

# GERANIUM TECHNICAL BULLETIN

**Phyton<sup>®</sup>**  
**27**  
BACTERICIDE & FUNGICIDE

***Savvy Growers Rely on Phyton-27<sup>®</sup>***



# Bacterial Diseases:

## Xanthomonas & Pseudomonas

Successful, practical control is possible using a comprehensive risk management program which includes:

- Strict sanitation procedures
- Roguing of symptomatic plants
- Isolation of highly infected varieties or groups of plants
- Aggressive spraying with Phyton-27®

Walk the crop at least once a week. Look for anything suspicious or wilting and remove those plants from the growing area immediately. In the process of handling plants, be careful not to become a vector of the bacteria. Wash hands, or change or disinfect gloves, immediately after handling each suspect plant before touching another plant.

**When disease is visible**, remove all visibly diseased plants being careful not to spread the disease with your hands during the process. When practical, isolate particular varieties or groups of plants that are showing more symptoms than others. Apply a wet foliar spray of Phyton-27® at the rate of 5.0 fluid ounces per 10 gallons, every 3 to 5 days. On ivy geraniums, stay at or below the rate of 3.5 fluid ounces per 10 gallons water to avoid risk of phytotoxicity. Monitor plants between applications and remove any yellowed or disease damaged plants as soon as they are observed. Continue roguing and spraying at the high rate until no disease symptoms appear after spray application. Two or three applications should do it.

**To prevent bacterial diseases**, apply 1.5 fluid ounces of Phyton-27® per 10 gallons every 10 to 14 days.

### Preventive But Not Eradicative

Phyton-27® protects healthy plants from plant-to-plant spread of Xanthomonas with the added benefit of "marking" infected plants before they show symptoms. It does not totally eradicate or disinfect the bacteria.

### Yellowing effect

After spraying at the higher rates, some growers noticed patchy, chlorotic, yellowed areas which were unevenly distributed across the benches. These yellowed areas were believed to be the centers of disease infection.

Trials investigating this yellowing as a possible early indicator of bacterial infection were completed in 1995 at The Ohio State University by Dr. Steve Nameth. Within 5 days of spraying, the leaves of infected plants showed a bright yellowing. The entire plant turned bright yellow, while most of the veins remained green. Classic symptoms were expressed on inoculated plants that were sprayed and yellowed and on inoculated plants that were not sprayed. These symptoms did not show until more than a week after the yellowing appeared on the infected, sprayed geraniums.

In lab tests, the yellowed foliage consistently tested positive for the presence of Xanthomonas. Absence of yellowing is not a reliable indicator that the crop has no risk of disease outbreak.

Geranium stock plant growers observed the yellowing effect after spraying young, rapidly growing plants with Phyton-27® during the hot summer months. This yellowing phenomenon has not been reported in mature stock plants during the autumn and winter months.

### Sanitation & Cultural Practices

Disinfect all greenhouse benches that held geraniums the past season along with any equipment used to transport, hold or work with geraniums. Sterilize planting containers, cutting knives, and associated greenhouse implements. Use clean growing medium.

Limit access to geranium growing areas. Wear disposable gloves, overboots and laboratory coats when working in restricted areas. Place foot baths or mats soaked with a disinfectant, at each doorway and refresh them frequently.

Use cuttings derived from culture-indexed plants. Inspect plants from other sources before allowing them in your greenhouse. Avoid overhead watering. Space plants to avoid plant to plant contact and reduce splashing water from plant to plant.

### Ancillary Matters

#### Safety on blooms

Reports vary as to what rates are safe to apply on open blooms. It appears that between 3.0 to 3.5 fluid ounces per 10 gallons is the rate where damage may occur on open blooms. It may be varietal related with the blooms on some varieties being more sensitive to Phyton-27® than blooms on other varieties.

### Alternate hosts

*Xanthomonas campestris* pv. *pelargonii* is known to attack only pelargonium species. Research done at the University of Minnesota by Drs. Kennedy and Pflieger, showed some evidence that other bedding plant crops may support the bacterial inoculum for a limited time. It is unlikely that other species are important in disseminating *X. campestris* pv. *pelargonii* within the greenhouse industry.

Regal and perennial geraniums can be infected by *X. campestris* pv. *pelargonii*. These species will exhibit leaf spotting symptoms, but not wilting. Aromatic geraniums may act as carriers for the disease, but will not express any symptoms. The bacteria can be transmitted from these species to geraniums susceptible to bacterial wilt.

### Disease transmission

Bacteria are most commonly carried over in infected cuttings, home grown varieties maintained and propagated from year to year, and asymptomatic carriers such as aromatic geraniums. Contaminated cutting knives, tools, or hands are also efficient means of bacterial transmission. Bacteria can readily spread between pots of closely spaced geraniums through overhead watering, splashing of water between plants, and plant to plant contact. *Xanthomonas* is not known to be seed borne.

## Fungal Diseases: Botrytis & Rust

**To prevent Botrytis**, apply 1.5 fluid ounces Phyton-27® per 10 gallons water, every 10 to 14 days. Apply during any time of the crop cycle, even when blooms are open. Hydraulic and low volume equipment may be used.

**When Botrytis is present**, apply 2.0 fluid ounces per 10 gallons water every 5 to 7 days. Under severe disease pressure the spray interval can be shortened to every 3 days.

### Rust

Geranium rust occurs sporadically in the U.S, but in recent years has reached epidemic proportions. Rust spores are spread by splashing water, air currents, workers handling plants and moving infected plants including cuttings coming in from offshore in areas where rust is endemic.

**To prevent rust**, apply 1.5 to 2.0 fluid ounces Phyton-27® per 10 gallons water, every 10 to 14 days. Spray or dip cuttings to stop rust spores from germinating. Apply during any time of the crop cycle, even when blooms are open.

**When rust is present**, rogue infected plants, then apply 2.5 to 5.0 fluid ounces of Phyton-27® per 10 gallons water. Under severe disease pressure the spray interval can be shortened to every 3 days. A rotation with fungicides with different chemistries or modes of action may provide optimal control and extend the efficacy of Phyton-27® and the alternative products.

Phyton-27® is a great tool for cleaning up incoming cuttings by inhibiting germination of rust spores that may have escaped detection by the propagator/supplier.

## Partner in Propagation

Regular applications of Phyton-27® clean up stock plants on contact and keep them clean.

**Stock Plants** - Spray stock plants a few days before taking cuttings to allow systemic uptake.

**Cuttings** - Treat cuttings, your own or cuttings shipped in, by dipping for a few seconds before sticking or spray the stuck cuttings a few days after transplant.

## Application Guidelines

For foliar applications, spray for thorough coverage; for soil drench applications, saturate growing media thoroughly.

Adjust rates and re-spray intervals according to susceptibility of plant variety and adversity of environmental conditions. In the event of heavy disease pressure, intervals can be shortened to 3-5 days.

Lower rates may be as effective as higher rates and should be tried first.

Routine preventive programs may be maintained at the lower rates.

Open flowers can be sprayed without damage, but should be trialed first. Older or diseased blooms are likely to be desiccated.

Use of low volume equipment is effective against Botrytis but may not be effective against established Powdery Mildew and bacterial infections.

Adjust the pH of the spray, drench or dip solution to 5.5 to 6.5 for optimal plant safety and efficacy.

For additional information, please contact Phyton Corporation's Technical Service at 1-800-356-8733 or [info@phytoncorp.com](mailto:info@phytoncorp.com)

Read and follow all label directions.

For technical information, contact the manufacturer:

**Phyton Corporation - Manufacturer of Phyton 27®**,

7449 Cahill Rd., Edina, MN 55439 USA

952-944-9779 Fx: 952-944-7755

Toll-free: 1-800-356-8733 [www.phytoncorp.com](http://www.phytoncorp.com)

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California residents should consult the current California Phyton-27® label for registered uses.



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