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EVALUATION OF SEED TREATMENTS ON WHEAT FORAGE PRODUCTION

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Summary

Seed treatment for the prevention of disease has been a common practice for many years and various companies are continually developing and testing new products. Gaucho is the first seed-applied insecticide for commercial use. This test was conducted to determine the effectiveness of three different experimental seed treatments compared to several standards on three different wheat cultivars. Cultivars used were 'Chisholm', 'Coker 9835', and 'TAM 300'. There were no significant differences in forage dry matter production due to seed treatment (Table 3), but there were differences due to cultivar with mean forage yields of 7281, 6947, and 6798 for Chisholm, TAM 300, and Coker 9835, respectively.

Introduction

Generally the positive effect of the seed treatments is expressed in the first part of the growing season as a reduction in diseases and increased stands and plant growth. It was hypothesized that if diseases were present, the effectiveness of the seed treatment would be expressed by increased wheat forage production during the fall. The primary diseases to be controlled were seedling diseases, root rot, rust, and powdery mildew, whereas the primary insect to be controlled were aphids.

Materials and Methods

This study was part of a larger study to determine the effectiveness of three different experimental fungicide treatments from Gustafson, Inc. compared to seed colorant only and seven different commercial seed treatments (Table 1). The treatments 2, 3, 4, 5, 8, 10 and 11 are systemic fungicides that control a number of fungal diseases including powdery mildew, smuts, and seedling diseases. Seed treatments 4 and 10 also contained Gaucho which is systemic insecticide, and treatment 3 contained *Bacillus subtilis*, a biological fungicide with season-long protection against *Rhizoctonia* and *Fusarium*.

The seed treatments (Table 1) were applied by Gustafson, Inc. to the seed of three

different wheat cultivars. The cultivars were (1) Chisholm, a hard red winter wheat that is susceptible to leaf rust and powdery mildew, (2) Coker 9835, a soft red winter wheat that is resistant to rust and powdery mildew but susceptible to barley yellow dwarf virus, and (3) TAM 300, a hard red winter wheat that is resistant to leaf rust but susceptible to powdery mildew and barley yellow dwarf virus. The test was planted 14 Sept 94 at the Texas A&M University Research and Extension Center at Dallas on Fairlie clay soil using a 7-row plot planter. Plots were 5 by 20 ft with a 5 ft-border at each end of each plot and along each side of the test. Plots were harvested at a height of 2.5 in on 7 Dec 94, 22 Feb 95, and 25 Apr 95. A sample of the harvested forage was taken and used to determine percent dry matter. Dry matter production per acre was then calculated, and analysis of variance and Duncan's multiple range test was conducted using SAS. Rainfall and temperature data were collected daily from a weather station 300 ft north of the plots (Table 2).

Results and Discussion

There were no significant differences in dry matter production due to seed treatments within cultivars at any of three harvest dates or the season total (Table 3). This lack of a significant difference for the 7 Dec 94 harvest may be due to the large coefficient of variation (C.V.) but the 25 Apr 95 harvest and the seasonal total both had relative low CV. Another possible reason for the failure to measure differences due to seed treatment may have been due to the delay in making the first harvest. This delay was due to excessive wet conditions. Based upon this study, dry matter production is not a good character to measure to determine the differences in seed treatment of wheat.

Chisholm and Coker 9835 had the highest fall production as measured by the 7 Dec. harvest (Table 3), and Coker 9835 had the highest production on 22 Feb. with almost 3 times the production as Chisholm on that date. Chisholm had the highest production for the 24 Apr. harvest and for the season total with 7281 lbs per acre. The forage yields in this test were high which was most likely due to an excess in rainfall. There was a total of 42.01 in. of rain measured for the 8 months this test was in the field (Table 2), compared to the 1945 to 1994 fifty-year average of 23.47 in. for the same 8 months.

Acknowledgment

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Table 1. Fungicides and insecticide used to test the effect of seed treatment on wheat forage production.

Treatment	Treatments	
1	Ck ²	Gustafson Seed Colorant @ 2 qt/5gal
2	F	RTU-Vitavax-Thiram @ 6 fl oz/cwt
3	F	RTU-Vitavax-Thiram @ 6 fl oz/cwt + Kodiak Concentrate @ 0.05 oz/cwt
4	F+I	RTU-Vitavax-Thiram @ 6 fl oz/cwt + Gaucho 480 FS @ 0.5 oz ai/cwt
5	F	Thiram-Raxil @ 3.5 fl oz/cwt
6	F	Gustafson FX 110 @ 2.87 fl oz/cwt ¹
7	F	Gustafson FX 120 @ 10 ppm ¹
8	F	Dividend @ 0.25 fl oz/cwt
9	F	Gustafson EX120 @ 0.16 oz/cwt ¹
10	F+I	RTU-Vitavax-Thiram @ 6 fl oz/cwt + Gaucho 480 FS @ 1.0 oz ai/cwt
11	F	Baytan 30 FL @ 1.25 fl oz/cwt

¹ Experimental material from Gustafson, Inc.

² Ck = check, F = fungicide, I = insecticide

Table 2. Monthly weather data.

Month	Average temperatures			Rainfall in.
	Max.	Min.	Mean	
	°F			
Sept. 94	84.2	63.5	73.9	04.60
Oct. 94	75.2	55.3	65.2	10.33
Nov. 94	64.2	46.9	55.6	07.50
Dec. 94	55.2	38.1	46.6	03.17
Jan. 95	56.1	34.8	45.5	02.79
Feb. 95	61.9	37.8	49.9	00.82
Mar. 95	63.6	45.2	54.4	07.95
Apr. 95	72.3	52.3	62.3	<u>04.85</u>
Total				42.01

Table 3. Wheat forage dry matter production of 3 wheat cultivars treated with 11 different seed treatments.

Trt ¹	7 Dec 94			22 Feb 95			25 Apr 95			Total	Trt. Mean		
	Chi ²	Coker ²	TAM ⁴	Chi ²	Coker ²	TAM ⁴	Chi ²	Coker ²	TAM ⁴				
01	334	390	261 ⁵	608	1865	798	6023	4443	5892	6965	6699	6951	6872
02	470	374	324	599	1899	888	6248	4724	5845	7318	6997	7058	7124
03	434	355	267	590	1688	778	5666	4445	5779	6691	6488	6825	6668
04	450	591	398	578	1887	851	6113	4906	5819	7140	7385	7068	7198
05	419	335	318	558	1771	793	6399	4871	5885	7376	6977	6996	7116
06	468	490	268	634	1911	781	6570	4859	5761	7672	7260	6810	7247
07	433	430	342	690	1773	806	6024	4420	6378	7147	6623	7526	7099
08	385	426	298	647	1888	728	6302	4578	5946	7334	6892	6972	7066
09	515	441	361	633	1755	835	6093	4336	5558	7241	6532	6754	6842
10	403	431	380	681	1768	735	6649	4091	5817	7733	6289	6933	6985
11	408	343	224	765	1947	734	6301	4347	5565	7474	6636	6524	6878
C.V.	24.5	37.4	26.9	27.9	13.9	23.6	10.0	10.2	9.5	10.4	10.4	9.2	
Mean	429a	419a	313b ⁵	635c	1832a	793b	6217a	4547c	5841b	7281a	6798b	6947b	

¹ See Table 1 for description of treatments.

² Chisholm

³ Coker 983

⁴ TAM 300

⁵ Variety means within harvest dates followed by the same letter are not significantly different at 0.05 level / Duncan Multiple Range Test.