

RootShield & PlantShield HC

RootShield Granules:

Recommended rate: 1.5 pounds (#) per cubic yard

1 cubic yard (yd³) = 27 cubic feet (ft³)

1.5 # per yd³ = 0.055 # per ft³

= 0.89 ounces per ft³ (1 ounce = 3 tablespoon)

Approximate measurement

3 tablespoons of RootShield Granules per **1 cubic foot** of potting soil

PlantShield HC:

Root Drench – recommended rate: 3-5 ounces per 100 gallons of water

Approximate measurement

1 – 2 tablespoons per **5** gallons of water

Apply 8 ounces (1 cup) of solution per 6-inch pot

Foliar Spray – recommended rate: 25-50 ounces per 100 gallons of water

Approximate measurement

1 – 2.5 ounces (5 – 10 tablespoons) per **5** gallons of water

RootShield and PlantShield are manufactured by BioWorks, Inc. BioWorks is the established worldwide leader in the biocontrol of plant diseases. BioWorks manufactures and markets high quality, consistent, well-researched products that are backed by extensive technical support.

Root Protection

Strain T-22, the Active Ingredient in RootShield Granules:

- Is the highly effective, patented hybrid *Trichoderma harzianum* that forms a protective barrier on the root system to defend against root rotting fungi
- Colonizes outer root surface and its surrounding soil particles (termed: Rhizosphere)
- Grows best between pH 4 - 8, in soil, peat and bark based mixes, between 48 – 97°F
- Feeds on products released by the roots, removing the pathogen's food supply
- Is a living organism, which will continue to grow with the expanding root system providing extended protection against root rotting fungi
- No adverse affects to humans, animals, or plants
- 0 hour REI
- Listed by the Organic Materials Review Institute (OMRI) for use in organic production

Disease Control (A Biological Fungicide):

- One of the first EPA-registered biofungicides
- Provides preventative control of *Pythium*, *Rhizoctonia*, *Fusarium*, *Sclerotinia*, *Thielaviopsis* and *Cylindrocladium*
- Blocks pathogens from occupying the space near or on the root zone (Squatter's Rights)
- Actively attacks and kills diseases trying to damage the roots
- Protects the root system of plants grown in the greenhouse and nursery
- Starts immediately protecting propagated plants or seeds, resulting in fewer plant losses
- Protects against secondary infections resulting from insect damage of the roots
- Apply every 3 – 4 months to secure an adequate "defensive" barrier around the roots

Plant Health Enhancement:

- Increases overall plant health and development
- Promotes faster root development; increases soil exploration
- Reduces production costs; shortened bench time, reduced chemical needs, reduced labor
- Increases overall plant vigor; greater number of buds and lateral branching
- Reduces environmental stresses that challenge the root system (transplant shock, temperature, moisture)
- Releases compounds that make nutrients more available to the root system

Products:

- RootShield Granules is mixed into your growing medium; BioWorks recommends 1.25 to 1.5 lbs. per cubic yard, or a minimum of three, 40 lbs. bags per truck load of mix (100 cubic yards).
- PlantShield HC wettable powder for use during watering: BioWorks recommends using 3 to 5 ounces per 100 gallons (5 to 6 ounces per 100 gallons for sub-irrigation)
- Costs less than two cents to treat a 6 inch pot with RootShield Granules or PlantShield HC
- RootShield Granules has a shelf life of up to 6 months when stored at room temperatures (less than 77°F) or up to 12 months if stored at cooler temperatures (40°F)
- "Exemption from Residue Tolerance" as established by the EPA for added safety
- Used by organic growers throughout the U.S.
- Can be used in rotation with insecticides, fertilizers, rooting compounds, growth regulators, nonionic surfactants, several types of fungicides and other beneficial biologicals (mycorrhizae, predators)

Transplants & RootShield®

RootShield Granules, PlantShield HC, and T-22 PB Product Guide for Applications in Transplant Crop Production

<i>Purpose</i>	<i>Best Method of Application</i>
Application to greenhouse seedlings for transplant plugs	Pre-blend RootShield Granules into germination or plug soil mix at 1.25 – 1.5 lbs. product/cubic yard, or apply PlantShield HC at seeding at a rate of 3-5 oz/100 gallons water to 800 sq. ft. of plug trays. A second application of PlantShield HC (at 1-3 oz/100 gallons water) 3 days prior to transplanting in the field will increase the concentration of the beneficial organism on the roots for added protection in the field.
Application to field-grown seed beds for bare-root transplants	T-22 Planter Box (T-22 PB) seed treatment may be applied directly to seed at planting at a rate of 6-8 oz/cwt, or with an in-furrow application of RootShield Granules at 3 – 10 lbs./acre. In-furrow sprays of PlantShield HC may be applied at 8 oz/acre at seeding. Please note: the T-22 Planter Box formulation is to be used on larger seeded crop such as corn, soybeans, watermelon, pumpkins, etc. For small seeded crops, such as tomatoes, use RootShield Granules or PlantShield HC wettable powder.
Application in transplant water at planting	For best results, an application of RootShield or PlantShield HC in the greenhouse at seeding should be made to transplant plugs. To increase concentrations of the beneficial fungus on the transplant roots, mix PlantShield HC at a rate of 1-3 oz per 100 gallons of water – this may be tank-mixed with starter fertilizer solutions. Agitation will ensure uniform application.
Use on bare rooted transplants	Dip transplants directly into PlantShield HC dry powder or dip into a suspension of 0.5 lb. PlantShield HC in 5 gallons of water. Plant treated crops in usual manner.



Woody Ornamentals

BENEFITS OF *ROOTSHIELD/PLANTSHIELD HC* IN LANDSCAPES AND NURSERIES

RootShield Granules and PlantShield HC* can help protect your rooted cuttings from damping off diseases (*Rhizoctonia*, *Pythium* and *Fusarium*) resulting with fewer losses and better quality. RootShield can help with harder-to-root cuttings by improving root quality and health resulting in greater durability and quicker rooting when transplanting into larger-sized pots or landscapes.

APPLICATIONS

Propagation Beds:

Pre-blend RootShield Granules (1.25 – 1.5 lbs. / cubic yard) into the soil media, or apply PlantShield HC (8.0 oz / 100 gallons) at sticking for control of root diseases in the greenhouse and/or to enhance cutting root quality.

A second application of PlantShield HC (4.0 – 8.0 oz / 100 gallons) several days before transplanting or planting cuttings into soil will increase the concentration of the beneficial fungus on the transplant roots for residual in the field.

Established Beds:

Apply RootShield Granules at a rate of 1.25 to 1.5 lbs. / 1000 sq. ft. when the soil warms to 48 °F, and follow with a second application (half rate) approximately 6 weeks later.

Containers:

When transplanting rooted cuttings, pre-blend RootShield Granules at 1.0 – 1.5 lbs. / cubic yard, or apply PlantShield HC (6 - 12.0 oz / 100 gallons) at transplanting (first watering) for continued control of root diseases during growth and to enhance root quality and health.

To keep RootShield/PlantShield HC populations at high levels for continued disease protection and to enhance growth of the crop during the growing season, it is recommended to apply PlantShield HC at 4 to 8.0 oz / 100 gallons water every three months.

Landscapes:

Apply RootShield Granules to the planting hole at a rate of 1 – 8 oz. and incorporate into the planting soil or soil mix. Use higher rate with larger-sized plants.

Dip cuttings or transplants in PlantShield HC dry powder or in suspension of 1.0 lb. PlantShield HC in 5 gallons of water. Plant treated cuttings or transplants in potting mix or soil in the usual manner.

RootShield/PlantShield HC Tech

*PlantShield HC, formally known as TopShield and RootShield Drench, is the safe and proven preventative biological fungicide that can be applied for root or foliar disease control. While PlantShield HC is not yet registered in California, RootShield Drench is still available.



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