


# SUGARBEET

Herbicide	Product/A (ai/A)	Weeds	When to Apply	Remarks and Paragraphs
<p><b>Refer to page 6 for Fall or Spring Early Preplant Herbicides (See M6 to M9 for fall-applied herbicides). Refer to page 59 for additional herbicides to use in conventional or herbicide-resistant sugarbeet.</b></p>				
<p><b>Soil-Applied Herbicides</b></p>				
Far-Go (triallate <sup>8</sup> )	 1.5 qt EC, 15 lb 10G (1.5 lb)	Wild oat.	PPI. Spring. Fall - see label for rates and timing.	Incorporate immediately after application. A second incorporation will improve wild oat control. A1-2 M1-2,7
Eptam (EPTC <sup>8</sup> )	2.3 to 3.4 pt EC (2 to 3 lb)	Annual grasses and some broadleaf weeds.		Eptam may cause some sugarbeet stand reduction and temporary stunting. A1-2 B1 M1-2 M5-6 M18
Eptam (EPTC <sup>8</sup> ) + Ro-Neet SB (cycloate <sup>8</sup> )	1.1 to 2.3 pt EC + 2.7 to 3.3 pt EC (1 to 2 + 2 to 2.5 lb)			Less sugarbeet injury than from Eptam alone. Refer to narrative for suggested rates for various soil textures and organic matter. A1-2 M1-2 M5-6 M18
Ro-Neet SB (cycloate <sup>8</sup> )	4 to 5.3 pt EC (3 to 4 lb)			Ro-Neet is safer than Eptam. Weed control is poor on fine textured, high OM soils. A1-3 M1-2 M5-6 M18
Nortron / generic ethofumesate <sup>8</sup>	6 to 7.5 pt SC (3 to 3.75 lb)	Pigweed, kochia, waterhemp.	PPI or PRE.	PPI improves weed control. Band application reduces cost and risk of carryover. A1 M1-2 M9 M18
<p><b>POST-Applied Herbicides</b></p>				
Nortron / generic ethofumesate <sup>8</sup>	3 to 12 fl oz SC (0.094 to 0.375 lb)	Improves control of kochia, pigweed, waterhemp, and lambsquarters.	POST with Betamix or UpBeet and glyphosate up to 90 days PHI.	Apply Norton* POST 3 times at 4 fl oz/A or 4 times at 3 fl oz/A but do not apply POST more than 12 fl oz/A total during the growing season due to crop rotation restrictions. 90 day PHI. Willowood Ethofumesate 4SC, 45 day PHI. M1-2 M8-9 M15 M18
Stinger / generic clopyralid <sup>4</sup>	4 to 10.6 fl oz SL (0.09 to 0.25 lb)	Cocklebur, marshelder, ragweed, sunflower, buckwheat, and Canada thistle.	POST. Sugarbeet: Cotyledon up to 8-leaf stage.	Refer to narrative for rates and sizes for various species. Stinger* may be tank-mixed with Betamix*. Allow a 45 day PHI. M1-2 M8 M12 M15
UpBeet (triflurosulfuron <sup>2</sup> )	0.25 to 1 oz DF (0.125 to 0.5 oz)	Annual broadleaf weeds.	POST. Weeds: Cotyledon to 2-leaf stage.	Do not exceed 2.5 oz/A/season. Must include MSO adjuvant at 2 pt/A unless prohibited. Allow a 60 day PHI. M1-2 M8 M11 M15
Betamix (desmedipham <sup>5</sup> & phenmedipham <sup>5</sup> )	0.75 to 7.5 pt EC 0.06 to 0.6 lb + 0.06 to 0.6 lb	Annual broadleaf weeds.	POST. Sugarbeet: Cotyledon up to 75 days PHI.  Broadleaf weeds: Cotyledon up to 4-leaf stage.	Risk of sugarbeet injury increases from morning or midday applications and in certain environments. Split application with reduced rates has reduced sugarbeet injury and increased weed control compared to a single full-dose application. Do not add MSO or any adjuvant when applying full rates. Refer to paragraph for rate adjustment information. Allow a 75 day PHI. M1-2 M3 M8-9 M15 M18
Betamix + Nortron* (desmedipham <sup>5</sup> & phenmedipham <sup>5</sup> + ethofumesate <sup>8</sup> )	0.52 to 4.6 pt EC + 3 to 12 fl oz SC (0.042 to 0.374 lb + 0.042 to 0.374 lb + 0.094 to 0.375 lb)			
Betamix <sup>5,5</sup> + UpBeet <sup>2</sup> + Stinger <sup>4*</sup> + MSO adjuvant  or  Betamix <sup>5,5</sup> + Nortron <sup>8*</sup> + UpBeet <sup>2</sup> + Stinger <sup>4*</sup> + MSO adjuvant	<b>MICRO-RATE PROGRAM</b> 8 to 12 fl oz + 0.125 oz + 1.3 fl oz + 2 pt/A or 8 to 12 fl oz + 3 to 4 fl oz + 0.125 oz + 1.3 fl oz + 2 pt/A. <b>MID-RATE PROGRAM</b> 12 to 16 fl oz + 0.125 oz + 1.3 fl oz + 2 pt/A or 12 to 16 + 3 to 4 fl oz + 0.125 oz + 1.3 fl oz + 2 pt/A.	Annual broadleaf weeds and fair to good annual grass control. <b>Generally provides poor control of ALS-resistant kochia.</b> Increasing clopyralid rate from 1.3 to 2.6 fl oz will improve control of lanceleaf sage with some risk of increased sugarbeet injury.	POST. Sugarbeet: Apply a minimum of three times with <b>subsequent treatments at 5 to 7 day intervals.</b> Micro-rate can be applied starting at cotyledon sugarbeet stage. Mid-rate can be applied starting at 4-leaf sugarbeet stage.	Use mid-rate for difficult weed problems or when application has been delayed. A herbicide for grass control at ½ to 1X normal rate can be added. Nozzle plugging from herbicide precipitation in the spray tank can be reduced by: - mixing in warm water - raising water pH to 8 or 9 - premixing UpBeet - adding a grass herbicide - frequent sprayer cleaning. Allow a 75 day PHI or 90 day PHI using Nortron. M1-3 M8-9 M11-12 M15

\*Or generic equivalent.



# SUGARBEET

**M1. Sugarbeet** herbicides may be used to supplement cultural practices. Hand rouging and hoeing weeds can be reduced or eliminated by timely cultivations and herbicide applications.

**M2.** Herbicide tank-mixtures are commonly used on sugarbeet. Non-labeled herbicide combinations may be applied if all products in the mixture are registered for use on sugarbeet and are not prohibited. However, the user must assume liability for any crop injury, inadequate weed control, or illegal and/or harmful residues.

**M3. Betamix** (desmedipham & phenmedipham) applied POST may cause sugarbeet injury. Sugarbeet with four true leaves are more tolerant than smaller plants and continue to gain tolerance as size increases. Application rates totaling 3 pt/A or less should be followed by a second application in 5 to 7 days if weeds are present after 5 days. Split application with reduced rates reduces sugarbeet injury but increases weed control compared to one full-rate application - See table below. Risk of sugarbeet injury is reduced by applying in late afternoon so cooler temperatures follow application. Risk of injury increases during flooding, high temperature, and especially, a sudden change from cool, cloudy conditions to hot, sunny weather.

Betamix Broadcast Rate.

Sugarbeet stage	No soil herbicide			
	Low pressure (<100 psi)		High pressure or aerial	
	(lb/A)	(pt/A)	(lb/A)	(pt/A)
Coty to 2-leaf	0.25	1.5	0.16	1
2-leaf	0.33	2	0.25	1.5
4-leaf	0.5	3	0.4	2.5
6 to 8-leaf	0.75	4.6	0.75	4.6
Sugarbeet stage	With soil herbicide			
	Low pressure (<100 psi)		High pressure or aerial	
	(lb/A)	(pt/A)	(lb/A)	(pt/A)
Coty to 2-leaf	0.16	1	0.12	0.75
2-leaf	0.25	1.5	0.16	1
4-leaf	0.33	2	0.25	1.5
6 to 8-leaf	0.5	3	0.5	3

\* Or generic equivalent.

**M4. Dual Magnum** (S-metolachlor) applied preplant incorporated or preemergence may cause sugarbeet injury. Sugarbeet injury is greater following Dual Magnum application preplant incorporated than preemergence. Growers are required to sign a liability form that releases manufacturer from liability for sugarbeet injury. Apply PPI or PRE in the spring or fall and adjust rate depending on soil texture and OM content. Make fall applications (MN only) after October 15 but before ground freezes. Lay-by applications can be done without signing a liability release form. Apply lay-by after sugarbeet has 2 true leaves. Multiple lay-by applications can be made but the total applied must not exceed 2.6 pt/A per season. Precipitation after application is required for activation.

**M5. Eptam** (EPTC) may cause reduced sugarbeet stands and temporary stunting without yield reduction if adequate sugarbeet population remains after thinning. Injury increases in light soils with low OM. Ro-Neet or Nortron\* cause less sugarbeet injury on the low OM soils where Eptam injury may be excessive.

**Ro-Neet SB** (cycloate) gives better control than Eptam under

adequate spring rainfall but Eptam tends to give better weed control than Ro-Neet on fine-textured, high OM soils or under dry conditions. Ro-Neet causes less injury than Eptam and is safer on more coarse-textured, low OM soils. Eptam and Ro-Neet can be applied in the fall.

**M6. Eptam** (EPTC) plus **Ro-Neet SB** (cycloate) has less potential for sugarbeet injury and is less expensive than Ro-Neet alone. The rate of the mixture must be adjusted for soil texture and OM.

**M7. Far-Go** (trilalate) requires immediate incorporation after application at 3 to 4 inches deep for best wild oat control. Delaying the second incorporation for three days or longer after the first incorporation improves wild oat control. Delaying the second incorporation is especially important for granular formulations. One incorporation in the fall followed by spring seed-bed preparation is sufficient for fall-applied Far-Go. Far-Go should be fall-applied when temperatures are consistently below 50 F. Far-Go may be applied until snow cover or soil freeze up. Far-Go will control wild oat that have developed resistance to ACCase-inhibitor POST herbicides.

**M8. Micro-rate or Mid-rate** programs use low rates of herbicides in combination applied three or more times at 5 to 7 day intervals starting when weeds are just emerging. The micro-rate treatment is Betamix (8 to 12 fl oz/A) plus Nortron\* (3 to 4 fl oz/A) plus MSO adjuvant (2 pt/A) or Betamix (8 to 12 fl oz/A) plus UpBeet (0.125 oz/A) plus Stinger\* (1.3 fl oz/A) plus MSO adjuvant (2 pt/A). The MSO is essential to increase weed control when low herbicide rates are used.

The mid-rate treatment includes Betamix at 12 to 16 fl oz/A or Betamix plus Nortron\* at 12 to 16 fl oz/A plus 3 to 4 fl oz/A after sugarbeet has four leaves along with the same rate of UpBeet, Stinger\* and MSO. Add Select\* at up to 6 fl oz/A or Assure II or Fusilade at 8 to 10 fl oz/A or Poast at 1 pt/A to the micro-rate to improve grass control. Always use the mid-rate program once sugarbeet has reached the 4-leaf stage and when the next application has been delayed beyond 7 days after the previous application. The micro-rate will not control lanceleaf sage or ALS-resistant kochia and is less effective on waterhemp.

The micro-rate and mid-rates applied a minimum of three times generally gives better weed control than two applications of conventional rates. Three applications of conventional rates may give better weed control than three applications of the micro-rate. Four micro-rate applications may give better weed control than three applications of conventional rates or the micro-rate due to controlling late-emerging weeds.

Precipitation and nozzle plugging is common with ground application of the micro-rate treatment.

Several factors may reduce nozzle plugging.

- 1) Start with a clean sprayer and completely spray out the tank immediately after mixing, flush sprayer between loads, clean sprayer frequently, and avoid spray solution to set in the tank.
- 2) Allow the sprayer tank water to warm before mixing and increase the pH of water to 8 or 9 by adding ammonia or Quad 7.
- 3) Pre-mix the UpBeet in hot water or water with pH 8 to 9. Put UpBeet in the tank first and be sure it is dissolved before adding, in order, Betamix, Stinger\*, and MSO type oil adjuvant. A 2% solution of household ammonia at 1 gal/100 gal of water will give about pH 9. Add ammonia slowly as the tank fills so water pH does not go much over pH 9.
- 4) Add a grass herbicide. Tests show Assure II\* reduced precipitation more than Poast and Select\* but all had an effect.
- 5) Use gentle agitation.

\*Or generic equivalent.

## M9-17 - SUGARBEET

**M9. Nortron\*** (ethofumesate) is the best soil-applied herbicide for kochia control, providing fair to good control. Nortron\* applied PPI improves weed control, especially kochia control. Do not incorporate less than 2 inches deep (2 to 4 inches preferable). Nortron\* (1 to 3 pt/A) + Dual Magnum (0.5 (except course-textured soils) to 0.75 pt/A PRE can improve control of small-seeded broadleaf weeds, including waterhemp, when followed by Dual Magnum, Outlook or Warrant (chloroacetamides) early POST to sugarbeet and PRE to waterhemp (layby). Split application of chloroacetamide herbicides is recommended since in some environments, growth reduction may occur from chloroacetamides following Nortron and Dual Magnum compared with Nortron and Dual Magnum alone. Likewise, Ro-Neet or Eptam (fall-applied) can cause sugarbeet injury especially on medium to coarse textured soils. Nortron\* plus spring-applied Eptam may cause serious injury and should only be used on fine textured soils with over 6% OM. See label for rate adjustment on various soil types.

Use the following recommendations to reduce nozzle plugging or incompatibility issues with Nortron\*:

- 1) Fill partially used Nortron\* jugs with water to prevent formation of insoluble Nortron\* residue. Mark the level of remaining Nortron\* in the jug before adding water.
- 2) Flush lines and clean nozzles and screens daily.
- 3) Use warm water.
- 4) Addition of liquid nitrogen may help.
- 5) Use 50 mesh or larger screens.

**M10. Outlook\*** (dimethenamid) on medium to fine-textured soils may be used as a lay-by treatment when sugarbeet has 2 to 8 leaves. Apply once at a maximum of 21 fl oz/A or sequentially but the total must not exceed 24 fl oz/A. Sugarbeet leaf burn may occur from a single application at 18 to 21 fl oz/A. Precipitation after application is required for activation. Weeds that emerge prior to activation will not be controlled.

**M11. UpBeet** (triflurosulfuron) should be used with MSO adjuvant when applied with Stinger\*, Betamix, or Nortron\*. UpBeet will antagonize grass control from Assure II\*, Fusilade DX, Poast, or Select\*, similar to antagonism caused by Betamix. UpBeet at 0.5 to 1.0 oz/A applied with Roundup\* + HSMOC and AMS has improved control of non-ALS resistant waterhemp and kochia. Research in eastern North Dakota and Minnesota has shown UpBeet + Nortron\* or UpBeet + Nortron\* and Betamix have improved control of glyphosate resistant waterhemp and kochia.

**M12. Stinger\*** (clopyralid) applied with MSO adjuvant controls small weeds in the Composite, Polygonum, Legume, and Nightshade families. Apply to wild buckwheat in the 3- to 5-leaf stage before vining begins. Apply Stinger\* at 0.5 to 0.66 pt/A to Canada thistle in the rosette to pre-bud growth stage. Rosette application will give better control than later application.

**M13. Treflan\*** (trifluralin) will provide residual weed control. Broadcast and incorporate immediately with cultivators or tillage tools adjusted to mix the herbicides in the soil without excessive sugarbeet stand loss. The crop should be clean cultivated before application since established weeds are not controlled. Treflan\* with good moisture conditions will control late germinating weeds that may become a problem late into the season.

**M14. Warrant** (acetochlor) may be applied singly or sequentially at 1.25 to 2 qt/A. Allow at least 7 days between sequential applications and do not exceed 2 qt/A as a single application. Precipitation is required for activation. Weeds that emerge prior to activation will not be controlled.

**M15. Combinations of postemergence herbicides** give more broad spectrum and greater total weed control compared to individual treatments. For example, Stinger\* + Betamix have controlled wild buckwheat, eastern black nightshade, lambsquarters, buffalobur, giant ragweed, common ragweed, ladythumb, lanceleaf sage and Russian thistle superior to Stinger\* or Betamix applied alone. Betamix + Nortron\*, UpBeet + Nortron\* or Betamix + UpBeet have improved control of glyphosate resistant waterhemp compared to Roundup\* alone. Finally, UpBeet + Betamix + Nortron\* or UpBeet + Nortron + Roundup\* have improved control of glyphosate resistant kochia compared to Roundup\* alone.

UpBeet generally has little effect on sugarbeet injury. UpBeet plus Betamix has provided improved control of redroot pigweed, prostrate pigweed, kochia, common mallow, nightshade, ladythumb, Venice mallow, nightflowering catchfly, wild mustard and velvetleaf compared to Betamix or Betamix + Nortron\*. UpBeet + Betamix has provided similar control of waterhemp compared to Betamix + Nortron\*.

### HERBICIDE-RESISTANT SUGARBEET

#### **Roundup Ready Sugarbeet**

**M16.** Glyphosate may be applied to Roundup Ready sugarbeet from emergence to 30 days before harvest. Refer to labels for adjuvant use. Use registered formulations and always apply glyphosate at the full rate depending on weed species and weed size. The maximum rate of glyphosate that can be applied to sugarbeet at various times is listed in the tables. Glyphosate may be applied up to four times POST to sugarbeet with at least 10 days between applications. Apply glyphosate in the least amount of spray volume allowed but avoid drift of spray droplets. Apply with AMS at 8.5 lbs/100 gallons of water.

The initial glyphosate application should be applied to 1 to 2 inch weeds or 2 to 4-leaf stage sugarbeet at 0.98 to 1.125 lb ae/A. Sequential applications should be applied approximately 14 to 21 days after the previous application.

**M17. Sequence** (glyphosate-K & S-metolachlor) may be applied only to Roundup Ready sugarbeet from 2-leaf to canopy closure. Sequence may be applied from 2 to 8-leaf sugarbeet at the maximum rate of 2.5 pt/A on course soils and 3 pt/A on medium and fine soils in a single application. The maximum rate of Sequence that may be applied from 8-leaf to canopy closure is 2.5 pt/A for a single application. Sequential applications must be separated by 10 days. Additional glyphosate may be included but do not exceed single and multiple glyphosate application rates within each growth stage according to the label. Add AMS at the minimum rate of 8.5 lbs/100 gallon of water. The PHI for Sequence is 60 days. Do not exceed 7 pt/A of Sequence and 4 POST applications per season.

**M18. Glyphosate-resistant waterhemp and kochia** are difficult to control in Roundup Ready sugarbeet with conventional herbicides. Glyphosate-resistant waterhemp and kochia should be managed using an integrated approach that combines tillage to ensure a clean start and a strategy that includes herbicides with complimentary SOA in crops planted in sequence with sugarbeet.

In sugarbeet, Nortron\*, Ro-Neet, Ro-Neet + Eptam, Dual Magnum, Outlook\* or Warrant provide residual control of glyphosate-resistant waterhemp. Nortron\* PRE followed by Betamix + UpBeet with Nortron\* provided glyphosate-resistant kochia control. However, row cultivation and/or hand-labor may likely be required to achieve complete control, especially complete control of waterhemp.

\*Or generic equivalent.