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## SMALL GRAIN FORAGE YIELDS AT OVERTON 1986-1989

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### SUMMARY

This report presents forage yield data for clipping tests on oats, wheat, and rye at Overton, Texas. Data are presented for the 1988-89 growing season and compared with 3-year averages. The major portion of the oat forage was produced in the spring of 1989; however, during the 3-year period, more fall forage production was evident. Forage production of rye was quite uniform even during January and February. Wheat was intermediate between oats and rye for seasonal forage production. Winterkill oats and wheat was severe in 1989 due to a warm fall followed by very cold temperatures. When selecting small grain varieties to plant on your farm or ranch, data from more than one year should be used to overcome risks associated with environmental variations.

### INTRODUCTION

A large number of small grain varieties of wheat, rye, and oats are available to cattlemen each year to be planted for winter forage. Selection of adapted, high yielding varieties can result in high forage yields and profits for cattlemen. Selection of low yielding, unadapted varieties which may winterkill will usually result in an unprofitable winter pasture program. These studies were conducted to determine the forage yielding potential of numerous experimental and newly released varieties of wheat, oats, and rye in East Texas and to determine the seasonal distribution of the winter small grains. Finally, we also wanted to test the varieties for winterhardiness and disease resistance or susceptibility.

### PROCEDURES

Available commercial and experimental wheat, oat, and rye cultivars were evaluated for adaptation, forage production, and rust resistance in 1986-87, 1987-88, and 1988-89 at Overton, Texas. All tests were planted in a prepared seedbed. Planting dates at Overton were early September in all three years. Seeding rates were 120 lbs/ac for all three small grains. Seed were planted with a drill with seven rows with 6 inch row spacing, and plots were 12 ft in length. Each forage species was planted into a separate experiment and replicated four times.

Fertilizer applications varied each year. In 1986-87, preplant applications were 24-96-96 lbs/ac of N, P<sub>2</sub>O<sub>5</sub>, and K<sub>2</sub>O, respectively. Nitrogen was top-dressed

as ammonium nitrate at 100, 25 and 40 lbs/ac, on Oct. 3, Jan. 5, and Feb. 19, respectively. In 1987-88, fertilizer was applied as 83-83-83-76 lbs/ac as N, P<sub>2</sub>O<sub>5</sub>, K<sub>2</sub>O, and sulfur, respectively. Nitrogen was top-dressed at 50, 50, and 30 lbs/ac on Nov. 17, Jan. 20, and Feb. 29, respectively. In 1988-89, fertilizer applications were 90-90-90-84 lbs/ac as N, P<sub>2</sub>O<sub>5</sub>, K<sub>2</sub>O, and S, respectively. Nitrogen was top-dressed at 50, 50, and 40 lbs/ac on Nov. 14, Jan. 30, and Apr. 5, respectively.

## RESULTS

**Weather:** In 1986-87 and 1987-88, little freeze damage occurred and good overall yields resulted. In 1988-89, a very warm fall and early winter followed by severe freezes in February resulted in severe winterkill. Unfavorable weather conditions resulted in low forage production for all small grain species in 1988-89. Although temperatures were above normal, several cold periods caused severe freeze damage on oats, wheat, triticale, and rye. This freeze damage was amplified by warm weather just prior to the cold temperatures. Therefore, plants did not have time to become hardened to the freezing temperatures. Freeze damage consisted of both above ground foliage freeze back (with recovery), and also some varieties had crown damage and complete death of the plants. A low temperature of 15°F on February 7 was the lowest reading of the growing season at Overton. Moisture levels were quite dry in September (1.45 inches) which resulted in slow plant establishment, however thereafter moisture levels were adequate or high. Monthly levels in inches were Oct. 3.7; Nov. 5.5; Dec. 4.0; Jan. 3.7; Feb. 4.3; Mar. 10.3; and Apr. 2.2.

**Oats:** Oat forage yields are presented in Table 1. Fall and winter yields were quite low, however spring yields were near normal. Overall, total seasonal yields were slightly below normal. Percent winterkill ratings were correlated to total yield as varieties with low winterkill produced high yields and varieties with high winterkill had lower yields. Highest yields were produced by Noble Foundation 170 (experimental), Harpool 833, two Arkansas experimentals, Citation and Big Mac. The third ranked 'variety' is a mixture of 1/3 Maton rye, 1/3 McNair 1003 wheat, and 1/3 Harpool 833 oats. The advantage of a mixture is normally they will have less freeze damage (because of the rye component) and will also have better total seasonal distribution of forage. At least one component or specie should be productive during each growing period.

A newly release oat variety, TAM-0-386, recommended for South and Central Texas, winterkilled during 1989. This is to be expected in Northeast Texas. Three-

year oat forage yields (Table 4) illustrate a higher fall and winter forage yield than in 1988-89. The major portion of the oat forage yields was produced in March, April, and May.

Wheat: Wheat yields were very low in 1988-89 (Table 2). We believe this was due to a combination of weather conditions. The warm temperatures caused the wheat to try to joint and produce seed heads very early and also may have limited tillering. The cold temperatures caused winterfreeze damage or winterkilling of some varieties. As with the oats, varieties or experimental lines which had lower freeze damage, generally produced higher forage yields. Highest yields were produced by experimentals, TX-82-118, TX 85-264, TX-83-50, TX-80-31-3, followed by Keiser. Three-year mean yields (Table 4) were much higher than 1988-89. These yields include the 1988-89 yields and therefore were reduced even more compared to the first two years. Note that wheat forage yields were fairly uniform during the winter and that they were below the mean yields of the oats.

Rye: Rye forage yields (Table 3) were also below normal. Freeze damage did occur, however, this was caused by the warm weather reducing the normal winterhardiness of the rye species. Maton rye produced the highest forage yield followed by N.F. 73, N.F. 14, and Bonel. Three-year mean rye forage yields (table 4) indicate that rye produces good fall and winter production. Also that rye will not normally produce as much forage as oats in the spring during April or May. The forage 'mixture' in this test was 1/3 Elbon rye, 1/3 Bradford wheat, and 1/3 Mesquite oats. The triticale lines in this test tended to be fairly susceptible to winterfreeze damage and their yields were reduced.

Results of these studies should be used with caution. More than one year's data is desirable when variety recommendations are made because of interaction with weather conditions. Therefore, the 3-year means are very useful. Other locations are also useful. Disease ratings for many of these varieties are found elsewhere in this publication.

TABLE 1. OAT FORAGE VARIETY TEST AT OVERTON, TX 1988-89

Variety	Harvest Dates					Total Yield	% Winterkill Recorded Mar. 3
	Dec. 2	Jan. 6	Mar. 13	Apr. 5	May 10		
-----pounds of oven dried forage per acre-----							
Noble Foundation 170	226	442	1222	1570	3366	6826	7
Harpool 833	214	550	1137	1211	3687	6799	12
Mixture*	702	758	1784	1538	1667	6449	1
AR 102-5	171	474	1748	1763	2228	6384	3
AR 125-4A	337	452	1117	1236	3040	6182	7
Citation	401	829	1022	1278	2389	5919	5
Big Mac	193	575	670	946	3489	5873	50
Bob	348	480	704	1232	2942	5706	31
Noble Foundation 63	57	192	1205	1378	2498	5330	3
Nora	172	377	964	1278	2376	5167	11
Blizzard	28	360	763	868	3142	5161	7
Fla. 501	421	714	477	448	3075	5135	67
Mesquite II	203	578	698	745	2784	5008	53
Coker 86-13	187	663	332	308	3495	4985	68
Fla. 502	224	983	287	363	2856	4713	72
Noble Foundation 20	128	266	959	1225	2117	4695	7
TX 28M 4964	78	342	290	481	3481	4672	68
TAM-0-386	668	1160	48	152	2327	4355	93
TX 86 B1117	127	418	295	332	2758	3930	73
TX 86 B1207	209	880	66	136	1683	2974	81

TABLE 1. OAT FORAGE VARIETY TEST AT OVERTON, TX 1988-90 (CONTINUED)

Variety	Harvest Dates					Total Yield	% Winterkill Recorded Mar. 3
	Dec. 2	Jan. 6	Mar. 13	Apr. 5	May 10		
	-----pounds of oven dried forage per acre-----						
TX 83 AB 2923	439	1016	16	41	1430	2942	96
Mean	263	596	753	882	2706	5200	
LSD (10% level)	201	297	295	417	1020	1317	
CV	65	42	33	40	32	21	

\*40 lbs of Maton rye, 40 lbs of McNair 10-03 wheat, and 40 lbs of Harpool 833 oats.

Planting on September 14, 1988. Seeding rate: 120 lbs/ac.

Fertilizer application:

Preplant 700 lbs/ac of 13-13-13-12 (N, P<sub>2</sub>O<sub>5</sub>, K<sub>2</sub>O, and S).

Topdressed 50 lbs/ac actual N on November 14, 1988.

50 lbs/ac actual N on January 30, 1989.

40 lbs/ac actual N on April 5, 1989.

Weed control: Applied 1/3 ounce Glean/ac on September 14, 1988.

TABLE 2. WHEAT FORAGE VARIETY TEST AT OVERTON, TX 1988-89

Variety	Harvest Dates					Total Yield	% Winterkill Recorded Mar. 3
	Dec. 1	Jan. 4	Mar. 13	Apr. 4	May 2		
-----pounds of oven dried forage per acre-----							
TX 82-118	241	561	1228	1108	71	3209	3
TX 85-264	479	737	1102	418	0	2736	51
TX 83-50	379	693	803	742	0	2617	10
TX 80-31-3	249	488	1008	681	85	2511	2
Keiser	302	711	474	664	212	2363	44
TX 83-70	228	655	330	619	453	2285	49
TAM-107	97	214	980	962	0	2253	1
Bradford	170	475	838	590	113	2186	8
TX 80-32	345	844	400	438	0	2027	32
TX 85-242	259	597	577	561	0	1994	36
TX 75-213	282	998	339	244	127	1990	75
TX 85-237	161	624	163	433	509	1890	60
Fla. 7927-G29	681	1090	0	69	0	1840	98
Fla. 301	420	1077	147	175	0	1819	97
Mesa	128	316	739	622	0	1805	3
Fla. 301 H	401	1193	116	95	0	1805	98
TX 76-40-2	228	670	384	523	0	1805	61
Fla. 302	329	720	330	423	0	1802	53
TX 75-213-1	85	425	461	623	198	1792	34
TAM-200	181	463	495	638	0	1777	22

TABLE 2. WHEAT FORAGE VARIETY TEST AT OVERTON, TX 1988-89 (CONTINUED)

Variety	Harvest Dates					Total Yield	% Winterkill Recorded Mar. 3
	Dec. 1	Jan. 4	Mar. 13	Apr. 4	May 2		
-----pounds of oven dried forage per acre-----							
Traveler	295	975	109	264	127	1770	89
Fla. 303	384	1054	49	258	0	1745	98
Waco	310	655	326	444	0	1735	32
TX 73025	226	717	361	354	70	1728	74
TX 76-40-1	184	617	273	475	155	1704	59
TX 82-185	302	653	314	411	0	1680	61
Noble Foundation 67	368	552	422	272	28	1642	63
TAM-201	96	271	642	480	0	1489	26
Hunter	233	720	95	241	0	1289	86
Collin	102	196	295	527	0	1120	59
Mean	272	665	460	479	72	1948	
LSD (10% level)	204	290	196	315	235	440	
CV	64	37	36	56	276	19	

Planted on September 7, 1988. Seeding rate: 120 lbs/ac  
 Fertilizer application: Preplant 700 lbs/ac of 13-13-13-12 (N, P<sub>2</sub>O<sub>5</sub>, K<sub>2</sub>O, and S)  
 Topdressed 50 lbs/ac actual N on November 14, 1988.  
 50 lbs/ac actual N on January 30, 1989.  
 40 lbs/ac actual N on April 5, 1989.  
 Weed control: Applied 1/3 ounce Glean/ac on September 14, 1988.



TABLE 3. RYE AND TRITICALE FORAGE VARIETY TEST AT OVERTON, TX 1988-89

Variety	Harvest Dates						Total Yield	% Winterkill Recorded Mar. 3
	Nov. 29	Dec. 21	Jan. 23	Mar. 9	Apr. 4	May 2		
	-----pounds of oven dried forage per acre-----							
Mixture*	204	263	650	806	1675	305	3903	25
Maton	406	290	312	809	1810	0	3627	0
Noble Foundation 73	479	433	585	604	1516	0	3617	1
Noble Foundation 14	434	398	464	614	1510	38	3458	1
Bonel	513	378	412	676	1300	0	3279	0
Underwood Exp. 428	472	378	435	256	1123	445	3109	11
Elbon	268	270	461	610	1477	13	3099	1
Noble Foundation 185 (Triticale)	394	392	1053	346	874	13	3072	39
Underwood Exp. 425	438	478	658	303	1134	13	3024	34
GA. WGBC <sub>2</sub>	480	552	788	209	837	140	3006	33
Underwood Exp. 528	274	418	580	359	1293	0	2924	12
Underwood Exp. 225	376	537	723	282	1005	0	2923	24
Underwood Exp. 308	221	342	497	309	1300	203	2872	14
GA. WAHRC <sub>2</sub>	527	399	536	293	1061	13	2829	39
Fla. 402	370	468	819	189	956	13	2815	53
Fla. 401	714	673	802	86	400	0	2675	89
Underwood Exp. 104	601	620	546	168	588	140	2663	70
Ga. WAC <sub>2</sub> L	408	416	477	209	784	0	2294	45
Underwood Exp. 845	511	437	458	57	653	89	2205	51
Noble Foundation 21 (Triticale)	294	315	935	47	343	0	1934	87

TABLE 3. RYE AND TRITICALE FORAGE VARIETY TEST AT OVERTON, TX 1988-89 (CONTINUED)

Variety	Harvest Dates						Total Yield	% Winterkill Recorded Mar. 3	
	Nov. 29	Dec. 21	Jan. 23	Mar. 9	Apr. 4	May 2			
	-----pounds of oven dried forage per acre-----								
Fla. 201 (Triticale)	450	221	281	0	200	0	1152	97	
Mean	421	413	594	344	1040	68	2880		
LSD (10% level)	225	190	300	240	710	234	1044		
CV	45	39	43	59	58	292	31		

\*40 lbs of Elbon rye, 40 lbs of Bradford wheat, and 40 lbs of Mesquite oats.

Planted on September 6, 1988. Seeding rate: 120 lbs/ac

Fertilizer application: Preplant 700 lbs/ac of 13-13-13-12 (N, P<sub>2</sub>O<sub>5</sub>, K<sub>2</sub>O, and S).

Topdressed 50 lbs/ac actual N on November 14, 1988.

50 lbs/ac actual N on January 30, 1989.

40 lbs/ac actual N on April 5, 1989.

Weed control: Applied 1/3 ounce Glean/ac on September 14, 1988.

TABLE 4. FORAGE YIELDS OF OATS, WHEAT, TRITICALE AND RYE AVERAGED OVER 3 YEARS (1986-87, 1987-88 AND 1988-89) AT OVERTON, TX

	Harvest Period			Total Yield
	Nov.-Dec. 3 yr. mean	Jan.-Feb. 3 yr. mean	Mar.-Apr.-May 3 yr. mean	
<b>Oats</b>	-----pounds of oven dried forage per acre-----			
Noble Foundation 20	1173	1660	4435	7268
Noble Foundation 170	1226	1864	5818	8915
Bob	1179	1394	4496	7069
Noble Foundation 63	779	1047	5254	7080
Citation	1338	2060	4017	7415
Harpool 833	1062	1987	4585	7634
Big Mac	908	1507	4067	6485
TAM-O-386	863	1844	3877	6585
TX 82M 4964 Exp.	1426	1525	3378	6338
TX 83Ab 2923 Exp.	903	1258	2796	4956
<b>Wheat</b>				
TAM-107	1843	614	3222	5679
Fla. 302	2349	1464	2022	5842
Bradford	1820	1067	2882	5769
TX-82-118 Exp.	1838	811	4479	5900
Collin	1710	1045	1859	4615
TX-80-32 Exp.	2108	1272	1709	5089
TAM-200*	2394	1134	1967	5495*
TAM-201*	2105	1058	2080	5243*
TX-76-40-2 Exp.*	1616	1338	2042	4996*
Noble Foundation 185 triticale	2391	1790	2804	7165
Fla. 201 triticale	2692	508	958	4158

TABLE 4. FORAGE YIELDS OF OATS, WHEAT, TRITICALE AND RYE AVERAGED OVER 3 YEARS (1986-87, 1987-88 AND 1988-89) AT OVERTON, TX (CONTINUED)

	Harvest Period			Total Yield
	Nov.-Dec. 3 yr. mean	Jan.-Feb. 3 yr. mean	Mar.-Apr.-May 3 yr. mean	
-----pounds of oven dried forage per acre-----				
<b>Rye</b>				
Noble Foundation 14	2520	1443	2814	6778
Noble Foundation 73	2590	1413	2554	6555
Maton	2608	1120	3084	6811
Bonel	2227	1266	2693	6187
Elbon	2872	1135	2510	6517

\*This variety was tested for only two years rather than three.