

# CANADA FLEABANE (glyphosate resistant) CONTROL IN FIELD CROPS

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Canada fleabane is on a lot of people's radar this year since there are glyphosate resistant populations in 12 different counties. Below is a summary of Canada fleabane control with herbicides applied in corn, soybean and winter wheat from research conducted by Peter Sikkema, University of Guelph (Ridgetown Campus).

## CORN

**Table 1:** Control of glyphosate resistant Canada fleabane applied pre corn emergence with herbicides that were tank-mixed with glyphosate.

<b>Herbicide</b>	<b>Rate/acre</b>	<b>Visual Control (%) 8 weeks after application</b>
Banvel II	0.5 L/ac	98
Battalion (Elim EP + Dual + Banvel II)	24 g/ac + 0.3 L/ac + 0.3 L/ac	94
Marksman	1.8 L/ac	90
Integrity	0.44 L/ac	82
Callisto + Aatrex 480	120 mL/ac + 1.25 L/ac	77
Primextra II Magnum	1.6 L/ac	14
Converge XT (Flexx + 480)	178 mL/ac + 0.89 L/ac	13

\*Based on 2 trials conducted by Dr. Sikkema, University of Guelph (Ridgetown Campus) in 2013

**Table 2:** Control of glyphosate resistant Canada fleabane applied post corn emergence with herbicides that were tank-mixed with glyphosate.

Herbicide	Rate/acre	Visual Control (%) 8 weeks after application
Banvel II	0.5 L/ac	97
Marksman	1.8 L/ac	95
Distinct	115 g/ac + 0.25% v/v + 1.25% v/v	95
Pardner + Aatrex	0.4 L/ac + 1.24 L/ac	85
Peak Plus + non-ionic surfactant	5.3 g/ac + 0.12 L/ac + 0.2% v/v	78
Callisto + Aatrex 480 + non-ionic surfactant	85 mL/ac + 235 mL/ac + 0.2% v/v	69
2,4-D Ester	0.5 L/ac	65
Liberty	1 L/ac	58
Armezon + Aatrex 480 + Assist Oil + 28% UAN	15 mL/ac + 0.42 L/ac + 1.25% v/v + 1.25% v/v	45
Aatrex 480	0.84 L/ac	19

\*Based on 2 trials conducted by Dr. Sikkema, University of Guelph (Ridgetown Campus) in 2013

### Are lower rates of Marksman or Banvel II effective?

Yes, but to reduce the chance of selecting for populations of Canada fleabane that are more tolerant to dicamba (the active ingredient in Banvel II), the highest labeled rates should be used. The labelled rate of Banvel II in corn ranges from 240 to 500 mL/ac. The labelled rate of Marksman ranges from 1 to 1.8 L/ac which provides a rate of dicamba that is roughly equivalent to the 275 to 500 mL/ac rate of Banvel II. Eubank's and his colleagues in Missouri reported that the 240 mL/ac rate of Banvel II was effective at controlling Canada fleabane (<http://bit.ly/PrnkVH>). However, recently Crespo and his colleagues in Nebraska conducted a dicamba dose response on 10 different Canada fleabane populations and observed a range in susceptibility with the most

tolerant population requiring a dicamba rate slightly above the maximum labelled rate in order to provide 90% visual control. These Nebraska researchers also evaluated seed production on five populations treated with different rates of dicamba and observed that one population produced seed at the 240 mL/ac rate of Banvel II (<http://bit.ly/1IBDTcx>). Bottom line, if there is variability in different Canada fleabane's susceptibility to dicamba, applying lower rates will increase your chance of selecting populations that are tolerant to those lower rates. Many people that I have spoken to about the use of dicamba to control Canada fleabane have commented that I should warn growers that certain corn hybrids are more sensitive to dicamba and applying it those hybrids should be avoided. Fair enough, and at one time that information was published in seed guides so one could make that call. I have searched several seed supplier websites to try and track down hybrid sensitivity to dicamba. I can't find anything. So if you sell corn hybrids in Eastern Canada and have this information, please provide it.

**I've been told that atrazine and bleaching herbicides are effective on this weed, but the Ontario data suggests otherwise. What is going on?**

I was recently directed to two extension articles on Canada fleabane (Marestail) management. The first out of Kansas by Jill Zimmerman (<http://bit.ly/1i9nX22>) which stated:

- 1) "Atrazine is very effective at controlling marestail when applied to small seedlings. As plants bolt in the spring, atrazine causes leaf burn. The plant recovers, however."
- 2) "The HPPD-inhibiting (or "bleacher") herbicides such as Lumax, Lexar, Callisto, Balance, Corvus, Capreno, Laudis and Impact are generally effective for marestail control in corn"

The second article, out of Delaware by Mark VanGessel (<http://bit.ly/1nGIprt>) summarizes herbicide control of 5" (12 cm) tall Canada fleabane in field corn. Dr. VanGessel's results showed poor control with atrazine, which is consistent with the Ontario data and with the comment about the effectiveness of atrazine on bolting plants in Jill Zimmerman's article. However there is discrepancy concerning the effectiveness of bleaching herbicides. In particular, the observations of Canada fleabane control with Callisto (active ingredient: mesotrione) in Ontario is

different when compared to the two cited extension articles, although a study in Virginia ([Armel et al., 2009](#)) had results that were similar to the Ontario studies. Possibly explanations for differences in observed control are:

- 1) As Crespo and his colleagues observed with fleabane susceptibility to dicamba, it is plausible that populations vary in their susceptibility to mesotrione.
- 2) The rate of active ingredient applied for post-emergent applications in the U.S. formulation of Callisto is about 6% higher than the Canadian formulation.
- 3) The rate of atrazine used in Dr. VanGessel's study is twice what is labelled for use with post-emergent applications in Eastern Canada. Although atrazine alone is not effective on Canada fleabane, in general there is synergy when Callisto and atrazine are tank-mixed that improves the broadleaf weed control compared with each herbicide applied on its own.
- 4) In the United States, they add corn oil concentrate and 28% UAN as adjuvants to Callisto and atrazine applied post-emergent. In Ontario we only use non-ionic surfactants. The difference in adjuvant use could affect the uptake of the active ingredients by the weed. You will note that the pre-emergent application of Callisto and atrazine in the Ontario trials controlled fleabane more effectively than the post-emergent one. This could be explained by the higher rates involved with the pre-emergent application. However, the pre-emergent application of Callisto and atrazine contained no adjuvant, as normally it is not required if there are no emerged weeds at the time of application, but Canada fleabane seedlings were emerged at the time of application in those studies. It would be interesting to see if the addition of an adjuvant would have improved control to what Dr. VanGessel had experienced.
- 5) In the Ontario studies, control evaluations were made at 28 and 56 days after herbicide application, whereas they were made at 12 and 19 days after application in the VanGessel study.

## SOYBEANS

**Table3:** Control of glyphosate resistant Canada fleabane in soybean with pre-plant herbicides that were tank-mixed with glyphosate

Tank-mix partner with glyphosate	Rate	Visual Control (%) 8 weeks after application
Metribuzin (e.g. Sencor)	600 g/ac	98
Eragon + Merge	14.4 g/ac + 1% v/v	96
Integrity + Merge	150 mL/ac + 1% v/v	96
Amitrol 240*	3.3 L/ac	93
Broadstrike RC	35 g/ac	91
FirstRate + 28% UAN+ Agral 90	17 g/ac + 2.5% v/v + 0.25% v/v	87
2,4-D Ester (660 g/L)*	320 mL/ac	85
FirstRate + 28% UAN+ Agral 90	8.5 g/ac + 2.5% v/v + 0.25% v/v	82
Chlorimuron (e.g. Classic)	9 g/ac	81

\*must be applied 7 days prior to planting soybeans

Source: Byker et al. Can. J. Plant Sci (2013) 93(4): 659-667

### Q: Will lower rates of Sencor provide effective control?

A: The 600 g/acre rate of Sencor 75DF shown in Table 3 is the highest label rate and can cause significant crop injury and yield loss if used on high risk soils (low organic matter, coarse textured). Canada fleabane susceptibility at lower rates of Sencor was evaluated in 2013 by Dr. Sikkema. Preliminary results have shown that rates lower than the 600 g/ac rate of Sencor 75DF do not adequately control fleabane which is consistent with [Eubank et al., 2008](#) who tested a rate of 225 g/acre of Sencor 75DF on Canada fleabane and observed visual control that ranged from 53-73%.

**Q: I have heard that Eragon can be inconsistent on Canada fleabane, is this true?**

A: In research trials conducted by Dr. Sikkema during the 2013 growing season, control of glyphosate resistant Canada fleabane with Eragon + Merge ranged from 20-100% visual control. The reason for such poor control at certain field sites is unknown at this point. A research project has been initiated to gain a better understanding of why inconsistent results are occurring.

## WINTER WHEAT

**Table 4:** Control of glyphosate resistant Canada fleabane winter wheat with post emergent herbicides.

<b>Product</b>	<b>Rate</b>	<b>Visual Control (%) 8 weeks after application</b>
2,4-D Ester (660 g/L)	520 mL/ac	94
Infinity	330 mL/ac	92
Dichlorprop/2,4-D (610 g/L)	480 ml/ac	90
Trophy A + Trophy B	240 mL/ac + 450 mL/ac	88
Peak + Pardner + non-ionic surfactant	5.3 g/ac + 200 mL/ac + 0.2% v/v	70
Refine M = Refine SG + MCPA Ester 600 + non-ionic surfactant	12 g + 0.36 L/ac + 0.2% v/v	69
Buctril M	400 mL/ac	68

\* Based on trials conducted by Dr. Sikkema, University of Guelph (Ridgetown Campus)