Phyton 27®
BACTERICIDE & FUNGICIDE

SPRAY & DRENCH APPLICATIONS FOR TREES

January 2005

Phyton-27® is a fully systemic bactericide and fungicide labeled for a wide variety of ornamental plants, nursery crops and trees. Its unique composition goes beyond the traditional disease control of copper-based products without the traditional side effects. Phyton-27® works within the plant to provide integral disease control and often enhances overall plant health and vitality. Spray and drench applications can be useful throughout the growing cycle, from seedlings in the nursery to mature trees in the landscape.

Fire Blight

Fire blight is caused by the bacterium *Erwinia amylovora.* This bacterium can attack more than 75 species of trees and shrubs including members of the rosaceae family such as: Cotoneaster, Malus, Mountain Ash, Ornamental Crabapple, Ornamental Pear, Photina, Pyracantha and Raphiolepis.

The *Erwinia* bacterium overwinters on infected plants in cankers. In the spring, the bacteria are dispersed by rain, wind, insects and animals. Symptoms include blight of blossoms, fruitlets, spurs, and leafy shoots and the formation of cankers that cause dieback of twigs and branches. Results from Cornell University show excellent control with Phyton-27® of shoot and blossom blight on apples.

When to Act - The preferred season for spray treatment is from bud-swell until a few weeks after bloom. When fire blight is observed later in the growing season, it should be treated at that time. The disease is most active during warm periods in spring before the tree is fully active and again during warm periods in autumn when the tree is entering dormancy.

Prune infected branches and excise cankers - Bacterial diseases are readily spread on cutting tools so surface-sterilize tools between each cut, even cuts on the same tree. Dipping tools in 70% alcohol solution or 1 part bleach to 4 parts water is sufficient. Prune infected branches at least 12 inches (30.5 cm) beyond the area of infection. Cankers on the trunk can be excised with a pruning knife or other cutting tool by removing bark and infected tissue, as well as 12 inches (30.5 cm) of healthy tissue above and below the cankered area and 3 inches (7.6 cm) on either side (tree diameter permitting). The best time for pruning and canker excision is in late summer, fall, or winter. A perennial canker in the trunk or branches of the tree, or in a nearby tree, can provide inoculum for continued infection or reinfection.

Apply Phyton-27® to pruned and excised canker sites
Mix 2.5 teaspoons of Phyton-27® into 1 gallon of water (4 fluid ounces per 10 gallons). Spray the cut sites, trunk, and limbs to runoff. Adjust the amount of solution to the number and area of cuts as needed.

Spray the crown - Mix an amount of solution appropriate for the size of the tree to be sprayed, at the rate of 1.25 teaspoons of Phyton-27® in 1 gallon of water (2 fluid ounces per 10 gallons). The crown should be sprayed thoroughly. During post-peak bloom, spray with caution. Phyton-27® may destroy fading blossoms.

Cover wounds with Phytech®-50 Plant Wound Paste
This should be done last so that the Phyton-27® has time to soak in. Phytech®-50 is an all-natural material that enhances callus formation and wound closure.

Fertilization and Irrigation - Succulent new tissue is more susceptible to infection so forcing soft, fast growth may benefit the pathogen more than the tree. Unless nutritional deficiency is shown by soil or tissue testing, fertilization should not be necessary because of growth stimulation resulting from the tree's release from disease pressure. Focus post-treatment care on adequate irrigation.

Apple Scab

Apple Scab is caused by the fungus *Venturia inequalis*. The fungus attacks upper and lower surfaces of leaves, flower parts, fruit, and succulent twigs. The disease is most severe when humidity is high and temperature moderate during spring and early summer. Severely infected leaves and fruit fall prematurely. Most primary infections are initiated by airborne ascospores dispersed from previously diseased leaves on the ground.

Rate: 4.0 fluid ounces Phyton-27® per 10 gallons water.

For control of Apple Scab, rake leaves and debris from beneath the tree before spraying. Spray for thorough coverage, including the ground beneath the tree as well as the crown of the tree. Re-spray intervals vary with severity of disease and adversity of environmental conditions. The rate of 4.0 fluid ounces per 10 gallons water will damage blossoms, tender foliage and surrounding turf. Applications on actively growing tissue may be more effective than applications on dormant tissue.

The key to successful control of apple scab is the early and thorough application of Phyton-27® to protect new growth. The most critical period for apple scab development is the time from the breaking of the cluster buds until the leaves are fully expanded.

Cultural Control - The application of nitrogen (urea) to leaves in the fall will enhance the decomposition of fallen leaves. Reduce disease pressure by raking and disposing of leaves after they fall. If put in a compost pile, be sure leaves decompose completely.

Application Guidelines

- Spray for thorough coverage.
- Adjust rates and re-spray intervals according to susceptibility of plants and adversity of environ mental conditions.
- Applications on actively growing tissue may be more effective than applications on dormant tissue.

Verticillium *Japanese Maple*

Verticillium is a soilborne fungus which infects through the roots via wounds. Symptoms include curling, drying, or abnormal red or yellow color of leaves; defoliation; wilting; dieback; and death. Yellowing and defoliation often progress upwards. Infected sapwood may have dark streaks or bands that follow the grain.

Application: Apply 2.5 ounces Phyton-27® per 10 gallons water as a soil drench, around the tree out to the dripline. Water promptly and thoroughly to ensure that the Phyton-27® solution is reaching the roots. Apply 1.5 ounces Phyton-27® per 10 gallons water as a foliar spray on the tree. Three treatments are recommended during the growing season: spring, midsummer, and approximately two weeks before expected color in the fall.

If neighboring trees do not show symptoms but are growing in the same bed or area, preventive treatment should be undertaken promptly.

Post-Application: Trees infected with Verticillium often benefit from fertilization and regular watering to increase vigor. Pruning dead branches increases aesthetic value but may not affect the progression of the disease.

Xanthomonas *Cherry Laurel*

Xanthomonas sp. is the primary pathogen of shot-hole disease on common cherry laurel. Symptoms range from small reddish spots with yellow halos in which the center drops out as the spots age to larger, irregular, spots that are usually along the leaf margin. The disease is most severe under wet conditions of mid- to late-summer.

Application: Apply 2.0 to 3.5 fluid ounces Phyton-27® per 10 gallons water as a foliar spray. Repeat at weekly intervals if needed.

Diplodia *Conifers*

Diplodia tip blight is a fungal disease that can cause tip blight, resinous cankers, misshapen tops, death of cones, blight of seedlings, dieback, and sometimes death of entire trees. Many pines and several other conifers are reported hosts of *Diplodia*. Epidemics are promoted by wet spring weather favorable for spore production, dispersal, and infection.

Application: Apply 1.0 to 1.3 fluid ounces Phyton-27® per 10 gallons water. Make at least 2 applications about 10 days apart early in candling out or when disease appears.

Dothistroma *Pinus*

Dothistroma needle blight is a common disease on Austrian and ponderosa pine and occurs on at least 20 other species of pines. Symptoms include reddish-brown spots or bands on needles, needles with brown tips that remain green at the base and premature needle drop. Conidia are released during wet weather and dispersed by rainsplash any time during the growing season.

Application: Make two applications of 1.5 to 2.5 fluid ounces Phyton-27® per 10 gallons water as a foliar spray during the growing season. The first application should be made in mid-May (earlier in Western States) to protect needles from the previous season. A second application in mid-to late-June to protects newly developing current season needles. Where the disease is entrenched, use the high rate.

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Anthracnose *Azalea, Oak & Sycamore*

Azalea Anthracnose - Warm, moist conditions favor infection and spread of anthracnose on azalea. The *Colletotrichum azaleae* fungus causes leaf spotting and defoliation.

Oak Anthracnose - Frequent spring rainfall and moderate temperatures are conducive to outbreaks of oak anthracnose. Oak anthracnose usually subsides before midsummer, but succulent shoots may be affected any time during the season.

Sycamore Anthracnose - Sycamore anthracnose occurs in three phases: canker formation, shoot blight, and leaf blight. Cankers form during dormancy. Mild weather during host dormancy promotes fungal activity and lesion formation. Shoot blight tends to develop suddenly during or immediately after a period of cold spring weather. Leaf blight, resulting from direct infection of leaves, intensifies and spreads upwards during wet seasons, causing premature leaf drop.

Application: Apply 1.5 to 3.5 fluid ounces Phyton-27® per 10 gallons water as a foliar spray. For trunk injection applications, refer to the label for dosage rates and the Injection Application Guidelines.

Botrytis *All Trees & Nursery Crops*

Botrytis cinerea, a fungus, causes blight of flowers, leaves, and shoots. *Botrytis* can cause considerable damage during extended periods of wet weather. Propagation is a critical time for *Botrytis* management due to the presence of wounds on the stock plants and cuttings and free moisture from misting.

Application: For control of *Botrytis* on seedlings, during propagation, and on finished nursery stock, apply 1.3 to 2.5 fluid ounces Phyton-27® per 10 gallons water as a foliar spray for thorough coverage. During propagation, spray or fog stock plants 1 to 2 days prior to taking cuttings. Spray cuttings to drench 2 to 3 days after transplant. When cuttings or liners are shipped in, spray to drench 2 to 3 days after transplant.

Powdery Mildew *Crape Myrtle & Dogwood*

Powdery Mildew produces superficial mycelia and spores which appear "powdery" giving the disease its name. The disease is favored by dry weather with warm days and cool nights. Symptoms on Crape Myrtle include stunting and flower abortion on young shoots, development of reddish pigment beneath the white mycelial mat on infected leaves, and leaf and bud drop. Symptoms on Dogwood include some stunting of growth flushes, distortion of leaf size and shape, chlorosis, and early senescence of severely affected canopy.

Application: Apply 2.0 to 3.0 fluid ounces Phyton-27® per 10 gallons water as a foliar spray. Repeat at 10-day intervals if needed.

Pseudomonas *Japanese Maple & Lilac*

Pseudomonas causes leaf spots, blossom blight, shoot blight, and cankers and dieback on many plants. Factors that weaken or injure plants will predispose them to *Pseudomonas* infection. Bacterial blight of Lilac is characterized by death and shriveling of leaves, shoots, and sometimes flower clusters. Bacterial blight of Japanese Maple is characterized by leaf spot, vein blackening, and tip dieback. Mild, moist weather favors development of *Pseudomonas* bacterial blight.

Application: Apply 1.3 to 2.5 fluid ounces Phyton-27® per 10 gallons water as a foliar spray.

Cultural Control - Maintain adequate spacing and prune to provide good air circulation within the canopy. Prune out and burn all affected tissue as soon as noticed. Keep rain and frost off plants in the spring with plastic hoop houses or similar structures if possible.

Phytech®-50 Plant Wound Paste

Phytech®-50, composed of lanolin and waxes, promotes faster closure of plant wounds and shields the wound from pests with all-natural ingredients and a straw-colored appearance. The healing benefits of lanolin have been documented, but lanolin tends to melt off the applied site in heat or direct sunlight. Phytech®-50 includes the healing benefits of lanolin, while the waxes stay tight to the plant surface without drying out or trapping excess moisture, even in warm weather.

- Tree wounds
- Grafting
- Propagation or plant division

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Environmental Compatibility and Human Health Aspects

Arboreal spray applications by their very nature have more potential for environmental impact and health risks than do trunk injections. Therefore this brief review of the applicable environmental and toxicological traits of Phyton-27® is included as part of the information about spray applications.

Environmental Compatibility

The amount of copper needed to achieve anti-fungal efficacy is less than 10% of the amount needed for efficacy when using traditional fixed coppers. This reduces the potential for copper accumulation in the soil by 90%. The small amount of copper in Phyton-27® goes into the plant. Once a sprayed foliar surface has dried, the product does not wash off and cannot move into the environment. The amount of copper, which is applied and enters the foliage, is within copper micro-nutrient limits for plants. This is then reduced proportionately as the plants' biomass increases.

Risks of spray drift from aerial applications may be mitigated by the absence of volatile ingredients in the product. Cautions to avoid drift should nevertheless be taken. To assure safety for vegetation underlying the spray area, refer to the dosage rates prescribed by the label for numerous flowers and ornamentals.

Regarding incidental affects on insect life, makers of biological controls for greenhouse pests categorize Phyton-27® with the materials which are believed to be compatible with their living products. Studies have shown that copper products are not lethal to bees. Some tests, however, have shown that Phyton-27® can be lethal to insect and mite pests in the greenhouse.

Public waters must not be contaminated with this product. Clean equipment and dispose of containers and residual material in accordance with the EPA label directions. Although copper sulfate in traditional forms is used to kill undesirable aquatic life, fish toxicity tests done in Holland found Phyton-27® not lethal at concentrations higher than labeled rates.

Human Health Aspects

The Danger signal word is required on the Phyton-27® EPA label because tests show that when the undiluted Phyton-27® concentrate is held in prolonged contact with skin and eyes, permanent damage can be done. It is important to follow label directions when preparing and using Phyton-27®. Wearing glasses, rubber gloves and coveralls are part of those directions.

Regarding inhalation risks, no level of suspended concentration could be maintained sufficient to kill test animals. Respirators are not required when spraying.

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