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PIONEER agronomy

Critical Period of Weed Control in Canola

Why Control Weeds Early?

- Early season weed control helps protect crop yield potential, especially during the canola seedling stage when the crop is a poor competitor.
- Weeds and canola compete for the same resources (water, sunlight and nutrients).
- Small weeds are easier to control and can absorb and translocate herbicide better.
- Herbicides can be less effective during times of heat and drought stress, which often occurs with later applications. Additionally, there is greater risk of crop injury with later/out of stage applications.
- Generally, a combination of both pre-seed and in-crop herbicide applications have the greatest potential to protect canola crop yield.
- New glyphosate herbicide tolerant canola traits allow for a wider in-crop application window; however, it is important to keep in mind the critical weed free period (CWFP) for canola and to maximize yield potential by controlling weeds early.

Critical Weed Free Period (CWFP)

- Defined as the stages in a crop's life cycle during which weeds must be controlled to prevent yield loss from weed competition in crop.
- Studies from Western Canada have found that the CWFP in canola is from emergence to the 4-leaf stage of the plant. (Martin et al., 2001; Harker et al., 2008).
- In one study in Western Canada examining the timing of weed removal in canola, it was found that delaying weed control until the 6- to 7-leaf stage of canola resulted in a 20% yield loss (Harker et al. 2008; Figure 1).
- Another benefit of early season weed removal is the prevention of weed seed production.

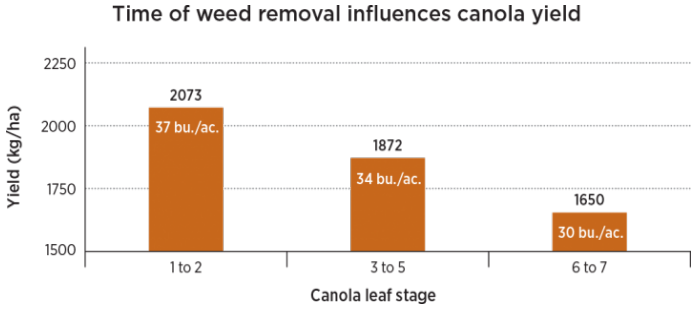


Figure 1. Influence of time of weed control on canola yield (Harker et al. 2008).

Pre-Seed Application

- Applying recommended, labeled herbicides prior to seeding reduces overall risk of yield loss due to weed competition, especially if an in-crop herbicide application is delayed.
- A pre-seed herbicide application is highly recommended, especially for fields with an abundance of winter annual and perennial weeds.
- If a pre-seed application is not an option, consider applying control measures immediately after seeding prior to crop emergence. Keep in mind that this can be a very narrow application window.

Post Emergent Applications

- The best time to apply in-crop herbicide applications to canola is from the 1- to 4-leaf stage.
- After the 4-leaf stage, canola plants are much more competitive and emerging weeds have less effect on yield.
- As the crop canopy closes, late emerging weeds have a reduced effect on yield. Second in-crop applications may produce a smaller ROI but can help manage weed escapes from the first herbicide pass or crops with low plant populations.
- In some cases, a pre-harvest or post-harvest herbicide application is more effective at controlling weed escapes than a second in-crop herbicide application – especially in the case of perennial weeds.
- Tank mix options are available for both pre-seed and in-crop applications to enhance weed control. Always read and follow label directions.
- However, all situations are unique and need to be evaluated on a field-by-field basis. Your local Pioneer sales representative or agronomist can provide a specific field recommendation.



Figure 2: Left: Grassy weed pressure in herbicide tolerant canola near the end of the CWFP.



Figure 3: Right: kochia competition in canola. July 2019. Saltcoats, SK.

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Herbicide Tolerant Canola Systems from Corteva Agriscience

Table 1. List of herbicide tolerant canola system options available from Corteva Agriscience.

HT System	Active(s)	Product*	Group	Application Rate	Crop Stage	Water Volume	Max Passes/ Year
Roundup Ready®	Glyphosate	VP480	9	2 apps. up to 0.5 REL/ac** each or a single app. Ip to 0.75 REL/ac	Cotyledon to 6-leaf	5-10 US gal/ac	2
LibertyLink®	Glufosinate	Interline®	10	1st app: 1.62L/ac; 2nd app: 1.37L/ac; do not exceed 2.97L/ac per season	Cotyledon to early bolting	10 US gal/ac	2
Clearfield®	Imazamox/ Imazapyr	Ares™ SN***	2	244ml/ac	2- to 7-leaf	5-10 US gal/ac	1
Optimum® GLYt	Glyphosate	VP480	9	2 apps. up to 1.0 REL/ac each Single app. up to 2.0 REL/ac.	Cotyledon to first flower Cotyledon to 6-leaf	5-10 US gal/ac	2 1

***** Refer to individual product labels for complete instructions on rates, tank mix partners, staging, application timing, rainfastness, etc. **REL = Roundup Equivalent Litre. ***Requires Surjet Surfactant. [t] Availability subject to regulatory approval.

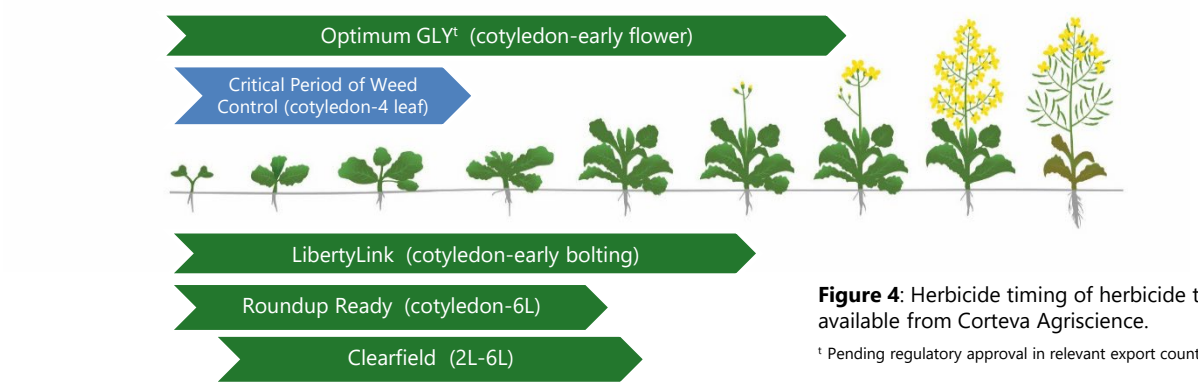


Figure 4: Herbicide timing of herbicide tolerant systems available from Corteva Agriscience.

[t] Pending regulatory approval in relevant export countries.

Weeds of Concern

- Weed surveys are conducted in the Prairie provinces on a recurring basis. The latest prairie weed survey (2014-2017) listed the following as the top 10 weeds in canola (Canola Digest, 2019)
  1. Wild buckwheat (annual)
  2. Wild oats (annual)
  3. Green foxtail (annual)
  4. Volunteer wheat (annual)
  5. Cleavers (annual)
  6. Chickweed (annual)
  7. Volunteer canola (annual)
  8. Spiny annual sow thistle (annual)
  9. Lamb's quarters (annual)
  10. Canada thistle (perennial)

Future Research

- The majority of research regarding the critical period of weed control in canola was conducted over 15 years ago.
- There is ongoing research in Western Canada, specifically at the University of Manitoba, investigating the CWFP in canola given the myriad new herbicide technologies (pre-emerge and in-crop), improved hybrid competitiveness, and changes to recommended seeding rates in canola.

References

Harker, K. N., O'Donovan, J. T., Clayton, G. W., & Mayko, J. (2008). Field-Scale Time of Weed Removal in Canola. *Weed Technology*, *22*(4), 747–749.

Martin, S. J., Van Acker, R. C., & Friesen, L. F. (2001). Critical Period of Weed Control in Spring Canola. *Weed Science,* 49 (3), 326-333.

Canola Digest. Top 10 Weeds in Canola. March 5, 2019. https://canoladigest.ca/march-2019/agronomy-insights-mar2019/.

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Hybrids and varieties with the Roundup Ready® gene (RR) are tolerant to labeled rates of Roundup® branded herbicides. This technology allows for post-emergent applications of Roundup without crop injury or stress (see herbicide label). Labeled Roundup herbicide should only be used over the top of those hybrids that carry the Roundup Ready designation. The Optimum® GLY herbicide tolerance trait will not be offered for sale or distribution until completion of field testing and applicable regulatory reviews. Roundup Ready® is a registered trademark of Bayer Group. Liberty®, LibertyLink® and the Water Droplet Design are registered trademarks of BASF. The unique Clearfield symbol and Clearfield are registered trademarks of BASF. The foregoing is provided for informational use only. Please contact your Pioneer sales professional for information and suggestions specific to your operation. Product performance is variable and depends on many factors such as moisture and heat stress, soil type, management practices and environmental stress as well as disease and pest pressures. Individual results may vary. CF220524