Evaluation of Palisade® on Fifteen Kentucky Bluegrass Varieties Grown for Seed under Non-Thermal Residue Management in Central Oregon, 2011

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Abstract

The growth regulator, Palisade® (Trinexapac-ethyl), was evaluated on 15 Kentucky bluegrass (*Poa pratensis*) varieties grown for seed at the Central Oregon Agricultural Research Center on a third-year stand. The influence of Palisade on plant height, lodging and seed yield were evaluated. Treatments were applied at early boot stage and varieties were harvested based on maturity. There were no significant interactions between the 15 Kentucky bluegrass varieties and Palisade treatments. Trends indicate no average increase in seed yield across varieties following Palisade treatments, while plant height was reduced 1.9 inches and lodging was reduced 10%. Average seed yield (600 lb/acre) was less this season compared to previous years, perhaps due to a long, cool spring that delayed seed development and harvest. Across three production years for each of two planting dates (6 years total), the trend was for Palisade increased seed yield an average of 19%, reduce plant height an average of 2.7 inches and reduced lodging an average of 35%.

Introduction

Research to evaluate Palisade on Kentucky bluegrass was conducted in commercial seed fields of 'Merit' or 'Geronimo' from 1999 to 2003. Yields were increased by 31 to 36% 4 of the 5 years when Palisade was applied at 22 oz/acre from the second node (Feekes growth stage 7) to heads just becoming visible (Feekes 10.1). Late application, when the heads extended just above the flag leaf (Feekes 10.4), produced the greatest reduction in plant size, while plants tended to outgrow the effect of earlier Palisade applications. No differences between treatments in weight per 1,000 seeds were observed, and percent germination was not adversely affected.

Methods and Materials

This research project was conducted at the Central Oregon Agricultural Research Center (COARC) near Madras. A split-plot design was used, with 10 ft by 60 ft main plots and 10 ft by 20 ft subplots for comparing yields for plots treated with the growth regulator Palisade and plots left untreated. Main plots were replicated four times in a randomized complete block design.

Palisade was applied at 24 oz/acre on May 11 when most varieties were at the second node to early boot stage. Applications were made with a CO_2-pressurized, hand-held boom sprayer at 40 psi and 20 gal/acre water using TeeJet 8002 nozzles. Plant height was measured June 20; percent lodging was estimated July 11 for the third-year field planted in 2008. A 6 ft by 17 ft section of

each plot was swathed as varieties matured from July 11 to July 25. This was followed by combining of the plots at an appropriate timing. A plot-sized swather and Wintersteiger plot combine were used. Seed samples were transported to the Hyslop Farm near Corvallis, Oregon where they were debearded, run through a small-scale Clipper cleaner, and clean seed weight was determined.

Results and Discussion

There were no significant interactions for seed yield and lodging between the 15 Kentucky bluegrass varieties and Palisade treatment (Table 1). Average seed yield (600 lbs) across varieties this season was lower than the previous two years (Table 2). Average seed yield did not increased following Palisade treatment this third season, unlike the 35% increase the first year and 19% increase the second. There was a significant interaction on plant height in year three of treatment (Table 2). Palisade reduced plant height an average of 1.9 inches, compared to 2.1 inches the first year and 3.1 inches the second. Percent lodging was decreased following Palisade treatment by10%, compared to 39% the first year and 57% the second.

Overall Project Discussion

The first planting was made in 2007, with a second planting in 2008. Design of these plots includes nonthermal residue management. Following harvest, straw was baled and remaining residue was removed mechanically using a Grass Vac to simulate field conditions following baling in the large plot variety evaluations off station. Harvest in 2008 was one first-year field, harvest in 2009 included a first-year and second-year field, harvest in 2010 was a second-year and third-year field, final harvest in 2011 of the final third-year field. With completion we have data for three ages of fields across two planting dates. This design also provides a comparison of results for the same age field across two different production years. There was stand deterioration for the 2007 planting following the first production year. This creates less confidence in the second- and third-year data from this field, and less weight should be given to these results.

Statistical analysis indicated significant interactions between the 15 Kentucky bluegrass varieties and Palisade treatments on first-year stands, with no statistical significance in the second- and third-years. Looking at trends associated with the 6 harvests across 3 production years to date, Palisade increased seed yield by an average of 19% (Table 2). The average for first-year fields was a 23% increase, second-year fields averaged 22% and third-year fields was a 13% increase. Reduction in plant height from Palisade averaged 2.7 inches with 6 harvests across 3 years, with a reduction of 1.7 inches for first-year fields, 3.8 inches across second-year fields, and 2.7 inches for the third-year fields. Palisade reduced lodging by an average of 35% across with 6 harvests across 3 years, with a reduction of 37% in first-year fields, 39% in second-year fields, and 29% for the third-year fields.

Evaluating the influence of Palisade by production year across stand age indicates an 11% increase in seed yield in 2008, 28% increase during 2009, 22% increase in 2010, and a decrease of 1% in 2011. Palisade reduced plant height by an average of 1.3 inches in 2008, and 3.3 inches for both 2009 and 2010, and 1.9% in 2011. Percent reduction in lodging with Palisade averaged 35% in 2008, 30% in 2009, 52% in 2010, and 10% in 2011.

Table 1. Effect of Palisade growth regulator on seed yield, lodging, and plant height on a third-year field of 15 Kentucky bluegrass varieties planted August, 2008, at Central Oregon Agricultural Research Center, Madras, Oregon.

				Evaluation dates			
				6/20/11		8/2/11	
	Clean seed yield (lb/acre)			Plant height (in)		Lodging (%)	
Variety[1]	Check	Palisade	% Check	Check	Palisade	Check	Palisade
Atlantis	588	624	106	22	19	18	18
Merit	656	493	75	24	18	33	3
Rhapsody	617	526	85	19	18	0	8
Valor	586	461	79	17	15	0	0
Bar-Iris	233	349	150	23	23	89	88
Crest	851	613	72	20	16	20	13
Monte Carlo	579	545	94	16	15	0	0
Shamrock	712	816	115	24	22	68	48
A00-891	709	669	94	21	17	40	11
A00-1400	460	407	88	22	18	39	5
Bandera	681	554	81	20	18	3	1
Bordeaux	582	782	134	22	21	36	21
Volt	589	837	142	23	24	63	43
Zinfandel	641	692	108	18	18	0	0
A01-299	524	526	100	18	19	0	0

[1] Paired t-test indicated no significant interaction between varieties and palisade treatments.

Table 2. Three-year averages of clean seed yield, lodging and plant height for 2007 & 2008 plantings of 15 Kentucky bluegrass varieties with and without Palisade at Central Oregon Agricultural Research Center, Madras, Oregon.

	Averages across 15 varieties								
	Seed yield (lb/acre)			Plant height (in)			Plant lodging (%)		
	Check	Palisade	% Check	Check	Palisade	Dif.	Check	Palisade	Dif.
2007 Planting									
1st Year	1266	1383	111	26.4	25.1	1.3	67	24	35
2nd Year	702	822	122	21.5	17.0	4.4	43	9	21
3rd Year	961	1093	125	21.7	18.3	3.4	40	19	48
2008 Planting									
1st Year	1025	1341	135	14.3	12.3	2.1	61	24	39
2nd Year	810	951	119	21.7	18.5	3.1	28	16	57
3rd Year	599	592	101	20.6	18.7	1.9	27	17	10