

Delaware Cooperative Extension



This is a section from the

2024/2025

Mid-Atlantic Commercial Vegetable Production Recommendations

The recommendations are **NOT** for home gardener use.

The full recommendations are available online at:

<https://www.udel.edu/academics/colleges/canr/cooperative-extension/sustainable-production/commercial-crops/vegetable-crops/midatlantic-vegetable-recommendations/>

Printed copies of the recommendations are available for purchase at the New Castle, Kent and Sussex County Extension Offices in Delaware.

This publication will be revised biennially. In January 2025, a Critical Update with important updates for this publication will be communicated through the above website.

These recommendations were prepared and reviewed by individuals from Cornell University, University of Delaware, Delaware State University, University of Maryland, Penn State, Rutgers University, Virginia Tech, and West Virginia University with the purpose of providing up to date information for commercial vegetable growers in the Mid-Atlantic states of **Delaware, Maryland, New Jersey, Pennsylvania, Virginia, and West Virginia.**

Disclaimer

- The label is a legally-binding contract between the pesticide user and the manufacturer.
- The user **MUST** follow all rates and restrictions as per label directions.
- The use of any pesticide inconsistent with the label directions is a violation of Federal law.

F. Commodity Recommendations

Pesticide Use Disclaimer

THE LABEL IS THE LAW

A pesticide applicator is legally bound by the labeling found on and with the pesticide container in their possession. Before using a pesticide, check and always follow the labeling distributed with the product at the point of sale for legally enforceable rates and use restrictions and precautions.

Although labels are available on the Internet from electronic label services such as Proagrica's CDMS (<https://www.cdms.net/>), Greenbook (<https://www.greenbook.net/>), or Agworld DBX powered by Agrian (<https://www.agrian.com/labelcenter/results.cfm>) the information contained in these electronic labels may not be identical to the labeling distributed with the product. **Please be advised that these electronic label services provide use disclaimers, and in some cases legally binding *User Agreements* assigning ALL liability to user of service.** (See section D 3.1. Labels and Labeling for more detail.)

Guide to the Recommended Pesticide Tables in the Following Crop Sections:

1. Pesticides are listed by **group number or code based on chemical structure and mechanism of action**, as classified by the Herbicide Resistance Action Committee (HRAC, <https://hracglobal.com>) for herbicides, the Insecticide Resistance Action Committee (IRAC, <https://irac-online.org>) for insecticides, and the Fungicide Resistance Action Committee (FRAC, <https://www.frac.info/>) for fungicides. **In this guide, if the group number or code is in bold font, there are resistance concerns for the product.**
2. **Restricted use pesticides** are marked with a * in the Tables. These products may only be used by certified and/or licensed pesticide applicators, and when stated on the label, those making applications under their direct supervision. Some labels may restrict use solely to certified and/or licensed applicators. (See section D 3.2.1 Restricted Use Classification Statement for more detail).
3. **In addition to the pesticide products listed in the Commodity Recommendations below, other formulations or brands with the same active ingredient(s) may be commercially available. ALWAYS CHECK THE LABELING ON THE PRODUCT CONTAINER ITSELF:**
 - a) to ensure a pesticide is labeled for the same intended use,
 - b) to ensure the pesticide is labeled for the desired crop,
 - c) for differences in application rates and % active ingredient(s), and
 - d) additional restrictions.
4. All pesticide recommendations contained in this document are prescribed for spray applications to a **broadcast area of 1 acre** (43,560 square feet). **Adjust the rate accordingly for banded applications** (See section E 1.3. Calibrating Granular Applicators) **or for chemigation** (check labels for amounts per 1,000 feet).
5. Check the physical product label for and do not exceed the maximum amount of pesticide *per application* and the maximum number of applications *per year*.
6. **Bee Toxicity Rating (Bee TR):** N=nontoxic; L=minimum impact on bees; M=moderately toxic, can be used if dosage, timing, and method of application are correct, but should NOT be applied directly to the crop if bees are present; H=highly toxic, severe losses expected, -- = data not available.
7. In accordance with the USDA National Organic Program, the Organic Materials Research Institute (OMRI) maintains a directory of all products that OMRI has determined are allowed for use in organic production, processing, and handling. These products are catalogued online in the **OMRI Products List** (see <https://www.omri.org/omri-lists>).

Greens (Mustard, Turnip)

Recommended Varieties

Note: For Kale and Collard Greens, see the Cole Crops section

Type	Variety ¹	Use	Hybrid	Season	Description
Asian Mustard ²	Carlton Komatsuna	Cooked, Salad	Yes	Spring/Fall	Green, flat leaf
	Green Mizuna	Cooked, Salad	No	Spring/Fall	Green, serrated leaf
	Koji Tatsoi	Cooked, Salad	Yes	Spring/Fall	Green, heavy savoy leaf
	Miz America	Cooked, Salad	Yes	Spring/Fall	Dark red, toothed leaf
	Red Kingdom	Cooked, Salad	Yes	Spring/Fall	Purple, serrated leaf
	Senposai	Cooked, Salad	Yes	Spring/Fall	Green, flat leaf
	Tatsoi	Cooked, Salad	No	Spring/Fall	Green, semi savoy leaf
	Tokyo Bekana	Salad	Yes	Spring/Fall	Light-green, non-heading Chinese cabbage
Mustard	Florida Broadleaf	Cooked	No	Fall	Green, flat leaf
	Garnet Giant	Salad	No	Fall	Red, flat leaf
	Green Wave	Cooked, Salad	No	Fall	Green, curled leaf
	Red Giant	Cooked, Salad	No	Fall	Red, crinkled leaf
	Red Splendor	Cooked, Salad	No	Spring/Fall	Red, serrated leaf
	Savannah	Cooked	Yes	Spring/Fall	Green, flat leaf
	Scarlet Frills	Salad	No	Spring/Fall	Red, ruffled leaf
	Southern Giant Curled	Cooked	No	Fall	Green, curled leaf
	Tendergreen	Cooked	No	Fall	Green, flat leaf
Turnip	Alamo	Cooked, Salad	Yes	Spring/Fall	Green, flat leaf
	All Top	Cooked	Yes	Fall	Green, flat leaf
	Seven Top	Cooked	No	Fall	Green, serrated leaf
	Topper	Cooked	Yes	Spring/Fall	Green, serrated leaf

¹Listed alphabetically within type. ²Asian mustards recommended growing season for full size harvest without bolting. Greens may be planted throughout the year for harvest in the baby stage. For spring planting, Asian mustards should be planted after frost risk to avoid bolting.

Recommended Nutrients Based on Soil Tests

In addition to using the table below, check the suggestions on rate, timing, and placement of nutrients in your soil test report and Chapter B Soil and Nutrient Management. Your state's soil test report recommendations and/or your farm's nutrient management plan supersede the recommendations found below.

Greens ¹ (Mustard, Turnip)		Soil Phosphorus Level				Soil Potassium Level				
		Low	Med	High (Opt)	Very High	Low	Med	High (Opt)	Very High	
	N (lb/A)	P ₂ O ₅ (lb/A)				K ₂ O (lb/A)				Nutrient Timing and Method
	50-170	150	100	50	0	150	100	50	0	Total nutrient recommended
	50	150	100	50	0	150	100	50	0	Broadcast and disk-in
25-60	0	0	0	0	0	0	0	0	Topdress after each cutting	

¹Apply 25-30 lb/A of sulfur (S) for most soils.

Seeding

Seed in early- to mid-August for fall harvest. Mustards and turnip greens planted in the spring are susceptible to bolting if exposed to cold temperatures for prolonged periods of time, and only bolt-resistant varieties such as Savanna mustard and Alamo turnip should be grown. Later spring plantings (April) have a lower risk of bolting. For all plantings, sow 3-4 lb/A of seed in rows 12-24 inches apart. A wide variety of mustards are available for incorporating into salad mixes for microgreens or baby salad mixes. These are sown in beds or trays as a broadcast or in narrow rows. They can be seeded from late winter through late fall in high tunnels for successive harvests.

Harvest and Post-Harvest Considerations

Greens for baby salad mixes are cut at ground level for a single harvest, or 1-2 inches from the ground for multiple cuts. Larger turnip, mustard, and Asian mustards may be harvested by cutting off entire plants near ground level for

F. Greens (Mustard, Turnip)

a single harvest, or by cutting 2-6 inches above the ground to allow for regrowth. For processing, greens are machine cut 4-6 inches from the ground when full tonnage has been achieved but before petioles and midribs have become too large. Multiple harvests may be possible.

Greens should be transported as quickly as possible to the packing area. Hydrocooling or vacuum cooling are recommended for pre-cooling. Greens should be held as close to 32°F as possible, because of their perishability. At this temperature, greens can be held for 10-14 days. Relative humidity of at least 95% is desirable to prevent wilting. Air circulation should be adequate to remove heat of respiration, but not too rapid to speed transpiration and wilting. Greens are commonly shipped with plastic package and top ice. Greens packed in polyethylene-lined crates and protected by crushed ice keep in excellent condition if kept near 32°F but deteriorate rapidly at higher temperatures.

Weed Control

THE LABEL IS THE LAW-see the Pesticide Use Disclaimer on the first page of Chapter F.

Recommended Herbicides

1. Identify the weeds in each field and select recommended herbicides. More information is available in the "Herbicide Effectiveness on Common Weeds in Vegetables" (Table E-3) in Chapter E Pest Management.
2. Minimize herbicide resistance development. Identify the herbicide mode of action group number and follow recommended good management practices; **bolded group numbers in tables below are herbicides at higher risk for selecting resistant weed populations.** Include non-chemical weed control whenever possible.

1. Soil-Applied (Preplant Incorporated or Preemergence)						
Group	Product Name (* = Restricted Use)	Product Rate	Active Ingredient	Active Ingredient Rate	PHI (d)	REI (h)
3	Dacthal 6F Dacthal W-75	6 to 14 pt/A 6 to 14 lb/A	DCPA	4.5 to 10.5 lb/A	--	12
-Labeled for turnip and mustard greens for preplant incorporated or preemergence; do not incorporate deeper than 2 inches. Labeled for applications over the top of transplants without injury (will not control emerged weeds). Primarily controls annual grasses and a few broadleaf weeds, including common purslane. Results have been most consistent when used in fields with coarse -textured soils low in organic matter, and when the application are followed by rainfall or irrigation. Maximum application not addressed on label.						
3	Treflan 4EC	1 to 1.5 pt/A	trifluralin	0.5 to 0.75 lb/A	--	12
-Labeled for turnip greens for processing and mustard greens. Incorporate into 2-3 inches of soil within 8 h after application. -Primarily controls annual grasses and a few broadleaf weeds. Poor incorporation can reduce overall weed control. Do not use (or reduce rate) used when cold, wet soil conditions are expected, or crop injury may result. Maximum application not addressed on label.						
8	Prefar 4E	5 to 6 qt/A	bensulide	5 to 6 lb/A	--	--
-Labeled for mustard greens. -Labeled for preplant incorporated or preemergence applications; do not incorporate more than 2 inches deep (1 inch is optimum). -If applied preemergence, irrigate within 36 h of application with ½ inch of water; if not incorporated with irrigation or rainfall within 36 h, weed control maybe reduced. Provides control/suppression of some annual grass weeds and some broadleaves including pigweeds, purslane, and lambsquarters. - Do not apply more than 6 lb ai/A per season.						

2. Postemergence						
Group	Product Name (* = Restricted Use)	Product Rate	Active Ingredient	Active Ingredient Rate	PHI (d)	REI (h)
1	Shadow 3EC Select 2EC Select Max 0.97EC	4 to 5.33 fl oz/A 6 to 8 fl oz/A 9 to 16 fl oz/A	clethodim	0.07 to 0.125 lb/A	14	24
	Poast 1.5EC	1 to 1.5 pt/A	sethoxydim	0.2 to 0.3 lb/A	30	12
- Select 2EC : use crop oil concentrate (COC) at 1% v/v (1 gal/100 gal of spray solution). Select Max : use nonionic surfactant (NIS) at 0.25% v/v (1 qt/100 gal of spray solution). Shadow 3EC : use crop oil concentrate (COC) at 1% v/v (1 gal/100 gal of spray solution) for large or stressed grasses; use nonionic surfactant (NIS) at 0.25% v/v (1 qt/100 gal of spray solution) when crop safety is a concern. Poast : Apply with COC at 1.0% v/v. - The use of COC may increase the risk of crop injury when hot or humid conditions prevail. To reduce the risk of crop injury, omit additives or switch to NIS when grasses are small and soil moisture is adequate. Use lower labeled rates for annual grass control and higher labeled rates for perennial grass control. -Yellow nutsedge, wild onion, and broadleaf weeds will not be controlled. Controls many annual and certain perennial grasses, including annual bluegrass, but Poast is preferred for goosegrass control. For best results, treat annual grasses when they are						

2. Postemergence Shadow, Select, Select Max, Poast - continued next page

2. Postemergence Shadow, Select, Select Max, Poast - continued

<p>actively growing and before tillers are present. Control may be reduced if grasses are large or under hot or dry weather conditions.</p> <p>-Repeated applications may be necessary to control certain perennial grasses. If repeat applications are necessary, allow 14 days between applications. -Rainfastness is 1 h.</p> <p>-Do not tank mix with or apply within 2 to 3 days of any other pesticide, unless labeled, as this may increase the risk of crop injury or reduce the control of grasses. Do not apply more than 8 fl oz/A of Select 2EC in a single application and do not exceed 2 pt/A for the season; do not apply more than 16 fl oz/A of Select Max in a single application and do not exceed 4 pt/A for the season.</p> <p>-Do not apply more than 5.33 fl oz/A of Shadow 3EC in a single application and do not exceed 21.33 fl oz/A for the season.</p> <p>-Do not apply more than 1.5 pt/A Poast in a single application and do not exceed 3 pt/A for the season.</p>						
4	Stinger 3SL / Spur 3SL	4 to 8 fl oz/A	clopyralid	0.094 to 0.188 lb/A	30/15	12
<p>-Labeled for mustard greens and turnip greens. Spray additives are not needed or required by the label, and are not recommended</p> <p>-Stinger controls composite and legume weeds including galinsoga, ragweed species, common cocklebur, groundsel, pineappleweed, clover, and vetch. Perennials controlled include Canada thistle, goldenrod species, aster species, and mugwort (wild chrysanthemum).</p> <p>-Stinger is very effective on small seedling annual and emerging perennial weeds less than 2-4 inches tall but is less effective and takes longer to work when weeds are larger. Use 4 fl oz/A to control annual weeds less than 2 inches tall. Increase the rate to 4 to 8 fl oz/A to control larger annual weeds. Apply the maximum rate of 8 fl oz/A to suppress or control perennial weeds.</p> <p>-Observe follow crop restrictions or injury may occur from herbicide carryover.</p> <p>-Rainfastness is 6 h. Do not harvest mustard greens within 30 days of harvest or turnip greens within 15 days of harvest.</p> <p>-Maximum Stinger application per year: 8 fl oz/A; maximum number of applications: 1 for turnip greens, 2 for mustard greens.</p>						

3. Postharvest

Group	Product Name (*Restricted Use)	Product Rate	Active Ingredient	Active Ingredient Rate	PHI (d)	REI (h)
22	Gramoxone SL 2.0* Gramoxone SL 3.0*	2.25 to 3 pt/A 1.5 to 2 pt/A	paraquat	0.56 to 0.75 lb/A	--	24
<p>-Supplemental Label in DE for the use of both Gramoxone formulations for postharvest application to desiccate the crop.</p> <p>-Apply after the last harvest for bareground or plasticulture. Always include an adjuvant. Spray coverage is essential for optimum effectiveness. See the label for additional information and warnings.</p> <p>-Rainfastness 30 min. A maximum of 2 applications for crop desiccation are allowed.</p> <p>-Restricted-use pesticide. Only certified applicators, who successfully complete the paraquat-specific training, can mix, load, or apply paraquat. Application of paraquat "under the direct supervision" of a certified applicator is no longer allowed. Required training link (https://campus.extension.org/enrol/index.php?id=2201); certified applicators must repeat training every three years.</p>						

4. Other Labeled Herbicides These products are labeled but limited local data are available; and/or are labeled but not recommended in our region due to potential crop injury concerns.

Group	Product Name (*Restricted Use)	Active Ingredient
3	Satellite Hydrocap (mustard and turnip greens)	pendimethalin
14	Aim	carfentrazone
15	Devrinol (Mustard greens only)	napropamide

Insect Control

THE LABEL IS THE LAW-see the Pesticide Use Disclaimer on the first page of Chapter F.

Recommended Insecticides

Aphids

Apply one of the following formulations:						
Group	Product Name (*Restricted Use)	Product Rate	Active Ingredient(s) and Crop Restrictions	PHI (d)	REI (h)	Bee TR
1B	Dimethoate 400	0.5 pt/A	dimethoate	14	48	H
1B	Malathion 57 EC ¹	1.0 to 1.6 pt/A ¹	malathion	7	12	H
3A + 4A	Leverage 360*	3.0 fl oz/A	imidacloprid + beta-cyfluthrin	7	12	H
4A	Actara 25WDG	1.5 to 3.0 oz/A	thiamethoxam - foliar	7	12	H
4A	Platinum 75SG	5.0 to 11.0 oz/A	thiamethoxam - soil	30	12	H
4A	Admire Pro	4.4 to 10.5 fl oz/A	imidacloprid - soil	21	12	H
4A	Admire Pro	1.2 fl fl oz/A	imidacloprid - foliar	7	12	H
4A	Assail 30SG	2 to 5.3 oz/A	acetamiprid	3	12	M
	Assail 30SC	1.7 to 4.5 fl oz/A				

Aphids - continued next page

F. Greens (Mustard, Turnip)

Aphids - continued

4A	Belay 2.13SC	9 to 12 fl oz/A	clothianidin - soil	21	12	H
4A	Belay 2.13SC	3.0 to 4.0 fl oz/A	clothianidin - foliar	7	12	H
4C	Transform WG	0.75 to 1.0 oz/A	sulfloxaflor - turnip greens only	7	24	H
9B	Fulfill 50WDG	2.75 oz/A	pymetrozine	7	12	L
9B	PQZ	2.4 to 3.2 fl oz/A	pyrifluquinazon	1	12	L
9D	Versys	1.5 fl oz/A	afidopyropen	0	12	L
28	Exirel	13.5 to 20.5 fl oz/A	cyantraniliprole	1	12	H
28	Verimark	6.75 to 13.5 fl oz/A	cyantraniliprole	n/a	4	H
29	Beleaf 50SG	2.0 to 2.8 oz/A	flonicamid	0	12	L

¹Maximum of 3 applications per season at the 1.6 pt/A rate.

Caterpillar “Worms” Pests Including: Beet Armyworms (BAW), Cabbage Loopers (CL), Diamondback Moths (DBM), and Imported Cabbageworms (ICW)

Due to resistance development, pyrethroid insecticides are not recommended for control of BAW or DBM. Other insecticides may no longer be effective in certain areas due to DBM resistance; consult your county Extension. Rotation of insecticides with different modes of action is recommended to reduce the development of resistance.

Apply one of the following formulations. Note: Not all materials are labeled for all crops, insects, or application methods, check labels.						
Group	Product Name (* = Restricted Use)	Product Rate	Active Ingredient(s) and Crop Restrictions	PHI (d)	REI (h)	Bee TR
1A	Lannate LV*	1.5 to 3.0 pt/A	methomyl	10	48	H
3A	Asana XL*	2.9 to 9.6 fl oz/A	esfenvalerate - only CL and ICW	3/7 collards	12	H
3A	Baythroid XL* (CL, ICW)	1.6 to 2.4 fl oz/A	beta-cyfluthrin - not recommended for BAW or DBM	0	12	H
3A	Brigade 2EC*	2.1 to 6.4 fl oz/A	bifenthrin - not recommended for BAW or DBM	7	12	H
3A	Hero*	4.0 to 10.3 fl oz/A	bifenthrin + zeta-cypermethrin - not recommended for BAW or DBM	7	12	H
3A	Mustang Maxx*	3.2 to 4.0 fl oz/A	zeta cypermethrin - not recommended for BAW or DBM	1	12	H
3A	Tombstone* (CL, ICW)	1.6 to 2.4 fl oz/A	cyfluthrin - not recommended for BAW or DBM	0	12	H
5	Entrust SC (OMRI)	1.5 to 6.0 fl oz/A	spinosad	1	4	M
5	Radiant SC	5.0 to 10.0 fl oz/A	spinetoram	1	4	M
6	Proclaim 5SG*	2.4 to 4.8 oz/A	emamectin benzoate	14	12	H
11A	Dipel DF, others (OMRI)	0.25 to 1.0 lb/A	<i>Bacillus thuringiensis kurstaki</i>	0	4	N
11A	XenTari (OMRI)	0.5 to 1.5 lb/A	<i>Bacillus thuringiensis aizawai</i>	0	4	N
18	Intrepid 2F	4.0 to 8.0 fl oz/A early season; 8.0 to 10.0 fl oz/A late season	methoxyfenozide	1	4	L
22	Avaunt 30WDG, Avaunt eVo	2.5 to 3.5 oz/A	indoxacarb	3	12	H
28	Coragen 1.67SC Coragen eVo	3.5 to 7.5 fl oz/A 1.2 to 2.5 fl oz/A	chlorantraniliprole	3	4	L
28	Vantacor	1.2 to 2.5 fl oz/A	chlorantraniliprole - turnip greens only	1	4	L
28	Exirel	7.0 to 13.5 fl oz/A 10 to 17 fl oz/A for CL	cyantraniliprole	1	12	H
28	Verimark	5 to 10 fl oz/A	cyantraniliprole	1	4	H
28	Harvanta 50SL	10.9 to 16.4 fl oz/A	cyclaniliprole	1	4	H

Flea Beetles

Apply one of the following formulations:						
Group	Product Name (*Restricted Use)	Product Rate	Active Ingredient(s) and Crop Restrictions	PHI (d)	REI (h)	Bee TR
1A	Sevin XLR Plus	0.5 to 1 qt/A	carbaryl	14	12	H
3A	Baythroid XL*	2.4 to 3.2 fl oz/A	beta-cyfluthrin	0	12	H
3A	Brigade 2EC*	2.1 to 6.4 fl oz/A	bifenthrin	7	12	H
3A	Hero*	4.0 to 10.3 fl oz/A	bifenthrin + zeta-cypermethrin - mustard greens only	7	12	H
3A	Mustang Maxx*	3.2 to 4.0 fl oz/A	zeta cypermethrin	1	12	H
3A	Tombstone*	2.4 to 3.2 fl oz/A	cyfluthrin	0	12	H
3A + 4A	Leverage 360*	3.0 fl oz/A	imidacloprid + beta-cyfluthrin	7	12	H
4A	Actara 25WDG	1.5 to 3.0 oz/A	thiamethoxam	7	12	H
4A	Platinum 75SG	5.0 to 11.0 oz/A	thiamethoxam	30	12	H
4A	Admire Pro	1.3 fl oz/A	imidacloprid - foliar	7	12	H
4A	Belay 50 WDG	4.8 to 6.4 oz/A	clothianidin - soil	AP	12	H
4A	Belay 50 WDG	1.6 to 2.1 oz/A	clothianidin - foliar	7	12	H
28	Exirel	13.5 to 20.5	cyantraniliprole	1	12	H
28	Verimark	6.73 to 13.5 fl oz/A	cyantraniliprole	n/a	4	H
28	Harvanta 50SL	10.9 to 16.4 fl oz/A	cyclaniliprole	1	4	H

Harlequin Bugs

These orange, black and white stinkbugs can be quite destructive, particularly on leafy cole crops like collards. Egg masses consist of numerous white and black barrel-shaped eggs in neat rows. Nymphs remain clustered near the eggs until molting. Infestations can be quite heavy. Feeding results in pale blotches with scalloped edges on foliage.

Apply one of the following formulations:						
Group	Product Name (*Restricted Use)	Product Rate	Active Ingredient(s) and Crop Restrictions	PHI (d)	REI (h)	Bee TR
3A	Baythroid XL*	2.4 to 3.2 fl oz/A	beta-cyfluthrin	0	12	H
3A	Brigade 2EC*	2.1 to 6.4 fl oz/A	bifenthrin	7	12	H
3A	Hero*	4.0 to 10.3 fl oz/A	bifenthrin + zeta-cypermethrin - mustard greens only	7	12	H
3A	Mustang Maxx*	3.2 to 4.0 fl oz/A	zeta cypermethrin	1	12	H
3A	Tombstone*	2.4 to 3.2 fl oz/A	cyfluthrin	0	12	H
3A + 4A	Leverage 360*	3.0 fl oz/A	imidacloprid + beta-cyfluthrin	7	12	H
4A	Assail 30SG Assail 30SC	4.0 to 5.3 oz/A 3.4 to 4.5 fl oz/A	acetamiprid	3	12	M
4A	Belay 50 WDG	4.8 to 6.4 oz/A	clothianidin - soil	AP	12	H
4A	Belay 50 WDG	1.6 to 2.1 oz/A	clothianidin - foliar	7	12	H

Leafhoppers

Apply one of the following formulations:						
Group	Product Name (*Restricted Use)	Product Rate	Active Ingredient(s) and Crop Restrictions	PHI (d)	REI (h)	Bee TR
1A	Sevin XLR Plus	0.5 to 1 qt/A	carbaryl	14	12	H
1B	Dimethoate 400	0.5 pt/A	dimethoate	14	48	H
3A	Baythroid XL*	0.8 to 1.6 fl oz/A	beta-cyfluthrin	0	12	H
3A	Brigade 2EC*	2.1 to 6.4 fl oz/A	bifenthrin	7	12	H
3A	Hero*	4.0 to 10.3 fl oz/A	bifenthrin + zeta-cypermethrin - mustard greens only	7	12	H
3A	Mustang Maxx*	3.2 to 4.0 fl oz/A	zeta cypermethrin	1	12	H
3A	Tombstone*	0.8 to 1.6 fl oz/A	cyfluthrin	0	12	H
3A + 4A	Leverage 360*	3.0 fl oz/A	imidacloprid + beta-cyfluthrin	7	12	H
4A	Admire Pro	4.4 to 10.5 fl oz/A	imidacloprid - soil	21	12	H
4A	Admire Pro	1.3 fl oz/A	imidacloprid - foliar	7	12	H
4A	Belay 50 WDG	4.8 to 6.4 oz/A	clothianidin - soil	AP	12	H
4A	Belay 50 WDG	1.6 to 2.1 oz/A	clothianidin - foliar	7	12	H

F. Greens (Mustard, Turnip)

Leafminers

Apply one of the following formulations:						
Group	Product Name (*Restricted Use)	Product Rate	Active Ingredient(s) and Crop Restrictions	PHI (d)	REI (h)	Bee TR
1B	Dimethoate 400	0.5 pt/A	dimethoate	14	48	H
5	Entrust SC (OMRI)	4.0 to 10.0 fl oz/A	spinosad	1	4	M
5	Radiant SC	6.0 to 10.0 fl oz/A	spinetoram	1	4	M
17	Trigard 75WSP	2.66 oz/A	cyromazine	7	12	H
28	Exirel	13.5 to 20.5 fl oz/A	cyantraniliprole	1	12	H
28	Harvanta 50SL	10.9 to 16.4 fl oz/A	cyclaniliprole	1	4	H
28	Verimark	6.75 to 13.5 fl oz/A	cyantraniliprole	n/a	4	H

Thrips

Apply one of the following formulations:						
Group	Product Name (*Restricted Use)	Product Rate	Active Ingredient(s) and Crop Restrictions	PHI (d)	REI (h)	Bee TR
3A + 4A	Leverage 360* (controls foliage feeding thrips only)	3.0 fl oz/A	imidacloprid + beta-cyfluthrin	7	12	H
4A ¹	Actara 25WDG	3.0 to 5.5 oz/A	thiamethoxam	7	12	H
4A ¹	Platinum 75SG	5.0 to 11.0 oz/A	thiamethoxam	30	12	H
5	Entrust SC (OMRI)	4.0 to 10.0 fl oz/A	spinosad	1	4	M
5	Radiant SC	6.0 to 10.0 fl oz/A	spinetoram	1	4	M
28	Exirel	13.5 to 20.5 fl oz/A	cyantraniliprole	1	12	H
28	Verimark	10 to 13.5 fl oz/A	cyantraniliprole	n/a	4	H
28	Harvanta 50SL	10.9 to 16.4 fl oz/A	cyclaniliprole	1	4	H

¹Resistance concerns with tobacco thrips

Disease Control

THE LABEL IS THE LAW-see the Pesticide Use Disclaimer on the first page of Chapter F.
Recommended Fungicides

Damping-off caused by *Phytophthora*, *Pythium* and *Rhizoctonia*

Code	Product Name (*Restricted Use)	Product Rate	Active Ingredient(s)	PHI (d)	REI (h)	Bee TR
Apply one of the following at seeding (see label for application methods and restrictions):						
Pythium root rot						
4	Ridomil Gold 4SL	0.5 to 1.0 pt/A	mefenoxam	AP	48	N
Pythium and Rhizoctonia root rot						
4 + 11	Uniform 3.66SE	0.34 fl oz/1000 ft row. Avoid direct seed contact, which may cause delayed emergence	mefenoxam + azoxystrobin	AP	0	N
Rhizoctonia root rot						
11	azoxystrobin 2.08F	0.40 to 0.80 fl oz/1000 ft row	azoxystrobin	AP	4	N

Bacterial and Fungal Diseases

Downy Mildew

The pathogen has a wide host range including broccoli, Brussels sprouts, cauliflower, cabbage, kale, Chinese cabbage, Chinese broccoli, Chinese mustard, radish, etc. and related weeds in the brassica family. Plant certified seed since the pathogen can be seed-borne. Use hot water seed treatment (See Cole Crops, Disease Control section). Avoid overhead watering in the morning when spores are released. *(continued next page)*

Downy Mildew - continued

Code	Product Name (*=Restricted Use)	Product Rate	Active Ingredient(s)	PHI (d)	REI (h)	Bee TR
Scout regularly. Rotate the following fungicides with different modes of action during periods of high moisture and moderate temperatures and continue as long as weather conditions favor disease development:						
11	azoxystrobin 2.08F	6.0 to 15.5 fl oz/A	azoxystrobin	0	4	N
11	Cabrio 20EG	8.0 to 16.0 oz/A	pyraclostrobin	0	12	N
21	Ranman 400SC	2.75 fl oz/A	cyazofamid	0	12	L
40	Forum 4.17SC/A <i>plus</i> fixed copper	6.0 fl oz	dimethomorph	0	12	N
40	Revus 2.08F	8.0 fl oz/A	mandipropamid	1	4	--
40 + 45	Zampro 5.25SC	14.0 fl oz/A	dimethomorph + ametoctradin	0	12	--
40 + 49	Orondis Ultra 2.33SC	5.5 to 8.0 fl oz/A	mandipropamid + oxathiapiprolin	1	4	--
43	Presidio 4SC	4.0 fl oz/A	fluopicolide	2	12	L
P07	Aliette 80WDG (for mustard greens only)	3.0 lb/A	fosetyl-Al	3	12/24	N

Leaf Spots caused by *Alternaria* or *Cercospora* spp.

The fungal pathogens that cause leaf spot overwinter in the soil. Rotate away from fields for as long as possible.

Code	Product Name (*=Restricted Use)	Product Rate	Active Ingredient(s)	PHI (d)	REI (h)	Bee TR
M01	copper (OMRI) ¹	at labeled rates	copper	0		N
When conditions favor disease development, apply one of the following fungicides every 7 to 10 days for as long as conditions are favorable for disease development. Rotate between fungicides with different mode of actions:						
3	tebuconazole 3.6F	3.0 to 4.0 fl oz/A	tebuconazole	7	12	N
3 + 9	Inspire Super 2.82EW	16.0 to 20.0 fl oz/A	difenoconazole + cyprodinil	7	12	--
3 + 11	Quadris Top 1.67SC	12.0 to 14.0 fl oz/A	difenoconazole + azoxystrobin	1	12	--
7 + 12	Miravis Prime	9.2 to 13.4 fl oz/A	pydiflumetofen + fludioxonil	0	12	--
7	Endura 70W	14.0 oz/A	boscalid	0	12	--
7	Fontelis 1.67SC	14.0 to 30.0 fl oz/A	penthiopyrad	0	12	L
7 + 11	Priaxor 4.17SC	6.0 to 8.2 fl oz/A	fluxapyroxad + pyraclostrobin	3	12	N
9 + 12	Switch 62.5WG	11.0 to 14.0 oz/A	cyprodinil + fludioxonil	7	12	L
11	azoxystrobin 2.08F	6.0 to 15.5 fl oz/A	azoxystrobin	0	4	N
11	Cabrio 20EG	8.0 to 16.0 oz/A	pyraclostrobin	0	12	N

¹There are several OMRI listed copper-based products; see labels for specifics. Copper applications may help suppress some fungal pathogens in organic production systems.

If you are having a medical emergency after using pesticides, always **call 911 immediately.**



In Case of an Accident

- Remove the person from exposure
- Get away from the treated or contaminated area immediately
- Remove contaminated clothing
- Wash with soap and clean water
- Call a physician and/or the National Poison Control Center (1-800-222-1222).
Your call will be routed to your State Poison Control Center.
- Have the pesticide label with you!
- Be prepared to give the EPA registration number to the responding center/agency