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Oat Silage Yield as Affected by Time of Application of Nitrogen Fertilizer, Seeding Rate, and Planting Date

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Summary

This test was conducted at Texas A&M University Research and Extension Centers at Dallas and Stephenville to determine if time of nitrogen (N) fertilizer application, plant density, and planting date would affect yield and winterkill of oats. Winter-hardy ('H833') and winter-sensitive ('Cornado') cultivars were planted. The only winterkill was on plots of the early planting date of Cornado at Dallas which had 100 percent stand loss. There were no differences in silage yield due to either time of N application or seeding rate at Dallas but there were differences for both of these treatments at Stephenville. Plots of the early planting date produced the highest yields in most cases.

KEYWORDS: Oats/winterkill/nitrogen fertilizer/Dallas and Stephenville.

Introduction

Oats are grown extensively for grazing and silage producion in Texas but lacks winter hardiness when compared to other small grains. In central Texas oats perform good in most years but there is a risk of winterkill when a colder than normal winter occurs. More cold tolerant cultivars of oats have been developed for this region. Fall applications of N fertilization can have an effect on winter survival, but the rates that may promote winterkill have not been established. Also, little is known concerning the effects at plant populations on winter sur-

vival. This test was undertaken to determine if either seeding rate, timing of nitrogen fertilizer application, or date of planting would influence winterkill and which of these treatments would optimize forage yield.

Procedure

This test was conducted at Dallas and Stephenville using H833, a winter-hardy oat, and Cornado, a winter-sensitive oat. Dates of planting were 9 Oct 85 and 6 Dec 85 at Dallas and 6 Nov 85 and 6 Dec 85 and Stephenville. Earliest planting date at both locations was later than desired because of extreme dry conditions in September at Dallas and in September and October at Stephenville. Nitrogen applications were 0, 50, 100, and 150 lbs/A in the fall prior to planting and 150, 100, 50, and 0 lbs/A in the spring so that each plot received a total of 150 lbs of N/A. Planting rates were 1, 2, 3, and 4 bu/A. A split plot design with dates as whole blocks with four replications was used.

Results and Discussion

The mean silage yield for Dallas was 3,767 lbs/A and for Stephenville was 2,738 lbs/A (Tables 1 and 2). In all cases except for the 9 Oct 85, planting date for H833 at Dallas there was an increase in silage yield due to an increase in planting rate (Table 1). The means for both locations were 3,425, 3,371, 3,275, and 2,930 lbs/A for the 4, 3, 2 and 1 bu/A seeding rate, respectively. One bu per acre had significantly lower yields but the 2, 3, and 4 bu plantings were not significantly different from each other. At Dallas there were no differences due to planting rate (Table 1). The trend was for an increase in yield with increased planting rate. Table 1 shows that at Stephenville there was a significant increase in yield due to increased planting rate.

TABLE 1. EFFECT OF PLANTING DATE AND DENSITY ON OAT SILAGE YIELD OF TWO CULTIVARS AT DALLAS AND STEPHENVILLE

Seeding rate	H833	Cornado			Mean
	9 Oct 85	6 Dec 85	9 Oct 85	6 Dec 85	
bu/A					lb/A
Dallas					
4	5,354 b*	4,975a	0	5,070a	3,850ns
3	5,544ab	4,754ab	0	5,025a	3,831
2	5,800a	4,652b	0	4,890a	3,836
1	5,503ab	4,248c	0	4,452b	3,551
Mean	5,550	4,657	0	4,859	3,762
Stephenville					
	6 Nov 85	6 Dec 85	6 Nov 85	6 Dec 85	
4	2,741a*	2,603a	3,848a	2,807a	3,000a
3	2,529ab	2,532a	3,877a	2,703a	2,910ab
2	2,334b	2,390ab	3,712ab	2,421a	2,714
1	1,634c	1,940b	3,341b	2,403b	2,329
Mean	2,309	2,366	3,695	2,584	2,738

*Mean in a column for each location not followed by a common letter differ significantly (5% level) using Duncan's Multiple Range Test.

Table 2 shows that there was no significant difference due to timing of N fertilizer applications at Dallas but rather a general trend for increased yield with increased fall fertilization. Table 2 shows that there are differences due to timing of N fertilizer applications for both cultivars at Stephenville. Opposed to the Dallas location the higher yields were associated with the higher N applications in the spring.

No differences in winter survival were due to either timing of N fertilizer applications or planting rate. Winter survival differences were due to planting date and cultivars. A freeze occurred in late November causing a 100 percent stand loss of the 9 Oct 85 planting of Cornado at Dallas.

TABLE 2. OAT SILAGE YIELD AS AFFECTED BY TIMING OF NITROGEN FERTILIZER APPLICATIONS ON TWO CULTIVARS AT TWO PLANTINGS AT DALLAS AND STEPHENVILLE

Time of N appl.		H833		Cornado		Mean
Fall	Spring	9 Oct 85	6 Dec 85	9 Oct 85	6 Dec 85	
			lb/A			
Dallas						
150	0	5,735a*	4,772ns	0	5,040a	3,887ns
100	50	5,830a	4,510	0	4,900ab	3,810
50	100	5,550a	4,604	0	4,878ab	3,758
0	150	5,086b	4,744	0	4,620b	3,613
Mean		5,550	4,658	0	4,860	2,738
Stephenville						
		6 Nov 85	6 Dec 85	6 Nov 85	6 Dec 85	
150	0	2,468ns	2,018b*	3,419b	2,380b	2,624b
100	50	2075	2,472a	3,629ab	2,589ab	2,639b
50	100	2,230	2,540a	4,016a	2,757a	2,886a
0	150	2,462	2,434a	3,714ab	2,608ab	2,805ab
Mean		2,309	2,366	3,695	2,584	2,738

*Mean in a column for each location followed by a common letter differ significantly (5% level) using Duncan's Multiple Range Test.