TABLE 1. FORAGE PRODUCTION OF COOL-SEASON PERENNIAL GRASSES ON A LAKE CHARLES CLAY AT ANGLETON 1984-85

Grass	19 Feb.	3 Apr.	Total
	— Pounds dry matter per acre —		
Georgia Jessup fescue	1,916 a[2]	2,592 a	4,508 a
Matua Prairie grass[1]	1,831 ab	2,462 ab	4,293 ab
Georgia-5 fescue	1,684 b	2,457 ab	4,141 ab
Bellegarde bromegrass	1,840 ab	2,094 cd	3,934 b
Kenhy tall fescue	1,685 b	2,231 bc	3,916 b
Baylor smoothbrome	497 d	2,482 ab	2,979 c
Sirosa phalaris	1,045 c	1,888 d	2,933 c
Sirolan phalaris	1,149 c	1,604 e	2,753 c

[1]*Bromus catharticus*.

[2]Yields within a column followed by the same letter are not significantly different at .05 level, Waller-Duncan.

harvest dates and total yield. Baylor smoothbrome, Sirosa phalaris, and Sirolan phalaris were significantly lower yielding than the other grasses at the first harvest and for total yield. These three grasses do not appear to be adapted to the poorly drained clay soils of Southeast Texas.

Summer survival will be the most critical issue on the use of cool-season perennial grasses in the Lower South. This information will not be available until completion of the 1985-86 growing season.

Effect of Grazing on Growing Point Elevation of Wheat

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Summary

The influence of grazing on the initiation, rate, and extent of growing point elevation in 'TAM-101' winter wheat (*Triticum aestivum* L.) was studied during spring 1985. Results showed that grazing did not appreciably affect onset of stem elongation but did slow elongation rate and reduce final height of grain bearing tillers.

Introduction

Winter wheat is used throughout the Southern Great Plains as fall and/or spring forage for the stocker cattle industry. Table 1 shows the total non-irrigated wheat acreage and average yields for Nebraska, Kansas, Oklahoma, and Texas. The total grain harvested for the four states in an average year totals over 660 million bushels (Table 1). No state or federal agencies assemble accurate grazing statistics and contradictory evidence has been published concerning the effect of grazing on wheat plant yields. Even a 10 percent reduction in grain yield due to grazing would amount to 66 million bushels in an average year for the four state areas. In this hypothetical example, at today's wheat prices of approximately $2.75 per bushel, simple calculations show a loss to the economy of $181.5 million in revenues. Conversely, we know very little about animal inventories on pasture, when and how many of the animals are removed, how much wheat acreage is "grazed out" and at what economic gain relative to harvesting grain. More detailed data and economic analyses are needed to provide better on-farm decisions to choose between the use of wheat for forage and/or grain.

The conflicting evidence related to subsequent grain harvest following grazing suggests that under moderate conditions wheat yields are not greatly affected by grazing but under special cases, such as extremely wet weather or severe defoliation, yield depression can occur. In addition, evidence is accumulating to suggest that loss of grain due to grazing is not solely related to removal of growing points, but rather a decrease in total amounts of leaf area or assimilate needed to maximize grain yields. One consideration is the question of how grazing affects the initiation of stem elongation during the change from vegetative to reproductive development in the spring. Our objective in this study was to determine whether grazing affected onset, rate, and extent of stem elongation in winter wheat.

KEYWORDS: *Triticum aestivum* L./grazeout wheat/tillering/jointing/phenology.

Materials and Methods

TAM-101 wheat was planted at a rate of 90 lb/A in September 1984. The seedbed was fertilized with ammonium nitrate at 300 lb/A prior to planting. Cattle pastures were 1.57 acres in area and were replicated six times. The details of the time and duration of grazing are shown in Table 2. A dry autumn prohibited grazing until February. Cattle remained on the heavily grazed treatment for 5 days longer than on the moderately grazed treatment.

Growing points were measured as follows: nine randomly selected plants in each experimental unit were uprooted and one tiller was separated from the plant. The distance was measured between the root-shoot junction to the base of the growing primordia. The growing points were exposed with a scalpel. Measurements were repeated on a weekly basis from March 18 to May 2, 1985.

TABLE 1. AVERAGE (1978-82) TOTAL ACREAGE OF NON-IRRIGATED WINTER WHEAT AND GRAIN YIELDS FOR FOUR STATES IN THE SOUTHERN GREAT PLAINS[1]

State	Area planted (acres)	Average yield (1978-82) (bushels/acre)	Total yield (bushels)
Nebraska	2,446,395	29.3	71,679,373
Kansas	9,285,290	31.9	296,200,751
Oklahoma	6,661,877	30.4	202,521,060
Texas	4,259,087	21.4	91,144,461
Total	22,652,649	Avg. 28.2	661,545,645

[1](Source: USDA Crop Reporting Service and the Oklahoma Climate Survey, 710 ASP, Suite 8, Norman, OK 73019)

Grain yield was estimated with a plot combine. Two 30 m swaths were harvested per experimental unit. The data were reduced using analysis of variance and means were tested using the Least Significant Difference procedure.

Results and Discussion

There was a significant treatment × date interaction ($P<0.01$) for growing point height, thus each sampling date was analyzed separately. The growing points had only grown approximately one-half inch above the root-shoot junction by March 18, 1985 (Table 3). The wheat was drilled to a depth of 1.5 inches at planting, thus growing points had not extended past the soil surface at the beginning of our measurements.

Onset of wheat stem elongation was not vastly different among treatments (Table 3). However, rate of elongation in control plants was nearly double that of heavily grazed plants during the first three measurement periods (Table 4). Maximum absolute differences occurred during the third measurement period, which corresponds to the pre-boot stage of growth. Plants from all treatments had reached the boot stage by April 23 and on the last measurement date (May 2) wheat had completed elongation. There was an inverse relationship between final growing point height (May 2) and degree of grazing stress (Table 3). Control plants attained growing point heights 10 inches higher than heavily grazed plants. Heading was delayed by about 1 week, hence grazing also retarded phenological development after jointing.

The three treatments yielded 39, 43, and 41 bushels per acre at harvest for heavy, moderate, and no grazing, respectively, but there were no grain yield differences ($P<.05$) among treatments. Thus, during the 1984-85 season we know growing points were not removed (Table 3); however, removal of leaf area failed to reduce yield relative to controls. Spring 1985 was unusually wet and leaf area recovery may have been sufficient to counteract grazing effects. The debate concerning the relative importance of growing point removal versus leaf area reduction in reducing grain yield has important ramifications in managing wheat pasture. We suggest that studies dealing with the effect of grazing termination date on wheat grain yield should include measurements of growing point height and residual leaf area at grazing termination with periodic measurements until heading to further understand the biological effects of grazing.

TABLE 2. ANIMAL UNIT DAYS, DURATION, AND GRAZING PRESSURE SUMMARIES FOR THE 1984-85 WHEAT GROWING SEASON

Treatment	Animal unit (days per acre)	Duration (days)	Density (head/acre)
Moderate grazing	46	Feb. 28-Mar. 17 (18 days)	2.5
Heavy grazing	59	Feb. 28-Mar. 22 (23 days)	2.5

TABLE 3. HEIGHT OF TAM-101 WHEAT GROWING POINTS ON SEVEN DATES IN 1985 AS AFFECTED BY GRAZING

Grazing Trt	Mar. 18	Mar. 25	Apr. 1	Apr. 8	Apr. 15	Apr. 23	May 2
	inches						
Heavy	0.5b*	1.3b	2.5c	3.9c	7.0c	11.1c	21.2c
Light	0.5b	1.7b	4.0b	6.3b	10.0b	16.0b	26.5b
Control	0.7a	2.4a	4.8a	7.7a	12.3a	19.3a	31.2a

*Means in a column with different superscripts are statistically different ($P<0.05$).

TABLE 4. RATE OF GROWING POINT ELONGATION FOR TAM-101 WHEAT AT VARIOUS TIMES THROUGHOUT SPRING 1985

Grazing Trt	Mar. 18 to Mar. 25	Mar. 25 to Apr. 1	Apr. 1 to Apr. 8	Apr. 8 to Apr. 15	Apr. 15 to Apr. 23	Apr. 23 to May 2
	inches/day					
Heavy	0.10b*	0.15b	0.18c	0.37b	0.45b	0.97a
Light	0.15b	0.28a	0.28b	0.45ab	0.65ab	1.01a
Control	0.21a	0.28a	0.37a	0.56a	0.76a	1.14a

*Means in a column with different superscripts are statistically different ($P<0.05$).

Effect of Grazing Duration on Growth and Grain Yield of Winter Wheat

S. R. Winter

Summary

Irrigated grazing trials were conducted to determine the effects of grazing duration on growth and grain yield of 'TAM 105' winter wheat. Wheat forage was removed to 2- to 3-inch stubble height (15 to 30 percent ground cover) by stocker cattle. Three-year average grain yields were 82, 82, 73, 63, 55, and 41 bu/A for a grain-only check, February 1, March 6, March 17, March 31, and April 13 grazing termination dates, respectively. Grazing past February 1 reduced LAI and biomass and delayed heading in proporation to the loss in grain yield. Tiller weight and height were also progressively reduced by grazing past February 1. Tiller density was not reduced unless grazing continued past March 31. Grazing past February 1 appeared to reduce grain yield by limiting LAI and biomass in the spring. The earliest wheat (February 1 termination) did not reach Feekes stage 6 (first node of stem visible) until about April 1. Later grazing delayed

KEYWORDS: Winter wheat/Texas Panhandle/grazing trials.