

## Broadleaf Weed Control with Spartan Applied Preemergence in Winter Peas

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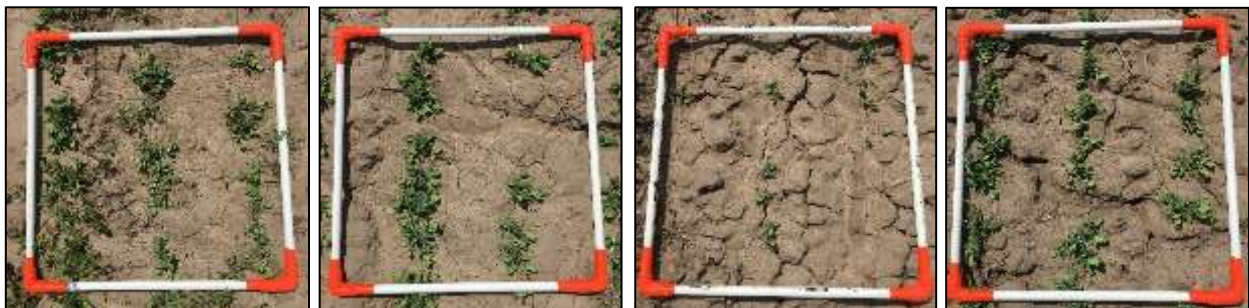
The objective of the study was to look at Spartan (sulfentrazone) alone and in combination with other preemergence (PRE) and postemergence (POST) herbicides for effective long-term broadleaf weed control in winter peas. Due to limited POST options for broadleaf weed control in peas and to the long growing season, prolonged activity of soil active herbicides into the spring in winter peas is important for effective broadleaf weed control.

The study was seeded to winter peas, variety Windham, on November 2, 2017 using a Monosem NG4+ singulating planter at the PCFS farm outside Pullman, WA. Treatments were applied either preemergence (PRE) just after seeding or postemergence (POST) to the winter peas, detailed in Table 1 and Table 2. No weeds were present at the timing of the PRE-treatments. The study was arranged in a completely randomized design with 10' by 35' long plots. The entire study was blanket sprayed with clethodim 2EC (8 fl oz/A) with COC and UAN for grass weed control on May 16, 2018 (194 DAAT).

Crop emergence was visually assessed 166 days after treatment of PREs (A) (DAAT). Crop necrosis and crop stunting was assessed at 207 DAAT (7 days after treatment of POSTs (B) (DABT)). Broadleaf weed control was rated at 170 DAAT and 207 DAAT (7 DABT). Peas heights were recorded by measuring the point of three pea plants in each plot at 214 DAAT (14 DABT). Plots were harvested using a plot combine with a 5.74 ft wide header on September 7, 2018. Due to non-normal data, crop emergence data and pest control data was arcsine square-rooted. Data was subjected to an analysis of variance using the statistical package built into the Agricultural Research Manager software system (ARM 8.5.0, Gylling Data Management).

Spartan, Karmex DF, and Dual Magnum + Prowl H2O + Metribuzin had no effect on crop emergence (> 97% 166 DAAT), while, Valor significantly reduced the crop emergence (< 35% 166 DAAT) (Table 2). At 207 DAAT (7 DABT), there was crop stunting present for Valor applied PRE (35 – 39%), Ultra Blazer applied POST (13 – 24 %), and MCPA ester (Rhomene) applied POST (15 – 24%) compared to the nontreated control and all other treatments (< 5% crop stunting) (Table 2). Ultra Blazer caused significant crop necrosis 7 DABT (11 & 19%). All other POST treatments did not cause significant crop necrosis compared to the nontreated (Table 2).

Plant heights were greatest for Spartan + Karmex DF, applied PRE, with 72 cm in height, Valor, applied PRE, had the worst with 49 cm (214 DAAT) (Table 2). There was no significant difference in yield between the nontreated control and all the treatment combination. However, Spartan applied PRE with metribuzin + NIS POST had the greatest yield of 1110 lb A<sup>-1</sup> and Spartan + Valor had the lowest yield of 380 lb A<sup>-1</sup>. The nontreated control had 810 lb A<sup>-1</sup> (Table 2).



*Fig 1.* Winter peas 79 days after treatment A (DATA). From left to right: Nontreated, Spartan PRE, Spartan + Valor PRE, and Spartan PRE + Metribuzin + NIS POST.

Interestingly, certain plots had serious weed infestations, and the only treatments we were able to harvest all the plots with the plot combine were Spartan + Valor, Spartan + metribuzin + NIS, Spartan +

Ultra Blazer + metribuzin + NIS, and Spartan + Karmex DF (Table 2). These were all treatments with greater than 90% weed control 207 DAAT (7 DAAT) (Table 3). Tough + NIS alone with no PRE, did not provide effective weed control based on percent weed control (26 & 10%), plots harvested (25%), and yield (590 lb A<sup>-1</sup>)

**Table 1.** Treatment application details

| Study Application              | A         | B         | C         |
|--------------------------------|-----------|-----------|-----------|
| Date                           | 11/3/2017 | 5/15/2018 | 5/22/2018 |
| Application Timing             | 10:00 AM  | 2:30 PM   | 12:15 PM  |
| Application volume (GPA)       | 15        | 15        | 15        |
| Day air temperature (°F)       | 37.5      | 55.7      | 70        |
| Soil temperature (°F)          | 42.8      | 62.4      | 61        |
| Wind velocity (mph, direction) | 0, SW     | 0.4, E    | 4, SE     |
| Next rain occurred on          | 11/4/2017 | 5/16/2018 | 5/24/2018 |

**Table 2.** Plant heights, percentage of plots harvested, and yield, as well as percent emergence, stunting, and leaf necrosis following fall preemergence (PRE) and spring postemergence (POST) applications. Pullman, WA, 2017-2018. DAAT = days after treatment of PRES (A). DABT = days after treatment of POSTS (B). Means followed by the same letter are not statistically significantly different ( $\alpha=0.05$ ).

| Treatment    | Application Timing | Rate       |         | 4/18/18<br>166 DAAT |          | 5/29/18<br>207 DAAT (7 DABT) |           | 6/5/2018<br>214 DAAT |        | 9/7/2018 |  |
|--------------|--------------------|------------|---------|---------------------|----------|------------------------------|-----------|----------------------|--------|----------|--|
|              |                    | field rate | lb ai/A | Emergence           | Stunting | Leaf Necrosis                | Plant Hts | Plots Harvested      | Yield  |          |  |
|              |                    |            |         | %                   | %        | %                            | cm        | %                    | lb/A   |          |  |
| Nontreated   | A                  | -          | -       | -                   | -        | -                            | 67 abc    | 50                   | 810 ab |          |  |
| Spartan      | A                  | 8 fl oz/A  | 0.250   | 97 a                | 5 c      | 0 c                          | 63 abc    | 50                   | 610 ab |          |  |
| Valor        | A                  | 2 oz/A     | 0.064   | 21 b                | 39 a     | 0 c                          | 49 c      | 75                   | 580 ab |          |  |
| Spartan      | A                  | 8 fl oz/A  | 0.250   | 35 b                | 35 a     | 0 c                          | 54 bc     | 100                  | 380 b  |          |  |
| Valor        | A                  | 2 oz/A     | 0.064   |                     |          |                              |           |                      |        |          |  |
| Spartan      | A                  | 8 fl oz/A  | 0.250   |                     |          |                              |           |                      |        |          |  |
| Metribuzin   | B                  | 5 oz/A     | 0.234   | 97 a                | 3 c      | 3 c                          | 65 abc    | 100                  | 1110 a |          |  |
| NIS          | B                  | 0.25% v/v  |         |                     |          |                              |           |                      |        |          |  |
| Spartan      | A                  | 8 fl oz/A  | 0.250   |                     |          |                              |           |                      |        |          |  |
| Ultra Blazer | B                  | 12 fl oz/A | 0.188   | 99 a                | 24 ab    | 19 a                         | 57 abc    | 75                   | 560 ab |          |  |
| NIS          | B                  | 0.25% v/v  |         |                     |          |                              |           |                      |        |          |  |
| Spartan      | A                  | 8 fl oz/A  | 0.250   |                     |          |                              |           |                      |        |          |  |
| Ultra Blazer | B                  | 12 fl oz/A | 0.188   | 99 a                | 13 bc    | 11 b                         | 57 abc    | 100                  | 900 ab |          |  |
| Metribuzin   | B                  | 5 oz/A     | 0.234   |                     |          |                              |           |                      |        |          |  |
| NIS          | B                  | 0.25% v/v  |         |                     |          |                              |           |                      |        |          |  |
| Spartan      | A                  | 8 fl oz/A  | 0.250   |                     |          |                              |           |                      |        |          |  |
| Tough        | B                  | 8 fl oz/A  | 0.313   | 100 a               | 5 c      | 0 c                          | 70 ab     | 75                   | 750 ab |          |  |
| NIS          | B                  | 0.25% v/v  |         |                     |          |                              |           |                      |        |          |  |
| Spartan      | A                  | 8 fl oz/A  | 0.250   |                     |          |                              |           |                      |        |          |  |
| MCPA ester   | B                  | 16 fl oz/A | 0.463   | 100 a               | 24 ab    | 0 c                          | 53 bc     | 50                   | 730 ab |          |  |
| Metribuzin   | B                  | 5 oz/A     | 0.234   |                     |          |                              |           |                      |        |          |  |
| NIS          | B                  | 0.25% v/v  |         |                     |          |                              |           |                      |        |          |  |
| MCPA ester   | B                  | 16 fl oz/A | 0.463   |                     |          |                              |           |                      |        |          |  |
| Metribuzin   | B                  | 5 oz/A     | 0.234   | 99 a                | 15 bc    | 5 c                          | 55 abc    | 75                   | 630 ab |          |  |
| NIS          | B                  | 0.25% v/v  |         |                     |          |                              |           |                      |        |          |  |
| Spartan      | A                  | 8 fl oz/A  | 0.250   |                     |          |                              |           |                      |        |          |  |
| Karmex DF    | A                  | 3 lb/A     | 1.500   | 98 a                | 0 c      | 0 c                          | 72 a      | 100                  | 940 ab |          |  |
| Tough        | C                  | 8 fl oz/A  | 0.313   |                     |          |                              |           |                      |        |          |  |
| NIS          | C                  | 0.25% v/v  |         | 100 a               | 0 c      | 1 c                          | 70 ab     | 25                   | 590 ab |          |  |
| Dual Magnum  | A                  | 1.33 pt/A  | 1.270   |                     |          |                              |           |                      |        |          |  |
| Prowl H2O    | A                  | 2.40 pt/A  | 0.990   | 100 a               | 3 c      | 0 c                          | 65 abc    | 50                   | 910 ab |          |  |
| Metribuzin   | A                  | 5 oz/A     | 0.234   |                     |          |                              |           |                      |        |          |  |
|              |                    |            | LSD     | 12                  | 12       | 5                            | 11        | NS                   | 350    |          |  |

**Table 3.** Percent broadleaf weed control following fall preemergence (PRE) and spring postemergence (POST) applications. Pullman, WA, 2017-2018. DAAT = days after treatment of PRES (A). DABT = days after treatment of POSTS (B). Means followed by the same letter are not statistically significantly different ( $\alpha=0.05$ ).

| Treatment    | Application Timing | Rate       |         | May 1, 2018  | May 59, 2018     |
|--------------|--------------------|------------|---------|--------------|------------------|
|              |                    | field rate | lb ai/A | 179 DAAT     | 207 DAAT, 7 DAAT |
|              |                    |            |         | Weed Control | Weed Control     |
|              |                    |            |         | %            | %                |
| Nontreated   | A                  | -          | -       | -            | -                |
| Spartan      | A                  | 8 fl oz/A  | 0.250   | 86 ab        | 61 ab            |
| Valor        | A                  | 2 oz/A     | 0.064   | 96 a         | 85 a             |
| Spartan      | A                  | 8 fl oz/A  | 0.250   |              |                  |
| Valor        | A                  | 2 oz/A     | 0.064   | 99 a         | 91 a             |
| Spartan      | A                  | 8 fl oz/A  | 0.250   |              |                  |
| Metribuzin   | B                  | 5 oz/A     | 0.234   | 89 ab        | 90 a             |
| NIS          | B                  | 0.25% v/v  |         |              |                  |
| Spartan      | A                  | 8 fl oz/A  | 0.250   |              |                  |
| Ultra Blazer | B                  | 12 fl oz/A | 0.188   | 69 ab        | 89 a             |
| NIS          | B                  | 0.25% v/v  |         |              |                  |
| Spartan      | A                  | 8 fl oz/A  | 0.250   |              |                  |
| Ultra Blazer | B                  | 12 fl oz/A | 0.188   |              |                  |
| Metribuzin   | B                  | 5 oz/A     | 0.234   | 98 a         | 94 a             |
| NIS          | B                  | 0.25% v/v  |         |              |                  |
| Spartan      | A                  | 8 fl oz/A  | 0.250   |              |                  |
| Tough        | B                  | 8 fl oz/A  | 0.313   | 67 ab        | 51 ab            |
| NIS          | B                  | 0.25% v/v  |         |              |                  |
| Spartan      | A                  | 8 fl oz/A  | 0.250   |              |                  |
| MCPA ester   | B                  | 16 fl oz/A | 0.463   |              |                  |
| Metribuzin   | B                  | 5 oz/A     | 0.234   | 70 ab        | 70 a             |
| NIS          | B                  | 0.25% v/v  |         |              |                  |
| MCPA ester   | B                  | 16 fl oz/A | 0.463   |              |                  |
| Metribuzin   | B                  | 5 oz/A     | 0.234   | 25 b         | 40 ab            |
| NIS          | B                  | 0.25% v/v  |         |              |                  |
| Spartan      | A                  | 8 fl oz/A  | 0.250   |              |                  |
| Karmex DF    | A                  | 3 lb/A     | 1.500   | 99 a         | 96 a             |
| Tough        | C                  | 8 fl oz/A  | 0.313   |              |                  |
| NIS          | C                  | 0.25% v/v  |         | 26 b         | 10 b             |
| Dual Magnum  | A                  | 1.33 pt/A  | 1.270   |              |                  |
| Prowl H2O    | A                  | 2.40 pt/A  | 0.990   | 65 ab        | 39 ab            |
| Metribuzin   | A                  | 5 oz/A     | 0.234   |              |                  |
|              |                    |            | LSD     | 40           | 37               |

## 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.