

SAG-18

# Microbial Biopesticides for the Control of Plant Pathogens

SAG-18-Table 1

*Disclaimer: The Ohio State University does not guarantee the efficacy or quality of any of these products. By law, it is the pesticide applicator's responsibility to read and follow all current label directions for the specific pesticide being used.*

Biocontrol Organism	Trade Name	Target Disease	Target Crops	Efficacy <sup>1,2</sup>
Bacteriophages of <i>Xanthomonas</i> spp. and <i>Pseudomonas syringae</i> pv. tomato	AgriPhage™	Bacterial spot in pepper and tomatoes and bacterial speck in tomatoes	Tomatoes and pepper	Bell pepper/bacterial spot: +
<i>Pseudomonas syringae</i> strain ESC 10	Bio-Save® 10LP3	Post-harvest frost damage and biological decay	Apples, pears, lemons, oranges, or grapefruit after the fruit is harvested	Sweet potato/ <i>Rhizopus</i> soft rot: +
<i>Pantoea agglomerans</i> strain E325	Bloomtime Biological™3	Fireblight ( <i>Erwinia amylovora</i> )	Apples and pears	Apple/fire blight: ±
	Bloomtime Biological™ FD3	Fireblight ( <i>Erwinia amylovora</i> )	Apples and pears	Apple/fire blight: ±
<i>Streptomyces lydicus</i> WYEC 108	Actinovate® SP	<b>Soilborne pathogens:</b> <i>Pythium</i> spp., <i>Rhizoctonia</i> spp., <i>Phytophthora</i> spp., <i>Fusarium</i> spp., <i>Verticillium</i> spp., <i>Phymatotrichum omnivorum</i> , and other root decay fungi <b>Foliar pathogens:</b> <i>Podosphaera</i> spp., <i>Botrytis</i> spp., <i>Sclerotinia</i> spp., <i>Monilinia</i> spp., <i>Alternaria</i> spp., <i>Peronospora</i> spp., and other foliar fungi	Greenhouse, nursery, and turf	Pumpkin/powdery mildew: + Pumpkin/ <i>Phytophthora</i> leaf blight: o Pepper/ <i>Phytophthora</i> foliar blight: +

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Biocontrol Organism	Trade Name	Target Disease	Target Crops	Efficacy <sup>1,2</sup>
<i>Bacillus pumilus</i> QST 2808	Ballad® Plus Biofungicide	Rust, powdery mildew, <i>cercospora</i> , and brown spot	Soybeans, cereal crops, and potatoes	Soybean/Asian soybean rust: ± Soybean/target spot: ± Snap bean/ashy stem blight: ± Snap bean/rust: +
<i>Coniothyrium minitans</i> strain CON/M/91-08	Contans® WG	<i>Sclerotinia minor</i> , <i>Sclerotinia sclerotiorum</i>	Agricultural soils	Snap beans/white mold: ± Snap beans/gray mold: 0 Lettuce/white mold: ± Lettuce/lettuce drop: +
<i>Bacillus subtilis</i> GB03	Kodiak® Concentrate Biological Fungicide	<i>Rhizoctonia</i> , <i>Fusarium</i> , <i>Alternaria</i> , <i>Aspergillus</i> , and others that attack the root systems of plants	Cotton, peanuts, soybeans, wheat, barley, peas, and beans	Snap beans/ <i>Fusarium</i> root rot: ± Snap bean/ <i>Rhizoctonia</i> root rot: 0 Pea/ <i>Fusarium</i> , <i>Phoma</i> and <i>Pythium</i> : ± Wheat/ <i>Fusarium</i> crown rot: 0 Cucumber/damping-off: 0
<i>Trichoderma harzianum</i> Rifai strain KRL-AG2	PlantShield® HC Biological Foliar and Root Fungicide	<i>Fusarium</i> , <i>Pythium</i> , and <i>Rhizoctonia</i>	Cucurbit vegetables, flowers, bedding plants, ornamentals, fruiting and leafy vegetables, cole crops, hydroponic crops, pome fruits, shade house, outdoor nursery, stone fruit, and tree nuts	Dry beans/ <i>Fusarium</i> root rot: ± Snap beans/ <i>Rhizoctonia</i> root rot: 0 Tomato/grey mold: 0 Potato/silver scurf: + Gladiolus/ <i>Fusarium</i> root rot: 0 African daisy/powdery mildew: ± Geranium/black leg disease: 0
	RootShield® Granules	<i>Fusarium</i> , <i>Pythium</i> , and <i>Rhizoctonia</i>	Flowers, bedding plants, ornamentals, fruiting vegetables, herbs and spices, hydroponic crops, leafy vegetables, cole crops, pome fruits, stone fruits, and tree nuts	Myrtle/leaf milkwort: + Potato/ <i>Rhizoctonia</i> canker and black scurf: 0 Gladiolus/ <i>Fusarium</i> corn rot: 0 Tomato/bacterial speck: ±
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Biocontrol Organism	Trade Name	Target Disease	Target Crops	Efficacy <sup>1,2</sup>
<i>Bacillus subtilis</i> QST 708	Rhapsody®	Fungal and bacterial diseases, brown patch, anthracnose, and dollar spot	Turf, ornamentals, trees, shrubs, flowers, bedding plants, tropical plants, seedlings, conifers, fruity and leafy vegetables, and bulbs	Creeping bent grass/dollar spot, abiotic stress, brown patch and anthracnose: o Annual bluegrass (60%) and creeping bentgrass (40%)/anthracnose: + Tall fescue/ <i>Pythium</i> blight and gray leaf spot: o Geranium/ <i>Botrytis</i> blight: + Dogwood/powdery mildew: + Dogwood/ <i>Cercospora</i> leaf spot and spot anthracnose: o
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Biocontrol Organism	Trade Name	Target Disease	Target Crops	Efficacy <sup>1,2</sup>
<i>Bacillus subtilis</i> strain QST 713	Serenade® Garden Disease Control Concentrate	Bacterial spot, powdery mildew, rust, gray mold, leaf blight, scab, and more	Fruits, vegetables, and flowers	*
	Serenade® Garden Disease Control Ready to Use	Bacterial spot, powdery mildew, rust, gray mold, leaf blight, scab, and more	Vegetable, fruit, nuts, ornamentals plants, annual and perennial flowering plants, tropical foliage, trees, and shrubs	*
	Serenade® MAX™	Fire blight, <i>Botrytis</i> , Sour rot, rust, <i>Sclerotinia</i> , powdery mildew, bacterial spot	Vegetables, fruit, nut, and vine crops	Blueberry/anthracnose fruit rot: + Blueberry/mummy berry: ± Cranberry/fruit rot: o Apple/fire blight: o Apple/flyspeck: o Apple/sooty blotch: o Apple/black pox: o Apple/brooks fruit spot: o
	Serenade® Wettable Powder Biofungicide	Fire blight, <i>Botrytis</i> , sour rot, rust, <i>Sclerotinia</i> , powdery mildew, bacterial spot	Vegetables, fruit, nut, and vine crops	Apple/fire blight: o Red raspberry/fruit rot: o Grape/bunch rot and powdery mildew: + Turnip greens/bacterial leaf spot: o Hydrangea/powdery mildew: + Pansy/ <i>Cercospora</i> leaf spot: + Pumpkin, cantaloupe, and honeydew/powdery mildew: + Lettuce/lettuce drop: ± Lettuce/powdery mildew: + Broccoli/downy mildew: +
	Serenade® ASO	Fungi and bacteria that cause scab, powdery mildew, sour rot, downy mildew, and early leaf spot, early blight, late blight, bacterial spot, and walnut blight diseases	Food crops including cherries, cucurbits, grapes, leafy vegetables, peppers, potatoes, tomatoes, and walnuts	Cranberry/cotton ball: ± Spinach/ <i>Stemphylium</i> leaf spot: o Snap bean/ <i>Rhizoctonia</i> root rot: o Radish/hypocotyl root rot and clubroot: ±

Biocontrol Organism	Trade Name	Target Disease	Target Crops	Efficacy <sup>1,2</sup>
<i>Trichoderma virens</i> (formerly <i>Gliocladium virens</i> )	SoilGard 12G3	<i>Pythium</i> , <i>Rhizoctonia</i> , and root rots	Ornamental and food crop plants grown in greenhouses, nurseries, interiorscapes, and outdoors	Geranium/root rot: o Gladiolus/ <i>Fusarium</i> corn rot: o Poinsettia/ <i>Pythium</i> root rot: + Azalea/ <i>Phytophthora</i> root rot: o Potato/black scurf: + Potato/ <i>Rhizoctonia</i> and <i>Streptomyces</i> : o Snap beans/gray mold: ± Snap beans/white mold: o Cucumber/damping-off: o
<i>Bacillus pumilus</i> QST 2808	Sonata®	Fungal pests such as molds, mildews, blights, and rusts	Many food and non-food crops, including trees susceptible to sudden oak death syndrome. For use outdoors, including nurseries, landscapes, and rights-of-way, and for use in greenhouses	Lima beans/white mold: o Lettuce/powdery mildew: + Lettuce/lettuce drop: ± Broccoli/downy mildew: + Pumpkin/powdery mildew: o Radish/downy mildew: + Radish/clubroot and <i>Rhizoctonia</i> hypocotyl root rot: o
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Biocontrol Organism	Trade Name	Target Disease	Target Crops	Efficacy <sup>1,2</sup>
<i>Trichoderma harzianum</i> Rifai strain KRL-AG2	T-22™ HC	<i>Fusarium</i> , <i>Pythium</i> , and <i>Rhizoctonia</i>	Agronomic field and row crops, alfalfa, hay and forage crops, bulb crops, cucurbits, fruiting vegetables, herbs, spices, leafy vegetables, cole crops, legumes, root crops, small grains, and tuber crops	Soybean/ <i>Rhizoctonia solani</i> and drought: o
	T-22™ Planter Box	<i>Fusarium</i> , <i>Pythium</i> , and <i>Rhizoctonia</i>	Agronomic field and row crops, alfalfa, hay and forage crops, bulb crops, cucurbits, fruiting vegetables, herbs, spices, leafy vegetables, cole crops, legumes, root crops, small grains, and tuber crops	Pea/root rot: ± Bean (baby lima)/root rot: o Pea/root rot: o
<i>Bacillus pumilus</i> GB34	Yield Shield® Concentrate Biological Fungicide	<i>Rhizoctonia</i> and <i>Fusarium</i>	Legumes	Soybean/root rot: o Soybean/ <i>Rhizoctonia</i> damping-off: o Snap beans/root rot: o

1. The efficacy ratings are based on the results of studies published between 2000 and 2009 in the Plant Disease Management Reports ([plantmanagementnetwork.org](http://plantmanagementnetwork.org)). These ratings are built on a comparison between untreated controls and the application of each product independently.
2. + Evidence for disease control and/or yield increase, ± mixed results, o no obvious response to treatment, and \* no data available in the selected PDM reports.
3. These products are not currently registered for use in the state of Ohio.

