

# Sugar Beets

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All rates listed are stated as broadcast equivalent (i.e., the amount that would be required for weed control if broadcast sprayed between rows as well as in the row). If sugar beet herbicides are applied in a band, the amount required for 1 acre of beets can be calculated as: broadcast equivalent x (band width ÷ distance between rows).

## SUGAR BEETS—Annual Grass and Broadleaf Weeds

### cycloate (Ro-Neet)

**Rate** 3 to 4 lb ai/A (0.5 to 0.67 gal/A Ro-Neet 6EC)

**Time** Preplant or postemergence. Apply preplant incorporated in spring or in fall (4 lb ai/A). If applied in fall, do not reapply preplant the next spring. Postemergence or layby applications can be made after fall or spring Ro-Neet applications. Postemergence applications can be made after the first true leaves form, after thinning, and after clean cultivation.

**Remarks** Incorporate all applications mechanically, 2 to 3 inches deep, or incorporate using 0.5 to 0.75 inch of sprinkler irrigation water or enough water to penetrate soil 3 to 4 inches. Use lower rate on sandy soil. For maximum weed control, plant immediately after application. May be broadcast or band applied. Injury may result in highly saline or alkaline soils. When cultivating fields where cycloate has been banded in row, use shields to prevent moving untreated soil into treated row. May be applied with fluid fertilizers or impregnated on dry bulk fertilizers.

**Caution** Do not tank-mix with Betamix or Progress or generic equivalents. If applying in irrigation water, apply only through sprinklers. See label for sprinkler application requirements.

**Site of action** Group 8: lipid synthesis inhibitor but not an ACCase inhibition

**Chemical family** Thiocarbamate

### dimethenamid-P (Outlook)

**Rate** 0.56 to 0.984 lb ai/A (12 to 21 fl oz/A Outlook 6EC)

**Time** Apply after sugar beets have two true leaves, otherwise injury may occur.

**Remarks** Application rate depends on soil type and organic-matter content. Apply from the two-true-leaf to the twelve-leaf growth stage. Two applications per growing season are permitted, but do not exceed 21 fl oz/A per growing season. Outlook will not control emerged weeds. Tank-mix postemergence herbicides with Outlook if weeds are present.

**Caution** Avoid treating light, sandy soils when conditions favor wind erosion.

**Site of action** Group 15: lipid synthesis inhibitor but not an ACCase inhibitor

**Chemical family** Chloroacetamide

### EPTC (Eptam)

**Rate** 1 to 3 lb ai/A (1.25 to 3.5 pints/A Eptam 7EC or 15 lb/A Eptam 20G)

**Time** Apply after cultivation, thinning, or last cultivation of the season (layby).

**Remarks** Must be incorporated or metered into sprinkler irrigation lines, or injected on each side of beet row as label directs. If using Eptam 20G, apply 15 lb/A. Do not apply before first true sugar beet leaves have formed, or within 49 days of harvest. May be mixed with some liquid fertilizers or dry bulk fertilizers (see label).

**Site of action** Group 8: lipid synthesis inhibitor but not ACCase inhibition

**Chemical family** Thiocarbamate

### ethofumesate (Nortron or Ethotron)

**Rate** 0.25 to 3.75 lb ai/A (0.5 to 7.5 pints/A Nortron 4SC or Ethotron 4SC)

**Time** Apply preplant or preemergence followed with a light incorporation or sprinkler irrigation (0.5 to 0.75 inch of water). May also apply to bedded soil in the fall. Ethofumesate can be applied postemergence in a tank-mix with Betamix, Phen-Des 8+8, Progress, or BnB Plus.

**Remarks** Do not apply more than 6 pints/A (broadcast equivalent) on soils with less than 3% organic matter. Do not mechanically incorporate under sprinkler irrigation. Effective on most broadleaf weeds, but only fair on nightshade. Good on most grasses, kochia, Russian thistle, and redroot pigweed. Ethofumesate tank-mix rates with Betamix are 0.25 to 0.5 pint/A. Do not broadcast-spray ethofumesate because increased soil residue raises chance of injuring follow-crops. See label for rate best suited to your soil type.

**Caution** Temporary injury may occur at higher rates. Do not exceed a total of 1 gal/A (broadcast equivalent) in a single season. If soil-applied, do not plant any crop other than sugar beets or ryegrass within 12 mo after applying. May rotate 6 mo after low-rate postemergence applications. Do not mix with liquid fertilizers. Moldboard-plow soil the next year before planting other crops.

**Site of action** Group 16: unknown

**Chemical family** Benzofuran

### glyphosate (Roundup PowerMax and Helosate Plus)

**Rate** 0.375 to 1.125 lb ae/A (22 to 32 fl oz Roundup PowerMax 4.5SL, or 32 to 48 fl oz Helosate Plus 3SL)

**Time** Apply preemergence through canopy closure.

**Remarks** Use only on beets grown for sugar. Be aware that glyphosate is formulated as 3, 3.7, and 4.5 lb ae/gal; be sure to use the correct amount of herbicide. In Roundup Ready sugar beets, up to 3.71 lb ae/A (106 fl oz/A Roundup PowerMax) may be applied preplant, at planting, or preemergence; up to 1.97 lb ae/A (56 fl oz/A Roundup PowerMax) may be applied from emergence

to eight-leaf stage; and up to 1.54 lb ae/A (44 fl oz/A Roundup PowerMax) may be applied between eight-leaf stage and canopy closure. A total of 5.96 lb ae/A glyphosate may be applied per year. The maximum rate for any single application from crop emergence until the eight-leaf stage is 1.125 lb ae/A (32 fl oz/A Roundup PowerMax). It is strongly recommended not to use less than 0.75 lb ae/A for weed control to reduce the potential for glyphosate-resistant weeds. The maximum rate for any single application between the eight-leaf stage and canopy closure is 0.77 lb ae/A. Controls only emerged weeds and has no residual weed control. Do not plant crops other than those listed on label for 30 days after applying. See individual glyphosate labels for amount of surfactant and water applied per acre. Use up to 2 lb ae/A glyphosate to control perennial weeds. Up to four sequential applications of this product may be made with at least 10 days between applications. Preharvest interval is 30 days.

**Caution** Do not use glyphosate for spot treatment in emerged sugar beet crops that are not Roundup Ready.

**Site of action** Group 9: inhibits EPSP synthase

**Chemical family** None generally accepted

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### S-metolachlor (Dual Magnum)

**Rate** 0.95 to 1.59 lb ai/A (1 to 1.67 pints/A Dual Magnum 7.62EC)

**Time** Can apply preplant incorporated, preemergence, or postemergence (after first-true-leaf stage). Studies in Idaho indicate increased injury potential with preplant and preemergence applications compared with postemergence applications.

**Remarks** Refer to label for application rates appropriate for soil type. For preplant and preemergence applications, use lower rates on soils with less than 3% organic matter. Weeds present at the time of application will not be controlled.

**Caution** Do not exceed 2.66 pints/A postemergence or 4 pints/A total.

**Site of action** Group 15: lipid synthesis inhibitor but not an ACCase inhibitor

**Chemical family** Chloroacetamide

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### paraquat (Gramoxone Inteon)

**Rate** 0.5 to 1 lb ai/A (2 to 4 pints/A Gramoxone Inteon 2SL)

**Time** Apply postemergence to weeds but before crop emerges.

**Remarks** Form seedbeds as far ahead of treatment as possible to permit maximum weed emergence.

**Caution** **A restricted-use herbicide.** Wear a long-sleeved shirt, long pants, shoes and socks, and a NIOSH-approved respirator with any N, R, P, or HE filter when handling and spraying. Avoid contact with eyes and skin. Do not breathe spray mist. Do not allow drift from target site.

**Site of action** Group 22: photosystem I electron diversion

**Chemical family** Bipyridilium

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### pronamide (Kerb)

*Seed in Oregon only*

**Rate** 1 lb ai/A (2 lb/A Kerb 50WP)

**Time** Apply postemergence to weeds and beets in November or December, after beets have at least three to five true leaves.

**Remarks** Special local needs label OR-900004. Controls most annual grasses and volunteer grains; suppresses chickweed. Does not control most broadleaves.

**Caution** **A restricted-use herbicide.** Avoid spraying areas that may drain onto fields planted to grass or cereal crops. Do not graze or feed crop residues.

**Site of action** Group 3: microtubule assembly inhibitor

**Chemical family** Benzamide

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### pyrazon (Pyramin DF)

**Rate** 3 to 3.5 lb ai/A (4.6 to 5.4 lb/A Pyramin 65DF)

**Time** Sprinkler irrigation: band apply within 3 days after planting and water with 0.5 to 0.75 inch of water. Furrow irrigation: apply preplant to prepared seedbeds.

**Remarks** Rates listed above are broadcast equivalents. Band application rate depends on band width. See label for correct rate for your soil type. Sprinkler irrigation: do not mechanically incorporate. Furrow irrigation: incorporate no more than 2 inches deep with a rotary-type incorporator. Plant beets and furrow-irrigate until the tops of the beds are thoroughly wetted. Band treat only, and do not use on sands or loamy sands. Pyramin DF also may be used as a tank-mix with Betamix or a nonphytotoxic emulsifiable oil for postemergence applications; see label directions.

**Caution** Do not use on sand or loamy sand soils. Do not apply broadcast. Do not apply more than 0.75 inch of water per irrigation until beets emerge and have two true leaves. At high rates or excessive irrigation, early crop may be injured. Do not plant any crop except beets in the treated area during the same season.

**Site of action** Group 5: photosystem II inhibitor

**Chemical family** Pyridazinone

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### phenmedipham + desmedipham (Betamix or Phen-Des 8+8)

**Rate** 0.25 to 1.25 lb ai/A (1.5 to 7.5 pints/A Betamix 1.3EC, or Phen-Des 8+8 1.3EC)

**Time** Apply low rates two to three times at about 1-wk intervals. The first application may be made when sugar beets are in cotyledon to one-leaf stage, but weeds must have no more than one true leaf. Higher rates are required when weeds are in two- to four-leaf stage. In such a case, sugar beets must have at least two true leaves and temperatures must be between 50°F and 80°F.

**Remarks** Controls common lambsquarters, mustard species, and nightshade. Some control of green foxtail. Weak on kochia and pigweed. Do not spray while dew is present. Rain within 6 hr of application may reduce weed control.

**Caution** Sugar beets may be injured if stressed or if air exceeds 85°F at application.

**Site of action** (both) Group 5: photosystem II inhibitor

**Chemical family** (both) phenylcarbamate

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**phenmedipham + desmedipham + ethofumesate (Progress or BnB Plus)**

**Rate** 0.25 to 1.125 lb ai/A (1.13 to 5 pints/A Progress 1.8EC, or BnB Plus 1.8EC)

**Time** Split applications (0.25 to 0.5 lb ai/A) may be made to control early-emerging weeds in the cotyledon stage. Repeat application 5 to 7 days after the first, or when another flush of weeds germinates.

**Remarks** Low-rate, split applications are most successful on newly emerging weeds. If second application is delayed, higher application rates will be necessary. Rain within 6 hr of application may reduce weed control.

**Caution** Sugar beets may be injured if under stress, or if air exceeds 80°F at application. Frost within 3 days before application or 7 days after could injure crop. Favorable growing conditions after crop injury usually result in no yield loss.

**Site of action** (phenmedipham and desmedipham) Group 5: photosystem II inhibitor; (ethofumesate) Group 16: unknown

**Chemical family** (phenmedipham and desmedipham) phenylcarbamate; (ethofumesate) benzofuran

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**trifluralin (several trade names)**

**Rate** 0.5 to 0.75 lb ai/A (1 to 1.5 pints/A with any 4-lb ai/gal formulation)

**Time** Apply at layby when soil has been pushed around beets after thinning (i.e., when beets are 2 to 6 inches tall or in four- to six- leaf stage).

**Remarks** Cover exposed beet roots with soil before applying. Irrigation is not needed to activate. Incorporate with power tiller, rolling cultivator, or flexline harrow. After using trifluralin, plow deeply before planting any sensitive crop. Do not plant oats. See label for crop rotation restrictions.

**Site of action** Group 3: microtubule assembly inhibitor

**Chemical family** Dinitroaniline

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**triflurosulfuron-methyl (UpBeet)**

**Rate** 0.25 to 0.5 oz ai/A (0.5 to 1 oz/A UpBeet 50DF)

**Time** Apply to sugar beets any time after planting and weed emergence.

**Remarks** Tank-mix with other broadleaf herbicides such as Betamix, Progress, or Stinger. Use at least two sequential applications 5 to 10 days apart or as weeds germinate. For best results, weeds should be small (cotyledon to four true leaves), actively growing, and not under stress. If UpBeet is applied alone or combined with Stinger, include a nonionic surfactant or crop oil concentrate. Since UpBeet has no soil activity, only emerged weeds will be controlled. Rain within 6 hr may reduce weed control.

**Caution** Temporary chlorosis may occur under stressful growing conditions. Preharvest interval is 90 days. Do not exceed 1.25 oz ai/A in one season.

**Site of action** Group 2: acetolactate synthase (ALS) inhibitor

**Chemical family** Sulfonylurea

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**SUGAR BEETS—Annual Grass**

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**clethodim (Select or Select Max)**

**Rate** 0.094 to 0.25 lb ai/A (6 to 16 fl oz/A Select 2EC) or 0.068 to 0.121 lb ai/A (9 to 16 fl oz/A Select Max)

**Time** Apply to actively growing grasses 1 to 6 inches tall.

**Remarks** Apply when the first grass weed species in a mixed grass weed population reaches recommended growth stage for treatment. Always use crop oil concentrate at 1 quart/A with ground applications, or 1% v/v (but not less than 1 pint/A) by air. An additional 1 to 2 quarts/A liquid fertilizer (28% or 32% N) or 2.5 to 4 lb AMS fertilizer may be added for enhanced grass control. Do not apply if rain is expected within 1 hr of application. Refer to label for information on tank-mixing with broadleaf herbicides.

**Caution** Preharvest interval is 40 days.

**Site of action** Group 1: acetyl CoA carboxylase (ACCase) inhibitor

**Chemical family** Cyclohexanedione

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**quizalofop P-ethyl (Assure II or Targa)**

**Rate** 0.034 to 0.083 lb ai/A (5 to 12 fl oz/A Assure II 0.88EC or Targa 0.88EC)

**Time** Apply to actively growing grasses from three-leaf to early tillering stage.

**Remarks** Controls annual grass weeds and volunteer small grains. Can use quizalofop at 2.5 fl oz/A for preplant burndown of grass weeds. Subsequent flushes of grass require additional treatment. Use of crop oil concentrate is preferred (4 quarts/A), but a nonionic surfactant (1 quart/A) may be used. Do not apply if rain is expected within 1 hr of application

**Caution** Do not mix with broadleaf herbicides unless listed on the label. Preharvest interval is 45 days.

**Site of action** Group 1: acetyl CoA carboxylase (ACCase) inhibitor

**Chemical family** Aryloxyphenoxy propionate

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**sethoxydim (Poast)**

**Rate** 0.19 to 0.47 lb ai/A (1 to 2.5 pints/A Poast 1.5EC)

**Time** Apply to actively growing grasses.

**Remarks** See label for application rates, which differ by grass species and size. Sugar beets at all stages of growth are tolerant. In irrigated areas, apply 2 to 4 days after irrigation for best results. Always add oil concentrate at 2 pints/A. Annual bluegrass and fine fescues are not controlled. Spray volunteer grain up to 4 inches tall, but before tillering. Spray wild oat when 2 to 4 inches tall. Can be tank-mixed with Betamix without crop oil concentrate. Do not apply if rain is expected within 1 hr of application.

**Caution** Do not exceed 2.5 pints/A Poast per application or 5 pints/A Poast in 1 yr. Allow at least 100 days before harvest if tops are to be fed to livestock.

**Site of action** Group 1: acetyl CoA carboxylase (ACCase) inhibitor

**Chemical family** Cyclohexanedione

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## SUGAR BEETS—Quackgrass

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### clethodim (Select)

**Rate** 0.125 to 0.25 lb ai/A (6 to 16 fl oz/A Select 2EC)

**Time** Apply to actively growing grasses 4 to 12 inches tall.

**Remarks** Apply when the first species in a mixed-grass weed population reaches the recommended growth stage for treatment. Always use crop oil concentrate at 1% v/v. Adding 1 to 2 quarts/A liquid fertilizer (28 or 32% N) or 2.5 to 4 lb AMS fertilizer enhances quackgrass control. Do not apply if rain is expected within 1 hr of application. See label on tank-mixing with broadleaf herbicides.

**Caution** Do not apply within 30 days of harvesting or cutting beets.

**Site of action** Group 1: acetyl CoA carboxylase (ACCase) inhibitor

**Chemical family** Cyclohexanedione

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### quizalofop P-ethyl (Assure II or Targa)

**Rate** 0.069 to 0.083 lb ai/A (10 to 12 fl oz/A Assure II 0.88EC or Targa 0.88EC)

**Time** Apply to actively growing quackgrass 6 to 10 inches tall.

**Remarks** Two applications more effectively control quackgrass than one application. Using crop oil concentrate is preferred (4 quarts/A), but a nonionic surfactant (1 quart/A) may be used. Do not apply if rain is expected within 1 hr of application.

**Caution** Do not mix with broadleaf herbicides unless listed on the label. Preharvest interval is 45 days.

**Site of action** Group 1: acetyl CoA carboxylase (ACCase) inhibitor

**Chemical family** Aryloxyphenoxy propionate

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### sethoxydim (Poast)

**Rate** 0.47 lb ai/A first application + 0.28 lb ai/A second application (2.5 + 1.5 pints/A Poast 1.5EC)

**Time** Apply first when quackgrass is 6 to 8 inches tall. Apply again when re-growth or new growth is 6 to 8 inches tall.

**Remarks** Quackgrass is suppressed during crop season, but little long-term control will result. Use an oil concentrate with herbicide. Cultivation 14 to 21 days after applying aids control. Do not apply if rain is expected within 1 hr of application.

**Site of action** Group 1: acetyl CoA carboxylase (ACCase) inhibitor

**Chemical family** Cyclohexanedione

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## SUGAR BEETS—Certain Annual Broadleaf Weeds and Canada Thistle

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### clopyralid (Stinger or Clopyr Ag)

**Rate** 0.094 lb ae/A to 0.188 lb ae/A clopyralid (0.25 to 0.5 pint/A Stinger 3SC, or Clopyr Ag 3SC) to control annual broadleaf weeds. To control Canada thistle and suppress perennial sowthistle, use 0.188 to 0.25 lb ae/A clopyralid (0.5 to 0.66 pint/A Stinger 3SC or Clopyr Ag 3SC).

**Time** Apply when beets have two to eight true leaves. For Canada thistle, apply after most basal leaves emerge, but before bud stage.

**Remarks** May be tank-mixed with Betamix or Betanex to control additional weeds. For most effective control of Canada thistle, apply broadcast to entire infested area. Apply at 10 gal/A or higher total spray volume.

**Caution** Wheat, barley, oats, grasses, field corn, or sugar beets may be planted any time following treatment. Do not plant alfalfa, asparagus, canola (rapeseed), *Brassica* species grown for seed, cole crops, dry beans, soybeans, grain sorghum, mint, onions, popcorn, safflower, sunflower, sweet corn, or strawberries for 12 mo after applying clopyralid.

In areas with 18 or more inches of annual precipitation (not including irrigation), alfalfa, asparagus, dry beans, canola (rapeseed), *Brassica* species grown for seed, grain sorghum, mint, onions, popcorn, sweet corn, soybeans, strawberries, and sunflowers may be planted 12 mo after applying clopyralid. Cole crops, lentils, peas, potatoes (including potatoes grown for seed), safflower, or broadleaf crops grown for seed (excluding *Brassica* species) should not be planted for 18 mo after treatment unless previous experience has shown no crop injury with the minimal 12-mo rotation interval. In areas with less than 18 inches average annual precipitation (not including irrigation), do not plant alfalfa, dry beans, soybeans, sunflowers, lentils, peas, potatoes (including potatoes grown for seed), or broadleaf crops grown for seed (excluding *Brassica* species) until 18 mo after applying clopyralid. Crop may suffer injury or yield loss up to 4 yr after application.

Re-treat as necessary but do not exceed 0.66 pint/A per year. Preharvest interval is 105 days for beet roots and tops. Do not apply by air.

**Site of action** Group 4: synthetic auxin

**Chemical family** Pyridine

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# Herbicide Effectiveness<sup>1</sup> on Weeds in Sugar Beets

Weeds	cycloate (Ro-Neet)	ethofumesate (Norton or Etho SC)	pyrazon (Pyramin)	dimethenamid-P (Outlook)	phenmedipham + desmedipham (Betamix)	clopyralid (Stinger / Clopyr Ag)	triflusalufuron (UpBeet) <sup>2</sup>	clethodim (Select)	quizalofop (Assure II) <sup>3</sup>	sethoxydim (Poast)	EPTC layby (Eptam)	trifluralin
Barley, volunteer	F	F	P	P	P	P	P	G	G	P-F	P	P
Barnyardgrass	G	G	P	E	P-F	P	P	E	E	E	G	G
Bindweed, field	P	P	P	P	P	P	P	P	P	P	P	P
Buckwheat	P	F-G	P	P	F-G	E	G	P	P	P	F	F
Clover, sweet	P	F-G	P	P	P	E	P	P	P	P	P	P
Cocklebur	P	P	P	P	F	E	F	P	P	P	P	P
Crabgrass	G	F-G	P	G	P	P	P	E	E	F	G	G
Dodder	P	P	P	P	P	P	P	P	P	P	P	P
Foxtail	G	G	P	E	F	P	P	E	E	E	G	G
Knapweed, Russian	P	P	P	P	P	G	P	P	P	P	P	P
Knotweed	P	P	P	F	F	F	G	P	P	P	G	G
Kochia	P	F-G	P	F	P-F	P	G	P	P	P	F	F
Lambsquarters	E	G-E	G	F-G	E	F	G	P	P	P	G	F-G
Mallow	P	P	P	P-F	P	P	F	P	P	P	P	P
Mustard	P	G	G	P	G	P	G	P	P	P	P	P
Nightshade, black	G	F-G	F-G	G	F-G	F-G	G	P	P	P	F-P	P
Nightshade, hairy	G	F-G	F-G	E	G-E	F-G	F	P	P	P	G	P
Nutsedge, yellow	F	P	P	F-G	P	P	P	P	P	P	F	P
Oats, volunteer	F	F	P	F	P	P	P	G	G-E	P-F	P	P
Oat, wild	F	F	P	F	P	P	P	G-E	G-E	G-E	F-G	F
Pigweed	E	G-E	G-E	E	G-E	P	G-E	P	P	P	F-G	G
Purslane	G	F-G	F-G	F-G	G	P	F	P	P	P	G	G
Quackgrass	F	P	P	P	P	P	P	G3	G3	F	F	P
Sandbur	G	P	P	G	P	P	P	E	G	—	G	G
Smartweed	P	F-G	G	P	P	G	G	P	P	P	P	P-F
Sowthistle	P	G	P	F	E	G	G	P	P	P	F	P
Sunflower	P	P	P	P	F	E	P	P	P	P	P	P
Thistle, Canada	P	P	P	P	P	E	P	P	P	—	P	P
Thistle, Russian	P	F-G	P-F	F	F	P	P	P	P	P	P	F-G
Wheat, volunteer	F	F	P	P	P	P	P	G	G	P-F	F	F

E = excellent      G = good      F = fair      P = poor      — = limited information

<sup>1</sup> Response of weeds to any of the listed herbicides may be altered by growing conditions, weed population, type of irrigation, genetic variation, soil type, pH, organic matter, time of application, or application rate. Ratings may vary from season to season and from site to site. Weed control generally decreases as the season progresses.

<sup>2</sup> UpBeet controls these weeds when tank-mixed with Betamix.

<sup>3</sup> Requires two applications of Assure II for quackgrass.