

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>).

Celery

Recommended Varieties Check with your seed supplier or other growers for recommendations on locally adapted varieties. Any new variety should be tested on a small scale before planting in a large area.

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.

		Soil Phosphorus Level				Soil Potassium Level				
		Low	Med	High (Opt)	Very High	Low	Med	High (Opt)	Very High	
Celery ¹	N (lb/A)	P ₂ O ₅ (lb/A)				K ₂ O (lb/A)				Nutrient Timing and Method
	150-175	250	150	100	0	250	150	100	0	Total nutrient recommended
	50-75	250	150	100	0	250	150	100	0	Broadcast and disk-in
	25-50	0	0	0	0	0	0	0	0	Sidedress 2-3 weeks after planting
	25-50	0	0	0	0	0	0	0	0	Sidedress 6-8 weeks after planting

¹Apply 1.5-3 lb/A of boron (B) with broadcast fertilizer; see also Table B-7. in Chapter B Soil and Nutrient Management.

See also **Brown Check** under Celery Disorders below.

Seed Treatment

Freshly harvested seed may exhibit dormancy leading to poor germination. Seeds should either be stored below 40°F (4°C) for 6 months or longer or treated with phytohormones. For seed treatments, see Disease Control below.

Transplant Production

Transplants grown locally in greenhouses are commonly used. Sow seed 10-12 weeks before field planting. About 35,000 plants can be produced from 2½ oz seed. Maintain the greenhouse at 70-75°F (21-24°C) until emergence, and after that at 65-70°F (18-21°C) for steady growth. Maintain night temperatures above 55°F (13°C) to avoid the production of “seeders”. Plants for an early crop should be set in the field when there is no more risk of frost or a cold period. If plants become too tall or spindly before field setting, they can be clipped back to a height of 5-6 inches. Plants can be hardened by withholding water 7-10 days before field planting. Never harden celery plants by lowering temperatures.

Planting and Spacing

Celery is a cool-season crop that grows most rapidly and develops the best yield and quality at moderately cool temperatures (55-75°F, 13-24°C), good soil moisture, and relatively high humidity. Satisfactory crops can be produced on fertile, medium-textured mineral soils with irrigation. The usual planting period is May 1 to June 30 with rows 16-32 inches apart and plants 8 inches apart in row. Set 30,000-45,000 plants/A.

Celery will withstand light freezes but both young and old plants are damaged by moderate freezes. After exposure to temperatures below 55°F (13°C) for a number of days, celery (a biennial) initiates seed stalks (bolts). Under satisfactory growing conditions, celery reaches usable size 85-100 days from transplanting. High plant populations can promote blanching. For non self-blanching cultivars, blanching can be accomplished by trenching or other mechanical means. Special blanching practices can improve color and eating quality.

Since celery is expensive to grow, experience in both production and marketing is desirable before large-scale operations are attempted.

Harvest and Post-Harvest Considerations

Harvest when stalks are of sufficient size but before any pithiness has developed in the petioles. Harvested celery should be cooled quickly to temperatures below 45°F (7°C) by hydrocooling, vacuum-cooling, icing, or other means of refrigeration. Stalks can be held 5-7 weeks if storage is near 32°F (0°C) with 98% relative humidity.

Celery Disorders

Blackheart: Internal leaves develop a brown discoloration which eventually becomes deep black. The cause is similar to tip-burn of lettuce or blossom-end rot of tomato. The development of blackheart is promoted by environmental conditions that favor rapid growth, such as heavy rain or irrigation before drought, or high nitrogen,

potassium, and sodium levels. Water stress may result in a calcium deficiency disorder causing cell death. The risk of blackheart is reduced by avoiding wide fluctuations in moisture and nutrients and ensuring steady plant growth. Drip irrigation, which provides more even moisture levels can help reduce the risk. Drench applications of soluble calcium can lessen or prevent the development of blackheart.

Brown Check: A physiological disorder called “brown check,” is characterized by russetting and cracking on the inner side of the petiole. Brown check may be caused by high levels of soil potassium and/or high potassium fertilization rates, although boron nutrition may also be involved.

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)
5	Caparol 4L	2.4 to 3.3 pt/A	prometryn	1.2 to 1.6 lb/A	--	12
-Apply after seeding, but before crop emergence. Use lower rate on lighter coarse-textured sandy soils and the higher rate on heavier fine-textured soils; Do not use on sand or loamy sand soils, or crop injury may occur. Follow with overhead irrigation if rainfall does not occur. Primarily controls annual broadleaf weeds; annual grasses may only be suppressed. -Only 1 application per crop per year, Do not use both at planting and postemergence applications.						
8	Prefar 4E	5 to 6 qt/A	bensulide	5 to 6 lb/A	--	--
-Labeled for preplant incorporated or preemergence applications; do not incorporate more than 2 inches deep (1 inch is optimum). -Irrigate within 36 h of application with ½ inch of water; if not incorporated with irrigation or rainfall within 36 h, weed control may be reduced. Provides control/suppression of some annual grass weeds and 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	4 to 5.33 fl oz/A	clethodim	0.07 to 0.125 lb/A	30	24
	Select 2EC	6 to 8 fl oz/A				
	Select Max 0.97EC	9 to 16 fl oz/A				
	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: use 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, wild garlic, 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 actively growing and before tillers are present. Control may be reduced if grasses are large or under hot or dry weather conditions. If repeated applications are necessary, allow 14 days between applications. - 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. -Rainfastness is 1 h. - 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. - 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. - Do not apply more than 1.5 pt/A Poast in a single application and do not exceed 3 pt/A for the season.						
5	Caparol 4L	1.6 to 2 pt/A	prometryn	0.8 to 1 lb/A	40	12
-Postemergence application can be made after the crop has 3 to 5 true leaves. Primarily controls many annual broadleaf weed seedlings less than 2 inches tall. Annual grasses may only be suppressed. Use lower rate when the crop and weeds are small, or when cloudy,						

2. Postemergence (Caparol) - continued next page

F. Celery

2. Postemergence (Caparol)- continued

humid growing conditions prevail and the higher rate when the crop and weeds are larger or hot dry growing conditions prevail. -Do not use on sand or loamy sand soils, or crop injury may occur. -Do not tank mix Caparol with any other pesticide. -Do not use spray additives such as nonionic surfactant or oil concentrate. -Do not apply within 2 weeks of any herbicidal oil such as “carrot oil” or Stoddard Solvent. -Only 1 application per crop per year. -Do not use both at planting and postemergence applications.						
7	Lorox 50DF	1.5 to 3 lb/A	linuron	0.75 to 1.5 lb/A	45	24
-For use on celery grown on muck soils only. -Make a single application after celery transplants are established, but before celery is 8 inches tall Lorox will provide broadleaf weed control when applied to small weeds; will not control grass weeds. -Do not exceed 40 psi or apply when temperatures exceed 85°F. -Do not add surfactants, oil concentrate, or liquid fertilizer. -Use only the Lorox 50DF formulation of linuron. Only 1 application per season is allowed.						

3. 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	Treflan	trifluralin
14	Aim	carfentrazone
14	Tuscany SC, numerous	flumioxazin
15	Zidua SC	pyroxasulfone

Insect Control

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

Aphids

There are many species of aphids that feed on celery with green peach being the most common. Aphids feed with their needle-like mouths and suck the plant’s juices. While feeding they also can inject toxins and viruses that affect the plant’s growth. There are no thresholds for aphids. Application of systemic insecticides can be effective but will not stop the transmission of most viruses.

Apply one of the following formulations:						
Group	Product Name (*=Restricted Use)	Product Rate	Active Ingredient(s)	PHI (d)	REI (h)	Bee TR
1B	Malathion 57 EC	1.5 pt/A	malathion	7	24	H
1B	Orthene 97	0.5 to 1 lb/A	acephate	21	24	H
4A	Actara 25WDG	1.5 to 3.0 oz/A	thiamethoxam	7	12	H
4A	Admire Pro	4.4 to 10.5 fl oz/A	imidacloprid - soil	45	12	H
4A	Assail 30SG Assail 30SC	2.0 to 4.0 oz/A 1.7 to 3.4 fl oz/A	acetamiprid	7	12	M
4A	Belay 2.13SC	9.0 to 12.0 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
4D	Sivanto Prime or 200SL	7 to 14 fl oz/A	flupyradifurone - foliar	1	4	M
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
21A	Torac	17.0 to 21.0 fl oz/A	tolfenpyrad	1	12	H
23	Movento	4 to 5 fl oz/A	spirotetramat	3	24	L
23 + 7C	Senstar	8.0 to 10.0 fl oz/A	spirotetramat + pyriproxyfen	14	24	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	1	4	H
28 + 6	Minecto Pro*	10 fl oz/A	cyantraniliprole + abamectin	7	12	H
29	Beleaf	2.0 to 2.8 oz/A	flonicamid	0	12	L

Beet Armyworms (BAW), Fall Armyworms (FAW)

Small beet armyworm larvae feed on celery leaves while larger larvae feed on petioles which can cause significant damage. In addition to the feeding damage larvae drop fecal matter throughout the plant, which makes the celery unmarketable. Moths lay masses of eggs and cover them with scales, giving them a cottony appearance. Check fields weekly for damage, look for egg masses on leaves, and consider using pheromone traps to monitor moths.

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Beet Armyworms (BAW), Fall Armyworms (FAW) - continued

Apply one of the following formulations:						
Group	Product Name (*Restricted Use)	Product Rate	Active Ingredient(s)	PHI (d)	REI (h)	Bee TR
1A	Lannate LV*	1.5 to 3.0 pt/A	methomyl	7	48	H
1A	Sevin XLR Plus	1.0 to 2.0 qt/A	carbaryl	14	12	H
1B	Orthene 97	1 lb/A	acephate	21	24	H
5	Entrust SC (OMRI)	4.0 to 8.0 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	7	12	H
11A	Dipel	1.0 to 2.0 lb/A	<i>Bacillus thuringiensis kurstaki</i>	0	4	L
11A	Xentari	0.5 to 2.0 lb/A	<i>Bacillus thuringiensis aizawai</i>	0	4	L
22	Avaunt 30WDG, Avaunt eVo	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	1	4	L
28	Exirel	7.0 to 13.5 fl oz/A	cyantraniliprole	1	12	H
28	Verimark	5 to 10 fl oz/A	cyantraniliprole	n/a	4	H
28 + 6	Minecto Pro*	5.5 to 10 fl oz/A	cyantraniliprole + abamectin	7	12	H

Cabbage Loopers

The larvae cause similar damage as beet armyworms, but it is not as serious. Like the beet armyworm, fields should be scouted weekly for cabbage looper. Natural enemies, such as parasitoid wasps and flies, can help in control.

Apply one of the following formulations:						
Group	Product Name (*Restricted Use)	Product Rate	Active Ingredient(s)	PHI (d)	REI (h)	Bee TR
1A	Lannate LV*	3 pt/A	methomyl	7	48	H
1A	Sevin XLR Plus	1.0 to 2.0 qt/A	carbaryl	14	12	H
1B	Orthene 97	1 lb/A	acephate	21	24	H
3A	Permethrin 3.2EC*, others	2 to 8 fl oz/A	permethrin	1	12	H
3A	Tombstone*	1.6 to 2.4 fl oz/A	cyfluthrin	0	12	H
5	Entrust SC (OMRI)	3.0 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*	3.2 to 4.8 oz/A	emamectin benzoate	7	12	H
11A	Dipel DF, others (OMRI)	1.0 to 2.0 lb/A	<i>Bacillus thuringiensis kurstaki</i>	0	4	N
11A	XenTari (OMRI)	0.5 to 2.0 lb/A	<i>Bacillus thuringiensis aizawai</i>	0	4	N
22	Avaunt 30WDG, Avaunt eVo	3.5 to 6.0 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	1	4	L
28	Exirel	10 to 17 fl oz/A	cyantraniliprole	1	12	H
28	Verimark	6.75 to 13.5 fl oz/A	cyantraniliprole	n/a	4	H
28 + 6	Minecto Pro*	5.5 to 10 fl oz/A	cyantraniliprole + abamectin	7	12	H

Cutworms See also section E 3.1. Soil Pests - Detection and Control.

Apply one of the following formulations:						
Group	Product Name (*Restricted Use)	Product Rate	Active Ingredient(s)	PHI (d)	REI (h)	Bee TR
1A	Lannate LV*	1.5 pt/A	methomyl	7	48	H
3A	Baythroid XL*	0.8 to 1.6 fl oz/A	beta-cyfluthrin	0	12	H
3A	Brigade 2EC*, others	2.1 to 6.4 fl oz/A	bifenthrin	7	12	H
3A	Permethrin 3.2EC*, others	4.0 to 8.0 fl oz/A	permethrin	1	12	H
3A	Tombstone*	0.8 to 1.6 fl oz/A	cyfluthrin	0	12	H

Flea Beetles

Apply one of the following formulations:						
Group	Product Name (*Restricted Use)	Product Rate	Active Ingredient(s)	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*, others	2.1 to 6.4 fl oz/A	bifenthrin	7	12	H

Flea Beetles - continued next page

F. Celery

Flea Beetles - continued

3A	Fastac CS*	2.2 to 3.8 fl oz/A	alpha-cypermethrin	1	12	H
3A	Permethrin 3.2EC*, others	2 to 8 fl oz/A	permethrin	1	12	H
3A	Tombstone*	2.4 to 3.2 fl oz/A	cyfluthrin	0	12	H
4A	Actara 25WDG	1.5 to 3.0 oz/A	thiamethoxam	7	12	H
4A	Scorpion 35 SL	9 to 10.5 fl oz/A	dinotefuran - soil	21	12	H
4A	Scorpion 35 SL	2 to 5.25 fl oz/A	dinotefuran - foliar	7	12	H
4A	Venom 70SG	5 to 7.5 oz/A	dinotefuran - soil	21	12	H
4A	Venom 70SG	1.0 to 3.0 oz/A	dinotefuran - foliar	7	12	H

Leafhoppers

Leafhoppers feed by sucking sap from leaf material, which causes a stippling mark on the leaf. If there is very heavy feeding this can cause leaves to turn brown and wither at the edges. Aster leafhoppers can vector Aster Yellows, a phytoplasma disease that causes a general yellowing and stunting but seldom occurs in Mid-Atlantic celery crops.

Apply one of the following formulations:						
Group	Product Name (* = Restricted Use)	Product Rate	Active Ingredient(s)	PHI (d)	REI (h)	Bee TR
1A	Lannate LV*	1.5 to 3.0 pt/A	methomyl	7	48	H
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*, others	2.1 to 6.4 fl oz/A	bifenthrin	7	12	H
3A	Permethrin 3.2EC*, others	2 to 8 fl oz/A	permethrin	1	12	H
3A	Tombstone*	2.4 to 3.2 fl oz/A	cyfluthrin	0	12	H
4A	Actara 25WDG	1.5 to 3.0 oz/A	thiamethoxam	7	12	H
4A	Admire Pro	4.4 to 10.5 fl oz/A	imidacloprid - soil	45	12	H
4A	Belay 2.13SC	9.0 to 12.0 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
4A	Scorpion 35 SL	9 to 10.5 fl oz/A	dinotefuran - soil	21	12	H
4A	Scorpion 35 SL	2 to 5.25 fl oz/A	dinotefuran - foliar	7	12	H
4A	Venom 70SG	5 to 7.5 oz/A	dinotefuran - soil	21	12	H
4A	Venom 70SG	1.0 to 3.0 oz/A	dinotefuran - foliar	7	12	H
4D	Sivanto Prime or 200SL	7 to 14 fl oz/A	flupyradifurone - foliar	1	4	M
16	Courier SC	9.0 to 13.6 fl oz/A	buprofezin	7	12	L

Leafminers

Adults are small black/gray flies with yellow markings. Females puncture leaves with their ovipositor and feed on plant sap and lay eggs within the leaf tissues. When eggs hatch larvae begin feeding between the upper and lower surface of the leaves, making meandering mines. These pests usually only cause minor damage in our area as long as broad-spectrum insecticides are not commonly used.

Apply one of the following formulations:						
Group	Product Name (* = Restricted Use)	Product Rate	Active Ingredient(s)	PHI (d)	REI (h)	Bee TR
4A	Scorpion 35 SL	9 to 10.5 fl oz/A	dinotefuran - soil	21	12	H
4A	Scorpion 35 SL	2 to 5.25 fl oz/A	dinotefuran - foliar	7	12	H
4A	Venom 70SG	5 to 7.5 oz/A	dinotefuran - soil	21	12	H
4A	Venom 70SG	1.0 to 3.0 oz/A	dinotefuran - foliar	7	12	H
5	Entrust SC (OMRI)	6.0 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
6	Agri-Mek SC*	1.75 to 3.5 fl oz/A	abamectin	7	12	H
17	Trigard 75WSP	2.66 oz/A	cyromazine	7	12	H
28	Coragen 1.67SC Coragen eVo	5.0 to 7.5 fl oz/A 1.7 to 2.5 fl oz/A	chlorantraniliprole	1	4	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	1	4	H
28 + 6	Minecto Pro*	5.5 to 10 fl oz/A	cyantraniliprole + abamectin	7	12	H

Mites

Feeding damage is recognized by stippling (small scratches) marks on the foliage. Watch for mite activity in mid-late summer during hot dry periods. *(continued next page)*

Mites - continued

Apply one of the following formulations:						
Group	Product Name (* = Restricted Use)	Product Rate	Active Ingredient(s)	PHI (d)	REI (h)	Bee TR
6	Agri-Mek SC*	1.75 to 3.5 fl oz/A	abamectin	7	12	H
28 + 6	Minecto Pro*	5.5 to 10 fl oz/A	cyantraniliprole + abamectin	7	12	H

Tarnished Plant Bugs

This pest feeds using its needle-like mouth parts to suck fluids from the plant. Early season feeding can cause heart injury, while late-season feeding can produce large dark spots at the celery joint, resulting in 'black joint'. Look for bugs on leaves shortly after transplanting and when nearby alfalfa or grain is cut.

Apply one of the following formulations:						
Group	Product Name (* = Restricted Use)	Product Rate	Active Ingredient(s)	PHI (d)	REI (h)	Bee TR
1A	Sevin XLR Plus	1 to 2 qt/A	carbaryl	14	12	H
3A	Baythroid XL*	2.4 to 3.2 fl oz/A	beta-cyfluthrin	0	12	H
3A	Tombstone*	2.4 to 3.2 fl oz/A	cyfluthrin	0	12	H
21A	Torac	17.0 to 21.0 fl oz/A	tolfenpyrad	1	12	H
29	Beleaf 50SG	2.0 to 2.8 fl oz/A	flonicamid	0	12	L

Disease Control

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

Seed Treatment

Use seed that is at least 2 years old. Soak the new seed in hot water at 118°F (48°C) for 30 minutes. Use seed treated with Maxim 4F (0.08 to 0.16 fl oz/100 lb) for *Rhizoctonia* and *Fusarium* management and Apron XL (0.085 to 0.64 fl oz/100 lb seed) for *Pythium* damping-off protection.

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

Damping-off is favored by excessive soil moisture. Avoid over-saturation of seedbeds and do not transplant unhealthy plants in the field.

Code	Product Name (* = Restricted Use)	Product Rate	Active Ingredient(s)	PHI (d)	REI (h)	Bee TR
Apply one of the following in a 7-inch band:						
Phytophthora and Pythium root rot						
4	Ridomil Gold 4SL	1.0 to 2.0 pt/A	mefenoxam	0	48	N
4	Ultra Flourish 2E	2.0 to 4.0 pt/A	mefenoxam	7	48	N
Pythium and Rhizoctonia root rot						
4 + 11	Uniform 3.66SE	0.34 fl oz/1000 ft row in-furrow, see label	mefenoxam + azoxystrobin	AP	0	N

Bacterial and Fungal Diseases**Celery Leaf Curl/Anthracnose (*Colletotrichum* spp.)**

This disease is characterized by curled, cupped, and twisted leaves, and dark, brownish necrotic lesions near the base of the petioles. It is suspected to be seedborne; planting high quality seed is recommended. Consider hot water seed treatment.

Code	Product Name (* = Restricted Use)	Product Rate	Active Ingredient(s)	PHI (d)	REI (h)	Bee TR
For resistance management, alternate one of the following protectant fungicides:						
M01	copper (OMRI) ¹	at labeled rates	copper	0	see label	N
M05	chlorothalonil 6F	2.0 pt/A	chlorothalonil	7	12	N
With one of the following FRAC code 3 or 11 fungicides also tank mixed with a protectant fungicide:						
3	Rhyme 2.08SC	5.0 to 7.0 fl oz/A	flutriafol	7	12	--
3 + 11	Topguard EQ	6.0 to 8.0 fl oz/A	flutriafol + azoxystrobin	7	12	N

Celery Leaf Curl/Anthracnose (Colletotrichum spp.) - continued next page

F. Celery

Celery Leaf Curl/Anthracnose (Colletotrichum spp.) - continued

7 + 11	Pristine 38WG	10.0 to 15.0 oz/A	boscalid + pyraclostrobin	0	12	--
11	azoxystrobin 2.08F	9.0 to 15.5 fl oz/A	azoxystrobin	0	4	N
11	Cabrio 20EG	12.0 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.

Crater and Petiole Rot or Basal Stalk Rot (*Rhizoctonia*)

Rotate out of celery for at least 3 years to ensure crop residue is thoroughly decomposed. Avoid planting transplants too deep and in poorly drained soils. In soils where problems occur, apply fungicides regularly.

Code	Product Name (* = Restricted Use)	Product Rate	Active Ingredient(s)	PHI (d)	REI (h)	Bee TR
Apply in a 7-in band in-furrow or shortly after emergence directed at the stem:						
11	azoxystrobin 2.08F	0.40 to 0.80 fl oz/1000 ft row	azoxystrobin	0	4	N
11+M05	Quadris Opti 5.5SC	2.4 to 3.7 pt/A	azoxystrobin + chlorothalonil	7	12	N
M05	chlorothalonil 6F	2.0 pt/A	chlorothalonil	7	12	N

Fusarium Yellows

Do not obtain plants from areas of known infestation. There are no means of chemical management. Avoid seeding or transplanting into infested soil or use resistant cultivars.

Leaf Blights (*Cercospora* and *Septoria*)

Use certified, pathogen-free seed or hot water treated seed or fungicide seed treatments. Practice careful sanitation in transplant production. Use 3 or 4-year crop rotation.

Code	Product Name (* = Restricted Use)	Product Rate	Active Ingredient(s)	PHI (d)	REI (h)	Bee TR
Alternate one of the following FRAC code 11 fungicides:						
7 + 11	Merivon 2.09SC	4.0 to 11.0 fl oz/A	fluxapyroxad + pyraclostrobin	1	12	N
11+M05	Quadris Opti 5.5SC	2.4 to 3.7 pt/A	azoxystrobin + chlorothalonil	7	12	N
11	azoxystrobin 2.08F	9.0 to 15.5 fl oz/A	azoxystrobin	0	4	N
11	Cabrio 20EG	12.0 to 16.0 oz/A	pyraclostrobin	0	12	N
With one of the following fungicides:						
M01	copper (OMRI) ¹	at labeled rates	copper	0	see label	N
M05	chlorothalonil 6F	2.0 pt/A	chlorothalonil	7	12	N
3	Tilt 3.6EC	4.0 fl oz/A	propiconazole	14	12	N
3	Rhyme 2.08SC	5.0 to 7.0 fl oz/A	flutriafol	7	12	--
7	Fontelis 1.67SC	14.0 to 24.0 fl oz/A	penthiopyrad	3	12	L
7 + 12	Miravis Prime	9.2 to 13.4 fl oz/A	pydiflumetofen + fludioxonil	0	12	--

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

Pink Rot (*Sclerotinia sclerotiorum*)

Under moist conditions, white to pinkish cottony growth develops on the petioles and around the base of the plant. This is followed by a pink, watery, soft rot that causes a rapid collapse and death of the plant. Few products are available for managing Pink Rot. Avoid planting in shaded or poorly drained areas and areas with a history of Pink Rot. Rotate fields for at least 2 or 3 years. Maximize air movement through the plant canopy.

Apply Contans 3 to 4 months prior to the onset of disease to allow the mycoparasite to reduce soil inoculum (sclerotia) levels. Following application, incorporate 1-2 inches deep; however, to avoid the chance of infesting the upper soil layer with untreated sclerotia from the lower soil layer, **do not plow** between treatment and planting.

Code	Product Name (* = Restricted Use)	Product Rate	Active Ingredient(s)	PHI (d)	REI (h)	Bee TR
Apply 3 to 4 months prior to the onset of disease (see instructions above and on the label):						
44	Contans 5.3WG (OMRI)	1.0 to 4.0 lb/A	<i>Coniothyrium minitans</i>	0	4	N
Rotate between the following fungicides as long as weather conditions are favorable for disease development:						
M05	chlorothalonil 6F ¹	3.0 pt/A ¹	chlorothalonil	7	12	N
9 + 12	Switch 62.5WG	11.0 to 14.0 oz/A	cyprodinil + fludioxonil	0	12	L
12	Cannonball 50WP	7.0 oz/A	fludioxonil	0	12	L

¹Shortly after plants emerge and repeat on a 7-day schedule (suppression only).

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