

TOLERANCE OF SULPHUR-FLOWER BUCKWHEAT (*ERIOGONUM UMBELLATUM*) TO RATES AND MIXTURES OF POSTEMERGENCE HERBICIDES, 2008–2012

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Introduction

Native forb seed is needed to restore rangelands of the Intermountain West. Commercial seed production is necessary to provide the quantity of seed needed for restoration efforts. A major limitation to economically viable commercial production of native forb seed is weed competition. Weeds are adapted to growing in disturbed soil, and native forbs are not competitive with these weeds. The use of preemergence and postemergence herbicides for forb weed control is important, because forbs are fall planted. Fall planting results in nearly simultaneous forb and weed emergence early in the spring, complicating weed control. There is considerable knowledge about the relative efficacy of different herbicides to control target weeds, but few trials have tested the tolerance of native forbs to commercial herbicides. This trial evaluated the tolerance of sulphur-flower buckwheat (*Eriogonum umbellatum*) to the herbicides Select[®] (clethodim), Prowl[®] (pendimethalin), and Outlook[®] (dimethenamid-p). Prowl and Outlook are broad-spectrum, soil-active herbicides that prevent weed emergence during the growing season. Select is a foliar-contact grass herbicide.

This work sought to discover products that could eventually be registered for use for native forb seed production. The information in this report is for the purpose of informing cooperators and colleagues in other agencies, universities, and industry of the research results. Reference to products and companies in this publication is for the specific information only and does not endorse or recommend that product or company to the exclusion of others that may be suitable. Nor should any information and interpretation thereof be considered as recommendations for the application of any of these herbicides. **Pesticide labels should always be consulted before any pesticide use. Considerable efforts may be required to register these herbicides for use in native forb seed production.**

Materials and Methods

The trial was conducted on a field of Nyssa silt loam with a pH of 8.3 and 1.1 percent organic matter. Before planting, drip tape (T-Tape TSX 515-16-340) was buried at 12-inch depth midway between two 30-inch rows. The drip tapes were buried 5 ft apart in alternating inter-row

spaces (5 ft apart). The flow rate for the drip tape was 0.34 gal/min/100 ft at 8 psi with emitters spaced 16 inches apart, resulting in a water application rate of 0.066 inch/hour.

In the fall of 2006, sulphur-flower buckwheat was planted in an area 10 ft wide and 220 ft long. The seeds were planted at 0.25-inch depth in 4 rows 30 inches apart. The field previously had been disked, ground hogged, and marked in rows 30 inches apart. A total of 4 drip irrigations applying 1 inch of water each were applied at 2-week intervals in 2007–2010. Drip irrigations were started when the flowering began. The trial was not irrigated in 2011.

On March 12, 2008, March 20, 2009, April 7, 2010, April 1, 2011, and April 10, 2012 13 herbicide treatments (Table 1) were applied to plots 4 rows wide and 5 ft long. The treatments consisted of different rates and combinations of the soil-active herbicides Prowl and Outlook. The treatments were arranged in a randomized complete block design with four replications. Treatments were applied at 30 psi, 2.63 mph, and 20 gal/acre using 8002 nozzles with 6 nozzles spaced 20 inches apart.

Seed was harvested at maturity from the middle two rows in each plot each year.

General Considerations

The focus of the evaluations was forb tolerance to the herbicides, not weed control, so weeds were removed as needed.

Treatment differences were compared using ANOVA and protected least significant differences at the 95 percent confidence LSD (0.05) using NCSS Number Cruncher software (NCSS, Kaysville, UT).

Results and Discussion

All observations made on the herbicides tested are strictly preliminary observations. Herbicides that damaged forbs as reported here might be helpful if used at a lower rate or in a different environment. The herbicides were relatively safe for sulphur-flower buckwheat in this trial but they might be harmful if used at higher rates or in a different environment. Nothing in this report should be construed as a recommendation.

Symptoms of herbicide injury were not observed in any of the plants in any year. Foliar injury would not be expected since all herbicides tested (except Select) were soil active and were applied early. There were no significant differences in seed yield between the herbicide treatments and the untreated check in 2008 and 2009 (Table 1). In 2010, Prowl at 1.43 lb ai/acre produced a higher seed yield than the check. In 2011, Prowl at 1.43 lb ai/acre and the mixture of Prowl at 1.19 lb ai/acre with Outlook at 0.84 lb ai/acre had a higher yield than the check. These herbicide treatments could have provided better weed control than the check, had the check not been kept weed free by hand weeding. In 2012, there were no significant differences in seed yield between the herbicide treatments and the untreated check.

Summary

Sulphur-flower buckwheat was tolerant to Prowl and Outlook applied as postemergence treatments at the rate and timing and on the soils used in these trials. The use of these three herbicides may provide the basis for an effective weed control program for seed production of sulphur-flower buckwheat. Further tests are warranted to describe the range of safety for these herbicides and whether or not they have any undesirable interactions.

Seed yields in 2012 were low. The soil water started very low in April, which may have had a detrimental effect on the seed yield of all of the treatments.

Table 1. Seed yield of sulphur-flower buckwheat (*Eriogonum umbellatum*) in response to repeated postemergence herbicides applied on March 12, 2008, March 20, 2009, April 7, 2010, April 1, 2011, and April 10, 2012. Malheur Experiment Station, Oregon State University, Ontario, OR. Prowl and Outlook are soil-active herbicides and Select is a foliar-contact grass herbicide.

Treatment	Rate	2008	2009	2010	2011	2012
	(lbs ai/acre)	----- lb/acre -----				
Weed free, untreated control		276.5	430.0	622.6	346.2	89.5
Select 2.0 EC ^a	0.094	149.1	475.2	618.1	285.3	141.2
Prowl	0.95	387.2	440.8	549.7	406.9	120.9
Prowl	1.19	533.1	596.6	736.5	356.0	105.1
Prowl	1.43	250.6	596.4	988.8	502.3	105.9
Outlook	0.84	319.8	474.5	725.2	440.1	89.7
Outlook	0.98	143.5	501.4	627.4	251.7	137.1
Prowl + Outlook	0.95 + 0.66	300.9	555.5	795.5	357.0	154.9
Prowl + Outlook	0.95 + 0.84	440.0	763.8	861.3	464.0	61.2
Prowl + Outlook	0.95 + 0.98	330.9	569.1	614.8	436.0	59.8
Prowl + Outlook	1.19 + 0.66	244.0	699.8	618.5	433.7	129.7
Prowl + Outlook	1.19 + 0.84	336.7	556.0	592.2	513.6	57.9
Prowl + Outlook	1.19 + 0.98	285.6	506.2	684.3	367.0	126.3
Average		307.5	551.2	695.0	396.9	106.1
LSD (0.05)		NS	NS	241.7	149.5	NS

^aapplied with Herbimax adjuvant at 1 percent v/v.