

# Forage Yields from 2010-2011 Small Grains Variety Trial

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## Introduction

Livestock and forage production are the largest contributors to agricultural income in the primary service region of the Noble Foundation. The small grains variety testing program, which includes oats, rye, triticale and wheat, is designed to provide up-to-date performance information to producers in Oklahoma and Texas about varieties that are commercially and commonly available. In addition, the program provides a tool to evaluate and compare experimental breeding lines emerging from the Noble Foundation breeding program, as well as other public and private breeding programs.

The program is intended to furnish producers with supplemental information to aid decision-making and idea formation. The information coming from the variety testing program should be a valuable tool when used with similar information from other sources. The objective of this report is to summarize forage and grain yields from the 2010-2011 small grains variety trials.

## Materials and Methods

The small grains variety trials were conducted at the Noble Foundation Dupy Farm (Dale silt loam) near Gene Autry, Okla., and the Red River Demonstration and Research Farm (Minco fine sandy loam) near Burneyville, Okla. The experimental area had been fallowed the previous year. The experimental design was a randomized complete block with three replications. The experimental unit is a 5- by 10-foot plot of a single variety. The trial consisted of 22 entries of wheat, four entries of oats, 10 entries of rye and seven entries of triticale that were evaluated during the 2010-2011 crop growing season.

The entries were seeded in a clean-tilled seedbed on Sept. 20, 2010, at Dupy Farm and on Sept. 21, 2010, at Red River.

Depending on the crop and variety, approximately 90 to 120 pounds/acre pure live seed (PLS) were planted, which amounts to 2,000,000 PLS/acre. Each entry was drilled in two adjacent 5- by 10-foot plots, in 7-inch rows, at 1-inch planting depth with a HEGE 500 drill. The adjacent plots were used to represent forage-only and dual purpose (forage and grain). Fertilization consisted of preplant incorporation of 60 pounds actual N/acre on Oct. 21, 2010, at Dupy and on Oct. 22, 2010, at Red River. Soil tests showed all other nutrients to be adequate at both locations. Plots received a topdress application of 80 pounds N/acre on Feb. 23, 2011, at Dupy and on Feb. 24, 2011, at Red River. Aphid control was done using a spray application of Cobalt @ 13 ounces/acre on Oct. 15, 2010, at Dupy Farm. Annual ryegrass was controlled using Amber at 0.56 ounces/acre on Sept. 22, 2010, at Dupy and Red River.

Plots were harvested with a HEGE sickle bar forage plot harvester at a 3-inch height. Adjacent plots of each variety were harvested at the same time for forage during fall until first hollow stem stage of wheat was reached. At first hollow stem stage, the dual purpose half was no longer harvested and was allowed to grow for grain production. At Dupy, forage-only plots were harvested on Dec. 2, Feb. 22, March 23 and April 28; at Red River, they were harvested on Dec. 6, Feb. 22, March 15 and April 12. Dual-purpose plots were harvested for forage on Dec. 2, 2010, and Feb. 22, 2011 at Dupy and on Dec. 6, 2010, and Feb. 22, 2011, at Red River. Grain was harvested at Dupy on June 3, 2011, and on June 6, 2011, at Red River, except triticale which was harvested on June 13, 2011.

Data were analyzed with the general linear models procedure in SAS (Statistical Analysis Software, Cary, N.C.), and means

were separated by the least significant difference (LSD) method ( $P \leq 0.05$ ).

## Results and Discussion

Average growing conditions at Dupy Farm and Red River Farm are reported in Table 1. Seasonal rainfall at both locations was significantly lower than the 30-year average. Better than average growing conditions early during the growing season, particularly during September, helped the plants to grow better and provide fall season harvest. Both of the locations received less than 60 percent of their average monthly rainfall during the remainder of the crop growing season. In particular during the months of January and March, the total monthly rainfall was almost negligible. The lack of rainfall in the later part of the growing season affected the forage growth and grain yield.

## Forage Production

Forage yields are reported in tables 2, 3, 4 and 5. Total forage production and typical seasonal production during fall and spring are important traits of small grains production in the Southern Great Plains. Historically, rye has produced the most fall forage. Triticale is also a strong fall and early spring forage producer. Wheat matures later and produces the majority of its forage during spring. Oat is the latest maturing of the small grains, producing the majority of its forage from April to May. Due to extremely dry conditions in March, there was no harvestable forage for May as the plants went into reproductive state. At Dupy Farm, the majority of wheat varieties didn't produce harvestable forage for the month of April due to the extremely dry conditions the month before.

Oat forage yields varied greatly with location. The oat forage yields at Dupy were 75 percent higher than the oat ▶

**Table 1.** Average 2010 and 2011 monthly high and low temperatures (°F) and precipitation (inches) for the Noble Foundation Dupy Farm, Gene Autry, Okla., and Red River Research and Demonstration Farm, Burneyville, Okla.

Month	Year	Dupy				Red River Research and Demonstration Farm			
		Temperature		Precipitation		Temperature		Precipitation	
		Avg. High	Avg. Low	Total	30-yr Avg.	Avg. High	Avg. Low	Total	30-yr Avg.
Sept	2010	86	67	6.13	4.17	87	65	6.82	4.00
Oct	2010	78	50	2.33	4.43	79	47	2.90	4.39
Nov	2010	66	43	1.81	2.70	67	41	1.37	2.73
Dec	2010	55	33	2.03	2.32	56	31	2.02	2.38
Jan	2011	51	27	0.27	1.85	52	24	0.86	1.73
Feb	2011	56	33	1.95	2.19	58	32	1.82	2.14
Mar	2011	69	45	0.06	3.20	69	44	0.26	3.37
Apr	2011	80	54	1.86	3.19	81	52	2.84	3.33
May	2011	80	59	5.77	5.08	81	59	5.24	5.07
Sept- May	2010-2011			22.21	29.13			24.13	29.14

forage yields at Red River. At Red River, the total forage yields of oat ranged from 2,147 pounds/acre to 3,640 pounds/acre, whereas at Dupy, they ranged from 4,503 to 5,611 pounds/acre. These yields reflect previous years findings that oats don't perform as well in the sandy soils at Red River compared to silt loam soils at Dupy Farm.

At Dupy, the total forage yields of rye ranged from 7,683 pounds/acre to 9,315 pounds/acre, whereas at Red River, they ranged from 3,824 to 5,222 pounds/acre. At Dupy, the total forage yields of triticale ranged from 8,396 pounds/acre to 9,051 pounds/acre, whereas at Red River, they ranged from 3,780 to 4,363 pounds/acre. At Dupy, the total forage yields of wheat ranged from 5,984 pounds/acre to 10,752 pounds/acre, whereas at Red River, they ranged from 1,964 to 3,766 pounds/acre. The average yields across all the varieties for oats, rye, triticale and wheat are 4,967, 8,493, 8,396 and 7,300 pounds/acre at Dupy and 2,905, 4,475, 4,103 and 2,666 pounds/acre at Red River, respectively. Rye was better in overall forage produc-

tion compared to other species tested under these environmental conditions at both locations, followed by triticale which produced similar yields as rye.

### Grain Production

Grain yields are reported in Tables 6 and 8. The dual-purpose small grain portion was harvested twice before first hollow stem stage in all the crops at both locations in December and February.

At Red River, the test weights (pounds per bushel) for oats ranged from 29.4 to 33.0 pounds/bushel, and the yield ranged from 12.6 to 21.0 bushels/acre. At Dupy, the test weights for oats ranged from 28.6 to 32.6 pounds/bushel, and the yield ranged from 7.6 to 28.3 bushels/acre. At Red River, NF 27 yielded significantly lower grain yields compared to other varieties, whereas at Dupy, NF 27 along with 10 WN Oat 1009 yielded significantly lower yields. At Red River, the test weights for rye ranged from 54.3 to 56.7 pounds/bushel, and the yield ranged from 11.7 to 42.3 bushels/acre. At Dupy, the test weights

for rye ranged from 53.6 to 56.2 pounds/bushel, and the yield ranged from 28.5 to 65.1 bushels/acre. At Red River, the test weights for triticale ranged from 49.1 to 53.2 pounds/bushel, and the yield ranged from 6.9 to 45.1 bushels/acre. At Dupy, the test weights for triticale ranged from 50.5 to 53.1 lbs/bushel, and the yield ranged from 25.9 to 51.8 bushels/acre. At Red River, the test weights for wheat ranged from 58.1 to 62.0 pounds/bushel, and the yield ranged from 4.5 to 36.7 bushels/acre. At Dupy, the test weights for wheat ranged from 57.7 to 62.5 lbs/bushel, and the yield ranged from 23.7 to 55.5 bushels/acre.

When studying the data, producers should look for consistency and dependability of crop performance of a variety across multiple years and environments rather than within individual years. The producer should also take into account the location that best approximates their production situation (i.e., soil type, location proximity, yield goals, fertility levels, etc.) when using this data to assist decision making. ●

# FORAGE

**Table 2.** Forage yield of commercial and advanced experimental lines of oats, rye and triticale at the Noble Foundation Dupy Farm, Gene Autry, Okla.

Crop	Variety	Harvest dates – yield lbs/ac				Total
		Dec	Feb	Mar	Apl	
Oats	NF 27	3,802	413	367	1,029	5,611
	NF95418	2,705	662	458	1,354	5,178
	10 WN Oat 1009	2,871	259	314	1,132	4,575
	10 WN Oat 1012	2,234	658	553	1,059	4,503
	<b>Mean</b>	2,903	498	423	1,143	4,967
	<b>LSD</b>	599	642	493	765	1,513
Rye	Winter Graze 70	2,606	2,954	1,780	389	9,315
	Maton	2,705	3,262	1,991	341	9,269
	Oklon	2,760	2,499	3,366	413	9,263
	Elbon	2,561	2,802	2,961	261	8,969
	NF95307A	3,009	2,664	1,984	510	8,283
	MatonII	2,767	3,003	2,099	423	8,184
	NF95319B	2,848	2,793	1,861	391	8,179
	NF97326	2,926	2,780	3,592	409	7,975
	NF95307B	2,566	2,859	2,146	400	7,808
	BatesRS4	2,630	2,829	3,345	444	7,683
	<b>Mean</b>	2,738	2,844	2,512	398	8,493
<b>LSD</b>	474	783	509	231	940	
Triticale	Trical 348	3,267	1,589	3,402	792	9,051
	718	4,463	1,762	1,865	848	8,938
	NF96210	3,722	1,929	2,770	0	8,421
	NF96213	3,578	2,150	2,634	26	8,387
	Tamcale 5019	3,517	2,382	2,124	328	8,351
	Tam401	3,481	2,568	2,104	0	8,153
	NF96215B	2,976	2,371	2,125	0	7,472
	<b>Mean</b>	3,572	2,107	2,432	285	8,396
	<b>LSD</b>	501	473	471	139	932

\*Shaded numbers are not statistically different from the highest yielding entry within a column.

# FORAGE

**Table 3.** Forage yield of commercial and advanced experimental lines of wheat at the Noble Foundation Dupy Farm, Gene Autry, Okla.

Crop	Variety	Harvest dates – yield lbs/ac				Total
		Dec	Feb	Mar	Apr	
Wheat	Greer	2,891	2,489	5,324	49	10,752
	NF99117	3,544	2,050	2,321	0	7,915
	Endurance WN0EI	2,952	2,020	2,781	65	7,818
	OK05212	3,455	1,837	2,098	357	7,746
	Doans	3,307	1,671	2,635	75	7,688
	Jackpot	3,497	2,014	2,015	40	7,567
	Fuller We0PI	2,963	2,183	2,381	0	7,527
	Duster10OKFSS	3,182	2,052	2,290	0	7,524
	Deliver WG0KI	2,689	1,923	1,855	1007	7,473
	NF96131	2,932	2,202	2,150	38	7,322
	Fannin	2,943	2,163	2,159	0	7,265
	NF97117	3,305	1,940	1,767	122	7,134
	Jagger WJ95	2,943	2,569	1,546	0	7,057
	Overley	3,329	2,127	1,594	0	7,050
	DusterWD052	2,782	2,096	2,096	14	6,987
	2174WZ8V2	3,298	1,597	1,822	118	6,835
	NF95134A	3,062	1,836	1,857	80	6,835
	ForageMaxx	2,816	1,888	1,562	430	6,695
	Kingrazer	2,905	1,850	1,229	602	6,586
	OK Bullet WH8P2	3,304	1,843	1,333	99	6,580
	BillingWI0D1	3,189	1,663	1,400	0	6,253
	NF96107A	3,289	1,570	1,018	107	5,984
	<b>Mean</b>	3,117	1,981	2,056	146	7,300
	<b>LSD</b>	481	595	2,564	602	2,817

\*Shaded numbers are not statistically different from the highest yielding entry within a column.

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**Table 4.** Forage yield of commercial and advanced experimental lines of oats, rye and triticale at the Noble Foundation Red River Demonstration and Research Farm, Burneyville, Okla.

Crop	Variety	Harvest dates – yield lbs/ac				Total
		Dec	Feb	Mar	Apl	
Oats	NF95418	763	1132	777	967	3640
	NF 27	900	622	804	1242	3567
	10 WN Oat 1012	718	627	500	422	2267
	10 WN Oat 1009	1068	485	279	315	2147
	<b>Mean</b>	862	716	590	736	2905
	<b>LSD</b>	502	397	404	559	832
Rye	Elbon	1944	1013	1260	1005	5222
	Maton	2205	1045	1262	511	5023
	Oklon	1783	722	1112	1237	4853
	Winter Graze 70	1915	880	1225	671	4691
	NF95319B	1923	1177	767	539	4406
	NF97326	2005	1231	695	351	4281
	BatesRS4	2288	1154	591	211	4244
	NF95307A	2204	1097	538	280	4119
	MatonII	2137	1187	556	205	4085
	NF95307B	1820	1179	533	292	3824
	<b>Mean</b>	2022	1068	854	530	4475
	<b>LSD</b>	514	191	297	316	742
Triticale	NF96210	2367	1053	769	174	4363
	NF96213	2251	1083	693	174	4200
	Tamcale 5019	1968	1176	709	338	4190
	NF96215B	2201	1062	611	265	4139
	718	2063	1109	605	296	4072
	Tam401	2045	1276	526	130	3977
	Trical 348	1272	424	1133	950	3780
	<b>Mean</b>	2024	1026	721	332	4103
	<b>LSD</b>	475	337	286	215	476

\*Shaded numbers are not statistically different from the highest yielding entry within a column.

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**Table 5.** Forage yield of commercial and advanced experimental lines of wheat at the Noble Foundation Red River Demonstration and Research Farm, Burneyville, Okla.

Crop	Variety	Harvest dates – yield lbs/ac				Total
		Dec	Feb	Mar	Apl	
Wheat	NF96107A	1747	738	976	306	3766
	NF96131	1307	813	884	253	3257
	NF95134A	1177	604	988	365	3135
	NF97117	1347	600	690	475	3111
	BillingWI0D1	738	780	992	595	3103
	Endurance WN0EI	597	322	929	1124	2972
	DusterWD052	666	519	922	838	2945
	Greer	838	848	900	294	2879
	Fuller We0PI	563	706	1091	500	2860
	2174WZ8V2	952	439	778	528	2696
	NF99117	890	636	656	489	2671
	Deliver WG0KI	724	375	1044	473	2615
	Overley	651	599	835	509	2594
	OK05212	474	335	799	924	2532
	OK Bullet WH8P2	764	501	749	465	2479
	Fannin	827	627	705	283	2441
	Duster10OKFSS	520	416	831	498	2265
	Kingrazer	445	463	562	756	2225
	Jagger WJ95	374	749	807	279	2210
	Doans	307	252	961	452	1971
	ForageMaxx	268	537	540	624	1969
	Jackpot	362	395	809	398	1964
	<b>Mean</b>	752	557	838	519	2666
	<b>LSD</b>	439	228	380	399	932

\*Shaded numbers are not statistically different from the highest yielding entry within a column.

# FORAGE

**Table 6.** Grain yield of commercial and advanced experimental lines of oats, rye and triticale at the Noble Foundation Dupy Farm, Gene Autry, Okla., and Red River Demonstration and Research Farm, Burneyville, Okla., harvested in June 2011

Crop	Variety	Dupy Farm		Red River Farm	
		Test wt bu/ac	Yield lbs/bu	Test wt bu/ac	Yield lbs/bu
Oats	10 WN Oat 1012	31.7	28.3	33.0	21.0
	NF 95418	32.1	26.6	32.9	16.9
	10 WN Oat 1009	28.6	12.9	29.4	18.0
	NF 27	32.6	7.6	30.2	12.6
	<b>Mean</b>	31.2	18.8	31.4	17.1
	<b>LSD</b>	0.9	13.1	0.9	5.7
Rye	Elbon	56.2	65.1	56.8	42.3
	Winter Graze 70	55.6	62.1	56.7	33.8
	Oklon	55.7	54.0	56.4	34.1
	Maton	55.7	46.1	56.6	27.2
	Bates RS4	54.6	44.8	55.0	18.8
	NF 95319 B	54.6	34.6	55.5	15.3
	NF 95307 B	53.6	33.1	54.3	19.2
	NF 95307 A	54.9	32.7	55.1	11.7
	NF 97326	54.9	32.1	54.5	16.3
	Maton II	54.7	28.5	54.6	13.7
	<b>Mean</b>	55.1	43.3	55.5	23.2
	<b>LSD</b>	0.6	25.1	0.8	6.1
Triticale	Trical 348	53.1	51.8	53.2	45.1
	NF 96213	52.1	42.0	51.1	15.3
	Tamcale 5019	52.5	35.5	51.4	22.5
	NF 96210	50.5	31.9	49.1	12.9
	Tam- 401	60.2	31.1	57.7	6.9
	NF 96215 B	51.3	28.1	50.1	10.8
	718	50.9	25.9	51.1	28.1
	<b>Mean</b>	52.9	35.2	52.0	20.2
	<b>LSD</b>	1.0	8.4	2.0	11.7

\*Shaded numbers are not statistically different from the highest yielding entry within a column.

# FORAGE

**Table 7.** Grain yield of commercial and advanced experimental lines of wheat at the Noble Foundation Dupy Farm, Gene Autry, Okla., and Red River Demonstration and Research Farm, Burneyville, Okla., harvested in June 2011

Crop	Variety	Dupy		Red River Farm	
		Test wt bu/ac	Yield lbs/bu	Test wt bu/ac	Yield lbs/bu
Wheat	Forage Maxx	61.2	55.5	58.7	6.5
	OK05212	60.5	55.4	59.7	34.9
	Kingrazer	61.4	48.2	58.7	4.5
	Endurance WN0EI	60.9	45.3	59.1	31.5
	Duster 10OKFSS	61.4	45.2	59.9	26.3
	OK Bullet WH8P2	61.0	42.5	61.0	34.6
	Greer	57.7	39.8	58.1	31.9
	Duster WD052	62.0	38.6	60.4	33.2
	Jackpot	59.4	36.7	59.4	31.2
	Fuller We0PI	60.8	36.6	60.4	36.8
	NF99117	58.7	36.4	56.8	26.4
	NF 95134 A	59.3	35.9	59.2	25.9
	Jagger WJ95	59.8	32.9	59.4	22.3
	NF 96131	59.5	32.8	58.3	22.8
	Billing WI0D1	60.9	32.1	60.3	32.7
	NF 97117	59.4	30.5	58.2	20.8
	Deliver WG0KI	61.0	29.7	60.4	24.7
	2174 WZ8V2	60.6	29.6	60.7	28.8
	Overley	60.2	29.1	59.0	28.2
	Fannin	62.5	26.8	62.0	20.1
Doans	60.5	25.0	60.2	31.0	
NF 96107 A	60.4	23.7	60.6	18.3	
<b>Mean</b>	60.4	36.7	59.6	26.1	
<b>LSD</b>	0.7	17.4	1.1	14.9	

\*Shaded numbers are not statistically different from the highest yielding entry within a column.

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