

TIP SHEET: MAXIMIZING THE PERFORMANCE OF GLYPHOSATE

By: Mike Cowbrough, Weed Specialist (Field Crops), OMAFRA - Guelph

1. Apply when annual weeds are 10 cm tall or less
2. If possible, apply during the warmest part of the day, between 9am and 5pm
3. Use a rate that will kill the most tolerant species in your field (see Table 1 and 2)
4. Use a 10 gal/acre (100 L/ha) water volume unless weeds are large, dense or you are tank-mixing with a contact herbicide, then use 20 gal/acre (200 L/ha)
5. Test for water hardness (ppm of CaCO₃), consider adding AMS if water is above 700 ppm. Ontario research has shown no benefit to adding AMS to carrier water (Table 3).

Table 1. A summary of guidance provided on the Roundup Transorb HC label (glyphosate at 540 g/L) with respect to annual weed species, height, and effective rate.

Annual Grasses	268* mL/acre	510 mL/acre	600 mL/acre	670 mL/acre	930 mL/acre
Barley, volunteer	8-15 cm	8-15 cm	8-15 cm	8-15 cm ¹	>15 cm
Barnyard grass	-	-	-	< 25 cm	-
Bluegrass, annual	-	-	8-15 cm	8-15 cm	>15 cm
Brome, downy	-	8-15 cm	8-15 cm	8-15 cm	>15 cm
Crabgrass	-	-	8-15 cm	8-15 cm ¹	>15 cm
Fall panicum	-	-	-	< 25 cm	-
Foxtail, giant	-	8-15 cm	8-15 cm	8-15 cm ¹	>15 cm
Foxtail, green	8-15 cm	8-15 cm	8-15 cm	8-15 cm ¹	>15 cm
Foxtail, yellow	-	-	-	< 25 cm	-
Proso millet	-	-	-	< 25 cm	-
Wheat, volunteer	8-15 cm	8-15 cm	8-15 cm	8-15 cm ¹	>15 cm
Wild oats	8-15 cm	8-15 cm	8-15 cm	8-15 cm ¹	>15 cm
Annual Broadleaves	268* mL/acre	510 mL/acre	600 mL/acre	670 mL/acre	930 mL/acre
Buckwheat, wild	-	3-4 leaf	8-15 cm	8-15 cm	>15 cm
Chickweed	-	-	-	< 25 cm	-
Cleavers	-	8-15 cm	8-15 cm	8-15 cm	>15 cm
Cocklebur	-	-	-	< 25 cm	-
Flixweed	-	8-15 cm	8-15 cm	8-15 cm	>15 cm
Hempnettle	-	8-15 cm	8-15 cm	8-15 cm	>15 cm
Lady's thumb	8-15 cm	8-15 cm	8-15 cm	8-15 cm ¹	>15 cm
Lamb's-quarter	-	8-15 cm	8-15 cm	8-15 cm ¹	>15 cm
Lettuce, Prickly	-	-	8-15 cm	8-15 cm	>15 cm
Mustard, wild	8-15 cm	8-15 cm	8-15 cm	8-15 cm ¹	>15 cm
Nightshade, Eastern black	-	-	-	< 25 cm	-
Pigweed, redroot	-	8-15 cm	8-15 cm	8-15 cm ¹	>15 cm
Ragweed, common	-	<8 cm	8-15 cm	8-15 cm ¹	>15 cm
Shepherd's Purse	-	-	8-15 cm	8-15 cm ¹	>15 cm
Sow-thistle, annual	-	-	8-15 cm	8-15 cm	>15 cm
Stinkweed	8-15 cm	8-15 cm	8-15 cm	8-15 cm ¹	>15 cm
Velvetleaf	-	-	-	< 25 cm	-

- no information or guidance provided on the label. * a non-ionic surfactant must be added at a rate of 140 mL/acre

¹ When listed in the "weeds controlled" area of the Roundup Ready soybean (section 7.71) and corn (section 7.9) sections of the label, the weed is apparently susceptible up until a height of 25 cm. This contradicts the guidance provided under section 7.1 of the label which provides rate guidance when the weed is smaller than or larger than 15 cm tall.

Table 2. A summary of guidance provided on the Roundup Transorb HC label (glyphosate at 540 g/L) with respect to perennial weed species, stage, and effective rate when in glyphosate tolerant corn and soybeans.

Perennial weed	Stage/Size	Rate
Adzuki beans, volunteer	Up to 4 th trifoliolate	0.67 L/acre – applied twice, 2 weeks apart.
Alfalfa, volunteer	>10 cm tall	1.87 L/acre – applied once
Biennial wormwood	2 to 8 leaf	0.67 L/acre
Bindweed, field		1.34 L/acre – applied once or 0.67 L/acre – applied twice, 2 weeks apart
Bromegrass	>10 cm tall	1.87 L/acre – applied once
Bur cucumber	1-18 leaf	0.67 L/acre – applied twice, 2 weeks apart.
Canada thistle	Rosette to 50 cm tall	0.67 L/acre
Dandelion	<15 cm diameter	0.67 L/acre
Dandelion	>15 cm diameter	1.34 L/acre
Horse-nettle	2-12 leaf stage	1.34 L/acre
Nutsedge	5-15 cm tall	1.34 L/acre – applied once or 0.67 L/acre – applied twice, 2 weeks apart
Milkweed	15-60 cm	0.67 L/acre
Perennial Sow-thistle	Rosette to 50 cm tall	0.67 L/acre
Quackgrass	< 25 cm	0.67 L/acre
Wirestem muhly	10-20 cm tall	0.67 L/acre

Table 3. The influence of AMS to condition water prior to adding glyphosate at various rates, its influence on the visual control (%) of velvetleaf, pigweed, lamb's-quarters and annual grasses and the relative cost of each herbicide treatment.

Treatment	Rate (L/ac)	Velvetleaf	Pigweed	Lamb's quarters	Grasses	Cost (\$/ac)
Glyphosate	0.17	24%	91%	59%	87%	\$2.80
AMS + glyphosate	0.8 + 0.17	45%	89%	68%	85%	\$5.20
Glyphosate	0.34	75%	96%	90%	94%	\$5.59
AMS + glyphosate	0.8 + 0.34	78%	96%	89%	95%	\$7.99
Glyphosate	0.51	94%	99%	92%	95%	\$8.39
AMS + glyphosate	0.8 + 0.51	95%	99%	91%	95%	\$10.79
Glyphosate	0.67	95%	97%	96%	95%	\$11.02
AMS + glyphosate	0.8 + 0.67	95%	99%	93%	96%	\$13.02

Notes: glyphosate price = \$16.45/L, AMS price = \$3/L, water volume was 10 gal/acre, weed height = 15 cm, glyphosate brand used was Roundup Weathermax. It is possible the at glyphosate brands with a lower surfactant load would respond differently.

Source: Nurse, Hamill, Kells and Sikkema - Annual weed control may be improved when AMS is added to below-label glyphosate doses in glyphosate-tolerant maize (*Zea mays* L.) - Crop Protection 27 (2008) 452–458