Delaware Cooperative Extension

UNIVERSITY OF DELAWARE | DSU DELAWARE STATE UNIVERSITY

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*).

Carrots

Recommended Varieties[1]

Fresh Market	Bolero*	Goldfinger* (early)	Napoli
	Cellobunch*	Kuroda*	Romance
	Enterprise*	Maverick (early)*	Sugarsnax 54
	Envy* (early)	Mokum (early)	Tendersnax*
	Fuerte* (early)	Nantindo* (early)	Tendersweet*
Processing: Dicing	Danvers 126	Hercules*	Royal Chantenay*
	Danvers Half Long	Red Cored Chantenay	
Processing: "Coins"	Bolero (early)*	Scarlet Nantes	YaYa*
	Goldfinger*	SV2384DL*	

[1]**Listed alphabetically within type**. *Indicates hybrid variety

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	
Carrots[1,2]	**N (lb/A)**	**P_2O_5 (lb/A)**				**K_2O (lb/A)**				**Nutrient Timing and Method**
	50-80	150	100	50	0	150	100	50	0	Total nutrient recommended
	50	150	100	50	0	150	100	50	0	Broadcast and disk-in
	25-30	0	0	0	0	0	0	0	0	Sidedress if needed

[1]Apply 12 lb/A of boron (B) with broadcast fertilizer; see also Table B-7. in Chapter B Soil and Nutrient Management.
[2]Apply 25-30 lb/A of sulfur (S) for most soils.

Seed Treatment See Disease Control below. Seed treatments are not a substitute for high-quality seed.

Seeding Dates

For early harvest (late June to September), sow March 20 to April 30. For late harvest, sow May 1 to July 5 (May 1 to June 15 in PA and northern NJ). Practice crop rotation and plant after a small grain crop for highest yields.

Seeding Rate and Spacing

Processing: Rows 18-36 inches apart. "Coins": sow at a density of 16 plants/ft. Dicing: sow 6 plants/ft (8 if soil is fine-textured). Dicers: 1-2 lb/A using 2-inch scatter shoe. Depth of seeding should be no greater than ¼ inch.
Fresh market and Cut and Peel*:* Rows 18-36 inches apart; sow for 6-8 plants/ft or 2-4 lb/A using 4-inch scatter shoe. Depth of seeding should be no greater than ¼ inch.
Processing and Fresh: Sowing with a precision vacuum seeder produces more uniform carrots. In a row, each vacuum plate meters seed to three separate lines. Lines are generally 1.5-2 inches apart and seeds are dropped about 1.5-2 inches apart within the line, resulting in 4-6 seeds/ft of seed-line for dicers and 6-8 plants/ft for slicers or fresh market. If triple line sets are used, increase the distance between seeds in the center row.

Cultivation Hill with 2 inches of soil to cover shoulders to minimize greening.

Harvest and Post-Harvest Considerations

Early fresh market carrots are harvested from July to September. Late market carrots are harvested from September into early winter. Fresh market carrots should be over 5 inches long and 0.751.5 inches in diameter. Carrots harvested and handled in hot weather are more prone to rapid decay, and care should be exercised in handling to prevent wilting. Fresh market carrots in small plantings are harvested by loosening the soil around the plants with a garden fork and then pulling carrots gently out of the ground by the tops. For larger acreages carrots with intact tops are harvested with a belt pick-up harvester that lifts carrots by their foliage. Belt pick up, coulter pick up, or modified potato harvester types are used for processing carrots.

Carrots are processed immediately after harvest. Most are scalped (tops removed) just before digging. A reduction in yield of about 15-20% occurs when carrots are field scalped. Scalped carrots, and those with inadequate, or frozen tops are harvested with a coulter pick-up or a modified potato harvester. Carrots with intact tops are harvested with a belt pick-up harvester that lifts carrots by their foliage then cuts off the tops.

Fresh market carrots are washed, sorted, and packed into 48 1-lb plastic bags, or 24 2-lb plastic bags per carton, or loose in 50-lb mesh or plastic sacks. Store carrots at 32°F (0°C) and 98100% relative humidity. Carrots for processing may be given a pre-storage dip treatment in a 0.1% solution of sodium o-phenylphenate- (SOPP) to reduce storage decay. The solution is not rinsed off after treatment. Careful handling during and after harvest to avoid bruising, cutting and breakage, will help ensure successful storage.

Mature topped carrots can be stored 7-9 months at 32-34°F (0- 1°C) and 98-100% relative humidity. Prompt cooling- to 40°F (4°C) or below is essential for extended storage. Humidity should be kept high to prevent wilting. Carrots stored at 98-100% relative humidity develop less decay, lose less moisture, and remain crisper than those stored at 90-95% relative humidity. A temperature of 32-34°F is essential to minimize decay and sprouting.

Pre-storage washing of carrots may be desirable if they are harvested under wet conditions. Many potential decay-causing organisms are removed by washing and air circulation is improved. Otherwise, storing unwashed, brushed, and topped carrots is desirable for long-term storage. Air circulation between crates or pallet boxes with carrots is desirable to remove respiratory heat, maintain uniform temperatures, and help prevent condensation. An air velocity of about 14-20 ft/min is adequate at low storage temperatures.

Bitterness in carrots, which may develop in storage, is due to ethylene exposure. This gas is given off by apples, pears, and certain other fruits and vegetables and from decaying tissues. Bitterness can be prevented by storing carrots away from such products. Also, ethylene and development of bitterness can be minimized by low temperature. Surface browning or oxidative discoloration often develops in carrots stored for extended periods.

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	Treflan 4EC	1 to 2 pt/A	**trifluralin**	0.50 to 1 lb/A	--	12
-Labeled for preplant incorporated only; incorporate into 2-3 inches of soil within 8 h after application. -Primarily controls annual grasses with a few broadleaf weeds. -**Do not** use (or reduce the rate) when cold, wet soil conditions are expected, or crop injury may result. -Poor incorporation can reduce overall weed control. Maximum application not addressed on label.						
5	Caparol 4L	2 to 4 pt/A	**prometryn**	1 to 2 lb/A	30	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. Follow with overhead irrigation if rainfall does not occur. -Primarily controls annual broadleaf weeds. Annual grasses may only be suppressed.						
7	Lorox 50DF	1 to 3 lb/A	**linuron**	0.5 to 1.5 lb/A	14	24
-Apply after seeding, but before crop emergence. Determine carrot variety tolerance to Lorox prior to use. Sow seed at least ½ inch deep. Use lower rate on lighter coarse-textured sandy soils and the higher rate on heavier fine-textured soils. Follow with overhead irrigation if rainfall does not occur. -Primarily controls annual broadleaf weeds. Annual grasses may only be suppressed. -**Do not** exceed a total of 2 lb/A of active ingredient linuron per season.						
15	Dual Magnum 7.62E	1.33 to 2 pt/A	***s*-metolachlor**	1.26 to 1.9 lb/A	64	24
-**Special Local Needs Label 24(c) for the use of Dual Magnum 7.62E to control weeds in carrots in NJ (expires 1/28/2027). The use of Dual Magnum is legal ONLY if a waiver of liability has been completed (see: *https://www.syngenta-us.com/labels/indemnified-label-login*).** -**Do not** incorporate. Use only on high organic matter (>20%) muck soils. -Primarily controls annual grasses, certain broadleaf weeds, and nutsedge. Dual will not control emerged weeds. -**Do not** apply more than 2 pt/A during any one crop year. -Other generic versions of metolachlor and *s*-metolachlor may be available and may or may not be labeled for use in the crop.						

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	30	24
	Poast 1.5EC	1 to 2.5 pt/A	**sethoxydim**	0.2 to 0.5 lb/A	30	12
	Fusilade DX 2EC	8 to 24 fl oz/A	**fluazifop**	0.125 to 0.375 lb/A	45	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). **Poast**: use COC at 1.0% v/v. **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. **Fusilade DX:** use COC at 1.0% v/v or NIS at 0.25% 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. -Repeated applications may be necessary to control certain perennial grasses. 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 2.5 pt/A of Poast in a single application and **do not** exceed 5 pt/A for the season. -**Do not** apply more than 24 fl oz/A of Fusilade DX in a single application and **do not** exceed 3 pt/A per season.						
5	Caparol 4L	2 to 4 pt/A	**prometryn**	1 to 2 lb/A	30	12
-Apply 4L after the crop has 3 true leaves, through the 6 true leaf stage of growth. -Add nonionic surfactant at 0.5% of the spray solution (2 qt/100 gal) or oil concentrate at 1% of the spray solution (1 gal/100 gal). -Primarily controls many annual, broadleaf weed seedlings less than 2 inches tall. Annual grasses may only be suppressed. -Follow with overhead irrigation if rainfall does not occur. -Use lower rate when the crop and weeds are small, or when cloudy, humid growing conditions prevail and the higher rate when the crop and weeds are more mature and hot dry growing conditions prevail. -One preemergence treatment of up to 4 pt/A plus two postemergence treatments of 2 pt/A may be applied, but **do not** exceed 8 pt/A per crop cycle.						
5	Metribuzin 75DF Metribuzin 4L	0.33 lb/A 0.5 pt/A	**metribuzin**	0.25 lb/A	60	12
-Apply after carrots have formed 5 to 6 true leaves, but before weeds are 1 inch in height or diameter. -Controls many broadleaf weeds, including tropic croton, spotted spurge, and horseweed. -**Do not** use to control triazine-resistant weeds. -**Do not** apply to carrots grown for seed. -**Do not** apply within 3 days after periods of cool, wet, cloudy weather. -**Do not** tank mix with any other pesticide or apply within 3 days, or excessive crop injury may result. -If needed a second application may be made after an interval of at least 3 weeks. -**Do not** apply more than 0.67 lb/A per season of metribuzin 75DF or 1 pt/A per season of metribuzin 4L. -Following application of metribuzin chlorosis (yellowing) and burning of the leaf tissue may occur. Varietal differences exist in carrot tolerance to metribuzin. **Use caution when treating new varieties.** -Rainfastness is 6 h.						
7	Lorox 50DF	1.5 to 3 lb/A	**linuron**	0.75 to 1.5 lb/A	14	24
-Apply when carrots are approximately 3 to 6 inches tall. Avoid postemergence applications when daily temperatures are 90°F (32°C) or above or during a period of cloudy weather or just after rain or irrigation. -Linuron is effective on most weeds including ragweed. -**Do not** plant treated area to crops not on the label within a 4-month period after treatment.						

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	Prowl H2O	**pendimethalin**
14	Aim	**carfentrazone**

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)**	**PHI (d)**	**REI (h)**	**Bee TR**
1B	Malathion 57 EC	1.5 to 2.0 pt/A	malathion	7	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** (in furrow spray)	21	12	H
4A	Admire Pro	1.2 fl oz/A	imidacloprid - **foliar**	7	12	H
4C	Transform WG	0.75 to 1.0 oz/A	sulfloxaflor	7	24	H
4D	Sivanto Prime	7.0 to 14.0 fl oz/A	flupyradifurone	7	4	M
23+7C	Senstar	10 fl oz/A	spirotetramat + pyriproxifen	7	24	L
28	Exirel	13.5 to 20.5 fl oz/A	cyantraniliprole	1	12	H
29	Beleaf 50SG	2.0 to 2.8 oz/A	flonicamid	3	12	L

Carrot Weevils

Begin treatment when weevils become active, usually when the soil surface reaches 60°F (16°C). Tillage of previous crop residue and rotating fields at least ¼ mile from previous carrot-family plantings are important cultural practices.

Apply one of the following formulations:						
Group	**Product Name (*=Restricted Use)**	**Product Rate**	**Active Ingredient(s)**	**PHI (d)**	**REI (h)**	**Bee TR**
1A	Vydate L*	2.0 to 4.0 pt/A	oxamyl - **foliar**	14	48	H
3A	Asana XL*	9.6 fl oz/A	esfenvalerate	7	12	H
3A	Baythroid XL*	2.8 fl oz/A	beta-cyfluthrin	0	12	H
3A	Tombstone*	2.8 fl oz/A	cyfluthrin	0	12	H
3A + 4A	Leverage 360*	2.4 to 2.8 fl oz/A	imidacloprid + beta-cyfluthrin	7	12	H
28	Exirel	13.5 to 20.5 fl oz/A	cyantraniliprole	1	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*	0.75 to 1.5 pt/A	methomyl	1	48	H
3A	Asana XL*	5.8 to 9.6 fl oz/A	esfenvalerate	7	12	H
3A	Baythroid XL*	0.8 to 1.6 fl oz/A	beta-cyfluthrin	0	12	H
3A	Tombstone*	0.8 to 1.6 fl oz/A	cyfluthrin	0	12	H
28	Exirel	10 to 20.5 fl oz/A	cyantraniliprole	1	12	H
28 + 3A	Elevest*	5.6 to 9.6 fl oz/A	chlorantraniliprole + bifenthrin	21	12	H

Leafhoppers

Begin spraying when true leaves first appear. Repeat every 14 days or as needed. Leafhoppers transmit Aster Yellows. Seedling protection from leafhoppers is important.

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	1	48	H
1B	Malathion 57 EC	2.0 pt/A	malathion	7	24	H
3A	Asana XL*	5.8 to 9.6 fl oz/A	esfenvalerate	7	12	H
3A	Baythroid XL*	1.6 to 2.8 fl oz/A	beta-cyfluthrin	0	12	H
3A	Tombstone*	1.6 to 2.8 fl oz/A	cyfluthrin	0	12	H
3A + 4A	Leverage 360*	2.4 to 2.8 fl oz/A	imidacloprid + beta-cyfluthrin	7	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**	7	12	H
4A	Admire Pro	1.2 fl oz/A	imidacloprid - **foliar**	7	12	H
4C	Transform WG	1.5 to 2.75 oz/A	sulfloxaflor	7	24	H

Disease Control

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Recommended Fungicides

Nematodes

Avoid seeding in fields with a known history of nematode problems. Nematode control is essential for successful production. See fumigants listed in sections E 1.5. Soil Fumigation and E 1.6. Nematode Control.

Seed Treatment

Use seed treated with Maxim 4FS (0.08 to 0.16 fl oz/100 lb seed) for *Rhizoctonia* and *Fusarium* control or Apron XL (0.32 to 0.64 fl oz/100 lb seed) or Allegiance FL (0.75 fl oz/100 lb seed) for *Pythium* damping-off protection. Seed treatments are not a substitute for high-quality seed.

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

Use seed treatments as instructed above.

Apply one of the following preplant incorporated or as a soil-surface spray after seeding. Note: If seed treatment contains mefenoxam (Apron XL) or metalaxyl (Allegiance) do not use soil application.						
Code	**Product Name (*=Restricted Use)**	**Product Rate**	**Active Ingredient(s)**	**PHI (d)**	**REI (h)**	**Bee TR**
4	Ridomil Gold 4SL	0.5 to 1.3 pt/A	mefenoxam	AP	48	N
4	Ultra Flourish 2E	2.0 to 4.0 pt/A	mefenoxam	AP	48	N

Bacterial and Fungal Diseases

Aster Yellows

Use insecticides to control leafhoppers. Control weed populations (including carrot volunteers) on the periphery of fields early in the season to prevent transmission by leafhoppers from the weeds into the crop. The severity of Aster Yellows and damage to the crop will depend on the age of the crop. The earlier the infection occurs, the more severe and widespread the symptoms may become later in the season. See leafhopper management under Insect Control.

Bacterial Blight (*Xanthomonas*)

Initiate a fixed copper-based program as soon as symptoms are observed. Copper content and active ingredient(s) vary between copper-based products. See label for specific rates and use. Avoid working in fields when the foliage is wet to reduce the spread of the disease. Some copper-based products are OMRI listed and may be helpful in suppressing Bacterial Blight and some fungal leaf blights in organic production systems.

Leaf Blights (*Alternaria* and *Cercospora*)

Begin fungicide applications when disease threatens or start preventative fungicide programs in early July and continue every 7 to 10 days as long as conditions favor disease development. For processing crops or situations where the crop is not being marketed with its foliage, a 25% disease incidence threshold may be used to time the first fungicide application. Scout carrot fields by variety. While walking across the field in a 'V' or 'W' shaped transect for each variety, evaluate disease incidence on 5 leaves from 5 adjacent plants in a minimum of 10 locations. A leaf is infected if one or more fungal leaf blight lesions are observed. Apply the first fungicide spray when 12 of the 50 leaves (~25%) scouted show symptoms. Subsequent sprays should be applied based on the label recommended spray interval or on increased disease severity. Under severe defoliation, add urea (10.0 lb/A) to encourage new leaf growth.

Code	**Product Name (*=Restricted Use)**	**Product Rate**	**Active Ingredient(s)**	**PHI (d)**	**REI (h)**	**Bee TR**
Tank mix one of the following fungicides *with* chlorothalonil 6F 1.5 to 2.0 pt/A and rotate between different FRAC codes[1] from below:						
7	Fontelis 1.67SC	16.0 to 30.0 fl oz/A	penthiopyrad	0	12	L
7 + 11	Pristine 38WG	8.0 to 10.5 oz/A	boscalid + pyraclostrobin	0	12	--
7 + 11	Luna Sensation 4.2SC	4.0 to 7.6 fl oz/A	fluopyram + trifloxystrobin	0	12	--

Leaf Blights (Alternaria and Cercospora) - continued next page

Leaf Blights (Alternaria and Cercospora) - continued

7 + 12	Miravis Prime	6.8 fl oz/A	pydiflumetofen + fludioxonil	7	12	--
11	azoxystrobin 2.08F	9.0 to 15.5 fl oz/A	azoxystrobin	0	4	N
11	Cabrio 20EG	8.0 to 12.0 oz/A	pyraclostrobin	0	12	N
For Alternaria Leaf Blight only, tank mix one of the following fungicides *with* chlorothalonil 6F 1.5 to 2.0 pt/A and rotate between different FRAC codes[1]:						
2	iprodione 4F[2]	1.0 to 2.0 pt/A[2]	iprodione	0	24	N
7	Endura 70W	4.5 oz /A	boscalid	0	12	--
3 + 9	Inspire Super 2.82EW	16.0 to 20.0 fl oz/A	difenoconazole + cyprodinil	7	12	--
7 + 11	Merivon 2.09SC	4.0 to 5.5 fl oz/A	fluxapyroxad + pyraclostrobin	7	12	N
9 + 12	Switch 62.5WG	11.0 to 14.0 oz/A	cyprodinil + fludioxonil	7	12	L

[1]Chlorothalonil applied alone will not provide adequate control of *Cercospora*, *Alternaria*, or Powdery Mildew.
[2]Check label for rotational restrictions.

For Alternaria Leaf Blight only in organic production systems apply one of the following every 7 to 14 days to help suppress disease development:						
Code	**Product Name (*=Restricted Use)**	**Product Rate**	**Active Ingredient(s)**	**PHI (d)**	**REI (h)**	**Bee TR**
44	Serenade Opti (OMRI)	14.0 to 20.0 oz/A	*Bacillus subtilis* (QST 713 strain)	0	4	N
44	LifeGard WG (OMRI)	4.5 oz/100 gal	*Bacillus mycoides* isolate J	0	4	N

Powdery Mildew

Initiate a fungicide program to protect foliage if symptoms are observed early in the season. Disease development mid- to late-season rarely results in reduced yield. Under severe defoliation, add urea (10.0 lb/A) to encourage new leaf growth.

Code	**Product Name (*=Restricted Use)**	**Product Rate**	**Active Ingredient(s)**	**PHI (d)**	**REI (h)**	**Bee TR**
Tank mix one of the following fungicides with chlorothalonil 6F[1] 1.5 to 2.0 pt/A and rotate:						
7	Fontelis 1.67SC	16.0 to 30.0 fl oz/A	penthiopyrad	0	12	L
11	Cabrio 20EG	8.0 to 12.0 oz/A	pyraclostrobin	0	12	N
with one of the following fungicides plus chlorothalonil 6F 1.5 to 2.0 pt/A:						
3 + 9	Inspire Super 2.82EW	16.0 to 20.0 fl oz/A	difenoconazole + cyprodinil	7	12	--
7 + 11	Merivon 2.09SC	4.0-5.5 fl oz/A	fluxapyroxad + pyraclostrobin	7	12	N
7 + 11	Pristine 38WG	8.0 to 10.5 oz/A	boscalid + pyraclostrobin	0	12	--

[1]Chlorothalonil applied alone will not provide adequate control of *Cercospora*, *Alternaria*, or Powdery Mildew.

Southern Blight (*Sclerotium rolfsii*)

Southern Blight can cause significant losses. Once established, Southern Blight will persist in infested soils for many years. Rotate away from known infested fields. Apply a fungicide every 7-14 days and rotate between the following fungicides with different modes of action when symptoms appear:

Code	**Product Name (*=Restricted Use)**	**Product Rate**	**Active Ingredient(s)**	**PHI (d)**	**REI (h)**	**Bee TR**
3 + 11	Quadris Top 1.67SC	14.0 fl oz/A	difenoconazole + azoxystrobin	7	12	--
7	Fontelis 1.67SC	16.0 to 30.0 fl oz/A	penthiopyrad	0	12	L
11	azoxystrobin 2.08F	15.5 fl oz/A	azoxystrobin	0	4	N
29	Omega 500F	1.0 pt/A	fluazinam	7	12	N

Storage Rots caused by *Botrytis* and White Mold (*Sclerotinia sclerotiorum*)

Remove roots from field, separate and discard all damaged roots before placing them in storage at 32°F (0°C) and 90-95% relative humidity immediately after digging.

Code	**Product Name (*=Restricted Use)**	**Product Rate**	**Active Ingredient(s)**	**PHI (d)**	**REI (h)**	**Bee TR**
Prior to harvest apply:						
7	Fontelis 1.67SC	16.0 to 30.0 fl oz/A	penthiopyrad	0	12	L
Or, as carrots are placed into storage, dip into:						
1	Mertect 340-F	41.0 fl oz/100 gal water for 5-10 seconds	thiabendazole	NA	NA	N

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

POISON Help®
1-800-222-1222

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