SECTION Q.
VEGETABLE SEED CROPS
Tim Miller
Revised March 2019

In some seed-producing regions, contracting seed companies or seed associations have secured SLN (SLN) labels for members. These labels may not be listed here because the authors of this handbook wish to honor the third-party ownership of these labels and their restricted use. SLNs for Syngenta products are only found on the website farmassist.com, therefore we have included specific directions in the text of each section on how to access these labels, or we have at least referenced other sections where that information is available.

We do not include Section 18 labels because of their transient nature.

If an herbicide is labeled for use in a given crop, that herbicide also may be used in producing seed for that vegetable, unless expressly forbidden on the label. Be sure to check vegetable crop sections of this handbook for additional herbicide listings. Uses listed here are specifically for seed crops, and are not labeled for use in crops grown for food.

Stale Seedbed Method
Refer to “Stale and False Seedbeds” in Section P. Vegetable Crops for information on the following options.

- acetic acid
- ammonium nonanoate, ammonium salts of fatty acids
- carfentrazone
- caprylic and capric acids
- clove oil, peppermint oil, rosemary oil, thyme oil
- decanoic acid, octanoic acid, pelargonic acid
- flaming
- glyphosate
- d-limonene
- paraquat (restricted-use herbicide in Idaho and Oregon for acute toxicity)
- pyraflufen

Beet Seed, red or table
clopyralid (Stinger)
Rate 0.094 to 0.125 lb ae/a (0.25 to 0.33 pints/a Stinger)
Time Apply in 10 gal or more total spray volume when seed crop has at least two true leaves.
Remarks SLN label WA-970033. Use above rates for annual weeds 1 to 2 inches high. Make spot applications up to 0.66 pints/a to Canada thistle.
Caution Apply after most thistle basal leaves emerge but before buds form. Re-treat as necessary up to eight-leaf stage of crop growth, but do not exceed 0.66 pints /a Stinger per growing season. Crop safety data are limited; use only when crop injury is acceptable. Follow rotational crop restrictions on label. Avoid spray drift to sensitive crops. Do not use any part of the treated field, including seed, seed screenings, hay forage, and stubble, for human or animal consumption.
Site of action Group 4: synthetic auxin
Chemical family Pyridine
cycloate (Ro-Neet 6-E)
Rate 3 to 4 lb ai/a (4 to 5.4 pints/a Ro-Neet 6-E)
Time Apply preplant to soil dry enough to thoroughly mix; immediately incorporate 2 to 3 inches deep by cross-disking or using a rotary tiller.
Remarks Use on mineral soil only; seed may be planted immediately.
Site of action Group 8: lipid synthesis inhibitor but not an ACCase inhibitor
Chemical family Thiocarbamate
EPTC (Eptam 7E)
Oregon and Washington only
Rate 2.0 to 3.0 lb ai/a (2.25 to 3.5 pints/a Eptam 7E)
Time Apply postemergence after transplant leaves emerge or as a layby application at time of last cultivation.
Remarks SLN labels OR-160009 and WA-140001. Product must be incorporated either by rainfall/irrigation or by mechanical means. Eptam has little to no postemergence activity, so emerged weeds must be controlled by incorporation equipment, other herbicide, or hand-weeding near the time of application.
Caution Do not feed or graze table beet forage or fodder. No portion of the treated field, including seed, seed screening, hay forage, and stubble, may be used for human or animal consumption. Do not exceed 3.5 pints EPTAM 7E per acre per crop (except for irrigation applications in the Pacific Northwest Region where two applications of 3.5 pints may be made).
Site of action Group 8: lipid synthesis inhibitor but not an ACCase inhibitor.
Chemical family Thiocarbamate
ethofumesate (Nortron SC)
Western Oregon and Washington only
Rate Consult label.
Time Apply preplant incorporated, preemergence, or postemergence tank mixed with phenmedipham (Spin-Aid). Postemergence treatment may be repeated 4 weeks after first application.
Remarks SLN labels OR-160002 and WA-010002. Crop may be injured under unfavorable environmental conditions or when higher rates are used.
Caution Do not feed or graze table beet forage or fodder. No portion of the treated field, including seed, seed screening, hay forage, and stubble, may be used for human or animal consumption.
Site of action Group 16: unknown
Chemical family Benzofuran
**fluazifop (Fusilade DX)**

*Washington only*

- **Rate**: 0.063 to 0.25 lb ai/a (4 to 16 fl oz/a Fusilade DX)
- **Time**: Apply to actively growing grasses.
- **Remarks**: SLN label WA-040006. Identify grasses; adjust rates for susceptibility and stage of weed growth as label instructs. Results often are erratic on grasses stressed from lack of vigor, drought, high temperature, or low fertility. More mature grasses and quackgrass can be controlled but may require two applications. Annual bluegrass and all fine fescues resist treatment.
- **Caution**: Do not exceed 32 oz/a per season. Do not apply if rain is expected within 1 hour. Rotational grass crops such as corn and cereals may not be planted within 60 days of the last application. Grazing any plant product or residue is prohibited.
- **Site of action**: Group 1: acetyl CoA carboxylase (ACCase) inhibitor
- **Chemical family**: Aryloxyphenoxypropionate

**phenmedipham (Spin-Aid)**

- **Rate**: 0.5 to 1 lb ai/a (3 to 6 pints/a Spin-Aid)
- **Time**: Apply any time red beets have four to six true leaves and before weeds have two leaves.
- **Remarks**: Avoid applying when daytime weather changes rapidly from cool and cloudy to warm and sunny, or if beets are stressed from insect, disease, or cultivation injury. Tip burn or temporary growth retardation and chlorosis may occur, although plants usually recover within 10 days.
- **Caution**: Preharvest interval is 60 days. Avoid using more than 7 gal water per quart of herbicide in spray tank; this can cause the herbicide to precipitate.
- **Site of action**: Group 5: photosystem II inhibitor
- **Chemical family**: Phenylcarbamate

**quizafofop (Assure II)**

- **Rate**: 0.035 to 0.083 lb ai/a (5 to 12 fl oz/a)
- **Time**: Apply at optimum growth stage listed on label.
- **Remarks**: Identify susceptible grasses and add 4 quarts crop oil concentrate or 1 quart nonionic surfactant/100 gal spray mix. Grass control may be reduced if applied immediately before or after applying a broadleaf herbicide.
- **Caution**: Do not mix with or apply with any other pesticide except as specified on label. Do not apply to plants stressed from lack of moisture, cold, or injury from herbicides, insects, or disease. Do not use any treated part of crop for food or feed. Do not exceed 25 fl oz/a per season.
- **Site of action**: Group 1: acetyl CoA carboxylase (ACCase) inhibitor
- **Chemical family**: Aryloxyphenoxypropionate

**sethoxydim (Poast)**

- **Rate**: 0.28 to 0.47 lb ai/a (1.5 to 2.5 pints/a Poast)
- **Time**: Apply at optimum growth stage listed on label.
- **Remarks**: Identify susceptible grasses and add 2 pints/a nonphytotoxic crop oil concentrate to improve leaf absorption. Control often is erratic on grasses stressed from drought, high temperatures, or low fertility. Resistant grasses include annual bluegrass and all fine fescues, but quackgrass can be suppressed.
- **Site of action**: Group 1: acetyl CoA carboxylase (ACCase) inhibitor
- **Chemical family**: Cyclohexanedione

**S-metolachlor (Dual Magnum)**

- **Rate**: Consult label
- **Time**: Broadcast immediately after planting with ground application equipment.
- **Remarks**: Irrigate with 0.5 inch of water if rainfall is not expected with 2 or 3 days of application. Does not control weeds that have emerged. SLN indemnified labels ID-150006, OR-040010, OR-060012, and WA-120001, available only through the Syngenta Farm Assist website (farmassist.com) by completing the following steps:
  1. Visit the website and register as a user.
  2. Click on Sign-in button; enter your user name and password.
  3. Under products, search for special or indemnified labels.
  4. On the next screen, enter state (e.g., OR) and product (Dual Magnum) on the drop-down menus and click Submit button.
  5. The next screen shows the available Dual Magnum 24c labels. Select the crop (beets, in this case). Click Submit button.
  6. The ‘Waiver of Liability and Indemnification Agreement’ will appear on the screen. Read it carefully, then click “I accept” or “I decline.”
  7. The label(s) you selected will appear on the next screen. Print the label(s), which must be in your possession when you apply the herbicide.

- **Caution**: Restricted-use herbicide in Washington to protect surface and groundwater. Crop may be injured if environmental conditions are unfavorable. Do not feed or graze forage or fodder or cut for hay or forage. No part of the treated field, including seed, seed screenings, hay, forage, or stubble, may be used for human or animal consumption. See label for all other precautions and regulations.
- **Site of action**: Group 15: inhibits very long chain fatty acid synthesis
- **Chemical family**: Chloroacetamide

**Carrot Seed (and other Apiaceae or Umbelliferae seed crops)**

**bensulide (Prefar 4-E)**

*Parsley and cilantro seed*

- **Rate**: 5 to 6 lb ai/a (5 to 6 quarts/a Prefar 4-E)
- **Time**: Apply preplant or preemergence.
- **Remarks**: Use lower rates on light, coarse soils and on soils with low organic matter. Application to cold, wet soils, due to rains or poor drainage, during germination period may reduce crop stands or yields. Do not exceed 6 lb ai/a per season.
- **Site of action**: Group 8: lipid synthesis inhibitor but not an ACCase inhibitor
- **Chemical family**: Thiacarbamate

**ethalfluralin (Curbit)**

*Dill grown for oil*

- **Rate**: 0.56 to 1.1 lb ai/a (1.5 to 3 pints/a Curbit)
- **Time**: Apply after seeding but prior to emergence of crop and weeds.
- **Remarks**: SLN labels OR-120002 and WA-170003. Adequate rain or irrigation after application before weed seedlings emerge, provides the most effective weed control.

- **Chemical family**: Thiocarbamate
fluazifop (Fusilade DX)

**Carrot seed only**

**Rate** 0.063 to 0.25 lb ai/a (4 to 16 oz/a Fusilade DX)

**Time** Apply to actively growing grasses.

**Remarks** Identify grasses and adjust rates for susceptibility and weed growth stage as on label. Results often are erratic on grasses stressed by lack of vigor, drought, heat, or low fertility. More mature grasses and quackgrass can be controlled but may require two applications. Annual bluegrass and all fine fescues resist treatment. Do not exceed 48 oz/a per season.

**Caution** Do not apply if rain is expected within 1 hour. Do not rotate to grass crops such as corn and cereals within 60 days of last application. Grazing any plant products or residue is prohibited.

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

**Chemical family** Aryloxyphenoxypropionate

linuron (Lorox 50 DF)

**Carrot and parsnip seed**

**Rate** 0.75 to 1.5 lb ai/a (1.5 to 3 lb/a 50DF product)

**Time** Apply preemergence (Oregon and Washington only) or postemergence when carrots are at least 3 inches tall, when grass weeds are not more than 2 inches tall, and when broadleaf weeds are not more than 6 inches tall.

**Caution** Plant seed at least 0.5 inches deep. Do not exceed 40 psi spray pressure. Weed control may be poor if daytime highs are below 50°F. Crop may be injured if linuron is mixed with surfactants, nitrogen, or fertilizer solutions, or applied at temperatures above 85°F. Applications may be repeated, but do not exceed 1.5 lb ai/a per season. Do not apply on sandy, loamy sands, gravelly soils, or soils with less than 1% organic matter. See label for planting rotation crops within 12 months.

**Caution** Do not use any part of the crop for food or feed. Do not exceed 4 pints/a per crop. To reduce the chance of injuring rotational crops, disk the field deeply and irrigate at least twice after applying a broadleaf herbicide.

**Caution** Do not mix with, or apply with, any other pesticide except as specified on label. Do not apply to plants stressed from lack of moisture, cold, or injury from herbicides, insects, or disease. Do not use any treated portion of crop for food or feed. Rotate to tolerant crops other than winter wheat or barley if rates exceed 1.5 lb/a.

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

**Chemical family** Triazine

oxyfluorfen (Galigan 2E)

**Oregon—carrot seed only**

**Rate** 0.25 to 0.5 lb ai/a (1 to 2 pints/a Galigan 2E)

**Time** Broadcast applications can be made in spring when carrots are 8 to 10 inches tall. Directed spray applications between the crop rows can be made in the dormant season from November 15 to February 28 and at layby before carrots have fully bolted. Weeds are best controlled in the two- to four-leaf stage.

**Remarks** SLN label OR-070003. Do not exceed 0.5 lb ai/a per crop cycle. Maintain a 25-ft vegetative buffer between treated areas and water. Reduce crop injury potential by using lower rate, by not applying soon after or in combination with linuron, and by applying to large carrots. Grazing crop residue or treated fields prohibited.

**Site of action** Group 14: protoporphyrinogen oxidase inhibitor

**Chemical family** Diphenylether

pendimethalin (Prowl H2O)

**Carrot seed only**

**Rate** 0.45 to 1.9 lb ai/a (1 to 4 pints/a Prowl H2O)

**Time** Apply at last cultivation (layby) as a directed spray.

**Remarks** Adequate rain or irrigation after application, before weed seedlings emerge, provides the most effective weed control. Inhibits mitosis in roots and shoots.

**Caution** Do not spray broadcast over the top of carrots, because crop may be injured. Refer to main labels for crop rotation restrictions. Preharvest interval is 60 days. Do not use any plant residue or product for food or feed. Rotate to tolerant crops other than winter wheat or barley if rates exceed 1.5 lb/a.

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

**Chemical family** Dinitroaniline

prometryn (Caparol 4L or Vegetable Pro)

**Washington—carrot, parsley, parsnip, and dill seed**

**Oregon—carrot, coriander, parsley, and dill seed**

**Rate** 0.5 to 1 lb ai/a (1 to 2 pints/a product)

**Time** Apply postemergence when crop has three to five true leaves, when weeds are not more than 2 inches tall, or as a layby treatment, preferably as a directed spray.

**Remarks** SLN labels WA-960014 and OR-090023. This indemnified label is available only through the Syngenta Farm Assist website (farmassist.com). Follow the steps listed in “Beet seed” section of this chapter to acquire the indemnified label. Use in at least 30 gal/a spray volume. Use adjuvants only with layby applications.

**Caution** Do not use any part of the crop for food or feed. Do not exceed 4 pints/a per crop. To reduce the chance of injuring rotational crops, disk the field deeply and irrigate at least twice soon after harvest. Using prometryn on soils with excess salts or that are highly calcareous may injure crop.

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

**Chemical family** Triazine

quizalofop (Assure II)

**Carrot seed only**

**Rate** 0.069 to 0.17 lb ai/a (5 to 12 oz/a Assure II)

**Time** Apply at optimum growth stage listed on label.

**Remarks** Identify susceptible grasses and add 4 quarts crank oil concentrate or 1 quart nonionic surfactant/100 gal spray mix. Grass control may be reduced if applied immediately before or after applying a broadleaf herbicide.

**Caution** Do not mix with, or apply with, any other pesticide except as specified on label. Do not apply to plants stressed from lack of moisture, cold, or injury from herbicides, insects, or disease. Do not use any treated portion of crop for food or feed. Do not exceed 25 oz/a per season.

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

**Chemical family** Aryloxyphenoxypropionate
sethoxydim (Poast)

**Rate** 0.28 to 0.47 lb ai/a (1.5 to 2.5 pints/a Poast)

**Time** Apply for barnyardgrass and other grass control at 3- to 12-inch stage of growth. Add 2 pints/a nonphytotoxic crop oil concentrate to improve leaf absorption.

**Remarks** Control often is erratic on grasses stunted or stressed by drought, heat, or low fertility. Resistant grasses include annual bluegrass and all fine fescues, but quackgrass can be suppressed.

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

**Chemical family** Cyclohexanediione

S-metolachlor (Dual Magnum)

*Idaho and Oregon only—carrot and parsnip seed*

**Rate** Consult label.

**Time** Broadcast preplant with ground application equipment.

**Remarks** Uniformly mix into top 2 inches of soil. SLN labels ID-150006 and OR-060012. This indemnified label is available only through the Syngenta Farm Assist website (farmassist.com). Follow the steps listed in “Beet seed” section of this chapter to acquire the indemnified label.

**Caution** Restricted-use herbicide in Washington to protect surface and groundwater. Crop may be injured if environmental conditions are unfavorable. Do not feed or graze forage or fodder, or cut for hay or forage. No part of the treated field, including seed, seed screenings, hay, forage, or stubble, may be used for human or animal consumption. See label for all other precautions and regulations.

**Site of action** Group 15: inhibits very long chain fatty acid synthesis

**Chemical family** Chlороacetamide

trifluralin (several trade names)

*Carrot seed only*

**Rate** 0.5 to 1 lb ai/a (1 to 2 pints/a product)

**Time** Apply from 3 weeks to immediately before planting; incorporate 2 to 3 inches deep within 24 hr by cross-disking or using a power take-off rotary tiller.

**Remarks** Spray only once; avoid overlaps. Consult label for restrictions on planting sensitive crops within 12 months.

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

**Chemical family** Dinitroaniline

Cole Crop Seed

cloazine (Command 3ME)

*Cabbage seed only*

**Rate** 0.25 to 0.5 lb ai/a (0.67 to 1.3 pints/a Command 3ME)

**Time** Apply to soil before transplanting cabbage. Place plant roots below the herbicide barrier when transplanting.

**Remarks** Use lower rate for coarse soils and higher rate for fine soils. See label for crop rotation restrictions and application requirements to avoid crop injury or vapor drift to sensitive plants. Cabbage may be chlorotic temporarily. Before using, ask seed company whether the cultivar has good tolerance to Command. Avoid overlaps while spraying.

**Caution** Do not mix or apply within 300 ft of landscapes, orchards, vegetable or berry plots, or property lines to prevent chemical trespass. Do not graze cover crops. Preharvest interval is 9 months for food or feed. Do not let livestock graze on treated pea vines or vine trash.

**Site of action** Group 13: inhibits DOXP synthase

**Chemical family** Isoxazolidinone

clopyralid (Stinger)

*Washington: Broccoli, cauliflower, and cabbage seed*

*Oregon: Broccoli, broccoli raab, Brussels sprouts, cabbage, cauliflower, cavalo broccolo, Chinese (bok choy) cabbage, Chinese broccoli, Chinese mustard cabbage, Chinese (napa) cabbage, collards, kale, kohlrabi, mizuna, mustard greens, mustard spinach, rape greens seed*

**Rate** 0.094 to 0.125 lb ae/a (0.25 to 0.33 pint/a) in Washington; maximum rate in Oregon is 0.188 lb ae/a (0.5 pints/a)

**Time** Apply in 10 gal or more total spray volume when seed crop has at least two true leaves. Spot applications up to 0.66 pint/a may be applied to Canada thistle. Apply after most thistle basal leaves emerge but before buds form.

**Remarks** SLN labels OR-090018 and WA-970033. Use for annual weeds 1 to 2 inches high. Re-treat as necessary up to eight-leaf stage of crop growth; do not exceed 0.66 pint/a Stinger per growing season. Crop safety data are limited; use only where crop injury is acceptable. Follow rotational crop restrictions on label. Avoid spray drift to sensitive crops. SLN labels OR-090018 and WA-970033.

**Caution** Do not apply with other herbicides that are emulsifiable concentrates, or oil-based adjuvants, particularly during heat-stressed periods. Extreme growing conditions such as drought or near freezing temperatures prior to, at, and following time of application may increase the risk of crop injury. See label for crops allowed. Do not use any part of treated field, including seed, seed screenings, hay forage, or stubble for human or animal consumption.

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

**Chemical family** Pyridine

fluazifop (Fusilade DX)

*Washington only—cabbage, kale, and Chinese cabbage seed*

**Rate** 0.063 to 0.25 lb ai/a (4 to 16 fl oz/a Fusilade DX)

**Time** Apply to actively growing grasses.

**Remarks** SLN label WA-040006. Identify grasses and adjust rates for susceptibility and stage of weed growth as label instructs. Control often is erratic on grasses stunted or stressed by drought, heat, or low fertility. More mature grasses and quackgrass can be controlled but may require two applications. Annual bluegrass and all fine fescues resist treatment.

**Caution** Do not exceed 32 oz/a per season. Do not apply if rain is expected within 1 hour. Do not plant rotational grass crops such as corn and cereals within 60 days of the last application. Grazing any plant product or residue is prohibited.

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

**Chemical family** Aryloxyphenoxypropionate
### mustard, kale, kohlrabi, rutabaga, and turnip

- **Oregon—broccoli, Brussels sprout, cabbage, Chinese cabbage, Chinese Washington—Brussels sprout, cabbage, and cauliflower seed**

### simazine (Simazine 4L)

*Washington—Brussels sprout, cabbage, and cauliflower seed*

<table>
<thead>
<tr>
<th>Chemical family</th>
<th>Rate</th>
<th>Time</th>
<th>Remarks</th>
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<tbody>
<tr>
<td>Aryloxyphenoxypropionate</td>
<td>0.25 to 0.5 lb ai/a</td>
<td>Apply soon after final soil preparation and before transplanting through the treated layer with minimal soil disturbance.</td>
<td>Use lower rate for coarse soils with less than 1% organic matter. Leaves that contact treated soil may be injured temporarily. Injury may be severe if transplants are stressed by temperature, disease, fertilizer salts, nematodes, insects, pesticides, and storage conditions or if planting small transplants grown in 1-inch cells. After transplanting, apply at least 0.25 inch overhead moisture. Plant only crops listed on label within 10 months after treatment. Grazing crop residue or treated fields prohibited.</td>
</tr>
<tr>
<td>Aryloxyphenoxypropionate</td>
<td>0.25 to 0.5 lb ai/a</td>
<td><strong>Chemical family</strong> Diphenylether</td>
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### sethoxydim (Poast)

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<th>Chemical family</th>
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<tbody>
<tr>
<td>Group 15: inhibits very long chain fatty acid synthesis</td>
<td>0.28 to 0.47 lb ai/a (1.5 to 2.5 pints/a Poast)</td>
<td>Apply at optimum growth stage listed on label.</td>
<td>Do not mix with or apply with any other pesticide except as specified on label. Do not apply to plants stressed from lack of moisture, cold, or injury from herbicides, insects, or disease. Do not use any treated portion of crop for food or feed. Do not exceed 3 pints/a per season.</td>
</tr>
<tr>
<td>Diphenylether</td>
<td>0.25 to 0.5 lb ai/a</td>
<td><strong>Chemical family</strong> Diphenylether</td>
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### quizalofop (Assure II)

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<tr>
<th>Chemical family</th>
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<th>Remarks</th>
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<tbody>
<tr>
<td>Group 1: acetyl CoA carboxylase (ACCase) inhibitor</td>
<td>0.069 to 0.17 lb ai/a (5 to 12 oz/a Assure II)</td>
<td>Apply at optimum growth stage listed on label.</td>
<td>Identify susceptible grasses and add 4 quarts crop oil concentrate or 1 quart nonionic surfactant/100 gal spray mix. Grass control may be reduced if applied immediately before or after applying a broadleaf herbicide.</td>
</tr>
<tr>
<td>Aryloxyphenoxypropionate</td>
<td>0.125 to 0.25 lb ai/a</td>
<td><strong>Chemical family</strong> Aryloxyphenoxypropionate</td>
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### oxyfluorfen (Goal 2XL, Goal Tender several trade names)

*Transplanted broccoli, cauliflower, and cabbage seed*

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<tr>
<th>Chemical family</th>
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<tbody>
<tr>
<td>Group 14: protoporphyrinogen oxidase inhibitor</td>
<td>0.25 to 0.5 lb ai/a</td>
<td>Apply soon after final soil preparation and before transplanting through the treated layer with minimal soil disturbance.</td>
<td>Use lower rate for coarse soils with less than 1% organic matter. Leaves that contact treated soil may be injured temporarily. Injury may be severe if transplants are stressed by temperature, disease, fertilizer salts, nematodes, insects, pesticides, and storage conditions or if planting small transplants grown in 1-inch cells. After transplanting, apply at least 0.25 inch overhead moisture. Plant only crops listed on label within 10 months after treatment. Grazing crop residue or treated fields prohibited.</td>
</tr>
<tr>
<td>Diphenylether</td>
<td>0.069 to 0.17 lb ai/a</td>
<td><strong>Chemical family</strong> Triazine</td>
<td></td>
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### S-metolachlor (Dual Magnum)

*Idaho—collard, kale, mustard, rutabaga, and turnip seed*

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<th>Chemical family</th>
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<tbody>
<tr>
<td>Chloroacetamide</td>
<td>0.125 to 0.25 lb ai/a</td>
<td>Broadcast preplant with ground application equipment.</td>
<td>Uniformly mix into top 2 inches of soil. SLN labels ID-150006 and OR-060012. This indemnified label is available only through the Syngenta Farm Assist website (<a href="http://www.farmassist.com">www.farmassist.com</a>). Follow the steps in “Beet seed” section of this chapter to acquire the indemnified label.</td>
</tr>
<tr>
<td>Aryloxyphenoxypropionate</td>
<td>0.28 to 0.47 lb ai/a (1.5 to 2.5 pints/a Poast)</td>
<td><strong>Chemical family</strong> Diphenylether</td>
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### oxyfluorfen (several trade names)

*Onion Seed*

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<tr>
<td>Aryloxyphenoxypropionate</td>
<td>0.125 to 0.25 lb ai/a</td>
<td>Apply postemergence to onions with at least three true leaves, and to weeds in the two- to four-leaf growth stage.</td>
<td>Multiple applications may be necessary to control late weed flushes; do not exceed 0.5 lb ai/a total per year. Do not mix with oils, surfactants, fertilizers, or other pesticides. Do not apply to onions under stress.</td>
</tr>
<tr>
<td>Diphenylether</td>
<td>0.25 to 0.5 lb ai/a</td>
<td><strong>Chemical family</strong> Aryloxyphenoxypropionate</td>
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### quizalofop (Assure II)

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<tbody>
<tr>
<td>Group 1: acetyl CoA carboxylase (ACCase) inhibitor</td>
<td>0.069 to 0.17 lb ai/a (5 to 12 oz/a Assure II)</td>
<td>Apply at optimum growth stage listed on label.</td>
<td>Identify susceptible grasses and add 4 quarts crop oil concentrate or 1 quart nonionic surfactant/100 gal spray mix. Grass control may be reduced if applied immediately before or after applying a broadleaf herbicide.</td>
</tr>
<tr>
<td>Aryloxyphenoxypropionate</td>
<td>0.25 to 0.5 lb ai/a</td>
<td><strong>Chemical family</strong> Aryloxyphenoxypropionate</td>
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**sethoxydim (Poast)**

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<thead>
<tr>
<th>Chemical family</th>
<th>Site of action</th>
<th>Time</th>
<th>Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cyclohexanedione</td>
<td>Oregon only</td>
<td></td>
<td>0.19 to 0.28 lb ai/a (1 to 1.5 pints/a Poast)</td>
</tr>
</tbody>
</table>

**Remarks**: Control often is erratic on grasses stressed or suppressed by drought, heat, or low fertility. Resistant grasses include annual bluegrass and all fine fescues, but quackgrass can be suppressed.

**Caution**: Do not exceed 4.5 pints/a per season.

**Clopyralid (Stinger)**

<table>
<thead>
<tr>
<th>Chemical family</th>
<th>Site of action</th>
<th>Time</th>
<th>Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pyridine</td>
<td>Idaho and Oregon only</td>
<td>Apply at optimum growth stage as on label. Add 2 pints/a nonphytotoxic crop oil concentrate to improve leaf absorption.</td>
<td>0.094 to 0.187 lb ae/a (0.25 to 0.5 pints/a Stinger)</td>
</tr>
</tbody>
</table>

**Remarks**: SLN labels ID-170008 and OR-120010. See label for use rates for control of certain broadleaf weeds and Canada thistle suppression. One or two broadcast applications are allowed, not to exceed 0.5 pints/a per year.

**Caution**: For Canada thistle, apply after most thistle basal leaves emerge but before buds form, at least 30 days prior to harvest. Apply once or twice, but do not exceed 0.5 pints/a Stinger per growing season. Radish crops are more susceptible to herbicide injury during bolting and/or flowering; use the lower rate during that time. Crop safety data are limited; use only when crop injury is acceptable. Follow rotational crop restrictions on label. Avoid spray drift to sensitive crops. Do not use any part of the treated field, including seed, seed screenings, hay, forage, and stubble, for human or animal consumption.

**Spinach Seed**

**Asulam (Asulox)**

<table>
<thead>
<tr>
<th>Chemical family</th>
<th>Site of action</th>
<th>Time</th>
<th>Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chloroacetamide</td>
<td>Oregon and Washington only</td>
<td>Apply postemergence; works best if weeds are small. If applied once per season, use 1.5 pints/a on spinach with four to six true leaves. If applied twice per season, use 3 pints/a on spinach with four to eight true leaves and 3 pints/a seven days later (typically 8 to 12 true leaves).</td>
<td>0.62 to 1.25 lb ai/a (1.5 to 3 pints/a Asulox)</td>
</tr>
</tbody>
</table>

**Remarks**: SLN label OR-090014. A second application can be made in the spring.

**Caution**: Restricted-use herbicide in Washington to protect surface and groundwater. Do not use on sandy, loamy, or gravelly areas of fields, or where water pools. Avoid crop rotations to susceptible crops. Do not use crop, crop residues, or seed screenings for food or feed. Do not apply through any type of irrigation system.

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

**Chemical family**: Triazine

**S-metolachlor (Dual Magnum)**

<table>
<thead>
<tr>
<th>Chemical family</th>
<th>Site of action</th>
<th>Time</th>
<th>Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chloroacetamide</td>
<td>Oregon and Washington only</td>
<td>Broadcast after planting.</td>
<td>Consult label.</td>
</tr>
</tbody>
</table>

**Remarks**: SLN labels ID-150006, OR-040010, OR-060012, and WA-990005 (excludes daikon radish). This indemnified label is available only through the Syngenta Farm Assist website (farmassist.com). Follow the steps listed in “Beet seed” section of this chapter to acquire the indemnified label.

**Caution**: Restricted-use herbicide in Washington to protect surface and groundwater. Crop may be injured if environmental conditions are unfavorable. Do not feed or graze radish forage or fodder or cut for hay or forage. No part of treated field, including seed, seed screenings, hay, forage, or stubble, may be for human or animal consumption. See label for all other precautions and regulations.

**Site of action**: Group 15: Inhibits very long chain fatty acid synthesis

**Chemical family**: Chloroacetamide

**Radish Seed**

**Quizalofop (Assure II)**

<table>
<thead>
<tr>
<th>Chemical family</th>
<th>Site of action</th>
<th>Time</th>
<th>Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aryloxyphenoxypropionate</td>
<td>Group 1: acetyl CoA carboxylase (ACCase) inhibitor</td>
<td>Apply at optimum growth stage listed on label.</td>
<td>0.069 to 0.17 lb ai/a (5 to 12 oz/a Assure II)</td>
</tr>
</tbody>
</table>

**Remarks**: Identify susceptible grasses and add 4 quarts crop oil concentrate or 1 quart nonionic surfactant/100 gal spray mix. Grass control may be reduced if applied immediately before or after applying a broadleaf herbicide.

**Caution**: Do not mix with or apply with any other pesticide except as label specifies. Do not apply to plants stressed by drought, cold, or injury from herbicides, insects, or disease. Do not use any treated part of crop for food or feed or exceed 25 oz/a per season.

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

**Chemical family**: Aryloxyphenoxypropionate

**Simazine (Simazine 4L)**

<table>
<thead>
<tr>
<th>Chemical family</th>
<th>Site of action</th>
<th>Time</th>
<th>Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carbamate</td>
<td>Oregon only; fall planted radish only</td>
<td>Apply in fall after radish plants are well established and after winter rains begin, but before most winter weeds emerge.</td>
<td>0.8 to 1 lb ai/a (1.6 to 2 pints/a Simazine)</td>
</tr>
</tbody>
</table>

**Remarks**: SLN label OR-090014. A second application can be made in the spring.

**Caution**: Restricted-use herbicide in Washington to protect surface and groundwater. Do not use on sandy, loamy, or gravelly areas of fields, or where water pools. Avoid crop rotations to susceptible crops. Do not use crop, crop residues, or seed screenings for food or feed. Do not apply through any type of irrigation system.

**Site of action**: Group 18: inhibits DHP synthase step

**Chemical family**: Carbamate
**clopyralid (Stinger)**

<table>
<thead>
<tr>
<th>Time</th>
<th>Rate</th>
<th>Chemical family</th>
<th>Site of action</th>
<th>Site of action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apply in 10 gal or more total spray volume when weed crop has at least two true leaves. Spot applications up to 0.66 pint/a may be applied to Canada thistle. Apply after most thistle basal leaves emerge but before buds form.</td>
<td>0.064 to 0.125 lb ae/a (0.17 to 0.33 pints/a Stinger)</td>
<td>Group 1: acetyl CoA carboxylase (ACCase) inhibitor</td>
<td>Group 4: synthetic auxin</td>
<td>Thioether</td>
</tr>
</tbody>
</table>

**cycloate (Ro-Neet)**

Western Washington only

<table>
<thead>
<tr>
<th>Time</th>
<th>Rate</th>
<th>Chemical family</th>
<th>Site of action</th>
<th>Site of action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preplant to soil dry enough to thoroughly mix; incorporate immediately by cross-disking or using a rotary tiller.</td>
<td>3 to 4 lb ai/a (4 to 5.4 pints/a Ro-Neet)</td>
<td>Group 5: photosystem II inhibitor</td>
<td>Group 8: lipid synthesis inhibitor but not an ACCase inhibitor</td>
<td>Thiocarbamate</td>
</tr>
</tbody>
</table>

**ethofumesate (Nortron SC)**

Western Washington and Oregon only

<table>
<thead>
<tr>
<th>Time</th>
<th>Rate</th>
<th>Chemical family</th>
<th>Site of action</th>
<th>Site of action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preemergence at or shortly after planting but before weeds germinate.</td>
<td>0.75 to 1 lb ai/a (24 to 32 oz/a Nortron SC)</td>
<td>Group 1: acetyl CoA carboxylase (ACCase) inhibitor</td>
<td>Group 16: unknown</td>
<td>Benzo-furan</td>
</tr>
</tbody>
</table>

**fluazifop (Fusilade DX)**

Washington only

<table>
<thead>
<tr>
<th>Time</th>
<th>Rate</th>
<th>Chemical family</th>
<th>Site of action</th>
<th>Site of action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Actively growing grasses. Results often are erratic on grass stressed from lack of vigor, drought, high temperature, or low fertility.</td>
<td>0.063 to 0.25 lb ai/a (4 to 16 oz/a)</td>
<td>Group 1: acetyl CoA carboxylase (ACCase) inhibitor</td>
<td>Group 1: acetyl CoA carboxylase (ACCase) inhibitor</td>
<td>Benzofuran</td>
</tr>
</tbody>
</table>

**fusimidepham (Spin-Aid)**

<table>
<thead>
<tr>
<th>Time</th>
<th>Rate</th>
<th>Chemical family</th>
<th>Site of action</th>
<th>Site of action</th>
</tr>
</thead>
<tbody>
<tr>
<td>When most weeds have germinated and spinach has four to six true leaves.</td>
<td>0.069 to 0.17 lb ai/a (5 to 12 oz/a Assure II)</td>
<td>Group 1: acetyl CoA carboxylase (ACCase) inhibitor</td>
<td>Group 1: acetyl CoA carboxylase (ACCase) inhibitor</td>
<td>Aryloxyphenoxypropionate</td>
</tr>
</tbody>
</table>

**quizalofop (Assure II)**

<table>
<thead>
<tr>
<th>Time</th>
<th>Rate</th>
<th>Chemical family</th>
<th>Site of action</th>
<th>Site of action</th>
</tr>
</thead>
<tbody>
<tr>
<td>8-leaf stage of crop growth, but do not exceed 3 pints/a per season.</td>
<td>0.069 to 0.17 lb ai/a (5 to 12 oz/a Assure II)</td>
<td>Group 1: acetyl CoA carboxylase (ACCase) inhibitor</td>
<td>Group 1: acetyl CoA carboxylase (ACCase) inhibitor</td>
<td>Aryloxyphenoxypropionate</td>
</tr>
</tbody>
</table>

**saxoxydim (Poast)**

<table>
<thead>
<tr>
<th>Time</th>
<th>Rate</th>
<th>Chemical family</th>
<th>Site of action</th>
<th>Site of action</th>
</tr>
</thead>
<tbody>
<tr>
<td>When weed seedlings have germinated and spinach has a three to four-leaf stage.</td>
<td>0.28 to 0.47 lb ai/a (1.5 to 2.5 pints/a Poast)</td>
<td>Group 1: acetyl CoA carboxylase (ACCase) inhibitor</td>
<td>Group 1: acetyl CoA carboxylase (ACCase) inhibitor</td>
<td>Aryloxyphenoxypropionate</td>
</tr>
</tbody>
</table>

**S-metolachlor (Dual Magnum)**

<table>
<thead>
<tr>
<th>Time</th>
<th>Rate</th>
<th>Chemical family</th>
<th>Site of action</th>
<th>Site of action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preemergence at or shortly after planting, but before weeds germinate.</td>
<td>0.6 to 0.9 lb ai/a (3 to 5 pints/a Dual Magnum)</td>
<td>Group 1: acetyl CoA carboxylase (ACCase) inhibitor</td>
<td>Group 1: acetyl CoA carboxylase (ACCase) inhibitor</td>
<td>Aryloxyphenoxypropionate</td>
</tr>
</tbody>
</table>

**Remarks**

- Use above rates for annual weeds 1 to 2 inches high.
- Re-treat as necessary up to eight-leaf stage of crop growth, but do not exceed 0.5 pint/a Stinger per growing season. Crop safety data are limited, so use only if crop injury is acceptable. Follow rotational crop restrictions on label. Avoid spray drift to sensitive crops.
- Do not mix with, or apply with, any other pesticide except as label specifies. Do not apply to plants stressed by drought, cold, or injury from herbicides, insects, or disease. Do not use any treated part of crop for food or feed. Do not exceed 25 oz/a per season.
- Do not exceed 32 oz/a per season. Do not apply if rain is expected within 1 hour. Do not plant rotation grass crops such as corn and cereals within 60 days of the last application. Grazing any plant product or residue is prohibited.
- Do not exceed 32 oz/a per season. Do not apply if rain is expected within 1 hour. Do not plant rotation grass crops such as corn and cereals within 60 days of the last application. Grazing any plant product or residue is prohibited.
- Do not exceed 32 oz/a per season. Do not apply if rain is expected within 1 hour. Do not plant rotation grass crops such as corn and cereals within 60 days of the last application. Grazing any plant product or residue is prohibited.
irrigation soon after treatment is important to activate herbicide. Use lower rate on coarse soil and higher rate on medium- or fine-textured soils.

**Caution** Restricted-use herbicide in Washington to protect surface and groundwater. Do not mechanically incorporate. Do not apply through any type of irrigation system. Crop may be damaged if excess rain after seeding washes Dual Magnum into the root zone.

**Site of action** Group 15: Inhibits very long chain fatty acid synthesis

**Chemical family** Chloroacetamide

### Swiss Chard Seed

**clopyralid (Stinger)**

*Oregon and Washington only*

**Rate** 0.094 to 0.125 lb ae/a (0.25 to 0.33 pints/a Stinger)

**Time** Apply in 10 gal or more total spray volume when seed crop has at least two true leaves. Apply after most thistle basal leaves emerge but before buds form.

**Remarks** SLN labels OR-090018 and WA-970033. Use above rates for annual weeds 1 to 2 inches high. Retreat as necessary up to eight-leaf stage of crop growth, but do not exceed 0.66 pint/a Stinger per growing season. Crop safety data are limited, so use only if crop injury is acceptable. Follow rotational crop restrictions on label. Avoid spray drift to sensitive crops.

**Caution** Do not use any part of the treated field, including seed, seed screenings, hay forage, and stubble, for human or animal consumption.

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

**Chemical family** Pyridine

### EPTC (Eptam 7E)

*Oregon and Washington only*

**Rate** 2.0 to 3.0 lb ai/a (2.25 to 3.5 pints/a Eptam 7E)

**Time** Apply preplant incorporated (OR only), postemergence incorporation after transplant or first true leaves have emerged, or as a layby application at time of last cultivation.

**Remarks** SLN labels OR-160009 and WA-140001. Product must be incorporated either by rainfall/irrigation or by mechanical means. Eptam has little to no postemergence activity, so emerged weeds must be controlled by incorporation equipment, other herbicide, or hand-weeding near the time of application.

**Caution** Do not use any part of the treated field, including seed, seed screenings, hay forage, and stubble, for human or animal consumption.

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

**Chemical family** Thiocarbamate

### Ethofumesate (Nortron SC)

*Oregon and Western Washington only*

**Rate** Consult label.

**Time** Apply preplant incorporated, preemergence, or postemergence. Postemergence treatment may be repeated in 4 weeks.

**Remarks** SLN labels OR-160002 and WA-010002. Crop may be injured under unfavorable environmental conditions or when higher rates are used.

**Caution** Do not feed or graze Swiss chard forage or fodder. Do not use any part of the treated field, including seed, seed screening, hay forage, and stubble, for human or animal consumption.

**Site of action** Group 16: unknown

**Chemical family** Benzofuran

### Fluazifop (Fusilade DX)

*Washington only*

**Rate** 0.063 to 0.25 lb ai/a (4 to 16 oz/a Fusilade DX)

**Time** Apply to actively growing grasses.

**Remarks** SLN label WA-040006. Identify susceptible grasses and add 4 quarts crop oil concentrate or 1 quart nonionic surfactant/100 gal spray mix. Grass control may be reduced if applied immediately before or after applying a broadleaf herbicide.

**Caution** Do not exceed 3 oz/a per season. Do not apply if rain is expected within 1 hour. Rotational grass crops such as corn and cereals may not be planted within 60 days of the last application. Grazing any plant products and residues is prohibited.

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

**Chemical family** Aryloxyphenoxypropionate

### Quizalofop (Assure II)

**Rate** 0.069 to 0.17 lb ai/a (5 to 12 oz/a Assure II)

**Time** Apply at optimum growth stage listed on label.

**Remarks** Identify susceptible grasses and add 4 quarts crop oil concentrate or 1 quart nonionic surfactant/100 gal spray mix. Grass control may be reduced if applied immediately before or after applying a broadleaf herbicide.

**Caution** Do not mix with or apply with any other pesticide except as specified on label. Do not apply to plants stressed from lack of moisture, cold, or injury from herbicides, insects, or disease. Do not use any treated part of crop for food or feed. Do not exceed 25 oz/a per season.

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

**Chemical family** Aryloxyphenoxypropionate
sethoxydim (Poast)

**Rate** 0.28 to 0.47 lb ai/a (1.5 to 2.5 pints/a Poast)

**Time** Apply at optimum growth stage listed on label.

**Remarks** Identify susceptible grasses and add 2 pints/a nonphytotoxic crop oil concentrate to improve leaf absorption. Control often is erratic on grasses stunted or stressed from drought, high temperatures, or low fertility. Resistant grasses include annual bluegrass and all fine fescues, but quackgrass can be suppressed.

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

**Chemical family** Cyclohexanedione

S-metolachlor (Dual Magnum)

Oregon and Washington only

**Rate** 0.64 lbs ai/a (0.67 pints/a Dual Magnum)

**Time** Broadcast preplant with ground application equipment.

**Remarks** Make a single soil broadcast application of Dual Magnum to the soil surface after planting, but before the weeds or crop emerge (preemergence). Inhibits roots and shoots. SLN indemnified labels OR-040010 and WA-120001 and. This indemnified label is available only through the Syngenta Farm Assist website (farmassist.com). Follow the steps listed in “Beet seed” section of this chapter to acquire the indemnified label.

**Caution** Restricted-use herbicide in Washington to protect surface and groundwater. Crop may be injured if environmental conditions are unfavorable. Do not feed or graze forage or fodder, or cut for hay or forage. No part of the treated field, including seed, seed screenings, hay, forage, or stubble, may be used for human or animal consumption. See label for all other precautions and regulations.

**Site of action** Group 15: inhibits very long chain fatty acid synthesis

**Chemical family** Chloroacetamide

Preharvest Desiccation

diquat (Reglone)

Idaho—dill, endive, garden beet, kohlrabi, leek, lettuce, mustard, onion, parsnip, radish, turnip, sugar beet, and Swiss chard seed

Oregon—cabbage, coriander, kohlrabi, onion, radish, rutabaga, spinach, sugar beet, Swiss chard, table beet, and turnip seed

Washington—beet, carrot, coriander, radish, spinach, and turnip seed

**Rate** 0.375 to 0.5 lb ai/a (1.5 to 2 pints/a Reglone)

**Time** Apply 3 to 10 days before swathing for harvest, when most seed is harvest ripe (spinach is tan to gray ripe).

**Remarks** SLN labels ID-100006, OR-080025, and WA-040011.

**Caution** Do not apply through any type of irrigation system. Do not use seed or residues from treated plants for food, feed, or oil purposes. Do not use on daikon radish. Application restricted in Washington; contact Washington State Department of Agriculture before applying.

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

**Chemical family** Bipyridilium

Sex Expression in Cucumber and Squash

ethephon (Florel)

**Rate** 1 quart/a

**Time** Apply within 4 hr of mixing, or activity will be reduced.

**Remarks** For uniform plantings, spray once when two true leaves have developed. Spray nonuniform plantings twice: when first true leaf is the size of a quarter and again when third true leaf is expanding. Plant male or pollen rows ahead of seed parent; treatment often causes flowering 7 to 10 days earlier. Growth may be inhibited temporarily because of shortened internodes.

**Site of action** Unknown

**Chemical family** Ethylene generator