

Herb Bedding Plants Grown in Greenhouses

For information on pest management for herbs see: “Pest Management for Herb Bedding Plants Grown in Greenhouses”

<http://www.hort.uconn.edu/ipm/greenhs/htms/herbmanl.pdf>

Below are the tables: Some Key Pests of Potted Herbs Grown in the Greenhouse; Scouting Guidelines and Biological Control Options; Selected Insecticides and Miticides; and Selected Fungicides.

Table 1: Some key pests of potted herbs grown in the greenhouse

Plant	Pest (s)
Basil	Primarily thrips, also aphids, whiteflies Botrytis blight, Downy Mildew, Fusarium wilt, Impatiens Necrotic Spot Virus, Pseudomonas Leaf Spot, Pythium and Rhizoctonia root rots, Rhizoctonia web blight
Lavender	Aphids, leafhoppers, mealybugs, spider mites, whiteflies Primarily Phytophthora crown and root rots, Rhizoctonia crown and root rots, Pythium crown and root rots, Botrytis blight, leaf spot diseases
Lemon Balm	Primarily spider mites, also aphids, leafhoppers, thrips, Botrytis blight, powdery mildew
Lemon Grass	Spider mites, thrips, rust
Lemon Verbena	Aphids, spider mites, whiteflies
Marjoram	Whiteflies, Botrytis blight
Mint	Primarily whiteflies, spider mites, also aphids, leafhoppers, thrips Crown and root rots, powdery mildew, Rhizoctonia web blight, rust (peppermint and spearmint)
Parsley	Aphids, thrips Primarily root rots, also Botrytis blight, damping off, Rhizoctonia web blight
Rosemary	Aphids, leafhoppers, thrips, whiteflies Primarily powdery mildew, also bacterial leaf spots, crown and root rots caused by Phytophthora, Pythium & Rhizoctonia, Rhizoctonia web blight
Rue	Aphids, whiteflies Crown and root rots
Sage	Primarily whiteflies, also aphids, leafhoppers, spider mites Primarily powdery mildew, also Phytophthora crown and root rot
Scented Geranium	Aphids, whiteflies Bacterial blight (<i>Xanthomonas</i>), Bacterial fasciation
St. Johnswort	Anthracoise, powdery mildew, rust
Tarragon	Thrips, powdery mildew, rust
Thyme	Aphids, thrips Botrytis blight, crown and root rots, Rhizoctonia web blight

Table 2 Scouting guidelines and biological control options for herb bedding plants

Pest	How To Monitor	Signs and Symptoms	Biological Control Options
Aphids	Monitor weekly. Look on the underside of leaves and along stems on tips of new growth for small (1/16 inch long) aphids with 2 cornicles or “tailpipes” at the rear of their bodies. Identification to species is needed to determine which host specific aphid parasite to release. If uncertain, mixes of different species of parasitic wasps are available.	Distorted young growth (will vary depending upon type of aphid). Shed white skins of aphids that have molted. Honeydew and sooty mold.	<i>Aphidoletes aphidimyza</i> (aphid midge, predator) <i>Aphidius matricariae</i> (aphid parasite) <i>Aphidius colemani</i> (aphid parasite) <i>Aphidius ervi</i> (aphid parasite) <i>Aphelinus abdominalis</i> <i>Chrysoperla spp.</i> (green lacewing, predator) <i>Hippodamia convergens</i> (lady bird beetles)
Bacterial Diseases Bacterial Fasciation Pseudomonas Leaf Spot Bacterial Blight (Xanthomonas)	Look for abnormal branching near the base of scented geraniums. Inspect basil and other small plugs during routine monitoring. Test plants prior to use as stock plants. Grower friendly test kits for Xanthomonas are available from Agdia (www.agdia.com)	Plants are stunted with short, swollen, fleshy and misshapen leaves. Look for water-soaked, dark-brown to black leaf spots especially on young plugs. Symptoms easily confused with fungal diseases. Confirm diagnosis through a plant diagnostic laboratory. Scented geraniums may be carriers of disease without exhibiting symptoms. Infected plants may not show symptoms: wilting, small leaf spots, v-shaped angular lesions.	None. <i>Bacillus subtilis</i> (Cease)
Beetles	During routine inspection, look for chewed holes or pinholes in leaves especially on herbs grown outdoors.	Chewed holes or pinholes in leaves.	<i>Beauveria bassiana</i> (Botanigard, Mycotrol O, Naturalis L)

Botrytis Blight	Concentrate scouting in areas where crop is closely spaced with poor air circulation, and on tender crops. Look for dieback, stem cankers (especially near a wound), and powdery gray spores during humid conditions. May see gray mold on the leaves.	Leaf blights, stem cankers, damping off and occasionally root rots.	<i>Bacillus subtilis</i> (Cease) <i>Bacillus subtilis</i> Companion) <i>Streptomyces griseoviridis</i> (Mycostop) <i>(Streptomyces lydicus</i> (Actinovate)
Caterpillars	If adult moths or butterflies are seen in the greenhouse, look for eggs and young caterpillars. During weekly foliage inspection, look for fecal droppings and bites taken out of leaves.	If damage is observed, look under pots or in planting medium just around the base of the plants. Many caterpillars hide during the day and feed at night.	<i>Bacillus thuringiensis</i> subsp. <i>kurstaki</i> (Dipel Pro DF) <i>Trichogramma spp.</i> (egg parasite)
Crown and Root Rots	Inspect plants weekly for signs of disease: wilted off-colored plants with discolored root systems. Pay particular attention to media that stays wet.. Monitor soluble salt levels.	Leaves turn yellow and wilt. Plants are stunted and off-color. Roots are discolored and may turn brown or black.	<i>Preventative biological fungicides</i> <i>Streptomyces griseoviridis</i> (Mycostop) <i>Trichoderma harzianium</i> (soil applications only) <i>Streptomyces lydicus</i> (Actinovate)
Damping Off	Monitor weekly. Scan flats for signs of seedlings that do not emerge or collapse at the soil line. Disease often spreads from a central point. Discard heavily infected flats.	Seeds do not germinate or collapse with dark, necrotic stem canker at soil line. Infected plants may later develop crown and root rots.	<i>Trichoderma harzianium</i> (Plant Shield, RootShield) Soil applications only
Fungus Gnats	Use sticky cards to monitor for adults. Place cards at base of plants at soil line. Place potato chunks on soil surface to monitor for larvae. (Check every two days.) Scout favorable habitats including areas with standing pools of water, dirt floors or spilled media and weeds.	On cuttings, fungus gnat larvae may feed on callus, slowing down rooting. Larvae feed upon roots and may tunnel into stems causing plants to wilt and die.	<i>Steinernema feltiae</i> (Nemasys, Nemashield, Scanmask) <i>Hypoaspis miles</i> (mite predator) <i>Atheta coriaria</i> (rove beetle, predator)

Fungal Leaf Spots	Scan the crop for leaf spots. With a hand lens, look for small, fungal fruiting bodies. To confirm, send sample to diagnostic laboratory.	Alternaria leaf spots are generally dark brown to black with a yellow border. Septoria leaf spots are small, grayish-brown with a dark brown edge.	<i>Bacillus subtilis</i> (Cease)
Fusarium Wilt on Basil	Scan the crop for symptoms. The first symptom is a downward bending or cupping of the leaves. May be confused with water stress, root rot diseases or <i>Botrytis</i> stem canker. To confirm, send sample to diagnostic laboratory.	Leaves may cup downward or the top of the stem will bend like a shepherd's crook. On large-leaved cultivars, defoliation may occur. In later stages, brown streaks can be seen on the stem.	None. Use resistant varieties such as the Genovese Basil 'Nufar' 'Aroma', "Mozzarella"
Mealybugs	Inspect herbs propagated by cuttings. Look for small, oval, soft-bodied insects covered with a white, wax-like layer especially along stems, and on underside of leaves.	White, cottony residue may be seen.	<i>Cryptolaemus montrouzieri</i> (predatory beetle) is used against citrus mealybug but is ineffective against those species that give birth to live young such as long-tailed mealybugs. <i>Chrysoperla spp.</i> (green lacewing)
Plant Bugs	Monitor herbs outdoors and those in greenhouses especially if weeds are nearby.		Naturally occurring predators include big-eyed bugs and damsel bugs.
Four-lined plant bugs	Look for signs of feeding activity - small, yellow spots on upper leaf surface. Four-lined plant bugs tend to be secretive and drop off the leaf or run around the leaf.	Round, brown, dead leaf spots that may be confused with fungal leaf spot disease.	
Tarnished plant bugs	Look for signs of feeding injury on youngest growth and buds.	Look for death of tender young, growth, dead spots and badly distorted buds.	

Powdery Mildew	Scout weekly. Inspect susceptible crops. Scout areas near vents, hanging baskets or any location with a sharp change between day and night temperatures. Use a hand lens to see white fungal threads and spores.	White powdery fungal growth can occur on upper or lower leaf surfaces. If severe, white coating can be seen on the foliage.	<i>Bacillus subtilis</i> (Cease)
Rhizoctonia Web Blight	Scout susceptible crops, especially when they are closely spaced. Look for cobweb-like growth that mats leaves together (web blight) especially during humid conditions.	Stems and leaves collapse rapidly and turn mushy with fine, web-like fungal strands present.	
Rusts	Look for yellow spots on the upper leaf surface and rusty brown spots on the lower leaf surface during routine foliage inspections.	Rusty brown spots or stripes especially on the lower leaf surface.	
Scale -: Brown Soft Scale	Look for yellow-brown, to dark brown scale insects along veins and stems of susceptible herbs such as bay.	Honeydew and sooty mold are additional signs of infestation.	
Slugs	Look for chewed holes in leaves and shiny patches of slime. Slugs hide under dense foliage, beneath pots and benches and in other protected spots.	Chewed, irregular holes with smooth edges in leaves and slime that dries into silvery trails on foliage.	
Two-Spotted Spider mites	Look on leaf undersides, especially along the veins, for all stages of mites, empty eggshells and webbing. Look near hot, dry areas of greenhouse near furnace and near entranceways. Tap foliage over sheet of white paper to look for mites and faster-moving predatory mites. Scout mite-infested areas last.	Light flecking, and discolored foliage. Leaf drop and webbing may occur during outbreaks.	<i>Feltiella acarisuga</i> (predatory midge) <i>Neoseiulus californicus</i> (predatory mite) <i>Phytoseiulus persimilis</i> (predatory mite)

Thrips	Rely on sticky cards (placed just above crop canopy) and foliage inspection to track population trends and to evaluate treatments.	Distortion of flowers, buds and tender young growth. White scarring on expanded leaves and flowers. Transmission of tospoviruses.	<i>Amblyseius swirskii</i> (predatory mite) <i>Hypoaspis miles</i> (predatory mites) <i>Neoseiulus cucumeris</i> (predatory mites) <i>Orius spp.</i> (minute pirate bug, predator) Beneficial Nematodes (<i>Steinernema feltiae</i>) (Nemasys)
Viruses	Scan crops weekly. Inspect incoming plants. Look for mosaic patterns, leaf crinkle or distortion, chlorotic streaking, ringspots, line patterns and stunted plants	For confirmation, send sample to diagnostic laboratory.	None.
Whiteflies	Rely on plant inspection to detect scale-like immature stages. Egg laying adults found on uppermost tender leaves. Immature stages found on underside of leaves. Use sticky cards to detect adults.	When high populations develop, honeydew and sooty mold may be seen.	<i>Amblyseius swirskii</i> (predatory mite) <i>Chrysoperla spp.</i> (green lacewing) <i>Encarisa formosa</i> (greenhouse whitefly parasite) <i>Eretmocerus spp.</i> (sweet potato whitefly parasite)

Table 3: Selected insecticides and miticides for use for herb bedding plants

Insecticide	Use Site	Target Pests	Labeled Crops	Comments
<p>Azadirachtin Group 18B</p> <p>(Aza-Direct) 4 hr. REI Organic product</p> <p>(AzaGuard) 4 hr. REI Organic product</p> <p>(Azahar) 4 hr. REI Organic product</p> <p>Azatin XL 4 hr. REI</p> <p>(Azatrol) 4 hr. REI Organic product</p> <p>(Molt-X) 4 hr. REI</p>	<p>G, O</p> <p>G,O</p> <p>G,O</p> <p>G.O</p> <p>G, O</p> <p>G, O</p>	<p>Aphids, beetles, caterpillars, weevils, thrips, true bugs, leafhoppers, whiteflies, scales, mealybugs, leafminers, leafhoppers, cutworms, loopers, armyworms, fungus gnat larvae</p> <p>Leafminers, soft scales, mealy bugs, thrips, aphids, lacebugs, fungus gnats, shore flies, whiteflies, caterpillars, beetles, weevils</p> <p>Beetles, weevils, thrips, true bugs, leafhoppers, whiteflies, aphids, leafrollers, cutworms, loopers, fungus gnats, shore flies</p> <p>Aphids, beetles, caterpillars s, cutworms, fungus gnat larvae, shore fly larvae, leafhoppers, leafminers, mealybugs, leafrollers, thrips whiteflies</p> <p>Beetles, weevils, thrips, true bugs, leafhoppers, whiteflies, aphids, leafrollers, cutworms, loopers, flies</p> <p>Whiteflies, leafminers, soft scales, mealybugs, thrips, aphids, lacebugs, fungus gnats, caterpillars, beetles, weevils.</p>	<p>Herbs and Spices</p>	<p>Insect growth regulator for immature stages of insects. Repeat applications needed. Repels some insects and can be used as antifeedant.</p>

(Ornazin 3% EC) 12 hr. REI	G, O	Aphids, armyworms, beetles, cutworms, fungus gnat larvae and shore flies, leafminers, leafrollers, leafhoppers, loopers, mealybugs, soft scales, thrips, weevils ,whiteflies		
(Neemix 4.5) 12 hr. REI Organic product	G, O	Whiteflies, thrips, mealybugs, leafminers, loopers, caterpillars, aphids		
<i>Bacillus thuringiensis</i> subsp. <i>aizawai</i> (Xen Tari) 4 hr. REI Group 11B Organic product	G, O	Armyworms, <i>Heliothis</i> (corn earworm), loopers, salt marsh caterpillars	Herbs, spices and leafy herbs	Stomach poison that must be ingested by target insect to be effective. Treat when larvae are young. Insect stops feeding and dies from 1 to 5 days later.
<i>Bacillus thuringiensis</i> subsp. <i>kurstaki</i> (DiPel Pro DF) 4 hr. REI Group 11B Organic product	G, O	Caterpillars	Herbs, spices and mints	Stomach poison that must be ingested by target insect to be effective. Treat when larvae are young. Insect stops feeding and dies 1 to 5 days later.
<i>Beauveria bassiana</i> (Botanigard ES) 4 hr. REI (Botanigard 22 WP) 4 hr. REI (Mycotrol O) 4 hr. REI Organic product (Naturalis L) 4 hr. REI Organic product	G, O	Aphids, thrips, whitefly, psyllids, mealybugs, plant bugs	Herbs and spices	Contact insecticide. Active ingredient is an insect killing fungus. To be effective needs relative humidity greater than 70% and 65-75 °F temperatures for 8-10 hours. Do not tank mix with fungicides. Most effectively used when insect populations are low. Repeat applications are needed.

Bifenthrin (Talstar Nursery Granular) 12 hr. REI Group 3	O	Fungus gnat larvae, mealybugs, black vine weevil, white grubs	Herbs (many) See label	For soil incorporation into potting media used in containerized plantings of herbs listed on label. Minimum preshipment interval is 70 days. Rate varies depending upon the bulk density of the potting mix. (See label for additional information). Bifenthrin has a long residual (up to 8 to 12 weeks) and is very harmful to many natural enemies. See Pesticide Side Effect Databases or consult with your biological control agent supplier.
Cottonseed Oil, Clove Oil, Garlic Oil (GC- Mite) EPA Exempt NC Organic product		Mites, thrips and aphids	Exempt from food tolerances	Works by contact. Thorough coverage needed. Repeat applications may be needed.
Horticultural Oil (Ultra- Pure Oil) 4 hr. REI NC	G, O	Aphids, mites, beetle larvae, leafminers, mealybugs, thrips, leafhoppers, scale, whiteflies	Herbs and Spices	Works by contact. Thorough spray coverage is needed. Do not exceed 4 applications in a growing season. Due to varietal differences, conduct a small-scale test spray before application. See label for plant safety information and application intervals.
Insecticidal Soap Potassium Salts of Fatty Acids (M-Pede) 12 hr. REI NC Organic product	G, O	Aphids, caterpillars, leafhoppers, lace bugs, leafminers, mealybugs, mites (spider and broad), scales, thrips, whiteflies,	Herbs and spices	Works by contact. Short residual activity. Good coverage is needed. Avoid treatment when plants are stressed. Certain species or cultivars may be sensitive. Spot treat first. May also help suppress powdery mildew.
Neem Oil (Triact 70) 4 hr. REI Organic product (Trilogy) 4 hr. REI Organic product	G, O G, O	Aphids, leafhoppers, mealybugs, mites, scale Aphids, mealybugs, spider mites, soft scales Suppression of whiteflies, thrips	Herbs and spices	Works by contact. Thorough coverage of all plant parts is important. See label for plant safety precautions.

Nematodes (Entomopathogenic) <i>Steinernema feltiae</i> (NemaShield, Nemasys, Scanmask) Exempt from REI	G, O	Fungus gnat larvae	All greenhouse crops	Available in packages. Nematodes move through media on a film of water and release a bacterium that reproduces within and kills target pest. See label for application directions.
Nematodes <i>Steinernema feltiae</i> (Nemasys) Exempt from REI	G	Thrips (immatures)		Apply to foliage for control of immature nymphal stages of thrips. Efficacy may be variable depending upon relative humidity, temperature, concentration and frequency of applications and life stage present. Refer to label for information on application directions and treatment rates.
Pyrethrins (PyGanic EC) 12 hr. REI Group 3A Organic product	G, O	Aphids, caterpillars, fungus gnats (adults), greenhouse thrips, leafhoppers, leafrollers, mealybugs, whiteflies	Herbs and Spices	Contact insecticide, Provides rapid knockdown of pests.
Pyrethrins & PBO (Pyreth-It Formula 2) 12 hr. REI Group 3 and 27A	G, O	Aphids, caterpillars, fungus gnats (adults), lacebugs, leafhoppers, mealybugs, thrips, whiteflies	Herbs and spices	Contact insecticide.
Pyronyl Crop Spray (Pyrethrins & PBO) 12 hr. REI Group 3 and 27A	G,O	Aphids, caterpillars, fungus gnats, lace bugs, leafhoppers, leafminers, mealybugs, plant bugs, thrips, whiteflies	Herbs and spices	Contact insecticide.
Sucrose Octanate (SucraShield) 48 hr. REI Organic product	G, O	Aphids, caterpillars, leafhoppers, mites, thrips and whiteflies	Herbs and spices	Works by contact with limited residual activity. Sucrose octanoate esters are produced in the hairs of tobacco leaves.
Spinosad (Entrust) 4 hr. REI Group 5 Organic product	O	Insect suppression caterpillars, thrips	Herbs	Spinosad is derived from the fermentation of a naturally occurring soil microorganism. Follow resistance management guidelines on label.

White Mineral Oil Paraffinic oil (JMS Stylet Oil) 4 hr.REI NC Organic product	G, O	Mites, Powdery Mildew	Mints	Contact insecticide.
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- G =Greenhouse, ** O = Outdoor Updated 1/2011
- Resistance Groups (number and letter) indicate products with a common mode of action based on the Insecticide Resistance Action Committee (IRAC) guidelines at <http://www.irc-online.org/>. For multiple applications to one crop, select products from different resistant groups.
- Many insecticide residues such as pyrethrins (i.e. bifenthrin) can adversely affect natural enemies for up to 3 or 4 months after their application. Review your pesticide use for the past 3 or 4 months, before releasing natural enemies.

Searchable On Line Databases: Click on “Side Effects” Enter product and natural enemy to Search Databases

Pesticide Side Effects Database – Biobest Be www.biobest.be

Pesticide Side Effects Database – Koppert www.koppert.com

This information is supplied here with the understanding that no discrimination is intended and no endorsement supplied. Due to constantly changing regulations, we assume no liability for suggestions. Additional products may be available for certain herbs grown in the field. Growers should always read and follow label instructions. Always follow label instructions regarding registered uses and note cautions. To avoid any phytotoxicity problems, spot test first before widespread use.

Table 4: Selected Fungicides labeled for Herb Bedding Plants

Fungicide	Use Site	Targeted Pest	Labeled Crops	Comments
<i>Bacillus subtilis</i> (Cease) 4 hr. REI NC Organic product	G	Suppression of <i>Rhizoctonia</i> , <i>Pythium</i> , <i>Fusarium</i> and <i>Phytophthora</i> . Alternaria leaf blight, Botrytis blight, Anthracnose, bacterial blight, powdery mildew, downy mildew?	Herbs and spices	Preventative broad spectrum biological fungicide. For maximum effectiveness, apply prior to or in the early stages of disease development. Applied as foliar spray or drench. Thorough coverage is essential. Begin applications when environmental conditions are favorable for disease development.
<i>Bacillus subtilis</i> (Companion Liquid Biological Fungicide) 4 hr. REI NC Organic product	G, O	Crown Rot, Damping off , Botrytis Blight, Root Rots (Pythium)	Herbs and Spices	Preventive biological fungicide. Activates ISR (induced systemic resistance).
Fenhexamid (Decree 50 WDG) 12 hr. REI Group 17	G	Botrytis	Cilantro, leafy greens including chervil, parsley	Preventative translaminar fungicide. Begin applications when conditions favor disease development. Follow resistance management guidelines on label.
Horticultural Oil Paraffinic Oil (Ultra-Pure Oil) 4 hr. REI NC	G, O	Powdery mildew	Herbs and spices	Works by contact. Application should be made when the disease is first noticed. Due to varietal differences, conduct a small-scale test spray first. Greenhouse applications should be at lower rates stated on the label.
Hydrogen dioxide (OxiDate) 0 hr. REI 1 hr. REI (spray) NC Organic product	G, O	Anthracnose, downy mildew, powdery mildew, Pythium root rot	Herbs and spices	Works by contact. Strong oxidizing agent.

Neem Oil (Trilogy) 4 hr. REI Organic product	G, O	Botrytis, leaf spot, downy mildew, powdery mildew, rusts	Herbs and spices	Works by contact. Thorough coverage needed. See label for plant safety precautions.
Phosphorous Acid (Fosphite) 4 hr. REI Group 33	G, O	Phytophthora, Pythium, Fusarium, Rhizoctonia, Downy mildew, powdery mildew	Herbs and spices	Systemic fungicide. Make applications prior to disease development in conjunction with good cultural management practices. See label precautions.
Phosphorus Acid (Alude) 4 hr. REI Group 33	G, O	Downy Mildew	Leafy vegetables such as parsley and chervil	Systemic fungicide. See label for plant safety precautions.
Potassium bicarbonate (MilStop) 1 hr. REI NC Organic product (Kaligreen) 4 hr. REI NC Organic product	G, O	Milstop: Powdery mildew and many others (see label) Kaligreen is only labeled for powdery mildew	Herbs such as lemon balm, basil, oregano, rosemary, sage, thyme	Contact, fungicide. Thorough coverage essential. Use sufficient volume of spray solution to obtain complete coverage of stems and foliage. Begin application at first sign of disease. Repeat at one to two week intervals until conditions are no longer favorable for disease development.
<i>Streptomyces griseoviridis</i> strain K61 (Mycostop) 4 hr. REI Organic product	G, O	<i>Fusarium</i> , <i>Alternaria Phomopsis</i> , <i>Botrytis</i> , <i>Pythium</i> and <i>Phytophthora</i> that can cause seed, root and stem rot	Herbs	Preventative biological fungicide. Contains a beneficial bacterium. Repeat applications may be needed. Use as a soil spray or drench.
<i>Streptomyces lydicus</i> (Actinovate SP) 1 hr. REI NC Organic product	G	Suppression of soil borne fungi such as <i>Fusarium</i> , <i>Rhizoctonia</i> , <i>Pythium</i> , <i>Phytophthora</i> . Suppression of foliar diseases such as powdery mildew, <i>Botrytis</i> , <i>Alternaria</i> and others	Herbs	Preventive biological fungicide that contains a beneficial bacterium that can be applied as a drench or spray. It may also increase plant size, vigor and root mass. Note storage conditions needed and expiration date on the package.

<i>Streptomyces lydicus</i> (Actino-Iron) 4 hr. REI Organic product	G	Root rot and damping off fungi such as <i>Fusarium</i> , <i>Pythium</i> , <i>Rhizoctonia</i> , <i>Phytophthora</i> ,	All food crops	Preventive biological fungicide containing a beneficial bacterium with iron and humic acid.
<i>Trichoderma harzianum</i> (PlantShield HC) 0 hr. REI (RootShield G) (RootShield WP) 0 hr. REI NC Organic product	G, O	<i>Pythium</i> , <i>Rhizoctonia</i> , <i>Fusarium</i> , <i>Cylindrocladium</i> , and <i>Thielaviopsis</i>	Herbs, spices and mints	Preventative biological fungicide for use in soil applications. Contains a beneficial fungus. Acts as a preventative and will not cure diseased plants. Becomes active when soil temperatures are above 50 °F. Greenhouse foliar applications are for non-food crops only. Granules for use in greenhouse planting mix, WP as a soil drench

*G= Greenhouse, ** O= Outdoors*

Fungicides are grouped by their mode of action (MoA) and each MoA group is assigned a Fungicide Resistance Action Committee (FRAC) code. 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 and incorporate biological fungicides as a preventative.

See www.frac.info/frac/index.htm

NC = Not classified

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Organic Materials Review Institute (www.omri.org) is a non-profit organization whose mission is to publish information on lists of materials allowed for organic food production. Final decisions regarding organic use production reside with the USDA.

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