7.57	7.93	5.65	7.82*	8.35*	7.46
Greenfield	6.52	5.65	3.69	6.10	5.35	5.46
Experimental Varieties – Not Available for Farm Use						
ERS 94X 2-8	10.24**	9.82**	5.99	7.91*	8.65*	8.52*
LCB 84X 19-16	8.71	9.16*	7.11*	8.56*	8.61*	8.43*
ERS 94X 13-9	7.09	7.93	6.37	7.95*	9.36*	7.74
LCB 84X 16-66	8.70	7.51	5.58	6.76	6.43	7.00
SCRS-C	6.83	7.17	5.78	7.66	7.45	6.98
ERS 94X 5-12	7.26	7.28	4.75	7.61	7.32	6.84
ERS 94X 6-13	7.76	7.62	5.16	6.11	7.54	6.84
ERS-C	5.78	5.93	3.43	6.46	5.71	5.46
A12199	5.23	5.95	3.71	6.00	4.76	5.13
Mean	7.56	7.53	5.38	7.30	7.38	7.03
CV (%)	13	9	13	9	8	10
5% LSD	1.38	0.94	0.97	0.94	0.89	0.45

**Highest numerical value in column.
*Not significantly different from highest numerical value in the column based on the 5% LSD.

Table 10. Forage yields (tons dry matter/acre) of bermudagrass varieties in Test 1998-2, South Central Research Station, Chickasha, OK. 2003.

Variety	2003 Harvest Dates 5/29	7/7	9/15	Total
Commercial Varieties – Available for Farm Use				
Midland 99	1.16	3.96	3.30	8.42*
Tifton 44	1.99*	3.54	2.87	8.40*
Greenfield	0.82	3.87	0.98	5.67
Experimental Varieties – Not Available for Farm Use				
ERS 94X 13-9	1.34	4.19**	4.04**	9.57**
SCRS-C	1.83*	3.54	3.29	8.66*
LCB 84X 19-16	2.35**	3.24	2.71	8.30*
LCB 84X 16-66	2.15*	3.28	2.50	7.93
ERS 94X 2-8	0.98	3.40	3.10	7.48
ERS 94X 6-13	0.82	3.33	3.10	7.25
ERS 94X 5-12	0.41	3.34	2.99	6.74
A12199	0.64	3.77	2.06	6.47
ERS-C	0.87	2.60	1.05	4.52
Mean	1.28	3.51	2.66	7.45
CV (%)	35	18	16	16
5% LSD	0.64	N.S.	0.62	1.69

**Highest numerical value in column.
*Not significantly different from the highest numerical value in the column based on the 5% LSD.
N.S.= No significant difference among varieties at the 95% confidence level.

Table 11. Forage yields (tons dry matter/acre) of bermudagrass varieties in Test 1998-2, South Central Research Station, Chickasha, OK. 1999 -2003.

Variety	Harvest Year 1999	2000	2001	2002	2003	5-Yr Mean
Commercial Varieties – Available for Farm Use						
Midland 99	13.12*	10.97*	9.28**	9.14**	8.43*	10.18**
Tifton 44	12.03	12.26**	7.65	8.45*	8.40*	9.76*
Greenfield	8.91	6.73	4.04	5.52	5.67	6.17
Experimental Varieties – Not Available for Farm Use						
ERS 94X 2-8	14.21**	10.31*	8.68	6.80	7.48	9.50*
ERS 94X 13-9	10.95	10.38*	8.53	8.02*	9.57**	9.48*
LCB 84X 19-16	11.72	10.10*	8.41	7.92*	8.30*	9.29
SCRS-C	11.69	10.40*	7.35	7.26	8.67*	9.07
LCB 84X 16-66	13.00	7.46	6.08	6.82	7.93*	8.26
ERS 94X 6-13	10.43	8.90	6.20	4.99	7.25	7.55
A12199	8.56	7.21	6.03	6.15	6.47	6.88
ERS 94X 5-12	9.01	6.82	5.72	6.02	6.74	6.86
ERS-C	8.81	4.98	3.32	4.32	4.52	5.19
Mean	11.03	8.87	6.77	6.78	7.45	8.18
CV (%)	13	18	14	18	16	16
5% LSD	2.05	2.30	1.39	1.79	1.69	0.81

**Highest numerical value in column.
*Not significantly different from the highest numerical value in the column based on the 5% LSD.

Table 12. Greenup and height notes for bermudagrass varieties in Test 2001-1, Eastern Research Station, Haskell, OK. 2003.

Variety	April 17		May 20	
Commercial Varieties – Available for Farm Use				
Midland 99	88	2.3	98	16.5
Ozark	90	2.0	95	14.0
Tifton-44	88	2.3	100	15.5
Experimental Varieties – Not Available for Farm Use				
A-12244	85	3.5	89	13.5
A-12245	90	2.5	100	15.5
A-12246	92	2.8	98	9.5
ERS 16S-1	88	2.0	99	12.0
ERS 16S-2	88	3.5	100	18.0
ERS 16S-3	95	2.3	100	16.0
ERS 16S-4	90	2.5	98	14.5
ERS 16S-5	100	2.0	100	5.5
ERS 16S-6	88	2.5	100	10.0
ERS 16S-7	85	2.0	99	8.5
ERS 16S-8	92	2.5	95	10.0
ERS 16S-9	87	2.8	100	10.5
ERS 16S-10	80	2.0	97	10.5
LCB 84X 16-66	88	3.8	99	13.5
Mean	89	3	98	12
CV (%)	5	21	2	12
5% LSD	6	0.8	3	2

[1]Visually estimated percentage of plot with living plant material.
[2]Height of new growth in inches.

Table 13. Forage yields (tons dry matter/acre) of commercial and experimental bermudagrass varieties in Test 2001-1, Eastern Research Station, Haskell, OK. 2003.

Variety	2003 Harvest Dates				Total
	5/28	7/2	8/28	10/16	
Commercial Varieties – Available for Farm Use					
Ozark	2.89	2.71	3.43*	1.77	10.80*
Midland 99	2.79	2.97	3.37*	1.19	10.32
Tifton 44	3.23**	2.89	3.26*	0.84	10.22
Experimental Varieties – Not Available for Farm Use					
A-12245	3.15*	2.93	3.21*	2.15*	11.44**
ERS 16S-4	2.73	2.75	3.38*	2.24**	11.10*
ERS16S-2	2.84	2.69	2.86*	1.84	10.23
ERS 16S-9	2.25	2.78	3.55**	1.39	9.97
ERS 16S-10	2.12	2.97	3.37*	1.38	9.84
LCB 84X 16-66	2.79	2.61	2.47	1.80	9.67
ERS 16S-3	2.75	2.85	2.97*	0.87	9.44
A-12246	2.29	2.73	3.51*	0.85	9.38
ERS16S-6	2.22	3.05**	3.05*	0.83	9.15
ERS 16S-1	2.44	2.77	3.09*	0.80	9.10
ERS 16S-7	2.12	2.93	3.15*	0.86	9.06
ERS 16S-8	2.31	2.63	2.32	1.22	8.48
ERS 16S-5	1.89	2.81	2.74	0.57	8.01
A-12244	2.23	2.15	2.37	0.78	7.53
Mean	2.53	2.78	3.07	1.26	9.63
CV (%)	9	5	10	15	6
5% LSD	0.33	0.21	0.43	0.26	0.81

**Highest numerical value in column.
*Not significantly different from the highest numerical value in the column based on 5% LSD.

Table 14. Forage yields (tons dry matter/acre) of commercial and experimental bermudagrass varieties in Test 2001-1, Eastern Research Station, Haskell, OK. 2002-2003.

Variety	Harvest Year		2-Yr
	2002	2003	Mean
Commercial Varieties – Available for Farm Use			
Ozark	11.71**	10.80*	11.25*
Midland 99	11.49*	10.32	10.90*
Tifton 44	10.90*	10.22	10.56
Experimental Varieties – Not Available for Farm Use			
A-12245	11.44*	11.44**	11.44**
ERS 16S-4	10.97*	11.10*	11.03*
ERS 16S-10	11.31*	9.84	10.58
ERS16S-2	10.61	10.23	10.42
ERS 16S-9	10.61	9.97	10.29
ERS 16S-7	10.89*	9.06	9.98
A-12246	10.51	9.38	9.95
ERS16S-6	10.20	9.15	9.67
ERS 16S-3	9.89	9.44	9.66
LCB 84X 16-66	9.61	9.68	9.64
ERS 16S-1	9.73	9.10	9.41
ERS 16S-8	9.29	8.48	8.89
A-12244	9.03	7.53	8.28
ERS 16S-5	8.13	8.01	8.07
Mean	10.37	9.63	10.00
CV (%)	7	6	6
5% LSD	1.02	0.81	0.63

**Highest numerical value in column.
*Not significantly different from the highest numerical value in the column based on 5% LSD.

Table 15. Forage yields (tons dry matter/acre) of bermudagrass varieties in Test 2001-2, South Central Research Station, Chickasha, OK. 2003.

Variety	2003 Harvest Dates			Total
	5/29	7/7	9/15	
Commercial Varieties – Available for Farm Use				
Midland 99	2.19	4.00	4.72**	10.91*
Ozark	2.45*	4.06*	3.85	10.36*
Tifton 44	2.82*	4.18*	3.19	10.19*
Experimental Varieties – Not Available for Farm Use				
ERS 16S-3	2.82	4.26*	4.14*	11.22**
A12245	3.04**	4.30*	3.71	11.05*
A12246	2.42*	4.50*	4.03*	10.95*
ERS 16S-4	2.57*	4.09*	3.48	10.14*
ERS 16S-8	2.13	4.35*	3.19	9.67
ERS 16S-1	1.91	3.62	3.71	9.24
ERS 16S-5	0.61	4.67**	3.77	9.05
LCB 84X 16-66	2.50	3.71	2.53	8.74
A12244	1.90	3.87	2.53	8.30
Mean	2.28	4.13	3.57	9.98
CV (%)	21	10	16	10
5% LSD	0.69	0.62	0.84	1.49

**Highest numerical value in column.
*Not significantly different from the highest numerical value in the column based on the 5% LSD.

Table 16. Forage yields (tons dry matter/acre) of bermudagrass varieties in Test 2001-2, South Central Research Station, Chickasha, OK. 2002-2003.

Variety	Harvest Year 2002	Harvest Year 2003	2-Yr Mean
Commercial Varieties – Available for Farm Use			
Tifton 44	11.72*	10.19*	10.84*
Midland 99	10.97*	10.91*	10.93*
Ozark[1]	--	10.36*	--
Experimental Varieties – Not Available for Farm Use			
A12246	12.04*	10.95*	11.50**
A12245	11.82*	11.05*	11.44*
ERS 16S-3	11.44*	11.22**	11.33*
ERS 16S-4	12.44**	10.14*	10.91*
ERS 16S-8	9.98	9.67	9.77
ERS 16S-1	10.37	9.24	9.73
ERS 16S-5	9.79	9.05	9.37
LCB 84X 16-66	10.08	8.74	9.19
A12244	9.73	8.30	8.78
Mean	11.07	9.95	10.41
CV (%)	10	10	10
5% LSD	1.62	1.49	1.00

[1]Ozark was not harvested in 2002 due to herbicide injury on plots. The plots had recovered from the injury by 2003.

**Highest numerical value in column.

*Not significantly different from the highest numerical value in the column based on the 5% LSD.

Additional information on forage bermudagrass and related topics is contained in these publications available from your Cooperative Extension Office:

PT 2003-3	Performance of Forage Bermudagrass Varieties in Oklahoma Tests, 1998-2002.
PT 2002-3	Performance of Forage Bermudagrass Varieties in Oklahoma Tests, 1998-2001.
PT 2001-9	Performance of Forage Bermudagrass Varieties in Oklahoma Tests, 1998-2000.
PT 2000-8	Performance of Forage Bermudagrass Varieties in Oklahoma Tests, 1995-99.
PT 96-9	Performance Of Forage Bermudagrass Varieties In Oklahoma Tests, 1992-1995.
PT 1998-14	Performance Of Forage Bermudagrass Varieties In Oklahoma Tests, 1995-1997.
F-2117	Forage Quality Interpretations
F-2568	Protein-Nitrogen Relationships in Forages
F-2583	Bermudagrass Varieties for Oklahoma
F-2587	Bermudagrass for Grazing or Hay

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Goodwell

Soybean Variety Tests 2003

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Table 5. Early Season Roundup Ready Soybean Production Goodwell, OK 2003.[2]

Variety[4]	Maturity Group	Harvest Date	Height in Inches	Shattering[3] Score	Lodging[3] Score	Seeds/ Lb.	Yield in[1] Bu/Acre
93M80	III		23	1	0	3150	60.3
Asgrow AG3905	III		25	0	1	3200	59.4
Asgrow AG3202	III		22	0	0	3250	59.0
DKB 44-51	IV		30	0	0	3350	57.3
DKB 40-51	IV		31	0	0	3200	56.3
93B85	III		22	0	0	3200	54.5
DKB 38-52	III		24	1	0	3450	50.9
DKB 37-51	III		22	0	1	3400	48.6
Asgrow AG3801	III		21	0	0	3250	46.8
Asgrow AG3701	III		23	0	0	3500	42.4

[1]Mean yield = 53.6 Bu/acre. LSD @ .05 = 17.9 Bu/acre. C.V. = 19.4%
[2]Planted April 30, 2003 on a 30" row spacing. Supplemental irrigation used as needed at this location. Harvested all plots as ready.
[3]0 = no shattering or lodging, 5 = very severe shattering or lodging.
[4]Varieties 93B85 and 93M80 are from Pioneer Hi-Bred International Inc.; Asgrow AG3202, AG3701, AG3801, AG3905, Dekalb DKB 37-51, DKB 38-52, DKB 40-51, and DKB 44-51 are from Monsanto.

Table 5. Full Season Roundup Ready Soybean Variety Test Goodwell, OK 2003[2]

Variety[4]	Maturity Group	Height in Inches	Shattering [3] Score	Lodging [3] Score	Seeds/ Lb.	Yield in[1] Bu/acre
5812 RR/N	V	35	0	1	3150	42.4
DYNAGRO 3600NRR	V	38	0	1	3650	41.9
DKB 46-51	IV	34	0	1	3450	41.1
AG4502	IV	29	0	0	3050	38.8
MORSOY 4480	IV	31	0	0	3450	38.4
MORSOY 4809	IV	31	0	0	3550	36.3
AG5605	V	36	0	1	4800	36.1
95B96	V	36	0	2	3450	35.6
95B42	V	38	0	1	4000	35.4
MORSOY 4802	IV	29	0	0	3450	34.6
DYNAGRO 3583NRR	V	35	0	1	3650	34.1
DYNAGRO 3518NRR	V	34	0	0	4300	34.0
AG5301	V	31	0	1	3650	33.9
DYNAGRO 3521NRR	V	31	0	0	4150	33.4
DYNAGRO 33B52	V	29	0	1	3650	33.0
AG5501	V	29	0	0	3900	32.9
DYNAGRO 38K57	V	37	0	2	4350	31.9
MORSOY 5252	V	30	0	2	4300	31.3
DYNAGRO 3562NRR	V	29	0	2	3750	28.8
DYNAGRO 3535NRR	V	34	0	3	3900	26.5
MORSOY 5553	V	35	0	1	3800	25.3

[1]Mean yield = 34.6 Bu/acre. LSD@.05= 9.0 Bu/acre. C.V.= 15.8%.
[2]Planted May 19, 2003 on a 30" row spacing. Supplemental irrigation used as needed at this location. Harvested all plots ? 2003.
[3]0= no shattering or lodging, 5= very severe shattering or lodging.
[4]Variety 5812 RR/N is from Garst Seed Co.; 95B96 and 95B42 are from Pioneer Hi-Bred International Inc.; ASGROW AG4502, AG5301, AG5501, AG5601, and DEKALB 46-51 are from Monsanto; MORSOY 4480, 4802, 4809, 5252, and 5553 are from Cashe River Valley Seed LLC; DYNAGO 3518NRR, 33B52, 3521NRR, 3535NRR, 3562NRR, 38K57, 3583NRR, and 3600NRR are from UAP Midsouth Dyna Gro Seed.

OKLAHOMA PANHANDLE LIMITED IRRIGATION SORGHUM SILAGE PERFORMANCE TRIAL, 2003

PRODUCTION TECHNOLOGY CROPS

OKLAHOMA COOPERATIVE EXTENSION SERVICE
DEPARTMENT OF PLANT AND SOIL SCIENCES
DIVISION OF AGRICULTURAL SCIENCES & NATURAL RESOURCES
OKLAHOMA STATE UNIVERSITY

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TRIAL OBJECTIVES AND PROCEDURES

In 2003 the Oklahoma Cooperative Extension Service established a sorghum silage performance trial in the Oklahoma panhandle to evaluate sorghum silages when irrigation is limited. Limited irrigation has many definitions the most common being one half of normal irrigation or less. For the purpose of this trial eight inches of irrigation was defined as being the maximum to be applied. In the coming years with natural gas prices rising and the possibility of water supplies diminishing, sorghum silage may replace corn silage in the panhandle region. Sorghum being more drought tolerant than corn requires less water, therefore less irrigation is required. Many seed companies have increased efforts to bring higher quality sorghum silage hybrids to market. Among these are brown mid-rib, photoperiod sensitive, conventional forage sorghums, and sorghum/sudan hybrids.

This trial provides producers, extension educators, industry representatives, and researchers with information on silage sorghum hybrids marketed in Oklahoma. Company or brand name, entry designation, plant characteristics, and maturity information, was provided by the companies (Table 1). Oklahoma State University did not verify this information. Company participation was voluntary, therefore some hybrids marketed in Oklahoma were not included in the test.

Limited irrigated test plots were established at the Oklahoma Panhandle Research and Extension Center (OPREC), Goodwell. Two rows 25 feet long were seeded at the target population of 50,000 plants/ac for brown mid-rib, and a target of 70,000 plants/ac for all other entries. The lower population for brown midribs may help with lodging associated with these hybrids. Experimental design was a randomized complete block with four replications. Prior to harvest five-foot alleys were cut to facilitate harvest. Five feet of one row was hand harvested, weighed and three plants were randomly selected to run through a chipper shredder. Samples where then dried at 65° C until weight was constant for two consecutive days. Maturity was checked periodically to monitor development so plots could be harvested when most entries were between soft and hard dough. Photoperiod sensitive hybrids were harvest on the last date. Ensilage production is reported as tons/ac adjusted to 65% moisture. This is consistent with current ensiling practices.

- Planting date: June 17, 2003
- Harvest dates: October 3 to October 18, 2003
- Previous crop: Soybean
- Soil type: Richfield Clay Loam
- Soil Test: N: 45 lbs/ac P: 26 lbs/ac K: 1192 lbs/ac pH: 7.5
- Fertilizer applied: N: 175 lbs/ac P: 40 lbs P_2O_5/ac K: 0
- Herbicide: Cinch ATZ Lite @ 1.5 qt/ac (Preemergence)
- Tillage: Conventional tillage
- Irrigation: Sprinkler irrigated 2 inches in July and 3 inches in August
- Rainfall:

May	June	July	Aug.	Sep.	Total
1.84	5.26	1.87	1.19	1.62	11.78

Data Collected

Lodging:	scale 1 – 4; 1-no lodging, 2-less than 25%, 3-25 – 50%, 4-greater than 50%
Plant population:	Plants/ac

All nutrient analysis are reported on dry matter basis

Crude protein:	6.25 * % total nitrogen
ADF:	% acid detergent fiber; constituent of the cell wall includes cellulose And lignin; inversely related to energy
NDF:	Neutral Detergent Fiber; cell wall fraction of forage
Lignin:	Undigestible plant component gives cell wall strength reduces digestibility
TDN%	sum of crude protein, (fat * 2.25), carbohydrates, and digestible NDF
IVTD48/ac:	% true digestibility followed by incubation period in hours %IVTD * forage yield (DM/ac)
RFQ:	Relative Forage Quality score given based on (CP, ADF, NDF, NDFD48, fat, and ash). Utilizes same scale as RFV, the higher the score the better
NEl:	Estimate of Net Energy for lactation
NEm:	Estimate of Net Energy for maintenance
NEg:	Estimate of Net Energy for gain

Results

In 2003 the planting date was delayed due to rainfall in late May and early June, therefore yields of some hybrids may have been reduced. Emergence was less than anticipated due to rainfall after planting. With the late planting it was determined not to replant. The reduced stand may have also reduced yields of some hybrids more than the late planting. With the abundant rainfall of May and June, less irrigation was applied than anticipated, therefore only five inches of irrigation was applied. Yields of the higher yielding hybrids were equal to or better than corn silage yields at same location see **PT 2003-16.** These yields were obtain with less irrigation than utilized on the corn trial where 16 inches of irrigation water was applied, compared to the 5 inches for the irrigation sorghum silage trial.

Small differences in yield or other parameters should not be overemphasized. Least Significant Differences (L.S.D.) are shown at the bottom of each table. Unless two entries differ by at least the L.S.D. shown, little confidence can be placed in one being superior to another. The coefficient of variability (C.V.) is provided as an estimate of the precision of the data with respect to the mean.

The following people have contributed to this report by assisting in crop production, data collection, and publication; Donna George, Lawrence Bohl, Matt LaMar, Mike LaMar, Chad Fowler, and James Shepard. Their efforts are greatly appreciated.

Table 1. Characteristics of Sorghum Silage Hybrids in OPREC Performance Trial, 2003.

Company Brand Name	Entry Designation	Sorghum Type	Maturity	Males Sterile	Brown Mid-rib
Garst Seed Company	BMR 344	Forage	ML	No	Yes
Garst Seed Company	BMR 348	Forage	ML	No	Yes
Garst Seed Company	325	Forage	ML	No	No
NC+ Hybrids	Nutri-Choice II	Forage	ML	Yes	No
NC+ Hybrids	Nutri-Cane II	Forage	M	No	No
NC+ Hybrids	8R18	Forage	ML	No	No
Sorghum Partners, Inc.	NK 300	Forage	EM	No	No
Sorghum Partners, Inc.	SS 405	Forage	L	No	No
Sorghum Partners, Inc.	SS 506	Forage	L	No	No
Sorghum Partners, Inc.	1990	Forage	L	Photo	No
Sorghum Partners, Inc.	Sordan 79	Sorghum-sudan	M	No	No
Sorghum Partners, Inc.	Sordan headless	Sorghum-sudan	M	Photo	No
Sorghum Partners, Inc.	Trudan 8	Hybrid-sudan	M	No	No
Sorghum Partners, Inc.	Trudan Headless	Hybrid-sudan	M	Photo	No
Seed Resource	Fame	Forage	M	No	No
Seed Resource	FS 515 HQ	Forage	M	No	No
Seed Resource	FS 517	Forage	M	No	No
Seed Resource	FS 555	Forage	L	No	No
Seed Resource	BMR 100	Forage	M	No	Yes
Seed Resource	BMR 106	Forage	M	No	Yes

Table 2. Ensilage Yields and and harvest parameters for OPREC Sorghum Silage Performance Trial, 2003.

Company Brand Name	Entry Designation	Yield Tons/ac	Harvest Moisture	Plant Population plants/ac	Lodging
Sorghum Partners, Inc.	SS 506	30.6	0.64	36,800	2.0
Seed Resource	FS 555	26.7	0.69	45,600	2.0
Sorghum Partners, Inc.	1990	25.9	0.66	44,600	1.0
NC+ Hybrids	Nutri-Cane II	25.5	0.69	37,500	1.0
NC+ Hybrids	Nutri-Choice II	25.0	0.71	40,700	1.0
Garst Seed Company	BMR 348	24.6	0.69	42,500	1.0
Garst Seed Company	325	24.4	0.72	37,800	1.0
Garst Seed Company	BMR 344	23.3	0.65	40,600	4.0
Seed Resource	BMR 100	23.3	0.62	47,900	3.0
Sorghum Partners, Inc.	Sordan headless	23.1	0.72	49,600	1.0
Seed Resource	FS 517	23.0	0.63	35,300	1.7
Sorghum Partners, Inc.	SS 405	21.8	0.69	41,800	1.3
Sorghum Partners, Inc.	Sordan 79	21.2	0.66	37,000	1.7
Seed Resource	FS 515 HQ	20.8	0.71	39,500	1.0
Sorghum Partners, Inc.	Trudan Headless	20.7	0.74	39,500	1.3
Seed Resource	BMR 106	19.4	0.67	43,300	1.0
Sorghum Partners, Inc.	NK 300	18.6	0.71	31,500	1.0
Seed Resource	Fame	18.5	0.65	46,300	1.3
Sorghum Partners, Inc.	Trudan 8	14.4	0.67	44,700	1.0
NC+ Hybrids	8R18	14.2	0.67	33,700	1.0
	Mean	22.2	0.68	40,800	1.5
	C.V.%	13.7	4.9	12.5	19.8
	L.S.D.	5.0	0.06	8,400	0.5

Table 3. Ensilage Quality OPREC Sorghum Silage Performance Trial, 2003.

Company Brand Name	Entry Designation	CP	Ca %	P %	ADF %	NDF %	Lignin	TDN %	IVTD % DM lbs/ac	Relative Forage Quality	NEl	NEm	NEg
Garst Seed Company	BMR 344	11.0	0.36	0.22	43.3	62	7.15	50.0	13,600	92	0.45	0.40	0.16
Garst Seed Company	BMR 348	9.7	0.32	0.21	37.35	57.4	4.65	57.5	14,600	120	0.53	0.52	0.26
Garst Seed Company	325	7.7	0.30	0.17	37.7	56.65	5.95	54.5	11,000	108	0.51	0.63	0.22
NC+ Hybrids	Nutri-Choice II	8.7	0.29	0.12	37.4	63.05	5.9	52.5	14,100	103	0.46	0.44	0.19
NC+ Hybrids	Nutri-Cane II	10.0	0.42	0.15	36.7	55.6	5.65	54.0	14,000	111	0.51	0.46	0.21
NC+ Hybrids	8R18	10.1	0.36	0.23	37.3	56.2	5.45	57.0	7,200	120	0.54	0.51	0.26
Sorghum Partners, Inc.	NK 300	8.1	0.30	0.15	35.3	62.3	4.9	54.0	12,100	105	0.47	0.46	0.21
Sorghum Partners, Inc.	SS 405	8.6	0.36	0.18	44.15	66.8	7.05	47.5	11,600	81	0.39	0.35	0.11
Sorghum Partners, Inc.	SS 506	11.7	0.41	0.18	44.55	64.2	8.35	49.5	18,500	86	0.43	0.39	0.15
Sorghum Partners, Inc.	1990	10.0	0.44	0.18	41.65	62.95	6.65	47.0	16,300	87	0.41	0.35	0.11
Sorghum Partners, Inc.	Sordan 79	8.3	0.29	0.18	40.7	60.45	8.5	42.5	8,000	75	0.38	0.28	0.07
Sorghum Partners, Inc.	Sordan headless	9.5	0.34	0.16	46.6	67.4	7.1	44.5	11,100	73	0.37	0.31	0.07
Sorghum Partners, Inc.	Trudan 8	8.9	0.32	0.15	39.9	61.35	7.1	48.0	6,900	90	0.42	0.37	0.12
Sorghum Partners, Inc.	Trudan Headless	8.4	0.30	0.11	45.25	67.25	7.2	45.5	12,600	77	0.37	0.33	0.08
Seed Resource	Fame	8.9	0.31	0.18	41.05	60.25	6.4	47.0	10,500	85	0.43	0.35	0.10
Seed Resource	FS 515 HQ	9.0	0.29	0.21	35.5	57.7	5.3	54.0	10,000	110	0.50	0.46	0.21
Seed Resource	FS 517	10.1	0.35	0.18	35.15	49.8	6.5	52.0	11,600	101	0.51	0.44	0.19
Seed Resource	FS 555	8.4	0.31	0.15	44.1	67.6	6.4	47.0	18,300	81	0.38	0.35	0.11
Seed Resource	BMR 100	10.4	0.37	0.17	42.7	63.1	7.05	52.5	15,600	97	0.45	0.43	0.18
Seed Resource	BMR 106	10.5	0.36	0.20	35.5	56.25	4.6	58.0	9,600	125	0.55	0.52	0.27

Note: Due to handling errors during drying phase all quality based on average of two replications