TINY VETCH CONTROL IN CRIMSON CLOVER GROWN FOR SEED

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Introduction

Crimson clover (*Trifolium incarnatum* L.) grown for seed is an important crop in some areas of western Oregon. For grass seed and wheat growers, it is a dicot rotational crop that provides good economic returns in a system dominated by monocots. To sustain these good economic returns, seed quality and purity are important. Tiny vetch species, *Vicia* spp., are a weed management problem in crimson clover grown for seed because they compete for resources, reducing crimson clover yield, and contaminate clover seed, decreasing its value and increasing losses at the seed conditioner. Controlling tiny vetch in crimson clover grown for seed is especially difficult because both are annual legumes with similar growth habits.

Flumetsulam and 2,4-DB have demonstrated crop safety in red clover (Roerig et al., 2018). 2,4-DB is a Group 4 (synthetic auxin) herbicide that controls many annual and perennial broadleaf weeds. 2,4-DB does not perform as an herbicide until susceptible plants convert 2,4-DB into 2,4-D via enzymes within the plant. Legume crop safety with 2,4-DB is possible due to the low quantity of these enzymes, slow rate of penetration into the foliage, and slow rate of translocation within legume plants. There are no known cases of resistance to 2,4-DB (Shaner, 2014). Flumetsulam is a Group 2 (ALS inhibitor) herbicide with pre- and postemergent activity on broadleaf weeds. ALS-resistant grass and broadleaf weeds are common throughout the United States; however, ALS-resistant broadleaf weeds are rare in the Willamette Valley. The objective of this study was to evaluate herbicides for crop safety in crimson clover and for efficacy in controlling tiny vetch.

Materials and Methods

The trial was conducted in a commercially grown field of crimson clover with a history of tiny vetch in Washington County, OR. Plots were 8 feet x 25 feet in a randomized complete block design with four replications. The first applications of 2,4-DB and flumetsulam were applied to crimson clover with two or three trifoliates when tiny vetch had grown 1–3 inches on November 1, 2017. Additional flumetsulam applications were made to crimson clover with 3–6 inches of growth on March 20, 2018. An untreated check and a grower standard, imazamox + bentazon, were also included. Treatments were delivered in 20 gallons of water/acre and included a nonionic surfactant using a plot sprayer with a 7.5-foot boom.

Visual evaluations of crop injury and weed control were conducted throughout the growing season, and evaluations from May 15, 2018 are reported. The plots were swathed on June 18, 2018 and combined on June 26, 2018, using a Wintersteiger plot combine.

Results and Discussion

Eleven weeks following application, crimson clover injury was 20–23% (data not shown) when 2,4-DB was applied on November 1 at the two higher rates. By May 15, injury was no longer visible, and the plots yielded equivalent to the untreated and grower standard (Table 1). Tiny vetch was not controlled; however, 2,4-DB could be a useful tool for controlling other important weeds in crimson clover due to its crop safety.

Flumetsulam did not injure the crimson clover, and yield was equal to or greater than the untreated check and the grower standard when applied at either timing or rate (Table 1). Control of tiny vetch was 70–83% and was not significantly different between application rates or timing (fall or spring). The control observed was primarily stunting of the tiny vetch plants and suppression of flowering. Since one of the primary objectives is seed purity, and currently registered herbicides provide inadequate control of tiny vetch, flumetsulam would be a valuable tool if it were registered for use in crimson clover.

References

Roerig, K.C., A.G. Hulting, D.W. Curtis, and C.A. Mallory-Smith. 2018. Control of dock species in seedling red clover grown for seed. In *Western Society of Weed Science Research Progress Report.*

Shaner, D.L. 2014. *Herbicide Handbook*, 10th edition. Lawrence, KS: Weed Science Society of America.

Acknowledgments

The authors gratefully acknowledge the Oregon Clover Commission for funding this research.

Table 1. Tiny vetch control and crimson clover injury and seed yield, 2018.

			Tiny vetch	Crimson clover	
	Rate	Date applied	Control (May 15, 2018)	Injury (May 15, 2018)	Seed yield (June 26, 2018)
			(%)	(%)	(lb/a)
Untreated	—	—	0	0	442
Imazamox	0.039 lb ai/a	Nov. 1, 2017	0	0	447
+ bentazon	0.625 lb ai/a	Nov. 1, 2017			
2,4-DB	0.500 lb ae/a	Nov. 1, 2017	10	0	464
2,4-DB	1.000 lb ae/a	Nov. 1, 2017	0	0	461
2,4-DB	1.500 lb ae/a	Nov. 1, 2017	10	0	419
flumetsulam	0.067 lb ai/a	Nov. 1, 2017	75	0	527
flumetsulam	0.133 lb ai/a	Nov. 1, 2017	83	0	456
flumetsulam	0.067 lb ai/a	Mar. 20, 2018	70	0	503
flumetsulam	0.133 lb ai/a	Mar. 20, 2018	75	0	545
LSD $P = 0.05$			16		73