



## Integrated Pest Management Program

Department of Plant Science and Landscape Architecture  
UConn Extension

### Selected Organic Fungicides & Bactericides Labeled for Vegetable Bedding plants/transplants

Fungicide	Targeted Pest	Labeled Crops	Comments
<i>Bacillus amyloliquefaciens</i> D747 (Double Nickel) (Triathlon BA) 4 hr. REI OMRI-certified products Group BM02	Fungal & bacterial leaf spots and blights, downy mildew, powdery mildew, damping off ( <i>Pythium</i> , <i>Rhizoctonia</i> , <i>Fusarium</i> , <i>Phytophthora</i> ) (depending upon crops, see labels)	Cole crops, bulb, cucurbit, fruiting and leafy vegetable transplants.	Broad-spectrum, preventative biological fungicides. Begin applications when conditions in the greenhouse favor disease development.
<i>Bacillus amyloliquefaciens</i> F727 (Stargus) 4 hr. REI OMRI-certified product Group BM02	Bacterial spot & blight, botrytis blight, late blight, damping off and root rots ( <i>Fusarium</i> , <i>Phytophthora</i> , <i>Pythium</i> , <i>Rhizoctonia</i> ), downy mildew (depending upon crops, see labels)	Brassica, bulb, cucurbit, fruiting and leafy vegetable transplants.	Broad-spectrum, preventive biological fungicide for growing media or foliar applications. Activates ISR (induced systemic resistance).
<i>Bacillus subtilis</i> QST 713 (Cease) 4 hr. REI OMRI-certified product Group BM02	Fungal and bacterial leaf spots, powdery mildew, <i>Botrytis</i> blight downy mildew.	Cole crops, bulb, cucurbit, leafy and fruiting vegetable transplants.	Broad-spectrum, preventative biological fungicide. Begin applications when conditions in the greenhouse favor disease development.
Copper hydroxide (Kalmor) 48 hr. REI OMRI-certified product Group MO1	Bacterial spot (pepper), angular leaf spot & downy mildew (cucumber), bacterial & fungal leaf spots & blights (tomato)	Cucumber, eggplant, pepper, and tomato transplants.	Protectant contact fungicide. See label for plant safety information.
Copper oxychloride & copper hydroxide (Badge X2) OMRI-certified product 24 hr. REI Group M01	Fungal & bacterial spots, and blights	Cucumber, eggplant, pepper, tomato transplants.	Contact fungicide. Badge X2 is a low load dry copper formulation that is a mixture of two high purity copper salts; copper oxychloride and copper hydroxide. See label for plant safety information.

Copper octanoate (Camelot O) (Grotto) 4 hr. REI Group M01 OMRI-certified products	Bacterial & fungal leaf spots (many), powdery mildew, downy mildew, early blight, late blight and others (depending upon crop, see labels)	Crucifers, cucurbit, lettuce, onion, tomato, eggplant, and pepper transplants.	Contact fungicides. See labels for plant safety information.
<i>Gliocladium catenulatum</i> J1446 (LALSTOP G46 WG) 4 hr. REI OMRI-certified product	Damping off, root and stem rot ( <i>Alternaria</i> , <i>Fusarium</i> , <i>Pythium</i> , <i>Phytophthora</i> , <i>Rhizoctonia</i> ), powdery mildew suppression	Cucurbit, fruiting, leafy, bulb and brassica leafy vegetable transplants.	Preventive biological fungicide that can be incorporation into the media, applied as a drench or foliar spray.
<i>Gliocladium virens</i> GL-21 (SoilGard) 4 hr. REI OMRI certified product Group BM02	<i>Pythium</i> , <i>Rhizoctonia</i> , <i>Sclerotium</i> , <i>Phytophthora</i> , and <i>Fusarium</i>	Fruiting and leafy vegetable transplants.	Preventive biological fungicide applied before transplanting into the field.
Hydrogen dioxide & peroxyacetic acid (ZeroTol 2.0) 0 hr. REI (drench) 1 hr. REI (spray) OMRI-certified product	Downy mildew, powdery mildew, leaf spots and blights, root rots ( <i>Pythium</i> , <i>Fusarium</i> , <i>Rhizoctonia</i> )	Cucumber, eggplant, pepper, tomato and lettuce transplants.	Contact fungicide. Strong oxidizing agent. See label for plant safety information.
Insecticidal Soap (potassium salts of fatty acids) (Kopa Insecticidal Soap) (M-Pede) OMRI certified products	Powdery mildew	Cucurbit, fruiting and leafy vegetable transplants.	Contact fungicides. Short residual activity. See labels for plant safety information.
Mineral Oil (SuffOil- X) 4 hr. REI OMRI-certified product	Powdery mildew	Cucumber, eggplant, melon, pepper, pumpkin, squash & tomato transplants.	Contact fungicide. Thorough coverage of all plant parts is important. See label for plant safety information.
Potassium bicarbonate (Milstop)	Powdery mildew and others	Broccoli, brussels sprouts, cabbage, cantaloupe,	Contact, eradicant fungicides. Through coverage essential. Potassium

1 hr. REI (Kaligreen) 4 hr. REI OMRI-certified products		cauliflower, celery, cucumber, eggplant, lettuce, okra, pepper, tomato and squash transplants.	bicarbonate disrupts the potassium ion balance in the fungus cell, causing the cell walls to collapse.
<i>Pseudomonas chloraphis</i> AFS009 (Zio) 4 hr. REI OMRI certified product Group BM02	Damping off, root rots ( <i>Pythium</i> , <i>Phytophthora</i> , <i>Rhizoctonia</i> ), Botrytis blight (supression with low disease pressure)	Vegetable transplants	Preventive biological fungicide.
<i>Reynoutria sachalinensis</i> extract (Regalia GC) 4 hr. REI Group P05 OMRI-certified product	Powdery mildew, downy mildew, bacterial leaf spot, early & late blight, botrytis blight, damping off (depends upon crop, see label)	Bulb, Cole crop, cucurbit, leafy and fruiting vegetable transplants.	Preventive, biological fungicide with translaminar activity. Plant activator. Formulation of an extract from giant knotweed. Use preventatively to increase the natural defense system of plants.
<i>Streptomyces</i> K 61 (Mycostop) 4 hr. REI OMRI-certified product Group BM02	<i>Alternaria</i> , Botrytis blight (suppression), <i>Fusarium</i> , <i>Phytophthora</i> , <i>Pythium</i> , <i>Rhizoctonia</i>	Many vegetable transplants. Do not treat melon seeds.	Preventative biological fungicide. Contains a beneficial bacterium. Apply as a soil spray or drench.
<i>Streptomyces lydicus</i> WYEC 108 (Actinovate AG) 1 hr. REI (spray) OMRI-certified product	Suppression of <i>Fusarium</i> , <i>Rhizoctonia</i> , <i>Pythium</i> , <i>Phytophthora</i> , downy mildew, powdery mildew, Botrytis blight, <i>Alternaria</i>	Cole crop, bulb, cucurbit, fruiting and leafy vegetable transplants.	Preventative biological fungicide for suppression of root rot diseases and foliar pathogens.
Streptomycin sulfate (Agri-mycin 17) 12 hr. REI Group 25 OMRI-certified product	Bacterial spot and speck	Tomatoes & pepper transplants.	Xylem mobile fungicide. Repeated applications can result in resistant bacteria.

Sulfur (Microthiol Disperss) (Micro Sulf) 24 hr. REI Group M02 OMRI-certified product	Powdery mildew	Many vegetables	Contact fungicides. Crops grown in greenhouses may be more sensitive to sulfur injury, so trial first with the lowest label rate. See label for plant safety information. Do not use within 2 weeks of an oil treatment.
<i>Swinglea glutinosa</i> extract (EcoSwing) 4 hr. REI OMRI-certified product Group BM01	Alternaria leaf spot, Botrytis blight, powdery mildew, basil downy mildew	Broccoli, cabbage, cauliflower, onion, cucumber, squash, eggplant, pepper, tomato and leafy vegetable transplants.	Preventive biological fungicide. Activates ISR (induced systemic resistance). Thorough coverage is needed.
<i>Trichoderma asperellum</i> (ICC012) & <i>Trichoderma gamsii</i> (ICC 080) (Obtego) 4 hr. REI OMRI-certified product Group BM02	Root rots such as <i>Phytophthora</i> , <i>Pythium</i> , <i>Rhizoctonia</i> and <i>Thielaviopsis</i>	Curcubits, fruiting and leafy vegetable transplants (except Brassica).	Preventive biological fungicide.
<i>Trichoderma harzianum</i> T-22 (RootShield Granules) 4 hr. REI Group BM02 OMRI-certified product	Root rots ( <i>Pythium</i> , <i>Rhizoctonia</i> , <i>Fusarium</i> , and <i>Thielaviopsis</i> )	Bulb, cucurbit, fruiting, leafy and brassica leafy vegetable transplants.	Preventative biological fungicide that can be incorporated into greenhouse planting mix.
<i>Trichoderma harzianum</i> KRL-AG2 (RootShield WP) 4 hr. REI OMRI-certified product Group BM02	Root rots ( <i>Pythium</i> , <i>Rhizoctonia</i> , <i>Fusarium</i> , and <i>Thielaviopsis</i> )	Brassica leafy vegetables, bulb, cucurbit, and fruiting vegetable transplants.	Preventative biological fungicide. Apply as a soil drench with no overhead spray.

<i>Trichoderma harzianum</i> T-22 & <i>Trichoderma virens</i> G-41 (RootShield Plus Granules) (RootShield Plus WP) 4 hr. REI OMRI-certified products Group BM02	Root rots ( <i>Pythium</i> , <i>Phytophthora</i> , <i>Rhizoctonia</i> , <i>Fusarium</i> and <i>Thielaviopsis</i> )	Bulb, cucurbit, fruiting, leafy and Cole crop, and leafy vegetable transplants.	Preventative biological fungicides. Apply as a soil drench (RootShield Plus WP) or incorporate into greenhouse planting mix (RootShield Plus Granules).
<i>Ulocladium oudemansii</i> U3 Strain (BotryStop) 4 hr. REI OMRI-certified product Group BM02	Botrytis Blight	Bulb, cucurbit, and fruiting vegetable transplants.	Preventative biological fungicide. Thorough coverage needed.

*If any information in this table is inconsistent with the label, then follow the label.*

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OMRI-certified product: determined by the Organic Materials Review Institute (OMRI) (<https://www.omri.org/>) to be suitable for use in certified organic production. Fungicides are grouped by their mode of action (MoA) and each MoA group is assigned a Fungicide Resistance Action Committee (FRAC) code. Numbers and letters are used to distinguish the fungicide groups according to their cross-resistance behavior. The letters refer to P = host defense inducers, M = multi-site inhibitors. Most systemic fungicides (that are absorbed into plant tissues) are specific in their mode of action. Protectant fungicides are less likely to develop resistance problems as they have multi-site modes of action (M). To prevent the development of resistance, alternative applications among different FRAC codes with different modes of action and incorporate biological fungicides into your disease management plan. See <http://www.frac.info/>

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