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Small Grain Forage Tests Under Irrigated and Dryland Conditions at Stephenville, Texas in 1980-81.

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SUMMARY

Wheat, rye, triticale, oats, and barley were tested for forage production under two moisture regimes. Triticale yields were highest in the irrigated test, while rye yields were higher in the dryland test. Barley produced the lowest yield in both moisture regimes. The average yield of the dryland test was 3285 pounds dry matter per acre versus 6681 pounds for the irrigated test.

Introduction

Small grain forage is highly nutritious for livestock. Cereals differ in time of production, palatability, cold hardiness and yield potential. Individual cultivars may also differ in yield potential. Irrigation may increase yields by allowing higher nitrogen rates or providing water when rainfall is deficient. Cold hardiness may also 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.

Materials and Methods

Irrigated and dryland tests of small grains were established on Windthorst fine sandy loam to determine effects of irrigation and cultivar on yield and protein content. Nine oat cultivars; three barley, rye and wheat cultivars; and two triticales were sown in plots having four rows twelve feet long spaced one foot apart. A randomized complete-block design with four replications was used. Fertilizer at the rate of 47-59-0 was applied and incorporated by disking before sowing. Tests were topdressed March 26, 1981 with 107-0-0.

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First and second cuttings were made with a flail mower when the taller cultivars were approximately ten inches tall. A sickle mower was used the third cutting.

Forage from the center two rows was collected from the twelve-feet length. The forage was weighed, and subsamples were dried at 70C to determine yields. Samples were retained for protein analysis.

Irrigation was applied with a solid-set sprinkler system as conditions indicated the need. Amounts of irrigation and rainfall received by harvest date are listed (Table 2).

Results and Discussion

Dry matter yields of irrigated small grains ranged from 3887 pounds per acre for 'Tambar 402' to 8335 pounds per acre for 6TA-131A triticale (Table 1). The mean of irrigated yields was 2.04 times that of dryland yields. Lowest and highest producing cultivars of triticale, wheat, and barley were the same whether irrigated or dryland. This was true for oats except that yield of 'Walken' was very slightly higher than that of 'Okay' under dryland conditions. 'Bonel' rye yield was highest under irrigation and lowest under dryland conditions.

Low yields, especially at the first cutting, may have been due to insufficient nitrogen and equipment problems. Yellowing of plants in October and November as well as noticeable border effect on both irrigated and dryland tests also indicated inadequate nitrogen. Probably insufficient nitrogen was applied and some nitrogen leached due to the 4.3 inches of rainfall during the week following seeding. In addition, an estimated 10-15% of the forage cut was not collected by the flail mower in the first two cuttings.

Insect and disease occurrence was minor. Barley leaf rust disappeared after the first freezing temperatures. Barley yellow dwarf virus appeared on oats in early April. Some greenbugs were noted, but control measures were not required.

Most of the forage produced was harvested in March and May (Table 2). Oats and triticale produced greater yield from mid-April to mid-May while rye growth occurred mid-February to mid-March. Dryland wheat and barley yields were slightly higher in March, whereas irrigated yields were higher at the May harvest. Irrigated wheat yields were considerably higher at the May cutting.

Total forage production was highest for the two triticales under irrigation, whereas dryland rye produced slightly more than irrigated rye (Table 2). Oats ranked second under irrigation and third under dryland conditions. Barley was clearly lowest under either moisture situation. Therefore, in subsequent tests more triticale cultivars will be included, and barley will be removed.

Table 1. Seasonal Distribution and Total Forage Production of Irrigated and Dryland Small Grains at Stephenville, Texas in 1980-81

CULTIVARS	CROP	DRYLAND Date of Harvest 12/17	3/17	5/14	Total		IRRIGATED Date of Harvest 12/18	3/23	5/21	Total
		Pounds Dry Matter Per Acre					Pounds Dry Matter per Acre			
Winter Grazer	Rye	170	3250	884	4304	6TA-131A	88	2419	5827	8335
6TA-131A	Triticale	52	1442	2638	4132	Okay	583	2746	4344	7673
Bonel	Rye	81	3219	807	4107	Grazer Blend	435	2196	5022	7653
Maton	Rye	108	2973	1023	4105	TAM 106	116	2500	4825	7441
Walken	Oat	76	1254	2727	4057	New Nortex	416	2109	4724	7249
Okay	Oat	210	1662	2130	4003	Coker 234	513	2131	4529	7174
New Nortex	Oat	70	1783	1948	3801	Four Twenty Two	203	1945	4948	7097
Grazer Blend	Triticale	211	1321	1932	3464	Bonel	302	3965	2784	7052
Big Mac	Oat	114	1352	1904	3370	Walken	212	2188	4640	7040
TAM 106	Wheat	26	1639	1619	3284	Big Mac	343	1883	4791	7016
Mesquite	Oat	103	1193	1949	3246	Mesquite	548	1646	4761	6955
Coker 234	Oat	99	1408	1672	3179	Maton	248	4203	2446	6898
Four Twenty Two	Oat	70	1239	1829	3136	Nora	300	1910	4247	6457
Nora	Oat	100	1180	1812	3092	Coker 68-15	550	2861	2996	6407
Coker 68-15	Wheat	146	1840	987	2973	Winter Grazer	376	3890	2092	6357
Sturdy	Wheat	55	1331	1306	2692	Coronado	518	1128	4447	6093
Coronado	Oat	163	894	1405	2463	Post	231	2050	3611	5892
Post	Barley	46	722	1354	2123	Sturdy	169	1973	3667	5810
Tambar 401	Barley	86	1394	619	2101	Tambar 401	430	2566	2578	5574
Tambar 402	Barley	288	1453	332	2074	Tambar 402	1380	1414	1093	3887
Mean		114	1627	1544	3285		396	2386	3919	6701
CV		25.81	11.22	24.61	13.55		38.46	16.96	13.91	9.6
LSD 0.05*		46	258	537	629		215	572	770	909

* The difference in yield between any two cultivars must be at least as large as the LSD 0.05 listed for each date in order to be 95% certain that the difference is not due to chance.

Table 2. Seasonal Distribution and Total Forage Production of Five Small Grains Grown Under Irrigated and Dryland Conditions at Stephenville, Texas, 1980-81.

	Harvest Date-Dryland				Harvest Date-Irrigated			
Cereal	12/17	3/17	5/17	Total	12/17	3/23	5/21	Total
	Pounds Dry Matter Per Acre							
Rye*	120	3147	905	4172	309	4019	2441	6769
Triticale**	132	1382	2285	3799	261	2307	5425	7993
Oats***	112	1329	1931	3372	404	1965	4603	6972
Wheat*	76	1603	1304	2983	278	2445	3829	6552
Barley*	140	1190	768	2098	680	2010	2427	5117
Rainfall(In.)	8.58	3.73	1.81		8.58	3.73	2.83	
Irrigation(In.)	0	0	0		4.85	2.00	2.00	

* Average of three cultivars ** Average of two cultivars

*** Average of nine cultivars