

Chapter 15.

Minor Vegetable Crops: Beets, Carrots, Celery, and Parsley

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BEETS BOTANY

Nomenclature

Family - Chenopodiaceae

Beet - *Beta vulgaris*

Origin

Beet is native to areas of Europe, the Near East, and Africa adjacent to the Mediterranean Sea. Leaves and roots (enlarged hypocotyl) are the consumed plant parts (Fig. 15-1).

Related Species

Spinach and Swiss chard are the only other vegetables of significance in the Chenopodiaceae family. The most important crop plant in this family is sugar beet.

CARROTS, CELERY, AND PARSLEY BOTANY

Nomenclature

Family - Apiaceae (Umbelliferae)

Carrot - *Daucus carota*

Celery - *Apium graveolens*

Parsley - *Petroselinum crispum*

Origin

The origin of carrot is believed to be in central Asia, perhaps in present-day Afghanistan. Celery is native to marshy sites that may be somewhat saline in areas of southern Europe and North Africa that border the Mediterranean Sea (Fig. 15-2). Parsley is believed to be native to the Mediterranean area as well. Its early use was

medicinal. Present day use is as a garnish rather than as a primary component of the diet.

Related Species

Other common vegetables in the Apiaceae family are celeriac and parsnip. This family also contains many important herbs and spices including cilantro and fennel as well as some ornamentals.

VARIETIES

Common Florida Beet, Carrot, Celery, and Parsley varieties are listed in Table 1.

SEEDING AND PLANTING

Seeding and planting information for minor vegetables is listed in Table 2.

FERTILIZER AND LIME

Beet - Broadcast all P₂O₅, micronutrients, and 25 to 50% of N and K₂O before planting. Sidedress remaining N and K₂O four to five weeks after planting when plants are four to six inches tall. Soil test and fertilizer recommendations for beet grown on mineral soil are described in Table 3.

Carrot - For mineral soils, broadcast all P₂O₅, micronutrients, and 25% of N and K₂O prior to forming beds (Fig. 15-3). Sidedress remaining N and K₂O in two or three applications during the early growth period (see Table 3).

Table 1. Common minor vegetable crop varieties.

Beets	Carrots	Celery	Parsley
Asgrow Wonder	Apache	Floribelle - M9	Forest Green (CL)
Bulls Blood (tops)	Choctaw	June Belle	Jade (CL, H)
Golden Beets (yellow)	Navajo	Florida 683	Improved Market Gardeners (CL)
Green Top	Top Notch		Dark Green Italian (PL)
Pacemaker III			
Red Ace			

CL=Curley Leaf; PL=Plain Leaf; H=hybrid

On Histosol soils, broadcast all fertilizer prior to bed forming (Fig. 15-4). Better P_2O_5 efficiency might result on alkaline mucks from banding. Supplemental N (40 lb/A) might be needed in cool winter weather or after leaching rains (see Table 4).

Celery - On mineral soils, broadcast all P_2O_5 , micro-nutrients, and 20 to 25% N and K_2O before transplanting. Apply the remaining N and K_2O in 40 to 60 lb side dressings through the early part of the growing season (once at 2 to 3 weeks after planting and the second one at 6 to 8 weeks after planting) (see Table 3).

On Histosol soils, broadcast and incorporate all P_2O_5 and micronutrient fertilizers (Fig. 15-5) prior to planting. On high-pH soil, there might be benefit from banding P_2O_5 . Potassium should be applied in three applications (at planting and at 1 and 2 months after planting) to reduce soluble salt burn and minimize leaching losses. For crops harvested before December 1, make two applications of 40 lbs N each at 1 and 2 months after transplanting. For crops harvested between December 1 and March 31, make two applications of 60 lbs each. For crops, harvested after April 1, make two applications of 30 lbs each (see Table 4).

Parsley - For mineral soils with subsurface or sprinkler irrigation, broadcast all P_2O_5 , micronutrients, and 20 to 25% of N and K_2O before seeding. Top dress or band remaining N and K_2O at rates up to 30 lbs/A each several times during growing season for single cutting. For multiple cuttings apply 30 lbs/A each of N and K_2O after each cutting. Soil test and fertilizer recommendations for parsley on mineral soils are given in Table 3.

For Histosol soils, broadcast all fertilizer prior to seeding. Supplemental N might be needed during cool, winter periods or after leaching rain. For more than one cutting, apply additional 20 to 30 lbs K_2O/A after each cutting. Soil test and fertilizer recommendations for parsley grown on Histosols are given in Table 4.

PLANT TISSUE ANALYSIS

Plant tissue analysis data for all minor crops are listed in Table 5.

IRRIGATION

Beet - Irrigation is critical if rainfall is low during the rapid growth period of root (hypocotyl) development. Crop water requirements (see Chapter 3, *Principles and Practices of Irrigation Management for Vegetables*, Tables 4-6) will equal ETo (see Chapter 3, Table 3) during this stage of growth, and decrease to 90% of ETo during the final stage of production. Overhead (sprinkler) irrigation might be needed to aid seedling emergence, especially on crusting soils in dry periods. Sprinkler irrigation might also be needed at harvest to refresh plants when beets leaves are sold separately or when bunched beets are harvested.

Carrots - Carrots have a high demand for water during rapid growth and root development, 105% of ETo (see Chapter 3, *Principles and Practices of Irrigation Management for Vegetables*, Table 4-6). However, rates will decrease to 75% of ETo during the final stages of growth.

Table 2. Seeding and planting information for Beet, Carrots, Celery, and Parsley.

	Beets	Carrots	Celery	Parsley
Planting Dates				
North Florida	Aug - Feb	Aug-Mar	Aug - Feb	Sept - Mar
Central Florida	Sept - Feb	Aug-Mar	Sept - Mar	Sept - Mar
South Florida	Oct - Jan	Sept-Mar	Oct - Mar	All year
Planting Information				
Distance between rows (in)	12 - 30	10 - 12	18-40	6 - 12
Distance between plants (in) ²	2 - 4	1 - 3	6-12	drilled ⁴
Seeding depth (in)	0.5 - 1.0	1/4	on surface ²	0.25
Seed per acre (lb)	10 - 15	2 - 4	1 - 2 ³	6 - 8
Days to maturity from seed	50 - 70	70 - 120	75 - 90 ³	70 - 80
Plant population (per acre) ¹	261,360	630,000	58,080	1 million+

¹ Population based on closest between and within row spacing

² Seed pressed in beds, not buried, and kept moist for transplant production. Transplant production takes three months in seedbed.

³ For celery, column one should read "Seed per acre from transplants (lb)" and "Days to maturity from transplant".

⁴ Cut and bunched via ratoon system.

Celery - Celery water requirements (see Chapter 3, *Principles and Practices of Irrigation Management for Vegetables*, Tables 4-6) during rapid growth are similar to carrots (105% of ETo) with a slightly lower demand for water during the final stages of growth and development (95% of ETo). (See also Chapter 3, Table 3)

Parsley - Because parsley is produced for its vegetative growth, initial water requirements (see Chapter 3, *Principles and Practices of Irrigation Management for Vegetables*, Table 4 to 6) will increase from 20% to 30% of ETo to 100% of ETo (see Chapter 3, *Principles and Practices of Irrigation Management for Vegetables*, Table 3) at complete canopy or foliar coverage through harvest. Water stress will reduce leaf growth and development resulting in reduced yields.

WEED MANAGEMENT

Herbicides labeled for weed control in beets are listed in Table 6.

Herbicides labeled for weed control in carrots are listed in Table 7.

Herbicides labeled for weed control in celery are listed in Table 8.

Herbicides labeled for weed control in parsley are listed in Table 9.

DISEASE MANAGEMENT

Information on managing diseases affecting beet is given in Table 10.

Information on managing diseases affecting carrots is given in Table 11.

Information on managing diseases affecting celery is given in Table 12.

Information on managing diseases affecting parsley is given in Table 13.

INSECT MANAGEMENT

Table 14 outlines the insecticides approved for use on insects attacking carrot.

Table 15 outlines the insecticides approved for use on insects attacking celery.

Table 16 outlines the insecticides approved for use on insects attacking parsley.

Table 3. Soil test and fertilizer recommendations for mineral soils for minor crops.

Target pH	N lb/A	P ₂ O ₅					K ₂ O					
		VL	L	M	H	VH	VL	L	M	H	VH	
Beet												
6.5	120	120	100	80	0	0	120	100	80	0	0	
Carrot												
6.5	175	150	120	100	0	0	150	120	100	0	0	
Celery												
6.5	200	200	150	100	0	0	250	150	100	0	0	
Parsley												
6.5	120	150	120	100	0	0	150	120	100	0	0	

See Chapter 2 section on supplemental fertilizer application and best management practices

Table 4. Soil test and fertilizer recommendations for Histosol soils for carrot, celery, and parsley with target pH = 6.5 and N rate = 0 lb/A.

Crop	P and K indexes and fertilizer rates							
	P index	3	6	9	12	15	18	21
Carrot	P ₂ O ₅ (lb/A)	260	200	140	80	20	0	0
	K index	50	80	110	140	170		
	K ₂ O (lb/A)	200	140	80	20	0		
	P index	3	6	9	12	15	18	21
Celery	P ₂ O ₅ (lb/A)	260	200	170	100	60	30	0
	K index	50	80	110	140	170	200	
	K ₂ O (lb/A)	300	240	180	120	60	0	
	P index	3	6	9	12	15	18	
Parsley	P ₂ O ₅ (lb/A)	200	140	80	20	0	0	
	K index	50	80	110	140	170	200	
	K ₂ O (lb/A)	200	140	80	50	0	0	
	P index	3	6	9	12	15	18	

Table 5. Plant tissue analysis for beet, carrot, and celery. Dry weight basis.

Status	N	P	K	Ca	Mg	S	Fe	Mn	Zn	Bo	Cu	Mo
	Percent (%)						Parts per million (ppm)					
Beet ¹												
Deficient	<3.0	0.22	2.0	0.7	0.25	0.2	40	30	15	30	5	0.05
Adequate Range	3.0-5.0	0.25-0.4	2.0-6.0	0.7-2.0	0.25-1.0	0.2-.05	40-200	30-200	15-30	30-80	5-10	0.2-0.6
High	>5.0	0.40	6.0	2.0	1.0	0.5	200	200	30	80	10	0.06
Carrot												
Deficient	<1.8	0.2	2.0	1.0	0.15	0.2	30	30	20	20	4	-
Adequate Range	1.8-2.5	0.2-0.4	2.0-4.0	1.0-2.0	0.2-0.5	0.2-0.4	30-60	30-60	20-60	20-40	4-10	-
High	>2.5	0.4	4.0	2.0	0.5	0.4	60	100	60	40	10	-
Celery												
Deficient	<1.5	0.3	6.0	1.3	0.3	-	20	5	20	15	4	-
Adequate Range	1.5-1.7	0.3-0.6	6.0-8.0	1.3-2.0	0.3-0.6	-	20-30	5-10	20-40	15-25	4-6	-
High	>1.7	0.6	8.0	2.0	0.6	-	100	20	60	25	6	-

¹ Boron is toxic to beet at >650 ppm.

Note: No plant tissue analysis available for Parsley.

Table 6. Chemical weed control: Beets

Herbicide	Labeled crops	Time of application to crop	Rate (lbs. AI./Acre)	
			Mineral	Muck
Cycloate (Ro-Neet)	Beet	Preplant Incorporate	3-4 lb	
Remarks: Apply to mineral soils only. Use on trial basis.				
Pyrazon (Pyramin)	Beet	Preemergence Early Postemergence	3-3.5	
Remarks: Apply preemergence or early postemergence to beet and weeds for control of many broadleaf weeds. Do not use on muck soils.				
Carfentrazone (Aim)	Beets	Directed-hooded row middles	0.031	0.031
Remarks: Aim may be applied as a preplant burndown treatment and/or as a post-directed hooded application to row middles for the burndown of emerged broadleaf weeds. May be tank mixed with other registered herbicides. May be applied at up to 2 oz (0.031 lb ai). Use a quality spray adjuvant such as crop oil concentrate (coc) or non-ionic surfactant (nis) at recommended rates.				

Table 7. Chemical Weed controls: Carrots.

Herbicide	Labeled crops	Time of application to crop	Rate (lbs. AI./Acre)	
			Mineral	Muck
Carfentrazone (Aim)	Carrots	Directed-hooded row middles	0.031	0.031
Remarks: Aim may be applied as a preplant burndown treatment and/or as a post-directed hooded application to row middles for the burndown of emerged broadleaf weeds. May be tank mixed with other registered herbicides. May be applied at up to 2 oz (0.031 lb ai). Use a quality spray adjuvant such as crop oil concentrate (coc) or non-ionic surfactant (nis) at recommended rates.				
Clethodim (Select 2 EC) (Arrow) (Intensity) (Select Max)	Carrot	Postemergence	0.09-0.25	---
Remarks: Postemergence control of actively growing annual grasses. Apply at 6-16 fl oz/acre (Select, Arrow) or 9-16 fl oz/acre (Select Max). Higher rates are listed for perennial grasses. Use a crop oil concentrate for Select and Arrow, but a non-ionic surfactant may be used for Select Max. Do not apply within 30 days of harvest.				
Fluazifop (Fusilade DX)	Carrots	Postemergence	0.188	0.188
Remarks: Controls actively growing emerged annual and perennial grasses. Check the label for specified rates per grass species. Use a crop oil or non-ionic surfactant. Do not apply if rainfall is expected within 1 hour. Do not apply more than 0.75 lb ai/A per crop. Do not harvest carrots within 45 days of application. Withhold field flooding 45 to 60 days following application. In Palm Beach and Hendry counties a 60 day interval must be observed for flooding.				
Glyphosate (Roundup, Durango) Touchdown, Glyphomax)	Carrots	Chemical fallow Preplant Preemergence	0.3 - 1.0	
Remarks: Roundup, Glyphomax and Touchdown have several formulations. Check the label of each for specific labeling directions.				
Linuron (Lorox DF)	Carrots	Preemergence	0.5	0.5 - 1.5
Remarks: Make a single application after planting but before carrots emerge. Plant seed at least 2 inch deep. Subsequent postemergence treatments may be made provided total does not exceed 4lbs. material per acre per season.				
Linuron (Lorox DF)	Carrots	Postemergence	0.75	0.75 - 1.5
Remarks: Apply after carrots are at least 3 inches tall. Apply before annual grasses exceed 2 inches in height and before broadleaf weeds exceed 6 inches in height. Repeat applications may be made but do not exceed 4 lbs. material per acre. Can be applied following Stoddard's Solvent provided that the applications are at least one day apart. Do not tank mix with Stoddard's Solvent, surfactants, nitrogen or fertilizer solutions. Do not apply when temperatures exceed 85°F as crop injury may result.				
Metribuzin (Metri), (Metribuzin 75) (TriCor)	Carrots	Postemergence	0.25	0.25
Remarks: Apply as a broadcast spray over the tops of carrot plants. Application should be made after carrots have formed 5 to 6 true leaves but before weeds are 1 inch in height. If needed, a second application may be made after an interval of at least 3 weeks. Application may be made up to 60 days of harvest. Label through I-R-4 program.				
Paraquat (Gramoxone Inteon) (Parazone)	Carrots	Preplant; Preemergence	0.56 - 0.94	0.56 - 0.94
Remarks: Apply as a band treatment over the crop row or as a broadcast treatment before, during or after planting, but before the emergence of the crop. Weeds emerging after the application will not be controlled. Crop plants emerged at the time of application will be killed. Use a non-ionic surfactant in the spray mixture.				
Pelargonic Acid (Scythe)	Carrots	Preplant, Preemergence, Directed-shielded	3-10% v/v	3-10% v/v
Remarks: Product is a contact, non-selective, foliar applied herbicide. There is no residual control. May be tank mixed with soil residual compounds. Consult label for rates and other information.				
Pendimethalin (Prowl H20)	Carrots	Preemergence,	0.95	---
Remarks: Make a post-plant treatment prior to emergence of the crop and before weed emergence at 2.0 pint/A within 2 days of planting.				
Sethoxydim (Poast)	Carrots	Postemergence	0.188-0.28	0.188-0.47
Remarks: Controls actively growing grass weeds. A maximum rate of 2.5 pints product may be made per application. A total of 5 pints product may be applied per season. There is a 30 day PHI (pre harvest interval). Consult label for rates for grass species and growth stages for best control.				
Trifluralin (Treflan) (Trifluralin) (Trust)	Carrots	Preplant incorporate	0.5	--
Remarks: Apply to mineral soils only. Mineral soils with 2-5% organic matter, apply 0.75 lb ai.				

Table 8. Chemical weed controls: Celery.

Herbicide	Labeled crops	Time of application to crop	Rate (lbs. AI./Acre)	
			Mineral	Muck
Bensulide (Prefar 4E)	Celery, Chinese celery (transplant only) cardoon, Florence fennel	Preplant incorporated Preemergence	5-6	--
Remarks: Preplant incorporate using power driven rotary cultivations or apply preemergence and incorporate with irrigation. Controls many grass weeds. Provides fair to good control of lambsquarter, purslane, and amaranths. May be applied under polyethylene mulch.				
Carfentrazone (Aim)	Celery	Preplant, Directed-hooded row-middles	0.031	0.031
Remarks: Aim may be applied as a preplant burndown treatment and/or as a post-directed hooded application to row middles for the burndown of emerged broadleaf weeds. May be tank mixed with other registered herbicides. May be applied at up to 2 oz (0.031 lb ai). Use a quality spray adjuvant such as crop oil concentrate (coc) or non-ionic surfactant (nis) at recommended rates.				
Clethodim (Select) (Select 2 EC) (Arrow) (Intensity) (Select Max)	Celery	Postemergence	0.1-0.125	0.1-0.125
Remarks: Postemergence control of actively growing annual grasses. Apply at 6-16 fl oz/acre (Select, Arrow) or 9-16 fl oz/acre (Select Max). Higher rates are listed for perennial grasses. Use a crop oil concentrate for Select and Arrow, but a non-ionic surfactant may be used for Select Max. Do not apply within 30 days of harvest.				
Glyphosate (Roundup Durango, Touchdown Glyphomax)	Celery	Chemical fallow, Preplant pre emergence, pre transplant	0.3 - 1.0	0.3 - 1.0
Remarks: Roundup, Glyphomax and Touchdown have several formulations. Check the label of each for specific labeling directions.				
Linuron (Lorox DF)	Celery	Posttransplanting	0.75 - 1.5	0.75 - 1.5
Remarks: Controls emerged annuals. Apply following transplanting and establishment of celery, but before crop is 8 inches tall. Annual grasses should not exceed 2 inches and broadleaf weeds 6 inches tall. Avoid application when temperature exceeds 85°F. Do not use a surfactant or mix with other chemicals. Note precautions of planting non-registered crops within 4 months.				
Metolachlor (Dual Magnum)	Celery	Pre/postransplant	.95-1.26	
Remarks: Applications must be made prior to/immediately after transplanting. Rates are based on soil texture and percentage of organic matter. On coarse soils apply .95 - 1.26 lbs a.i/A (1.0 -1.33 pints) on medium and fine soils apply 1.25-1.6 lbs a.i. and when organic matter content is greater than 3% apply 1.6-1.9 lbs a.i/A (1.67-2.0 pts/A). This label is a special local need, third party registration. Authorization and waiver agreements must be obtained from T.P.R., Inc. prior to use.				
Pelargonic acid (Scythe)	Celery, fennel, Swiss chard	Preplant, Directed-Shielded	3-10% v/v	3-10% v/v
Remarks: Product is a contact, non-selective, foliar applied herbicide. There is no residual control. May be tank mixed with soil residual herbicides. Consult label for rates and other information.				
Prometryn (Caparol 4L)	Celery seedbed	Postemergence	0.6 - 0.8	0.6 - 0.8
Remarks: Controls emerged annuals. In seedbed, apply when seedlings have 2 to 5 true leaves after seedbed covers are removed for at least one week.				
Prometryn (Caparol 4L)	Celery field	Posttransplanting	0.8 - 1.6	0.8 - 1.6
Remarks: Controls emerged annuals. Apply one time after celery is established, 2 weeks after transplanting but before 6th week. Weeds should not exceed 2 inches. Note precautions of planting non-registered or sensitive crops within 5 months.				
Sethoxydim (Poast)	Celery	Postemergence	0.188 - 0.28	0.188-0.28
Remarks: Controls actively growing grass weeds. A total of 3 pts. product per acre may be applied in one season. Do not apply within 14 days of harvest. Apply in 5 to 20 gallons of water adding 2 pts. of crop oil concentrate per acre. Unsatisfactory results may occur if applied to grasses under stress. Use 0.188 lb ai (1 pt.) on seedling grasses and up to 0.28 lb ai (1.5 pt.) on perennial grasses emerging from rhizomes, etc. Consult label for grass species and growth stage for best control.				
Trifluralin (Treflan) (Trust)	Celery	Preplant Incorporate	0.5	--
Remarks: Apply as a soil incorporated treatment to direct seeded or transplanted celery before planting, at planting or immediately after planting. Apply to mineral soils only. Consult label for application instructions.				

Table 9. Chemical Weed controls: Parsley.

Herbicide	Labeled crops	Time of application to crop	Rate (lbs. AI./Acre)	
			Mineral	Muck
Carfentrazone (Aim)	Parsley	Preplant Directed-hooded row-middles	0.031	0.031
Remarks: Aim may be applied as a preplant burndown treatment and/or as a post-directed hooded application to row middles for the burndown of emerged broadleaf weeds. May be tank mixed with other registered herbicides. May be applied at up to 2 oz (0.031 lb ai). Use a quality spray adjuvant such as crop oil concentrate (coc) or non-ionic surfactant (nis) at recommended rates.				
Clethodim (Select) (Tapout) (Intensity) (Select Max) (Shadow)	Parsley Cilantro	Postemergence	0.1-.0125	0.1-0.125
Remarks: For the control of emerged annual and perennial grass weeds. For Select Max apply at 9-16 fl oz/A with a non-ionic surfactant. For the others do not apply more than 8 fl oz with a crop oil concentrate. Do not apply within 14 days of harvest.				
Pelargonic Acid (Scythe)	Parsley	Preplant, Preemergence, Directed-shielded	3-10% v/v	3-10% v/v
Remarks: Product is a contact, non-selective, foliar applied herbicide. There is no residual control. May be tank mixed with soil residual compounds. Consult label for rates and other information.				
Prometryne (Caparol 4L)	Parsley Dill (fresh market)	Postemergence	.25 -.5	.25 - .5
Remarks: Caparol 4L may be applied postemergent as a broadcast application at .5 -1 pint/A to direct seeded parsley or dill. Applications may be made no closer than 30 days prior to harvest. Applications must be made in a minimum of 20 gpa. A maximum of 1 lb a.i./A (2 pts/A) of Caparol 4L may be applied per growing season. Crops treated may be sold for fresh market only. This is a third party registration. Authorization and waiver agreements must be obtained from TPR, Inc. prior to use. The use of the product may result in stunting and delayed maturity. Climatic conditions during the growing season will affect efficacy and phytotoxicity.				
Sethoxydim (Poast)	Parsley	Postemergence	0.188-0.28	0.188-0.47
Remarks: Controls actively growing grass weeds. A maximum rate of 2.5 pints product may be made per application. A total of 5 pints product may be applied per season. There is a 30 day PHI (pre harvest interval). Consult label for rates for grass species and growth stages for best control.				
Linuron (Lorox DF)	Parsley	Preemergence Postemergence	0.75 NL	0.75 - 1.5 0.5
Remarks: Apply a single broadcast application in mineral and muck soils after planting but before plant emergence. In muck soils only, an additional application may be made after parsley emergence when weeds are in 1 to 3 leaf stage. Do not apply within 30 days of harvest.				
Bensulide (Prefar 4E)	Parsley Cilantro	Preplant, Preemergence	5-6	--
Remarks: May be applied preplant and incorporated with power driven cultivations or may be incorporated with irrigation.				

Table 10. Disease control for beets.

Chemical	Fungicide Group	Maximum Rate Per Acre Per		Min. Days to Harvest	Pertinent Diseases	Remarks
		Application	Season			
Copper fungicides (See individual labels) including: Badge SC, Badge X2, Basic Copper 53, C-O-C-S WDG, Champ DP, Champ WG, Champ Formula 2, Champ WP, COC DF, COC WP, Copper Count N, Cueva, Cuprofix Ultra, Kentan DF, Kocide DF, Kocide 2000, Kocide 3000, Kocide 4.5 LF, Nordox 75 WG, NuCop 50WP, NuCop 3L, NuCop HB, NuCop DF, Top Cop w/ Sulfur	M1	-	-	1	Cercospora	See individual labels for more details.
Sulfur fungicides (See individual labels) including: Kumulus DF, Micro Sulf, Microthiol Disperss, Sulfur 90W, Top Cop w/ Sulfur, Wettable Sulfur	M2	-	-	1	Cercospora	Do not apply during periods of warm weather. Do not apply within 2 weeks of an oil spray.
Defiant 75WP (thiram)	M3	5.3 oz/ 100 lbs of seed			Damping off	Seed treatment only
Folicur 3.6 F (tebuconazole)	3	7.2 fl oz	28.8 fl oz	7	Cercospora	Do not apply more than 4 appl/season
Monsoon 3.6 F (tebuconazole)	3	7.2 fl oz	28.8 fl oz	7	Cercospora	Do not apply more than 4 appl/season
Orius 3.6 F (tebuconazole)	3	7.2 fl oz	28.8 fl oz	7	Cercospora	Do not apply more than 4 appl/season
Toledo 3.6 F (tebuconazole)	3	7.2 fl oz	28.8 fl oz	7	Cercospora	Do not apply more than 4 appl/season
Tebuzol 3.6F (tebuconazole)	3	7.2 fl oz	28.8 fl oz	7	Cercospora	Do not apply more than 4 appl/season
Tebustar 3.6L (tebuconazole)	3	7.2 fl oz	28.8 fl oz	7	Cercospora	Do not apply more than 4 appl/season
Apron XL LS (mefenoxam)	4	0.64 fl. oz./ 100 lb seed			Pythium seedling blight	Seed treatment only
Metastar 2E AG (metalaxyl)	4	8 pt			Pythium seedling blight	Apply as a broadcast soil application and incorporate into top 2 inches. See label for directions.
Ridomil Gold EC (mefenoxam)	4	2 pt			Pythium seedling diseases	Apply at seeding in a 7-12" band on soil over seed furrow
Ridomil Gold GR (mefenoxam)	4	40 lb			Pythium seedling diseases	See label for specifics regarding preplant incorporated applications and surface applications at the time of planting.
Ultra Flourish (mefenoxam)	4	4 pt			Pythium seedling diseases	See label for specifics regarding preplant incorporated applications and surface applications at the time of planting.

Table 10. Continued.

Chemical	Fungicide Group	Maximum Rate Per Acre Per		Min. Days to Harvest	Pertinent Diseases	Remarks
		Application	Season			
Switch 62.5WDG (cyprodinil/fludioxonil)	9 & 12	14 oz	56 oz	7	Alternaria Powdery mildew	See label.
Amistar 80DF (azoxystrobin)	11	5 oz	2.5 lb	0	Cercospora	See label for Rhizoctonia control .
Cabrio EG (pyraclostrobin)	11	16 oz	48 oz	0	Cercospora	Limit is 3 appl./crop & alternate chemistry.
Flint (trifloxystrobin)	11	3 oz	12 oz	7	Cercospora	Alternate every other application with a fungicide of dissimilar mode of action.
Gem 500SC (trifloxystrobin)	11	2.9 fl oz	11.6 fl oz	7	Cercospora	Alternate every other application with a fungicide of dissimilar mode of action.
Quadris (azoxystrobin)	11	15.4 fl oz	3.75 qt	0	Cercospora	Alternate with a fungicide of dissimilar mode of action.
Reason (fenamidone)	11	8.2 fl oz	24.6 fl oz	2	Cercospora	Alternate every other application with a fungicide of dissimilar mode of action.
Maxim 4FS (fludioxonil)	12	0.16 fl oz/ 100 lb of seed			Various seedling diseases	Seed treatment only
Mono- and di-Potassium salts of phosphorous acid (See individual labels) including: Fosphite, Fungi-Phite, Prophyt, Phostrol, Rampart, Topaz (potassium phosphite) Phorcephite (potassium phosphate /potassium phosphate)	33	-	-		<i>Pythium</i> , <i>Rhizoctonia</i> , <i>Fusarium</i>	Do not exceed 6 appl/ crop. Caution should be used when applying in a management program including copper fungicides. See label for foliar, root dip and irrigation application details.
NutraPic (Chloropicrin)		500 lb			Soilborne fungi Nematodes	DANGER. Soil fumigant. Restricted use pesticide. See label for details.
Regalia (Extract of <i>Reynoutria Sachalinensis</i>)	P	1% v/v	12 qt	7	Bacterial blight	Begin applications preventatively. Spray volumes should be 50-100 GPA.
Actinovate AG (<i>Streptomyces lydicus</i>)	NC	12 oz	12 oz	0	Alternaria Antracnose Botrytis Fusarium Pythium Phytophthora Rhizoctonia Sclerotinia	Apply to soil through irrigation, as a seed treatment, to foliage as a spray. See label for details.
Companion L (<i>Bacillus subtilis</i> GB03)	NC	1 gal		0	Alternaria Fusarium Soft rot Pythium Rhizoctonia	Can be applied in field, greenhouse, or hydroponically. See label for details.
Kaligreen (potassium bicarbonate)	NC	3 lb		1	Powdery mildew	Apply in a minimum spray volume of 25 GPA.

Table 10. Continued.

Chemical	Fungicide Group	Maximum Rate Per Acre Per		Min. Days to Harvest	Pertinent Diseases	Remarks
		Application	Season			
Oxidate (hydrogen dioxide)	NC	1:100 dilution		0	Bacterial blight Botrytis Powdery mildew	See label for details.
Cease (<i>Bacillus subtilis</i> strain QST 713)	NC	6 qt/100 gal mix		0		Apply to soil through irrigation, or to foliage as a spray. See label for details.
Rhapsody (<i>Bacillus subtilis</i> strain QST 713)	NC	6 qt		0	Powdery mildew	See labels for details.
Serenade Max (<i>Bacillus subtilis</i> strain QST 713)	NC	3 lb		0	Sclerotinia	See labels for details.
Soilgard 12G (<i>Gliocladium virens</i> strain GL-21)	NC				Damping off Root diseases	See label for details.
Sonata (<i>Bacillus pumilis</i> strain QST 2808)	NC	4 qt		0	Powdery mildew	For suppression or use as a preventative in a program with other registered fungicides.
Sporatec (Clove Oil, Rosemary Oil, and Thyme Oil)	NC	1.5 qt		0	Powdery mildew	Sporatec is a concentrated oil-based product. It requires the use of an approved adjuvant to improve spreading and sticking. OMRI listed
Trilogy (Neem Oil)	NC	2 gal				Apply at a rate of 0.5% - 1.0% in 25 to 100 gall water/acre or at 2 pt in a minimum of 5 GPA for low volume appls.

Table 11. Disease control for carrot.

Chemical	Fungicide Group	Maximum Rate Per Acre Per		Min. Days to Harvest	Pertinent Diseases	Remarks
		Application	Season			
Copper fungicides (See individual labels) including: Badge SC, Badge X2, Basic Copper 53, COCS WDG, Champ DP, Champ WG, Champ Formula 2, Champ WP, COC DF, COC WP, Copper Count N, Cuerva, Cuprofix Ultra, Kentan DF, Kocide DF, Kocide 2000, Kocide 3000, Kocide 4.5 LF, Nordox 75 WG, NuCop 50WP, NuCop 3L, NuCop HB, NuCop DF, Stretch, Tenn-Cop 5E, Top Cop w/ Sulfur	M1	-	-	1	Alternaria blight, Cercospora leaf spot	
Sulfur fungicides (See individual labels) includ- ing: Dusting Sulfur – IAP, Kumulus DF, Micro Sulf, Microfine Sulfur, Microthiol Disperss, Sulfur 90W, Super-Six, Top Cop w/ Sulfur, Yellow Jacket Wettable Sulfur	M2	-	-	1	Powdery mildew	Do not apply during periods of warm weather. Do not apply within 2 weeks of an oil spray.
Defiant 75WP (thiram)	M3	5.3 oz/ 100 lbs of seed			Damping off	Seed treatment only.
Sebring 2.65ST (metalaxyl)	4	0.7 fl oz/ 100 lbs of seed			Pythium damping off	Seed treatment only.
Chlorothalonil fungicides (See individual labels) including: Bravo Ultrex, Bravo Weather Stik, Bravo ZN, Chloronil 720, Chlorothalonil 720 SC, Echo 720, Echo 90DF, Echo ZN, Equus 500 ZN, Equus 720SST, Equus DF, Initiate 720, Initiate ZN	M5	-	-	7		
Mertect 340F (thiabendazole)	1	41 fl oz/100 gal water			Botrytis rot, Sclerotinia white mold	Apply as a post-harvest dip. See label for details.
Iprodione 4L AG (iprodione)	2	2 pt	8 pt	0	Alternaria blight, Black crown rot	See label for details.
Nevado 4F (iprodione)	2	2 pt	8 pt	0	Alternaria blight, Black crown rot	See label for details.
Rovral 4F (iprodione)	2	2 pt	8 pt	0	Alternaria blight, Black crown rot	See label for details.
Enclosure 4F (iprodione)	2	2 pt	8 pt	0	Alternaria blight, Black crown rot	See label for details.
Bumper 41.8EC (propiconazole)	3	4 fl oz	16 fl oz	14	Alternaria blight, Cercospora leaf spot, Powdery mildew	Do not exceed 4 total appls.

Table 11. Continued.

Chemical	Fungicide Group	Maximum Rate Per Acre Per		Min. Days to Harvest	Pertinent Diseases	Remarks
		Application	Season			
Propimax EC (propiconazole)	3	4 fl oz	16 fl oz	14	Alternaria blight, Cercospora leaf spot, Powdery mildew	Do not apply more than 4 appl/ season.
Tilt 3.6E (propiconazole)	3	4 fl oz	16 fl oz	14	Alternaria blight, Cercospora leaf spot, Powdery mildew	Do not apply more than 4 appl/ season.
Apron XL LS (mefenoxam)	4	0.64 fl. oz./ 100 lb seed			Pythium seedling blight	Seed treatment only.
Metastar 2E AG (metalaxyl)	4	8 pt			Pythium seedling blight, cavity spot	Apply as a broadcast soil application and incorporate into top 2 inches. See label for directions.
Ridomil Gold EC (mefenoxam)	4	2 pt			Pythium seedling dis- eases, cavity spot	Apply at seeding in a 7-12" band on soil over seed furrow.
Ridomil Gold SL (mefenoxam)	4	2 pt			Pythium seedling dis- eases , cavity spot	See label for specifics regarding preplant incorporated applications and surface applications at the time of planting.
Ridomil Gold Copper	4 & M1	2 lb	8 lb	7	Cavity spot	See label for details.
Ridomil Gold Bravo WP (mefenoxam/chlorotha- lonil)	4 & M5	2 lbs		7	Cavity spot, Alternaria blight, Cercospora leaf spot	See label for details.
Ridomil Gold Bravo SC (mefenoxam/chlorotha- lonil)	4 & M5	2.5 pt		7	Cavity spot, Alternaria blight, Cercospora leaf spot	See label for details.
Endura (boscalid)	7	4.5 oz	22.5 oz	0	Alternaria blight	Alternate with non-FRAC code 7 fun- gicide. See label for directions.
Pristine (boscalid/pyraclostrobin)	7 & 11	10.5 oz	63 oz	0	Various (see label)	Limit is 6 appl/crop and alternate chemistry.
Switch 62.5WDG (cyprodinil/fludioxonil)	9 & 12	14 oz	56 oz	7	Alternaria blight, Powdery mildew	See label.
Amistar 80DF (azoxystrobin)	11	5 oz or 0.25 oz/1000 row ft	20 oz	0	Various (see label)	Do not exceed 1 sequential and 4 total appl. of Amistar or other Qol fungicides. See label for soil appl.
Cabrio EG (pyraclostrobin)	11	12 oz	48 oz	0	Alternaria blight, Cercospora leaf spot	Do not exceed 2 sequential and 4 total appls. of Cabrio or other Qol fungicides.
Flint (trifloxystrobin)	11	3 oz	12 oz	7	Various (see label)	Alternate every other application with a fungicide of dissimilar mode of action.
Gem 500SC (trifloxystrobin)	11	2.9 fl oz	11.6 fl oz	7	Various (see label)	Alternate every other application with a fungicide of dissimilar mode of action.
Heritage (azoxystrobin)	11	10.5 oz	4 lb	0	Various (see label)	Do not apply more than 3 sequential applications without alternating to a fungicide of dissimilar mode of action.

Table 11. Continued.

Chemical	Fungicide Group	Maximum Rate Per Acre Per		Min. Days to Harvest	Pertinent Diseases	Remarks
		Application	Season			
Quadris (azoxystrobin)	11	15.4 fl oz or 0.8 fl oz / 1000 row ft	3.75 qt	0	Various (see label)	Do not exceed 1 sequential and 4 total appl. of Quadris or other QoI fungicides. See label for soil applications.
Quadris Opti (azoxystrobin/ chlorothalonil)	11 & M5	2.4 pt	14.4 pt	0	Early blight (<i>Cercospora</i>) Powdery mildew Alternaria	Do not exceed 2 sequential and 6 total appl. of Quadris Opti. Rotate with non QoI fungicides.
Quilt (azoxystrobin/ Propiconazole)	11/3	14 fl oz	55 fl oz	14	Early blight (<i>Cercospora</i>) Powdery mildew Alternaria	Alternate every other application with a fungicide of dissimilar mode of action.
Quilt XCEL (azoxystrobin/ propiconazole)	11/3	14 fl oz	56 fl oz	14 days	Early blight (<i>Cercospora</i>) Powdery mildew Alternaria	Alternate every other application with a fungicide of dissimilar mode of action.
Reason (fenamidone)	11	8.2 fl oz	24.6 fl oz	14	Cavity spot	Alternate every other application with a fungicide of dissimilar mode of action.
Maxim 4FS (fludioxonil)	12	0.16 fl oz/ 100 lb of seed			Various seedling diseases	Seed treatment only.
Ranman (cyazofamid)	21	6 fl oz	30 fl oz	14	Cavity spot, Pythium	Alternate with fungicides of dissimilar chemistry.
Mono- and di-Potassium salts of phosphorous acid (See individual labels) including: Alude, Fosphite, Fungi-Phite, Prophyt, Phostrol, Rampart, Topaz (potassium phosphite) Phorcephite (potassium phosphate/potassium phosphite)	33	-	-		<i>Pythium</i> , <i>Rhizoctonia</i> , <i>Fusarium</i>	Do not exceed 6 appl/ crop. Caution should be used when applying in a management program including copper fungicides. See label for foliar, root dip and irrigation application details.
Sanction (Potassium phosphate and sulfur)	M2 & 33	6 pts			Powdery mildew	See label for details.
NutraPic (Chloropicrin)		500 lb			Soilborne fungi Nematodes	DANGER. Soil fumigant. Restricted use pesticide. See label for details.
Regalia (Extract of <i>Reynoutria Sachalinensis</i>)	P	1% v/v	12 qt	7	Bacterial blight, Powdery mildew	Begin applications preventatively. Spray volumes should be 50-100 GPA.
Actinovate AG (<i>Streptomyces lydicus</i>)	NC	12 oz	12 oz	0	Alternaria Antracnose Botrytis Fusarium Pythium Phytophthora Rhizoctonia Sclerotinia Verticillium	Apply to soil through irrigation, as a seed treatment, to foliage as a spray. See label for details.

Table 11. Continued.

Chemical	Fungicide Group	Maximum Rate Per Acre Per		Min. Days to Harvest	Pertinent Diseases	Remarks
		Application	Season			
Cease (<i>Bacillus subtilis</i> strain QST 713)	NC	6 qt/100 gal mix		0	Black root Black crown rot Alternaria	Apply to soil through irrigation, or to foliage as a spray. See label for details.
Companion L (<i>Bacillus subtilis</i> GB03)	NC	1 gal		0	Damping off Botrytis Fusarium Powdery Mildew Pythium Rhizoctonia Sclerotinia	Can be applied in field, greenhouse, or hydroponically. See label for details.
Contans WG (<i>Coniothyrium minitans</i> strain CON/M/91-08)	NC	6 lbs			Sclerotinia diseases	Apply to soil surface and incorporate prior to, at planting, or at transplanting.
Kaligreen (potassium bicarbonate)	NC	3 lb		1	Powdery mildew	Apply in a minimum spray volume of 25 GPA.
Oxidate (hydrogen dioxide)	NC	1:100 dilution		0	See label	See label for details.
PlantShield HC (<i>Trichoderma harzianum</i> Rifai strain KRL-22)	NC	5 oz		0	Damping off	Apply in-furrow or in transplant starter solution.
Rhapsody (<i>Bacillus subtilis</i> strain QST 713)	NC	6 qt		0	Various (see label)	See labels for details.
Serenade Max (<i>Bacillus subtilis</i> strain QST 713)	NC	3 lb		0	Various (see label)	See label for details.
Serenade Soil (<i>Bacillus subtilis</i> strain QST 713)	NC	6 qt		0	Rhizoctonia Pythium Fusarium Verticillium Phytophthora	See label for details. Soil treatment.
Soilgard 12G (<i>Gliocladium virens</i> strain GL-21)	NC				Damping off Root diseases	See label for details.
Sonata (<i>Bacillus pumilis</i> strain QST 2808)	NC	4 qt		0	Powdery mildew	For suppression or use as a preventative in a program with other registered fungicides.
Sporatec (Clove oil, Rosemary oil, and Thyme oil)	NC	1.5 qt		0	Powdery mildew	Sporatec is a concentrated oil-based product. It requires the use of an approved adjuvant to improve spreading and sticking. OMRI listed.
Trilogy (Neem oil)	NC	2 gal				Apply at a rate of 0.5% - 1.0% in 25 to 100 gal water/acre or at 2 pt in a minimum of 5 GPA for low volume appls.

Table 12. Disease management for celery.

Chemical	Fungicide Group	Maximum Rate Per Acre Per		Min. Days to Harvest	Pertinent Diseases or Pathogens	Remarks
		Application	Season			
Copper fungicides (See individual labels) including: Badge SC, Badge X2, Basic Copper 53, C-O-C-S WDG, Champ DP, Champ WG, Champ Formula 2, Champ WP, COC DF, COC WP, Copper Count N, Copper-Z, Cueva, Cuprofix Ultra, Kentan DF, Kocide DF, Kocide 101, Kocide 2000, Kocide 3000, Kocide 4.5 LF, Nordox 75 WG, NuCop 50WP, NuCop 3L, NuCop HB, NuCop DF, Stretch, Top Cop w/ Sulfur	M1	-	-	1	Bacterial blight	
Sulfur fungicides (See individual labels) including: Dusting Sulfur – IAP, Kumulus DF, Micro Sulf, Microthiol Disperss, Sulfur 90W, Top Cop w/ Sulfur	M2	-	-	1	Early blight Late blight Powdery mildew	Do not apply during periods of warm weather. Do not apply within 2 weeks of an oil spray.
Chlorothalonil fungicides (See individual labels) including: Bravo Ultrex, Bravo Weather Stik, Chloronil 720, Chlorothalonil 720 SC, Echo 720, Echo 90DF, Echo ZN, Equus 500 ZN, Equus 720, Equus DF, Initiate 720, Initiate ZN	M5	-	-	7	Early blight (<i>Cercospora</i>) Late blight (<i>Septoria</i>) Stalk rot (<i>Rhizoctonia</i>)	
Propiconazole fungicides (See individual labels) including: Bumper 41.8EC, Fitness, Propiconazole E-AG 41.8EC, Propimax EC, Tilt 3.6E	3	4 fl oz	16 fl oz	14	Early blight (<i>Cercospora</i>) Late blight (<i>Septoria</i>) Stalk rot (<i>Rhizoctonia</i>)	Do not apply more than 4 appl/season.
Apron XL LS (mefenoxam)	4	0.64 fl. oz./ 100 lb seed			Pythium seedling blight	Seed treatment only.
Metastar 2E AG (metalaxyl)	4	8 pt			Pythium seedling blight	Apply as a broadcast soil application and incorporate into top 2 inches. See label for directions.
Ridomil Gold EC (mefenoxam)	4	2 pt			Pythium seedling diseases	Apply at seeding in a 7-12" band on soil over seed furrow.
Ridomil Gold GR (mefenoxam)	4	40 lb			Pythium seedling diseases	See label for specifics regarding preplant incorporated applications and surface applications at the time of planting.

Table 12. Continued.

Chemical	Fungicide Group	Maximum Rate Per Acre Per		Min. Days to Harvest	Pertinent Diseases or Pathogens	Remarks
		Application	Season			
Ultra Flourish (mefenoxam)	4	4 pt			Pythium seedling diseases	See label for specifics regarding preplant incorporated applications and surface applications at the time of planting.
Endura (boscalid)	7	9 oz	18 oz	0	Alternaria Botrytis Sclerotinia	Alternate with non-FRAC code 7 fungicide. See label for directions.
Cabrio EG (pyraclostrobin)	11	16 oz	64 oz	0	Various (see label)	Do not exceed 2 sequential and 4 total appls. of Cabrio or other QoI fungicides.
Evito 480SC (fluoxastrobin)	11	5.7 fl oz	22.8 fl oz	3	Early blight (<i>Cercospora</i>) Late blight (<i>Septoria</i>) Stalk rot (<i>Rhizoctonia</i>)	Alternate every other application with a fungicide of dissimilar mode of action.
Flint (trifloxystrobin)	11	3 oz	12 oz	7	Early blight (<i>Cercospora</i>) Late blight (<i>Septoria</i>) Stalk rot (<i>Rhizoctonia</i>)	Alternate every other application with a fungicide of dissimilar mode of action.
Gem 500SC (trifloxystrobin)	11	2.9 fl oz	11.6 fl oz	7	Early blight (<i>Cercospora</i>) Late blight (<i>Septoria</i>) Stalk rot (<i>Rhizoctonia</i>)	Alternate every other application with a fungicide of dissimilar mode of action.
Quadris (azoxystrobin)	11	15.4 fl oz or 0.8 fl oz/1000 row ft	2.88 qt	0	Various (see label)	Do not exceed 1 sequential and 4 total appl. of Quadris or other QoI fungicides. See label for soil applications.
Quadris Opti (azoxystrobin/ chlorothalonil)	11/M5	3.7 pt	22.2 pt	7	Early blight (<i>Cercospora</i>) Late blight (<i>Septoria</i>) Stalk rot (<i>Rhizoctonia</i>)	Do not exceed 2 sequential and 6 total appl. of Quadris Opti. Rotate with non QoI fungicides.
Quilt (azoxystrobin/ propiconazole)	11/3	14 fl oz	56 fl oz	14 days	Early blight (<i>Cercospora</i>) Late blight (<i>Septoria</i>)	Alternate every other application with a fungicide of dissimilar mode of action.
Quilt XCEL (azoxystrobin/ propiconazole)	11/3	14 fl oz	56 fl oz	14 days	Early blight (<i>Cercospora</i>) Late blight (<i>Septoria</i>)	Alternate every other application with a fungicide of dissimilar mode of action.
Reason (fenamidone)	11	8.2 fl oz	24.6 fl oz	2	Late blight	Alternate every other application with a fungicide of dissimilar mode of action.
Maxim 4FS (fludioxonil)	12	0.16 fl oz/ 100 lb of seed			Various seedling diseases	Seed treatment only.
Botran 75W (dichloran)	14	2 lb	5.33 lb	7	Pink rot (<i>Sclerotinia</i>)	Direct spray to base of plant.
Agri-mycin 17 (streptomycin)	25	200 ppm			Bacterial blight	See label for details. For transplant production.

Table 12. Continued.

Chemical	Fungicide Group	Maximum Rate Per Acre Per		Min. Days to Harvest	Pertinent Diseases or Pathogens	Remarks
		Application	Season			
Bac-Master (streptomycin)	25	200 ppm			Bacterial blight	See label for details. For transplant production.
Firewall 17 WP (streptomycin)	25	200 ppm			Bacterial blight	See label for details. For transplant production.
Tanos (cymoxanil/famoxadone)	27/11	8 oz	72 oz	3	Early blight Late blight	Do not alternate or tank mix with another FRAC group 11 fungicide.
Aliette WDG (fosetyl-Al)	33	5 lb	20 lb		Pythium	
Legion 80WDG (fosetyl-Al)	33	5 lb	20 lb		Pythium	
Linebacker WDG (fosetyl-Al)	33	5 lb	20 lb		Pythium	
Mono- and di-Potassium salts of phosphorous acid (See individual labels) including: Fosphite, Fungi-Phite, Prophyt, Phostrol, Rampart, Reveille, Topaz (potassium phosphite) Phorcephite (potassium phosphite/Potassium phosphate)	33	-	-		<i>Pythium</i> , <i>Rhizoctonia</i> , <i>Fusarium</i>	Do not exceed 6 appl/ crop. Caution should be used when applying in a management program including copper fungicides. See label for foliar, root dip and irrigation application details.
NutraPic (Chloropicrin)		500 lb			Soilborne fungi Nematodes	DANGER. Soil fumigant. Restricted use pesticide. See label for details.
Revus (mandipropamid)	40	8 fl oz	32 fl oz	1	Downy mildew	Do not exceed 2 sequential applications. See label for soil applications.
Presidio (fluopicolide)	43	3-4 fl oz	12 fl oz	2	Downy mildew White rust	Must be tank-mixed with a fungicide of different mode of action. Do not exceed two sequential applications. See label for soil applications.
Regalia (Extract of <i>Reynoutria Sachalinensis</i>)	P	1% v/v	12 qt	7	Bacterial blight	Begin applications preventatively. Spray volumes should be 50-100 GPA.
Actinovate AG (<i>Streptomyces lydicus</i>)	NC	12 oz	12 oz	0	Alternaria Antracnose Botrytis Fusarium Pythium Phytophthora Rhizoctonia Sclerotinia Verticillium	Apply to soil through irrigation, as a seed treatment, to foliage as a spray. See label for details.

Table 12. Continued.

Chemical	Fungicide Group	Maximum Rate Per Acre Per		Min. Days to Harvest	Pertinent Diseases or Pathogens	Remarks
		Application	Season			
Companion L (<i>Bacillus subtilis</i> GB03)	NC	1 gal		0	Damping off Botrytis Fusarium Powdery Mildew Pythium Rhizoctonia Sclerotinia	Can be applied in field, greenhouse, or hydroponically. See label for details.
Contans WG (<i>Coniothyrium minitans</i> strain CON/M/91-08)	NC	6 lbs			Sclerotinia diseases	Apply to soil surface and incorporate prior to, at planting, or at transplanting.
Kaligreen (potassium bicarbonate)	NC	3 lb		1	Powdery mildew	Apply in a minimum spray volume of 25 GPA.
Oxidate (hydrogen dioxide)	NC	1:100 dilution		0	Bacterial blight Botrytis Early blight Late blight Powdery mildew	See label for details.
PlantShield HC (<i>Trichoderma harzianum</i> Rifai strain KRL-22)	NC	5 oz		0	Damping off	Apply in-furrow or in transplant starter solution.
RootShield Granules (<i>Trichoderma harzianum</i> Rifai strain KRL-22)	NC	12 lb/A field 1.5 lb/Cu Yd greenhouse			Damping off	Apply in-furrow in field or incorporate in soil mix for greenhouse. See label for details.
Rhapsody (<i>Bacillus subtilis</i> strain QST 713)	NC	6 qt		0	Pink rot (<i>Sclerotinia</i>)	See labels for details.
Serenade Max (<i>Bacillus subtilis</i> strain QST 713)	NC	3 lb		0	Pink rot (<i>Sclerotinia</i>)	Begin application approx. 8 wks prior to harvest and repeat on 14 day interval. Direct spray at base of plants and surrounding soil surface.
Soilgard 12G (<i>Gliocladium virens</i> strain GL-21)	NC				Damping off Root diseases	See label for details.
Sonata (<i>Bacillus pumilis</i> strain QST 2808)	NC	4 qt		0	Powdery mildew	For suppression or use as a preventative in a program with other registered fungicides.
Sporatec (Clove oil, Rosemary oil, and Thyme oil)	NC	1.5 qt		0	Powdery mildew	Sporatec is a concentrated oil-based product. It requires the use of an approved adjuvant to improve spreading and sticking. OMRI listed.
Trilogy (Neem oil)	NC	2 gal				Apply at a rate of 0.5% - 1.0% in 25 to 100 gall water/acre or at 2 pt in a minimum of 5 GPA for low volume appls.

Table 13. Parsley fungicides and other disease management products.

Chemical	Fungicide Group	Max Rate / Acre		Min. Days to Harvest	Pertinent Diseases or Pathogens	Remarks
		Application	Season			
Copper fungicides (See individual labels) including: Badge SC, Badge X2, Basic Copper 53, C-O-C-S WDG, Champ DP, Champ WG, Champ Formula 2, Champ WP, COC DF, COC WP, Copper Count N, Cueva, Cuprofix Ultra, Kentan DF, Kocide DF, Kocide 101, Kocide 2000, Kocide 3000, Kocide 4.5 LF, Nordox 75 WG, NuCop 50WP, NuCop 3L, NuCop HB, NuCop DF, Stretch	M1	-	-	1	Bacterial blight	
Sulfur fungicides (See individual labels) including: Sulfur 90W, Super Six, Top Cop w/ Sulfur	M2	-	-	1	Powdery mildew	Do not apply during periods of warm weather. Do not apply within 2 weeks of an oil spray.
Procure 480SC (triflumizole)	3	8 fl oz	18 fl oz	0	Alternaria Powdery mildew	Repeat applications at 14 day intervals.
Apron XL LS (mefenoxam)	4	0.64 fl. oz./ 100 lb seed			Pythium seedling blight	Seed treatment only.
Metastar 2E AG (metalaxyl)	4	8 pt			Pythium seedling blight	Apply as a broadcast soil applica- tion and incorporate into top 2 inches. See label for directions.
Ridomil Gold EC (mefenoxam)	4	2 pt			Pythium seedling diseases	Apply at seeding in a 7-12" band on soil over seed furrow.
Ridomil Gold GR (mefenoxam)	4	40 lb			Pythium seedling diseases	See label for specifics regarding preplant incorporated applications and surface applications at the time of planting.
Ultra Flourish (mefenoxam)	4	4 pt			Pythium seedling diseases	See label for specifics regarding preplant incorporated applications and surface applications at the time of planting.
Switch 62.5WDG (cyprodinil/fludioxonil)	9 & 12	14 oz	56 oz	7	Alternaria Powdery mildew	See label.
Tilt 3.6E (propiconazole)	3	4 fl oz	16 fl oz	14	Alternaria Powdery mildew Septoria	Do not exceed 2 sequential and 4 total applications.
Cabrio EG (pyraclostrobin)	11	16 oz	64 oz	0	Various (see label)	Do not exceed 2 sequential and 4 total appls. of Cabrio or other QoI fungicides.
Heritage (azoxystrobin)	11	10.5 oz	4 lb	0	Various (see label)	Do not apply more than 2 sequen- tial applications without alternat- ing to a fungicide of dissimilar mode of action.
Quadris (azoxystrobin)	11	15.4 fl oz or 0.8 fl oz/ 1000 row ft	2.88 qt	0	Various (see label)	Do not exceed 1 sequential and 4 total appl. of Quadris or other QoI fungicides. See label for soil applications.

Table 13. Continued.

Chemical	Fungicide Group	Max Rate / Acre		Min. Days to Harvest	Pertinent Diseases or Pathogens	Remarks
		Application	Season			
Reason (fenamidone)	11	8.2 fl oz	24.6 fl oz	2	Various (see label)	Alternate every other application with a fungicide of dissimilar mode of action.
Maxim 4FS (fludioxonil)	12	0.16 fl oz/ 100 lb of seed			Various seedling diseases	Seed treatment only.
Sebring 2.65ST (metalaxyl)	4	0.75 fl oz/ 100 lb of seed			Pythium damping off	Seed treatment only.
Tanos (cymoxanil/famoxadone)	27 & 11	8 oz	72 oz	3		Do not alternate or tank mix with another FRAC group 11 fungicide.
Aliette WDG (fosetyl-Al)	33	5 lb	35 lb		Damping off	Caution should be used when applying in a management program including copper fungicides.
Legion 80WDG (fosetyl-Al)	33	5 lb	35 lb		Damping off	Caution should be used when applying in a management program including copper fungicides.
Linebacker WDG (fosetyl-Al)	33	5 lb	35 lb		Damping off	Caution should be used when applying in a management program including copper fungicides.
Mono- and di-Potassium salts of phosphorous acid (See individual labels) including: Alude, Fosphite, Fungi-Phite, Prophyt, Phostrol, Rampart, Reveille, Topaz (potassium phosphite) Phorcephite (potassium phosphate/Potassium phosphite)	33	-	-		<i>Pythium</i> , <i>Rhizoctonia</i> , <i>Fusarium</i>	Caution should be used when applying in a management program including copper fungicides. See label for foliar, root dip and irrigation application details.
Revus (mandipropamid)	40	8 fl oz	32 fl oz	1	Downy mildew	Do not exceed 2 sequential applications. See label for soil applications.
Presidio (fluopicolide)	43	3-4 fl oz	12 fl oz	2	Downy mildew	Must be tank-mixed with a fungicide of different mode of action. Do not exceed two sequential applications. See label for soil applications.
Regalia (extract of <i>Reynoutria sachalinensis</i>)	P	1% v/v	12 qt	7	Bacterial blight	Begin applications preventatively. Spray volumes should be 50-100 GPA.
Actinovate AG (<i>Streptomyces lydicus</i>)	NC	12 oz	12 oz	0	Alternaria Antracnose Botrytis Fusarium Pythium Phytophthora Rhizoctonia Sclerotinia Verticillium	Apply to soil through irrigation, as a seed treatment, to foliage as a spray. See label for details.

Table 13. Continued.

Chemical	Fungicide Group	Max Rate / Acre		Min. Days to Harvest	Pertinent Diseases or Pathogens	Remarks
		Application	Season			
Companion L (<i>Bacillus subtilis</i> GB03)	NC	1 gal		0	Alternaria Damping off Botrytis Fusarium Powdery Mildew Pythium Rhizoctonia Sclerotinia	Can be applied in field, greenhouse, or hydroponically. See label for details.
Kaligreen (potassium bicarbonate)	NC	3 lb		1	Powdery mildew	Apply in a minimum spray volume of 25 GPA.
NutraPic (Chloropicrin)		500 lb			Soilborne fungi Nematodes	DANGER. Soil fumigant. Restricted use pesticide. See label for details.
Oxidate (hydrogen dioxide)	NC	1:100 dilution		0	Various (see label)	See label for details.
RootShield Granules (<i>Trichoderma harzianum</i> Rifai strain KRL-22)	NC	12 lb/A field 1.5 lb/Cu Yd greenhouse			Damping off	Apply in-furrow in field or incorporate in soil mix for greenhouse. See label for details.
PlantShield HC (<i>Trichoderma harzianum</i> Rifai strain KRL-22)	NC	5 oz		0	Damping off	Apply in-furrow or in transplant starter solution.
Rhapsody (<i>Bacillus subtilis</i> strain QST 713)	NC	6 qt		0	Powdery mildew Sclerotinia	For suppression or use in a preventative program with other fungicides.
Serenade Max (<i>Bacillus subtilis</i> strain QST 713)	NC	3 lb		0	Powdery mildew Sclerotinia	For suppression or use in a preventative program with other fungicides.
Soilgard 12G (<i>Gliocladium virens</i> strain GL-21)	NC				Damping off Root diseases	See label for details.
Sonata (<i>Bacillus pumilis</i> strain QST 2808)	NC	4 qt		0	Powdery mildew	For suppression or use as a preventative in a program with other registered fungicides.
Sporatec (clove oil, rosemary oil, and thyme oil)	NC	1.5 qt		0	Powdery mildew	Sporatec is a concentrated oil-based product. It requires the use of an approved adjuvant to improve spreading and sticking. OMRI listed
Trilogy (Neem oil)	NC	2 gal				Apply at a rate of 0.5% - 1.0% in 25 to 100 gall water/acre or at 2 pt in a minimum of 5 GPA for low volume appls.

Table 14. Selected insecticides approved for use on insects attacking carrots and garden beets.

Chemical	Rate (product/acre)	REI (hours)	Days to Harvest	Insects	MOA Code ¹	Notes
Admire Pro (imidacloprid)	4.4-10.5 fl oz	12	21	aphids, flea beetles, leafhoppers, whiteflies	4A	Limited to one soil application. Leaves may be used for food.
Agree WG (<i>Bacillus thuringiensis</i> subspecies <i>aizawai</i>)	0.5-2.0 lb	4	0	lepidopteran larvae (caterpillar pests)	11	Apply when larvae are small for best control. Leaves and roots. OMRI-listed .
*Asana XL (0.66EC) (esfenvalerate)	5.8-9.6 fl oz	12	7	aster leafhopper, cutworms, leafhoppers, carrot weevil	3	Do not apply more than 0.5 lb ai/acre per season. Not for use on beets.
Aza-Direct (azadirachtin)	1-2 pts, (max 3.5 pts)	4	0	aphids, beetles, caterpillars, leafhoppers, leafminers, miters, stink bugs, thrips, weevils, whiteflies	un	Antifeedant, repellent, insect growth regulator. OMRI-listed .
Azatin XL (azadirachtin)	5-21 fl oz	4	0	aphids, beetles, caterpillars, leafhoppers, leafminers, thrips, weevils, whiteflies	un	Antifeedant, repellent, insect growth regulator.
*Baythroid XL (beta-cyfluthrin)	1.6-2.8 fl oz	12	0	aster leafhopper, carrot weevil, cutworms, potato leafhopper	3	Do not exceed 14 oz/acre per season.
Beleaf 50 SG (flonicamid)	2.0-2.8 oz	12	3	aphids, plant bugs	9C	Do not apply more than 3 times at high rate.
Biobit HP (<i>Bacillus thuringiensis</i> subspecies <i>kurstaki</i>)	0.5-2.0 lb	4	0	caterpillars (will not control large armyworms)	11	Treat when larvae are young. Good coverage is essential. Can be used in the greenhouse. OMRI-listed .
BotaniGard 22 WP, ES (<i>Beauveria bassiana</i>)	WP: 0.5-2 lb/100 gal ES: 0.5-2 qts/100 gal	4	0	aphids, thrips, whiteflies	--	May be used in greenhouses. Contact dealer for recommendations if an adjuvant must be used. Not compatible in tank mix with fungicides.
*Brigade 2EC (bifenthrin)	5.12-6.4 fl oz	12	21 – carrots, 1 – beets	aphids, beet armyworm, celery leaf-tier, corn earworm, cutworms, fall armyworm, fire ants, flea beetles, loopers, southern armyworm, spider mites, yellowstriped armyworm, whitefly	3	Do not apply more than 0.5 lb ai/acre per season for carrots or 0.4 lb ai/acre per season for beets. Apply no more than once every seven days
Crymax WDG (<i>Bacillus thuringiensis</i> subspecies <i>kurstaki</i>)	0.5-2.0 lb	4	0	caterpillars	11	Use high rate for armyworms. Treat when larvae are young.
Deliver (<i>Bacillus thuringiensis</i> subspecies <i>kurstaki</i>)	0.25-1.5 lb	4	0	caterpillars	11	Use higher rates for armyworms. OMRI-listed .
*Diazinon AG500, *50W (diazinon)	AG500: 1-4 qt 50W: 2-8 lb	72	preplant	cutworms, mole crickets, wireworms	1B	Do not make more than on application per year.
DiPel DF (<i>Bacillus thuringiensis</i> subspecies <i>kurstaki</i>)	0.5-2.0 lb	4	0	caterpillars	11	Treat when larvae are young. Good coverage is essential. OMRI-listed .

Table 14. Continued.

Chemical	Rate (product/acre)	REI (hours)	Days to Harvest	Insects	MOA Code ¹	Notes
Entrust (spinosad)	1-2 oz	4	3	armyworms, dipteran leafminers, flea beetle, loopers, thrips	5	Do not apply more than a total of 7 oz/acre per crop or apply more than 4 times. OMRI-listed .
Intrepid 2F (methoxyfenozide)	6-16 fl oz	4	14	armyworms, loopers, saltmarsh caterpillar, webworms	18	Do not apply more than 64 fl oz per acre per season.
Javelin WG (<i>Bacillus thuringiensis</i> subspecies <i>kurstaki</i>)	0.12-1.50 lb	4	0	most caterpillars, but not <i>Spodoptera</i> species (armyworms)	11	Treat when larvae are young. Thorough coverage is essential. OMRI-listed .
*Lannate LV, *SP (methomyl)	LV: 0.75-3.0 pts SP: 0.25-1.0 lb	48	1—carrots 0—beets, roots 10—beets, tops	armyworms, aster leafhopper, beet armyworm, variegated cutworm	1A	Carrots: Do not apply more than 21 pt LV or 7 lb SP per acre per crop. Garden beets: Do not apply more than 12 pt LV or 4 lb SP per acre per crop.
Malathion 8F (malathion)	2.5 pt	12	7	aphids, beet armyworm, blister beetles, flea beetles	1B	Beets only.
M-Pede (potassium salts of fatty acids)	1-2% V/V	12	0	leafminers, aphids, thrips, whiteflies	--	OMRI-listed .
*Mustang (zeta-cypermethrin)	1.4-4.3 oz	12	1	cabbage looper, cucumber beetles, cutworms, flea beetles, grasshoppers, leafhoppers, tarnished plant bug, vegetable weevil, whitefringed beetle (adult), yellowstriped armyworm; aids in control of aphids and beet armyworm	3	A maximum of 0.3 lb ai/acre per season may be applied. Leaves cannot be used for food or feed.
Neemix 4.5 (azadirachtin)	4-16 fl oz	12	0	aphids, armyworms, cabbage looper, cutworms, leafminers, whiteflies	un	Acts as IGR and feeding repellent. OMRI-listed .
Platinum 75SG (thiamethoxam)	5.0-12.0 fl oz 1.7-4.0 oz	12	at planting	aphids, flea beetles, leafhoppers, whiteflies	4A	Do not exceed 12 oz Platinum or 4.0 oz 75SG per acre per season.
Provado 1.6F (imidacloprid)	3.5 oz	12	7	aphids, flea beetles, leafhoppers, whiteflies	4A	Maximum of 3 applications or 10.5 fl oz/acre per season. Tops or greens may be used for food.
Pyrellin EC (pyrethrins + rotenone)	1-2 pt	12	12 hours	aphids, flea beetles, leafhoppers, leafminers, Lygus bug, mites, plant bugs, stink bugs, thrips, vegetable weevil, whiteflies	3, 21	
Pyronyl Crop Spray (pyrethrins + piperonyl butoxide)	1-12 fl oz	12	0	ants, aphids, armyworms, cabbage looper, corn earworm, crickets, flea beetles, leafhoppers, thrips, whiteflies	3	
Radiant (spinetoram)	6-8 fl oz	4	3	armyworms, dipterous leafminers, loopers, thrips	5	Maximum of 4 applications per year.
Sevin 80S; XLR; 4F (carbaryl)	80S: 0.63-2.5 lb XLR, 4F: 0.5-2 qt	12	7	armyworms, aster leafhopper, corn earworm, cutworms, fall armyworm, flea beetles, leafhoppers, Lygus bug, spittlebugs, stink bugs, tarnished plant bug	1A	Highly toxic to bees. Repeat applications, as needed up to 6 times, at least 7 days apart.

Table 14. Continued.

Chemical	Rate (product/acre)	REI (hours)	Days to Harvest	Insects	MOA Code ¹	Notes
SpinTor 2SC (spinosad)	3-6 fl oz-carrot 3.0-10.0 fl oz-beet	4	3	armyworms, flea beetles, leafminers, loopers, thrips	5	Do not apply more than 21 oz per acre per crop. Limited to 4 applications per year.
*Telone C-35 (dichloropropene + chloropicrin)	See label	5 days - See label	preplant	symphylans, wireworms	--	See supplemental label for use restriction in south and central Florida.
*Telone II (dichloropropene)						
*Thionex 3EC (endosulfan)	0.66-1.33 qt	48	7	armyworms, flea beetles, green peach aphid, leafhoppers, whiteflies	2	Carrots only. Do not make more than 1 application per season. Do not use tops for food or feed.
No label available online in 2010.						
Trilogy (extract of neem oil)	0.5-2.0% V/V	4	0	aphids, mites, suppression of thrips and whiteflies	un	Apply morning or evening to reduce potential for leaf burn. Toxic to bees exposed to direct treatment. OMRI-listed.
Xentari DF (<i>Bacillus thuringiensis</i> subspecies <i>aizawai</i>)	0.5-2.0 lb	4	0	caterpillars	11	Treat when larvae are young. Thorough coverage is essential. May be used in the greenhouse. Can be used in organic production.

The pesticide information presented in this table was current with federal and state regulations at the time of revision. The user is responsible for determining the intended use is consistent with the label of the product being used. Use pesticides safely. Read and follow label instructions.

Mode of Action codes for vegetable pest insecticides from the Insecticide Resistance Action Committee (IRAC) Mode of Action Classification v. 6.1 August 2008.

- 1A. Acetyl cholinesterase inhibitors, Carbamates (nerve action)
- 1B. Acetyl cholinesterase inhibitors, Organophosphates (nerve action)
- 2A. GABA-gated chloride channel antagonists (nerve action)
3. Sodium channel modulators (nerve action)
- 4A. Nicotinic acetylcholine receptor agonists (nerve action)
5. Nicotinic acetylcholine receptor allosteric activators (nerve action)
6. Chloride channel activators (nerve and muscle action)
- 7A. Juvenile hormone mimics (growth regulation)
- 7C. Juvenile hormone mimics (growth regulation)
- 9B and 9C. Selective homopteran feeding blockers
10. Mite growth inhibitors (growth regulation)
11. Microbial disruptors of insect midgut membranes
- 12B. Inhibitors of mitochondrial ATP synthase (energy metabolism)
15. Inhibitors of chitin biosynthesis, type 0, lepidopteran (growth regulation)
16. Inhibitors of chitin biosynthesis, type 1, homopteran (growth regulation)
17. Molting disruptor, dipteran (growth regulation)
18. Ecdysone receptor agonists (growth regulation)
22. Voltage-dependent sodium channel blockers (nerve action)
23. Inhibitors of acetyl Co-A carboxylase (lipid synthesis, growth regulation)
28. Ryanodine receptor modulators (nerve and muscle action)
- un. Compounds of unknown or uncertain mode of action

OMRI-listed: Listed by the Organic Materials Review Institute for use in organic production.

* Restricted Use Pesticide

Table 15. Insecticides approved for use on insects attacking celery.

Trade Name (Common Name)	Rate (product/acre)	REI (hours)	Days to Harvest	Insects	MOA Code ¹	Notes
Actara (thiamethoxam)	1.5-5.5 oz	12	7	aphids, flea beetles, leafhoppers, whiteflies	4A	Do not use if other 4A insecticides have been or will be used.
Admire Pro (imidacloprid)	4.4-10.5 fl oz	12	45	aphids, leafhoppers, whiteflies, foliage feeding thrips	4A	Do not apply more than 0.38 lb ai per acre per year.
Agree WG (<i>Bacillus thuringiensis</i> subspecies <i>aizawa</i>)	0.5-2.0 lb	4	0	lepidopteran larvae (caterpillar pests)	11	Apply when larvae are small for best control. OMRI-listed .
*Agri-Mek 0.15 EC (abamectin)	8-16 fl oz	12	7	<i>Liriomyza</i> leafminers, spider mites	6	Do not make more than 2 sequential applications after transplanting.
*Ambush 25W (permethrin)	6.4-12.8 oz	12	1	beet armyworm, cabbage looper, corn earworm, cutworms, fall armyworm, leafminers	3	Do not apply more than 128 oz/acre per season.
Assail 70WP (acetamiprid)	0.8-1.7 oz	12	7	aphids, whiteflies	4A	Begin applications for whiteflies when first adults are noticed. Do not apply more than 5 times per season or apply more often than every 7 days.
Assail 30 SG	2.0-4.0 oz					
Avaunt (indoxacarb)	2.5-6.0 oz	12	3	beet armyworm, cabbage looper,	22	Do not apply more than 14 ounces of product per acre per crop.
Aza-Direct (azadirachtin)	1-2 pts, up to 3.5 pts	4	0		un	Antifeedant, repellent, insect growth regulator. OMRI-listed .
Azatin XL (azadirachtin)	5-21 fl oz	4	0	aphids, beetles, caterpillars, leafhoppers, leafminers, thrips, weevils, whiteflies	un	Antifeedant, repellent, insect growth regulator.
*Baythroid XL (beta-cyfluthrin)	0.8-3.2 fl oz	12	0	beet armyworm (1 and 2 instars), cabbage looper, corn earworm, cutworms, flea beetles, grasshoppers, potato leafhopper, saltmarsh caterpillar, thrips, vegetable weevil, yellowstriped armyworm, suppression of adult whitefly	3	Maximum of 12.8 fl oz per acre per season.
Belay 50 WDG (clothianidin)	1.6-2.1 oz	12	7	aphids, flea beetles, leafhoppers, leafminers (suppression), whiteflies (suppression)	4A	Do not apply more than 6.4 oz per acre per season. Do not use an adjuvant. Toxic to bees.
Belay 50 WDG (clothianidin)	4.8 -6.4 oz (soil application)	12	Apply at planting	aphids, flea beetles, leafhoppers, leafminers (suppression), whiteflies (suppression)	4A	Do not apply more than 6.4 oz per acre per season. See label for application instructions.
Beleaf 50 SG (flonicamid)	2.0-2.8 oz	12	0	aphids, plant bugs	9C	Do not apply more than 8.4 oz/acre per season. Begin applications before pests reach damaging levels.
Biobit HP (<i>Bacillus thuringiensis</i> subspecies <i>kurstaki</i>)	0.5-2.0 lb	4	0	caterpillars (will not control large armyworms)	11	Treat when larvae are young. Good coverage is essential. Can be used in the greenhouse. OMRI-listed .
BotaniGard 22 WP, ES (<i>Beauveria bassiana</i>)	WP:0.5-2 lb/100 gal ES:0.5-2 qts/100 gal	4	0	aphids, thrips, whiteflies	--	May be used in greenhouses. Contact dealer for recommendations if an adjuvant must be used. Not compatible in tank mix with fungicides.
Confirm 2F (tebufenozide)	6.0-8.0 fl oz	4	7	armyworms, cabbage looper, garden webworm	18	Do not exceed 56 ounces of product per acre per season.
Coragen (rynaxypyr)	3.5-7.5 fl oz	4	1	beet armyworm, cabbage looper, corn earworm, leafminers, suppression of whitefly nymphs	28	May be applied via drip chemigation in addition to foliar and various soil application methods.

Table 15. Continued.

Trade Name (Common Name)	Rate (product/acre)	REI (hours)	Days to Harvest	Insects	MOA Code ¹	Notes
Courier 40SC (buprofezin)	9.0-13.6 fl oz	12	7	leafhoppers, planthoppers, whiteflies	16	Do not make more than 2 applications per crop cycle. IGR targets immatures.
Crymax WDG (<i>Bacillus thuringiensis</i> subspe- cies <i>kurstaki</i>)	0.5-2.0 lb	4	0	caterpillars	11	Use high rate for armyworms. Treat when larvae are young.
Deliver (<i>Bacillus thuringiensis</i> subspe- cies <i>kurstaki</i>)	0.25-1.5 lb	4	0	caterpillars	11	Use higher rates for armyworms. OMRI-listed .
Dimethoate 4EC (dimethoate)	1 pt	48	7	leafminers, mites	1B	Use ground equipment. Florida only.
DiPel DF (<i>Bacillus thuringiensis</i> subspe- cies <i>kurstaki</i>)	0.5-2.0 lb	4	0	caterpillars	11	Treat when larvae are young. Good coverage is essential. OMRI-listed .
Durivo (thiamethoxam, chlorantraniliprole)	10.0-13.0 fl oz	12	30	aphids, beet armyworm, cab- bage looper, corn earworm, fall armyworm, flea beetles, leafhoppers, whiteflies	4A, 28	Do not exceed more than 13 fl oz per acre per season.
Entrust (spinosad)	0.5-3 oz	4	1	armyworms, cabbage looper, leafminers, thrips	5	See label for resistance management recommendations. Apply no more than 9 oz per acre per year. OMRI-listed .
Extinguish (S)-methoprene)	1-1.5 lb	4	0	fire ants	7A	Slow-acting IGR (insect growth regula- tor). Best applied early spring and fall where crop will be grown. Colonies will be reduced after three weeks and eliminated after 8 to 10 weeks. May be applied by ground equipment or aerially.
Fulfill (pymetrozine)	2.75 oz	12	7	aphids, suppression of whiteflies	9B	Apply when aphids first appear, before populations build to damaging levels. Two applications (maximum allowed) may be needed to control persistent aphid populations.
Intrepid 2F (methoxyfenozide)	4-10 fl oz	4	1	armyworms, cabbage looper, webworms	18	Do not apply more than 64 fl oz per acre per season.
Javelin WG (<i>Bacillus thuringiensis</i> subspe- cies <i>kurstaki</i>)	0.12-1.5 lb	4	0	most caterpillars, but not Spodoptera species (army- worms)	11	Treat when larvae are young. Thorough coverage is essential. OMRI-listed .
*Lannate LV, *SP (methomyl)	LV: 0.75-3 pt SP: 0.25-1.0 lb	48	7	armyworms, aster leafhop- per, beet armyworm, loop- ers, variegated cutworm	1A	Do not apply more than 24 pt of LV or 8 lb SP per acre per season.
*Larvin 3.2 (thiodi- carb)	16-30 fl oz	48	14	armyworms, beet army- worm, cabbage looper, corn earworm, fall armyworm, southern armyworm	1A	Do not exceed 60 fluid ounces of Larvin per acre per season.
Lepinox WDG (<i>Bacillus thuringiensis</i> subspe- cies <i>kurstaki</i>)	1.0-2.0 lb	12	0	most caterpillars, including beet armyworm (see label)	11	Treat when larvae are small. Thorough coverage is essential.
Malathion 8F (malathion)	1-1.5 pt	12	7	aphids, mites	1B	
Movento (spirotetra- mat)	4.0-5.0 fl oz	24	3	aphids, whiteflies	23	Do not apply more than 10 fl oz/acre/ crop.

Table 15. Continued.

Trade Name (Common Name)	Rate (product/acre)	REI (hours)	Days to Harvest	Insects	MOA Code ¹	Notes
M-Pede 49% EC (Soap, insecticidal)	1-2% V/V	12	0	whiteflies	--	OMRI-listed .
*Mustang (zeta-cypermethrin)	2.4-4.3 oz	12	1	corn earworm, cucumber beetles, cutworms, flea beetles, leafhoppers, salt-marsh caterpillar, tobacco budworm, aphids, whiteflies, armyworms, ground beetles, crickets, loopers, <i>Lygus</i> bugs, stink bugs, wireworm adults	3	A maximum of 0.3 lb ai/acre per season may be applied. Do not make applications less than 7 days apart.
Neemix 4.5 EC (azadirachtin)	4-16 fl oz	12	0	aphids, armyworms, cabbage looper, cutworms, leafminers, webworms, whiteflies	un	IGR and feeding repellent. OMRI-listed .
Orthene 75S, 97 (acephate)	75S: 0.67-1.33 lb 97: 0.5-1.0 lb	24	21	cabbage looper, fall armyworm, green peach aphid	1B	Do not use more than 2 lb active ingredient per acre per season.
PlatinumPlatinum 75SG (thiamethoxam)	5.0-11.0 fl oz 1.66-3.67 oz	12	30	aphids, flea beetles, leafhoppers, leafminers (suppression), whiteflies	4A	Maximum = 11 oz/acre or 3.67 oz/acre (75SG) per season. Do not use in conjunction with other 4A insecticides.
*Pounce 25 WP (permethrin)	3.2-12.8 oz	12	1	aphids, beet armyworm, cabbage looper, corn earworm, cutworms, fall armyworm, leafhoppers, leafminers, loopers, southern armyworm, tobacco budworm	3	Do not apply more than 1.0 lb active ingredient per acre per season.
*Proclaim (emamectin benzoate)	2.4-4.8 oz	12	7	beet armyworm, corn earworm, fall armyworm, <i>Liriomyza</i> leafminers, loopers, tobacco budworm	6	Provides suppression of leafminers. Rotate with other products with different modes of action.
Pyrellin EC (pyrethrins + rotenone)	1-2 pt	12	12 hours	aphids, leafhoppers, leafminers, leaftiers, loopers, <i>Lygus</i> bug, mites, plant bugs, stink bugs, whiteflies	3, 21	
Pyronyl Crop Spray (pyrethrins + piperonyl butoxide)	1-12 fl oz	12	0	ants, aphids, armyworms, cabbage looper, corn earworm, flea beetles, leafhoppers, leaftiers, webworms, whiteflies	3	
Radiant (spinetoram)	5-10 fl oz	4	1	armyworms (not yellow-striped), cabbage looper, corn earworm, <i>Liriomyza</i> leafminer, thrips	5	Maximum of 6 applications, no more than 2 consecutive applications before rotating to another MOA.
Sevin XLR; 4F; 80S (carbaryl)	XLR; 4F: 0.5-2 qt 80S: 0.03-2.5	12	14	armyworms, aster leafhopper, corn earworm, fall armyworm, flea beetles, leafhoppers, <i>Lygus</i> bug, spittlebugs, stink bugs, tarnished plant bug	1A	Repeat, as needed, up to 5 times, with at least 7 days between applications.
SpinTor 2SC (spinosad)	1.5-10 fl oz	4	1	armyworms, cabbage looper, leafminers (<i>Liriomyza</i> spp.), thrips	5	Control of leafminers and thrips may be improved by use of an adjuvant.

Table 15. Continued.

Trade Name (Common Name)	Rate (product/acre)	REI (hours)	Days to Harvest	Insects	MOA Code ¹	Notes
SunSpray 98.8%, JMS Stylet-Oil, Saf- T-side, others (Oils, insecticidal)	3-6 qt/100 gal (JMS)1-2 gal/100 gal	4	0	aphids, beetle larvae, leaf- hoppers, leafminers, mites, thrips, whiteflies (pests con- trolled vary by product)	--	See label for cautions on tank mixes. Organic Stylet-Oil and Saf-T-Side are OMRI-listed .
Synapse WG (flubendiamide)	2.0-3.0 oz	12	1	armyworms, loopers	28	Do not apply more than 9.0 oz/acre per season.
*Telone C-35 (dichlo- ropropene + chloro- picrin)	See label	5 days - See label	preplant	symphylans, wireworms	--	See supplemental label for use restric- tions in south or central Florida.
*Telone II (dichloropropene)						
Thionex 50W (endosulfan)	1-2 lb	96	4 or 7	armyworms, cabbage looper, flea beetles, green peach aphid, leafhoppers, whiteflies	2	If two applications at lowest rate used against aphids, then PHI is 7 days.
Trigard (cyromazine)	2.66 oz	12	7	leafminers	17	Do not make more than six applica- tions per crop.
Trilogy (extract of neem oil)	0.5-2.0% V/V	4	0	aphids, mites, suppression of thrips and whiteflies	un	Apply morning or evening to reduce potential for leaf burn. Toxic to bees exposed to direct treatment. OMRI- listed .
Venom Insecticide (dinotefuran)	foliar: 1-3 ozsoil: 5-6 oz	12	7	leafhoppers, leafminers, whiteflies	4A	Do not apply more than 6 oz per acre per season (foliar) or 12 oz per acre per season (soil). Do not use both methods of application.
Vetica (flubendiamide and buprofezin)	12.0-17.0 fl oz	12	7	armyworms, cabbage looper, corn earworm, cutworms, green cloverworm, imported cabbageworm, suppres- sion of leafhoppers, salt- marsh caterpillar, tobacco budworm, suppression of whitefly	28, 16	Do not apply more than three times per season or apply more than 38 fl oz per acre per season. Same active ingredi- ents as Synapse, Coragen, and Courier.
Voliam Flexi (thiamethoxam, chlorantraniliprole)	4.0-7.0 oz	12	7	aphids, beet armyworm, cab- bage looper, corn earworm, fall armyworm, flea beetles, leafhoppers, southern army- worm, tobacco budworm, whiteflies	4A, 28	Do not apply more than 14 oz per acre per growing season. An adjuvant may be used when applying to celery.
*Vydate L (oxamyl)	2-4 pt	48	21	leafminers (except <i>Liriomyza</i> <i>trifolii</i>)	1A	

The pesticide information presented in this table was current with federal and state regulations at the time of revision. The user is responsible for determining the intended use is consistent with the label of the product being used. Use pesticides safely. Read and follow label instructions.

Table 15. Continued.

Trade Name (Common Name)	Rate (product/acre)	REI (hours)	Days to Harvest	Insects	MOA Code ¹	Notes
¹ Mode of Action codes for vegetable pest insecticides from the Insecticide Resistance Action Committee (IRAC) Mode of Action Classification v. 6.1 August 2008.						
1A. Acetyl cholinesterase inhibitors, Carbamates (nerve action)						
1B. Acetyl cholinesterase inhibitors, Organophosphates (nerve action)						
2A. GABA-gated chloride channel antagonists (nerve action)						
3. Sodium channel modulators (nerve action)						
4A. Nicotinic acetylcholine receptor agonists (nerve action)						
5. Nicotinic acetylcholine receptor allosteric activators (nerve action)						
6. Chloride channel activators (nerve and muscle action)						
7A. Juvenile hormone mimics (growth regulation)						
7C. Juvenile hormone mimics (growth regulation)						
9B and 9C. Selective homopteran feeding blockers						
10. Mite growth inhibitors (growth regulation)						
11. Microbial disruptors of insect midgut membranes						
12B. Inhibitors of mitochondrial ATP synthase (energy metabolism)						
15. Inhibitors of chitin biosynthesis, type 0, lepidopteran (growth regulation)						
16. Inhibitors of chitin biosynthesis, type 1, homopteran (growth regulation)						
17. Molting disruptor, dipteran (growth regulation)						
18. Ecdysone receptor agonists (growth regulation)						
22. Voltage-dependent sodium channel blockers (nerve action)						
23. Inhibitors of acetyl Co-A carboxylase (lipid synthesis, growth regulation)						
28. Ryanodine receptor modulators (nerve and muscle action)						
un. Compounds of unknown or uncertain mode of action						
² OMRI-listed: Listed by the Organic Materials Review Institute for use in organic production.						
* Restricted Use Pesticide						

Table 16. Selected insecticides approved for use on insects attacking parsley.

Trade Name (Common Name)	Rate (product/acre)	REI (hours)	Days to Harvest	Insects	MOA Code ¹	Notes
Actara (thiamethoxam)	1.5-5.5 oz	12	7	aphids, flea beetles, leafhoppers, whiteflies	4A	Do not use if other 4A insecticides have been or will be used.
Admire Pro (imidacloprid)	4.4-10.5 fl oz	12	21	aphids, leafhoppers, thrips (foliage feeders), whiteflies	4A	Limited to 0.38 lb ai per acre per season.
Agree WG (<i>Bacillus thuringiensis</i> subspecies <i>aizawai</i>)	0.5-2.0 lb	4	0	lepidopteran larvae (caterpillar pests)	11	Apply when larvae are small for best control. OMRI-listed ² .
*Agri-Mek 0.15 EC (abamectin)	8-16 fl oz	12	7	<i>Liriomyza</i> leafminers, spider mites	6	No more than 2 sequential applications. Maximum of 48 oz per acre per season.
*Ambush 25W (permethrin)	6.4-12.8 oz	12	1	beet armyworm, cabbage looper, corn earworm, cutworms, fall armyworm, leafhoppers, vegetable leafminer	3	Do not apply more than 2 lb ai/acre per season.
Assail 70WP (acetamiprid)	0.8-1.7 oz	12	7	aphids, whiteflies	4A	Begin applications for whiteflies when first adults are noticed. Do not apply more than 5 times per season or apply more often than every 7 days.
Assail 30 SG	2.0-4.0 oz					
Avaunt (indoxacarb)	2.5-6.0 oz	12	3	beet armyworm, cabbage looper, corn earworm	22	Do not apply more than 24 ounces of product per acre per crop.
Aza-Direct (azadirachtin)	1-2 pts, to 3.5 pts if needed	4	0	aphids, beetles, caterpillars, leafhoppers, leafminers, mites, stink bugs, thrips, weevils, whiteflies	un	Antifeedant, repellent, insect growth regulator. OMRI-listed ² .
Azatin XL (azadirachtin)	5-21 fl oz	4	0	aphids, beetles, caterpillars, leafhoppers, leafminers, thrips, weevils, whiteflies	un	Antifeedant, repellent, insect growth regulator.
*Baythroid XL (beta-cyfluthrin)	0.8-3.2 fl oz	12	0	beet armyworm (1 st and 2 nd instars), cabbage looper, corn earworm, cutworms, flea beetles, grasshoppers, potato leafhopper, saltmarsh caterpillar, thrips, vegetable weevil, yellowstriped armyworm, suppression of adult whitefly	3	Maximum of 12.8 fl oz per acre per season.
Belay 50 WDG (clothianidin)	1.6-2.1 oz	12	7	aphids, flea beetles, leafhoppers, leafminers (suppression), whiteflies (suppression)	4A	Do not apply more than 6.4 oz per acre per season. Do not use an adjuvant. Toxic to bees.
Belay 50 WDG (clothianidin)	4.8 -6.4 oz (soil application)	12	Apply at planting	aphids, flea beetles, leafhoppers, leafminers (suppression), whiteflies (suppression)	4A	Do not apply more than 6.4 oz per acre per season. See label for application instructions.
Beleaf 50 SG (flonicamid)	2.0-2.8 oz	12	0	aphids, plant bugs	9C	Do not apply more than 8.4 oz/acre per season. Begin applications before pests reach damaging levels.
Biobit HP (<i>Bacillus thuringiensis</i> subspecies <i>kurstaki</i>)	0.5-2.0 lb	4	0	caterpillars (will not control large armyworms)	11	Treat when larvae are young. Good coverage is essential. Can be used in the greenhouse. OMRI-listed ² .

Table 16. Continued.

Trade Name (Common Name)	Rate (product/acre)	REI (hours)	Days to Harvest	Insects	MOA Code ¹	Notes
BotaniGard 22 WP, ES (<i>Beauveria bassiana</i>)	WP: 0.5-2 lb/100 gal ES: 0.5-2 qts/100 gal	4	0	aphids, thrips, whiteflies	--	May be used in greenhouses. Contact dealer for recommendations if an adjuvant must be used. Not compatible in tank mix with fungicides.
Confirm 2F (tebufenozide)	6.0-8.0 fl oz	4	7	armyworms, cabbage looper, garden webworm	18	Do not exceed 56 ounces of product per acre per season.
Coragen (rynaxypyr)	3.5-7.5 fl oz	4	1	beet armyworm, cabbage looper, corn earworm, leafminers, suppression of whitefly nymphs	28	May be applied by drip chemigation, in addition to foliar and various soil application methods.
Courier 40SC (buprofezin)	9.0-13.6 fl oz	12	7	leafhoppers, planthoppers, whiteflies	16	Do not make more than 2 applications per crop cycle. IGR targets immatures.
Crymax WDG (<i>Bacillus thuringiensis</i> subspecies <i>kurstaki</i>)	0.5-2.0 lb	4	0	caterpillars	11	Use high rate for armyworms. Treat when larvae are young.
Deliver (<i>Bacillus thuringiensis</i> subspecies <i>kurstaki</i>)	0.25-1.5 lb	4	0	caterpillars	11	Use higher rates for armyworms. OMRI-listed ² .
DiPel DF (<i>Bacillus thuringiensis</i> subspecies <i>kurstaki</i>)	0.5-2.0 lb	4	0	caterpillars	11	Treat when larvae are young. Good coverage is essential.
Durivo (thiamethoxam, chlorantraniliprole)	10-13 oz	12	30	aphids, beet armyworm, cabbage looper, corn earworm, fall armyworm, flea beetles, imported cabbageworm, leafhoppers, whiteflies	4A, 28	May be applied by one of several soil application methods.
Entrust (spinosad)	0.5-3 oz	4	1	armyworms, cabbage looper, leafminers, thrips	5	Use no more than 9 oz per acre per crop. OMRI-listed ² .
Extinguish ((S)-methoprene)	1.0-1.5 lb	4	0	fire ants	7A	Slow-acting IGR (insect growth regulator). Best applied early spring and fall where crop will be grown. Colonies will be reduced after three weeks and eliminated after 8 to 10 weeks. May be applied by ground equipment or aerially.
Fulfill (pymetrozine)	2.75 oz	12	7	aphids, suppression of whiteflies	9B	Apply when aphids first appear, before populations build to damaging levels. Two applications (maximum allowed) may be needed to control persistent aphid populations.
Intrepid 2F (methoxyfenozide)	4-10 fl oz	4	1	armyworms, cabbage looper, webworms	18	Do not apply more than 64 fl oz per acre per season.
Javelin WG (<i>Bacillus thuringiensis</i> subspecies <i>kurstaki</i>)	0.12-1.5 lb	4	0	most caterpillars, but not <i>Spodoptera</i> species (armyworms)	11	Treat when larvae are young. Thorough coverage is essential. OMRI-listed ² .

Table 16. Continued.

Trade Name (Common Name)	Rate (product/acre)	REI (hours)	Days to Harvest	Insects	MOA Code ¹	Notes
*Lannate LV; *SP (methomyl)	LV: 1.5-3.0 pts SP: 0.5-1.0 lb	48	10	beet armyworm, cabbage looper	1A	Do not use more than 4 lb of SP, or 12 pt of LV per acre/ season.
*Larvin 3.2 (thiodicarb)	16-30 fl oz	48	14	armyworms, beet armyworm, cabbage looper, corn ear- worm, fall armyworm, south- ern armyworm	1A	Do not exceed 60 fl oz per acre per season.
Lepinox WDG (<i>Bacillus thuringiensis</i> subspecies <i>kurstaki</i>)	1.0-2.0 lb	12	0	for most caterpillars, including beet armyworm (see label)	11B2	Treat when larvae are small. Thorough coverage is essential.
Malathion 8 F (malathion)	1-2 pt	12	21	aphids	1B	
Movento (spirotetramat)	4.0-5.0 fl oz	24	3	aphids, whiteflies	23	Do not apply more than 10 fl oz/acre/crop.
M-Pede 49% EC (soap, insecticidal)	1-2% V/V	12	0	aphids, leafhoppers, mites, plant bugs, whiteflies	--	OMRI-listed ² .
*Mustang (zeta-cypermethrin)	2.4-4.3 oz	12	1	aphids, armyworms, corn earworm, crickets, cucum- ber beetles, cutworms, flea beetles, ground beetles, leafhoppers, loopers, <i>Lygus</i> bugs, saltmarsh caterpillar, stink bugs, tobacco budworm, whiteflies, wireworm adults	3	A maximum of 0.3 lb ai/acre per season may be applied. Do not make applications less than 7 days apart.
Neemix 4.5 (azadirachtin)	4-16 fl oz	12	0	aphids, armyworms, leafhop- pers, leafminers, loopers, whiteflies	un	IGR and feeding repellent. OMRI-listed ² .
Oberon 2SC (spiromesifen)	7.0-8.5 fl oz	12	7	whiteflies	23	Maximum amount per crop: 25.5 fl oz/acre. No more than three applications.
Platinum Platinum 75SG (thiamethoxam)	5.0-11 fl oz 1.66-3.67 oz	12	30	aphids, flea beetles, leafhop- pers, leafminers (suppres- sion), whiteflies	4A	Maximum = 11 oz/acre or 3.67 oz/acre (75SG) per season. Do not use in conjunction with other 4A insecticides.
*Pounce 25 WP (perme- thrin)	3.2-12.8 oz	12	1	aphids, armyworms, beet armyworm, cabbage looper, corn earworm, cutworms, fall armyworm, leafhoppers, loopers, southern armyworm, tobacco budworm, vegetable leafminer	3	Do not apply more than 1.0 lb ai/acre per season.
*Proclaim (emamectin benzoate)	2.4-4.8 oz	12	7	beet armyworm, corn ear- worm, fall armyworm, loop- ers, tobacco budworm, sup- pression of leafminers	6	Do not apply more than 28.8 oz/A per season.
Provado 1.6 F (imidacloprid)	3.8 oz	12	7	aphids, flea beetles, leafhop- pers, whiteflies	4A	Maximum of 19.0 fl oz per acre per season. Do not use with other 4A insecticides.
Pyrellin EC (pyrethrin + rotenone)	1-2 pt	12	0	aphids, cabbage looper, <i>Lygus</i> bug, mites, plant bugs, white- flies	3, 21	

Table 16. Continued.

Trade Name (Common Name)	Rate (product/acre)	REI (hours)	Days to Harvest	Insects	MOA Code ¹	Notes
Radiant (spinetoram)	5-10 fl oz	4	1	armyworms (not yellow-striped), cabbage looper, corn earworm, <i>Liriomyza</i> leafminer, thrips	5	Maximum of 6 applications, no more than 2 consecutive applications before rotating to another MOA..
Sevin 80S; XLR; 4F (carbaryl)	80S: 0.63-2.5 lb XLR; 4F: 0.5-2.0 qt	12	14	armyworms, aster leafhopper, corn earworm, fall armyworm, flea beetles, leafhoppers, <i>Lygus</i> bug, spittlebugs, stink bug, tarnished plant bug	1A	Do not apply more than a total of 7.5 lb or 6 qt per acre per crop.
SpinTor 2SC (spinosad)	1.5-10 fl oz	4	1	armyworms, cabbage looper, leafminers (<i>Liriomyza</i> spp.)	5	Do not apply more than 29 fl oz per acre per season.
Synapse WG (flubendiamide)	2.0-3.0 oz	12	1	armyworms, loopers	28	Do not apply more than 9.0 oz/acre per season.
*Telone C-35 (dichloropropene + chloropicrin)	See label	5 days - See label	preplant	symphylans, wireworms	--	See supplemental label for use restrictions in south and central Florida.
*Telone II (dichloropropene)						
Trigard (cyromazine)	2.66 oz	12	7	leafminers	17	No more than 5 applications per crop.
Trilogy (extract of neem oil)	0.5-2.0% V/V	4	0	aphids, mites, suppression of thrips and whiteflies	un	Apply morning or evening to reduce potential for leaf burn. Toxic to bees exposed to direct treatment. OMRI-listed ² .
Venom Insecticide (dinotefuran)	foliar: 1-3 oz soil: 5-6 oz	12	foliar: 7 soil: 21	leafhoppers, leafminers, whiteflies	4A	Use only one application method (soil or foliar, not both). Do not apply more than 6 oz/acre (foliar) or 12 oz/acre (soil) per season.
Vetiva (flubendiamide and buprofezin)	12.0-17.0 fl oz	12	7	armyworms, cabbage looper, corn earworm, cutworms, green cloverworm, imported cabbageworm, suppression of leafhoppers, saltmarsh caterpillar, tobacco budworm, suppression of whitefly	28, 16	No more than 3 applications per season or 38 fl oz per acre per season. Same active ingredients as Synapse, Coragen, and Courier.
Voliam Flexi (thiamethoxam, chlorantraniliprole)	4.0-7.0 oz	12	7	aphids, beet armyworm, cabbage looper, corn earworm, fall armyworm, flea beetles, leafhoppers, southern armyworm, tobacco budworm, whiteflies	4A, 28	Do not apply more than 14 oz per acre per growing season. Do not use an adjuvant.
Xentari DF (<i>Bacillus thuringiensis</i> subspecies <i>aizawai</i>)	0.5-2 lb	4	0	caterpillars	11	Treat when larvae are young. Thorough coverage is essential. May be used in the greenhouse. Can be used in organic production.

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Trade Name (Common Name)	Rate (product/acre)	REI (hours)	Days to Harvest	Insects	MOA Code ¹	Notes
¹ Mode of Action codes for vegetable pest insecticides from the Insecticide Resistance Action Committee (IRAC) Mode of Action Classification v. 6.1 August 2008.						
1A. Acetyl cholinesterase inhibitors, Carbamates (nerve action)						
1B. Acetyl cholinesterase inhibitors, Organophosphates (nerve action)						
2A. GABA-gated chloride channel antagonists (nerve action)						
3. Sodium channel modulators (nerve action)						
4A. Nicotinic acetylcholine receptor agonists (nerve action)						
5. Nicotinic acetylcholine receptor allosteric activators (nerve action)						
6. Chloride channel activators (nerve and muscle action)						
7A. Juvenile hormone mimics (growth regulation)						
7C. Juvenile hormone mimics (growth regulation)						
9B and 9C. Selective homopteran feeding blockers						
10. Mite growth inhibitors (growth regulation)						
11. Microbial disruptors of insect midgut membranes						
12B. Inhibitors of mitochondrial ATP synthase (energy metabolism)						
15. Inhibitors of chitin biosynthesis, type 0, lepidopteran (growth regulation)						
16. Inhibitors of chitin biosynthesis, type 1, homopteran (growth regulation)						
17. Molting disruptor, dipteran (growth regulation)						
18. Ecdysone receptor agonists (growth regulation)						
22. Voltage-dependent sodium channel blockers (nerve action)						
23. Inhibitors of acetyl Co-A carboxylase (lipid synthesis, growth regulation)						
28. Ryanodine receptor modulators (nerve and muscle action)						
un. Compounds of unknown or uncertain mode of action						
² OMRI listed: Listed by the Organic Materials Review Institute for use in organic production.						
* Restricted Use Only.						