

SECTION Q.

VEGETABLE SEED CROPS

Ed Peachey

Revised March 2020

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 this website (<https://www.syngenta-us.com/labels/indemnified-label-search>), 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 post-emergence 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 **Restricted use.** 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

quizalofop (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 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)

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 (<https://www.syngenta-us.com/labels/indemnified-label-search>) 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. Enter state (e.g., OR) and product (Dual Magnum) on the drop-down menus and click Submit button.
4. The next screen shows the available Dual Magnum 24c labels. Select the crop (beets, in this case). Click Submit button.
5. The 'Waiver of Liability and Indemnification Agreement' will appear on the screen. Read it carefully, then click "I accept" or "I decline."
6. 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 Thiocarbamate

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.

Caution Refer to main labels for crop rotation restrictions. Preharvest interval is 91 days.

Site of action Group 3: microtubule assembly inhibitor

Chemical family Dinitroaniline

fluzifop (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 Aryloxyphenoxy propionate

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.

Site of action Group 7: photosystem II inhibitor

Chemical family Substituted urea

oxyfluorfen (Galigan 2E)

Oregon—carrot seed only

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

Time **Dormant application:** Directed spray applications using drop nozzles between the crop rows can be made in the dormant season from November 15 to February 28.

Spring Application: Begin applications in early spring. Make application as a broadcast spray when carrots are at least 8-10

inches tall. For best results, apply when weeds are in the 2 to 4 leaf stage.

Layby Application: Make application at layby with a directed spray using drop nozzles between the rows and in the furrows. For best results, apply when weeds are in the 2 to 4 leaf stage. Do not make a broadcast application over the top of the carrots at this timing.

Remarks SLN label OR-190007. Do not exceed 0.5 lb ai/a per crop cycle. Add 2 to 4 pints of an 80% active nonionic surfactant if postemergence weed control is desired. 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)

*Washington—carrot, parsley, parsnip, and dill seed
Oregon—carrot, coriander, and parsley 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-04002. This indemnified label is available only through the Syngenta Indemnified Label 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 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 apply within 14 days of anticipated bloom. 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 Cyclohexanedione

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 Indemnified Labels website (<https://www.syngenta-us.com/labels/indemnified-label-search>). 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

trifluralin (Treflan HFP)

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

clomazone (Command 3ME)

Broccoli and cabbage seed

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

Time Apply to soil before transplanting broccoli or cabbage, or direct-seeding 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

oxyfluorfen (Goal 2XL, Goal Tender several trade names)

Transplanted broccoli, cauliflower, and cabbage seed

Rate 0.25 to 0.5 lb ai/a

Time Apply soon after final soil preparation and before transplanting through the treated layer with minimal soil disturbance.

Remarks 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.

Site of action Group 14: protoporphyrinogen oxidase inhibitor

Chemical family Diphenylether

quizalofop (Assure II)

Chinese cabbage 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 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 apply within 14 days of flowering. 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 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 stunted or stressed by drought, heat, or low fertility. Resistant grasses include annual bluegrass and all fine fescues, but quackgrass can be suppressed.

Caution Do not exceed 3 pints/a per season.

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

Chemical family Cyclohexanedione

simazine (Simazine 4L)

Washington—Brussels sprout, cabbage, and cauliflower seed
Oregon—broccoli, Brussels sprout, cabbage, Chinese cabbage, Chinese mustard, kale, kohlrabi, rutabaga, and turnip

Rate Consult label.

Time Apply in fall after transplanted or direct-seeded crops are well established and after winter rains begin, but before most winter weeds emerge. Repeat application in spring after last cultivation.

Remarks SLN labels WA-900005, WA-090016 and OR-090014.

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)

Idaho—collard, kale, mustard, rutabaga, and turnip seed
Oregon—rutabaga and turnip 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 Indemnified Labels website ((<https://www.syngenta-us.com/labels/indemnified-label-search>)). Follow the steps 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 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

Onion Seed

oxyfluorfen (Goal Tender and others)

Rate 0.125 to 0.25 lb ai/a

Time Apply postemergence to onions with at least three true leaves, and to weeds in the two- to four-leaf growth stage.

Remarks 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.

Site of action Group 14: protoporphyrinogen oxidase inhibitor

Chemical family Diphenylether

quizalofop (Assure II)

Rate 0.069 to 0.17 lb ai/a (5 to 12 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 oz/a per season.

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

Chemical family Aryloxyphenoxypropionate

sethoxydim (Poast)

Rate 0.19 to 0.28 lb ai/a (1 to 1.5 pints/a Poast)

Time Apply at optimum growth stage as on label. 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.

Caution Do not exceed 4.5 pints/a per season.

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

Chemical family Cyclohexanedione

Radish Seed

clopyralid (Stinger)

Idaho and Oregon only

Rate 0.094 to 0.187 lb ae/a (0.25 to 0.5 pints/a Stinger)

Time Apply in 10 gal or more total spray volume when seed crop has at least two true leaves.

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.

Site of action Group 4: synthetic auxin

Chemical family Pyridine

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 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 (ACCCase) inhibitor

Chemical family Aryloxyphenoxypropionate

simazine (Simazine 4L)

Oregon only; fall planted radish only

Rate 0.8 to 1 lb ai/a (1.6 to 2 pints/a Simazine)

Time Apply in fall after radish plants are well established and after winter rains begin, but before most winter weeds emerge.

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)

Rate Consult label.

Time Broadcast after planting.

Remarks Apply 0.5 inch of irrigation water within 2 to 3 days. SLN labels ID-150006, OR-040010, OR-060012, and WA-990005 (excludes daikon radish). This indemnified label is available only through the Syngenta Indemnified Labels website (<https://www.syngenta-us.com/labels/indemnified-label-search>). 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

Spinach Seed

asulam (Asulox)

Oregon and Washington only

Rate 0.62 to 1.25 lb ai/a (1.5 to 3 pints/a Asulox)

Time Apply postemergence; works best if weeds are small. If applied once per season, use 1.5 pints/a on spinach with two to four leaves, or 3 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).

Remarks SLN labels OR-070016 and OR-100008, and WA-080001 and WA-110003. A nonionic surfactant at 0.25% v/v may be added to the spray to increase efficacy. Crop oils and other adjuvants such as urea ammonium nitrate are not recommended. Suggested dilution rate is 20 gal/a water. Spinach may be somewhat stunted, especially with two applications at 3 pints/a.

Caution No pesticide residue tolerance has been established for this crop, and so no portion of this seed crop (including screenings) may be used or distributed for food or feed. Grazing the crop field or stubble is not permitted. Asulam is known to leach through soil into ground water under certain conditions. Using asulam where soils are permeable, particularly where the water table is shallow, may contaminate ground water. Avoid surface water contamination.

Site of action Group 18: inhibits DHP synthase step

Chemical family Carbamate

clopyralid (Stinger)

Rate 0.064 to 0.125 lb ae/a (0.17 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. 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 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.

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

cycloate (Ro-Neet)

Western Washington only

Rate 3 to 4 lb ai/a (4 to 5.4 pints/a Ro-Neet)

Time Apply preplant to soil dry enough to thoroughly mix; incorporate immediately by cross-disking or using a rotary tiller.

Remarks Use on mineral soils only. Seed may be planted immediately. Inhibits shoot growth.

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

Chemical family Thiocarbamate

ethofumesate (Nortron SC)

Western Washington and Oregon only

Rate 0.75 to 1 lb ai/a (24 to 32 oz/a Nortron SC)

Time Apply preemergence at or shortly after planting but before weeds germinate.

Remarks SLN labels OR-160003 and WA-010001. Soon after treatment, 0.5 inch of rain or irrigation is important to activate herbicide. If rain is marginal, incorporate ethofumesate 1 to 2 inches before planting.

Caution Do not apply through any type of irrigation system. Do not rotate with any crops other than sugar beets or ryegrass for 12 months. Do not cultivate deeper than 2 inches; this may reduce effectiveness of ethofumesate.

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)

Time Apply to actively growing grasses. Results often are erratic on grass stressed from lack of vigor, drought, high temperature, or low fertility.

Remarks SLN label WA-040006. Identify grasses and adjust rates for stage of weed growth and susceptibility as label instructs. 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 rotation 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 (ACCCase) inhibitor

Chemical family Aryloxyphenoxypropionate

phenmedipham (Spin-Aid)

Rate 0.5 to 1 lb ai/a (3 to 6 pints/a Spin-Aid)

Time Apply when seedling weeds have germinated and spinach has four to six true leaves.

Remarks Temperature must be below 75°F, and spinach should not be stressed. Avoid applying when weather changes rapidly from cool and cloudy to warm and sunny. Tip burn or temporary growth retardation and chlorosis may occur, but plants usually resume normal growth within 10 days. Do not exceed 7 gal water per quart of herbicide, to prevent precipitating the herbicide.

Site of action Group 5: photosystem II inhibitor

Chemical family Phenylcarbamate

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 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.

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 by drought, heat, or low fertility. Resistant grasses include annual bluegrass and all fine fescues, but quackgrass can be suppressed.

Caution Do not exceed 3 pints/a per season.

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

Chemical family Cyclohexanedione

S-metolachlor (Dual Magnum)

Oregon and Washington only

Rate 0.32 to 0.64 lb ai/a (0.33 to 0.67 pints/a Dual Magnum)

Time Apply preemergence at or shortly after planting, but before weeds germinate.

Remarks SLN labels OR-040010 and WA-990005. This indemnified label is available only through the Syngenta Indemnified Labels website (<https://www.syngenta-us.com/labels/indemnified-label-search>). Follow the steps listed in "Beet seed" section of this chapter to acquire the indemnified label. Apply in at least 15 gal/a water with ground equipment; 0.5 inch of rain or 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. 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 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 0.66 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 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)

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 grasses and adjust rates for susceptibility and stage of weed growth as label instructs. 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.

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 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 Aryloxyphenoxy propionate

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 Indemnified Labels website (<https://www.syngenta-us.com/labels/indemnified-label-search>). 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 Bipyrindilium

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
