

MANAGEMENT OF TROUBLESOME WEEDS IN ALFALFA SEED PRODUCTION IN THE TREASURE VALLEY

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Introduction

Weed control is important in alfalfa seed production in order to harvest high quality seed and maximize yields. Effective weed control reduces losses by minimizing weed competition with alfalfa plants and reduces debris that must be removed during seed cleaning and conditioning. Weeds such as dodder and hairy nightshade produce seed that cannot be easily separated from alfalfa seed. Herbicides are needed for effective management of troublesome weeds such as prickly lettuce, annual sowthistle, and hairy nightshade for growers in the Treasure Valley growing region of southeastern Oregon and southwestern Idaho.

Differences in cultural practices between forage and alfalfa seed production include plant stand and planting configuration. Alfalfa grown for seed is planted in rows at a reduced plant population compared to alfalfa grown for forage where seed is broadcast. The relatively open plant canopy of alfalfa grown for seed tends to thicken with time; the canopy is normally thinned in the spring by cross-cultivation. Reducing plant population improves seed production by reducing the number of aborted flowers, competition among plants, lodging, and reducing foliar diseases by allowing free air movement. The reduced plant population is intentionally managed with moderate water stress. Water stress in alfalfa promotes higher leaf and air temperature. Warmer air temperature helps pollinator bees work more efficiently. The lower plant populations used in alfalfa seed production require intensive weed management compared to forage alfalfa.

Herbicides that are not currently registered for use to manage weeds in alfalfa seed production in the Treasure Valley may prove useful in the future. In order to compare the effectiveness of currently registered herbicides with future possible herbicides, a field trial was established at the Malheur Experiment Station during 2015 with treatments applied in the spring of 2016. This will be a multi-year study evaluating the efficacy of several products and their potential effects on alfalfa seed yield. Alfalfa seed producers in the Treasure Valley need herbicides to be evaluated in conditions that match local growing practices.

The overarching objective of this trial is to determine herbicides that are most effective for control of troublesome weeds such as prickly lettuce, annual sowthistle, and nightshade. Alion[®] and Outlook[®] are not currently labeled for use in alfalfa seed production, and this report is not meant to indicate that unlabeled products can be used for weed control in alfalfa. Always read and follow the label directions when applying herbicides or other plant protection products.

Materials and Methods

Alfalfa variety 54Q14-P263 (United Ag Technology) was planted on April 14, 2015 at the Malheur Experiment Station in Nyssa silt loam soil at 2-inch seed spacing in 22-inch rows. On June 29, 2015 14 inches of row were thinned out leaving 5 inches of plants. Prickly lettuce and annual sowthistle seed were broadcast by hand on the trial site in the fall of 2015. Eight treatments including a nontreated check were replicated four times in a randomized complete block design (Table 1). The herbicide treatments were applied February 25, 2016 using a CO₂-backpack sprayer at 20 gpa and 30 psi. The crop was flailed back to 3 inches high on May 4, 2016. The plot size was 6 rows, 22 inches wide by 35 ft long. Cultural operations such as irrigation, lygus control, and leafcutter bees were used in what would be considered standard grower practices.

In-season data

Visual weed ratings were made based on an incidence scale of 1 to 5 for each weed (with 5 being complete weed control). The diversity of weeds observed was also recorded but the data are not shown. Weeds included prickly lettuce, wild oats, common mallow, kochia, and purple mustard. Differences in incidence and control of specific weeds were not significantly different between treatments.

Harvest

The alfalfa plants were chemically desiccated with paraquat at 2 pt/acre on 23 August. Seed from three rows in the center of each plot were harvested using a Wintersteiger small plot combine on 31 August. Harvested seed was cleaned with a clipper mill, and weighed. The seed samples from each replicate were blended by treatment and were submitted to the Wyoming Seed Labs for viability testing.

Statistical analysis

Data analysis was performed using SAS, PROC GLM and the means separated using Fisher's Protected LSD at $\alpha = 0.05$.

Results

There were no significant differences in alfalfa seed or weed control ratings in 2016 (Table 1). Seed quality was similar among treatments (Fig. 1). The trial will be repeated in 2017.

Acknowledgements

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Table 1. Yield and weed control rating results of replicated herbicide treatments in an alfalfa seed grown at the Oregon State University, Malheur Experiment Station, Ontario, OR, 2016.

| Treatment | Yield (lb/acre) | Weed control ratings 1-5 (5 = best) | | |
|----------------------------------|--------------------|--|-------|--------|
| | | Jul 9 | Aug 1 | Aug 23 |
| Nontreated check | 589 | 4.3 | 3.5 | 3.8 |
| Alion 2 oz/acre ^a | 626 | 4.3 | 4.3 | 3.8 |
| Alion 3 oz/acre ^a | 598 | 5.0 | 4.5 | 4.0 |
| Alion 4 oz/acre ^a | 614 | 4.8 | 3.8 | 3.8 |
| Chateau 4 oz/acre | 713 | 4.8 | 4.8 | 4.5 |
| Outlook 21 oz/acre ^a | 611 | 4.8 | 4.5 | 4.5 |
| Prowl H ₂ O 2 pt/acre | 535 | 4.8 | 4.5 | 4.5 |
| Velpar 16 oz/acre | 589 | 5.0 | 4.3 | 4.3 |
| LSD (0.05) | ns | ns | ns | ns |
| F value | 0.45 | 0.13 | 0.11 | 0.46 |

^aNot currently labeled for use in alfalfa seed production.

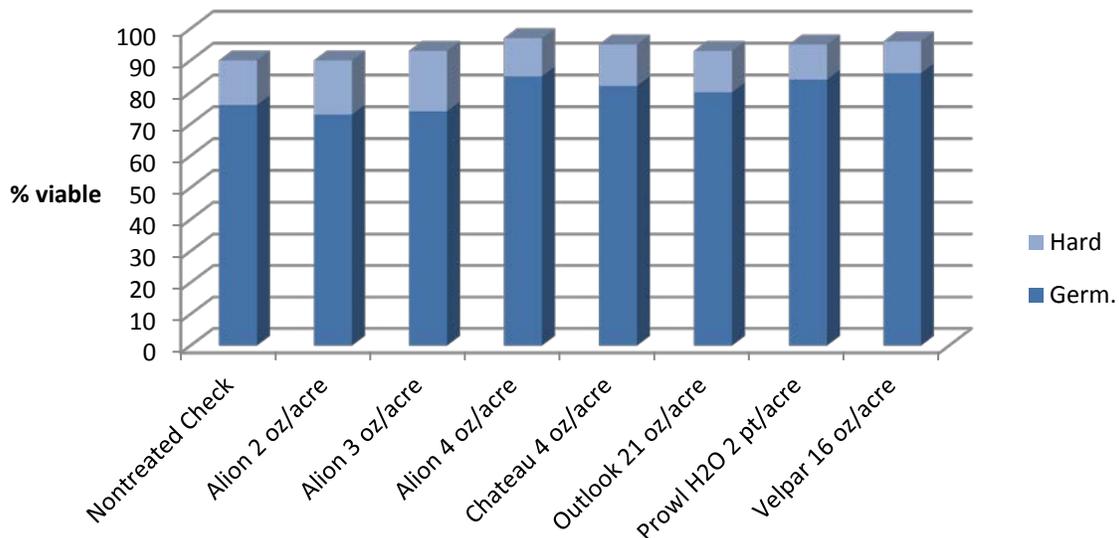


Figure 1. Germination and hard seed of alfalfa seed from a replicated herbicide trial at the Oregon State University, Malheur Experiment Station, Ontario, OR, 2016. Alion and Outlook are not currently registered for use in alfalfa seed production.