

## Nursery: Disease & Insect Management

Disease and insect management require planning and prevention to produce high quality container nursery stock. Give your plants a healthy start and keep them clean throughout production with the BioWorks family of products. (See chart for timing and rates.)

### RootShield® PLUS<sup>+</sup> for Root Disease Control

- 4-hour REI, 0-day PHI, OMRI Listed
- Provides long-term root protection for all stages of nursery stock
- Grows on the roots “shielding” them against root damaging fungi such as *Phytophthora*, *Fusarium*, *Pythium*, *Rhizoctonia*, *Cylindrocladium* and *Thielaviopsis*. RootShield PLUS<sup>+</sup> also actively consumes pathogenic fungi.
- Active ingredients: The beneficial fungi *Trichoderma harzianum*, strain T-22 and *Trichoderma virens*, G-41
- Cost effective: Reduces or eliminates chemical root fungicide applications
- Grows on the roots within a pH range of 4–8 at soil temperatures of 48° to 97°F
- Granular formulation for media incorporation or wettable powder for drenching

### CEASE® and MilStop® SP for Foliar Disease Control

#### CEASE®

- 4-hour REI, 0-day PHI, OMRI Listed
- Prevents both fungal and bacterial disease
- Controls Botrytis, powdery mildew, *Pseudomonas*, *Xanthomonas*, *Erwinia*
- Leaves no unsightly residues
- Active ingredients: *Bacillus subtilis* (strain QST 713)
- Safe for beneficial insects and bees

#### MilStop® SP

- 1-hour REI, 0-day PHI, OMRI Listed
- Kills powdery mildew on contact and prevents other disease
- Leaves no residues; dries quick, clean
- Active ingredient: Potassium Bicarbonate
- Cost effective, pre-formulated with surfactants
- Can be used in rotation with most chemical pesticides or as a stand-alone fungicide
- Compatible with many beneficial insects



### **NemaShield® for Fungus Gnat Larval Control**

- Especially useful in propagation and liner production
- Easy to use dispersible formulation; apply with a sprayer or through an injector
- Active ingredient: *Steinernema feltiae* insect parasitic nematode
- No REI; No human toxicity; exempt from EPA labeling requirements
- Compatible with many pesticides, including insecticides

### **BotaniGard® / Mycotrol®, Molt-X® and SuffOil-X® for Insect and Mite Control**

#### BotaniGard® / Mycotrol®

- 4-hr REI, 0-day PHI
- Mycotrol® is registered for use in organic agriculture by WSDA (Washington State Department of Agriculture)
- Controls whiteflies, thrips, aphids, etc.
- Mycoinsecticide with unique mode of action from *Beauveria bassiana* strain GHA
- Spores work by direct contact with insect
- Compatible with IPM programs and beneficial insects
- Ideal resistance management tool

#### SuffOil-X®

- 4-hr REI, 0-day PHI, OMRI Listed
- Suffocates and kills eggs, larvae, nymphs and soft bodied insects, mites
- Unique pre-emulsified formulation stays in suspension better than other oils
- Smaller oil particles provide uniform coverage with less chance of phytotoxicity

#### Molt-X® (4-hr REI)

- 4-hr REI, 0-day PHI, OMRI Listed
- Protects against both foliar and soil-borne pests
- No phytotoxicity on most plants
- Excellent for tank mixing or rotating with BotaniGard and SuffOil-X
- Multiple modes of action
- Generally safe on beneficial insects and bees

**Disease & Insect Management Program: Nursery**

Product and Application		Rates	
<b>Root Disease Prevention</b>  <b>Use on Stock Plants, in Propagation/ Cuttings/Seeds &amp; when Finishing Crops</b>	<b>RootShield® PLUS<sup>+</sup> WP, RootShield® PLUS<sup>+</sup> Granules</b> Controls: <i>Phytophthora, Rhizoctonia, Pythium, Fusarium, Thielaviopsis</i> and more Field production / in furrow Sow seed or plant clean, disease-free plants into media containing RootShield PLUS <sup>+</sup> , OR Drench immediately after seeding/planting with RootShield PLUS <sup>+</sup> WP* * RootShield PLUS <sup>+</sup> WP can be applied at any stage of the crop to prevent disease.	5 to 12 lb/acre (RSPLUS G) 16 to 32 oz/acre (RSPLUS WP)  1.5 to 2.0 lb/cu yd 6 oz/100 gal	
	Product and Application		Rates
	<b>Foliar Disease Prevention</b>  <b>Use on Stock Plants, in Propagation/ Cuttings/Seeds &amp; when Finishing Crops</b>	<b>CEASE®</b> Controls: <i>Botrytis, powdery mildew, Erwinia, Pseudomonas, Xanthomonas</i> and more Spray as a preventative for <i>Botrytis</i> , powdery mildew and bacterial diseases.	4 qts/100 gal. every 5-7 days
		<b>MilStop® SP **– OMRI-Listed</b> Controls: Powdery mildew, <i>Botrytis</i> and other diseases When conditions are right for powdery mildew or <i>Botrytis</i> , apply MilStop as a preventative.	1.25 lb to 2.5 lb/ 100 gal. every 7-10 days
		If plants become infected with powdery mildew, use MilStop at the curative rate (note precautions on label). When control is achieved, switch to the preventative rates shown above.	2 to 3 lbs/100 gal. every 7-10 days
Product and Application		Rates	
<b>Insect Control</b>  <b>Use on Stock Plants, in Propagation/ Cuttings/Seeds &amp; when Finishing Crops</b>		<b>NemaShield®</b> Controls: Fungus gnat larvae and Thrips (WFT) pupae and pre-pupae Apply NemaShield for insect control within the first week after seeding or transplant, or immediately after seeing adults flying.	One 100 million packet/ 3,400 sq.ft.
	<b>Re-application rates and intervals</b>		
	For light or heavy infestations. Re-apply in 14 to 21 day intervals at the light infestation rate. For heavy infestations on highly susceptible crops or newly propagated cuttings, follow the rate recommended above and re-apply at the light infestation rate when necessary after 5 to 6 weeks.	One 100 million packet/ 1,100-2,200 sq. ft.	
	<b>BotaniGard® ES and 22WP (Mycotrol® ESO and WPO – organic formulation) **</b> Controls: whiteflies, aphids, thrips, etc.	Whiteflies, Aphids, Mealybugs: ½ to 1 qt (lb)/ 100 gal. Thrips: 1 to 2 qt (lb)/ 100 gal. Other labeled insects: ½ to 2 qt (lb)/ 100 gal.	
	At first sign of insects (egg hatch or small larval instars) apply BotaniGard ES or WP at 3 to 10 day intervals. If pest pressure is high, combine initial applications with a contact insecticide or IGR and follow with another BotaniGard spray in 3 to 5 days and make at least 2 applications at this interval. Continue with applications, including recommended tank mixes, at the longer interval indicated above. Can be tank mixed or alternated with Molt-X.		
	<b>SuffOil-X®**</b> Controls: mites, whiteflies, aphids, etc. Follow all precautions and recommendations for applying horticultural oils.		1 to 2 gal/100 gal.
	<b>Molt-X®**</b> Controls both foliar and soil borne pests Combine or rotate with BotaniGard for an effective control strategy. Maintain pH of diluted mixture at between pH 5.5 - 6.5.	8 to 10 oz/100 gal.	

\*\*Use caution when making applications to open blooms, especially on varieties known to be sensitive. It is recommended that a small group of plants be tested for effects on open blooms before making applications to the whole crop.

Always read and follow label directions. Refer to product labels for complete application details. Additional technical information is available on our website ([bioworksinc.com](http://bioworksinc.com)) or from your BioWorks Biological Solutions Advisor.