Evaluation of Simulated Hail Damage to Kentucky Bluegrass Seed Production in Central Oregon, 2008

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Abstract

This is the second year of a 3-year study to determine the effect of simulated hail damage on Kentucky bluegrass (*Poa pratensis*) seed yields. Treatments were applied at three growth stages in the spring to simulate 33, 67, and 100 percent damage. Treatments of 33 and 67 percent damage applied at head emergence caused significantly greater yield reductions than those applied at the boot stage or seed fill. It appears the plant may be particularly sensitive to damage at head emergence. When 100 percent damage was applied at the boot stage, seed yield was reduced by only 59 percent, indicating the plants may be able to recover from significant damage at that stage.

Introduction

Kentucky bluegrass seed production has historically been an integral part of agriculture in central Oregon. In recent years there has been a decline in acreage due to reduction in price from an oversupply, but more recently acreage has rebounded. The objective of this project is to determine the impact from timing and severity of hail damage on seed production of Kentucky bluegrass. This information will assist the National Crop Insurance Service in developing methodology to evaluate hail damage on Kentucky bluegrass.

Methods and Materials

This is the second year of a multiple year evaluation on the effect of simulated hail damage on Kentucky bluegrass seed production. The study was conducted in a commercial third-year field of 'Monte Carlo' with H & T Farms near Culver, Oregon. Plots were 5 ft by 15 ft, with 3-ft alleyways, replicated four times in a randomized complete block design.

Variables established for this study included three treatment timings and three levels of damage. Damage treatments were inflicted at the boot stage, at head emergence, and during seed fill. Severity of damage inflicted was targeted at 33, 67, and 100 percent compared to undamaged plots.

A Jari mower was used to cut 3-ft alleyways across the front and back of each block of plots. Treatments were made on May 20, June 13, and July 1 using a weed eater with plastic blades held on edge at a 45 degree angle or perpendicular to the ground for the 100 percent treatment. The target amount of foliage or seed heads removed was one-third of the growth, two-thirds of the growth, or removal of all plant material above 1-2 inches. A research-sized swather was used to harvest a 40-inch by 12-ft portion of each Kentucky bluegrass plot on July 15, the date commercial harvest of the field was begun. Samples were placed in large burlap bags and hung in the three-sided equipment shed at the Central Oregon Agricultural Research Center to dry.

When samples were dry they were combined using a stationary Hege, with seed samples processed using a debearder follow by a Clipper cleaner.

Results and Discussion

The data (Table 1) are very similar to those collected last year. The same treatments caused similar reductions in yield with nearly the same comparative ranking of treatments to last year. This gives us confidence in the results across two varieties, stand age, and growing season.

It is clear that damage at head emergence resulted in the greatest reduction in yield. Treatments that applied 33 or 67 percent damage at head emergence had a significantly greater effect on seed yield than did other treatment timings. It appears that Kentucky bluegrass is particularly susceptible to damage at head emergence.

Even with 100 percent damage at the boot stage, the plant was able to recover with 41 percent of the yield compared to the untreated plots. Damage later in plant development, at head emergence or seed fill, eliminated any yield potential. Lesser damage of 33 and 67 percent inflicted at seed fill appeared to cause less reduction in seed yield than the same damage at the boot stage. This is despite heavier than intended damage inflicted at seed fill.

Table 1. Simulated hail damage on Kentucky bluegrass grown for seed with damage inflicted at the boot stage, head emergence, and seed filling prior to harvest on July 15, 2007.

Hail damage		Seed yield		
Damage (%)	Growth stage	lb/acre		% Untreated
Untreated	---	821	a[1]	100
33	Seed fill	622	b	76
33	Boot	568	b	69
67	Seed fill	453	c	55
100	Boot	338	d	41
67	Boot	335	d	41
33	Heads emerged	186	e	23
67	Heads emerged	67	f	8
100	Heads emerged	0	f	0
100	Seed fill	0	f	0

[1]Mean separation with Least Significant Difference (LSD) at $P \leq 0.05$.