

PMRA Approved
2016-1862
2018-08-09

ROOTSHIELD® PLUS WP Biological Fungicide WETTABLE POWDER

For the suppression of Root Rot caused by *Pythium* spp., *Rhizoctonia* spp., *Fusarium* spp., and *Phytophthora* spp. in Greenhouse Crops, Greenhouse Vegetable Transplants, Cannabis (marihuana) produced commercially indoors, Outdoor Nursery Plants and Ginseng

COMMERCIAL
LIVE ORGANISM

READ THE LABEL BEFORE USING

ACTIVE INGREDIENT: *Trichoderma harzianum* Rifai strain KRL-AG2 contains a minimum of 1.0×10^7 colony forming units per gram of dry weight
Trichoderma virens strain G-41 contains a minimum of 5.3×10^6 colony forming units per gram of dry weight

Warning, contains the allergens wheat and sulphites.

CAUTION – EYE IRRITANT
POTENTIAL SENSITIZER

REGISTRATION NO. 30539 PEST CONTROL PRODUCTS ACT

NET CONTENTS: 0.45 kg (1 lb), 1.36 kg (3 lb), 2 kg, 10 kg, 13.6 kg (30 lb), or 90.9 kg (200 lb)

BioWorks Inc.
100 Rawson Rd, Suite 205,
Victor, NY 14564
1-585-924-4362

Distributed by;
BioWorks (Canada), Inc.
P.O. Box 1125
Fonthill, Ontario, L0S 1E0
800-877-9443

Lot No.:

Date of Manufacture:

This product should be used within 10 months of date of manufacture.

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FIRST AID:

- IF SWALLOWED:** Call a poison control centre or doctor immediately for treatment advice. Have person sip a glass of water if able to swallow. Do not induce vomiting unless told to do so by a poison control centre or doctor. Do not give anything by mouth to an unconscious person.
- IF ON SKIN OR CLOTHING:** Take off contaminated clothing. Rinse skin immediately with plenty of water for 15-20 minutes. Call a poison control centre or doctor for treatment advice.
- IF INHALED:** Move person to fresh air. If person is not breathing, call 911 or an ambulance, then give artificial respiration, preferably by mouth-to-mouth, if possible. Call a poison control centre or doctor for further treatment advice.
- IF IN EYES:** Hold eye open and rinse slowly and gently with water for 15-20 minutes. Remove contact lenses, if present, after the first 5 minutes, then continue rinsing eye. Call a poison control centre or doctor for treatment advice.

Take container, label or product name and Pest Control Product Registration Number with you when seeking medical attention.

In Case of Emergency: Call CHEMTREC: (800) 424-9300

TOXICOLOGICAL INFORMATION:

Treat symptomatically.

PRECAUTIONS: KEEP OUT OF REACH OF CHILDREN.

May cause sensitization. May irritate eyes. Avoid contact with skin and eyes or clothing. Avoid breathing dust or spray mists. Wear waterproof gloves, long-sleeved shirt, long pants, eye goggles, socks with shoes and use a NIOSH-approved mist filtering respirator or NIOSH-approved mist filtering mask when handling the product and during all clean-up/repair activities.

Avoid skin contact with treated soil or potting mix. Wash thoroughly with soap and water after handling product or treated soil/potting mix. Remove contaminated clothing and follow manufacturer's directions for cleaning/maintaining personal protective equipment (PPE) before use. If no such instructions are available use clothing detergent and hot water for cleaning all washable PPE. Keep and wash PPE separately from other laundry. Wash hands after use.

Apply only when the potential for drift to areas of human habitation or areas of human activity such as houses, cottages, schools and recreational areas is minimal. Take into consideration wind speed, wind direction, temperature inversions, application equipment and sprayer settings.

Can be applied up to and including the day of harvest. The pre-harvest interval (PHI) is 0 days.

RESTRICTED ENTRY INTERVAL (REI):

DO NOT enter or allow worker entry into treated areas for 4 hours or until sprays have dried, unless wearing personal protective equipment (i.e., waterproof gloves, long-sleeved shirt, long pants and socks with shoes).

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ENVIRONMENTAL PRECAUTIONS:

As this pesticide is not registered for the control of pests in aquatic systems, DO NOT use to control aquatic pests.

DO NOT contaminate irrigation or drinking water supplies or aquatic habitats by cleaning of equipment or disposal of wastes.

To reduce runoff from treated areas into aquatic habitats, consider the characteristics and conditions of the site before treatment. Site characteristics and conditions that may lead to runoff include, but are not limited to: heavy rainfall, moderate to steep slope, bare soil, poorly draining soil (e.g. soils that are compacted, fine textured, or low in organic matter such as clay).

DO NOT apply this product by air.

STORAGE:

Store in a secure dry place at temperatures between 2°C and 5°C. Do not contaminate water, food, or feed during storage. Keep product in original container during storage and keep container lid tightly closed when not in use. This product should be used within 10 months of the date of manufacture.

DISPOSAL:

DO NOT reuse this container for any purpose. This is a recyclable container, and is to be disposed of at a container collection site. Contact your local distributor/dealer or municipality for the location of the nearest collection site. Before taking the container to the collection site:

1. Triple- or pressure-rinse the empty container. Add the rinsings to the spray mixture in the tank.
2. Make the empty, rinsed container unsuitable for further use.

If there is no container collection site in your area, dispose of the container in accordance with provincial requirements.

For information on disposal of unused, unwanted product, contact the manufacturer or the provincial regulatory agency. Contact the manufacturer and the provincial regulatory agency in case of a spill, and for clean-up of spills.

NOTICE TO USER:

This pest control product is to be used only in accordance with the directions on the label. It is an offence under the *Pest Control Products Act* to use this product in a way that is inconsistent with the directions on the label.

GENERAL INFORMATION

ROOTSHIELD® PLUS WP Biological Fungicide is a wettable powder biological fungicide that provides suppression of root rot caused by the indicated soil pathogens in the listed greenhouse crops, greenhouse vegetable transplants, Cannabis (marihuana) produced commercially indoors, outdoor nursery plants and ginseng. The two active ingredients are beneficial microbes, *Trichoderma harzianum* strain KRL-AG2 (T-22) and *Trichoderma virens* strain G-41. When applied to transplants, planting mix, or soil, ROOTSHIELD® PLUS WP Biological Fungicide

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actively grows onto plant roots as they develop and helps to protect roots against infection caused by *Pythium* spp., *Rhizoctonia* spp., *Fusarium* spp. and *Phytophthora* spp...

For control of seed rot and damping off of internally infected cuttings, use other fungicides registered for these uses or other appropriate measures in addition to ROOTSHIELD® PLUS WP Biological Fungicide.

Note: ROOTSHIELD® PLUS WP Biological Fungicide contains live spores of beneficial microbes. ROOTSHIELD® PLUS WP Biological Fungicide becomes active when soil temperatures are above 10°C. Disease management is not effective while soils remain cold and is more effective in neutral or acidic soils than in alkaline soils.

PLANT SAFETY

ROOTSHIELD® PLUS WP Biological Fungicide has been tested on numerous plant varieties with no phytotoxic effects. However, since ROOTSHIELD® PLUS WP Biological Fungicide has not been tested on all plant varieties, the manufacturer recommends testing ROOTSHIELD® PLUS WP Biological Fungicide on a small number of plants to check for adverse plant effects before applying to a larger number of plants.

DIRECTIONS FOR USE:

GENERAL APPLICATION INSTRUCTIONS

ROOTSHIELD® PLUS WP Biological Fungicide can be applied to the root zone using hand-held backpack, ground spray equipment, low pressure watering nozzles such as fan nozzles or other watering systems. AGITATION IS REQUIRED TO MAINTAIN SUSPENSION.

CHEMIGATION INSTRUCTIONS

Apply this product only through the following systems: 1) drip (trickle) irrigation (including micro-irrigation through spaghetti tubes or individual tubes), 2) overhead boom [not for use on greenhouse food crops and cannabis (marihuana) after the four-leaf stage]; 3) furrow, or 4) with hand-held calibrated irrigation equipment (such as a hand-held wand with injector). DO NOT apply this product through any other type of irrigation system.

Crop injury or lack of effectiveness can result from non-uniform distribution of applied product.

If you have questions about calibration, contact Provincial Extension Service specialists, equipment manufacturers or other experts.

A person knowledgeable of the chemigation system and responsible for its operation, or under the supervision of the responsible person, shall shut the system down and make necessary adjustments should the need arise.

Public water system means a system for the provision to the public of piped water for human consumption if such system has at least 15 service connections or regularly serves an average of at least 25 individuals daily at least 60 days out of the year.

You should not connect an irrigation system (including greenhouse systems) used for pesticide application to a public water system unless the pesticide label-prescribed safety devices recommended on this label for public water systems are in place.

It is recommended that chemigation systems connected to public water systems contain a functional, reduced-pressure zone, backflow preventer (RPZ) or the functional equivalent in the water supply line upstream from the point of pesticide introduction. As an option to the RPZ, the water from the public water system should be discharged into a reservoir tank prior to pesticide introduction. There should be a complete physical break (air gap) between the outlet end of the fill pipe and the top or overflow rim of the reservoir tank of at least twice the inside diameter of the fill pipe.

It is recommended that the pesticide injection pipeline contain a functional, automatic, quick-closing check valve to prevent the flow of fluid back toward the injection.

It is recommended that the pesticide injection pipeline contain a functional, normally closed, solenoid-operated valve located on the intake side of the injection pump and connected to the system interlock to prevent fluid from being withdrawn from the supply tank when the irrigation system is either automatically or manually shut down.

It is recommended that the system contain functional interlocking controls to automatically shut off the pesticide injection pump when the water pump motor stops, or in cases where there is no water pump, when the water pressure decreases to the point where pesticide distribution is adversely affected.

It is recommended that systems use a metering pump, such as a positive displacement injection pump (e.g., diaphragm pump) effectively designed and constructed of materials that are compatible with pesticides and capable of being fitted with a system interlock.

Remove scale, pesticide residues, and other foreign matter from the chemical supply tank and injector system and flush with clean water before use. Failure to provide a clean tank, free of scale or residues may reduce effectiveness of this product.

Drip (trickle) and micro-irrigation chemigation:

1. It is recommended that the system contain a functional check valve, vacuum relief valve and low pressure drain appropriately located on the irrigation pipeline to prevent water source contamination from backflow.
2. It is recommended that the pesticide injection pipeline contain a functional, automatic, quick-closing check valve to prevent the flow of fluid back toward the injection pump.
3. It is recommended that the pesticide injection pipeline also contain a functional, normally closed, solenoid-operated valve located on the intake side of the injection pump and connected to the system interlock to prevent fluid from being withdrawn from the supply tank when the irrigation system is either automatically or manually shut down.
4. It is recommended that the system contain functional interlocking controls to automatically shut off the pesticide injection pump when the water pump motor stops.
5. It is recommended that the irrigation line or water pump include a functional pressure switch which will stop the water pump motor when the water pressure decreases to the point where pesticide distribution is adversely affected.
6. It is recommended that systems use a metering pump such as a positive displacement injection pump (i.e., diaphragm pump) effectively designed and constructed of materials that are compatible with pesticides and capable of being fitted with a system interlock.

7. Dilute the product in water following the label mixing directions. It may be premixed in a supply tank with water, fertilizer, or other appropriate tank-mixed agricultural chemicals. Agitation is necessary. Apply to moderately moist soils. Use volumes that thoroughly wet the soil but that do not cause significant runoff or excessive drip from pots. Application should be continuous in sufficient water to apply the specified rate evenly to the entire treated area.

Overhead boom chemigation:

DO NOT apply through overhead boom chemigation on greenhouse food crops or cannabis (marihuana) after the four -leaf stage.

1. It is recommended that the system contain a functional check valve, vacuum relief valve, and low pressure drain appropriately located on the irrigation pipeline to prevent water source contamination from backflow.
2. It is recommended that the pesticide injection pipeline contain a functional, automatic, quick-closing check valve to prevent the flow of fluid back toward the injection pump.
3. It is recommended that the pesticide injection pipeline also contain a functional, normally closed, solenoid-operated valve located on the intake side of the injection pump and connected to the system interlock to prevent fluid from being withdrawn from the supply tank when the irrigation system is either automatically or manually shut down.
4. It is recommended that the system contain functional interlocking controls to automatically shut off the pesticide injection pump when the water pump motor stops.
5. It is recommended that the irrigation line or water pump include a functional pressure switch which will stop the water pump motor when the water pressure decreases to the point where pesticide distribution is adversely affected.
6. It is recommended that systems use a metering pump, such as a positive displacement injection pump (i.e., diaphragm pump) effectively designed and constructed of materials that are compatible with pesticides and capable of being fitted with a system interlock.
7. Dilute the product in water following the label mixing directions. It may be premixed in a supply tank with water, fertilizer or other appropriate tank-mixed agricultural chemicals. Agitation is necessary. Apply to moderately moist soils. Use volumes that thoroughly wet the soil but that do not cause significant runoff or excessive drip from pots. Application should be continuous in sufficient water to apply the specified rate evenly to the entire treated area.
8. DO NOT apply when wind speed causes non-uniform distribution and/or favours drift beyond the area intended for treatment.
9. DO NOT apply by overhead boom chemigation if the area to be treated is outdoors and is within 100 m of a residential area or park.

Flood and Furrow Chemigation:

- 1) Systems using a gravity flow pesticide dispensing system must meter the pesticide into the water at the head of the field and downstream of a hydraulic discontinuity, such as a drop

structure or weir box, to decrease potential for water source contamination from back flow if water flow stops.

- 2) Systems utilizing a pressurized water and pesticide injection system should meet the following requirements:
 - a. It is recommended that the system contain a functional check valve, vacuum relief valve, and low pressure drain appropriately located on the irrigation pipeline to prevent water source contamination from back flow.
 - b. It is recommended that the pesticide injection pipeline contain a functional, automatic, quick-closing check valve to prevent the flow of fluid back toward the injection pump.
 - c. It is recommended that the pesticide injection pipeline also contain a functional, normally closed, solenoid-operated valve located on the intake side of the injection pump and connected to the system interlock to prevent fluid from being withdrawn from the supply tank when the irrigation system is either automatically or manually shut down.
 - d. It is recommended that the system contain functional interlocking controls to automatically shut off the pesticide injection pump when the water pump motor stops.
 - e. It is recommended that the irrigation line or water pump include a functional pressure switch, which will stop the water pump motor when the water pressure decreases to the point where pesticide distribution is adversely affected.
 - f. It is recommended that systems use a metering pump, such as a positive displacement injection pump (e.g. diaphragm pump), effectively designed and constructed of materials that are compatible with pesticides and capable of being fitted with a system interlock.
- 3) Apply ROOTSHIELD® PLUS WP Biological Fungicide during the last half of the water application period. Mix ROOTSHIELD® PLUS WP Biological Fungicide in enough water to be able to draw through the system for the last half of the water application. Maintain constant agitation.
- 4) Apply enough water to move ROOTSHIELD® PLUS WP Biological Fungicide into the root zone. Amounts will vary depending on soil type and existing moisture level. Do not apply water volumes that would cause runoff or excessive leaching.

ORNAMENTALS, NURSERY CROPS AND GREENHOUSE CROPS

CROPS/CROP GROUPS*	DISEASES/ PATHOGENS	RATE	Remarks
Greenhouse Ornamental Crops	Root rot and damping off caused by: <i>Pythium</i> spp., <i>Rhizoctonia</i> spp., <i>Fusarium</i> spp., <i>Phytophthora</i> spp.	30-60 g in 100 L of water applied to 10 m ² of soil/potting mixture surface	Apply immediately after sowing seed or planting. Repeat applications at 8- to 10-week intervals if the disease is expected. When disease pressure is high, use the highest rate and shortest interval. Also see instructions for

			“CONTAINER-GROWN PLANTS
Greenhouse Vegetable Transplants: Bulb vegetables Leafy vegetables Brassica vegetables Fruiting vegetables Cucurbit vegetables Herbs and Spices	Root rot and damping off caused by: <i>Pythium</i> spp., <i>Rhizoctonia</i> spp., <i>Fusarium</i> spp., <i>Phytophthora</i> spp.	30-60 g in 100 L of water applied to 10 m ² of soil/potting mixture surface	Apply immediately after sowing seed or planting. When disease pressure is high, use the highest rate.
Greenhouse Fruiting Vegetables	Root rot and damping off caused by: <i>Pythium</i> spp., <i>Rhizoctonia</i> spp., <i>Fusarium</i> spp., <i>Phytophthora</i> spp.	30-60 g in 100 L of water applied to 10 m ² of soil/potting mixture surface	Apply immediately after sowing seed or planting.
Greenhouse Cucurbit Vegetables			A second application may be made after 8-10 weeks if the disease is expected. DO NOT use overhead boom chemigation for second application or after the four-leaf stage.
Greenhouse Brassica Vegetables			
Greenhouse Leafy Vegetables			When disease pressure is high, use the highest rate and shortest interval.
Greenhouse Strawberries	Root rot and damping off caused by: <i>Pythium</i> spp., <i>Rhizoctonia</i> spp., <i>Fusarium</i> spp., <i>Phytophthora</i> spp.	30-60 g in 100 L of water applied to 10 m ² of soil/potting mixture surface	Apply immediately after planting.
Greenhouse Wasabi			A second application may be made after 8-10 weeks if the disease is expected. DO NOT use overhead boom chemigation for second application or after the four-leaf stage. When disease pressure is high, use the highest rate and shortest interval.
Cannabis (marihuana) produced commercially indoors	Root rot and damping off caused by: <i>Pythium</i> spp., <i>Rhizoctonia</i> spp., <i>Fusarium</i> spp., <i>Phytophthora</i> spp.	30-60 g in 100 L of water applied to 10 m ² of soil/potting mixture surface	Apply immediately after sowing seed or planting. A second application may be made after 8-10 weeks if the disease is expected. DO NOT use overhead boom chemigation for second application or after the four-leaf stage. When disease pressure is high, use the highest rate and shortest interval.

Outdoor Nursery Crops	Root Rot and damping-off caused by: <i>Pythium</i> spp. <i>Rhizoctonia</i> spp. <i>Fusarium</i> spp. <i>Phytophthora cinnamomi</i> and <i>P. parasitica</i>	30-45 g in 100 L of water applied to 10 m ² of soil/potting mixture surface	Apply immediately after sowing seed or planting. Repeat applications at 8- to 10-week intervals if the disease is expected. When disease pressure is high, use the highest rate and shortest interval. Also see instructions for “CONTAINER-GROWN PLANTS.”
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***CROP GROUPS**

Crop Group 3-07 - Bulb Vegetables: chive, Chinese chive, daylily (bulb), Elegans hosta, fritillaria, garlic (bulb, great-headed, serpent), kurrat, leek, lady’s leek, wild leek, lily, onion (bulb, Beltsville bunching, Chinese, fresh, green, macrostem, pearl, potato, tree, Welsh), shallot (bulb, fresh leaves).

Crop Group 4 - Leafy Vegetables (except Brassica Vegetables): amaranth (leafy, Chinese spinach, tampala), arugula (Roquette), cardoon, celery, Chinese celery, celtuce, chervil, chrysanthemum (edible-leaved, garland), corn salad, cress (garden, upland), dandelion, dock (sorrel), endive (escarole), fennel (Florence, finocchio), lettuce (head, leaf), orach, parsley, purslane (garden, winter), radicchio (red chicory), rhubarb, spinach, New Zealand spinach, vine spinach, swiss chard

Crop Group 5 - Brassica Leafy Vegetables: broccoli, Chinese broccoli (gai lon), raab broccoli (rapini), Brussels sprouts, cabbage, Chinese cabbage (bok choy, Napa, mustard), cauliflower, cavolo broccoli, collards, kale, kohlrabi, mizuna, mustard greens, mustard spinach, rape greens

Crop Group 8-09 - Fruiting vegetables: eggplant (including African, pea, scarlet), garden huckleberry, goji berry, groundcherry, martynia, okra, pepino, pepper (bell, non-bell), sunberry, tomatillo, tomato (including currant)

Crop Group 9 - Cucurbit Vegetables: Chinese waxgourd (Chinese preserving melon), citron melon, cucumber, gherkin, edible gourd (includes hyotan, cucuzza, hechima, Chinese okra), momordica (includes balsam apple, balsam pear, bitter melon, Chinese cucumber), muskmelon (true cantaloupe, cantaloupe, casaba, crenshaw, golden pershaw, honeydew, honey balls, mango, Persian, pineapple, Santa Claus, snake), pumpkin, squash (winter, summer), watermelon

Crop Group 19 – Herbs and Spices: angelica, anise (anise seed), balm (lemon balm), basil, borage, burnet, chamomile, caraway, black caraway, catnip, celery seed, chervil (dried), chive, Chinese chive, clary, coriander (cilantro or Chinese parsley), coriander (seed), costmary, cumin, dill (dillweed), dill (seed), fennel (common), fenugreek, horehound, hyssop, juniper berry, lavender, lemongrass, lovage (leaf), lovage (seed), marigold, marjoram, mustard (seed), nasturtium, parsley (dried), pennyroyal, poppy (seed), rosemary, rue, saffron, sage, savory (summer, winter), sweet bay (bay leaf), tansy, tarragon, thyme, wintergreen, woodruff, wormwood.

CONTAINER-GROWN PLANTS

Suspend 0.3 - 0.6 g of ROOTSHIELD® PLUS WP Biological Fungicide per L of water to achieve uniform application and apply as follows:

Type of growing container	Amount of ROOTSHIELD® PLUS WP Biological Fungicide Suspension per square meter
Shallow flats and pots up to 10 cm deep	2.5 L
Pots deeper than 10 cm	10 L (or use per pot volumes shown in chart below)

ROOTSHIELD® PLUS WP Biological Fungicide Suspension Volume Per Pot	
Pot Size (diameter)	Amount of ROOTSHIELD® PLUS WP Suspension per pot
13 cm	200 ml
15 cm	236 ml
20 cm	325 ml
25 cm	414 ml
30 cm	0.5 L
Above 30 cm use 1.0 L per 0.1 m ²	
Pot Size (volume)	Amount of ROOTSHIELD® PLUS WP Biological Fungicide Suspension per pot
3.7 L	355 ml
7.5 L	0.5 L
11.4 L	0.9 L
15 L	1.2 L
19 L	1.6 L
Above 19 L use 1.0 L per 0.1 m ²	

GINSENG

DISEASES SUPPRESSED	APPLICATION RATE	Remarks
Root Rot caused by: <i>Pythium</i> spp. <i>Rhizoctonia</i> spp. <i>Fusarium</i> spp.	3-4 kg/ha of cultivated area in at least 1000 L of water	Apply to the soil surface immediately around the ginseng plants. Use higher rates when conditions favour disease development or high disease pressure is anticipated. Sufficient irrigation or rainfall of at least 5 mm should occur within 24 hours after application to move the active ingredient into the root zone. Apply when conditions are favourable for disease development: cool, wet and humid conditions. A second application may be made 8 – 10 weeks later if the disease is expected. When disease pressure is high, use the highest rate and shortest interval.