Commercial Crop Production
Vegetables

Integrated Vegetable Disease Management

Successful management of vegetable diseases requires a disease management program that integrates the use of resistant varieties, balanced soil fertility, irrigation water management, use of good cultural practices, weed and insect control, biocontrol and chemical control. Development and implementation of a disease management plan and good record keeping will increase the overall yield and success of the vegetable crop.

Start with clean seed and/or certified disease-free transplants. Many vegetable disease problems originate with the seed or transplants. Seed should be purchased from reputable commercial seed companies, and if seed has not been previously treated, it should be treated following the seed treatment recommendations provided in the Vegetable Seed Treatment section of this guide.

Select resistant varieties. The use of resistant varieties is one of the best management strategies in an integrated pest management program because they are inexpensive compared to the cost of fungicides and bactericides, and they provide seasonal management. Select resistant varieties based on the disease profile for your production region and soil.

Use good cultural practices. Cultural practices are defined as a broad set of techniques that are used to manipulate the environment to improve crop production. Examples of cultural practices that should be considered in an integrated disease management plan follow:

- ***Select land suitable for vegetable production.*** Start by selecting a site that is well-drained, has good air movement, gets at least six hours of sunlight each day and does not have a history of problems with soilborne diseases. Avoid land surrounded by large established trees. Tree roots that extend well beyond the extent of the limbs can exhaust water and nutrient resources that would otherwise be available to the vegetable crop. Some tree roots also produce a toxin (juglone) that causes toxicity in toxin-sensitive vegetables such as tomatoes, peppers, eggplant, potatoes, asparagus, cabbage and broccoli.
- ***Have your soil tested.*** Many pathogens that cause disease on plants live and survive for long periods of time in the soil. Soil temperature, moisture, pH and fertility all influence a pathogens ability to survive and colonize plants. Have your soil tested annually to determine the pH, salts, nutrients and organic matter levels and water-holding capacity. For more information on how to sample, test and assess the quality of your soil contact the LSU AgCenter Soil Testing & Plant Analysis Laboratory. Tests are also available that can determine the population levels of some pathogens in the soil. Contact the LSU AgCenter Plant Diagnostic Center for more information on available pathogen tests.

Soil Test and Plant Analysis Lab
LSU AgCenter
School of Plant, Environmental and Soil Sciences
Baton Rouge, Louisiana 70803
Phone: 225-578-2110
Fax: 225-578-1403

Plant Diagnostic Center
LSU AgCenter
Department of Plant Pathology & Crop Physiology
Baton Rouge, Louisiana 70803
Phone: 225-578-4562
Fax: 225-578-1415

- ***Use high quality water for irrigation and other agricultural uses*.** Untreated surface waters can harbor both plant and human pathogens. If practical, and economical, potable water should be used to irrigate vegetable crops, especially when crops are irrigated using overhead (sprinkler) irrigation systems. Water treatment and filtration practices should be adopted if surface water is the primary source of irrigation water. The timing and frequency of irrigation should also be considered to minimize the risk of disease development. Avoid overwatering and overhead irrigation. Water early in the day so that plants have an adequate amount of time to dry. Consider raised beds to reduce the amount of standing water in the rows.
- ***Develop a four*-year crop rotation cycle.** Crop rotations are an important component of an IPM program because they interrupt the life cycle of pathogens by placing the pathogens in a nonhost environment. Through this interruption the pathogens are unable to accumulate to levels that could cause significant levels of disease and crop losses. Over a four-year period plant plants from a different plant family.
- ***Use plastic and organic mulch.*** Mulch serves as a barrier between the soil and plant tissue and reduces the amount of pathogen that can be splashed onto leaves, stems and fruit. Light-reflective plastic mulches can deter insects that transmit important viral diseases from landing on plants. Do not reuse plastic mulches. Organic mulches help to retain moisture in the soil and improve soil quality.
- ***Use good sanitation practices.*** By putting a strong emphasis on sanitation practices disease development can be significantly reduced resulting in less disease and ultimately less chemical usage. A good sanitation practice is any technique that eliminates a desirable place for the pathogen to survive and spread. Removal and destruction of crop debris, weeds and infected plants, and cleaning and disinfection of production tools and equipment are examples of good sanitation practices.

Use registered biorational products. Biorational products (products composed of beneficial microorganisms or their products) are viable alternatives to synthetic chemicals for managing diseases in many vegetable production systems. As with chemical pesticides, biorational products can't be used if they are not registered with the Environmental Protection Agency (EPA). Always read the label and follow all safety precautions provided in the label. Do not use biorationals on a nonlabeled crop. A list of biopesticides and fungicide alternatives for vegetables is provided in Table 6.

Use registered chemicals. Fungicides, bactericides and nematicides are important tools for managing diseases and their efficacy and efficiency can be enhanced when incorporated into an integrated disease management program. Pesticides should be used in a manner that minimizes the risk of a pathogen becoming resistant to a pesticide. Always applying mixtures of pesticides or alternate fungicides that have different modes of action to help reduce pesticide resistance development by the pathogen. More information on pesticide-resistance management strategies is provided in Section IV-ii of this guide. A list of fungicide mode of actions for fungicide resistance management in vegetables is provided in Table 7. Always read the label and follow all safety precautions provided in the label. Do not use pesticides on a nonlabeled crop. A list of selected pesticides with known efficacy to various pathogens that can cause disease on vegetables in Louisiana can be found in Table 1.

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Table 1. Recommended pesticides, rates and pesticide use restrictions for selected vegetable crops
The symbol [OG] *indicates a pesticide that has been listed by the Organic Materials Review Institute (OMRI) as approved for use in organic production.*

Disease (Pathogen)	Product Choices[1] and Product Mode of Action Group[2]		Rate[3]	PHI[4]	Maximum Use
ASPARAGUS					
Cercospora leaf spot or blight (*Cercospora asparagi*)	chlorothalonil (various products)	M	2-4 lb	190	12 pt
	mancozeb 80WP	M	1 lb/100 gal	180	1 app
Crown and spear rot (*Phytophthora* spp.)	chlorothalonil (various products)	M	2-4 pt	190	12 pt
	Ridomil Gold SL	4	1 pt	7	4 app
	phosphorous acid				
	Fosphite	33	3-4 qt	2	12 fl oz
	Phostrol	33	2.5-5.0 pt	0	7 app
Fusarium crown and root rot (*Fusarium oxysporum*)	Mancozeb 80WP[5]	M	1 lb/100 gal	-	1 app
Purple spot (*Stemphylium* spp., *Pleospora* spp.)	azoxystrobin (various products)	11	6.0-15.5 fl oz	100	92 fl oz
	Flint 50WDG	11	3-4 oz	180	3 app
	chlorothalonil (various products)	M	2-4 pt	190	12 pt
Rust (*Puccinia* spp.)	Rally 40W	3	5 oz	180	6 app
	Mancozeb 80WP	3	2 lb	180	8 lb
	Chlorothalonil 720SC	M	2-4 pt	190	12 pt
	sulfur[OG]				
	80%	M	20 lb	0	
	90%	M	15 lb	0	
	98%	M	45 lb	0	
BASIL					
Downy mildew (*Peronospora belbahrii*)	Ranman 400SC	21	2.75-3.0 fl oz	0	27 fl oz
	Regalia[OG]	P5	0.5-1 qt	0	
	phosphorous acid				
	Conefine Extra	33	1 to 3 qt/20 to	0	
	K-Phite	33	100 gal	0	
	potassium phosphite				
	Fosphite	33	1-3 qt/100 gal	0	
	ProPhyt	33	3-4 pt/100 gal	0	
	Actinovate AG[OG]		3-12 oz	0	
Leaf spots (*Alternaria* spp., *Botrytis* spp., *Fusarium* spp.)	Switch 62.5WG	12, 9	11-14 oz	7	56 fl oz
Fusarium wilt and Pythium and Rhizoctonia root rots	phosphorous acid				
	Conefine Extra	33	1 to 3 qt/20 to	0	
	K-Phite	33	100 gal	0	
	potassium phosphite				
	Fosphite	33	1-3 qt/100 gal	0	
	ProPhyt	33	3-4 pt/100 gal	0	

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Disease (Pathogen)	Product Choices[1] and Product Mode of Action Group[2]		Rate[3]	PHI[4]	Maximum Use
BEANS (Snap and Dry)					
Alternaria leaf and pod spot (*Alternaria alternata*)	Inspire Super **(dry beans only)**	3, 9	16-20 fl oz	14	80 fl oz
	Quilt 1.66SC	3, 11	14 fl oz	7	3 app
	Priaxor 4.17SC	7, 11	4-8 fl oz	7	2 app
	Fontelis	7	14-30 oz	0	72 fl oz
	Quadris Flowable	11	6.2-15.4 fl oz	0	92 fl oz
	Headline 2.09	11	6-9 fl oz	7	2 app
	Actinovate AG[OG]		3-12 oz	0	
Anthracnose (*Colletotrichum lindemuthianum*)	Inspire Super **(dry beans only)**	11	16-20 fl oz	14	80 fl oz
	Aproach **(dry beans only)**	11	6-12 fl oz	7	24 fl oz
	chlorothalonil **(dry beans only)**				
	Bravo Ultrex	M	1.25-1.8 lb	7	7.3 lb
	Bravo WeatherStix	M	1.375-2 pt	7	8 pt
	thiophanate-methyl				
	Topsin M 70WP	1	1.5-2 lb	14	4 lb
	Incognito 4.5F	1	30-40 fl oz	14	80 fl oz
	85WDG **(dry beans)**	1	0.8-1.6 lb	28	3.2 lb
	85WDG **(snap beans)**	1	0.8-1.6 lb	14	3.2 lb
	Quilt 1.66SC	11, 3	14 fl. Oz	0	42 fl oz
	Quilt Xcel	11, 3	10.5-14 fl oz	0	42 fl oz
	Priaxor 4.17SC	7, 11	4-8 fl oz	7	2 apps
	Fontelis	7	14-30 fl oz	7	72 fl oz
	Quadris Flowable	11	6-15.5 fl oz	0	4 app
	Quadris Opti **(dry beans only)**	11, M	1.6-2.4 pt	0	4 app
	Headline 2.09 **(dry beans)**	11	6-9 fl oz	21	2 app
	Headline 2.09 **(snap beans)**	11	6-9 fl oz	7	2 app
	Tilt	3	4 fl oz	7	12 fl oz
	Cueva[OG]	M	0.2-2 gal		
	Nordox 75WG[OG]	M	0.66-2.5 lb		
Halo and common blight (*Pseudomonas phaseolicola* and *Xanthomonas phaseoli*)	copper hydroxide				
	Kocide 3000	M	0.5-1.25 lb	0	15.8 lb
	Kocide 2000	M	0.75-2.25 lb	0	13.5 lb
	Champ WG[OG]	M	1.58 lb	7	9.48 lb
	Nu-Cop 50DF	M	1-1.5 lb	7	9 lb
	copper hydroxide and copper oxychloride				
	Badge SC	M	1-2 pt	7	16.6 pt
	Badge X2[OG]	M	0.5-1.25 lb	7	2.65 lb
	copper sulfate				
	Cuprofix-Ultra 40	M	0.75-2 lb		11.19 lb
	Cuproxat	M	1.5-3.9 pt		23.4 pt
	Cueva[OG]	M	0.5-2 gal/100 gal		

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Disease (Pathogen)	Product Choices[1] and Product Mode of Action Group[2]		Rate[3]	PHI[4]	Maximum Use
	Nordox 75WG[OG]	M	0.6-2.5 lb		
Botrytis gray mold (*Botrytis cinerea*)	iprodione				
	Rovral 4 Flowable	2	1.5-2 pt	14	2 app
	thiophanate-methyl				
	Topsin M 70WP	1	1.5-2 lb	14	4 lb
	Incognito 4.5F	1	30-40 fl oz	14	80 fl oz
	85WDG **(dry beans)**	1	0.8-1.6 lb	28	3.2 lb
	85WDG **(snap beans)**	1	0.8-1.6 lb	14	3.2 lb
	Fontelis	7	14-30 oz	7	72 fl oz
	Endura	7	8-11 oz	7	2 app
	Cannonball 50WP	12	7 oz	7	28 oz
	Switch 62.5WG	12, 9	11-14 oz	2	56 oz
	chlorothalonil **(snap beans only)**				
	Bravo Ultrex	M	2.7 lb	7	10.9 lb
	Bravo WeatherStik	M	3 lb	7	12 pt
	Cueva[OG]	M	0.5-2 gal/100 gal		
Damping-off (*Pythium* spp.)	Ridomil Gold PC GR	4, 14	0.75 lb[6]		1 app
	Ridomil Gold SL	4	0.5-1.0 pt[8]		1 app
	MetaStar 2E	4	2-4 pt[8]		1 app
	Ultra Flourish	4	1-2 pt[8]		1 app
	Uniform	4, 11	0.34 fl. oz[6]		1 app
Damping-off (*Rhizoctonia solani*)	Quadris 2.08F	11	0.4-0.8 fl oz[6]		1 app
	Headline	11	0.1-0.8 fl oz[6]		1 app
	Blocker 4F	14	2.2-3.3 pt[6]		1 app
	Uniform	4, 14	0.34 fl oz[6]		1 app
Leaf spots and blights (*Alternaria* spp., *Ascochyta* spp., *Cercospora* spp.)	Aproach **(dry beans only)**	11	6-12 fl oz	7	24 fl oz
	chlorothalonil **(dry beans only)**				
	Bravo Ultrex	M	1.25-1.8 lb	7	7.3 lb
	Bravo WeatherStix	M	1.375-2 pt	7	8 pt
	Fontelis	7	14-30 fl oz	0	72 fl oz
	azoxystrobin (various products)	11	6.2-15.4 fl oz	0	4 app
	Quadris Opti **(dry beans only)**	11, M	1.6-2.4 pt	7	4 app
	Headline **(dry beans)**	11	6-9 fl oz	21	2 app
	Headline **(snap beans)**	11	6-9 fl oz	7	2 app
Rhizocontia web blight and Pod tip rot (*Rhizoctonia solani*)	Rally 40WSP **(snap beans only, pod tip rot)**	3	4-5 oz	0	20 oz
	Tilt	3	4 fl oz	7	12 fl oz
	azoxystrobin (various products)	11	6-15.5 fl oz	0	4 app
	Quadris Opti **(dry beans only)**	11, M	1.6-2.4 fl oz	7	4 app
	Quilt	11, 3	14 fl oz	7	42 fl oz
	Quilt Xcel	11, 3	10.5-14 fl oz	7	42 fl oz

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Disease (Pathogen)	Product Choices[1] and Product Mode of Action Group[2]		Rate[3]	PHI[4]	Maximum Use
Powdery mildew (*Erysiphe polygoni*)	Endura	7	8-11 oz	7	2 app
	Priaxor 4.17SC	7, 11	4-8 fl oz	7	2 app
	Fontelis	7	14-30 oz	0	72 fl oz
	Headline **(dry beans)**	11	6-9 fl oz	21	2 app
	Headline **(snap beans)**	11	6-9 fl oz	7	2 app
	Fosphite	33	1-3 qt/100 gal	0	
	sulfur				
	80%OG	M	20 lb	0	
	90%OG	M	15 lb	0	
	98%OG	M	45 lb	0	
	Armicarb 100OG		2.5-5 lb	0	
Rust (*Phakopsora pachyrhizi, Uromyces appendiculatis*)	Aproach **(dry beans only)**	11	6-12 fl oz	7	24 fl oz
	Proline 480SC **(dry beans only, white mold)**	3	5.7 fl oz	7	17 fl oz
	Rally 40WSP	3	4-5 oz	0	20 oz
	tebuconazole 3.6F				
	Folicur 3.6F **(dry)**	3	4-6 fl oz	7	12 fl oz
	Folicur 3.6F (**snap)**	3	4-6 fl oz	7	24 fl oz
	Quilt 1.66SC	3, 11	14 fl oz	7	3 app
	Priaxor 4.17SC	7, 11	4-8 fl oz	7	2 app
	Fontelis	7	14-30 oz	0	72 fl oz
	azoxystrobin (various products)	11	6.2-15.4 fl oz	0	4 app
	Quadris Opti **(dry beans only)**	11, M	1.6-2.4 pt	7	4 app
	Headline **(dry beans)**	11	6-9 fl oz	21	2 app
	Headline **(snap beans)**	11	6-9 fl oz	7	2 app
	chlorothalonil				
	Dry beans				
	Bravo Ultrex	M	1.25-1.8 lb	7	4 app
	Bravo WeatherStix	M	1.375-2 pt	7	8pt
	Snap beans				
	Bravo Ultrex	M	1.25-2.7 lb	7	10.9 lb
	Bravo WeatherStix	M	1.375-3 pt	7	12 pt
White mold (*Sclerotinia sclerotiorum*)	Aproach	11	8-12 fl oz	0	24 fl oz
	Botran 75W **(snap beans only)**	14	2.5-4 lb	2	5.3 lb
	Cannonball WG	12	7 oz	7	28 oz
	Endura	7	6-9 oz		2 apps
	Fontelis	7	16-30 fl oz	0-14[10]	72 fl oz
	iprodione				
	Iprodione 4L AG	2	1.5-2 pt	14	2 app
	Rovral 4F	2	1.5-2 pt	14	2 app
	Meteor	2	1.5-2 pt	14	2 app
	Nevado 4F	2	1.5-2 pt	14	2 app
	Omega 500SC **(succulent)**	29	0.5-0.9 pt	14	1.8 pt
	Omega 500SC **(dry)**	29	0.5-0.9 pt	30	1.8 pt

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	Priaxor **(dry)**	7, 11	4-8 fl oz	21	16 fl oz
	Priaxor **(succulent)**	7, 11	4-8 fl oz	7	16 fl oz
	Proline 480SC **(dry)**	3	5.7 fl oz	7	17.1 fl oz
	Switch 62.5WG	9, 12	11-14 oz	7	56 oz
	thiophanate-Methyl				
	85WDG **(succulent)**	1	1.2-1.6 lb	14	3.2 lb
	85WDG **(dry)**	1	1.2-1.6 lb	28	3.2 lb
	Incognito 4.5F **(succulent)**	1	30-40 fl oz	14	80 fl oz
	Incognito 4.5F **(dry)**	1	30-40 fl oz	28	80 fl oz
	Topsin M 70WDG **(succulent)**	1	1.5-2 lb	14	4 lb
	Topsin M 70WDG **(dry)**	1	1.5-2 lb	28	4 lb
	Vertisan	7	16-20 fl oz	21	41 fl oz
COLE CROPS (Broccoli, Brussels sprouts, Cabbage, Cauliflower, Chinese Cabbage and Kohlrabi)					
Alternaria leaf spot (*Alternaria* spp.)	Cabrio	11	12-16 oz	0	64 oz
	chlorothalonil				
	Bravo Ultrex	M	1.4 lb	7	14.5 lb
	Bravo WeatherStix	M	1.5 pt	7	11.7 lb
	copper hydroxide				
	Kocide 3000	M	0.5-1.25 lb	0	15.8 lb
	Kocide 2000	M	0.75-2.25 lb	0	13.5 lb
	Champ WG[OG]	M	1.58 lb	7	9.48 lb
	Nu-Cop 50DF	M	1 lb	7	5 lb
	copper hydroxide and copper oxychloride				
	Badge SC	M	1-2 pt	7	16.6 pt
	Badge X2[OG]	M	0.5-1.25 lb	7	2.65 lb
	copper sulfate				
	Cuprofix-Ultra 40	M	0.75-2 lb		11.19 lb
	Cuproxat	M	1.5-3.9 pt		23.4 pt
	Cueva[OG]	M	0.5-2 gal/100 gal		
	Nordox 75WG[OG]	M	0.6-2.5 lb		
	Endura	M	6-9 oz		
	Fontelis	7	14-30 fl oz		
	Inspire Super	7	16-20 fl oz	0-14[10]	2 app
	Koverall	3, 9	1.6-2.1 lb	3	72 fl oz
	ManKocide	M	1-3 lb	7	80 fl oz
	Manzate Pro-Stik[7]	M	1.6-2.1 lb	7	12.8 lb
	Milstop[OG]	M	2-5 lb/100 gal	7	8.8 lb
	Procure 480SC	3	6-8 fl oz	14	2 app
	azoxystrobin (various products)				
	Quadris Top	3, 11	12-14 fl oz	1	56 fl oz
	Reason 500SC	11	5.5-8.2 fl oz	2	24.6 fl oz
	Serenade ASO				
	ASO[OG]	44	2-4 qt		

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	Max[OG]	44	1-3 lb		
	Switch 62.5WG	9, 12	11-14 oz	7-10	2 app
Basal stem rot, Phytophthora root rot (*Phytophthora* spp.) **and Damping-off** (*Pythium* spp.)	Ridomil Gold SL	4	1-2 pt[8]		1 app
	Presidio 4F	43	3-4 fl oz	2	4 app
	MetaStar 2E	4	4-8 pt[8]		1 app
	Ultra Flourish	4	2-4 pt[8]		1 app
Black leg (*Phoma lingan*)	Cabrio	11	12-16 oz	0	64 oz
	iprodione				
	Rovral 4 Flowable	2	2 pt	0	2 app
	4L AG	2	2 pt	0	2 app
Black rot (*Xanthomonas campestris* pv. *campestris*)	Actigard	21	0.5-1.0 oz	7	4 apps
	copper hydroxide				
	Kocide 3000	M	0.5-1.25 lb	0	15.8 lb
	Kocide 2000	M	0.75-2.25 lb	0	13.5 lb
	Champ WG[OG]	M	1.58 lb	7	9.48 lb
	Nu-Cop 50DF	M	1 lb	7	5 lb
	copper hydroxide and copper oxychloride				
	Badge SC	M	1-2 pt	7	16.6 pt
	Badge X2[OG]	M	0.5-1.25 lb	7	2.65 lb
	copper sulfate				
	Cuprofix-Ultra 40	M	0.75-1.25 lb		6.6 lb
	Cuproxat	M	1.5-2.5 pt		13.1 pt
	Cueva[OG]	M	0.5-2 gal/100 gal		
	Nordox 75WG[OG]	M	0.6-2.5 lb		
Cercospora leaf spot (*Cercospora brassicicola*)	Cease Biofungicide[OG]	44	3-6 qt/100 gal	0	
	Inspire Super	9	16-20 fl oz	7	80 fl oz
	Quadris Top	11, 3	12-14 fl oz	1	56 fl oz
	Switch 62.5WG	9, 12	11-14 oz	7	56 oz
Clubroot (*Plasmodiophora brassicae*)	Omega 500F	29	2.6 pt[8]		1 app
	Blocker (Flowable & 4F)	14	7.5 gal[8]		1 app
	Ranman	21	13-25.8 fl oz[8]		1 app
Damping-off, Wire stem (*Rhizoctonia solani)*	Blocker 4F	14	2.2-3.3 pt		1 app
	Uniform	4, 11	0.34 fl. oz[6]		1 app
	Quadris Flowable	11	0.4-0.8 fl oz[6]		1 app
Downy mildew (*Peronospora parisitica*)	Ultra Flourish	4	0.25-0.5 pt	7	2 pt
	Ranman 400SC	21	2.75 fl oz	0	5 app
	Presidio 4SC	43	3-4 fl oz	2	12 fl oz
	potassium phosphite (various formulations)	33	2-4 pt	0	
	Quadris 2.08F	11	6-15.5 fl oz	0	92.3 fl oz
	Revus 2.08SC	40	8. fl oz	1	32 fl oz
	Zampro	45, 40	14 fl oz	0	42 fl oz
Powdery mildew	Cabrio EG	11	12-16 oz	0-3[9]	64 oz

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(*Erysiphe polygoni*,	Cease Biofungicide[OG]	44	3-6 qt/100 gal	0	
E. cruciferarum)	Endura 70WP	7	6-9 oz	0-14[10]	18 oz
	Fontelis	7	14-30 fl oz	0	72 fl oz
	Inspire Super	3, 9	16-20 fl oz	7	80 fl oz
	phosphorous acid (various				
	formulations)	33	1-3 qt	0	
	Potassium bicarbonate	33	2.5-5 lb/100 gal	0	
	Armicarb 100	33	2-5 lb/100 gal		
	Milstop[OG]	33	2.5-3 lb	0	
	Kaligreen Fungicide	3	6-8 fl oz	0	
	Procure 480SC	11, 3	12-14 fl oz	1	18 fl oz
	Quadris Top			1	56 fl oz
	Serenade	44	2-6 qt		
	ASO[OG]	44	1-3 lb	0	
	Max[OG]	44	2-4 qt	0	
	Sonata[OG]			0	
	sulfur	M	6-25 lb		
	Microfine Sulfur	M	3-10 lb		
	Microthiol Disperss[OG]	M	6-25 lb		
	Yellow Jacket Wettable	9, 12	10-12 oz		
	Switch 62.5WG			7	56 oz
Rhizoctonia bottom rot	Endura 70WP	7	6-9 fl oz	0	2 app
White mold	Endura 70WP	7	6-9 oz	0-14[10]	2 apps
(*Sclerotinia sclerotiorum*)	Fontelis	7	16-30 fl oz	3	72 fl oz
White rust	Cabrio EG	11	12-16 oz	0-3[9]	64 oz
(*Albugo candida*)	Reason 500SC	11	8.2 fl oz	2	24.6 fl oz
Cucurbits (Cantaloupe, Cucumbers, Pumpkins, Squash, Watermelons and Zucchini)					
Angular leaf spot	Actigard	21	0.5-1.0 oz	0	8 oz
(*Pseudomonas syringae* pv.	copper hydroxide				
lachrymans) **and Bacterial**	Kocide 3000	M	0.5-1.3 lb	0	17.5 lb
leaf spot (*Xanthomonas*	Kocide 2000	M	1-2.3 lb	0	15 lb
campestris pv. *cucurbitae*)	Champ WG[OG]	M	1.5-2 lb	0	10.5 lb
	Nu-Cop 50DF[OG]	M	1.5-2 lb		
	copper hydroxide and				
	copper oxychloride[11]				
	Badge SC	M	1-2.5 pt	0	18.6 pt
	Badge X2[OG]	M	0.5-1.3 lb	0	5.3 lb Cu
	copper sulfate				
	Cuprofix-Ultra 40	M	1-2 lb	0	13 lb
	Mastercop	M	0.5-1 pt	0	6 pt
	Cueva[OG]	M	0.5-2 gal/100 gal	0	
	Nordox 75WG[OG]	M	1.5-2 lb		
	ManKocide	M	2-3 lb	5	8 app

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Table 1. Recommended pesticides, rates and pesticide use restrictions for selected vegetable crops
The symbol [OG] *indicates a pesticide that has been listed by the Organic Materials Review Institute (OMRI) as approved for use in organic production.*

Disease (Pathogen)	Product Choices[1] and Product Mode of Action Group[2]		Rate[3]	PHI[4]	Maximum Use
Leaf spots (*Alternaria, Cercospora*), **Anthracnose** (*Colletotrichum*), **Gummy stem blight** (*Didymella*), **Target spot** (*Corynespora*)	Actinovate		3-12 oz	0	
	Cabrio	11	12-16 oz	0	64 oz
	chlorothalonil				
	Bravo Ultrex	M	1.4-2.7 lb	0	19.1 lb
	Bravo WeatherStik	M	1.5-3 pt	0	21 pt
	Bravo Zn	M	2.3-4.3 pt	0	30 pt
	Chlorotholonil 720SC	M	1.5-3 pt	0	21 pt
	copper hydroxide				
	Kocide 3000	M	0.5-1.3 lb	0	17.5 lb
	Kocide 2000	M	1-2.3 lb	0	15 lb
	Champ WG[OG]	M	1.5-2 lb	0	10.5 lb
	Nu-Cop 50DF[OG]	M	1.5-2 lb		
	copper hydroxide and copper oxychloride[11]				
	Badge SC	M	1-2.5 pt	0	18.6 pt
	Badge X2[OG]	M	0.5-1.3 lb	0	5.3 lb Cu
	copper sulfate				
	Cuprofix-Ultra 40	M	1-2 lb	0	13 lb
	Mastercop	M	0.5-1 pt	0	6 pt
	Cueva[OG]	M	0.5-2 gal/100 gal	0	
	Nordox 75WG[OG]	M	1.5-2 lb		
	Evito 480SC	11	3-5.7 fl oz	1	
	Gavel 75DF	M, 22	1.5-2 lb	1	22.8 fl oz
	Inspire Super	3, 9	16-20 fl oz	5	8 app
	mancozeb			7	80 fl oz
	Dry formulations	M	2-3 lb		
	Liquid Formulations	M	1.6-2.4 qt	5	25.6 lb
	ManKocide	M	2-3 lb	5	19.2 qt
	Merivon	7, 11	4-5.5 fl oz	5	24 lb
	Pristine	7, 11	12.5-18.5 oz	0	16.5
	Quadris	11	11-15.5 fl oz	0	74 oz
	Quadris Opti	11, M	3.2 pt	1	92.3 fl oz
	Quadris Top	11, 3	12-14 fl oz	1	4 app
	Ridomil Gold Bravo SC	4, M	2.5-3.3 pt	1	56 fl oz
	Satori	11	11-15.5 fl oz	0	4 app
	Tanos	11, 27	8 oz	1	92.3 fl oz
	thiophanate-methyl				
	Thiophanate-methyl 85WDG	1	0.4 lb	3	4 app
	Topsin 4.5FL	1	10 fl oz	1	2.5 lb
	Topsin M 70WP	1	0.5 lb	1	60 fl oz
	Topsin M WSB	1	0.5 lb	1	3 lb
	Trilogy[OG]		1%		
Bacterial fruit blotch (*Acidovorax avena* subsp. *citrulli*)	Actigard 50WG	21	0.5-1.0 oz	0	8 oz
	copper hydroxide				
	Kocide 3000	M	0.5-1.3 lb	0	17.5 lb
	Kocide 2000	M	1-2.3 lb	0	15 lb
	Champ WG[OG]	M	1.5-2 lb	0	10.5 lb

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Disease (Pathogen)	Product Choices[1] and Product Mode of Action Group[2]		Rate[3]	PHI[4]	Maximum Use
	Nu-Cop 50DF[OG]	M	1.5-2 lb	1	10.5 lb
	copper hydroxide and copper oxychloride[11]				
	Badge SC	M	1-2.5 pt	0	18.6 pt
	Badge X2[OG]	M	0.5-1.3 lb	0	5.3 lb Cu
	copper sulfate				
	Cuprofix-Ultra 40	M	1-2 lb	0	13 lb
	Mastercop	M	0.5-1 pt	0	6 pt
	Cueva[OG]	M	0.5-2 gal/100 gal	0	
	Nordox 75WG[OG]	M	1.5-2 lb	1	
Bacterial wilt (*Erwinia trachephilia*)	No bactericides available. Control of the cucumber beetle prior to flowering is the only recommended practice. See Louisiana Insect Pest Management Guide.				
Belly rot (*Rhizoctonia solani*)	Evito 480SC	11	3-5.7 fl oz	1	22.8 fl oz
	Quadris	11	11-15.5 fl oz	1	92.3 fl oz
	Quadris Opti	11, M	3.2 pt	1	4 app
	Quadris Top	11, 3	12-14 fl oz	1	56 fl oz
	Satori	11	0.4-0.8 fl oz[6]		1 app
	thiophanate-methyl				
	Thiophanate-methyl 85WG	1	0.4 lb	1	2.5 lb
	Topsin 4.5FL	1	10 fl oz	1	60 fl oz
	Topsin M 70WP	1	0.5 lb	1	3 lb
	Topsin M WSB	1	0.5 lb	1	3 lb
Downy mildew (*Pseudoperonospora cubensis*)	Actigard 50WG	21	0.5-1.0 oz	0	8 oz
	Actinovate AG[OG]		3-12 oz	0	
	Aliette WDG	33	2-5 lb	0.5	7 app
	Alude	33	1.3 qt		6 app
	Cabrio	11	8-12 oz	0	64 oz
	Catamaran	M, 33	6 pt	0	50 pt
	chlorothalonil				
	Bravo Ultrex	M	1.4-1.8 lb	0	19.1 lb
	Bravo WeatherStik	M	1.5-2 pt	0	21 pt
	Bravo Zn	M	2.3-2.8 pt	0	30 pt
	Chlorotholonil 720SC	M	1.5-2 pt	0	21 pt
	copper hydroxide				
	Kocide 3000	M	0.5-1.3 lb	0	17.5 lb
	Kocide 2000	M	1-2.3 lb	0	15 lb
	Champ WG[OG]	M	1.5-2 lb	0	10.5 lb
	Nu-Cop 50DF[OG]	M	1.5-2 lb	1	10.5 lb
	copper hydroxide and copper oxychloride[11]				
	Badge SC	M	1-2.5 pt	0	18.6 pt
	Badge X2[OG]	M	0.5-1.3 lb	0	5.3 lb Cu
	copper sulfate				
	Cuprofix-Ultra 40	M	1-2 lb	0	13 lb
	Mastercop	M	0.5-1 pt	0	6 pt
	Cueva[OG]	M	0.5-2 gal/100 gal	0	

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Disease (Pathogen)	Product Choices[1] and Product Mode of Action Group[2]		Rate[3]	PHI[4]	Maximum Use
	Nordox 75WG[OG]	M	1.5-2 lb	1	
	Curzate 60DF	M	3.2 oz	3	
	Evito 480SC	27	3-5.7 fl oz	1	30 oz
	Flint 50WDG	11	4 oz	0	22.8 fl oz
	Forum	11	6 fl oz[12]	0	16 oz
	Gavel 75DF	40	1.5-2 lb	5	30 fl oz
	mancozeb	M, 22			8 app
	Dry formulations		1.6-2.4 qt	5	
	Liquid Formulations	M	2-3 lb	5	25.6 lb
	ManKocide	M	2-5 lb/100 gal	5	19.2 qt
	Milstop[OG]	M	3-4 fl oz[12]		24 lb
	Presidio 4F		50 fl oz/100 gal	2	
	Previcur Flex 6F	43	1.2 pt	2	12 fl oz
	Pristine	28	12.5-18.5 oz	0	6 pt
	Quadris 2.08SC	7, 11	11-15.5 fl oz	1	74 oz
	Quadris Opti	11	3.2 pt	1	92.3 fl oz
	Quadris Top	11, M	12-14 fl oz	1	4 app
	Ranman 400SC	11, 3	2.1-2.3 fl oz	0	56 fl oz
	Reason 500SC	21	5.5 fl oz	14	16.5 fl oz
	Revus 2.08F	11	8 fl oz[12]	0	22 fl oz
	Satori	40	11-15.5 fl oz	1	32 fl oz
	Zampro 4.38SC	11	14 fl oz	0	92.3 fl oz
	Zing	40, 45	36 fl oz	0	42 fl oz
		22, M			8 app
Fusarium wilt (*Fusarium oxysporum*)	No fungicides labeled				
Plectorsporium blight (*Plectosporium tabacinum*)	Cabrio 20WG	11	12-16 oz	0	64 fl oz
	Dithane F-45 Rainshield	M	1.6-2.4 qt	5	19.2 qt
	Dithane M-45	M	2-3 lb	5	24 lb
	Evito 480SC	11	3-5.7 fl oz	1	22.8 fl oz
	Flint 50WDG	11	1.5-2 oz	0	16 fl oz
	Merivon 500SC	7, 11	5.5 fl oz	0	16.5 fl oz
	Quadris Top 1.67SC	11, 3	12-14 fl oz	1	56 fl oz
	Roper DF Rainshield	M	2-3 lb	5	25.6 lb
Powdery mildew (*Sphaerotheca fuliginea, Erysiphe cichoracearum*)	Actigard 50WG	21	0.5-1.0 oz	0	8 oz
	Actinovate AG[OG]		3-12 oz	0	
	Cabrio	11	8-12 oz	0	64 oz
	Catamaran 5.27SC	M, 33	6 pt	0	50 pt
	chlorothalonil				
	Bravo Ultrex	M	1.4-1.8 lb	0	19.1 lb
	Bravo WeatherStik	M	1.5-2 pt	0	21 pt
	Bravo Zn	M	2.3-2.8 pt	0	30 pt
	Chlorotholonil 720SC	M	1.5-2 pt	0	21 pt
	copper hydroxide				
	Kocide 3000	M	0.5-1.3 lb	0	17.5 lb
	Kocide 2000	M	1-2.3 lb	0	15 lb

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Disease (Pathogen)	Product Choices[1] and Product Mode of Action Group[2]		Rate[3]	PHI[4]	Maximum Use
	Champ WG[OG]	M	1.5-2 lb	0	10.5 lb
	copper hydroxide and copper oxychloride[11]				
	Badge SC	M	1-2.5 pt	0	18.6 pt
	Badge X2[OG]	M	0.5-1.3 lb	0	5.3 lb Cu
	copper sulfate				
	Cuprofix-Ultra 40	M	1-2 lb	0	13 lb
	Mastercop	M	0.5-1 pt	0	6 pt
	Nordox 75WG[OG]	M	1.5-2 lb	1	
	Endura	7	6.5 oz	0	26 oz
	Evito 480SC	11	3-5.7 fl oz	1	22.8 fl oz
	Flint	11	1.5-2 oz	0	16 oz
	Fontelis	7	12-16 fl oz	1	67 fl oz
	ManKocide	M	2-3 lb	5	24 lb
	Milstop[OG]		2-5 lb/100 gal		
	Merivon	7, 11	4-5.5 fl oz	0	16.5 fl oz
	Prev-AM	7, 11	50 fl oz/100 gal		
	Pristine	7, 11	12.5-18.5 oz	0	74 oz
	Procure 50WS	3	4-8 oz	0	40 oz
	Quadris	11	11-15.5 fl oz	1	92.3 fl oz
	Quadris Opti	11, M	3.2 pt	1	4 app
	Quadris Top	11, 3	12-14 fl oz	1	56 fl oz
	Quintec 2.08SC **(not on cucumber or summer squash)**	13	4-6 fl oz	3	24 fl oz
	Rally 40WSP	3	2.5-5 oz	0	1.5 lb a.i.
	Satori	11	11-15.5 fl oz	1	92.3 fl oz
	Serenade[OG]				
	ASO	44	2-6 qt	0	
	Max	44	1-3 lb	0	
	Sonata[OG]	44	2-4 qt	0	
	Sovran	11	3.2-4.8 oz	0	19.2 oz
	sulfur[OG]				
	Microthiol Disperss **Cucumbers only Melons, squash, or pumpkins**	M2	2-4 lb		
	Surround WP[OG]		25-50 lb		
	Switch 62.5WG	9, 12	11-14 oz	1	56 oz
	Torino 0.85SC	U6	3.4 oz	0	2 app
	tebuconazole (various formulations)	3	4-6 fl oz	7	24 fl oz
	thiophanate-methyl				
	Thiophanate-methyl 85WG	1	0.2-0.4 lb	1	2.5 lb
	Topsin 4.5FL	1	10 fl oz	1	60 fl oz
	Topsin M 70WP	1	0.5 lb	1	3 lb
	Topsin M WSB	1	0.5 lb	1	3 lb

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Disease (Pathogen)	Product Choices[1] and Product Mode of Action Group[2]		Rate[3]	PHI[4]	Maximum Use
Phytophthora blight or crown rot (*Phytophthora capsici*)	Forum SC 4.17SC	40	6 fl oz[12]	0	30 fl oz
	Presidio 4F	43	3-4 fl oz	2	12 fl oz
	Ranman 400SC	21	2.8 fl oz	0	16.f fl oz
	Revus 2.08F	40	8 fl oz	0	32 fl oz
	Zampro 4.38SC	40, 45	14 fl oz	0	42 fl oz
Damping-off, Root rot and Cottony leak (*Pythium* spp.)	Actinovate AG[OG]		3-12 oz		
	Bio-Tam[OG]		1.5-3 oz[6]		1 app
	phosphorous acid				
	Confine Extra	33	1-4 qt	0	
	Rampart	33	1-3 qt/100 gal	0	
	potassium phosphite				
	Fosphite	33	1-3 qt/100 gal	0	6 app
	Fungi-phite	33	1-5 qt	0	7 app
	Previcur Flex	28	1.2 pt	2	6 pt
	Ridomil Gold SL	4	1-2 pt[13]		1 app
	MetaStar 2EC AG	4	4-8 pt[13]		1 app
	Serenade Soil[OG]	44	2-6 qt[13]		
	Ultra Flourish	4	2-4 pt[13]	5	4 pt
Scab (*Cladosporium cucumerinum*)	Actigard	21	0.5-1.0 oz		8 oz
	Catamaran 5.27SC	M, 33	6 pt	0	50 pt
	chlorothalonil				
	Bravo Ultrex	M	1.4-1.8 lb	0	19.1 lb
	Bravo WeatherStik	M	1.5-2 pt	0	21 pt
	Bravo Zn	M	2.3-2.8 pt	0	30 pt
	Chlorotholonil 720SC	M	1.5-2 pt	0	21 pt
	mancozeb				
	Dry formulations	M	2-3 lb	5	25.6 lb
	Liquid Formulations	M	1.6-2.4 qt	5	19.2 qt
	ManKocide	M	2-3 lb	5	24 lb
	Ridomil Gold Bravo SC	4, M	2.5-3.3 pt	0	15.8 lb a.i.
	Trilogy[OG]		1%		
Eggplant					
Leaf blights and spots (*Alternaria* spp.)	Actinovate AG[OG]		3-12 oz		
	Cabrio 20EG	11	8-12 oz	0	96 oz
	copper hydroxide				
Anthracnose or fruit rot (*Colletotrichum coccodes*) **and Phomopsis fruit rot** (*Phomopsis vexans*)	Kocide 3000	M	0.8-1.5 lb	0	26.3 lb
	Kocide 2000	M	1.5 lb	0	22.6 lb
	Champ WG[OG]	M	1.6 lb	7	15.8 lb
	Nu-Cop 50DF[OG]	M	1.5 lb	1	15 lb
	copper hydroxide and copper oxychloride[11]				
	Badge SC	M	1.5 pt	7	27.8 pt
	Badge X2[OG]	M	0.8 lb	7	7.9 lb Cu
	copper sulfate				
	Cuprofix-Ultra 40	M	1.3 lb[11]		19.8 lb
	Mastercop	M	0.5-1.5 pt	7	9 pt

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Disease (Pathogen)	Product Choices[1] and Product Mode of Action Group[2]		Rate[3]	PHI[4]	Maximum Use
	Nordox 75WG[OG]	M	2-4 lb		
	Aftershock OR Evito	11	2-5.7 fl oz	3	22.8 fl oz
	Fontelis	7	16-24 fl oz	0	72 fl oz
	Milstop[OG]		2-5 lb/100 gal		
	Priaxor 500 SC	7, 11	4-8 fl oz	0	24 fl oz
	Quadris Top 29.6SC	11, 3	8-14 fl oz	0	55.3 fl oz
	Reason 500SC	11	5.5-8.2 fl oz	14	24.6 fl oz
	Trilogy[OG]		1%		
Powdery mildew (*Leveillula taurica*)	Ariston	M, 27	2-2.4 pt	3	18.1
	Cabrio 20EG	11	8-16 oz	0	96 oz
	chlorothalonil				
	Bravo Ultrex	M	1.4 lb	3	10.9 lb
	Bravo WeatherStik[14]	M	1.5 pt	3	12 pt
	phosphorous acid (various formulations)	33	see labels	0	
	Fontelis	7	16-24 fl oz	0	72 fl oz
	Inspire Super	3, 9	16-20 fl oz	0	47 fl oz
	Priaxor 500SC	7, 11	6-8 fl oz	0	24 fl oz
	Quadris 2.08SC	11	6-15.5 fl oz	0	61.5 fl oz
	Quadris Top	11, 3	8-14 fl oz	0	55.3 fl oz
	Satori	11	6-15.5 fl oz	0	61.5 fl oz
	Serenade[OG]				
	ASO	44	2-6 qt	0	
	Max	44	1-3 lb	0	
	Sonata[OG]	44	2-4 qt	0	
	sulfur[OG]				
	Microfine Sulfur	M	22-38 lb		
	Microthiol Disperss	M	4-6 lb		
	Yellow Jacket Wettable	M	22-38 lb		
	Switch 62.5WG	9, 12	11-14 oz	0	56 oz
	Trilogy		1%		
	Vivando	U8	15.4 fl oz	0	46.2 fl oz
Phytophthora blight or crown rot (*Phytophthora capsici*)	Forum SC	40	6 fl oz[12]	0	30 fl oz
	Micora 2.08F	40	8 fl oz[12]	1	32 fl oz
	Omega 500F	29	1.5 pt	30	9 pt
	Presidio 4SC	43	3-4 fl oz	2	12 fl oz
	Ranman 400SC	21	2.8 fl oz	0	16.5 fl oz
	Reason 500SC	11	8.2 fl oz	14	24.6 fl oz
	Revus 2.08F	40	8 fl oz	1	32 oz
	Ridomil Gold + Copper	4, M	2 lb	7	4 app
	Zampro 525SC	40, 45	14 fl oz	0	42 fl oz
Damping-off (*Pythium* spp.)	MetaStar 2EC AG	4	4-8 pt[13]	7	12 pt
	Ridomil Gold SL	4	1 pt[13]	7	1.5 lb a.i.
	Ultra Flourish	4	2 pt[13]	7	6 pt
Southern blight (*Sclerotium rolfsii*)	Cabrio 20EG	11	12-16 oz	0	96 oz
	fluoxastrobin				
	Aftershock	11	2-5.7 fl oz	3	22.8 fl oz

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Disease (Pathogen)	Product Choices[1] and Product Mode of Action Group[2]		Rate[3]	PHI[4]	Maximum Use
	Evito	11	2-5.7 fl oz	3	22.8 fl oz
	OSO 5%	19	6.5-13 fl oz	0	4.2 oz a.i.
	Priaxor 500SC	7, 11	4-8 fl oz	0	24 fl oz
Verticillium wilt (*Verticillium* sp.)	OSO 5%	19	6.5-13 fl oz	0	4.2 oz a.i
GREENS (Collards, Kale, Mustard and Turnip)					
Alternaria leaf spot or Black leaf spot (*Alternaria brassicae*)	azoxystrobin				
	Quadris	11	6-15.5 fl oz	0	46 fl oz
	Quadris Top	11, 3	12-14 fl oz	1	56 fl oz
	Satori	11	12-16 oz	3	64 oz
	Cabrio	11	6-9 oz	14	18 oz
	Endura	7	14-30 fl oz	0	72 fl oz
	copper hydroxide				
	Kocide 3000	M	0.5-0.8 lb	0	8.8 lb
	Kocide 2000	M	0.8-1.5 lb	0	7.6 lb
	Champ Formula 2 Flowable	M	0.3-0.7 pt	0	7.3 pt
	Champ WG[OG]	M	1 lb	0	5.3 lb
	copper hydroxide and copper oxychloride[11]				
	Badge SC	M	1-1.8 pt	0	18.6 pt
	Badge X2[OG]	M	0.5-0.8 lb	0	2.7 lb Cu
	copper sulfate				
	Cuprofix-Ultra 40	M	0.8-1.3 lb	0	6.6 lb
	Mastercop	M	0.5-1 pt	0	6 pt
	Inspire Super	3, 9	16-20 fl oz	7	80 fl oz
	Procure 480 SC	3	6-8 fl oz	1	18 fl oz
	Reason 500 SC	11	8.2 fl oz	2	24.6 fl oz
	Serenade[OG]				
	ASO	44	2-6 qt		
	Max	44	1-3 lb		
	Sonata[OG]	44	2-4 qt		
	Switch 62.5WG	9, 12	11-14 oz	7	56 oz
	tebuconazole				
	Monsoon	3	3-4 fl oz	7	16 fl oz
	Onset 3.6L	3	3-4 fl oz	7	16 fl oz
	Tebu-Crop 3.6F	3	3-4 fl oz	7	16 fl oz
	Toledo	3	3-4 fl oz	7	16 fl oz
Anthracnose (*Colletotrichum higginsianum*), **Leaf spots** (*Cercospora* spp., *Cercosporella* spp.)	azoxystrobin				
	Quadris	11	6-15.5 fl oz	0	46 fl oz
	Quadris Top	11, 3	12-14 fl oz	1	56 fl oz
	Satori	11	12-16 oz	3	64 oz
	Cabrio 20EG	11	6-9 oz	14	18 oz
	Endura	7	14-30 fl oz	0	72 fl oz
	Inspire Super	3, 9	16-20 fl oz	7	80 fl oz
	Reason 500SC	11	8.2 fl oz	2	24.6 fl oz

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	Switch 62.5WG	9, 12	11-14 oz	7	56 oz
	tebuconazole				
	Monsoon	3	3-4 fl oz	7	16 fl oz
	Onset 3.6L	3	3-4 fl oz	7	16 fl oz
	Tebu-Crop 3.6F	3	3-4 fl oz	7	16 fl oz
	Toledo	3	3-4 fl oz	7	16 fl oz
Bacterial leaf spot (*Xanthomonas campestris* pv. *armoraciae*)	Cease	44	3-6 qt/100 gal	0	
	Serenade[OG]				
	ASO	44	2-6 qt	0	
	Max	44	1-3 lb	0	
	Sonata[OG]	44	2-4 qt	0	
Black rot (*Xanthomonas campestris* pv. *campestris*)	Actigard	21	0.5-1.0 oz	7	4 apps
	Cease	44	3-6 qt/100 gal	0	
	copper hydroxide				
	Kocide 3000	M	0.5-1.3 lb	0	15.8 lb
	Kocide 2000	M	0.5-0.8 lb	0	8.8 lb
	Champ Formula 2 Flowable	M	0.8-1.5 lb	0	7.6 lb
	Champ WG[OG]	M	1 lb	0	5.3 lb
	copper hydroxide and copper oxychloride				
	Badge SC	M	1-1.8 pt	0	18.6 pt
	Badge X2[OG]	M	0.5-0.8 lb	0	2.7 lb Cu
	copper sulfate				
	Cuprofix-Ultra 40	M	0.5-1 pt	0	6 pt
	Mastercop	M	0.5-1 pt	0	6 pt
	Nordox 75WG[OG]	M	1-3 lb		
Downy mildew (*Peronospora parasitica*)	Actigard 50WG	21	0.8-1 oz	7	4 oz[17]
	Actinovate AG[OG]		3-12 oz		
	Aliette WDG	33	2-5 lb	3	7 app
	Alude	33	0.5 gal/40 gal		
	Cabrio	11	12-16 oz	0	64 oz
	copper hydroxide				
	Kocide 3000	M	0.5-0.8 lb	0	8.8 lb
	Kocide 2000	M	0.8-1.5	0	7.6 lb
	Champ Formula 2 Flowable	M	0.3-0.7 pt	0	7.3 pt
	Champ WG[OG]	M	1 lb	0	5.3 lb
	copper hydroxide and copper oxychloride[11]				
	Badge SC	M	1.7 pt	5	28.1 pt
	Badge X2[OG]	M	1.8-3.5 lb	5	8 lb
	copper sulfate				
	Cuprofix-Ultra 40	M	0.5-1 pt	0	6 pt
	Mastercop	M	0.5-1 pt	0	6 pt
	Nordox 75WG[OG]	M	1-2 lb		

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Table 1. Recommended pesticides, rates and pesticide use restrictions for selected vegetable crops
The symbol [OG] *indicates a pesticide that has been listed by the Organic Materials Review Institute (OMRI) as approved for use in organic production.*

Disease (Pathogen)	Product Choices[1] and Product Mode of Action Group[2]		Rate[3]	PHI[4]	Maximum Use
	Forum	40	6 fl oz[12]	0	18 fl oz
	Micora	40	5.5-8 fl oz[12]		8 fl oz
	Milstop[OG]	40	2-5 lb/100 gal		
	phosphorous acid				
	Confine Extra	33	1-3 qt		
	Rampart	33	1-3 qt/100 gal		
	potassium phosphite				
	Fosphite	33	1-3 qt/100 gal		
	Fungi-phite	33	1-5 qt	0	6 app
	Helena ProPhyt	33	2-4 pt	0	7 app
	Ranman	21	2.8 fl oz	0	39.5 fl oz
	Reason 500SC	11	5.5-8.2 fl oz	2	24.6 fl oz
	Revus	40	8 fl oz	1	32 fl oz
	Serenade[OG]				
	ASO	44	2-6 qt	0	
	Max	44	1-3 lb	0	
	Sonata[OG]	44	2-4 qt	0	
	Zampro 525SC	40, 45	14 fl oz	0	42 fl oz
Peppery leaf spot (*Pseudomonas syringae* pv. *maculicola*)	Cease		3-6 qt/100 gal	0	
	Serenade[OG]				
	ASO	44	2-6 qt	0	
	Max	44	1-3 lb	0	
	Sonata[OG]	44	2-4 qt	0	
Powdery mildew (*Erysiphe polygoni*)	Actinovate AG[OG]		3-12 oz		
	Cease		3-6 qt/100 gal	0	
	Endura	7	6-9 oz	14	18 oz
	Fontelis	7	14-30 fl oz	0	72 fl oz
	Inspire Super	3, 9	16-20 fl oz	7	80 fl oz
	MilStop[OG]	40	2-5 lb/100 gal		
	phosphorous acid				
	Confine Extra	33	1-3 qt		
	Rampart	33	1-3 qt/100 gal		
	Fosphite	33	1-3 qt/100 gal		
	Procure 480 SC	3	6-8 fl oz	1	18 fl oz
	Quadris Top	11, 3	12-14 fl oz	1	56 fl oz
	Quintec	13	4-6 fl oz	1	24 fl oz
	Serenade[OG]				
	ASO	44	2-6 qt		
	Max	44	1-3 lb		
	Sonata[OG]	44	2-4 qt		
	sulfur[OG]				
	Microfine Sulfur	M	6-25 lb		
	Microthiol Disperss	M	3-10 lb		
	Yellow Jacket Wettable	M	6-25 lb		
	Switch 62.5WG	9, 12	10-12 oz	7	56 oz
	tebuconazole				
	Monsoon	3	3-4 fl oz	7	16 fl oz

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Disease (Pathogen)	Product Choices[1] and Product Mode of Action Group[2]		Rate[3]	PHI[4]	Maximum Use
	Onset 3.6L	3	3-4 fl oz	7	16 fl oz
	Tebu-Crop 3.6F	3	3-4 fl oz	7	16 fl oz
	Toledo	3	3-4 fl oz	7	16 fl oz
Damping-off (*Pythium* spp.)	Actinovate AG[OG]		3-12 oz		
	mefenoxam				
	Ridomil Gold SL	4	0.3-0.5 pt[13]		1 app
	Ultra Flourish	4	0.5-1 pt		4 pt
	phosphorous acid				
	Confine Extra	33	1-3 qt		
	Rampart	33	1-3 qt/100 gal		
	potassium phosphite				
	Fosphite	33	1-3 qt/100 gal		
	Fungi-phite	33	1-5 qt		
	RootShield Granules	44	2.5-6 lb/ ½acre[13]		1 app
Phytophthora root rot (*Phytophthora* spp.)	Actinovate AG[OG]		3-12 oz		
	Ultra Flourish	4	0.5-1 pt		4 pt
	phosphorous acid	3333	1-3 qt1-3 qt/100 gal		
	Confine Extra				
	Rampart	33	1-3 qt/100 gal1-5 qt2.5-6 lb/ ½acre[13]		
	potassium phosphite	33			
	Fosphite	44			
	Fungi-phite				1 app
	RootShield Granules				
Rhizoctonia basal stem and root rot, Wire stem (*Rhizoctonia solani*)	azoxystrobin				
	Quadris	11	0.4-0.8 fl oz[6]		1 app
	Satori	11	0.4-0.8 fl oz[6]		1 app
	Cabrio	11	12-16 oz	3	64 oz
Sclerotina stem rot (*Sclerotinia minor*, *S. sclerotiorum*)	Actinovate AG[OG]		3-12 oz		
	Cabrio	11	12-16 oz	3	64 oz
	Endura	7	6-9 oz	14	18 oz
	Fontelis	7	16-30 fl oz	0	72 fl oz
White rust (*Albugo candida*)	azoxystrobin				
	Quadris	11	6-15.5 fl oz	0	46 fl oz
	Satori	11	6-15.5 fl oz	0	46 fl oz
	Cabrio	11	12-16 oz	3	64 oz
	Reason 500SC	11	8.2 fl oz	2	24.6 fl oz
Herbs (Chervil, Cilantro, Coriander, Endive, Fennel and Parsley (excluding basil) and Other Leafy Vegetables (excluding lettuces and greens)					
Bacterial leaf spot (*Pseudomonas syringae* pathovars)	No products are currently labeled for bacterial leaf spot of herbs. Hot water treat seed to remove bacteria from the seed surface. See Seed Treatment section of this guide for instructions on how to treat seed.				
Cercospora and Septoria leaf blights (*Cercospora* spp., *Septoria* spp.)	azoxystrobin				
	Quadris	11	6-15.5 fl oz	0	92.3 fl oz
	Quadris Opti	11, M	2.4-3.7 pt	7	footnote[29]
	Satori	11	6-15.5 fl oz	0	92.3 fl oz
	Cabrio	11	12-16 oz	0	64 fl oz

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Disease (Pathogen)	Product Choices[1] and Product Mode of Action Group[2]		Rate[3]	PHI[4]	Maximum Use
	chlorothalonil				
	Bravo Ultrex	M	1.8-2.7 lb[28]	7	21.8 lb
	Chlorothalonil 720SC	M	2-3 pt[28]	7	24 pt
	Fontelis	7	14-24 fl oz	3	72 fl oz
	propiconazole				
	Bumper 41.8EC	3	3-4 fl oz[28]	14	16 fl oz
	Bumper ES	3	3-4 fl oz[28]	14	16 fl oz
	Propi-StarEC	3	3-4 fl oz[28]	14	16 fl oz
	Tilt	3	3-4 fl oz[28]	14	16 fl oz
	Switch 62.5WG	9, 12	11-14 oz	0	56 oz
Downy mildew	Actinovate AG[OG]		3-12 oz		
(*Peronospora* spp.)	Aliette	33	2-5 lb	3	7 app
	azoxystrobin				
	Quadris	11	12-15.5 fl oz		92.3 fl oz
	Satori	11	12-15.5 fl oz[15]		92.3 fl oz
	Cabrio	11	16 oz	0	64 fl oz
	Micora	40	5.5-8 fl oz[12]		2 app
	phosphorous acid				
	Confine Extra	33	1-4 qt		
	Rampart	33	1-3 qt/100 gal		
	potassium phosphite				
	Fosphite	33	1-3 qt/100 gal		
	Fungi-phite	33	1-2 qt		
	Helena ProPhyt	33	2-4 pt		
	Presidio	43	3-4 fl oz[12]	2	12 fl oz
	Ranman	21	2.8 fl oz	0	16.5 fl oz
	Reason 500SC	11	5.5-8.2 fl oz	2	24.6 fl oz
	Revus	40	8 fl oz	1	32 fl oz
	Serenade[OG]				
	ASO	44	2-6 qt	0	
	Max	44	1-3 lb	0	
	Sonata[OG]	44	2-4 qt	0	
	Tanos	27, 11	8-10 oz	1	48 oz
	Zampro	45, 40	14 fl oz	0	42 fl oz
Damping-off	mefenoxam				
(*Pythium* spp.)	Ridomil Gold SL	4	1-2 pt[13]	7	1 lb a.i.
	Ultra Flourish	4	2-4 pt[13]	7	4 pt
	phosphorous acid				
	Confine Extra	33	1-4 qt		
	Rampart	33	1-3 qt/100 gal		
	Fosphite	33	1-3 qt/100 gal		
	Ranman	21	2.8 fl oz[13]		16.5 fl oz1
	Rootshield Granules	44	2.5-6 lb/ ½acre[13]	0	app
	Uniform	4, 11	0.34 fl oz[6]		1 app
Damping-off	phosphorous acid				
(*Rhizoctonia solani*)	Confine Extra	33	1-4 qt		
	Rampart	33	1-3 qt/100 gal		

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	Fosphite	33	1-3 qt/100 gal		
	Rootshield Granules	44	2.5-6 lb/ ½acre[13]	0	1 app
	Serenade Soil	44	2-6 qt[13]		
White rust	azoxystrobin				
(*Albugo occidentalis*)	Quadris	11	6-15.5 fl oz	0	92.3 fl oz
	Satori	11	6-15.5 fl oz[15]	0	92.3 fl oz
	Cabrio	11	8-12 fl oz	0	64 fl oz
	Presidio	43	3-4 fl oz[12]	2	12 fl oz
	Ranman	21	2.8 fl oz	0	16.5 fl oz
	Reason 500SC	11	5.5-8.2 fl oz	2	24.6 fl oz
	Serenade[OG]				
	ASO	44	2-6 qt	0	
	Max	44	1-3 lb	0	
	Tanos	27, 11	8-10 oz	1	48 oz
Lettuces					
Bacterial spot	Actinovate AG[OG]		3-12 oz		
(*Xanthomonas campestris*	Serenade[OG]				
pv. *vitians*)	ASO	44	2-6 qt	0	
	Max	44	1-3 lb	0	
	Sonata[OG]	44	2-4 qt	0	
Bottom rot	azoxystrobin				
(*Rhizoctonia solani*)	Quadris	11	0.4-0.8 fl oz[6,13]	0	92.3 fl oz
	Satori	11	0.4-0.8 fl oz[6,13]	0	92.3 fl oz
	Endura	7	8-11 oz	14	22 oz
	iprodione				
	Iprodione 4L AG	2	1.5-2 pt	14	3 app
	Meteor	2	1.5-2 pt	14	3 app
	Nevado 4F	2	1.5-2 pt	14	3 app
	Rovral 4F	2	1.5-2 pt	14	3 app
Botrytis rot (or gray mold)	Botran 5F				
(*Botrytis cinerea*)	At planting	14	0.6 qt	14	3.2 qt[16]
	Pre-thinning	14	0.6-1.8 qt	14	3.2 qt[16]
	Post-thinning	14	1.8-3.2 qt	14	3.2 qt[16]
	Endura	7	8-11 oz	14	22 oz
	Fontelis	7	16-24 fl oz	3	72 fl oz
	iprodione				
	Meteor	2	1.5-2 pt	14	3 app
	Nevado 4F	2	1.5-2 pt	14	3 app
	Rovral 4F	2	1.5-2 pt	14	3 app
	Merivon	7, 11	8-11 fl oz	1	33 fl oz
	Switch 62.5WG	9, 12	11-14 oz	0	56 oz
Downy mildew	azoxystrobin				
(*Bremia lactucae*,	Quadris	11	12-15.5 fl oz	0	92.3 fl oz
Peronospora spp.)	Satori	11	12-15.5 fl oz[15]	0	92.3 fl oz
	Actigard 50WG	21	0.8-1 oz	7	4 oz[17]
	Actinovate AG[OG]		3-12 oz		

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Disease (Pathogen)	Product Choices[1] and Product Mode of Action Group[2]		Rate[3]	PHI[4]	Maximum Use
	Aliette WDG	33	2-5 lb	3	7 app
	Alude	33	0.5 gal/40 gal		
	Cabrio	11	12-16 oz	0	64 oz
	copper hydroxide				
	Kocide 3000	M	0.8-1.5 lb	0	26.6 lb
	Champ Formula 2 Flowable	M	0.7-1.3 pt	0	22 pt
	copper hydroxide and copper oxychloride[11]				
	Badge SC	M	1.7 pt	5	28.1 pt
	Badge X2[OG]	M	1.8-3.5 lb	5	8 lb
	Nordox 75WG[OG]	M	1-2 lb		
	Manzate Pro-Stick	M	1.6-2.1 lb		
	ManKocide	M	1-2 lb	10	12.8 lb
	Micora	40	5.5-8 fl oz[12]	10	26 lb
	Milstop[OG]		2-5 lb/100 gal		2 app
	phosphorous acid				
	Confine Extra	33	1-4 qt		
	Rampart	33	1-3 qt/100 gal		
	potassium phosphite				
	Fosphite	33	1-3 qt/100 gal		
	Fungi-phite	33	1-2 qt		6 app
	Helena ProPhyt	33	2-4 pt		7 app
	Presidio	43	3-4 fl oz[12]	2	12 fl oz
	Prev-AM		50 fl oz/100 gal		
	Previcur Flex	28	2 pt	2	8 pt
	Ranman	21	2.8 fl oz	0	16.5 fl oz
	Reason 500SC	11	5.5-8.2 fl oz	2	24.6 fl oz
	Revus	40	8 fl oz	1	32 fl oz
	Serenade[OG]				
	ASO	44	2-6 qt	0	
	Max	44	1-3 lb	0	
	Sonata[OG]	44	2-4 qt	0	
	Tanos	27, 11	8-10 oz	1	48 oz
	Zampro	40, 45	14 fl oz	0	42 fl oz
Lettuce drop (*Sclerotinia minor*, *S. sclerotiorum*)	Botran 5F				
	At planting	14	0.6 qt	14	3.2 qt[16]
	Pre-thinning	14	0.6-1.8 qt	14	3.2 qt[16]
	Post-thinning	14	1.8-3.2 qt	14	3.2 qt[16]
	Endura	7	8-11 oz	14	22 oz
	Fontelis	7	16-24 fl oz	3	72 fl oz
	iprodione				
	Iprodione 4L AG	2	1.5-2 pt	14	3 app
	Meteor	2	1.5-2 pt	14	3 app
	Nevado 4F	2	1.5-2 pt	14	3 app
	Rovral 4F	2	1.5-2 pt	14	3 app
	Merivon (***S. minor* only**)	7, 11	8-11 fl oz	1	33 fl oz
	Switch 62.5WG	9, 12	11-14 oz	0	56 oz

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Disease (Pathogen)	Product Choices[1] and Product Mode of Action Group[2]		Rate[3]	PHI[4]	Maximum Use
Powdery mildew (*Erysiphe cichoracearum*)	Actinovate AG[OG]		3-12 oz		
	azoxystrobin				
	Quadris	11	12-15.5 fl oz	0	92.3 fl oz
	Satori	11	12-15.5 fl oz[15]	0	92.3 fl oz
	Cabrio	11	12-16 oz	0	64 oz
	Endura	7	8-11 oz	14	22 oz
	Fontelis	7	16-24 fl oz	3	72 fl oz
	Milstop[OG]		2-5 lb/100 gal		
	Merivon	7, 11	4-11 fl oz	1	33 fl oz
	phosphorous acid				
	Confine Extra	33	1-4 qt		
	Rampart	33	1-3 qt/100 gal		
	Fosphite	33	1-3 qt/100 gal		
	Prev-Am		50 fl oz/100 gal		
	Procure 480 SC	3	6-8 fl oz	0	18 fl oz
	Quintec[18]	13	4-6 fl oz	1	24 fl oz
	Rally 40WSP	3	5 oz	3	4 app
	Serenade[OG]				
	ASO	44	2-6 qt	0	
	Max	44	1-3 lb	0	
	Sonata[OG]	44	2-4 qt	0	
	Microthiol Disperss	M	5-10 lb	0	
	Switch 62.5WG	9, 12	11-14 oz		56 oz
	Trilogy[OG]		1%		
Damping-off (*Pythium* spp.)	mefenoxam				
	Ridomil Gold SL	4	1-2 pt[13]	7	1 lb a.i.
	Ultra Flourish	4	2-4 pt[13]	7	4 pt
	phosphorous acid				
	Confine Extra	33	1-4 qt		
	Rampart	33	1-3 qt/100 gal		
	potassium phosphite				
	Fosphite	33	1-3 qt/100 gal		
	Fungi-phite	33	1-2 qt		6 app
	Previcur Flex	28	2 pt[13]	2	8 pt
	Ranman	21	2.8 fl oz[13]	0	16.5 fl oz
	Rootshield Granules	44	2.5-6 lb/ ½acre[13]		1 app
	Uniform	4, 11	0.34 fl oz[6]		1 app

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Disease (Pathogen)	Product Choices[1] and Product Mode of Action Group[2]		Rate[3]	PHI[4]	Maximum Use
Cercospora leaf spot (*Cercospora abelmoschi*, *C. malayensis*)	chlorothalonil				
	Bravo Ultrex	M	1.4 lb	3	10.9 lb
	Bravo WeatherStix	M	1.5 pt	3	12 pt
	Chloronil	M	1.5 pt	3	12 pt
	Equus720SST	M	1.5 pt	3	12 pt
	tebuconazole				
	(Orius 3.6F, Uppercut, Folicur, Tebustar 3.6L)	3	4-6 fl oz	3	24 fl oz
Downy mildew	Micora	40	5.5-8 fl oz		2 app
Powdery mildew (*Erysiphe cichoracearum*)	Ariston	27, M	2-4.4 pt	3	17.5 pt
	chlorothalonil				
	Bravo Ultrex	M	1.4 lb	3	10.9 lb
	Bravo WeatherStix	M	1.5 pt	3	12 pt
	Chloronil	M	1.5 pt	3	12 pt
	Equus720SST	M	1.5 pt	3	12 pt
	copper hydroxide				
	Kentan DF	M	0.5-1.5 lb		5.25 lb
	Kocide 3000	M	0.75-1.5 lb	0	17.5 lb
	Kocide 2000	M	1.5-3 lb	0	15 lb
	Mastercop	M	0.5-1.5 pt		9 pt
	Milstop[OG]		2-5 lb/100 gal	0	
	potassium phosphite				
	Confine Extra	33	1-4 qt	0	
	Fosphite	33	1-3 qt	0	
	KPhite	33	1-4 qt	0	
	Rampart	33	1-3 qt/100 gal	0	
	Inspire Super	3, 9	16-20 fl oz	0	47 fl oz
	Quadris Flowable	11	6-15.5 fl oz	0	61.5 fl oz
	Quadris Top	11, 3	8-14 fl oz	7	55.3 fl oz
	Rally 40WSP	3	2.5-5 oz	0	1.25 lb a.i
	Serenade				
	ASO[OG]	44	2-6 qt		
	MAX[OG]	44	1-3 lb		
	Microthiol Disperss[OG]	M	3-10 lb		
	Switch 62.5WG	9, 12	11-14 oz	0	56 oz
	Trilogy[OG]		0.5-1%/100 gal		
	Vivando	U8	15.4 fl oz	0	46.2 fl oz
Damping-off (*Rhizoctonia* spp.)	Quadris 2.08F	11	0.4-0.8 fl oz[6]		1 app
Onions (Dry, Green, Shallots and Spanish), Garlic and Leeks					
Bacterial leaf blight (*Xanthomonas axonopodis* pv. *allii*, *Pseudomonas syringe* pv. *porri*)	Actigard 50WG **(dry only)**	21	0.75-1 oz	7	4 oz
	copper hydroxide				
	Kentan DF	M	1.5 lb	0	6 lb
	Kocide 3000	M	0.75-1.5 lb	0	20 lb
	Kocide 2000	M	1.5 lb	0	17.1 lb
	Mastercop	M	0.5-1.5 pt	7	9 pt

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Disease (Pathogen)	Product Choices[1] and Product Mode of Action Group[2]		Rate[3]	PHI[4]	Maximum Use
Botrytis leaf blight, Neck rot, Purple blotch and Stemphylium blight	Aliette WDG **(dry only)**	33	2-3 lb	7	7 app
	Cabrio EG	11	8-12 oz	7	72 oz
	Cease Biofungicide[OG]	44	3-6 qt/100 gal	0	
	chlorothalonil				
	Dry and Garlic				
	Bravo Ultrex	M	0.9-2.7 lb	7	18.2 lb
	Bravo	M	1-3 pt	7	20 pt
	Bravo ZN	M	1.5-4.25 pt	7	29 pt
	Chloronil 720	M	1-3 pt	7	20 pt
	Chlorothalonil	M	1-3 pt	7	20 pt
	Echo 720	M	1-2 pt	7	1.5 lb a.i.
	Equus 720SST	M	1-3 pt	7	20 pt
	Equus 500ZN	M	1.5-4.25 pt	7	29 pt
	Intiate	M	1-3 pt	7	20 pt
	Initiate ZN	M	1.5-4.25 pt	7	29 pt
	Green, leeks, shallots				
	Bravo Ultrex	M	1.47-2.7 lb	14	8.2 lb
	Bravo	M	1.5-3 pt	14	9 pt
	Bravo ZN	M	2.25-4.25 pt	14	17 pt
	Chloronil 720	M	1.5-3 pt	14	9 pt
	Chlorothalonil	M	1.5-3 pt	14	9 pt
	Echo 720	M	1.5-3 pt	14	6.7 lb a.i.
	Equus 720SST	M	1.5-3 pt	14	9 pt
	Equus 500ZN	M	2.25-4.25 pt	14	13 pt
	Intiate	M	1.5-3 pt	14	3 apps
	Initiate ZN	M	2.25-4.25 pt	14	13 pt
	copper hydroxide				
	Badge SC	M	1.5 pt		21.1 pt
	Badge X2[OG]	M	0.75 lb		6 lb a.i.
	Champ DP DRY	M	1.33 lb		16 lb
	Champ Formula 2	M	1.33 pt		16.5 pt
	Champ WG[OG]	M	2 lb		12 lb
	Kentan DF	M	2 lb		6 lb a.i
	Kocide 3000	M	0.75-1.5 lb		20 lb
	Kocide 2000	M	1.5 lb		17.1 lb
	Nordox WG[OG]	M	1.25-2.5 lb		
	copper sulfate				
	Cuprofix Ulta 40 **(dry, green, garlic)**	M	1.25-2.25 lb		15 lb
	Cuproxat	M	2.5-4.9 pt	7	29.6 pt
	Fontelis	7	16-24 fl oz	3	72 fl oz
	Helena Prophyt		4 pt	0	7 apps
	Inspire Super **(green)**	3,9	16-20 fl oz	14	60 fl oz
	Inspire Super **(dry)**	3,9	16-20 fl oz	7	80 fl oz
	iprodione **(dry onions only)**				
	Iprodione 4L AG	2	1 pt	7	5 app
	Meteor	2	1 pt	7	10 app
	Nevado 4F	2	1 pt	7	10 app

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Table 1. Recommended pesticides, rates and pesticide use restrictions for selected vegetable crops
The symbol [OG] *indicates a pesticide that has been listed by the Organic Materials Review Institute (OMRI) as approved for use in organic production.*

Disease (Pathogen)	Product Choices[1] and Product Mode of Action Group[2]		Rate[3]	PHI[4]	Maximum Use
	Rovral 4 Flowable mancozeb	2	1 pt	7	10 app
	Dithane F45 Rainshield	M	2.4 qt	7	24 qt
	Dithane M45	M	3 lb	7	30 lb
	Manzate Flowable **(dry, garlic, shallot)**	M	2.4 qt	7	24 qt
	Manzate Max **(dry, garlic, shallot)**	M	1.6-2.4 qt	7	24 qt
	Manzate Pro-Stick **(dry, garlic, shallot)**	M	3 lb	7	30 lb
	Penncozeb 75DF **(dry, garlic, shallot)**	M	2-3 lb	7	24 lb
	Penncozeb 80WP **(dry, garlic, shallot)**	M	2-3 lb	7	24 lb
	ManKocide **(dry only)**	M	2.5 lb	7	20 lb
	Merivon	7, 11	8-11 fl oz	7	33 fl oz
	Omega 500F	29	1 pt	7	6 app
	Pristine	7, 11	10.5-18.5 oz	7	111 oz
	propiconazole				
	Dry, garlic and shallots				
	Amtide	3	2-8 fl oz	14	16 fl oz
	Bumper 41.8EC	3	2-8 fl oz	14	16 fl oz
	Bumper ES	3	2-8 fl oz	14	16 fl oz
	Fitness	3	2-8 fl oz	14	16 fl oz
	Tilt	3	2-8 fl oz	14	16 fl oz
	Topaz	3	2-8 fl oz	14	16 fl oz
	Green and leeks				
	Amtide	3	2-8 fl oz	0	16 fl oz
	Bumper 41.8EC	3	2-8 fl oz	0	16 fl oz
	Bumper ES	3	2-8 fl oz	0	16 fl oz
	Fitness	3	2-8 fl oz	0	16 fl oz
	Tilt	3	2-8 fl oz	0	16 fl oz
	Topaz	3	2-8 fl oz	0	16 fl oz
	Quadris	11	9-15.5 fl oz	0	92.3 fl oz
	Quadris Opti **(dry, garlic only)**	11, M	1.6-3.2 pt	7	3 apps
	Quadris Opti **(green, leek, shallots)**	11, M	1.6-3.2 pt	14	3 apps
	Quadris Top **(dry only)**	11, 3	12-14 fl oz	7	56 fl oz
	Quadris Top **(green only)**	11, 3	12-14 fl oz	7	42 fl oz
	Quilt **(dry only)**	11, 3	14-27.5 fl oz	14	55.3 fl oz
	Quilt **(green only)**	11, 3	14-27.5 fl oz	0	55.3 fl oz
	Quilt Xcel **(dry only)**	11, 3	14-26 fl oz	14	56 fl oz
	Quilt Xcel **(green only)**	11, 3	14-26 fl oz	0	56 fl oz
	Reason 500SC	11	5.5 fl oz	7	22 fl oz
	Ridomil Gold Bravo **(dry, garlic)**	4, M	2.5 pt	7	15 lb a.i.

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	Ridomil Gold Bravo **(green, leeks, shallots)**	4, M	2.5 pt	14	6.75 lb a.i.
	Satori	11	6-12 fl oz	0	92.3 fl oz
	Scala SC	9	9-18 fl oz	7	54 fl oz
	Serenade				
	ASO[OG]	44	2-6 qt		
	MAX[OG]	44	1-3 lb		
	Switch 62.5WG	9, 12	11-14 oz	7	56 oz
	Tanos	11, 27	8 oz	3	84 oz
	tebuconazole				
	Dry, garlic and shallot				
	Monsoon	3	4-6 fl oz	7	12 fl oz
	Onset 3.6L	3	4-6 fl oz	7	12 fl oz
	Tebustar 3.6L	3	4-6 fl oz	7	12 fl oz
	Toledo 3.6F	3	4-6 fl oz	7	12 fl oz
	Green and leeks				
	Monsoon	3	4-6 fl oz	7	24 fl oz
	Onset 3.6L	3	4-6 fl oz	7	24 fl oz
	Tebustar 3.6L	3	4-6 fl oz	7	24 fl oz
	Toledo 3.6F	3	4-6 fl oz	7	24 fl oz
	Vangard WG	9	10 oz	7	28 oz
Downy mildew (*Peronospora destructor*)	Actigard 50WG **(dry only)**	21	0.75-1 oz	7	4 oz
	Actinovate AG	44	3-12 oz	0	
	Aliette WDG **(dry only)**	33	2-3 lb	7	7 app
	Alude	33	2 qt/100 gal		
	Cabrio EG	11	12 oz	7	72 oz
	Cease Biofungicde[OG]	44	3-6 qt/100 gal	0	
	chlorothalonil				
	Dry and Garlic				
	Bravo Ultrex	M	0.9-2.7 lb	7	18.2 lb
	Bravo	M	1-3 pt	7	20 pt
	Bravo ZN	M	1.5-4.25 pt	7	29 pt
	Chloronil 720	M	1-3 pt	7	20 pt
	Chlorothalonil	M	1-3 pt	7	20 pt
	Echo 720	M	1-2 pt	7	1.5 lb a.i.
	Equus 720SST	M	1-3 pt	7	20 pt
	Equus 500ZN	M	1.5-4.25 pt	7	29 pt
	Intiate	M	1-3 pt	7	20 pt
	Initiate ZN	M	1.5-4.25 pt	7	29 pt
	Green, leeks, shallots				
	Bravo Ultrex	M	1.47-2.7 lb	14	8.2 lb
	Bravo	M	1.5-3 pt	14	9 pt
	Bravo ZN	M	2.25-4.25 pt	14	17 pt
	Chloronil 720	M	1.5-3 pt	14	9 pt
	Chlorothalonil	M	1.5-3 pt	14	9 pt
	Echo 720	M	1.5-3 pt	14	6.7 lb a.i.
	Equus 720SST	M	1.5-3 pt	14	9 pt
	Equus 500ZN	M	2.25-4.25 pt	14	13 pt

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Table 1. Recommended pesticides, rates and pesticide use restrictions for selected vegetable crops
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Disease (Pathogen)	Product Choices[1] and Product Mode of Action Group[2]		Rate[3]	PHI[4]	Maximum Use
	Intiate	M	1.5-3 pt	14	3 apps
	Initiate ZN	M	2.25-4.25 pt	14	13 pt
	copper hydroxide				
	Badge SC	M	1.5 pt		21.1 pt
	Badge X2	M	0.75 lb		6 lb a.i.
	Champ DP Dry	M	1.33 lb		16 lb
	Champ Formula 2	M	1.33 pt		16.5 pt
	Champ WG[OG]	M	2 lb		12 lb
	Kentan DF	M	2 lb		6 lb a.i.
	Kocide 3000	M	0.75-1.5 lb		20 lb
	Kocide 2000	M	1.5 lb		17.1 lb
	copper sulfate				
	Cuprofix Ultra 40 **(dry, green, garlic)**	M	1.25-2.5 lb		15 lb
	Cuproxat	M	2.5-4.9 pt	7	29.6 pt
	Nordox WG[OG]	M	1.25-2.5 lb		
	Forum	40	6 fl oz	0	30 fl oz
	mancozeb				
	Dithane F45 Rainshield	M	2.4 qt	7	24 qt
	Dithane M45	M	3 lb	7	30 lb
	Manzate Flowable **(dry, garlic, shallot)**	M	2.4 qt	7	24 qt
	Manzate Max **(dry, garlic, shallot)**	M	1.6-2.4 qt	7	24 qt
	Manzate ProStick **(dry, garlic, shallot)**	M	3 lb	7	30 lb
	Penncozeb 75DF **(dry, garlic, shallot)**	M	2-3 lb	7	24 lb
	Penncozeb 80WP **(dry, garlic, shallot)**	M	2-3 lb	7	24 lb
	ManKocide **(dry only)**	M	2.5 lb	7	20 lb
	Omega 500F	29	1 pt	7	6 app
	phosphorous acid				
	Confine Extra	33	1-4 qt	0	
	Phostrol **(dry only)**	33	2.5-3.75 pt	0	7 app
	Rampart	33	1-3 qt/100 gal	0	
	potassium phosphite				
	Fosphite	33	1-3 qt/100 gal	0	6 app
	Fungi-phite	33	1-5 qt	0	7 app
	Helena ProPhyt	33	4 pt	0	
	Presidio	43	3-4 fl oz	2	12 fl oz
	Pristine	7, 11	18.5 oz	7	111 oz
	Quadris	11	9-15.5 fl oz	0	92.3 fl oz
	Quadris Opti **(dry, garlic only)**	11, M	2.4-3.7 pt	7	3 apps
	Quadris Opti **(green, leek, shallots)**	11, M	2.4-3.7 pt	14	3 apps
	Quilt Xcel **(dry only)**	11, 3	17.5-26 fl oz	14	56 fl oz

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Table 1. Recommended pesticides, rates and pesticide use restrictions for selected vegetable crops
The symbol [OG] *indicates a pesticide that has been listed by the Organic Materials Review Institute (OMRI) as approved for use in organic production.*

Disease (Pathogen)	Product Choices[1] and Product Mode of Action Group[2]		Rate[3]	PHI[4]	Maximum Use
	Quilt Xcel **(green only)**	11, 3	17.5-26 fl oz	0	56 fl oz
	Reason 500SC	11	5.5 fl oz	7	22 fl oz
	Revus	40	8 fl oz	7	32 fl oz
	Ridomil Gold Bravo **(dry, garlic)**	4, M	2.5 pt	7	15 lb a.i.
	Ridomil Gold Bravo **(green, leeks, shallots)**	4, M	2.5 pt	14	6.75 lb a.i.
	Ridomil Gold MZ WG	4, M	2.5 lb	7	4 app
	Ridomil Gold Copper	4, M	2 lb	10	0.4 lb a.i.
	Ridomil Gold Copper	4, M	2 lb	7	0.3 lb a.i.
	Satori	11	9-15.5 fl oz	0	92.3 fl oz
	Serenade				
	ASO[OG]	44	2-6 qt		
	MAX[OG]	44	1-3 lb		
	Trilogy[OG]		1%/100 gal		
	Zampro	45, 40	14 fl oz	0	42 fl oz
Damping-off (*Pythium* spp.)	mefenoxam				
	Ridomil Gold SL	4	0.5-1 pt[8]		1 lb a.i
	Ultra Flourish	4	1-2 pt[8]	0	4 pt
	Metastar 2E	4	2-4 pt[8]		1 app
	Uniform	11, 4	0.34 fl oz[6]		1 app
White rot (*Sclerotinia cepivorum*)	**Dry, garlic, shallots only**				
	Cannonball WP	12	7 oz	7	32 oz
	dicloran				
	Botran 5F	14	2-3.2 qt		1 app
	Botran 75W	14	3-5.3 lb		1 app
	Fontelis	7	16-24 fl oz	3	72 fl oz
	tebuconazole				
	Monsoon	3	20.5 fl oz		1 app
	Onset 3.6L	3	20.5 fl oz		1 app
	Orious 3.6F	3	20.5 fl oz		1 app
	Tebu-crop 3.6F	3	20.5 fl oz		1 app
	Tebustar 3.6L	3	20.5 fl oz		1 app
	Tebustar 3.6L	3	20.5 fl oz		1 app
	Quadris OPTI	11, M	1.6-3.2 pt	7	3 apps
	Quilt Xcel	3, 11	17.5-26 fl oz	14	56 fl oz
	Switch 62.5WG	9, 12	7-14 oz		1 app
	thiophanate-Methyl				
	85 WDG	1	0.4-0.6 oz[6]		1 app
	Incognito 4.5F	1	40 fl oz		1 app
	Topsin 4.5FL	1	40 fl oz		1 app
	Topsin M 70WDG	1	2 lb		1 app
	Topsin M 70WP	1	2 lb		1 app
	Topsin M WSB	1	2 lb		1 app
Peas (Garden, Green and Sweet)					
Gray mold	Endura 70WG	7	8-11 oz	7	2 app

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Disease (Pathogen)	Product Choices[1] and Product Mode of Action Group[2]		Rate[3]	PHI[4]	Maximum Use
(*Botrytis cinerea*)	Fontelis	7	14-30 fl oz	0	72 fl oz
	Priaxor 500SC	11, 7	4-8 fl oz	7	16 fl oz
Powdery mildew	Actinovate AG[OG]		3-12 oz		
(*Erysiphe pisi*)	copper hydroxide				
	Kocide 3000	M	0.5-1.3 lb	0	13.2 lb
	Kocide 2000	M	1-2.3 lb	0	11.3 lb
	Champ WG[OG]	M	1.6 lb	0	7.9 lb
	copper hydroxide and copper oxychloride[11]				
	Badge SC	M	1-2.5 pt	0	13.9 pt
	Badge X2[OG]	M	0.5-1.3 lb	0	4 lb
	opper sulfate				
	Cuprofix Ultra-40	M	1-2 lb	0	9.9 lb
	Cuproxat	M	2-3.9 pt	0	19.5 pt
	Endura	7	8-11 oz	7	22 oz
	Fontelis	7	14-30 fl oz	0	72 fl oz
	MasterCop	M	0.5-1 pt		7 pt
	Milstop[OG]		2-5 lb/100 gal	0	
	phosphorous acid				
	Confine Extra	33	1-3 qt		
	Rampart	33	1-3 qt/100 gal		
	potassium phosphite				
	Fosphite	33	1-3 qt/100 gal		
	Fungi-phite	33	1-2 qt		6 app
	Helena ProPhyt	33	2-4 pt		7 app
	Priaxor	11, 7	4-8 fl oz	7	16 fl oz
	Sonata[OG]	44	2-4 qt	0	
	sulfur[OG]				
	Microfine Sulfur	M	3.8-36 lb	0	
	Microthiol Disperss	M	3-10 lb	0	
	Yellow Jacket Wettable	M	3.8-36 lb	0	
	Top Cop with Sulfur	M	2 qt	0	
	Trilogy[OG]		1%		
Damping-off	Actinovate AG[OG]		3-12 oz		
(*Pythium* spp.)	mefenoxam				
	Ridomil Gold SL	4	0.5-1 pt[8]		1 app
	Ultra Flourish	4	1-2 pt[8]	3	2 pt
	phosphorous acid				
	Confine Extra	33	1-4 qt		
	Rampart	33	1-3 qt/100 gal		
	potassium phosphite				
	Fosphite	33	1-3 qt/100 gal		
	Fungi-phite	33	1-2 qt		6 app
	Helena Prophyt	33	2-4 pt		7 app
Rust	Fontelis	7	14-30 fl oz	0	72 fl oz
(*Uromyces* sp.)	Priaxor 500SC	11, 7	4-8 fl oz	7	16 fl oz
	Quadris 2.08F	11	6.2 fl oz	0	92 fl oz

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Disease (Pathogen)	Product Choices[1] and Product Mode of Action Group[2]		Rate[3]	PHI[4]	Maximum Use
White mold (*Sclerotinia sclerotiorum*)	Contans WG [OG]		See label	0	1 app
	Endura 70WG	7	8-11 oz	7	2 app
	Fontelis	7	14-30 fl oz	0	72 fl oz
	Priaxor 500SC	11, 7	4-8 fl oz	7	16 fl oz
Peas (Southern, Dry)					
Alternaria leaf and pod spot (*Alternaria alternata*)	Quilt 1.66SC	3, 11	14 fl oz	7	3 app
	Priaxor 4.17SC	7, 11	4-8 fl oz	7	2 app
	Fontelis	7	14-30 oz	0	72 fl oz
	Quadris 2.08F	11	6.2-15.4 fl oz	0	92 fl oz
	Headline 2.09	11	6-9 fl oz	7	2 app
	Actinovate AG[OG]		3-12 oz	0	
Anthracnose (*Colletotrichum lindemuthianum*)	chlorothalonil				
	Bravo Ultrex	M	1.25-1.8 lb	7	7.3 lb
	Bravo WeatherStix	M	1.375-2 pt	7	8 pt
	thiophanate-methyl				
	Topsin M 70WP	1	1.5-2 lb	14	4 lb
	Incognito 4.5F	1	30-40 fl oz	14	80 fl oz
	Thiophanate-methyl 85WDG	1	0.8-1.6 lb	28	3.2 lb
	Quilt 1.66SC	11, 3	14 fl oz	0	42 fl oz
	Quilt Xcel	11, 3	10.5-14 fl oz	0	42 fl oz
	Priaxor 4.17SC	7, 11	4-8 fl oz	7	2 apps
	Fontelis	7	14-30 fl oz	7	72 fl oz
	Quadris 2.08F	11	6-15.5 fl oz	0	4 app
	Quadris Opti	11, M	1.6-2.4 pt	0	4 app
	Headline	11	6-9 fl oz	21	2 app
	Tilt	3	4 fl oz	7	12 fl oz
	Cueva[OG]	M	0.2-2 gal		
	Nordox 75WG[OG]	M	0.66-2.5 lb		
Bacterial blights (*Pseudomonas syringa*e pv. *pisi, P. s*. pv. *syringae*)	copper hydroxide				
	Kocide 3000	M	0.5-1.25 lb	0	15.8 lb
	Kocide 2000	M	0.75-2.25 lb	0	13.5 lb
	Champ WG[OG]	M	1.58 lb	7	9.48 lb
	copper hydroxide and copper oxychloride				
	Badge SC	M	1-2 pt	7	16.6 pt
	Badge X2[OG]	M	0.5-1.25 lb	7	2.65 lb
	copper sulfate				
	Cuprofix-Ultra 40	M	0.75-2 lb		11.19 lb
	Cuproxat	M	1.5-3.9 pt		23.4 pt
	Cueva[OG]	M	0.5-2 gal/100 gal		
	Nordox 75WG[OG]	M	0.6-2.5 lb		
Botrytis gray mold (*Botrytis cinerea*) **and White mold** (*Sclerotinia sclerotiorum*)	Proline 480SC **(white mold)**	3	4.3-5.7 fl oz	7	3 app
	Aproach	11	8-12 fl oz	7	24 fl oz
	Rovral 4F	2	1.5-2 pt	14	2 app

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Disease (Pathogen)	Product Choices[1] and Product Mode of Action Group[2]		Rate[3]	PHI[4]	Maximum Use
	thiophanate-methyl				
	Topsin M 70WP	1	1.5-2 lb	14	4 lb
	Incognito 4.5F	1	30-40 fl oz	14	80 fl oz
	85 WDG	1	0.8-1.6 lb	28	3.2 lb
	Fontelis	7	14-30 oz	7	72 fl oz
	Endura	7	8-11 oz	7	2 app
	Cannonball 50WP	12	7 oz	7	28 oz
	Switch 62.5WG	12, 9	11-14 oz	2	56 oz
	Cueva[OG]	M	0.5-2 gal/100 gal		
Damping-off (*Pythium* spp.)	Ridomil Gold PC GR	4, 14	0.75 lb[6]		1 app
	Ridomil Gold SL	4	0.5-1.0 pt[8]		1 app
	MetaStar 2E	4	2-4 pt[8]		1 app
	Ultra Flourish	4	1-2 pt[8]		1 app
	Uniform	4, 11	0.34 fl. oz[6]		1 app
Damping-off (*Rhizoctonia* spp.)	Quadris 2.08F	11	0.4-0.8 fl oz[6]		1 app
	Headline	11	0.1-0.8 fl oz[6]		1 app
	Blocker 4F	14	2.2-3.3 pt[6]		1 app
	Uniform	4, 14	0.34 fl oz[6]		1 app
Leaf spots and blights (*Alternaria* spp., *Ascochyta* spp., *Cercospora* spp.)	Aproach	11	6-12 fl oz	7	24 fl oz
	chlorothalonil				
	Bravo Ultrex	M	1.25-1.8 lb	7	7.3 lb
	Bravo WeatherStix	M	1.375-2 pt	7	8 pt
	Fontelis	7	14-30 fl oz	0	72 fl oz
	Quadris 2.08F	11	6.2-15.4 fl oz	0	4 app
	Quadris Opti	11, M	1.6-2.4 pt		4 app
	Headline	11	6-9 fl oz	21	2 app
Powdery mildew (*Erysiphe pisi*)	Endura	7	8-11 oz	7	2 app
	Priaxor 4.17SC	7, 11	4-8 fl oz	7	2 app
	Fontelis	7	14-30 oz	0	72 fl oz
	Headline **(dry beans)**	11	6-9 fl oz	21	2 app
	Nu-Cop 50DF	M	1.5 lb	1	7.5 lb
	Fosphite	33	1-3 qt/100 gal		
	sulfur				
	80%[OG]	M2	20 lb	0	
	90%[OG]	M2	15 lb	0	
	98%[OG]	M2	45 lb	0	
	Armicarb 100[OG]		2.5-5 lb	0	
Rhizocontia web blight, Pod tip rot, (*Rhizoctonia* spp.)	Tilt	3	4 fl oz	7	12 fl oz
	Quadris 2.08F	11	6-15.5 fl oz	0	4 app
	Quadris Opti	11, M	1.6-2.4 fl oz		4 app
	Quilt	11, 3	14 fl oz	7	42 fl oz
	Quilt Xcel	11, 3	10.5-14 fl oz	7	42 fl oz
Rust (*Phakopsora pachyrhizi*, *Uromyces* spp.)	Aproach	11	6-12 fl oz	7	24 fl oz
	Proline 480SC	3	5.7 fl oz	7	17 fl oz
	Rally 40WSP	3	4-5 oz	0	20 oz
	Folicur 3.6F	3	4-6 fl oz	7	12 fl oz
	Quilt 1.66SC	3, 11	14 fl oz	7	3 app

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Disease (Pathogen)	Product Choices[1] and Product Mode of Action Group[2]		Rate[3]	PHI[4]	Maximum Use
	Priaxor 4.17SC	7, 11	4-8 fl oz	7	2 app
	Fontelis Quadris 2.08F	7	14-30 oz	0	72 fl oz
	Quadris Opti	11	6.2-15.4 fl oz	0	4 app
	Headline	11, M	1.6-2.4 pt		4 app
	chlorothalonil	11	6-9 fl oz	21	2 app
	Bravo Ultrex	M	1.25-1.8 lb	7	4 app
	Bravo WeatherStix	M	1.375-2 pt	7	8pt
Peppers					
Anthracnose fruit rot (*Colletotrichum* spp.)	Actinovate AG[OG]		3-12 oz		
	Ariston	27, M	2-2.44 pt	3	18.1 pt
	azoxystrobin				
	Quadris	11	6-15.5 fl oz	0	61.5 fl oz
	Quadris Top	11, 3	8-14 fl oz	0	55.3 fl oz
	Satori	11	6-15.5 fl oz	0	61.5 fl oz
	Cabrio	11	8-12 oz	0	96 fl oz
	chlorothalonil				
	Bravo Ultrex	M	1.4 lb	3	10.9 lb
	Chloronil 720	M	1.5 pt	3	12 pt
	Echo 720	M	1.5 pt	3	9 lb a.i.
	Equus 720SST	M	1.5 pt	3	12 pt
	copper hydroxide				
	Kocide 3000	M	0.8-1.3 lb	0	39.5 lb
	Kocide 2000	M	1.5-2.3 lb	0	33.9 lb
	copper hydroxide and copper oxychloride				
	Badge SC	M	1-2.3 pt	3	41.7 pt
	Badge X2[OG]	M	0.8-1.3 lb	3	11.9 lb Cu
	Cuprofix-Ultra 40	M	0.8-2 lb	3	29.5 lb
	Nordox 75WG[OG]	M	2-4 lb	0	
	Flint	11	3-4 oz	3	16 fl oz
	Fontelis	7	24 fl oz	0	72 fl oz
	Inspire Super	9, 3	16-20 fl oz	0	47 fl oz
	ManKocide	M	2-3 lb		39 lb
	MasterCop	M	0.5-3 pt	7	30 pt
	Priaxor	7, 11	4-8 fl oz	0	24 fl oz
	Reason 500SC	11	5.5-8.2 fl oz	14	24.6 fl oz
	Serenade Optimum	44	4-20 oz		
	Tanos	27,	8-10 oz	3	72 oz
	Top Cop with Sulfur	11M	2 qt		
	Trilogy		1%		
Bacterial soft rot (*Pectobacterium carotovora* subsp. *carotovora*)	Tanos	27, 11	8-10 oz	3	72 oz
Bacterial seedling blight	Actigard 50WG **(Chile only)**	21	0.3-0.8 oz	14	6 oz
	Actinovate AG[OG]		3-12 oz		

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Table 1. Recommended pesticides, rates and pesticide use restrictions for selected vegetable crops
The symbol [OG] *indicates a pesticide that has been listed by the Organic Materials Review Institute (OMRI) as approved for use in organic production.*

Disease (Pathogen)	Product Choices[1] and Product Mode of Action Group[2]		Rate[3]	PHI[4]	Maximum Use
(*Pseudomonas syringae* pv. *syringae*)	Agri-Mycin 17 [OG,22]		200 ppm		
	Cease		3-6 qt/100 gal		
	copper hydroxide				
	Kocide 3000	M	0.8-1.3 lb	0	39.5 lb
	Kocide 2000	M	1.5-2.3 lb	0	33.9 lb
	Champ WG[OG]	M	1.6 lb	0	23.7 lb
	copper hydroxide and copper oxychloride				
	Badge SC	M	1-2.3 pt	3	41.7 pt
	Badge X2[OG]	M	0.8-1.3 lb	3	11.9 lb Cu
	copper sulfate				
	Cuprofix-Ultra 40	M	0.8-2 lb	3	29.5 lb
	Cuproxat	M	2.4-3.8 pt	3	58.4 pt
	Nordox 75WG[OG]	M	2-4 lb	0	
	ManKocide	M	2-3 lb	7	39 lb
	MasterCop	M	0.5-3 pt		30 pt
	Serenade[OG]				
	ASO	44	2-6 qt		
	Optimum	44	14-20 oz		
	MAX	44	1-3 lb		
	Tanos	27, 11	8-10 oz	3	72 oz
	Top Cop with Sulfur	M	2 qt		
Bacterial spot (*Xanthomonas* spp.)	Actigard 50WG **(Chile only)**	21	0.3-0.8 oz	14	6 oz
	Actinovate AG[OG]		3-12 oz		
	Agri-Mycin 17 [OG,22]		200 ppm		
	Cease		3-6 qt/100 gal		
	copper hydroxide				
	Kocide 3000	M	0.8-1.3 lb	0	39.5 lb
	Kocide 2000	M	1.5-2.3 lb	0	33.9 lb
	Champ WG[OG]	M	1.6 lb	0	23.7 lb
	Copper hydroxide and copper oxychloride				
	Badge SC	M	1-2.3 pt	3	41.7 pt
	Badge X2[OG]	M	0.8-1.3 lb	3	11.9 lb Cu
	copper sulfate				
	Cuprofix-Ultra 40	M	0.8-2 lb	3	29.5 lb
	Cuproxat	M	2.4-3.8 pt	3	58.4 pt
	Nordox 75WG[OG]	M	2-4 lb	0	
	ManKocide	M	2-3 lb	7	39 lb
	MasterCop	M	0.5-3 pt		30 pt
	Serenade[OG]				
	ASO	44	2-6 qt		
	Optimum	44	14-20 oz		
	MAX	44	1-3 lb		
	Tanos	27, 11	8-10 oz	3	72 oz
	Top Cop with Sulfur	M	2 qt		

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Table 1. Recommended pesticides, rates and pesticide use restrictions for selected vegetable crops
The symbol [OG] *indicates a pesticide that has been listed by the Organic Materials Review Institute (OMRI) as approved for use in organic production.*

Disease (Pathogen)	Product Choices[1] and Product Mode of Action Group[2]		Rate[3]	PHI[4]	Maximum Use
Blossom-end rot	Blossom-end rot results from a calcium (Ca) deficiency in young, rapidly expanding pepper fruit tissues. The disorder can be intensified by excess nitrogen. Have soil and water tested for Ca levels prior to planting. ***Foliar applications of Ca fertilizers are not likely to prevent or reduce Blossom-end rot incidence, as Ca ions are not actively mobilized from the leaf downward to the fruits.***				
Cercospora leaf spot (or Frogeye leaf spot) (*Cercospora capsici*)	chlorothalonil				
	Bravo Ultrex	M	1.4 lb	3	10.9 lb
	Chloronil 720	M	1.5 pt	3	12 pt
	Echo 720	M	1.5 pt	3	9 lb a.i.
	Equus 720SST	M	1.5 pt	3	12 pt
	copper hydroxide				
	Kocide 3000	M	0.8-1.3 lb	0	39.5 lb
	Kocide 2000	M	1.5-2.3 lb	0	33.9 lb
	copper hydroxide and copper oxychloride				
	Badge SC	M	1-2.3 pt	3	41.7 pt
	Badge X2[OG]	M	0.8-1.3 lb	3	11.9 lb Cu
	Cuprofix-Ultra 40	M	0.8-2 lb	3	29.5 lb
	Nordox 75WG[OG]	M	2-4 lb	0	
	Manzate Pro-Stick	M	1.6-3.2 lb	7	12.8-9.2 lb[25]
	ManKocide	M	2-3 lb	7	39 lb
	MasterCop	M	0.5-3 pt		30 pt
	Quadris Top 29.6 SC	11, 3	8-14 fl oz	0	55.3 fl oz
	Top Cop with Sulfur	M	2 qt		
Phytophthora crown and root rot (*Phytophthora capsici*)	mefenoxam				
	Ridomil Gold SL	4	1 pt[13]	7	1.5 lb a.i.
	Ultra Flourish	4	2 pt[13]	7	6 pt
	Metastar 2E	4	4-8 pt[13]	7	12 pt
	Zampro	45, 40	14 fl oz	4	42 fl oz
Phytophthora foliar blight (*Phytophthora capsici*)	copper hydroxide and copper oxychloride				
	Badge SC	M	1-2.3 pt	0	41.7 pt
	Badge X2[OG]	M	0.8-1.3 lb	0	11.9 lb Cu
	Forum	40	6 fl oz[12]	0.5	30 fl oz
	Manzate Pro-Stick	M	1.6-3.2 lb	0	12.8-19.2lb[25]
	ManKocide	M	2-3 lb	0	39 lb
	Micora	40	8 fl oz[12]		2 app
	Presidio	43	3-4 fl oz	2	12 fl oz
	Ranman	21	2.1-2.8 fl oz	0	16.5 fl oz
	Reason 500SC	11	8.2 fl oz	14	24.6 fl oz
	Revus	40	8 fl oz	1	32 fl oz
	Tanos	27, 11	8-10 oz	3	72 oz
	Zampro	45, 40	14 fl oz	4	42 fl oz

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Table 1. Recommended pesticides, rates and pesticide use restrictions for selected vegetable crops
The symbol [OG] *indicates a pesticide that has been listed by the Organic Materials Review Institute (OMRI) as approved for use in organic production.*

Disease (Pathogen)	Product Choices[1] and Product Mode of Action Group[2]		Rate[3]	PHI[4]	Maximum Use
Damping-off (*Pythium* spp.)	mefenoxam				
	Ridomil Gold SL	4	1 pt[13]	7	4 app
	Ridomil Gold/Copper	4, M	1 pt[13]	7	4 app
	Ultra Flourish	4	2 pt[13]	7	6 pt
	Metastar 2E	4	4-8 pt[13]	7	12 pt
	phosphorous acid				
	Confine Extra	33	1-3 qt		
	Rampart	33	1-3 qt/100 gal		
	potassium phosphite				
	Fosphite	33	1-3 qt/100 gal		
	Fungi-phite	33	1-2 qt		6 app
	Previcur Flex	28	1.2 pt[8]	5	6 pt
	Rootshield Granules	44	2.5-6 lb/0.5acre[13]		1 app
	Serenade Soil	44	2-6 qt[13]		
Southern blight (*Sclerotium rolfsii*)	Blocker 4F (PCNB)	14	4.5-7.5 pt/100gal	0	7.5 lb a.i.
	fluoxastrobin				
	Aftershock	11	2-5.7 fl oz	0	22.8 fl oz
	Evito 480SC	11	2-5.7 fl oz	0	22.8 fl oz
	Priaxor	11, 7	4-8 fl oz	0	24 fl oz
	Cabrio	11	12-16 oz	0	96 fl oz
Target spot (*Corynespora cassiicola*)	Cabrio EG 20%	11	8-12 oz	0	96 oz
	Endura	7	3.5 oz	0	21 oz
	fluoxastrobin				
	Aftershock	11	2-5.7 fl oz	3	22.8 fl oz
	Evito 480SC	11	2-5.7 fl oz	3	22.8 fl oz
	Inspire Super	9,3	16-20 fl oz	0	47 fl oz
	Priaxor	7, 11	4-8 fl oz	0	24 fl oz
Viruses	A list of viruses of pepper can be found in Table 2. Plant resistant varieties. For viruses transmitted by insects, control of the insect vector using insecticides, polyethylene or polyethylene coated mulches and/or trap crops are recommended. Seed treatments and good sanitation practices are recommended for noninsect transmitted viruses.				
Potato (Irish)					
Bacterial stem rot (*Pectobacterium carotovora*)	Tanos	27, 11	8 oz	14	6 app
Early blight (*Alternaria solani*)	Aftershock	11	2-3.8 fl oz	7	22.8 fl oz
	azoxystrobin				
	Quadris	11	6-15.5 fl oz	14	123 fl oz
	Quadris Opti	11, M	1.6 pt	14	6 app
	Quadris Top	11, M	8-14 fl oz	14	55.3 fl oz
	Satori	11	6-15.5 fl oz	14	123 fl oz
	Cabrio Plus	11, M	2-2.9 lb	14	17.4 lb
	chlorothalonil				
	Bravo Ultrex	M	0.7-1.4 lb[26]	7	13.6 lb
	Bravo WeatherStik	M	0.8-1.5 pt[26]	30	18 pt

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Table 1. Recommended pesticides, rates and pesticide use restrictions for selected vegetable crops
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Disease (Pathogen)	Product Choices[1] and Product	Mode of Action Group[2]	Rate[3]	PHI[4]	Maximum Use
	Bravo Zn	M	1.1-2.3 pt[26]	7	21.5 pt
	Chlorotholonil 720SC	M	0.8-1.5 pt[26]	7	15 pt
	copper hydroxide				
	Kocide 3000	M	0.5-1.8 lb	0	83.3 lb
	Kocide 2000	M	0.8-3 lb	0	71.4 lb
	Champ WG[OG]	M	1-4 lb	5	50 lb
	copper hydroxide and copper oxychloride[11]				
	Badge SC	M	1-3 pt	5	88.2 pt
	Badge X2[OG]	M	0.5-1.8 lb	5	25 lb Cu
	copper sulfate				
	Cuprofix-Ultra 40	M	0.8-3 lb	5	62.5 lb
	MasterCop	M	0.5-1.5 pt	5	6 pt
	Endura	7	2.5-4.5 oz	10	20 oz
	Evito 480SC	11	2-3.8 fl oz	7	22.8 fl oz
	Gavel 75DF	M, 22	1.5-2 lb	14	12 lb
	Gem 500SC	11	2.9-3.8 fl oz	7	23 fl oz
	Headline and Headline SC	11	6-9 fl oz	3	72 fl oz
	iprodione				
	Iprodione 4L AG	2	1-2 pt	14	4 app
	Meteor	2	1-2 pt	14	4 app
	Nevado 4F	2	1-2 pt	14	4 app
	mancozeb				
	Dry formulations	M	0.5-2 lb	14	14-15 lb
	Liquid Formulations	M	0.4-1.6 qt	14	11.2 qt
	ManKocide	M	1.5-5 lb	14	74.7 lb
	mefenoxam			14	
	Ridomil Gold Bravo SC	4, M	2.5 pt	14	footnote[27]
	Ridomil Gold MZ WG	4, M	2.5 lb	14	footnote[27]
	Previcur Flex	28	0.7-1.2 pt	7	10 lb
	Priaxor	7, 11	4-8 fl oz	14	6 pt
	Reason 500SC	11	5.5-8.2 fl oz	14	16 fl oz
	Revus Top	3, 40	5.5-7.7 fl oz	14	24.6 fl oz
	Rovral 4 Flowable	2	1-2 pt	7	28 fl oz
	Scala SC	9	7 fl oz		4 app
	Serenade[OG]				
	ASO	44	2-6 qt	0	
	MAX	44	1-3 lb	0	
	Sonata[OG]	44	2-4 qt	0	
	Tanos	27, 11	6 oz	14	6 app
	Top Cop with Sulfur	M	2-3 qt		
	triphenyltin hydroxide				
	Agri-Tin	30	2.5-3.8 oz	7	11.3 oz
	Super Tin 4L	30	4-6 fl oz	7	18 fl oz
	Super Tin 80WP	30	2.5-5 oz	21	10 oz
Late blight (*Phytophthora infestans*)	Aftershock	11	3.8 fl oz	7	22.8 fl oz
	azoxystrobin				
	Quadris	11	6-15.5 fl oz	14	123 fl oz

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Disease (Pathogen)	Product Choices[1] and Product Mode of Action Group[2]		Rate[3]	PHI[4]	Maximum Use
	Quadris Opti	11, M	1.6 pt	14	6 app
	Quadris Top	11, 3	8-14 fl oz	14	55.3 fl oz
	Satori	11	6-15.5 fl oz	14	123 fl oz
	Cabrio Plus	11, M	2.9 lb	14	17.4 lb
	chlorothalonil				
	Bravo Ultrex	M	0.7-1.4 lb[26]	7	13.6 lb
	Bravo WeatherStik	M	0.8-1.5 pt[26]	30	18 pt
	Bravo Zn	M	1.1-2.3 pt[26]	7	21.5 pt
	Chlorotholonil 720SC	M	0.8-1.5 pt[26]	7	15 pt
	copper hydroxide				
	Kocide 3000	M	0.5-1.8 lb	0	83.3 lb
	Kocide 2000	M	0.8-3 lb	0	71.4 lb
	Champ WG[OG]	M	1-4 lb	5	50 lb
	copper hydroxide and copper oxychloride[11]				
	Badge SC	M	1-3 pt	5	88.2 pt
	Badge X2[OG]	M	0.5-1.8 lb	5	25 lb Cu
	copper sulfate				
	Cuprofix-Ultra 40	M	0.8-3 lb	5	62.5 lb
	Mastercop	M	0.5-1.5 pt	5	6 pt
	Evito 480SC	11	3.8 fl oz	7	22.8 fl oz
	Gavel 75DF	22, M	1.5-2 lb	14	12 lb
	Gem 500SC	11	3.8 fl oz	7	23 fl oz
	Headline and Headline SC	11	6-12 fl oz	3	72 fl oz
	mancozeb				
	Dry formulations	M	0.5-2 lb	14	14-15 lb
	Liquid Formulations	M	0.4-1.6 qt	14	11.2 qt
	ManKocide	M	1.5-5 lb	14	74.7 lb
	mefenoxam				
	Ridomil Gold Bravo	4, M	2.5 pt	14	footnote[27]
	Ridomil Gold MZ WG	4, M	2.5 lb	14	10 lb
	Omega 500SC	29	5.5 fl oz	14	3.5 pt
	phosphorous acid				
	Confine Extra	33	1-3 qt		
	Rampart	33	1-3 qt/100 gal		
	potassium phosphite				
	Fosphite	33	1-3 qt/100 gal		
	Fungi-phite	33	1-2 qt		6 app
	Helena Prophyt	33	2-4 pt		7 app
	Previcur Flex	28	0.7-1.2 pt	14	6 pt
	Priaxor	7, 11	4-8 fl oz	7	24 fl oz
	Ranman	21	1.4-2.8 fl oz	7	27.5 fl oz
	Reason 500SC	11	5.5-8.2 fl oz	14	24.6 fl oz
	Revus Top	3, 40	5.5-7.7 fl oz	14	28 fl oz
	Serenade[OG]				
	ASO	44	2-6 qt	0	
	MAX	44	1-3 lb	0	
	Sonata[OG]	44	2-4 qt	0	

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Disease (Pathogen)	Product Choices[1] and Product Mode of Action Group[2]		Rate[3]	PHI[4]	Maximum Use
	Tanos	27, 11	6-8 oz	14	6 app
	Top Cop with Sulfur	M	2-3 qt		
	triphenyltin hydroxide				
	Agri-Tin	30	2.5-3.8 oz	7	11.3 oz
	Super Tin 4L	30	4-6 fl oz	7	18 fl oz
	Super Tin 80WP	30	2.5-5 oz	21	10 oz
	Zampro	45, 40	11-14 fl oz	4	42 fl oz
Speckle leaf spot (or pepper spotting)	Speckle leaf spot is a result of high ozone levels in the atmosphere and is most likely to occur during the tuber bulking stage. The disorder is intensified by high levels of automobile exhausts, humid with cloudy overcast days and foggy conditions with heavy dew. 'LaChipper' is insensitive to ozone damage.				
White mold (*Sclerotinia sclerotiorum*)	Cabrio Plus	11, M	2.9 lb	14	17.4 lb
	Endura	7	2.5-4.5 oz	10	20 oz
	Headline or Headline SC	11	6-12 fl oz	3	72 fl oz
	iprodione				
	Iprodione 4L AG	2	2 pt	14	4 app
	Meteor	2	2 pt	14	4 app
	Nevado 4F	2	2 pt	14	4 app
	Omega 500SC	29	5.5-8 fl oz	14	3.5 pt
	Priaxor	7, 11	4-8 fl oz	7	24 fl oz
	Rovral 4 Flowable	2	2 pt	14	4 app
	Serenade[OG]				
	ASO	44	2-6 qt	0	
	MAX	44	1-3 lb	0	
	Sonata[OG]	44	2-4 qt	0	
	thiophanate-methyl				
	85 WDG	1	0.8-1.2 lb	21	3.2 lb
	Incognito 4.5F	1	20-30 fl oz	21	80 fl oz
	Nufarm T-methyl 70WSB	1	1-1.5 lb	21	4 lb
	Topsin M 70WDG	1	1-1.5 lb	21	4 lb
	Vertisan	7	14-24 fl oz	7	72 fl oz
Root crops (Beet, Carrot, Parsnip, Radish and Turnip)					
Downy mildew (*Peronospora parisitica*)	Actinovate AG[OG]		3-12 oz		
	chlorothalonil **(parsnip only)**				
	Bravo Ultrex	M	1.4-1.8 lb	10	7.3 lb
	Bravo WeatherStik	M	1.5-2 pt	10	8 pt
	Chlorotholonil 720SC	M	1.5-2 pt	10	8 pt
	Echo 90DF	M	1.4-1.8 lb	10	6 lb
	phosphorous acid				
	Confine Extra	33	1-3 qt		
	Rampart	33	1-3 qt/100 gal		
	potassium phosphite				
	Fosphite	33	1-3 qt/100 gal		
	Fungi-phite	33	1-2 qt		6 app
	Serenade[OG]				
	ASO	44	2-6 qt	0	

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Disease (Pathogen)	Product Choices[1] and Product Mode of Action Group[2]		Rate[3]	PHI[4]	Maximum Use
	MAX	44	1-3 lb	0	
	Sonata[OG]	44	2-4 qt	0	
	Top Cop with Sulfur	M	2 qt	0	
	Trilogy[OG]		1%		
Leaf spots and blights	azoxystrobin				
(*Alternaria* spp.,	Quadris	11	9-15.5 fl oz	0	123 fl oz
Cercospora spp.)	Satori	11	9-15.5 fl oz	0	123 fl oz
	Cabrio	11	8-12 oz	0	48 oz
	chlorothalonil				
	Bravo Weather Stik	M	1.5-2 pt	0	20 pt
	Bravo Zn	M	2.3-2.8 pt	0	29 pt
	Equus 720SST	M	1.5-2	0	20 pt
	copper hydroxide				
	Kocide 3000	M	0.8-1.5 lb	0	16.7 lb
	Kocide 2000	M	1.5-2.8 lb	0	14.3 lb
	Champ Formula 2	M	1.3 pt	0	13.7 pt
	copper hydroxide and copper oxychloride				
	Badge SC	M	1-1.8 pt	0	17.6 pt
	Badge X2[OG]	M	0.8-1.5 lb	0	5 lb Cu
	copper sulfate				
	Cuprofix-Ultra 40	M	1.3 lb	0	12.5 lb
	Cuproxat	M	2.5 pt	0	24.6 pt
	Endura	7	4.5 oz	0	22.5 oz
	Fontelis	7	16-30 fl oz	0	61 fl oz
	Gem 500SC	11	1.9-2.9 fl oz	7	11.5 fl oz
	MasterCop		0.5-1.5 pt		6 pt
	Merivon	7, 11	4-5.5 fl oz	7	16.5 fl oz
	Pristine	7, 11	8-10.5 oz	0	63 oz
	propiconazole				
	Amtide 41.8%	3	4 fl oz	14	16 fl oz
	Bumper 48.1EC	3	4 fl oz	14	16 fl oz
	Tilt	3	4 fl oz	14	16 fl oz
	Switch 62.5WG	9, 12	11-14 oz	7	56 oz
	Switch 62.5WG **(radish only)**	9, 12	11-14 oz	7	28 oz
	Top Cop with Sulfur	M	2 qt		
Damping-off	Ridomil Gold GR	4	20-40 lb[8]		
(*Pythium* spp.)	Metastar 2E	4	4-8 pt[13]		
	phosphorous acid				
	Confine Extra	33	1-3 qt		
	Rampart	33	1-3 qt/100 gal		
	potassium phosphite				
	Fosphite	33	1-3 qt/100 gal		
	Fungi-phite	33	1-2 qt		
	Serenade Soil	44	2-6 qt[13]		

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Disease (Pathogen)	Product Choices[1] and Product Mode of Action Group[2]		Rate[3]	PHI[4]	Maximum Use
Damping-off	azoxystrobin				
(*Rhizoctonia* spp.)	Quadris 2.08F	11	0.4-0.8 fl oz[6]		1 app
	Satori	11	0.4-0.8 fl oz[6]		1 app
SPINACH					
Anthracnose	azoxystrobin				
(*Colletortichum dematium*)	Quadris	11	6-15.5 fl oz	0	92.3 fl oz
and Leaf spots	Satori	11	6-15.5 fl oz	0	92.3 fl oz
(*Cercospora beticola*)	Cabrio	11	12-16 oz	0	64 oz
	copper hydroxide				
	Kocide 3000	M	0.8-1.3 lb	0	13.2 lb
	Kocide 2000	M	1.5-2.3 lb	0	11.3 lb
	Champ Formula 2	M	1.3-2.7 pt	0	10.9 pt
	Champ WG[OG]	M	1-1.6 lb	0	7.9 lb
	copper hydroxide and copper oxychloride[11]				
	Badge SC	M	1-2.3 pt	0	13.9 pt
	Badge X2[OG]	M	0.8-1.3 lb	0	4 lb Cu
	Nordox 75WG[OG]	M	2-3 lb	0	
	copper sulfate				
	Cuprofix Ultra 40	M	1.3-2 lb	0	9.9 lb
	Mastercop	M	0.5-1 pt	0	5 pt
	Fontelis	7	14-24 fl oz	3	72 fl oz
	Merivon	7, 11	4-11 fl oz	1	33 fl oz
	Top Cop with Sulfur	M	2-4 qt	0	
Downy mildew	azoxystrobin				
(*Peronospora farinosa* f.	Quadris	11	12-15.5 fl oz	0	92.3 fl oz
sp. *spinaciae*)	Satori	11	12-15.5 fl oz	0	92.3 fl oz
	Actigard 50WG	21	0.5-0.8 oz	7	2.3 oz
	Actinovate AG[OG]	44	3-12 oz	0	
	Aliette WDG	33	2-5 lb	3	7 app
	Cabrio EG 20%	11	12-16 oz	0	64 oz
	Cease	44	3-6 qt/100 gal		
	copper hydroxide				
	Kocide 3000	M	0.8-1.3 lb	0	13.2 lb
	Champ Formula 2	M	1.3-2.7 pt	0	10.9 pt
	Champ WG[OG]	M	1-1.6 lb	0	7.9 lb
	copper hydroxide and copper oxychloride[11]				
	Badge SC	M	1-2.3 pt	0	13.9 pt
	Badge X2[OG]	M	0.8-1.3 lb	0	4 lb Cu
	Nordox 75WG[OG]	M	2-3 lb		
	Curzate 60DF	27	5 oz	1	30 oz
	mefenoxam			3-21[22]	
	Ridomil Gold SL	4	0.3 pt[19]	3-21[22]	2 app
	Ultra Flourish	4	0.3 pt[19]	3-21[22]	2 app
	Ultra Flourish	4	0.5 pt[19]	1	1.6 pt

Commercial Crop Production
Vegetables

Table 1. Recommended pesticides, rates and pesticide use restrictions for selected vegetable crops
The symbol OG *indicates a pesticide that has been listed by the Organic Materials Review Institute (OMRI) as approved for use in organic production.*

Disease (Pathogen)	Product Choices[1] and Product Mode of Action Group[2]		Rate[3]	PHI[4]	Maximum Use
	Merivon 4.18SC	7, 11	4-11 fl oz		33 fl oz
	Micora	40	5.5-8 fl oz[12]		2 app
	MilStop[OG]		2-5 lb/100 gal		
	phosphorous acid				
	Alude	33	0.5 gal/40 gal		
	Confine Extra	33	1-4 qt		
	Rampart	33	1-3 qt/100 gal		
	potassium phosphite				
	Fosphite	33	1-3 qt/100 gal		
	Fungi-phite	33	1-2 qt		6 app
	Helena Prophyt	33	2-4 pt		7 app
	Presidio	43	3-4 fl oz	2	12 fl oz
	Ranman	21	2.8 fl oz	0	16.5 fl oz
	Reason 500SC	11	5.5-8.2 fl oz	2	24.6 fl oz
	Revus	40	8 fl oz	1	32 fl oz
	Serenade[OG]				
	ASO	44	2-6 qt		
	MAX	44	1-3 lb		
	Sonata[OG]	44	2-4 qt		
	Tanos	11,27	8-10 oz	1	84 oz
	Top Cop with Sulfur	M	2-4 qt		
	Trilogy[OG]		1%		
	Zampro[21]	40,45	14 fl oz	0	42 fl oz
Damping-off	mefenoxam				
(*Pythium* spp.)	Ridomil Gold SL	4	1-2 pt[13]	3-21[20]	1 app
	Ultra Flourish	4	0.5 pt[19]	3-21[20]	1 app
	phosphorous acid				
	Confine Extra	33	1-4 qt		
	Rampart	33	1-3 qt/100 gal		
	potassium phosphite				
	Fosphite	33	1-3 qt/100 gal		
	Fungi-phite	33	1-2 qt		6 app
	Ranman	21	2.8 fl oz[13]	0	16.5 fl oz
	Rootshield Granules[OG]		2.5-6 lb/ ½ acre[13]		1 app
White rust	azoxystrobin				
(*Albugo occidentalis*)	Quadris	11	6-15.5 fl oz	0	92.3 fl oz
	Satori	11	6-15.5 fl oz	0	92.3 fl oz
	Actigard	21			
	Aliette WDG	33			
	Cabrio	11	8-12 oz	0	64 oz
	copper hydroxide				
	Kocide 3000	M	0.8-1.3 lb	0	13.2 lb
	Kocide 2000	M	1.5-2.3 lb	0	11.3 lb
	Champ Formula 2	M	1.3-2.7 pt	0	10.9 pt
	Champ WG[OG]	M	1-1.6 lb	0	7.9 lb
	copper hydroxide and copper oxychloride[11]				

Commercial Crop Production
Vegetables

Table 1. Recommended pesticides, rates and pesticide use restrictions for selected vegetable crops
The symbol [OG] *indicates a pesticide that has been listed by the Organic Materials Review Institute (OMRI) as approved for use in organic production.*

Disease (Pathogen)	Product Choices[1] and Product Mode of Action Group[2]		Rate[3]	PHI[4]	Maximum Use
	Badge SC	M	1-2.3 pt	0	13.9 pt
	Badge X2[OG]	M	0.8-1.3 lb	0	4 lb Cu
	Nordox 75WG[OG]	M	2-3 lb		
	Copper sulfate				
	Cuprofix 40 Disperss	M	1.3-2 lb	0	9.9 lb
	Mastercop	M	0.5-1 pt	0	5 pt
	mefenoxam				
	Ridomil Gold SL	4	0.3 pt[19]	3-21[20]	2 app
	Ultra Flourish	4	0.5 pt[19]	3-21[20]	2 app
	Merivon	7, 11	4-11 fl oz	1	33 fl oz
	Presidio	43	3-4 fl oz	2	12 fl oz
	Ranman	21	2.8 fl oz	0	16.5 fl oz
	Reason 500SC	11	5.5-8.2 fl oz	2	24.6 fl oz
	Serenade[OG]				
	ASO	44	2-6 qt		
	MAX	44	1-3 lb		
	Tanos	11, 27	8-10 oz	1	84 oz
	Top Cop with Sulfur	M	2-4 qt		
Tomato (Fresh market)					
Anthracnose fruit rot (*Colletotrichum* spp.)	Actinovate AG[OG]		3-12 oz		
	Ariston	M, 27	2.0-2.44 pt	3	17.5 pt
	azoxystrobin				
	Quadris	11	5-6.2 fl oz	0	37 fl oz
	Quadris Opti	11, M	1.6 pt	0	5 app
	Quadris Top	11, 3	8 fl oz	0	47 fl oz
	Satori	11	5-6.2 fl oz	0	61.5 fl oz
	Cabrio	11	8-12 oz	0	96 fl oz
	chlorothalonil				
	Bravo Ultrex	M	1.8-2.6 lb	0	18.3 lb
	Chloronil 720	M	2-2.8 pt	0	20 pt
	Echo 90DF	M	2-3 pt	0	15.1 lb a.i.
	Equus 720SST	M	2-2.8 pt	0	20 pt
	copper hydroxide				
	Kocide 3000	M	0.8-1.8 lb	0	26.7 lb
	Kocide 2000	M	1.5-2.3 lb	0	22.8 lb
	Champ WG[OG]	M	1.1 lb	3	16 lb
	copper hydroxide and copper oxychloride				
	Badge SC	M	1.8 pt	3	28.1 pt
	Badge X2[OG]	M	0.8-1.8 lb	3	8 lb Cu
	copper sulfate				
	Cuprofix-Ultra 40	M	0.8-3 lb	3	20 lb
	Cuproxat	M	2.5-5 pt	3	39.4 pt
	Nordox 75WG[OG]	M	2-4 lb		
	Flint	11	3-4 oz	0	16 fl oz
	Fontelis	7	24 fl oz	3	72 fl oz

Commercial Crop Production
Vegetables

Table 1. Recommended pesticides, rates and pesticide use restrictions for selected vegetable crops
The symbol [OG] *indicates a pesticide that has been listed by the Organic Materials Review Institute (OMRI) as approved for use in organic production.*

Disease (Pathogen)	Product Choices[1] and Product Mode of Action Group[2]		Rate[3]	PHI[4]	Maximum Use
	Inspire Super 2.82SC	9, 3	16-20 fl oz	0	47 fl oz
	mancozeb			0	
	Dry formulations	M	0.5-3 lb[30]		21-22.4 lb
	Liquid Formulations	M	0.6-2.4 qt[30]	5	16.8 qt
	ManKocide	M	1-3 lb	5	42.7-58
	MilStop[OG]		2-5 lb/100 gal	5	lb[30]
	OSO 5%	19	3.75-13 fl oz		
	Priaxor	7, 11	4-8 fl oz	0	4.2 oz a.i
	Revus Top	3, 40	5.5-7 fl oz	0	24 fl oz
	Serenade[OG], Optimum	44	4-20 oz	1	28 fl oz
	Tanos	27, 11	8-10 oz	3	72 oz
	Top Cop with Sulfur	M	2 qt		
	Trilogy[OG]		1%		
Bacterial spot (*Xanthomonas* spp.)	Actigard 50WG	21	0.3-0.8 oz	14	6 oz
	Actinovate AG[OG]		3-12 oz		
	Agri-Mycin 17[OG, 22]		200 ppm		
	copper hydroxide				
	Kocide 3000	M	0.8-1.8 lb	0	26.7 lb
	Kocide 2000	M	1.5-3 lb	0	22.8 lb
	Champ WG[OG]	M	1.1 lb	0	16 lb
	copper hydroxide and copper oxychloride				
	Badge SC	M	1.8 pt	3	28.1 pt
	Badge X2[OG]	M	0.8-1.8 lb	3	8 lb Cu
	copper sulfate				
	Cuprofix-Ultra 40	M	0.8-3 lb	3	20 lb
	Cuproxat	M	2.5-5 pt	3	39.4 pt
	Nordox 75WG[OG]	M	2-4 lb	0	
	ManKocide	M	1.3 lb	5	42.7-58
	MasterCop	M	0.5-3 pt		lb[23]
	Serenade[OG]				30 pt
	ASO	44	2-6 qt		
	Optimum	44	14-20 oz		
	MAX	44	1-3 lb		
	Tanos	27,11	8 oz	3	
	Top Cop with Sulfur	M	2-3 qt		72 oz
Bacterial speck (*Pseudomonas syringae* pv. *syringae*)	Agri-Mycin 17[OG, 22]		200 ppm		
	copper hydroxide				
	Kocide 3000	M	0.8-1.8 lb	0	26.7 lb
	Kocide 2000	M	1.5-3 lb	0	22.8 lb
	Champ WG[OG]	M	2 lb	0	16 lb
	copper hydroxide and copper oxychloride				
	Badge SC	M	1.8 pt	3	28.1 pt
	Badge X2[OG]	M	0.8-1.8 lb	3	8 lb Cu
	copper sulfate				
	Cuprofix-Ultra 40	M	0.8-3 lb	3	20 lb

Commercial Crop Production
Vegetables

Table 1. Recommended pesticides, rates and pesticide use restrictions for selected vegetable crops
The symbol [OG] *indicates a pesticide that has been listed by the Organic Materials Review Institute (OMRI) as approved for use in organic production.*

Disease (Pathogen)	Product Choices[1] and Product Mode of Action Group[2]		Rate[3]	PHI[4]	Maximum Use
	Cuproxat	M	2.3 pt	3	39.4 pt
	Nordox 75WG[OG]	M	2-4 lb	0	
	mancozeb				
	Dry formulations	M	0.5-3 lb[30]	5	21-22.4 lb
	Liquid Formulations	M	0.6-2.4 qt[30]	5	16.8 qt
	ManKocide	M	1.3 lb	5	42.7-58
	MasterCop	M	0.5-3 pt		lb[23]
	serenade[OG]				30 pt
	ASO	44	2-6 qt		
	Optimum	44	14-20 oz		
	MAX	44	1-3 lb		
	Tanos	27, 11	8 oz	3	
	Top Cop with Sulfur	M	2-3 qt		72 oz
Bacterial wilt (*Ralstonia solanacearum*)	No bactericides available. Plant resistant varieties, crop rotations and soil solarization.				
Blossom-end rot	Blossom-end rot results from a calcium (Ca) deficiency in young, rapidly expanding tomato fruit tissues. The disorder can be intensified by excess nitrogen. Have soil and water tested for Ca levels prior to planting. ***Foliar applications of Ca fertilizers are not likely to prevent or reduce blossom-end rot incidence, as Ca ions are not actively mobilized from the leaf downward to the fruits.***				
Buckeye rot (*Phytophthora parasitica*)	azoxystrobin				
	Quadris	11	5-6.2 fl oz	0	37 fl oz
	Quadris Opti	11, M	1.6 pt	0	5 app
	Quadris Top	11, 3	8 fl oz	0	47 fl oz
	Satori	11	5-6.2 fl oz	0	61.5 fl oz
	Gavel 75DF	22, M	1.5-2 lb	5	8-16 lb[30]
	Serenade[OG]				
	Optimum	44	4-20 oz		
	Tanos	27, 11	8 oz	3	72 oz
Early blight (*Alternaria solani*), **Leaf spot** (*Septoria lycopersici*) **and Target spot** (*Corynespora cassicola*)	Ariston	M, 27	1.9-3 pt	3	17.5 pt
	azoxystrobin				
	Quadris	11	5-6.2 fl oz	0	37 fl oz
	Quadris Opti	11, M	1.6 pt	0	5 app
	Quadris Top	11, 3	8 fl oz	0	47 fl oz
	Satori	11	5-6.2 fl oz	0	61.5 fl oz
	Cabrio	11	8-12 oz	0	96 fl oz
	chlorothalonil				
	Bravo Ultrex	M	1.3-1.8 lb	0	18.3 lb
	Chloronil 720	M	1.4-2 pt	0	20 pt
	Echo 90DF	M	1.4-2 pt	0	15.1 lb a.i.
	Equus 720SST	M	1.4-2 pt	0	20 pt
	copper hydroxide				
	Kocide 3000	M	0.8-1.8 lb	0	26.7 lb
	Kocide 2000	M	1.5-2.3 lb	0	22.8 lb
	Champ WG[OG]	M	1.1 lb	3	16 lb

Commercial Crop Production
Vegetables

Table 1. Recommended pesticides, rates and pesticide use restrictions for selected vegetable crops
The symbol [OG] *indicates a pesticide that has been listed by the Organic Materials Review Institute (OMRI) as approved for use in organic production.*

Disease (Pathogen)	Product Choices[1] and Product Mode of Action Group[2]		Rate[3]	PHI[4]	Maximum Use
	copper hydroxide and copper oxychloride				
	Badge SC	M	1.8 pt	3	28.1 pt
	Badge X2[OG]	M	0.8-1.8 lb	3	8 lb Cu
	copper sulfate				
	Cuprofix-Ultra 40	M	0.8-3 lb	3	20 lb
	Cuproxat	M	2.5-5 pt	3	39.4 pt
	Nordox 75WG[OG]	M	2-4 lb	0	
	Evito 480SC or Aftershock	11	2-5.7 fl oz	3	22.8 fl oz
	Flint	11	2-3 oz	3	16 fl oz
	Fontelis	7	24 fl oz	0	72 fl oz
	Gavel 75DF	22, M	1.5-2 lb	5	8-16 lb[30]
	Inspire Super	9, 3	16-20 fl oz	0	47 fl oz
	mancozeb				
	Dry formulations	M	0.5-3 lb[30]	5	21-22.4 lb
	Liquid Formulations	M	0.6-2.4 qt[30]	5	16.8 qt
	ManKocide	M	1-3 lb	5	42.7-58
	MilStop[OG]		2-5 lb/100 gal		lb[30]
	Previcur Flex	28	0.7-1.5 pt	5	
	Priaxor	7, 11	4-8 fl oz	0	7.5 pt
	Reason 500SC	11	5.5-8.2 fl oz	14	24 fl oz
	Revus Top 4.16F	3, 40	5.5-7 fl oz	1	24.6 fl oz
	serenade[OG]				28 fl oz
	ASO	44	2-6 qt	0	
	Optimum	44	4-20 oz	0	
	MAX	44	1-3 lb	0	
	Scala SC	9	7 fl oz	1	
	Switch 62.5WG	9, 12	11-14 oz	0	35 fl oz
	Tanos	27, 11	8-10 oz	3	56 oz
	Top Cop with Sulfur	M	2 qt		72 oz
	Trilogy[OG]		1%		
Fusarium wilt (*Fusarium oxysporum*) **and Verticillum wilt** (*Verticillium* sp.)	No fungicides available. Soil protectants such as Serenade Soil, resistant varieties and crop rotations are recommended.				
Gray leaf spot (*Stemphylium* spp.)	chlorothalonil				
	Bravo Ultrex	M	1.8-2.6 lb	0	18.3 lb
	Chloronil 720	M	2-2.8 pt	0	20 pt
	Echo 90DF	M	2-3 pt	0	15.1 lb a.i.
	Equus 720SST	M	2-2.8 pt	0	20 pt
	Flint 50WDG	11	3-4 oz	3	16 fl oz
	Gavel 75DF	22, M	1.5-2 lb	5	8-16 lb[30]
	Inspire Super 2.82SC	9, 3	16-20 fl oz	0	47 fl oz
	mancozeb				
	Dry formulations	M	0.5-3 lb[30]	5	21-22.4 lb
	Liquid Formulations	M	0.6-2.4 qt[30]	5	16.8 qt
	ManKocide	M	1-3 lb	5	42.7-58 lb[30]

Commercial Crop Production
Vegetables

Table 1. Recommended pesticides, rates and pesticide use restrictions for selected vegetable crops
The symbol [OG] *indicates a pesticide that has been listed by the Organic Materials Review Institute (OMRI) as approved for use in organic production.*

Disease (Pathogen)	Product Choices[1] and Product Mode of Action Group[2]		Rate[3]	PHI[4]	Maximum Use
	Revus Top	3, 40	5.5-7 fl oz	1	28 fl oz
	Ridomil Gold Bravo	4, M	2.5 pt	5	see footnote[31]
Gray mold	Actinovate AG[OG]		3-12 oz		
(*Botrytis cinerea*)	Botran 75W	14			
	Cabrio	11	12-16 oz	0	96 oz
	chlorothalonil				
	Bravo Ultrex	M	1.3-1.8 lb	0	18.3 lb
	Chloronil 720	M	1.4-2 pt	0	20 pt
	Echo 90DF	M	1.4-2 pt	0	15.1 lb a.i.
	Equus 720SST	M	1.4-2 pt	0	20 pt
	Endura	7	9-12.5 oz	0	25 oz
	Fontelis	7	24 fl oz	0	72 fl oz
	Priaxor	7, 11	4-8 fl oz	0	24 fl oz
	Scala SC	9	7 fl oz	1	35 fl oz
Late blight	Aftershock	11	5.7 fl oz	3	22.8 fl oz
(*Phytophthora infestans*)	azoxystrobin				
	Quadris	11	6.2 fl oz	0	37 fl oz
	Quadris Opti	11, M	1.6 pt	0	5 app
	Quadris Top	11, 3	8 fl oz	0	47 fl oz
	Satori	11	5-6.2 fl oz	0	61.5 fl oz
	Cabrio	11	8-16 oz	0	96 fl oz
	chlorothalonil				
	Bravo Ultrex	M	1.3-1.8 lb	0	18.3 lb
	Chloronil 720	M	1.4-2 pt	0	20 pt
	Echo 90DF	M	1.4-2 pt	0	15.1 lb a.i.
	Equus 720SST	M	1.4-2 pt	0	20 pt
	copper hydroxide				
	Kocide 3000	M	0.8-1.8 lb	0	26.7 lb
	Kocide 2000	M	1.5-2.3 lb	0	22.8 lb
	Champ WG[OG]	M	1.1 lb	3	16 lb
	copper hydroxide and copper oxychloride				
	Badge SC	M	1.8 pt	3	28.1 pt
	Badge X2[OG]	M	0.8-1.8 lb	3	8 lb Cu
	copper sulfate				
	Cuprofix-Ultra 40	M	0.8-3 lb	3	20 lb
	Cuproxat	M	2.5-6 pt	3	39.4 pt
	Nordox 75WG[OG]	M	2-4 lb	0	
	Evito 480 SC	11	5.7 fl oz	3	22.8 fl oz
	Flint 50WDG	11	2-3 oz	3	16 fl oz
	Forum	40	6 fl oz	4	30 fl oz
	Gavel 75DF	22, M	1.5-2 lb	5	8-16 lb[30]
	mancozeb				
	Dry formulations	M	0.5-3 lb3[0]	5	21-22.4 lb
	Liquid Formulations	M	0.6-2.4 qt[30]	5	16.8 qt
	ManKocide	M	1-3 lb	5	42.7-58 lb[30]

Commercial Crop Production
Vegetables

Table 1. Recommended pesticides, rates and pesticide use restrictions for selected vegetable crops
The symbol [OG] *indicates a pesticide that has been listed by the Organic Materials Review Institute (OMRI) as approved for use in organic production.*

Disease (Pathogen)	Product Choices[1] and Product Mode of Action Group[2]		Rate[3]	PHI[4]	Maximum Use
	MilStop[OG]		2-5 lb/100 gal		4.2 oz a.i
	OSO 5%	19	3.75-13 fl oz	0	7.5 pt
	Previcur Flex	28	0.7-1.5 pt	5	24 fl oz
	Priaxor	7, 11	8 fl oz	0	16.5 fl oz
	Ranman	21	2.1-2.8 fl oz	0	24.6 fl oz
	Reason 500SC	11	5.5-8.2 fl oz	14	* footnote[31]
	Ridomil	4, M	2.5 pt	5	3 app
	Gold Bravo SC	4, M	2 lb	14	10 lb
	Gold/Copper	4, M	2.5 lb	5	28 fl oz
	Gold MZ WG	3, 40	5.5-7 fl oz	1	
	Revus Top				
	Serenade[OG]	44	2-6 qt	0	
	ASO	44	4-20 oz	0	
	Optimum	44	1-3 lb	0	72 oz
	MAX	27, 11	8-10 oz	3	
	Tanos	M	2 qt		42 fl oz
	Top Cop with Sulfur	45, 40	14 fl oz	4	8 app
	Zampro	22, M	36 fl oz	5	
	Zing				
Leaf mold (*Cladosporium fulvum*)	Gavel 75DF	22, M	1.5-2 lb	5	8-16 lb[30]
	Inspire Super	9,3	16-20 fl oz	0	47 fl oz
	mancozeb				
	Dry formulations	M	0.5-3 lb[30]	5	21-22.4 lb
	Liquid Formulations	M	0.6-2.4 qt[30]	5	16.8 qt
	ManKocide	M	1-3 lb	5	42.7-58 lb[30]
	OSO 5%	19	3.75-13 fl oz	0	4.2 oz a.i
	Quadris Top	11, 3	8 fl oz	0	47 fl oz
	Ridomil Gold Bravo	4, M	2.5 pt		*footnote[31]
	Tanos	27, 11	8 oz	3	72 oz
Southern blight (*Sclerotium rolfsii*)	Aftershock	11	2-5.7 fl oz	3	22.8 fl oz
	Blocker 4F (PCNB)	14	4.5 to 7.5 pt/100 gal	0	7.5 lb a.i.
	Cabrio EG 20%	11	12-16 oz	0	96 oz
	Evito SC	11	2-5.7 fl oz	3	22.8 fl oz
	Fontelis	7	1-1.6 fl oz[6]	0	24 fl oz
	Priaxor 500SC	7, 11	4-8 fl oz	0	24 fl oz
White mold (or Timber rot) (*Sclerotinia sclerotiorum*)	Cabrio EG 20%	11	12-16 oz	0	96 fl oz
	Priaxor 500SC	7, 11	4-8 fl oz	0	24 fl oz
Viruses	A list of viruses of tomato can be found in Table 3. Plant resistant varieties. Table 4 provides a list of varieties with resistance to *Tomato spotted wilt virus* (TSWV). For viruses transmitted by insects, control of the insect vector using insecticides, polyethylene or polyethylene coated mulches and/or trap crops are recommended. Seed treatments and good sanitation practices are recommended for noninsect transmitted viruses.				
Tomato (Greenhouse)					

Commercial Crop Production
Vegetables

Table 1. Recommended pesticides, rates and pesticide use restrictions for selected vegetable crops
The symbol [OG] *indicates a pesticide that has been listed by the Organic Materials Review Institute (OMRI) as approved for use in organic production.*

Disease (Pathogen)	Product Choices[1] and Product Mode of Action Group[2]		Rate[3]	PHI[4]	Maximum Use
Bacterial canker	No bactericides are available. Seed treatments and good sanitation practices are recommended.				
Fusarium crown and root Rot (*Fusarium oxysporum*)	No fungicides available. Resistant varieties, seed treatments and good sanitation practices are recommended.				
Gray leaf smot (*Stemphylium solani)*	Gavel 75DF	22, M	1.5-2 lb	5	8-16 lb[30]
	Inspire Super	9, 3	16-20 fl oz	0	47 fl oz
	mancozeb				
	Dry formulations	M	0.5-3 lb[30]	5	21-22.4 lb
	Liquid Formulations	M	0.6-2.4 qt[30]	5	16.8 qt
	ManKocide	M	1-3 lb	5	42.7-58 lb[30]
	Tanos	27, 11	8 oz	3	72 oz
Gray mold and Ghost spot (*Botrytis cinerea*)	Actinovate AG[OG]		3-12 oz		
	Botran 75W	14	1/100 gal	0	4 app
	Fontelis 1.67SC	7	16-24 fl oz	0	72 fl oz
	Scala SC	9	7 fl oz[32]	1	35 fl oz
	Switch 62.5WG	9, 12	11-14 oz[33]	0	56 oz
Leaf mold (*Cladosporium fulvum*)	Gavel 75DF	22, M	1.5-2 lb	5	8-16 lb[30]
	Inspire Super	9, 3	16-20 fl oz	0	47 fl oz
	mancozeb				
	Dry formulations	M	0.5-3 lb[30]	5	21-22.4 lb
	Liquid Formulations	M	0.6-2.4 qt[30]	5	16.8 qt
	ManKocide	M	1-3 lb	5	42.7-58 lb[30]
	Tanos	27, 11	8 oz	3	72 oz
Powdery mildew (*Odium neolycopersici*)	Fontelis	7	16-24 fl oz	0	72 fl oz
	Inspire Super	9, 3	16-20 fl oz	0	47 fl oz
	Microthiol Disperss[OG]	M	5 lb		
	phosphorous acid				
	Confine Extra	33	1-4 qt		
	Rampart	33	1-3 qt/100 gal		
	Pre-AM		50 fl oz/100 gal		
			8 fl oz		
	Quadris Top	11, 3	2.5-4 fl oz	0	47 fl oz
	Rally 40WSP	3		0	1.3 lb a.i.
	Serenade[OG]				
	ASO	44	2-6 qt	0	
	Optimum	44	4-20 oz	0	
	MAX	44	1-3 lb	0	
	Switch 62.5WG	9, 12	11-14 oz[33]	0	56 oz
	Trilogy[OG]		1%		
Damping-off (*Pythium* spp.)	phosphorous acid				
	Confine Extra	33	1-4 qt		
	Rampart	33	1-3 qt/100 gal		
	Previcur Flex	28	12.8 fl oz/100 gal[34]	0	4 app
Target spot (*Corynespora cassicola*)	Fontelis	7	16-24 fl oz	0	72 fl oz
	Inspire Super	9, 3	16-20 fl oz	0	47 fl oz
	Serenade[OG]				

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Vegetables

Table 1. Recommended pesticides, rates and pesticide use restrictions for selected vegetable crops
The symbol [OG] *indicates a pesticide that has been listed by the Organic Materials Review Institute (OMRI) as approved for use in organic production.*

Disease (Pathogen)	Product Choices[1] and Product Mode of Action Group[2]		Rate[3]	PHI[4]	Maximum Use
	ASO	44		0	
	Optimum	44		0	
	MAX	44		0	
	Tanos	27, 11	8 oz	0	72 oz
Viruses and Viroids[35]	A list of viruses and viroids of tomato can be found in Table 3. For viruses and viroids transmitted by insects, control of the insect vector using insecticides, screens, double entry doors and/or trap crops are recommended. Seed treatments and good sanitation practices are recommended for noninsect transmitted viruses and viroids. Plant-resistant varieties are listed in Table 4.				

[1]Reference to commercial or trade names is made with the understanding that no discrimination is intended nor endorsement of a particular product by LSU or the LSU AgCenter is implied.
[2]Mode of action groups are determined by the Fungicide Resistance Action Committee (FRAC).
[3]Rates are the amount of formation per acre unless otherwise indicated. Usually 100 gallons of water are required to give good coverage with boom sprayers.
[4]Postharvest interval (PHI) is the minimum number of days allowed between the last application and harvest.
[5]Where mancozeb 80WP is recommended, flowable and dry flowable formulations can be used at the labeled rates.
[6]All rates are per 1,000 square feet of row. Refer to the label for modes of application.
[7]Broccoli and cabbage are covered under a supplemental label (EPA Reg. No. 70506-234).
[8]Rates refer to band or broadcast applications. Refer to individual labels for per plant in transplant water rates.
[9]For head and stem applications the postharvest interval (PHI) is 0 days. For leafy greens the PHI is 3 days.
[10]For head and stem applications the postharvest interval (PHI) is 0 days. For leafy greens the PHI is 14 days.
[11]Do not use in a spray solution with a pH less than 6.5.
[12]Do not apply alone. Must be applied as a tank mix with another fungicide with a different mode of action.
[13]Soil applications. Refer to individual labels for application directions.
[14]Other product choices that can be applied at the same rate include Echo 720, Equus 720SST and Chloronil 720.
[15]Satori must not be tank mixed with another fungicide (i.e. Ambush WP, Pounce WP, Franchise) that may increase the penetration of Satori. Refer to label for addition restrictions.
[16] Rates are cumulative. Do not apply more than 3.2 qt. per acre per year.
[17]Do not use more than one application of Actigard 50WG on head lettuce intended for bag purposes.

[19]Shank applications only. Apply 21 days aftger planting or after the first cutting. Refer to label for additional application instructions.
[20]PHI varies depending on the rate and mode of application. Refer to label for specific PHI.

[22]**Transplant production only.**
[23]West of the Mississippi river do not apply more than 42.3 lb. per crop per year. East of the Mississippi river do not apply more than 58 lb. per crop per year.
[24]West of the Mississippi river do not apply more than 9.6 qt. product per acre per year. East of the Mississippi river do not apply more than 14.4 qt. product per acre per year.
[25]West of the Mississippi river do not apply more than 12.8 lb. product per acre per year. East of the Mississippi river do not apply more than 19.2 lb. product per acre per year.
[26]Use a lower rate of chlorothalonil when vines are first exposed and leaf wetness occurs. Increase the rate when vines close between rows or late blight forecasting measures 18 disease severity values or the crop reaches 300 P-days. Refer to labels for detailed application and timing instructions.

Commercial Crop Production
Vegetables

Table 1. Recommended pesticides, rates and pesticide use restrictions for selected vegetable crops
The symbol [OG] *indicates a pesticide that has been listed by the Organic Materials Review Institute (OMRI) as approved for use in organic production.*

Disease (Pathogen)	Product Choices[1] and Product Mode of Action Group[2]	Rate[3]	PHI[4]	Maximum Use
[27]Do not exceed 11.3 lb. a.i. per acre of chlorothalonil containing products. Do not exceed 0.2 a.i. per season of soil-applied and 0.4 lb a.i. per season of foliar-applied mefenoxam. [28]Not labeled for all herbs or leafy greens. Rate varies depending on the crop type. Refer to label for labeled crops and specific rates. [29]Do not exceed 18 lb. a.i. per acre of chlorothalonil containing products. Do not exceed 1.5 lb. a.i. per acre of azoxystrobin containing products. [30]Rates vary based on proximity to the Mississippi (west vs. east of the Mississippi river). Refer to labels for exact rates. [31]Do not exceed 15 lb. a.i. per acre of chlorothalonil containing products. Do not exceed 0.5 lb. a.i. per acre of foliar applied azoxystrobin containing products. Refer to label for additional restrictions. [32]Ventilate for at least 3 hours after application. [33]Do not apply to cherry or grape type tomatoes in the greenhouse. [34]Apply in the evenings through a drip irrigation system. Refer to label for additional application instructions and restrictions. [35]Viroids are the smallest “organisms” known to cause plant diseases. Viroids can also be transmitted by seeds, vegetative propagation, pollen, grafting and insects. Viroids are easily spread by contact with contaminated pruning tools, farm equipment, clothing, crop handing and contact between neighboring plants.			

Table 2. Pepper virus diseases and modes of transmission	
Virus	**Transmission**
Alfalfa mosaic virus (AMV)	Aphids
Cucumber mosaic virus[1] (CMV)	Aphids
Pepper mild mottle virus (PMMoV)	Seed Mechanical
Pepper mottle virus (PeMoV)	Aphids
Potato virus Y (PVY)	Aphids
Tobacco etch virus[2] (TEV)	Aphids
Tobacco mosaic virus (TMV)	Seed Mechanical
Tomato spotted wilt virus (TSWV)	Thrips
[1]CMV is the most important virus disease of peppers worldwide. [2]TEV and PVY normally occur together. Planting PVY-resistant varieties often helps control TEV because resistance to both viruses is closely linked.	

Table 3. Tomato virus diseases and modes of transmission	
Virus	**Transmission**
Cucumber mosaic virus (CMV)	Aphids
Pepino mosaic virus[1] (PeMV)	Mechanical
Potato leaf roll virus (PLRV)	Aphids
Potato virus Y (PVY)	Aphids
Tobacco etch virus (TEV)	Aphids
Tobacco mosaic virus (TMV)	Seed Mechanical
Tomato yellow leaf curl virus (TYLCV)	Whiteflies (silver leaf)
Tomato ringspot virus (TRSV)	Dagger nematode
Tomato spotted wilt virus (TSWV)	Thrips
[1]Reported mostly on tomatoes produced in the greenhouse.	

Table 4. Tomato varieties with resistance to *Tomato spotted wilt virus*; seed suppliers	
Variety	**Source**
Fresh Market (indeterminate)	
Amelia	Harris Moran Seed Co.
Bella Rosa	Sakata
BHN 444	BHNSeed
BHN 602	BHNSeed
BHN 640	BHNSeed
Crista	Harris Moran Seed Co.
Finishline	Syngenta
Fletcher	North Carolina State University
Florida 7964	University of Florida
Mountain Glory	NCSU
Nico	Harris Moran Seed Co.
Red Defender	Harris Moran Seed Co.
Redline	Syngenta
Talladega	Syngenta
Top Gun	Twilley Seeds
Roma (saladette or determinate)	
BHN 685	BHNSeed
Health Kick	Park Seed
Muriel	Sakata
Picus	Seminis

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Table 5. Example spray program for foliar disease control in tomato production when early blight is a consistent threat. *Table reproduced from the 2016 Southeastern US Vegetable Handbook. Table prepared by S. Bost, Plant Pathologist, University of Tennessee.*

Week	Chemical (Refer to the Label for rates.)	Number of Applications of Chemical Per Season[1]
BEFORE HARVEST (weeks 1 to 10)		
1	Mancozeb + Actigard[2]	Mancozeb, 1; Actigard, 1
2	Mancozeb + Copper	Mancozeb, 2; Copper, 1
3	Fontelis[3] + Actigard	Fontelis, 1; Actigard, 2
4	Mancozeb+ Copper	Mancozeb, 3; Copper, 2
5	Inspire Super[3] + Actigard	Inspire Super 1; Actigard, 3
6	Mancozeb + Copper	Mancozeb, 4; Copper, 3
7	Fontelis + Actigard	Fontelis, 2; Actigard, 4
8	Mancozeb + Copper	Mancozeb, 5; Copper, 4
9	Inspire Super + Actigard	Inspire Super, 2; Actigard, 5
10	Chlorothalonil + Copper	Chlorothalonil, 1; Copper, 5
DURING HARVEST (weeks 11 to 15)		
11	Fontelis + Copper	Fontelis, 3; Copper, 6
12	Chlorothalonil + Copper	Chlorothalonil, 2; Copper, 7
13	Inspire Super + Copper	Inspire Super, 3; Copper, 8
14	Chlorothalonil + Copper	Chlorothalonil, 3; Copper, 9
15	Chlorothalonil + Copper	Chlorothalonil, 4; Copper, 10
	Finish season with Chlorothalonil	

[1] For most products, the total number of applications per season is restricted by the label.
[2] In areas or seasons in which bacterial spot or speck problems are not expected, Actigard and Copper can be omitted.
[3] If late blight occurs, appropriate fungicides must be added. Fontelis and Inspire Super do not have any late blight activity.

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Table 6. Biopesticides and fungicide alternatives for vegetables.					
Active Ingredient	Product	Crops	Target Diseases/Pests	Greenhouse Use	OMRI Listed
acibenzolar-S-methyl	Actigard[1]	Chili pepper, cucurbits, lettuce, onion, spinach and tomato	Bacterial blights[4] Downy mildew Powdery mildew	No	No
Bacillus amyloliquefaciens D747	DoubleNickel[2]	Most vegetables[5], strawberries, citrus, fruit and nuts	Bacterial blights Downy mildew Leaf spots Powdery mildew[4]	Yes	Yes
Bacillus pumilus QST2808	Ballad Plus[3] Sonata	Bulb vegetables, cole crops, cucurbits, legumes, pepper, , root crops, sweet corn and tomato	Early blight Downy mildew Late blight Leaf blights Powdery mildew Rust	Yes	Yes
Bacillus subtilis MBI 600	Subtilex NG[6]	Cucurbits, eggplant, pepper and tomato	Powdery mildew[6] Root diseases	Yes	No
Bacillus subtilis QST713	Cease[7] Serenade Max[7]	Cole crops, cucurbits, leafy vegetables, legumes, pepper and tomato	Downy mildew Leaf blights Powdery mildew	Yes	Yes
Bacteriophage (Phage)	Agriphage[8]	Most vegetables[5]	Bacterial canker (foliar only) Bacterial speck Bacterial spot	Yes	No
Coniothyrium minitans	Contans[9]	Most vegetables[5]	Lettuce drop Timber rot White mold	Yes	Yes
Gliocladium cantenulatum	PreStop Biofungicide	Most vegetables[5]	Botrytis stem canker Root diseases Seed rots	Yes	No
Gliocladium virens GL-21	SoilGard 12G[10]	Most vegetables[5]	Root diseases Seed rots	Yes	Yes
hydrogen peroxide	Oxidate Terracide	Most vegetables[5]	Root diseases Leaf blights	Yes	Yes

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Table 6. Biopesticides and fungicide alternatives for vegetables.					
Active Ingredient	Product	Crops	Target Diseases/Pests	Greenhouse Use	OMRI Listed
Myrothecium verrucaria	DiTera DF	Cole crops, cucurbits, eggplant, leafy vegetables, legumes, pepper, root and tuber vegetables and tomato	Nematodes	Yes	Yes
neem Oil	Trilogy[11]	Vegetables	Foliar diseases	Yes	Yes
Oils from cottonseed, corn and garlic	Mildew Cure[11]	Cucurbits and tomato	Powdery mildew	Yes	No
Oils from clove, rosemary and thyme	Sporatec[12]	Most vegetables[5]	Fungal leaf blights Powdery mildew	Yes	Yes
Oil from soybean	Oleotrol-M[13]	Most vegetables[5]	Botrytis gray mold Downy mildew Powdery mildew	Yes	Yes
Paecilomyces lilacinus	MeloCon WG	Most vegetables[5]	Nematodes	Yes	Yes
phosphorous compounds	Alude Fosphite Fungi-Phite Phostrol ProPhyt Rampart	Most vegetables[5]	Downy mildew Leaf blights Powdery mildew	Yes	No
potassium bicarbonate[14]	Armicarb Kaligreen Milstop	Most vegetables[5]	Fungal leaf blights Powdery mildew	Yes	Yes (except Armicarb)
Potassium salts of fatty acids	M-Pede[15]	Most vegetables[5]	Powdery mildew	Yes	Yes
potassium silicate	Sil-MATRIX[16]	Most vegetables[5]	Botrytis gray mold Powdery mildew	Yes	Yes
Pseudomonas chlororaphis	Atezec	Most vegetables[5]	Stem and root diseases	Yes (no field use allowed)	No
Reynoutria sachalinensis extract	Regalia[17]	Most vegetables[5]	Fungal leaf blights Powdery mildew	Yes	Yes
Streptomyces griseoviridis	Mycostop[18]	Most vegetables[5]	Seedling, root and stem rots	Yes	Yes
Streptomyces lydicus	Actinovate AG[6]	Most vegetables[5]	Foliar blights Seedling, root and stem rots	Yes	Yes
Streptomyces lydicus + iron,	Actino-Iron[9]	Most vegetables[5]	Seedling, root and stem rots	Yes	Yes

Table 6. Biopesticides and fungicide alternatives for vegetables.

Active Ingredient	Product	Crops	Target Diseases/Pests	Greenhouse Use	OMRI Listed
molybdenum and humic acid					
Trichoderma harzianum[18]	T-22 RootShield PlantShield	Cole crops, eggplant, leafy vegetables, pepper and tomato	Seedling, root and stem rots	Yes	Yes
Trichoderma viride	Binab	Most vegetables[5]	Seedling, root and stem rots	Yes	No

Comments:

[1]Do not apply to plants stressed by heat, cold or moisture extremes.
[2]pH of spray solution should be between 6.0 and 8.0.
[3]Labeled for sweet corn only.
[4]Target diseases or pests are crop dependent. Refer to label for specific diseases and crop.
[5]Most vegetables are covered on the label. Refer to the label for specific crops and diseases.
[6]Apply to soil or potting medium; use as a foliar spray for powdery mildew.
[7]Works best when applied prior to disease development and used in an integrated program.
[8]Product is strain specific. Contact your State Vegetable Pathologist Extension Specialist for information on identifying bacterial strains. Apply in the evening or during cloud cover days.
[9]Apply to soil or potting medium.
[10]Do not apply in conjunction with chemical fungicides.
[11]May cause leaf burn; test a small number of plants before spraying entire crop.
[12]Addition of a spray adjuvant (spreader or penetrant) is recommended.
[13]Tank-mix with a spreader- sticker.
[14]pH of spray solution should not be below 7.0.
[15]To avoid plant injury, do not mix with surfactants or apply to stressed plants. Product also has insecticidal properties.
[16]Tank-mix with a nonionic surfactant for best results.
[17]First application should be made before symptoms appear.
[18]Can be added to potting mix or applied in-furrow to field soil.

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Table 7. Various fungicides for use on vegetable crops
Table reproduced from the 2019 Southeastern US Vegetable Handbook. Table prepared by R. Melanson, Plant Pathologist, Mississippi State University and R. Singh, Plant Pathologist, Louisiana State University.

Common Name	Trade Name(s)
azoxystrobin	Aframe *(Syngenta)*
	Aubrac *(AgChem Access)*
	Azoxy SC *(Willowood)*
	Azoxystar *(Albaugh)*
	Dynasty *(Syngenta)*
	Equation *(Cheminova)*
	Equation SC *(Cheminova)*
	Quadris *(Syngenta)*
	Satori *(Loveland Products)*
	Trevo *(Innvictis Crop Care)*
	Willowood Azoxy 2SC (Willowood USA)
chlorothalonil	Bravo Ultrex *(Syngenta)*
	Bravo Weather Stik *(Syngenta)*
	Bravo Zn *(Syngenta)*
	Chloronil 720 *(Syngenta)* Chlorothalonil 720SC *(Arysta)* Echo 720 *(SipcamAdvan)* Echo 90DF *(SipcamAdvan)* Echo Zn *(SipcamAdvan)* Equus 500 Zn *(MANA)*
	Equus 500ZN *(Adama)*
	Equus 720SST *(Adama)*
	Equus DF *(Adama)*
	Initiate 720 *(Loveland Products)*
	Initiate ZN *(Loveland Products)*
copper hydroxide	Champ DP Dry Prill *(Nufarm)*
	Champ Formula 2 Flowable *(Nufarm)*
	Champ WG *(Nufarm)*
	Champion Wettable Powder *(Nufarm)*
	Kentan DF *(Isagro USA)*
	Kocide DF *(DuPont; Certis USA)*
	Kocide 2000 *(DuPont; Certis USA)*
	Kocide 3000 *(DuPont; Certis USA)*
	Nu Cop 3L *(Albaugh)*
	Nu Cop 50WP *(Albaugh)*
	Nu Cop HB *(Albaugh)*
copper octanoate	Camelot-O *(Sepro)*
copper (cuprous) oxide	Nordox *(NORDOX Industrier AS)*
	Nordox 75WG *(NORDOX Industrier AS)*

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Table 7. Various fungicides for use on vegetable crops
Table reproduced from the 2019 Southeastern US Vegetable Handbook. Table prepared by R. Melanson, Plant Pathologist, Mississippi State University and R. Singh, Plant Pathologist, Louisiana State University.

Common Name	Trade Name(s)
copper sulfate (basic)	Basic Copper 53 *(Albaugh)*
	Cuprofix Ultra 40 Disperss *(UPI)*
	Cuproxat (NuFarm)
copper sulfate pentahydrate	Mastercop (Adama)
fosetyl-Al	Aliette WDG Fungicide *(Bayer)*
	Linebacker WDG *(NovaSource)*
fludioxonil	Cannonball *(Syngenta)*
	Dyna-Shield Fludioxonil *(Loveland)*
	Maxim 4FS *(Syngenta)*
	Scholar SC *(Syngenta)*
	Spirato 480FS *(Nufarm)*
iprodione	Enclosure 4 *(Devgen)*
	Iprodione 4L AG *(Arysta)*
	Meteor *(UPI)*
	Nevado 4F *(MANA)*
	Rovral 4 Flowable Fungicide *(Bayer: FMC)*
mancozeb	Dithane F-45 Rainshield *(Dow)* Dithane M-45 *(Dow)*
	Koverall *(Cheminova)*
	Manzate Flowable *(UPI)*
	Manzate Max *(UPI)*
	Manzate Pro-Stick *(UPI)*
	Penncozeb 4FL *(UPI)*
	Penncozeb 75DF *(UPI)*
	Penncozeb 80WP *(UPI)*
	Roper DF Rainshield *(Loveland Products)*
mefenoxam	Ridomil Gold GR *(Syngenta)*
	Ridomil Gold SL *(Syngenta)*
	Ultra Flourish *(Nufarm)*
myclobutanil	Rally 40WSP *(Dow)*
	Sonoma 25EW AG (*Albaugh*)
	Sonoma 40WSP *(Albaugh)*
pentachloronitrobenzene (PCNB)	Blocker 4F
phosphite (*potassium*)	Helena Prophyt *(Helena)*

Table 7. Various fungicides for use on vegetable crops
Table reproduced from the 2019 Southeastern US Vegetable Handbook. Table prepared by R. Melanson, Plant Pathologist, Mississippi State University and R. Singh, Plant Pathologist, Louisiana State University.

Common Name	Trade Name(s)
	Confine Extra (*Winfield Solutions*)
	Reveille *(Helena)*
phosphite (mono-and-dibasic salts)	Phostrol *(Nufarm)*
phosphorous acid (mono-and-dipotassium salts)	Alude *(Cleary)*
	Fosphite Fungicide *(JK Biotech)*
	Fungi-Phite *(Plant Protectants)*
	K-Phite 7LP AG *(Plant Food Systems)*
	Rampart *(Loveland Products)*
propamocarb hydrochloride	Previcur Flex *(Bayer)*
	Promess *(Agriphar)*
propiconazole	AmTide Propiconazole 41.8% EC *(AmTide)*
	Bumper 41.8EC *(Adama)*
	Bumper ES *(Adama)*
	Fitness *(Loveland Products)*
	Propi-star EC *(Albaugh)*
	Propicure 3.6F (*Direct Ag Source*)
	Propimax EC (*Dow AgroSciences*)
	Shar-Shield PPZ (*Sharda USA*)
	Tilt *(Syngenta)*
	Topaz *(Winfield Solutions)*
	Willowood Propicon 3.6EC *(Willowood USA)*
sulfur	Cosavet-DF *(Sulphur Mills Limited)*
	CSC 80% Thiosperse *(Martin Resources)* CSC Dusting Sulfur *(Martin Resources)* CSC Thioben 90 *(Martin Resources)* CSC Wettable Sulfur *(Martin Resources)*
	Dusting Sulfur *(Loveland Products; Wilbur-Ellis)* First Choice Dusting Sulfur *(Loveland Products)* IAP Dusting Sulfur *(Independent Agribusiness Professionals)*
	InteGro Magic Sulfur Dust (*InteGro Inc.*)
	Kumulus DF *(Arysta)* Liquid Sulfur Six *(Helena)* Micro Sulf *(Nufarm)*
	Microfine Sulfur *(Loveland Products)*
	Microthiol Disperss *(UPI)*
	Special Electric Sulfur *(Wilbur-Ellis)*
	Spray Sulfur *(Wilbur-Ellis)*
	Sulfur 6L *(Arysta)* Sulfur 90W *(Drexel)* Sulfur DF *(Wilbur-Ellis)*
	That Flowable Sulfur *(Stoller Enterprises)*

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Table 7. Various fungicides for use on vegetable crops
Table reproduced from the 2019 Southeastern US Vegetable Handbook. Table prepared by R. Melanson, Plant Pathologist, Mississippi State University and R. Singh, Plant Pathologist, Louisiana State University.

Common Name	Trade Name(s)
	Thiolux (*Loveland Products*)
	Wettable Sulfur *(Helena)*
	Yellow Jacket Dusting Sulfur *(Georgia Gulf Sulfur)*
	Yellow Jacket Wettable Sulfur *(Georgia Gulf Sulfur)*
tebuconazole	AmTide TEBU 3.6F *(AmTIde)*
	Barrier (*Real Farm Technologies*)
	Folicur *(Bayer)*
	Monsoon *(Loveland Products)*
	Onset 3.6L *(Winfield Solutions)*
	Orius 3.6F *(Adama)*
	Solera Tebuconazole 3.6F *(Solera)*
	Tebu-Crop 3.6F (*Sharda USA*)
	Tebucon 3.6F (*Repar Corp.*)
	TebuStar 3.6L *(Albaugh)*
	Tebuzol 3.6F *(UPI)*
	Toledo 3.6F *(Rotam)*
thiophanate-methyl	Cercobin *(Cheminova)*
	Incognito 4.5F *(Adama)*
	Incognito 85 WDG *(Adama)*
	Thiophanate-Methyl 85 WDG *(Adama)*
	T-Methyl 4.5F *(Nufarm)*
	T-Methyl 70W WSB *(Nufarm)*
	Topsin 4.5FL *(UPI)*
	Topsin M 70WDG *(UPI)*

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Table 8. Fungicides mode of actions for fungicide-resistance management
Table reproduced from the 2016 Southeastern US Vegetable Handbook. Table prepared by L. M. Quesada-Ocampo, Plant Pathologist, NCSU and M. Lewis Ivey, Plant Pathologist, Ohio State University.

FRAC Code	Fungicide Resistance Risk	Group Name	Example Active ingredients	Example Products
P1	Unknown	Benzo-thiadiazole (BTH)	acibenzolar-S-methyl	Actigard
M1	Low	Inorganic copper	fixed copper	Copper (generic)
M2	Low	Inorganic sulfur	sulfur	Sulfur (generic)
M3	Low	Dithiocarbamates	mancozeb	Mancozeb (generic)
M5	Low	Chloronitriles	chlorothalonil	Chlorothalonil (generic)
1	High	Methyl benzimidazole carbamates (MBC)	thiophanate-methyl	Topsin M
2	Medium to high	Dicarboximides	iprodione	Rovral
3	Medium	Demethylation inhibitors (DMI)	triflumizole myclobutanil	Procure Rally
4	High	Phenylamide	mefenoxam	Ridomil Gold
7	Medium to high	Succinate dehydrogenase inhibitors (SDHI)	boscalid penthiopyrad	Endura Fontelis
9	Medium	Anilino-pyrimidines (AP)	pyrimethanil	Scala
11	High	Quinone outside inhibitors (QoI)	pyraclostrobin trifloxystrobin azoxystrobin	Cabrio Flint Quadris
12	Low to medium	Phenylpyrroles (PP)	fludioxinil	Maxim
13	Medium	Aza-naphthalenes	quinoxyfen	Quintec
14	Low to medium	Aromatic hydrocarbons (AH)	dichloran	Botran
21	Medium to high	Quinone inside Inhibitors (QiI)	cyazofamid	Ranman
22	Low to medium	Benzamides (toluamides) Thiazole carboxamide	zoxamide	Gavel (contains zoxamide and mancozeb)
27	Low to medium	Cyanoacetamide-oximes	cymoxanil	Curzate
28	Low to medium	Carbamates	propamocarb	Presidio
29	Uknown	Dinitroanilines	fluazinam	Omega
33	Low	Phosphonates	fosetyl-Al	Aliette
40	Low to medium	Carboxylic acid amides (CAA)	dimethomorph mandipropamid	Forum Revus
43	High	Benzamides	fluopicolide	Presidio

Information in this section was last updated in December 2018 by Dr. R. Singh.