

2018-3352

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## RootShield® HC - Biological Fungicide Wettable Powder

*For the Suppression of Root rot caused by Pythium spp., Rhizoctonia spp. and Fusarium spp. in Greenhouse Crops, Greenhouse Vegetable Transplants, Greenhouse Vegetables, Outdoor Nursery Plants, Agricultural Field Crops, Hops, Ginseng, and Cannabis (marihuana) produced commercially indoors; Foliar Diseases caused by Botrytis cinerea in Greenhouse Crops, Greenhouse Vegetable Transplants, Greenhouse and Field Vegetables, Greenhouse Ornamentals, Outdoor Nursery Plants, Strawberry, Lettuce, Geranium, Ginseng, and Cannabis (marihuana) produced commercially indoors*

COMMERCIAL

### **READ THE LABEL BEFORE USING**

ACTIVE INGREDIENT *Trichoderma harzianum* Rifai strain KRL-AG2 contains a minimum of  $1.0 \times 10^7$  colony forming units per gram of dry weight

Warning, contains the allergens wheat and sulfites

POTENTIAL SENSITIZER

LIVE ORGANISMS

REGISTRATION No. 27115 PEST CONTROL PRODUCTS ACT

NET CONTENTS: 0.453 – 90.9 kg

Manufactured by BioWorks, Inc. 100 Rawson Road, Suite 205, Victor, NY 14564  
Telephone: 1.585.924.4362

Distributed by BioWorks, Inc., P.O. Box 1125, Fonthill, Ontario, L0S 1E0  
Telephone: 800-877-9443

Lot No.:

Date of Manufacture: Use within 12 months of date of manufacture.

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**GENERAL INFORMATION:** RootShield® HC - Biological Fungicide Wettable Powder is a biological fungicide for the suppression of root or foliar diseases in greenhouse crops, greenhouse vegetable transplants, outdoor nursery plants, agricultural field crops, strawberries, lettuce, hops ginseng, and *Cannabis* (marihuana) produced commercially indoors. The active ingredient is a beneficial microbe *Trichoderma harzianum* strain T-22 (KRL-AG2). When applied to seeds, transplants, greenhouse planting mix or soil, RootShield® HC - Biological Fungicide Wettable Powder actively grows onto plant roots as they develop and protects roots against *Pythium*, *Rhizoctonia* and *Fusarium*. As a foliar application, RootShield® HC - Biological Fungicide Wettable Powder also suppresses *Botrytis cinerea*.

RootShield® HC - Biological Fungicide Wettable Powder can be used alone or in conjunction with certain chemical fungicides; contact manufacturer or distributor for compatibility Technical Bulletin.

For control of seed rot and damping off of internally infected cuttings, use chemical fungicides or other appropriate measures in addition to RootShield® HC - Biological Fungicide Wettable Powder.

**Note:** RootShield® HC - Biological Fungicide Wettable Powder contains live spores of a beneficial microbe. RootShield® HC - Biological Fungicide Wettable Powder becomes active when soil temperatures are above 10 degrees C. Control is not effective while soils remain cold and is more effective in neutral or acidic soils than in alkaline soils.

#### **DIRECTIONS FOR USE:**

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

**DO NOT allow effluent or runoff from greenhouses containing this product to enter lakes, streams, ponds or other waters.**

#### **DRENCH APPLICATION TO POTTING MIX OR SOIL**

*Greenhouse Peppers, Tomatoes, and Cucumbers*

*Greenhouse Ornamental Crops*

*Greenhouse Vegetable Transplants*

*Outdoor Nursery Crops*

*Hops*

*Ginseng*

*Cannabis (Marihuana) produced commercially indoors*

**POTTING MIX:** Suspend RootShield® HC - Biological Fungicide Wettable Powder in sufficient water (eg. 30-45 g/100L) to achieve uniform application and apply at the rate of 55-110 g per cubic metre (loose) of greenhouse potting mix, soil or planting beds. RootShield® HC - Biological Fungicide Wettable Powder can be applied through low pressure watering nozzles such as fan nozzles or other watering systems. Agitate to maintain suspension.

*Cannabis (marihuana) produced commercially indoors:* RootShield HC is applied to potting mix or soil as a drench prior to planting.

#### **NURSERY DRENCH:**

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Suspend RootShield® HC - Biological Fungicide Wettable Powder in sufficient water (eg. 30 – 45 g/100 L) to achieve uniform application and apply at the rate of 55 – 110 g per cubic metre (loose) of nursery potting mix, soil or planting beds. RootShield® HC - Biological Fungicide Wettable Powder can be applied through low pressure watering nozzles such as fan nozzles or other watering systems. Agitate to maintain suspension.

*Ginseng, Hops:* Suspend RootShield® HC - Biological Fungicide Wettable Powder in 1,000 litres of water and apply at the rate of 3-4 kg per hectare to the soil surface immediately around the 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. Agitate to maintain suspension.

## **DIP APPLICATION**

*Bulbs: All Ornamental Crops*

Dip bulbs in suspension of 60 g/L RootShield® HC - Biological Fungicide Wettable Powder prior to planting.

## **FOLIAR APPLICATION:**

RootShield® HC should be applied preventatively prior to onset of disease.

*Greenhouse Vegetable Transplants:* For suppression of *Botrytis cinerea*, apply 10 grams per liter of water to foliage every 7-14 days depending upon disease pressure.

*Strawberry (Greenhouse and Field):* For suppression of *Botrytis cinerea* on strawberry, apply 10 grams per liter of water to foliage and blossoms every 7-14 days depending upon disease pressure.

*Lettuce (Greenhouse and Field):* For suppression of botrytis blight (*B. cinerea*), apply 10 grams per liter of water to foliage every 7-14 days depending upon disease pressure.

*Ginseng:* For suppression of *Botrytis cinerea*, apply RootShield® HC - Biological Fungicide Wettable Powder at 10 kg per hectare in a spray volume of 1,000 litres of water per hectare to foliage every 7-14 days depending upon disease pressure. Apply prior to disease establishment, when conditions favour disease development. Apply enough volume to thoroughly cover plant above-ground surfaces without runoff.

*Fruiting Vegetables: (Greenhouse and Field):* For suppression of *Botrytis cinerea* apply 3.75-7.5 grams per liter of water to foliage every 7-14 days depending upon disease pressure.

*Cucurbit vegetables (Greenhouse and Field):* For suppression of *Botrytis cinerea* apply 3.75-7.5 grams per liter of water to foliage every 7-14 days depending upon disease pressure.

*Greenhouse and Outdoor Ornamental Crops:* For suppression of *Botrytis cinerea* on ornamental crops apply 7.5 grams per liter of water to foliage every 7-14 days.

*Cannabis (marihuana) produced commercially indoors:* For suppression of *Botrytis cinerea*, apply 3.75 - 10 grams per liter of water to foliage every 7-14 days depending upon disease pressure.

It is not possible to test all ornamental varieties, and some may show delayed growth. RootShield® HC - Biological Fungicide Wettable Powder should first be tested on small lot of plants, if the response of the variety is not known, before using it for commercial scale production.

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DRENCH APPLICATION TO POTTING SOIL OR MIX					
Crops	Disease	Pathogens	Rate	Spray volume	Control/ Suppression
<b>Greenhouse Ornamental Crops</b>	<b>Root rot</b>	<i>Pythium</i> spp. <i>Rhizoctonia</i> spp. <i>Fusarium</i> spp.	55-110 g/m <sup>3</sup>	30-45 g/100 L	Suppression
<b>Outdoor Nursery Crops</b>					
<b>Greenhouse Vegetable Transplants</b> Bulb vegetables Leafy vegetables Brassica vegetables Fruiting vegetables Cucurbit vegetables Herbs					
<b>Greenhouse Peppers, Tomatoes, and Cucumbers</b>					
<b><i>Cannabis</i> (marihuana) Transplants produced commercially indoors</b>					
<b>Ginseng</b>			3-4 kg/ha	1000 litres/ha	
<b>Hops</b>			3-4 kg/ha	1000 litres/ha	

### SEED TREATMENT (ONSITE APPLICATION TO SEED)

*Pea, Lima Bean, Bean, Lentil, and Soybean*

RootShield® HC - Biological Fungicide Wettable Powder is applied to seeds at the rate of 60 - 125 grams per 50 kg of seed for protection against root rot. To assure uniform application, add half the required amount of RootShield® HC - Biological Fungicide Wettable Powder to half the seed in the hopper, mix with a wooden paddle, and then add the remaining seed and RootShield® HC - Biological Fungicide Wettable Powder. RootShield® HC - Biological Fungicide Wettable Powder can be applied in sufficient water to coat seeds. [4 oz/100 lb seed (cwt) = 125 g/50 kg of seed]

FOLIAR APPLICATION					
Crops	Disease	Pathogens	Rate	Days between application	Control/ Suppression
<b>Greenhouse Vegetable Transplants</b> Bulb vegetables Leafy vegetables Brassica vegetables Fruiting vegetables Cucurbit	<b>Foliar Disease</b> Botrytis blight	<i>Botrytis cinerea</i>	10 g/L	7-14 days	Suppression

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vegetables Herbs					
<b>Strawberry</b> (Greenhouse and Field)					
<b>Lettuce</b> (Greenhouse and Field)			10 kg/ha		
<b>Ginseng</b>					
<b>Fruiting Vegetables</b> (Greenhouse and Field)	Botrytis blight	<i>Botrytis cinerea</i>	3.75 – 7.5 g/L	7-14 days	Suppression
<b>Cucurbit Vegetables</b> (Greenhouse and Field)	Botrytis blight	<i>Botrytis cinerea</i>	3.75 – 7.5 g/L	7-14 days	Suppression
<b>Greenhouse and Outdoor Ornamental Crops</b>	Botrytis blight	<i>Botrytis cinerea</i>	7.5 g/L	7-14 days	Suppression
<b>Cannabis (marihuana) produced commercially indoors</b>	Botrytis blight	<i>Botrytis cinerea</i>	3.75 – 10 g/L	7-14 days	Suppression

DIP APPLICATION				
Crops	Disease	Pathogens	Rate	Control/Suppression
<b>Ornamental Bulbs</b>	<b>Root rot</b>	<i>Pythium</i> spp. <i>Rhizoctonia</i> spp. <i>Fusarium</i> spp.	Dip bulbs in 60 g/L suspension	Suppression

SEED TREATMENT (ONSITE APPLICATION TO SEED)				
Crops	Disease	Pathogens	Rate	Control/Suppression
<b>Pea Lima Bean Bean Lentil Soybean</b>	<b>Root rot</b>	<i>Pythium</i> spp. <i>Rhizoctonia</i> spp. <i>Fusarium</i> spp.	60-125 g/50kg seed	Suppression

**Bulb vegetables:** chive, Chinese chive, daylily, Elegans hosta, fritillaria, garlic (bulb, great-headed, serpent), onion (bulb, green), kurrat, leek, lady's leek, wild leek, lily, onion (bulb, Chinese, green, macrostem, pearl, potato, tree, Welsh), shallot

**Leafy vegetables:** amaranth, arugula, cardoon, celery, Chinese celery, celtuce, chervil, chrysanthemum (edible-leaved, garland), corn salad, cress (garden, upland), dandelion, dock, endive, fennel, lettuce (head, leaf), orach, parsley, purslane (garden, winter), radicchio, rhubarb, spinach, New Zealand spinach, vine spinach, swiss chard

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**Brassica vegetables:** broccoli (Chinese, raab), Brussels sprouts, cabbage, Chinese cabbage, cauliflower, cavolo broccoli, collards, kale, kohlrabi, mizuna, mustard greens, mustard spinach, rape greens

**Fruiting vegetables:** cocona, eggplant (including African, pea, scarlet), groundcherry, martynia, okra, pepino, pepper (bell, non-bell), sunberry, tomatillo, tamarillo, goji berry, tomato (including bush, currant)

**Cucurbit vegetables:** Chinese waxgourd, citron melon, cucumber, gherkin, gourd (edible), momordica, muskmelon (cantaloupe, casaba, crenshaw, golden pershaw, honeydew, honey balls, mango Persian, pineapple, Santa Claus, snake), pumpkin, squash (winter, summer), watermelon

**Herbs:** 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), costmary, culantro, cumin, dill, fennel, fenugreek, horehound, hyssop, juniper berry, lavender, lemongrass, lovage, marigold, marjoram, mustard, nasturtium, parsley, pennyroyal, poppy, rosemary, rue, sage, savory (summer, winter), sweet bay (bay leaf), tansy, tarragon, thyme, wintergreen, woodruff, wormwood.

#### **GENERAL APPLICATION INSTRUCTIONS**

Use a quantity of spray solution to thoroughly cover foliage. Crop size, spray equipment and local practice will determine the volume of water needed. Spray to wet, but avoid run-off. Use higher rates when conditions favour disease development or high disease pressure is anticipated.

RootShield® HC - Biological Fungicide Wettable Powder can be applied using hand-held backpack or ground spray equipment. Do not use with low-volume sprayers. AGITATION IS REQUIRED TO MAINTAIN SUSPENSION. Application equipment should be cleaned before use of this product, and prepared sprays should be used within 4 hours of preparation. To prevent nozzle tip clogging the manufacturer recommends using 50 – 100 mesh inlet screens in all spray equipment.

FIELD SPRAYER APPLICATION: DO NOT applying during periods of dead calm. Avoid application of this product when winds are gusty. DO NOT apply with spray droplets smaller than the American Society of Agricultural Engineers (ASAE) fine/medium/coarse classification. Boom height must be 60 cm or less above the crop or ground.

PRECAUTIONS: KEEP OUT OF THE REACH OF CHILDREN. May cause sensitization. Avoid contact with skin, eyes or clothing. Avoid breathing dust or spray mist. Wear a long-sleeved shirt, long pants, water proof gloves, shoes plus socks, eye goggles and a dust/mist filtering respirator/mask (MSH/NIOSH approval number prefix TC-21C) or a NIOSH approved respirator with any N -95, R-95, P-95 or HE filter for biological products when handling, mixing/loading or applying the product and during all clean-up/repair activities. Wash thoroughly with soap and water after handling. Remove contaminated clothing and wash before reuse.

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.

#### **RE-ENTRY INTERVAL**

DO NOT re-enter or allow re-entry into treated areas for 4 hours or until sprays have dried, unless wearing appropriate personal protective equipment including long-sleeved shirt, long pants, shoes plus socks, and waterproof gloves.

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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 with this product. DO NOT clean equipment or dispose of wastes in any water supply.

To reduce runoff from treated areas into aquatic habitats, avoid application to areas with a moderate to steep slope, compacted soil, or clay.

- Avoid application when heavy rain is forecast.

- Contamination of aquatic areas as a result of runoff may be reduced by including a vegetative strip between the treated area and the edge of the water body.

DO NOT apply this product by air.

#### 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/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 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.

**GENERAL:** Seek medical attention immediately if irritation or signs of toxicity occur and persist or is severe. Take container, label or product name and Pest Control Product Registration Number with you when seeking medical attention.

**TOXICOLOGICAL INFORMATION:** Treat symptomatically.

**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 12 months of the date of manufacture when stored under refrigerated conditions.

#### DISPOSAL/ DECONTAMINATION:

1. Thoroughly empty the contents of the container into the application device or medium.
2. Make the container unsuitable for further use.
3. Dispose of the container in accordance with provincial requirements.

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4. 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.