Post-harvest Russian thistle control in spring wheat stubble

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Post-harvest Russian thistle control in the low and mid-rainfall areas of eastern Washington is critical for preventing soil moisture loss, biomass accumulation, and seed production that will cause problems in future crops. Russian thistle is a warm season introduced annual forb and is a major weed problem in both winter and spring wheat and will flourish in wheat stubble following harvest if left uncontrolled (Figure 1). Previous research has found that post-harvest late-season Russian thistle root growth can remove as much as 26 gallons of water per plant and deplete most all the available soil moisture to a depth of at least 6 feet. Herbicides effective for post-harvest Russian thistle control are usually contact-type herbicides, e.g., paraquat, that must contact all surfaces of the plants to achieve complete control. Paraquat can be very effective but is also a very toxic chemical and can pose health risks to applicators. Glyphosate, a systemic herbicide, is also applied post-harvest for Russian thistle control but can be less effective if applied at too low of a rate for the size of the plants being treated or to plants that are glyphosate resistant. Group 14 protoporphyrinogen oxidase (PPO) inhibitor herbicides have burndown activity and can be tank mixed with glyphosate for increased efficacy.

Figure 1. Russian thistle in spring wheat stubble one week after harvest at the WSU Lind Dryland Research Station, Lind, WA.

We compared BAS 85101H, an experimental Group 14 PPO herbicide, with and without PowerMax® (glyphosate) for post-harvest Russian thistle control. We also compared tank mixes with Sharpen® (saflufenacil, Group 14), Distinct® (diflufenzopyr, Group 19; dicamba, Group 4), and Weedone® 638 (2,4-D, Group 4). See Table 1 for application rates.

Table 1. Herbicide treatments and rates.

Treatments*	Rates**
	(oz/A)
PowerMax	64
BAS 85101H	1.4
BAS 85101H + PowerMax	1.4 + 32
Sharpen + PowerMax	2.0 + 32
Distinct + Weedone 638 + PowerMax	2.5 + 22 + 32
Distinct + Sharpen + PowerMax	4.0 + 1.0 + 32

*All treatments included ammonium sulfate (AMS) at 17 lb/100 gal and methylated seed oil (MSO) at 1.0% v/v.

**Rates in fluid ounces except Distinct, which is a dry granular product.

The study location was on the WSU Lind Dryland Research Station near Lind, WA, and all treatments were applied on August 1, 2024, a week after the spring wheat had been harvested. The wheat stubble height was 10 inches at the time of application and the Russian thistle plant heights were up to 15 inches.

Treatments were applied with a CO_2-pressurized backpack sprayer and 10-ft hand-held spray boom with six TT110015 TeeJet® nozzles. Spray output was 15 gpa with 45 psi nozzle pressure and 3 mph ground speed. The experimental design was a randomized complete block with four replicates per treatment and 10- by 30-ft plots. All treatments included ammonium sulfate (AMS) at 17 lb/100 gal and methylated seed oil (MSO) at 1% v/v. Treatments were visually evaluated at 1, 2, and 4 weeks after treatment (WAT) and compared as a percentage of the nontreated check.

By 1 WAT, Russian thistle burndown and control with BAS 85101H and BAS 85101H + PowerMax was 100% and was greater than all other treatments. PowerMax by itself had only resulted in 12% control but then increased to 70% by 4 WAT (Figure 2). Some regrowth occurred after application and by 2 WAT, BAS 85101H control had declined to 93% and then 80% by 4 WAT; however, at 4 WAT BAS 85101H + PowerMax resulted in 87% control, which was the best control observed at 4 WAT. Control at 4 WAT averaged between 70-75% with all other treatments that did not include BAS 85101H. Control with Distinct + Weedone 638 + PowerMax did increase from 2 WAT to 4 WAT, which likely resulted from the slow activation time for Group 4 synthetic auxin herbicides. Control with treatments that included Sharpen declined from 1 WAT to 4 WAT.

BAS 85101H appears to be an effective post-harvest Russian thistle herbicide and a good alternative to other currently available options.

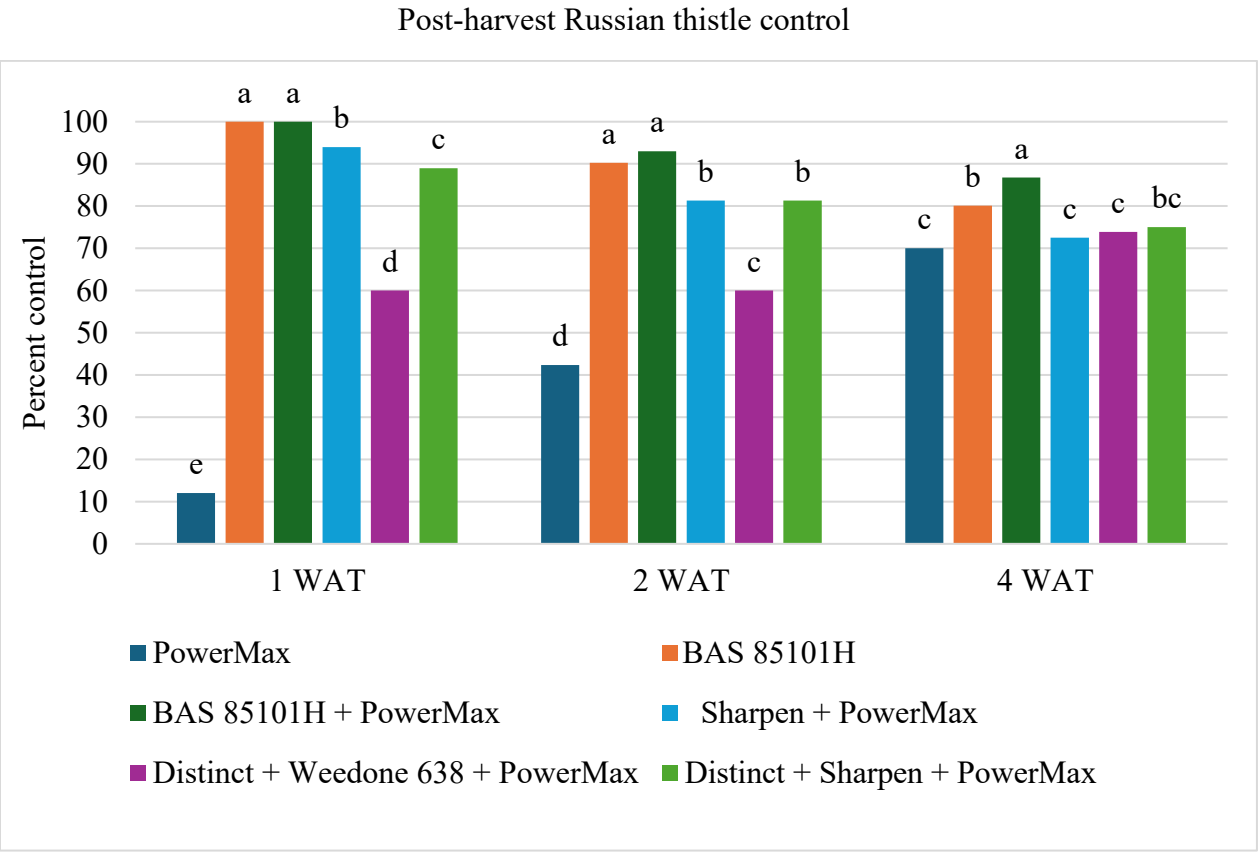

Figure 2. Post-harvest Russian thistle control assessed at 1 week after treatment (WAT), 2 WAT, and 4 WAT as a percentage of the nontreated check. See Table 1 for application rates. Columns followed by the same letter for each WAT are not statistically different (P≤0.05).

Off-Label or Experimental-Use Disclaimer

Some of the pesticides discussed in this presentation were tested under an experimental use permit granted by WSDA. Application of a pesticide to a crop or site that is not on the label is a violation of pesticide law and may subject the applicator to civil penalties up to $7,500. In addition, such an application may also result in illegal residues that could subject the crop to seizure or embargo action by WSDA and/or the U.S. Food and Drug Administration. It is your responsibility to check the label before using the product to ensure lawful use and obtain all necessary permits in advance.