

Evaluation of Simulated Hail Damage to Kentucky Bluegrass Seed Production in Central Oregon, 2009

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Abstract

This is the third 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 seed fill caused the greatest yield reduction, with similar results following damage at the boot stage and head emergence. This differs from the previous 2 years when the greatest damage was at head emergence. Previously, when 100 percent damage was applied at the boot stage, seed yield was 50 and 41 percent of the untreated plots, seeming to indicate the plants may be able to recover from significant damage at that stage. This year, however, seed yield from 100 percent damage at the boot stage yielded only 10 percent of the untreated plot.

Introduction

Kentucky bluegrass seed production has historically been an integral part of agriculture in central Oregon. The objective of this 3-year project is to determine the impact from timing and severity of hail damage on seed production of Kentucky bluegrass. This information is being generated to assist the National Crop Insurance Service in developing methodology to evaluate hail damage on Kentucky bluegrass.

Methods and Materials

This is the third 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 second-year field of 'Shamrock' at Macy Farms near Culver, Oregon. Plots were 5 ft by 15 ft, with 3-ft alleyways, replicated 4 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 8, May 27, and June 23 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 2, 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 followed by a Clipper cleaner.

Results and Discussion

Yield data from the two previous years were similar, while yields from this year did not follow the same pattern (Table 1). In previous years, damage at head emergence resulted in the greatest reduction in yield, with 33 or 67 percent damage at this stage having a significantly greater effect on seed yield than did other treatment timings. This year, damage at the beginning of seed fill resulted in the greatest yield reduction, with damage at the boot stage and head emergence being similar.

In previous years, even with 100 percent damage at the boot stage, the plant was able to recover with 50 and 41 percent of yield in the untreated plots. This year, seed yield for this treatment timing was 10 percent of the untreated plot. Damage of 100 percent later in plant development, at head emergence or seed fill, consistently eliminates any yield potential.

Table 1. Simulated hail damage on Kentucky bluegrass grown for seed with damage inflicted at boot, head emergence, and seed filling prior to harvest on July 2, 2009, Macy Farms, Culver, Oregon.

Growth stage	Hail damage		Seed yield	
	Damage (%)	Lbs/acre	% Untreated ¹	
Boot	33	583 bc ²	66	
	67	559 c	63	
	100	90 e	10	
Heads emerged	33	701 b	79	
	67	577 c	65	
	100	0 f	0	
Seed fill	33	525 c	59	
	67	343 d	39	
	100	0 f	0	
Untreated	---	890 a	100	

¹The heading “% Untreated” is a comparison of yields from the treated plots with the untreated plots of the same variety.

²Mean separation with Least Significant Difference (LSD) at $P \leq 0.05$.