ERGOT CONTROL PROGRAM FOR KENTUCKY BLUEGRASS SEED PRODUCTION

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Abstract

Ergot, an important-flower infecting pathogen affecting grass production, is particularly damaging to Kentucky bluegrass. To determine control measures without the use of field burning, the historic method of control, three fungicides in combination with and without a surfactant were evaluated on a Chateau Kentucky bluegrass field near Madras, Oregon. One hundred panicle samples collected at harvest were evaluated for incidence of sclerotia and honeydew, as well as sample weight and weight per 1,000 seed. Due to a light ergot year, incidence of the disease was low and efficacy of the fungicides inconclusive. There were statistical differences between treatments for seed weight per sample, with the surfactant Penaturf appearing to reduce sample weight, while the fungicides had no significant detrimental effect on seed weight.

Introduction

Ergot, caused by the fungus *Claviceps purpurea,* is an important flower-infecting pathogen in grass seed production regions of the Pacific Northwest. The pathogen produces an elongated, black sclerotia that replaces seeds in infected florets and causes a reduction in yield. These sclerotia are the primary means of survival and source of inoculum. In the spring, during flowering, spores from the sclerotia infect the grass flower and produce secondary spores, which causes exudate (honeydew) and makes harvest difficult. These secondary spores can be spread by water, wind, and insects prior to sclerotia formation.

Of the grass species grown for seed in Oregon, Kentucky bluegrass is particularly affected by ergot. Unpublished surveys conducted in central Oregon, where Kentucky bluegrass is the dominant variety being grown, indicate strong regional variation with high levels in the Culver and Metolius areas contrasted to low incidence on the Agency Plains.

Because there are no fungicides registered for ergot, the only method of controlling the disease has been through open field burning. This practice has partially suppressed the disease in the past, as indicated by research conducted by John Hardison, plant pathologist at Oregon State University. Pressure to decrease burning may leave grass seed producers with no effective tools.

Materials and Methods

A Chateau Kentucky bluegrass field in the Trail Crossing area of central Oregon with a history of ergot was chosen for the study. Three fungicides, flusilazole (Punch, Dupont), tebuconazole (Folicur, Mobay) and propiconazole (Tilt, Ciba Geigy), in combination with and without Penaturf surfactant were applied to 10 ft x 20 ft plots replicated four times in a randomized complete block design. Materials were applied with a CO_2 pressurized boom sprayer. Silwet-77 surfactant at 16 oz/100 gallons was applied in combination with all fungicides except the first 7 oz ai/a Punch treatment. The first treatments were applied May 21, 1992 at the initiation of anthesis. On May 25 the 150 ft x 80 ft trial area was covered with 4 mil black plastic to prevent contamination of the plots from an aerial application of Tilt and dimethoate to the field. The second treatment applications were made on June 2.

The plots and the field, as well as all grass growing regions of central Oregon, experienced low levels of ergot during the 1992 season. The warm, dry weather throughout the spring and early summer was likely a contributing factor. Unfortunately, areas of heat damage on the upper portion of panicles resulted from the plastic cover placed over the plots. This occurred despite the fact that the plastic was removed by mid-morning on a cool, overcast day.

One hundred panicle samples were collected from each plot on June 24. The 100 panicle samples were analyzed for the incidence of sclerotia and honeydew. Seed separation was conducted at the seed conditioning lab at the USDA-ARS National Forage Seed Production Research Center in Corvallis. Standard separation procedures were followed and weight was determined per sample (grams) and 1,000 seed count (milligrams).

Results and Discussion

Results are provided in Table 1. When evaluating sclerotia per plot there were no statistically significant differences (P _ 0.10), although the trend was for the untreated plot to have the highest number of sclerotia and the double applications of all three fungicides to have the fewest. Evaluation of the incidence of honeydew provided no statistically significant differences (P 0.10) nor any consistent trends.

For seed weight per 100 panicles, there were statistically significant differences (P 5_0.05) between treatments. A single application of 7 oz ai/a of Punch without Silwet-77 provided the greatest weight, and the double application of Penaturf had the lowest weight. Although weights per 1,000 seed count were not statistically different (P 0.10), the double application of Penaturf again produced the lightest seed weight, and Penaturf in combination with the three fungicides produced consistently low weights. Fungicide applications alone did not appear to have a significant detrimental effect on seed weight.

With the light incidence of ergot in central Oregon during the 1992 season, and damage to some plots from the plastic cover, it is difficult to draw conclusions from this first year of data. However, some of the trends may provide clues as to what future research may reveal a year with greater ergot incidence.

Table 1. Evaluation of fungicide treatments for ergot control on Kentucky bluegrass in central Oregon, 1992.

Fungicide Treatments	Rate			Sclerotia per plot	Incidence of honeydew	Weight per sample	1000 seed weight
	May 21	June 2					
	---ai/a---			---no. per 100 panicles---		---g---	---mg---
Punch 25EC	7*			1.25	1.75	2.40 a'	334
Punch 25EC	14			0.75	1.25	1.62 abc	346
Punch 25EC	7			0.25	1.25	1.30 be	368
Punch 25EC, Punch 25EC	7	7	0.00	0.25	1.46 be	354	
Punch 25EC, Penaturf	7	78	1.00	2.25	0.91 be	334	
Folicur 3.6F	3.6			1.75	2.00	1.57 abc	369
Folicur 3.6F, Folicur 3.6F	1.8	1.8	1.00	0.75	1.33 be	347	
Folicur 3.6F. Folicur 3.6F	3.6	3.6	0.25	1.00	1.04 be	369	
Folicur 3.6F, Penaturf	3.6	87	1.00	0.75	1.35 be	342	
Tilt 3.6E	3.3			1.25	5.25	1.26 be	350
Tilt 3.6E, Tilt 3.6E	1.7	1.7	1.75	6.50	1.24 be	357	
Tilt 3.6E, Tilt 3.6E	3.3	3.3	0.25	0.75	1.79 ab	346	
Tilt 3.6E, Penaturf	3.6	87	0.75	0.25	1.43 be	338	
Penaturf, Penaturf	87	87	0.50	1.75	0.69 c	322	
Untreated				3.25	2.50	1.82 ab	343

'Means in columns followed by the same letter are not statistically different by Duncan's Multiple Range test at P.0.05

*Fungicide treatment without Silwett-77 surfactant