

# Kentucky Bluegrass Variety Evaluation Under Nonthermal Residue Management

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## Abstract

A trial was established in a commercial field at Agency Farms north of Madras, Oregon to evaluate the performance of 15 Kentucky bluegrass (*Poa pratensis*) varieties under a nonthermal management system over a 3-year period. This was the establishment year, therefore residue management practices did not play a role in the seed yield data that were collected. Varietal differences observed in years two and three of this study will be of much greater importance because those data will be used to make decisions about variety placement, crop-rotation length, and price structure needed to maintain economic viability under nonthermal conditions.

## Introduction

Recently proposed legislation to eliminate open field burning throughout Oregon has created a sense of urgency among the grass seed industry in central Oregon. The Jefferson County Smoke Management Committee has worked to improve the local field burning program in significant ways every year over the last 7 years. One major step they have taken has been a ban on all burning within 0.125 mile of U.S. Highways 26 and 97 in Jefferson County. In addition, Affeldt and Weber (2008) conducted large-plot research to re-evaluate alternative residue management practices. Their research showed that with currently available technology, there is no suitable replacement for field burning that is capable of maintaining seed yield in established stands of Kentucky bluegrass.

The current situation consisting of a local ban on burning along the highway, a looming statewide ban on burning, and no suitable alternative to burning has created a need for variety performance data for Kentucky bluegrass managed without burning. Kentucky bluegrass variety performance data could be used by growers and seed companies to determine which varieties to grow along the highway, where burning is already banned. Furthermore, if all burning was banned these data could be used to determine varietal feasibility and the price structure needed to maintain economic viability.

The objective of this research was to evaluate the performance of 15 Kentucky bluegrass varieties under a nonthermal management system over a 3-year period.

## Materials and Methods

A trial consisting of large, nonreplicated plots was established in a commercial field at Agency Farms north of Madras, Oregon. The soil was a Madras sandy loam and a soil test prior to seedbed preparation indicated a pH of 5.8 and soil organic matter at 1.7 percent. Based on the soil test the field was amended with 1 ton/acre of lime ( $\text{CaCO}_3$ ), 100 lb/acre of potash ( $\text{K}_2\text{O}$ ), and 200 lb/acre of 20.5-0-0-24 fertilizer. Each bluegrass variety was planted on August 7, 2007 in a plot that was roughly 50 by 725 ft, consisting

of 20 beds with 2 rows spaced 14 inches apart per bed, with beds spaced 16 inches apart. Kentucky bluegrass seeding depth was approximately 0.25 inch; the seeding rate was 5.8 lb/acre for all varieties except 'A01-299', which was seeded at 10 lb/acre because the seed had been harvested in July prior to planting. The plots were randomized but not replicated. Ten beds of 'Geronimo' Kentucky bluegrass were planted on the edge of the trial as a border. The trial was furrow irrigated and the first irrigation began the day after planting. After the first irrigation, glyphosate was broadcast on the field to control emerged weeds. One row of 'Crest' was missing from the plot and was replanted with a single row seeder on September 6, 2007. Additional weed control consisted of a single broadcast application on October 23, 2007 of bromoxynil, MCPA, and dicamba for broadleaf weed control, hand-hoeing, and a single between-row spray application of the nonselective herbicide paraquat on November 9, 2007. Another 125 lb/acre of 40-0-0-6 fertilizer was applied December 14, 2007. Fungicide, consisting of myclobutanil and sulfur, was applied on April 2, 2008 for powdery mildew.

Swathing timing was determined by conducting moisture testing according to methods developed by the International Seed Testing Association. The target seed moisture for swathing was 24 to 28 percent. Swathing dates were as follows:

- July 4, 2008: 'Geronimo' (border), 'Shamrock', and 'Volt'
- July 6, 2008: 'Crest', 'Atlantis', and 'Merit'
- July 8, 2008: 'Bandera' and 'A00-891'
- July 9, 2008: 'Rhapsody', 'A00-1400', 'Bordeaux', and 'A01-299'
- July 10, 2008: 'Valor'
- July 11, 2008: 'Bariris'
- July 12, 2008: 'Monte Carlo', 'Zinfandel'

Seed threshing was conducted with an International 403 combine. Each plot was threshed as soon as it was dry. Harvested seed was placed in steel fork-lift totes that were tagged with a lot number and transported to Central Oregon Seeds, Inc. (COSI) for cleaning. Seed cleaning is further discussed below.

## **Results and Discussion**

Variety selection for the trial was established through an advisory committee that consisted of local seed contractors. CHS, Inc., Central Oregon Seeds, Inc., and Wilbur-Ellis worked with grass seed breeding companies to select varieties that may have potential under no-burn production along with other standard varieties. The advisory committee also worked out the overall management strategy for the trial. Agronomic aspects were the same for each variety except for the harvest timing, which was done according to maturity as described below. In order to be consistent with actual commercial production practices, the committee decided to make each plot as large as possible and forego replicating.

Most of the trial had very few weeds, but four plots ('Atlantis', 'Bordeaux', 'Valor', and 'A00-1400') on one edge of the field were infested with downy brome (*Bromus tectorum*, also known as cheatgrass). Downy brome was managed with hand-hoeing and between-row spraying. When downy brome control measures were completed, visual estimates of

the remaining infestation were made on May 22, 2008. The downy brome infestation was determined to be from 20 to 28 percent in these four plots. Beacon<sup>®</sup> (primisulfuron) is currently the only herbicide that could have selectively controlled the downy brome; however primisulfuron was not used because of the risk of crop injury it poses.

The fungicide application on April 2 served as preventative step for powdery mildew management. No further development of powdery mildew was observed.

Seed cleaning was completed with commercial equipment at the COSI cleaning facility near Madras. Seed containers were labeled only with a lot number and the cleaning operations were blind, so that COSI personnel handling the seed had no knowledge of variety identity. The percent cleanout, clean seed yield, and pure seed are listed in Table 1 and are ranked by seed yield. Since this was the establishment year there was no effect from not burning post-harvest residues. The ability of these varieties to yield well without burning over the next 2 years will be the most important part of this research.

Seed purity and germination were tested professionally at Agri-Seed Testing, Inc. in Salem, Oregon. Seed germination was inexplicably low for many of the newer or numbered varieties.

In the short-term, the results from this research will be used to determine which varieties can be effectively grown in the phased-out area along U.S.Highways 26 and 97. In the long-term, should field burning ever be banned, this research could be used to determine variety placement, crop-rotation length, and price structure needed to maintain economic viability.

### **References**

Affeldt, R., and M. Weber. 2008. Non-thermal residue management in Kentucky bluegrass. Pages 24-26 *in* Central Oregon Agricultural Research Center 2007 Annual Report. Special Report 1084.

### **Acknowledgements**

We are extremely grateful to Dean Brooks for not only permitting this research to be done at Agency Farms, but also for the active role he took in helping to design, plant, manage, and harvest the trial. We are grateful to Mike Weber, Jim Carroll, and Al Short, who were the three key individuals on the advisory committee. Further thanks go to Jim Carroll for the field scouting expertise he provided for this trial. The advisory committee also benefited from the input of Les Gilmore, Brad Holliday, and Jordan Trimmer. A very special thank you goes to Gary Harris for his donation of the International 403 combine we used to harvest these plots.

Table 1. Kentucky bluegrass seed yield under nonthermal residue management at Agency Farms north of Madras, Oregon, 2007-2008.

Variety	Cleanout	Clean seed yield <sup>‡</sup>	Pure seed	Germination
	%	lb/acre	%	%
Merit	21	1,501	98.25	89.00
Shamrock	12	1,406	99.26	90.25
Crest	17	1,399	97.76	87.00
Volt	17	1,369	94.95	76.75
Bandera	15	1,364	95.41	79.00
A00-891	17	1,295	93.24	59.75
Atlantis <sup>†</sup>	25 <sup>†</sup>	1,244	98.90	85.00
Bordeaux <sup>†</sup>	29 <sup>†</sup>	1,014	94.46	66.50
Monte Carlo	19	958	95.31	71.25
A01-299	24	918	92.78	61.75
Rhapsody	21	873	93.87	58.25
Valor <sup>†</sup>	29 <sup>†</sup>	782	75.04	53.50
A00-1400 <sup>†</sup>	38 <sup>†</sup>	752	94.55	60.75
Zinfandel	26	740	93.78	64.75
Bariris	31	583	94.28	74.25

<sup>‡</sup> Seed yield and variety rank were similar in small plots at COARC (data not shown).

<sup>†</sup> Indicates plots with an infestation of downy brome (also known as cheatgrass) that was visually estimated at 20 to 28 percent.