Evaluation of Simulated Hail Damage to Kentucky Bluegrass Seed Production in Central Oregon, 2007

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Abstract

This is the first year of a multi-year study to determine the effect of simulated hail damage on Kentucky bluegrass seed yields. Treatments were inflicted at four growth stages in the spring to simulate 33, 67, and 100% damage. Treatments of 33% and 67% damage applied at head emergence caused significantly greater yield reductions than those applied at the boot stage, seed fill or just prior to harvest. It appears the plant may be particularly sensitive to damage at head emergence. When 100% damage was applied at the boot stage seed yield was only reduced by 50%, indicating the plants may be able to recover from significant damage at that stage.

Introduction

Kentucky bluegrass *(Poa pratensis)* 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 over supply, 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 first 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 fifth-year field under a center pivot with Roff 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 four treatment timings and three levels of damage. Damage treatments were inflicted at the boot stage, at head emergence, during seed fill following pollination and just prior to harvest. Severity of damage inflicted was 33, 67, and 100 percent compared to undamaged plots.

A Jari mower was used to cut three-ft alleyways across the front and back of each block of plots. Treatments were made on May 14, May 28, June 26 and July 4 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 22-ft portion of each Kentucky bluegrass plot on July 5, 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 interesting and perhaps a bit unexpected. It seems clear that damage at head emergence resulted in the greatest reduction in yield. Treatments that applied 33% or 67% damage at head emergence had a significantly greater effect on seed yield than other treatment timings. It appears that Kentucky bluegrass is particularly susceptible to damage at head emergence. Mowing the plots down like a lawn with 100% damage at the boot stage only reduced yield by 50%, though 67% damage reduced yield by 61%. Nevertheless, it seems to indicate the plant's ability to recover from significant damage at the boot stage.

A check on our ability to estimate 33% and 65% damage is provided in the seed fill and near harvest applications dates, with 33% reducing seed yield about 25% and 67% damage reducing yield about 48%. It appears we are be a little light on our estimate of damage, as the plant wouldn't be expected to compensate in such a short time frame.

Table 1. Simulated hail damage on Kentucky bluegrass grown for seed with damage inflicted at the boot stage, head emergence, seed filling and a day prior to harvest on July 5, 2007.

Hail damage		Seed yield		
Damage (%)	Growth stage	lb/acre		% check
Untreated	---	1296	a[1]	100
33	Near harvest	977	b	75
33	Seed fill	956	b	74
33	Boot	753	c	58
67	Near harvest	706	c	54
100	Boot	654	cd	50
67	Seed fill	634	cd	49
67	Boot	511	d	39
33	Heads emerged	293	e	23
67	Heads emerged	96	f	7
100	Heads emerged	43	f	3
100	Seed fill	0	f	0
100	Near harvest	0	f	0

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