NEW YORK STATE INTEGRATED PEST MANAGEMENT

Biopesticide Profile

RootShield

Active ingredient
Trichoderma harzianum T-22 (alive)

This information is not meant to be a substitute for reading the label. Always read and follow all pesticide labels. Ensure the pesticide is currently registered in your state.

PRODUCT

Formulations: Granules, WP

Pests: Soilborne and root diseases of plants

FRAC Code (Fungicide Resistance Action Committee): BM 02

Mode of Action: Eat; Poison; Keep out; Turn on resistance; Grow strong plants

ENVIRONMENT

Temperature tolerance in field: Fungal active ingredient is active >50°F, so ensure that environment where you are applying RootShield (e.g., soil) is sufficiently warm.

Rainfastness: Not applicable, since applied to roots and root zone

UV tolerance: Not applicable, since applied to roots and root zone

STORAGE

How to store: Refrigerated or frozen away from food, water, and feed

Shelf life: 10 months if refrigerated or frozen (below 40 °F); 4 (WP) or 6 (Granules) months if stored between 40 and 75°F; < 1 (WP) or < 2 (Granules) month if stored above 75°F

RISK

Signal word: Caution

REI (Restricted-entry interval): 4 hr

PHI (Pre-harvest interval): 0 days

Impacts on beneficial insects: No known toxicity concerns for bees or other insects; Compatible with at least 2 species of entomopathogenic nematodes, the soil-dwelling predatory mite Stratiolaelaps scimitus, and the soil-dwelling predatory beetle Dalotia coriaria; see resource from BioWorks: bioworksinc.com/wp-content/uploads/BW-BCA-Compatibility.pdf

APPLICATION

Where to apply: Apply to soil or potting mix (Granules or WP); WP formulation may also be applied to cuttings, bare roots, seeds, seed pieces/tubers, and bulbs of some crops

When to start applying: Before disease begins

How to apply: Mixed with soil or potting mix (Granules) or as a drench, chemigation, seed treatment, seed piece/tuber dust/dip, or bulb dust/dip (WP), in sufficiently warm environment (see Temperature Tolerance); Labels specify which application method to use on each crop

Tank mix & application compatibility: Can be used with many fertilizers and pesticides; Not compatible with (either in a tank or applied just before) products containing imazalil, propiconazole, tebuconazole, triflumizole, or – WP formulation - benomyl; See compatibility resources from BioWorks for more information: bioworksinc.com/ask-us/product-compatibility/
ABOUT BIOPESTICIDES

**USING BIOPESTICIDES**

- Apply preventatively.
- Use as part of an IPM strategy, including cultural management practices, other pesticides, etc.
- Mix only what you need; don’t leave in spray tank overnight.
- Don’t expose to excessive heat in storage.
- When tank mixing, follow label instructions for all products. Check with company rep or distributor if you have questions. Do a “jar test” to determine physical compatibility if you want to mix two products for which you cannot find information on their compatibility.
- Proper cleaning of spray tanks after any pesticide application is always important. Pay special attention to tank cleaning when a biopesticide is applied after another incompatible product.

**HOW BIOPESTICIDES WORK**

**Modes of action (MOAs)**

<table>
<thead>
<tr>
<th><strong>Eat</strong></th>
<th>Live microbe grows on/in pest</th>
<th><img src="image" alt="Eat" /> <img src="heart" alt="Active ingredient is alive" /></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Poison</strong></td>
<td>Biopesticide (or its products) kills the pest directly</td>
<td><img src="image" alt="Poison" /> <img src="heart" alt="Active ingredient is alive" /></td>
</tr>
<tr>
<td><strong>Keep out</strong></td>
<td>Live microbe grows on plant, leaving no room for pests</td>
<td><img src="image" alt="Keep out" /> <img src="heart" alt="Active ingredient is alive" /></td>
</tr>
<tr>
<td><strong>Turn on resistance</strong></td>
<td>Turns on the plant’s defenses before pest attacks</td>
<td><img src="image" alt="Turn on resistance" /> <img src="heart" alt="Active ingredient is alive" /></td>
</tr>
<tr>
<td><strong>Grow strong plants</strong></td>
<td>Makes plant stronger, healthier, more resilient</td>
<td><img src="image" alt="Grow strong plants" /> <img src="heart" alt="Active ingredient is alive" /></td>
</tr>
<tr>
<td><strong>Repel</strong></td>
<td>Pest avoids plants treated with biopesticide</td>
<td><img src="image" alt="Repel" /> <img src="heart" alt="Active ingredient is alive" /></td>
</tr>
<tr>
<td><strong>Stop feeding</strong></td>
<td>Stops pest from feeding; pest eventually starves</td>
<td><img src="image" alt="Stop feeding" /> <img src="heart" alt="Active ingredient is alive" /></td>
</tr>
<tr>
<td><strong>Stop growth</strong></td>
<td>Stops pest from growing or molting; pest eventually dies</td>
<td><img src="image" alt="Stop growth" /> <img src="heart" alt="Active ingredient is alive" /></td>
</tr>
<tr>
<td><strong>Stop reproduction</strong></td>
<td>Hampers pests’ ability to find a mate, lay eggs</td>
<td><img src="image" alt="Stop reproduction" /> <img src="heart" alt="Active ingredient is alive" /></td>
</tr>
</tbody>
</table>

**LEARN MORE**

**Efficacy of biopesticides**
[go.nysipm.org/biopesticide-efficacy](go.nysipm.org/biopesticide-efficacy)

**Biocontrol Bytes blog**
[blogs.cornell.edu/biocontrolbytes/](blogs.cornell.edu/biocontrolbytes/)

**Biocontrol**
[go.nysipm.org/biocontrol](go.nysipm.org/biocontrol)