

FORB RESPONSE TO POSTEMERGENCE HERBICIDES

Joel Felix, Joey Ishida, Erik B. G. Feibert, and Alicia Rivera, Malheur Experiment Station, Oregon State University, Ontario, OR, 2014

Materials and Methods

Seed of 12 wildflower species were planted on the soil surface during fall 2013 (Table 1). After planting, a protective ground cover was immediately placed on each bed. The protective ground cover was removed on April 2, 2014.

Before planting, drip tape (T-Tape TSX 515-16-340) was buried at 12-inch depth midway between each pair of 30-inch rows. 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.

Treatments to evaluate forb species' tolerance of various herbicides were applied postemergence on April 16 (early) or May 14, 2014 (late). The treatments were broadcast using a CO₂ sprayer with 8002 nozzles at 30 psi applying 20 gal/acre. The study had a randomized complete block design with four replications. Each plot consisted of 12 single rows (one row/wildflower species) and was 7.33 ft wide. Herbicides were sprayed perpendicular to the rows, with all 12 species/plot sprayed in a single pass. Subjective plant damage ratings were taken in each plot on June 16, 2014.

Results and Discussion

Eight species had good stands. *Lomatium dissectum* (fernleaf biscuitroot), *Phacelia linearis* (threadleaf phacelia), *Ligusticum porteri* (Porter's licorice-root), and *Ligusticum canbyi* (Canby's licorice-root) did not emerge.

Evaluations on June 14 indicated very high injury for the plants that were sprayed on April 16, 2014 (data not shown). All annual plant species were killed and perennial species were severely stunted. Evaluations indicated some level of herbicide tolerance for plants sprayed on May 14, 2014 (Table 2). *Sphaeralcea grossulariifolia*, *Eriogonum umbellatum*, *Penstemon speciosus*, and *Achillea millefolium* suffered injury ranging from 24 to 95% across the herbicide treatments. The injury was characterized by stunting and reduced flowering. Injury for *Machaeranthera canescens*, *Heliomeris multiflora*, *Chaenactis douglasii*, and *Phacelia hastata* ranged from 4 to 58%.

Our results suggest that these wildflower species may be very sensitive to the herbicides evaluated, especially when applied early after removing the ground cover. However, it is possible that directed sprays between rows using protective shields (though not tested in this study) could be an option for weed control in forbs. These treatments will be applied in the same plots in 2015 to evaluate the response of perennial species that will have well established root systems.

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Table 1. Wildflower species planted in the fall of 2013 for the herbicide trial at the Malheur Experiment Station, Oregon State University, Ontario, OR.

	Species	Common name
1	<i>Lomatium dissectum</i>	fernleaf biscuitroot
2	<i>Sphaeralcea grossulariifolia</i>	gooseberryleaf globemallow
3	<i>Eriogonum umbellatum</i>	sulphur-flower buckwheat
4	<i>Penstemon speciosus</i>	royal penstemon, sagebrush penstemon
5	<i>Achillea millefolium</i>	yarrow
6	<i>Machaeranthera canescens</i>	hoary tansyaster
7	<i>Heliomeris multiflora</i>	showy goldeneye
8	<i>Chaenactis douglasii</i>	Douglas' dustymaiden
9	<i>Phacelia hastata</i>	silverleaf phacelia
10	<i>Phacelia linearis</i>	threadleaf phacelia
11	<i>Ligusticum porteri</i>	Porter's licorice-root
12	<i>Ligusticum canbyi</i>	Canby's licorice-root

Table 2. Response of eight forbs to postemergence herbicides for weed control at the Malheur Experiment Station, Oregon State University, Ontario, OR 2014.

Treatment	Rate per acre		Product rate per acre	Injury ^a							
				<i>Sphaeralcea grossulariifolia</i>	<i>Eriogonum umbellatum</i>	<i>Penstemon speciosus</i>	<i>Achillea millefolium</i>	<i>Machaeranthera canescens</i>	<i>Heliomeris multiflora</i>	<i>Chaenactis douglasii</i>	<i>Phacelia hastata</i>
1 Untreated				0c	0b	0b	0c	0d	0a	0b	0b
2 Buctril	0.125	lb ai	0.5 pt	73a	30b	11b	24bc	21ab	11a	5b	58a
Prowl H2O	0.95	lb ai	2 pt								
3 GoalTender	0.25	lb ai	0.5 pt	23bc	31b	39ab	24bc	14bc	6a	4b	48ab
Prowl H2O	0.95	lb ai	2 pt								
4 Buctril	0.125	lb ai	0.5 pt	83a	31b	43ab	40ab	31a	11a	23ab	35ab
GoalTender	0.25	lb ai	0.5 pt								
Prowl H2O	0.95	lb ai	2 pt								
5 Valor (Chateau)	0.128	lb ai	4 oz	74a	21b	79a	31ab	8cd	11a	13b	35ab
Prowl H2O	0.95	lb ai	2 pt								
6 Basagran	1.125	lb ai	2.25 pt	65ab	30b	53ab	58a	23ab	6a	8b	14ab
Prowl H2O	0.95	lb ai	2 pt								
7 Linex	1	lb ai	2 pt	55ab	91a	73a	38ab	14bc	11a	40a	16ab
Prowl H2O	0.95	lb ai	2 pt								
8 Raptor	0.0156	lb ae	0.125 pt	95a	33b	46ab	35ab	18bc	1a	5b	54a
Basagran	1.125	lb ai	2.25 pt								
Prowl H2O	0.95	lb ai	2 pt								
LSD ($P = 0.05$)				49	33	53	28	13	14	23	48

^a Means within a column followed by same letter do not significantly differ ($P = 0.05$, LSD)