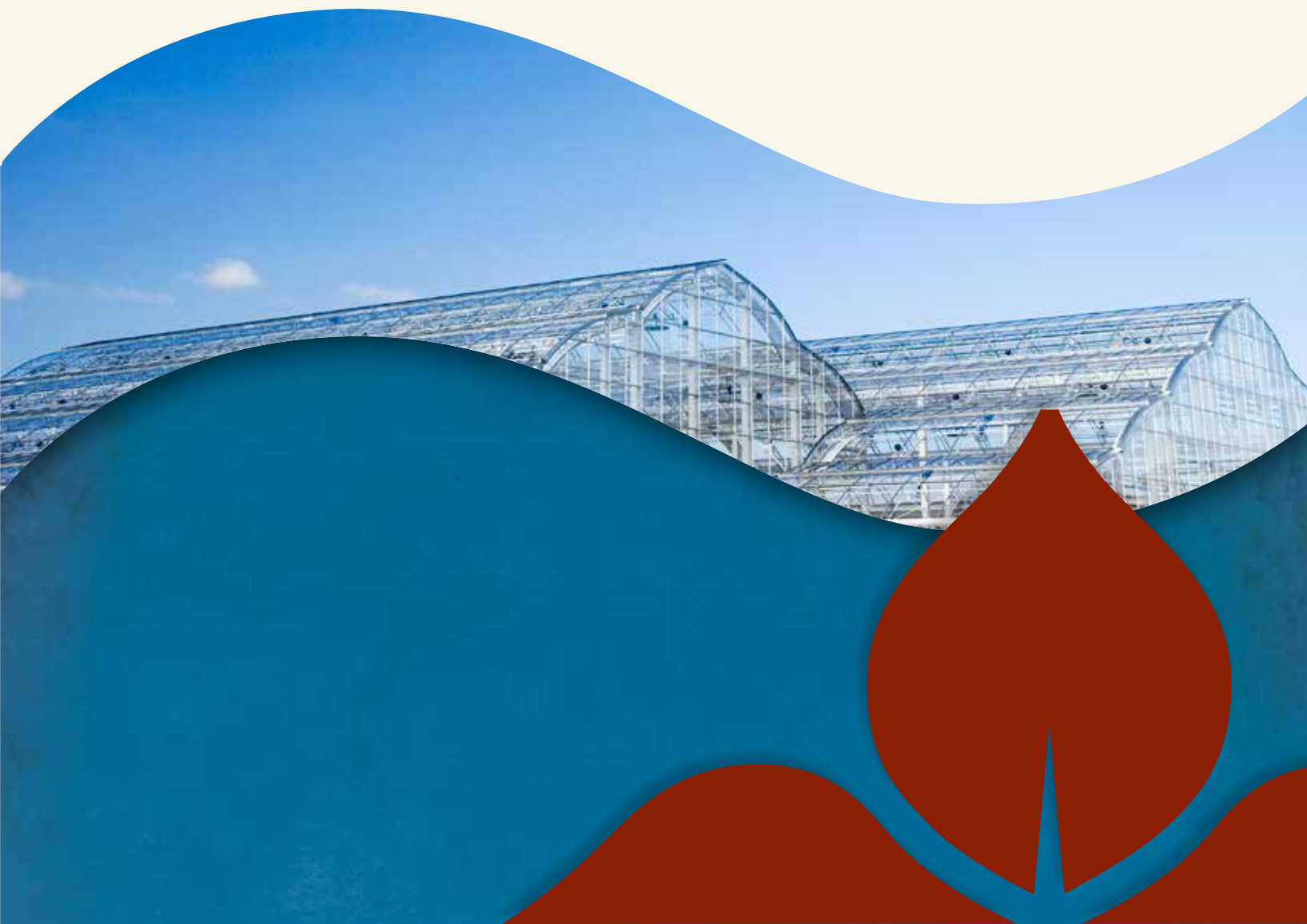




# GREENHOUSE & NURSERY

CLEANING & SANITATION | WATER TREATMENT | CROP PROTECTION

## RATES AND USAGE GUIDE





## ABOUT BIOSAFE SYSTEMS

BioSafe Systems, a family-owned manufacturer of biodegradable pest control products, began selling its flagship product ZeroTol to the horticulture industry in 1998. The company quickly expanded to the agricultural, industrial, and consumer markets with innovative pest control solutions, applications, and products. The mission of BioSafe Systems is to provide disease control solutions utilizing reduced risk chemistries that do not negatively impact the health and safety of people and the environment. The company is headquartered in Connecticut, but provides products and services throughout North and South America.

Communication, training, and product support are essential components in all pest management programs. BioSafe Systems offers many support programs and resources to help keep growers educated about running a clean, pest free growing facility all while using effective, sustainable chemistries.

BioSafe Systems takes pride in prompt and effective customer service. Call BioSafe Systems' toll-free number, 1.888.273.3088, and speak with a live representative who will answer questions and offer expertise. There are also over a dozen technical service managers throughout the country who are available for in-person meetings.

"BIOSAFE SYSTEMS IS PROUD TO STAND BY OUR MOTTO: **SIMPLY SUSTAINABLE, ALWAYS EFFECTIVE.** WE ARE CONSTANTLY LOOKING FOR INNOVATIVE SOLUTIONS FOR CROP PROTECTION AND DISEASE CONTROL."

– Rob Larose, BioSafe Systems

# SUSTAINABLE SOLUTIONS

## SUSTAINABLE SOLUTIONS FOR GREENHOUSE & NURSERY CROPS

For many years BioSafe Systems has been dedicated to providing chemistries to all facets of a greenhouse or nursery, from propagation to finished production. This philosophy centers around our mission to provide comprehensive horticultural solutions for plant health and quality.

BioSafe Systems' Horticultural Solutions include:

- Cleaning & Sanitation Solutions [PAGES 3–6](#)
- Water Treatment Solutions [PAGES 7–8](#)
- Crop Protection Solutions [PAGES 9–14](#)



### AXXE®

An organic weed control safe to use in all areas of a greenhouse and nurseries both inside and outside.



### ZeroTol® 2.0

A broad spectrum bactericide/fungicide that is essential to your disease control program.



### GreenClean® Acid Cleaner

Removes greenhouse whitewash coatings, biofilm, inorganic deposits, calcium, and other hard mineral deposits.



### TerraClean® 5.0

Controls a wide variety of soil borne pathogens such as: Pythium, Phytophthora, Rhizoctonia, Verticillium, and Fusarium.



### GreenClean® PRO

Controls and prevents algae, moss, slime molds, bacteria, fungi, and other microorganisms. For use on hard surfaces and greenhouse irrigation ponds.



### OxiPhos®

Works systemically and on contact to prevent & control Pythium, Phytophthora, mildews, and bacterial blights.



### SaniDate® 12.0

A microbiocide formulated for all types of irrigation systems. Can also be used as a disinfectant and algaecide on all hard surfaces.



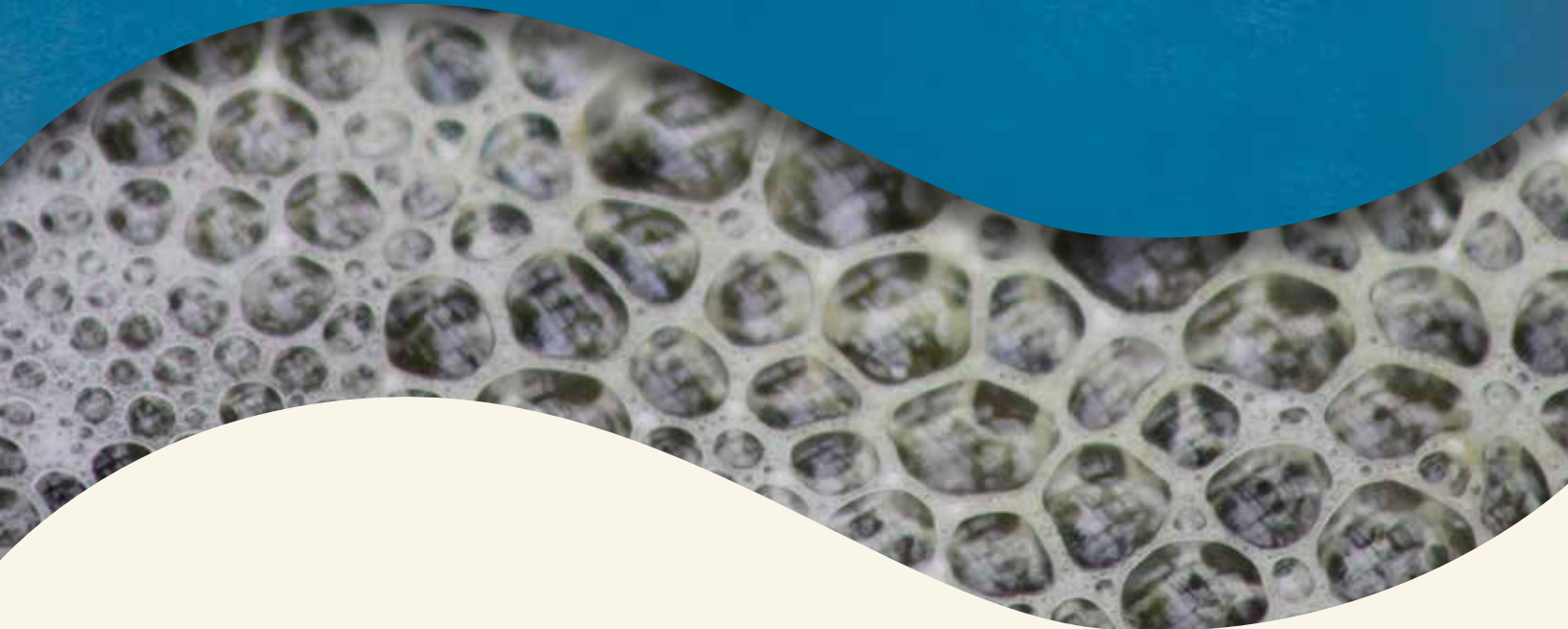
### AzaGuard®

Azadirachtin-based insecticide effective on more than 300 species of insects, including aphids, whiteflies, and thrips.

# BiSafe Systems LLC

## CLEANING & SANITATION SOLUTIONS

BioSafe Systems' cleaning and sanitizing products are designed to help growers keep their facilities maintained all year round. Proper cleaning of surfaces will allow a more effective use of control products such as algaecides, disinfectants, and sanitizers, providing complete sanitation solutions.



"GREENCLEANPRO NOT ONLY KILLS ALGAE ON CONTACT, BUT IT GIVES US UP TO 3 MONTHS OF EFFECTIVE ALGAE CONTROL ON OUR CONCRETE WALKWAYS AND UNDER BENCHES."

– *Tim Hodges, Olivehill Greenhouses*

## WEED CONTROL

### AXXE® Broad Spectrum Herbicide Application Rates

Final Spray Volume (Gallons)	Amount of AXXE Broad Spectrum Herbicide for Percent		
	6% LOW	10% MEDIUM	15% HIGH
1	8 fl. oz.	13 fl. oz.	1.2 pt.
2	1.0 pt.	1.3 pt.	2.4 pt.
5	2.5 pt.	4.0 pt.	6.0 pt.
10	5.0 pt.	1.0 gal.	1.5 gals.
20	1.3 gals.	2.0 gals.	3.0 gals.

Height of Plants to be Controlled	Spray Solution
1 inch or less	6 to 8%
1 to 3 inches	8 to 10%
Above 3 inches	10 to 13%

### AXXE® Broad Spectrum Herbicide Tank Mixing Rates

Final Spray Volume (Gallons)	Amount of AXXE Broad Spectrum Herbicide for Percent			
	1%	2%	3%	4%
1	1.25 fl. oz.	2.5 fl. oz.	3.75 fl. oz.	5.0 fl. oz.
2	2.5 fl. oz.	5.0 fl. oz.	7.50 fl. oz.	10.0 fl. oz.
5	6.25 fl. oz.	12.5 fl. oz.	18.5 fl. oz.	25.0 fl. oz.
10	12.5 fl. oz.	25.0 fl. oz.	37.5 fl. oz.	50.0 fl. oz.
20	25.0 fl. oz.	50.0 fl. oz.	75.0 fl. oz.	100.0 fl. oz.

## SURFACES & EQUIPMENT CLEANING

### GreenClean® Acid Cleaner Application Rates

Use	Application Rate	Solution Per 1,000 sq. ft.	Directions
Light to Heavy Cleaning	Up to 15 fl. oz./1 gallon of water	3–5 gallons	Spray, Mop, or Brush

**NOTE** Any contact of GreenClean Acid Cleaner to plants may cause injury

## ALGAE CONTROL: WALKWAYS & UNDER BENCHES

### GreenClean®PRO Granular Application Rates

Use	Lbs. Per 1,000 sq. ft.	Directions
Light Algae Growth	0.5–1.0	Make applications over a wet surface or activate with water immediately following application.
Heavy Algae Growth	1.0–2.0	

**NOTE** For best results, do not over dilute granules

## LINE CLEANING: MINERAL DEPOSIT REMOVAL

### GreenClean® Acid Cleaner Application Rates

Use	Direct Injection	Directions
Irrigation Line Cleaning	1:50	Let solution sit for 1 hour, thoroughly flush with water to remove any residual cleaner.

**NOTE** This is an in between crop application

## LINE CLEANING: ALGAE/BIOFILM

### ZeroTol® 2.0 for Small Systems Application Rates

Application	Direct Injection	Fl. Oz. Per 1,000 Gallons	Frequency of Application	Directions
Irrigation Line Sanitation	1:100	1,280	In between crops or as needed	Allow solution to remain in lines for 12–48 hours. Flush by opening valves or laterals.
	1:1,000	128	Continuous 1–2 weeks	Once control is achieved follow water treatment instructions for ZeroTol 2.0 on page 8.

## SaniDate® 12.0 for Large Systems Application Rates

Application	Direct Injection	Fl. Oz. Per 1,000 Gallons	Frequency of Application	Directions
Irrigation Line Sanitation	1:3,000 – 1:600	42.67–213.33	In between or as needed	Allow solution to remain in lines for 12–24 hours. Flush by opening valves or laterals.
	1:8,000 – 1:5,000	16–25.6	Continuous 1–2 weeks	Once control is achieved follow water treatment instructions.

## SURFACES & EQUIPMENT SANITATION

### SaniDate® 12.0 for Hard Surface Application Rates

Application	Dilution Rate	Fl. Oz. Per Gallon of Water	Directions
Pre-cleaned, Non-porous Surfaces	1:1,000 – 1:600	0.13–0.21	Thoroughly wet all surfaces with a mop, sponge, power sprayer, or fogger.

## GENERAL SANITATION

### ZeroTol® 2.0 Application Rates

Application	Dilution Rate	Fl. Oz. Per Gallon of Water	Frequency of Application	Directions
Pre-cleaned Tools, Pots, Trays: Dip Tank	1:300	0.5	As needed	Allow 10 minutes exposure to solution. Check proper dilution with test strips. Spray over top of surface. Cover all surfaces.
Uncleaned Tools, Pots, Trays: Spray	1:50	2.5	As needed	
Structures	1:300	0.5	As needed	Volume of treatment solution: 2.5 gallons per 1,000 sq. ft.
Concrete Walks, Gravel/Dirt Walks, Floors, & Under Benches	1:50	2.5	As needed	Volume of treatment solution: 3–5 gallons per 1,000 sq. ft.
Capillary Mats	1:500	0.25	As needed	Power wash mats to clean off organic matter before spraying. Bi-weekly = 1:500
Evaporative Pads	1:100	1.28	As needed	To clean, spray pads at 1:100. To keep pads clean, treat recirculating water weekly at 1:500.
Foot Mats	1:200	0.75	Daily	Fill BioMat and refresh daily or as needed.

# BiSafe Systems LLC

## WATER TREATMENT SOLUTIONS

Irrigation water treatment is a critical component in our horticultural crop protection program. BioSafe Systems offers practical, cost-effective solutions for all irrigation water treatment, including the necessary injection pumps. BioSafe Systems' water treatment products work on contact to kill algae, bacteria, and fungi. They are powerful and stable chemistries that break down into water and oxygen resulting in no interruptions and leaving no harmful residues, protecting horticulture water sources.



"SINCE WE'VE STARTED USING SANIDATE 12.0, THE EMITTERS DON'T CLOG, OUR FLOORS ARE CLEANER, AND DISEASE OCCURRENCES HAPPEN FAR LESS THAN THEY USED TO."

– Tony Carter, Langridge Plants



## IRRIGATION PONDS

### GreenClean®PRO Application Rates

Pest Type	Lbs. Per Surface Acre	Directions
Algae	100–400	Broadcast granules over water where algae is present using a hand spreader, or gran-blow device. Spot treat as needed.
Bacteria		
Fungi		

**NOTE** For best results break up algae mats prior to application

### GreenClean® Liquid 2.0 Application Rates

Algae Type	Gallons Per Acre-Foot	Directions
Planktonic	1–5	Spray evenly over surface making contact with algae.
Filamentous	5–10	Dilute at a rate up to 1:5 for spray applications.

**NOTE** For best results on thick algae mats, use a non-ionic penetrator/surfactant or break the mats manually to allow for solution penetration

## IRRIGATION WATERS



BioSafe Systems offers water testing services. For more information call 888.273.3088 (toll-free).

### ZeroTol® 2.0 for Small Systems Application Rates

Application	Direct Injection	Oz. Per 1,000 Gallons	Frequency of Application	Directions
Irrigation Water Sanitation	1:10,000 – 1:1,000	12.8–128	Continual or Periodic	Rates will vary with the amount of biological loading and algae in the water. A water test and ZeroTol 2.0 test kit are suggested.

### SaniDate® 12.0 for Large Systems Application Rates

Application	Direct Injection	Oz. Per 1,000 Gallons	Frequency of Application	Directions
Irrigation Water Sanitation	1:50,000 – 1:5,000	2.56–25.6	Continual or Periodic	On recycled or contaminated water use suggested rate and/or submit water sample to BioSafe Systems to determine proper rate.

# BioSafe Systems LLC

## CROP PROTECTION SOLUTIONS

BioSafe Systems' line of crop protection products utilize reduced risk chemistries to help provide curative and preventative treatments for a wide variety of crops. The unique activated peroxygen chemistries and innovative formulations provide growers with powerful and effective plant protection tools. With BioSafe Systems' EPA Registered and OMRI Listed products, growers can increase plant health using a sustainable approach.



"WE GROW POINSETTIAS, ANNUALS, EASTER LILIES, AND HYDRANGEAS AND I AM ESPECIALLY HAPPY WITH SANIDATE 12.0 AND ZEROTOL 2.0 FOR BACTERIAL LEAF SPOT PREVENTION ON OUR POINSETTIAS."

– Robert Albritton, Albritton's Nursery

# PROPAGATION

## ZeroTol® 2.0 Mist Propagation Application Rates

Application	Dilution Rate	Oz. Per 1,000 Gallons	Frequency of Application	Directions
Week 1	1:1,000	128	1–3 applications per week until growing media is turgid	Direct inject
Week 2	1:5,000 – 1:3,000	25.6–42.67	With each misting	

## ZeroTol® 2.0 Boom Propagation Application Rates

Application	Dilution Rate	Oz. Per 1,000 Gallons	Frequency of Application	Directions
Option 1	1:400	320	1–2 times a week	As a rinse on final 1–2 full passes.
Option 2	1:5,000 – 1:3,000	25.6–42.67	Continuous	Direct inject

## ZeroTol® 2.0 Foliar Spray Application Rates

Application	Dilution Rate	Oz. Per Gallon of Water	Frequency of Application	Directions
Potted Crops, Bedding Plants, Nursery Crops: <b>First Sign/Symptom</b>	1:100	1.28	1–3 applications per week	Wet thoroughly
Potted Crops, Bedding Plants, Nursery Crops: <b>Preventative</b>	1:400	0.32	Weekly	
Plugs	1:400	0.32	Weekly	Spray prior to algae forming
Cuttings	1:400	0.32	Weekly	Spray at first sticking
Cut Flowers	1:500	0.25	Prior to storage	Spray stems and foliage

**NOTE** See ZeroTol 2.0 tank mix sheet for compatible chemistries and instructions

## ZeroTol® 2.0 Foliar Spray Application Rates for Sensitive Plants:

*Poinsettias, Begonias, Bromeliads, Petunias, Orchids*

Application	Dilution Rate	Oz. Per Gallon of Water	Frequency of Application	Directions
First Sign/Symptom	1:300	0.43	1–3 applications per week	Wet thoroughly
Preventative	1:500	0.25	Weekly	

## ZeroTol® 2.0 Drench Application Rates

Application	Dilution Rate	Oz. Per Gallon of Water	Frequency of Application	Directions
First Sign/Symptom	1:100	1.28	1–3 consecutive applications	1–2 pints per sq. ft.
Preventative	1:300	0.43	Weekly	Wet to saturation

## SOIL BORNE PATHOGENS

## TerraClean® 5.0 Application Rates

Application	Gallons Per Acre	Directions
Drip Irrigation	1–2	<p>Inject TerraClean 5.0 towards the end of the drip irrigation cycle using a properly calibrated venturi system or metering pump. Ensure all the materials coming in contact with TerraClean 5.0 are compatible.</p> <p>Do not apply any additional water after product injection for at least 1-2 hrs.</p> <p>For best results, make first application of TerraClean 5.0 immediately after seeding/transplanting and repeat applications once every 7-14 days.</p>

**NOTE** Ensure the soil section to be treated is sufficiently wet before injecting TerraClean 5.0

## CONTACT & SYSTEMIC DISEASE CONTROL

## OxiPhos® Application Rates: Ornamentals

Disease	Application Method	Dilution Rate	Application Rate	Directions
Downy Mildew	Foliar Spray	1:300	42.3 fl. oz./100 gallons of water; apply 30–100 gallons of spray solution/treated acre	Apply at first sign of disease and repeat as needed at 7–14 day intervals. Ensure thorough wetness of all foliage.

## OxiPhos® Application Rates: Ornamentals

Disease	Application Method	Dilution Rate	Application Rate	Directions
Bacterial Blight	Foliar Spray	1:300	42.3 fl. oz./100 gallons of water; apply 30–100 gallons of spray solution per treated acre	Apply at first sign of disease and repeat as needed at 7–14 day intervals. Ensure thorough wetness of all foliage.
Phytophthora	Soil Drench	1:3,000	4.23 fl. oz./100 gallons of water	Apply 25 gallons of finished solution to an area of 100 sq. ft. Limit one application per month.
Pythium	Transplant Dip	1:500	25.6 fl. oz./100 gallons of water	Dip the transplant for two minutes immediately before transplanting. Ensure root mass is thoroughly wet.

## OxiPhos® Application Rates: Bedding Plants

Disease	Application Method	Dilution Rate	Application Rate	Directions
Downy Mildew	Foliar Spray	1:300	42.3 fl. oz./100 gallons of water; apply 30–100 gallons of spray solution per treated acre	Apply at first sign of disease and repeat as needed at 7–14 day intervals. Ensure thorough wetness of all foliage.
Pythium	Foliar Spray	1:300	42.3 fl. oz./100 gallons of water; apply 30–100 gallons of spray solution per treated acre	
Phytophthora	Soil Drench	1:3,000	4.23 fl. oz./100 gallons of water	Apply 25 gallons of finished solution to an area of 100 sq. ft. Limit one application per month.

## OxiPhos® Application Rates: Conifers

Disease	Application Method	Dilution Rate	Application Rate	Directions
Phytophthora Root Rot	Foliar Spray	1:300	42.3 fl. oz./100 gallons of water; apply 30–100 gallons of spray solution per treated acre	Apply at first sign of disease and repeat as needed at 14–21 day intervals. Ensure thorough wetness of all foliage.
	Soil Drench	1:1,000	12.8 fl. oz./100 gallons of water	Apply 1 gallon of finished solution to an area of 4 sq. ft. Limit one application per month.
	Transplant Dip	1:500	25.6 fl. oz./100 gallons of water	Immediately before transplanting, drip the transplant for two minutes. Ensure root mass is thoroughly wet.

## LIVERWORT CONTROL

### TerraCyte®PRO Application Rates: Spray Applications

Curative Rate	Preventative Rate	Directions
0.5 lb./gallon of water	0.25 lb./gallon of water	Spray thoroughly. Keep spray away from flowers. Repeat as needed.
	0.13 lb./gallon of water	

### TerraCyte®PRO Application Rates: Granular Application

Curative Rate	Preventative Rate	Directions
8–10 lbs./1,000 sq. ft.	4–5 lbs./1,000 sq. ft.	Apply granules with spreader. Ensure contact with Liverwort. Activate with 0.1–0.2 inches of water. Wash granules off foliage to prevent contact burn.

**NOTE** Check varietal response by spot treating prior to large scale use

**Not currently available in CA**

## INSECT CONTROL

### AzaGuard® Application Rates: Foliar Application

Treatment	Fl. Oz. Per 40,000 sq. ft.	Frequency of Application	Directions
Curative	16	Weekly	Spray when pests first appear and repeat at 7 day intervals until pest pressure subsides.
Preventative	8		Repeat every 5–7 days.

**NOTE** Use 50–100 gallons of solution/40,000 sq. ft. See label for full use instructions

### AzaGuard® Application Rates: Drench Application

Treatment	Rate	Oz. Per 10 Gallons	Directions
Curative	0.15%	1.92	Make 3–5 applications at 7 day intervals. Thoroughly wet the soil, do not cause surface runoff or excessive drip from pots.
	0.20%	2.56	
	0.30%	3.84	

**NOTE** Use 1–2 pints of solution per sq. ft.

## AzaGuard® Application Rates: Tree Injection

Fl. Oz. Per Inch Tree Trunk Diameter	Frequency of Application	Directions
0.30–0.75	As needed	<p>Measure tree diameter in inches at breast height (DBH) which is approximately 4.0-5.0 feet from the ground. If measuring the circumference of the tree, divide circumference by 3 to get DBH.</p> <p>If the product is too viscous to inject directly, dilute with small amount of water before injection.</p> <p>For more details on product injection, please refer to the label.</p>

**NOTE** See AzaGuard label for full list of insects and applications



"I LIKE ZEROTOL 2.0 TANK MIXED IN MY SPRAY ROTATION. IT HELPS OUT WITH DISEASE PROTECTION ON MY CROPS, PLUS IT HAS 0 HOUR REI."

– *Oliver, Flowerwood Nursery*

"I LIKE ZEROTOL 2.0 IN PROPAGATION, STERILIZATION, CROP PROTECTION, AND CLEANING LINERS. I ALSO USE IT FOR DIPPING CUTTINGS AND SPRAYING ROSES ONCE A WEEK FOR MILDEW CONTROL AND FOR BACTERIAL BLIGHT ON INDIAN HAWTHORN."

– *Juan Garcia, Country Pines*

## ZEROTOL 2.0: DIRECT INJECTION STOCK TANK MIXING

Final Dilution Ratio Desired										
Injector Rate Setting	1:100	1:200	1:300	1:400	1:500	1:1,000	1:2,000	1:3,000	1:5,000	1:10,000
1:15	19.2	9.6	6.4	4.8	3.8	1.9	1.0	0.6	0.4	0.2
1:50	64.0	32.0	21.4	16.0	12.8	6.4	3.0	2.1	1.3	0.6
1:100	<b>ZeroTol*</b>	64.0	42.7	32.0	25.6	12.8	6.4	4.3	2.6	1.2
1:200	N/A	<b>ZeroTol*</b>	85.4	64.0	51.2	25.6	12.8	8.5	5.1	2.5
1:300	N/A	N/A	<b>ZeroTol*</b>	96.0	76.8	38.4	19.2	12.8	7.7	3.8
1:500	N/A	N/A	N/A	N/A	<b>ZeroTol*</b>	64.0	32.0	21.3	12.8	6.4
1:1,000	N/A	N/A	N/A	N/A	N/A	<b>ZeroTol*</b>	64.0	42.7	25.6	12.8
1:2,000	N/A	N/A	N/A	N/A	N/A	N/A	<b>ZeroTol*</b>	85.3	51.2	25.6
1:4,000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	102.4	51.2
1:5,000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	<b>ZeroTol*</b>	64.0

### DIRECTIONS:

1. Select desired dilution ratio column (i.e. Mist Propagation 1:1,000).
2. Select injector rate setting row.
3. Read across injector rate setting row to final dilution ratio desired column.
4. Add ZeroTol 2.0 to stock tank at rate given in ounces per gallon of finished stock solution.

\* ZeroTol 2.0 denotes no stock tank mixing necessary. Inject directly from the ZeroTol 2.0 container.

### CORRECT MIXING PROCEDURE:

Product amount plus water amount should equal one gallon. For example: 64 fl. oz. of ZeroTol 2.0 + 64 fl. oz. of water = 1 gallon of solution. **NOT:** 64 fl. oz. of ZeroTol 2.0 + 1 gallon of water = 1.5 gallons of solution.