



Bulb Protection

What is RootShield®?

- It is an EPA-registered, biological root protectant fungicide available in granules or wettable powder
- RootShield prevents attack from diseases by growing on the roots and forming a protective “Shield” against disease and environmental stress
- It has proven efficacy that equals chemical fungicides and is nontoxic to workers
- It has a 0-hour REI, no phytotoxicity to plants and are compatible with beneficials
- RootShield® Granules can be mixed into your growing media; most media companies will incorporate
- RootShield® WP (a wettable powder) can be dusted, used in dips or drenched onto potted bulbs

Protection from root rots

- RootShield protects bulb crops like Lilies, Tulips, Gladiolus and Narcissus
- Attacks pathogens like *Pythium*, *Fusarium*, and *Rhizoctonia*
- Stops pathogens from damaging roots

Chemical compatibility

- RootShield is compatible with many chemical fungicides; all insecticides, miticides, fertilizers, disinfectants and plant growth regulators
- RootShield has been used as stand-alone fungicide for root disease control
- RootShield is a preventative fungicide. To “cure” existing problems, use appropriate chemical treatment, then follow-up with RootShield WP.
- Applying chemicals to media containing either product will not harm the active ingredient

Soil temperatures

- Storage conditions for the cooling period (vernalization) will not harm the active fungal ingredient, *Trichoderma harzianum* hybrid strain T22, found in RootShield

Watering and leaching

- Heavy watering increases the risk of root disease problems, and should be avoided
- Watering will not leach RootShield away from the crop’s root zone
- It will continue to grow on the roots as it expands through the growing media for up to three months

(See “Maintenance Program for Bulb Crops” on next page.)



Maintenance Program for Bulb Crops

Crop Production Phase	Application timing	Rate
Bulb Planting, Growth and Cold Storage	Pre-blend RootShield Granules into your soil mix at the time of planting or drench with RootShield WP immediately after planting. Bulbs may be dusted with RootShield WP immediately before planting or may be dipped into a drench slurry (dip). Treated bulbs can be pot or case cooled. Applying RootShield at this time is critical for basal root protection, especially if the bulbs are placed at temperatures above 50 F for 2-3 weeks. If bulbs are immediately placed in the cooler, the most effective treatment would be with RootShield granules incorporated into the media or the use of the dry bulb dust.	<i>Granules:</i> 1.25 – 1.5 lb/cu. yd. <i>Drench (WP):</i> 4 – 5 oz/100 gal <i>Bulb dusting:</i> 0.5 – 1.0 lbs/100 lbs. <i>Bulb dip (drench):</i> 0.5 lb/20 gal
Post-Cold Storage and Crop Growth	Apply RootShield WP immediately after removing the crop from cold storage, or replant into media containing RootShield Granules or top-dress with granules.	<i>Drench (WP):</i> 4 – 5 oz/100 gal <i>Granules:</i> 1.25 - 1.5 lb/cu. yd. <i>Top-dress (granules):</i> 1.5 teaspoons/8-inch pot (water in)
Additional Root Protection	A second application of RootShield (at half rate) should be made: <ul style="list-style-type: none"> • If treated before cold storage – treat within 3 weeks after placement in the greenhouse • If treated after cold storage – retreat in 10-11 weeks depending upon the crop 	Use half rates in all treatments <i>Drench (WP):</i> 2 –2.5 oz/100 gal <i>Top-dress (granules):</i> ¾ teaspoon/8-inch pot (water in)

Protection of the stem root system is essential for optimal plant growth and development. Long term protection of the stem root system against disease and environmental stress is optimized with a second application of RootShield at half rate. The root disease protection will carry over to the customer buying your product. A full application of RootShield costs less than 2 cents per 6-inch pot.

Here is what one grower has experienced with the use of RootShield on Easter lily:

Easter Lily Average Bud Count

With RootShield

Date of Easter	4/20	3/31	4/15	4/23	4/4	4/12
Year	2003	2002	2001	2000	1999	1998
% of Plants with 7 plus blooms	66%	62%	65%	64%	46%	61%

Without RootShield

3/30	4/7	4/19	4/3	412
1997	1996	1995	1994	1993
7%	21%	31%	25%	4%

Grower results with RootShield treated bulbs.