# VOLUNTEER WHEAT CONTROL IN NEWLY SEEDED KENTUCKY BLUEGRASS GROWN FOR SEED

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**Introduction**

Crop rotation in central Oregon often involves planting perennial grass for seed in August following wheat harvest. Wheat grain losses occur before and during harvest. As a result, wheat seeds remain in the soil and become the source of volunteer plants in the next crop. Volunteer wheat plants compete with the perennial grass crop for light, nutrients, and water, similar to any other weed. Competition from volunteer wheat can affect grass seed yield and quality and even compromise establishment of new grass stands. Control of annual grasses growing in competition with perennial grasses is difficult due to morphological and physiological similarities that drastically limit herbicide control options. Management options are further restricted due to the limited alternatives available for control in newly planted perennial grass. These management complexities and the resulting crop losses make determining the control efficacy of volunteer wheat and potential crop injury of currently labeled options a high priority.

**Materials and Methods**

A field study was conducted in September 2012 to evaluate volunteer wheat control on a newly planted Kentucky bluegrass field at COARC, Madras, OR. The study design was a randomized complete block with four replications with a plot size of 10 feet x 30 feet. Treatments consisted of ethofumasate (Nortron®), mesotrione (Callisto®), and primisulfuron (Beacon®). Nortron and Callisto were applied pre-emergent and early post-emergent, while primisulfuron was applied early post-emergent and in two sequential post-emergent applications. Herbicides were applied with a backpack sprayer calibrated to deliver 20 gallons of spray solution per acre at 40 psi pressure using XR 8002 Teejet® nozzles. Application dates and environmental conditions for each study are detailed in Table 1. Herbicide rates and adjuvants are detailed in Table 2. Herbicide efficacy and crop injury were evaluated in spring of 2013. Plots were harvested in 2013 to determine the impacts of each treatment on grass seed yield.

Table 1. Application date and environmental conditions for herbicide applications.

| Application timing | A | B | C |
|---|---|---|---|
| Application date | 9/28 | 11/2 | 11/22 |
| Time of day | 9 am | 10 am | 11 am |
| Air temperature (°F) | 68 | 42 | 44 |
| Relative humidity (%) | 31 | 80 | 56 |
| Wind speed (mph) | 2 | 2 | 5 |
| Wind direction | SSE | NW | NE |

**Results and Discussion**

Volunteer wheat control and crop injury

Volunteer wheat control and crop injury differed among treatments and time of application (Table 2). For instance, control with Nortron applied at pre-emergent was excellent (98%), but crop injury was significant (38%). Kentucky bluegrass injury was reduced to 18% when Nortron was applied early post-emergent, but only 10% of the volunteer wheat was controlled. The application of Callisto at pre-emergent resulted in only 5% control of volunteer wheat and crop injury of 3%. Control with Callisto improved to 68 and 59% when Callisto was applied early post-emergent at rates of 3 and 6 fl oz/acre, respectively. No crop injury was observed for this treatment the following spring. Beacon applied early post-emergent at 0.76 oz/acre, or in sequential applications of 0.38 oz/acre each, provided 92 and 97% volunteer wheat control, respectively. Nevertheless, a high level of crop injury was observed with these treatments the following spring.

Kentucky bluegrass seed yield

Although Nortron and Beacon treatments provided high levels of volunteer wheat control, these herbicides were associated with elevated crop injury that resulted in lower seed yields (Table 2). Callisto at 3 or 6 fl oz/acre provided only partial volunteer wheat control (68 and 59%, respectively). However, this partial control, combined with low crop injury, resulted in seed yields of 167 and 155 lb/acre, the highest among all treatments.

Results from this study indicate that volunteer wheat control in newly established stands of Kentucky bluegrass grown for seed with labeled herbicides is difficult because the most effective treatments cause unacceptable levels of crop injury, while levels of control provided by the safest products are not commercially acceptable. The levels of control and crop injury observed with the use of herbicides emphasize the need to implement an integral management program that includes cultural practices that ensure vigorous stands of Kentucky bluegrass as well as reduction of wheat seed losses during harvest.

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Table 2. Percent volunteer wheat control, crop injury, and Kentucky bluegrass seed yield for herbicide treatments tested in Madras, OR.

| No. | Treatment[1,2] | Rate | Code[3] | Control[4] | Injury[4] | Yield[4] |
|---|---|---|---|---|---|---|
| | | | | ------------- (%) | ------------ | (lb/a) |
| 1 | Nortron® | 3 pt/a | A | 98 a | 38 b | 91 bc |
| 2 | Nortron® | 3 pt/a | B | 10 c | 18 c | 34 c |
| 3 | Callisto® | 6 fl oz/a | A | 5 c | 3 c | 86 bc |
| 4 | Callisto®<br>COC<br>Ammonium sulfate | 3 fl oz/a<br>1% v/v<br>8.5 lb/100 gal | B | 68 b | 0 c | 167 a |
| 5 | Callisto®<br>COC<br>Ammonium sulfate | 6 fl oz/a<br>1% v/v<br>8.5 lb/100 gal | B | 59 b | 0 c | 155 ab |
| 6 | Beacon®<br>COC | 0.76 oz wt/a<br>1% v/v | B | 92 a | 40 b | 88 bc |
| 7 | Beacon®<br>COC<br>Beacon®<br>COC | 0.38 oz wt/a<br>1% v/v<br>0.38 oz wt/a<br>1% v/v | B<br><br>C | 97 a | 60 a | 42 c |
| 8 | Untreated check | — | — | 0 c | 0 c | 67 c |
| LSD ($P$ = 0.05) | | | | 15 | 16 | 55 |

[1]Before using an herbicide, make certain it is properly labeled for the intended use.
[2]COC = Crop oil concentrate
[3]A = pre-emergent; B = early post-emergent; C = 20 days after B
[4]Means among columns followed by the same letter are not different at $P$ = 0.05.