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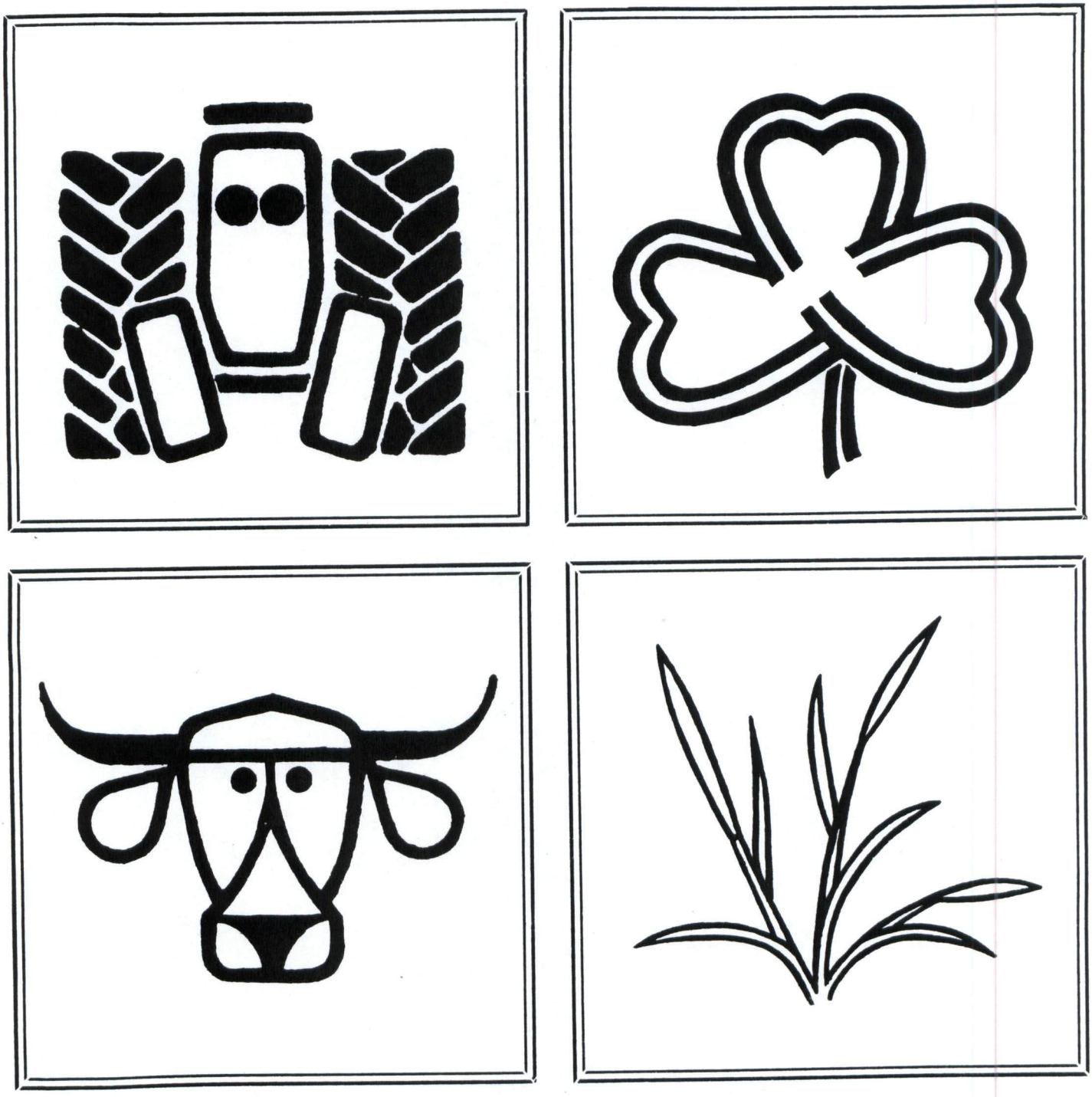

Forage Research in Texas

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Small Grain Forage Yields Under Irrigated and Dryland Conditions

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Summary

Forage yields of wheat, rye, oats, and triticale cultivars ranged from 8991 pounds per acre for 'Terrall 800-22' dryland wheat to 13,116 pounds for irrigated 'Grazer Blend' triticale. Most cultivars produced more forage under irrigation, but Grazer Blend triticale, 'TAM 106' wheat, and 'Nora' oats were especially responsive. Total production of dryland rye, oat, and triticale cultivars slightly exceeded that of wheat. Dryland yields of 'Big Mac' oats, 'Mesquite' oats, 'Maton' rye, Grazer Blend triticale, and experimental triticale EXP 313A-16 exceeded 11,000 pounds per acre. Rye, wheat, and triticale yields increased throughout the season. Oats produced more forage in the fall than other small grains, but less in March due to topburn from low temperatures in January.

Introduction

Small grains provide a highly nutritious forage for livestock. They differ in time of production, palatability, cold hardiness and yield potential. Cultivars of each type also differ in yield potential. Irrigation often increases yield by allowing higher nitrogen rates or providing water when rainfall is deficient. Cold hardiness may be improved under irrigation because of higher soil moisture during cold, dry periods. Cultivars of small grains need testing under local conditions to better estimate yield potential under irrigated and dryland conditions.

Procedure

Irrigated and dryland tests of small grains were established September 11, 1981 on Windthorst fine sandy loam near Stephenville to determine effects of irrigation and cultivar on forage yields. Seven cultivars of oats, three of rye, six of wheat, and four of triticale were sown in plots having four rows twelve feet long spaced one foot apart. These included three experimental triticales and two experimental wheats. A randomized complete-block design with four replications was used. Fertilizer at the rate of 81-59-0 was applied and incorporated by disking before sowing. Tests were topdressed February 15, 1982 with ammonium nitrate to provide 70 pounds nitrogen per acre.

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Irrigation was applied at the rate of 1.5 acre-inches on October 1 and December 15, and 2.0 acre-inches were applied February 17. More than twice the normal rainfall occurred in October. May rainfall prior to final cutting was 4.26 inches as compared with average rainfall of 4.62 inches for the month. Rainfall between the first and second cuttings was about two inches less than normal.

Forage was hand clipped at a height of two inches from four one-foot lengths of the center two rows of each plot. Freshly cut forage was weighed, and subsamples were dried at 70C to determine dry matter yields. After each hand harvest, all remaining forage was cut by machine at a height of two inches and removed from the test area.

The first cutting was made November 17 when most upright cultivars were 7-10 inches tall and the tallest were 13-15 inches. Oats were only 4-6 inches tall while at the other extreme rye was beginning to boot at 12-15 inches tall when a second cutting was made March 8. Cuttings in May were made when most of the cultivars in each cereal group had reached soft dough. This stage occurred May 14, May 19, May 20, and May 20 for wheat, oats, rye, and triticale, respectively.

Results and Discussion

Total forage production ranged from 8991 pounds dry matter per acre for 'Terrall 800-22' dryland wheat to 13,116 pounds for irrigated 'Grazer Blend' triticale (Table 1). Irrigated triticale, wheat, and oats produced, respectively, 1004, 1128, and 669 pounds dry matter per acre more than was produced under dryland conditions. Rye produced 727 pounds less forage under irrigation, but this may not be a true indication of the effects of irrigation. The May cutting of 'Maton' rye was largely responsible for the higher dryland mean of all three rye cultivars, and no irrigation was applied during that period of growth. Grazer Blend triticale, 'TAM 106' wheat and 'Nora' oats were especially responsive to irrigation producing about one ton per acre more dry matter.

Mean total yields of dryland triticale, rye, and oat cultivars were similar while mean total yield of wheat cultivars was slightly less (Table 1). The experimental triticale EXP A313A-16, Grazer Blend triticale, Maton rye, 'Big Mac' oats, and 'Mesquite' oats each produced more than 11,000 pounds of dry matter per acre. Cultivars or lines under dryland conditions which produced less than 9500 pounds per acre were EXP A876-6 triticale; Terrall 800-22 and 'NK 812' wheat; and Nora oat.

Forage production was highest at the May cutting for all cultivars partly due to cutting at the later growth stage. Each oat cultivar produced more forage in November than any cultivar of rye, wheat, or triticale indicating the advantage of oats for early forage production. Oat yields were lower than other small grains in March due to near-record low temperatures in January. Minimum air temperatures of 3F and 4F occurred at 8 a.m. on January 10 and 11,

respectively. Temperature remained below freezing until the afternoon of January 12. Considerable leaf burn and subsequent loss of the damaged leaves was noted in oats, but no stand reduction occurred. Very slight leaf burn was noted for Grazer Blend triticale. Rye, wheat, and triticale yields increased at each harvest throughout the season.

Forage yields of all cultivars were probably reduced at the final cutting by leaf rust. Rust was so severe that 80% of all leaves were covered. 'Mesquite' oat leaves were only 40% covered by rust making it the most resistant cultivar.

Table 1. Seasonal Distribution and Total Forage Production of Irrigated and Dryland Small Grains at Stephenville During the 1981-82 Season.

	Pounds Dry Matter Per Acre							
	Irrigated				Dryland			
CULTIVAR	NOV.	MARCH	MAY	TOTAL	NOV.	MARCH	MAY	TOTAL
Triticale								
Grazer Blend	1737	2149	9230	13116	1909	1740	7560	11209
EXP A876-6	1723	2486	6368	10577	1869	2702	4789	9360
EXP A313A-16	2042	2209	8189	12440	2111	2188	8676	12975
EXP A386A-12	1714	3067	6271	11052	1806	2414	5402	9622
Mean	1804	2478	7515	11796	1924	2261	6607	10792
Rye								
Bonel	1711	3282	4206	9199	2215	3062	4432	9709
Maton	2057	3135	4486	9678	2202	3479	5611	11292
Winter Grazer	1380	3875	5197	10452	1613	3851	5043	10507
Mean	1716	3431	4630	9776	2010	3464	5029	10503
Wheat								
Coker 68-15	1651	2872	5722	10245	1773	2368	5226	9367
TX-0-73-93	1890	2853	6740	11483	1909	2124	6049	10082
TX-0-78-7303	1671	2577	6170	10418	1650	2257	6136	10043
Terrall 800-22	2130	3178	4987	10295	1668	2557	4766	8991
TAM 106	1529	2452	7840	11821	1465	1976	6382	9823
NK 812	2134	3171	4694	9999	1997	2629	4559	9185
Mean	1834	2851	6026	10710	1744	2318	5520	9582
Oats								
Coker 234	2300	1052	7906	11258	1796	1094	6963	9853
Walken	2181	1498	5316	8995	1971	1608	6143	9722
Four Twenty Two	2273	1093	7159	10525	2184	1289	6549	10022
Nora	2245	1150	7692	11087	1786	1281	6111	9178
Big Mac	2646	844	8674	12164	2331	1258	7821	11410
Mesquite	2222	902	8655	11779	2243	940	8620	11803
Okay	2428	1416	7172	11016	2039	1306	6807	10152
Mean	2328	1136	7511	10975	2050	1254	7002	10306
Date Mean	1921	2474	6420		1932	2324	6039	
	Irrigated Mean			10815	Dryland Mean			10296
Irrigation (in.)	1.50	3.50	0		0	0	0	
Rainfall (in.)	8.26	4.41	9.35*		8.26	4.41	9.35*	

* Oats received 0.54 additional inches of rainfall; rye and triticale received 1.03 additional inches.