

Objective:

1. To demonstrate herbicide weed control options for kochia, wild mustard and volunteer canola in lentil
2. To demonstrate herbicide layering technique for lentil
3. To demonstrate the importance of planning ahead and use of fall herbicide application
4. To provide a platform to discuss herbicide resistance management through herbicide rotation

Methodology:

Field experiments were conducted in 2020 at four locations in Saskatchewan: Saskatoon, Scott, Swift Current, and Redvers. The study consisted of 16 herbicide treatments with different herbicide application timings. Fall application of herbicides was applied from mid to end of October on canola stubble in 2019 and spring application (pre-plant) in 2020. Herbicides used in fall application were; Edge (ethaflurafin), Fierce (flumioxazin + pyroxasulfone), Valtera EZ (flumioxazin), Express SG (tribenuron), and Focus (pyroxasulfone + carfentrazone). Herbicides used in spring pre-plant application were Focus (pyroxasulfone + carfentrazone), Goldwing (pyraflufen-ethyl + MCPA), Zidua (pyroxasulfone), and Heat LQ (saflufenacil). All spring application treatments were tank-mixed with glyphosate. In-crop herbicide Solo (imazamox) was considered as the control.

Table 1. Treatment list for the study of Herbicide Management Strategies for Weed Control in Lentil (Project #AP2001a).

| Trt No | Treatment | Herbicide Group | Timing | Rate |
|--------|----------------------------|-----------------|---------|-----------------------|
| 1 | CONTROL- In crop only-solo | 2 | In crop | |
| 2 | Glyphosate | 9 | Spring | .67 L /ac |
| 3 | Glyphosate + Heat LQ | 9 + 14 | Spring | .67 L/ac + 21.4ml/ac |
| 4 | Glyphosate + Goldwing | 9 + 14/4 | Spring | .67 L/ac + 133ml/ac |
| 5 | Edge | 3 | Fall | 19.6lb/ ac |
| | Glyphosate | 9 | Spring | .67 L/ac |
| 6 | Edge | 3 | Fall | 19.6 lb/ac |
| | Heat LQ + Glyphosate | 14 + 9 | Spring | 21.4ml /ac + .67L/ac |
| 7 | Focus co-formulated | 14/ 15 | Fall | 113 ml/ac |
| | Express SG + Glyphosate | 2 + 9 | Spring | 6 g/ac + 0.67L/ac |
| 8 | Focus | 14/15 | Fall | 113 ml/ac |
| | Glyphosate | 9 | Spring | 0.67 L/ac |
| 9 | Focus | 14/15 | Fall | 113 ml/ac |
| | Heat LQ + Glyphosate | 14 + 9 | Spring | 21.4ml /ac + 0.67L/ac |
| 10 | Focus + Glyphosate | 14/15 + 9 | Spring | 113 ml/ac + 0.67L/ac |
| 11 | Valtera EZ | 14 | Fall | 90 ml/ ac |
| | Glyphosate | 9 | Spring | .67 L/ac |
| 12 | Valtera EZ | 14 | Fall | 90 ml/ ac |
| | Goldwing + Glyphosate | 14/4 + 9 | Spring | 133ml/ac + 0.67L/ac |
| 13 | Fierce | 14/15 | Fall | 85 g/ac |
| | Glyphosate | 9 | Spring | .67 L/ac |
| 14 | Fierce | 14/15 | Fall | 85 g/ac |
| | Goldwing + Glyphosate | 14/4 + 9 | Spring | 133ml/ac + .67L/ha |
| 15 | Heat LQ + Zidua SC | 14 + 15 | Spring | 21.4ml /ac + 49ml/ac |
| 16 | Edge | 3 | Fall | 19.6lb/ ac |
| | Heat LQ + Zidua SC | 14 + 15 | Spring | 21.4ml /ac + 49ml/ac |

The full report is available at www.warc.ca. This project was funded by the Saskatchewan Pulse Growers and the Agricultural Demonstration of Practices and Technologies (ADOPT) initiative under the Canada-Saskatchewan Canadian Agricultural Partnership (CAP) bi-lateral agreement.

Key Findings:

- Treatment 1 the control (Solo) and the spring-applied herbicide treatments Glyphosate, Glyphosate + Heat and Glyphosate + Goldwing were the least effective and inconsistent in controlling weeds in this study.
- Treatment 9 a fall application of Focus followed by spring application of Heat + Glyphosate and treatment 14 a fall application of Fierce followed by spring application of Goldwing + Glyphosate were found to be effective in controlling wild mustard.
- Treatment 11 a fall application of Valtera followed by spring application of Glyphosate, treatment 13 a fall application of Fierce followed by spring application of Glyphosate, and treatment 14 a fall application of Fierce followed by spring application of Goldwing + Glyphosate were found to be the most consistent in controlling kochia.
- Canola was mainly controlled by treatment 11 a fall application of Valtera followed by spring application of Glyphosate, treatment 12 a fall application of Valtera followed by spring application of Glyphosate + Goldwing, and treatment 14 a fall application of Fierce followed by spring application of Goldwing + Glyphosate.
- Treatment 14 a fall application of Fierce followed by spring application of Goldwing + Glyphosate were found to be the most effective in controlling all three weed species. This herbicide combination showed greater residual activity as it was effective at all three rating stages. The combination of herbicide groups in this treatment (Goldwing (group 4, group 14), Fierce (group 14, group 15), and Glyphosate (group 9)) will help to slow down the resistance build-up to any particular mode of action. Further, this combination had 12% greater crop yields compared to the control treatment.
- Overall, based on the results of this study, we can recommend using herbicide layering of fall application followed by spring application of herbicides for better weed management and greater crop yields in lentils.



Figure 1. Lentils (left) sprayed with Solo (control) and (right) fall applied Fierce and spring applied Goldwing + Glyphosate (treatment 14).

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