

Corn Herbicides to Control Glyphosate-Resistant Canola Volunteers 2013

Background

- With the rapid adoption of glyphosate-resistant corn in Western Canada, glyphosate-resistant canola volunteers have become a major weed concern to corn producers in the region.
- The Pest Management Regulatory Agency now allows herbicides to be tank-mixed if they have individual registrations on the crop and have a common application timing.
- Several herbicide options are available to control glyphosate tolerant canola volunteers in corn; however, some herbicides may have undesirable effects on corn.

Objectives

- Assess crop injury and yield effects of various herbicides tank-mixed with glyphosate to control glyphosate-resistant canola volunteers in glyphosate-resistant corn.
- Identify the most suitable post-emergence strategy for managing glyphosate-resistant canola volunteers in glyphosate-resistant corn.

Study Description

- The study compared the crop response of four industry leading hybrids (Pioneer® brand and competitive) with five different herbicide treatments (Table 1).
- Treatments were compared to a single application of glyphosate-only as a check.
- Herbicide treatments were applied at recommended rates at the V3 growth stage.
- Treatments were replicated four times per location at six locations over three years (2011-2013).

Table 1. Herbicide treatments.

	Treatment	Application Rate/Acre
1	Gly Only (Check)	1 L/acre (360g ae)
2	Gly + Dicamba	1 L/acre + 0.243 L/acre
3	Gly + 2,4-D	1 L/acre + 0.4 L/acre (600g/L)
4	Gly + MCPA Amine	1 L/acre + 0.45L/acre
5	Gly + Bromoxynil	1 L/acre + 0.48 L/acre
6	Gly / Bromoxynil (Split Application*)	1 L/acre + 0.48 L/acre

* Glyphosate and bromoxynil applied separately at V3 stage.

- Herbicide injury scores were recorded at:
 - 3-5 days after treatment
 - 7-10 days after treatment
 - 21-24 days after treatment
- Other recorded observations include:
 - Brittle snap counts
 - Yield (bu/acre) & moisture (%)
 - Test weight (lbs/bu)

Results

- Crop injury symptoms were similar among hybrids tested.
- The most severe and persistent herbicide injury resulted from the 2,4-D treatment on all hybrids (Figure 1 and 3).
- 2,4-D showed the highest brittle snap in all hybrids (Table 2).
- On average, 2,4-D reduced yield by 13.5% (Table 3) and lowered test weight by 4.4 lbs/bu (Table 4).

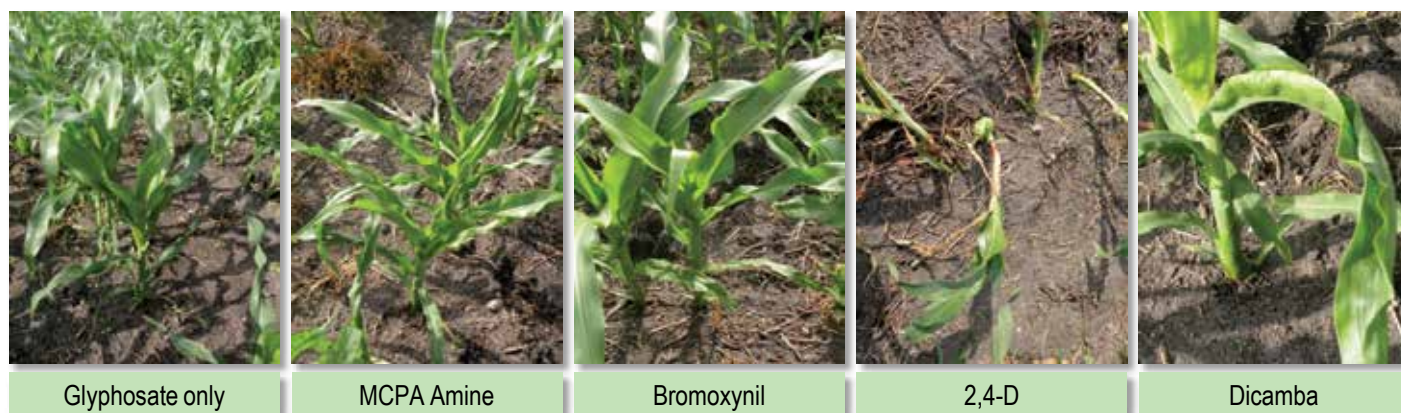


Figure 1. Crop response to herbicides tank-mixed with glyphosate 10 days after treatment.

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Results

- MCPA amine treatment increased brittle snap relative to the glyphosate-only check and produced extensive onion-leaving symptoms.
- Dicamba treatment increased brittle snap (Table 2) and stalk lodging (data not shown), and it significantly reduced yield and test weight.
- 2,4-D, MCPA amine and dicamba treatments all resulted in stunted plants and poor brace root development when compared to the bromoxynil treatments and glyphosate-only check (Figure 2).
- Bromoxynil treatments caused some leaf burn but produced no growth inhibition or brittle snap, and plants recovered quickly.



Figure 2. Corn treated with glyphosate + MCPA amine (left) and glyphosate only (right).



Figure 3. Corn treated with glyphosate + 2,4-D.

Table 2. Brittle snap (%) observed with four hybrids and six herbicide treatments.

	Gly Only	Dicamba	2,4-D	MCPA Amine	Bromoxynil	Bromoxynil (Split App)
Brittle snap (%)						
Hybrid A	0	8	21	10	0	0
Hybrid B	0	11	25	8	0	0
Hybrid C	0	15	20	12	0	0
Hybrid D	0	7	27	7	0	0
Average	0	10	23	9	0	0

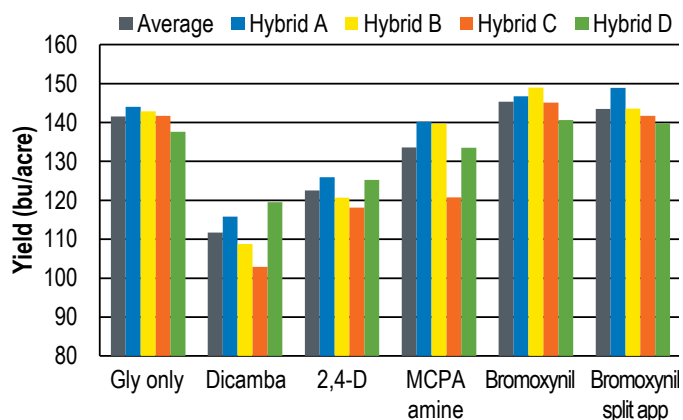


Figure 4. Hybrid yield by herbicide treatment.

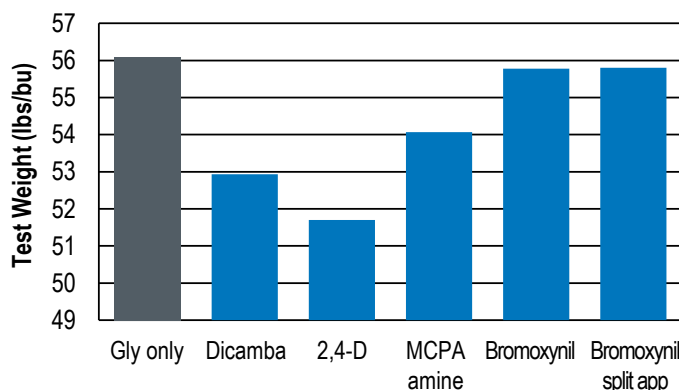


Figure 5. Average corn test weight by herbicide treatment.

Summary

- Bromoxynil treatments consistently provided excellent control of volunteer glyphosate-resistant canola with the lowest level of injury to corn among herbicides tested.
 - Bromoxynil treatments did not cause any crop stunting, growth restriction or brittle snap.
 - No reduction in corn yield (Figure 4) or test weight (Figure 5) was associated with the bromoxynil treatments.
- The growth inhibitor herbicides (2,4-D, dicamba and MCPA amine) caused extensive crop injury to all hybrids tested.
 - Injury symptoms included poor brace root development, stunting and brittle snap.
 - Crop injury associated with the growth regulator herbicides resulted in reduced corn test weight and yield.
- When applying bromoxynil herbicides to corn:
 - Apply during warm temperatures.
 - Use high water volumes (minimum 10-15 gal/acre).
 - Do not apply during or immediately following crop stress.
 - **Always read and follow herbicide label directions.**
- Consult with your local Pioneer Sales Representative for more information.