



RootShield® Granules & PlantShield® HC

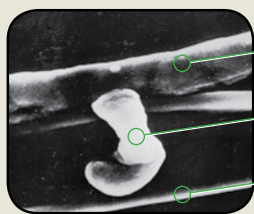
Healthy Roots, Healthy Plants

Before planting choose RootShield Granules to mix in your soil/media or drench with PlantShield HC wettable powder for greenhouse, nursery and vegetable crops. The active ingredient is a patented hybrid fungus, *Trichoderma harzianum*, strain T-22 that protects roots, stems and leaves from many pathogens. RootShield Granules and PlantShield HC block and actively attack pathogens by “eating” them; ensuring uninterrupted plant growth.

RootShield Granules and PlantShield HC are preventative biofungicides and should be applied to “clean” plants. Diseased plants should be chemically treated first since the aggressively growing active ingredient, strain T-22 only grows on the outside and does not enter the plant tissue. RootShield Granules and PlantShield HC are compatible with fertilizers, algacides, insecticides, disinfectants, miticides, herbicides, growth regulators, and nearly all fungicides.

Root Protection:

- Grows on the roots “shielding” them against root damaging fungi
- Releases enzymes that dissolve the cell wall of many fungal pathogens
- Promotes a healthier root system increasing root mass potential
- 0-Hour REI; OMRI Listed
- RootShield Granules is a VeriFlora® approved input material
- Reduces or eliminates chemical fungicide applications
- Grows between pH 4-8; at soil temperatures between 48° - 97° F
- Costs less than 2¢ per 6 – inch pot for a root protection program
- Reduces effects of environmental stresses that challenge the root system



RootShield strand
 Strand eating pathogen
Rhizoctonia

RootShield in action: This magnified photo shows RootShield (thinner top strand) coiled around and attacking the pathogen *Rhizoctonia* (lower strand).



RootShield strand has been removed to reveal the damage (holes) eaten into the cell wall of the *Rhizoctonia*.

(photo courtesy of Professor Ilan Chet, The Hebrew University of Jerusalem, Israel)

To find out more about the BioWorks family of products, please contact us at 800-877-9443 or visit www.bioworksinc.com.



BioWorks®

How You Grow Matters™

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RootShield® Granules & PlantShield® HC

Application

Apply RootShield Granules or PlantShield HC right away, before roots have emerged or fully developed. Within 24 hours, the actively growing fungus forms a "shield" by growing around the roots. Forming that "shield" right away is key to preventing pathogens from damaging the roots.

RootShield Granules

RootShield Granules grow on the plant's root system and is compatible in all bark, coir, peat based and soil-less mixes and will protect plugs, cuttings, liners and all container plants

Packaging and Product Shelf Life

The granules are packaged in 10 lb. boxes, 40 lb. bags, 500 lb. and 1,000 lb. bulk bags. Shelf life: 6 months at 50° F (10° C) to 77° F (25° C); 9 months at 32° F (0° C) to 50° F (10° C); and 12 months below 32° F (0° C). If desired, request your distributor to direct ship, Freight Pre-paid!

Blend Rates

For small volumes blend 3 tbsps. per cubic foot (ft.³) of potting soil. If you prefer large volume custom blending with your media, contact you mix company. Large volume blend rates are 1.25 -1.5 lbs./yd.³ of mix, or a minimum of three 40 lb. bags per truckload of mix (100 yds.³). The shelf life of RootShield Granules when blended at 1.5 lbs. per yd.³ is 12 weeks at 5° F (-15°C), 20 weeks at 40° F (4°C) to 77° F (25°C), 8 weeks at 100° F (39°C).

Broadcast/Top-dressing Rates

For established beds apply 2-3 lbs./1,000 ft.², depending on disease severity, when the soil warms to 48° F (9°C). Work RootShield Granules into the soil and irrigate to activate.

PlantShield HC

This wettable powder can be drenched into the soil for root rot protection or applied as foliar spray to prevent *Botrytis* and mildews on ornamentals.

Packaging and Product Shelf Life

PlantShield HC is packaged in 1lb., 3 lb., and 30 lb. boxes. Shelf life: 4 months at 50° F (10° C) to 77° F (25° C); 6 months at 32° F (0° C) – 50° F (10° C) and 8 months below 32° F (0° C). If desired, request your distributor to direct ship, Freight Pre-paid!

Root Application

Suspend PlantShield HC (4-5 oz./100 gals. or for smaller volume: 1-2 tbsps./5 gals. of water) in sufficient water with agitation and apply as a drench to greenhouse planting mixes and container nursery crops. Constant agitation in a stock tank is required to maintain PlantShield HC in suspension.

PlantShield HC can be applied through low pressure watering nozzles, overhead boom type sprayers or sprinklers, sub-irrigation (5-6 oz./100 gals.) or other drench watering systems. When using a fertilizer injector to drench PlantShield HC, keep the injector pick-up tube screen at least 1"-2" from the bottom of the stock tank.

Soil/Media Coverage

- Trays/flats/liners and pots less than 4-inches deep – 100 gals./800 ft.²
- Beds and pots 4-inches deep or deeper – 100 gals./400 ft.²
- For 6-inch pots use approximately 1 cup, (8 oz.)/pot
- One pound of PlantShield HC will treat 6400, 6-inch pots

Enclosed scoop holds 1.5 oz. (Three scoops equals 4.5 oz.)

Foliar Application for Ornamentals

(Spreader/sticker recommended)

Begin applications when conditions are favorable for foliar disease development. Spray every 7 to 10 days at a rate of 1.5 – 3 lbs./100 gals./acre (0.25 – 0.5 oz. /gal)

For best results rotate with other foliar products. When applying PlantShield HC, keep the stock tank or spray tank agitated and remove any screens smaller than 100 mesh to ensure flow into the soil or the foliage.

Maintenance Programs

Seeding/Flats/Liner/Woody Cuttings

Plant seeds into propagation mix containing RootShield Granules (1.25 – 1.5 lbs./yd.³) or topdress (3 lbs./1000 ft.²). Or, drench flats with PlantShield HC immediately after seeding (4-5 oz./100 gals).

Cuttings; Poinsettias/Mums/Geraniums

Place unrooted or rooted cuttings directly into propagation media containing RootShield Granules or apply PlantShield HC approximately 7 days after sticking unrooted cuttings or drench rooted cuttings. Please note: If using Oasis wedges or cubes, growers should wait to apply when roots emerge or when stepping up into pots.

Bulbs

Pre-blend RootShield Granules (1.25-1.5 lbs./yd³), or topdress (3 lbs./1,000 ft.²) or apply PlantShield HC immediately after planting (4-5 oz./100 gals.). Bulbs may be dusted with PlantShield HC (0.5 lbs./100 lbs. of bulbs) immediately before planting or may be dipped in a drench slurry (0.5 lb./5 gals.). Treated bulbs can be case or pot cooled. Or, apply PlantShield HC immediately after removing the crop from cold storage, or replant in media containing RootShield Granules. Pre-cool bulb application protects the basal roots while post-cool application protects the stem roots.

Extended Root Protection

To ensure good root protection over extended periods or at transplant, re-apply RootShield Granules or PlantShield HC every 10-12 weeks after initial application or when stepping up/transplanting to a larger container or out into the field. Second applications can be made at half the initial rate.

Woody Propagation

A healthy start for woody cuttings is key to producing a healthy plant in the container. Treat the woody cuttings as described above with RootShield Granules or PlantShield HC. After 3 months or when stepping up into larger containers, retreat at half the initial rate to ensure prolonged protection in the field.



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