

# Biological fungicide believed to be new foundation for disease control

By WANDA J. GARDNER & SANDRA E. KOWALLIS

Turfgrass managers have a new biological option for their integrated plant management programs following the federal Environmental Protection Agency's (EPA) approval of *Trichoderma harzianum*, the first biological turf fungicide.

Developed by a team of Cornell University researchers, a hybridized strain of *Trichoderma harzianum*, designated T-22, is the active ingredient in Wilbur-

Ellis Co.'s EPA-approved Bio-Trek 22G.

T-22 is a living organism that is dormant in dry granular form. Mixed with a carrier in appropriate particle size and density, it is formulated in several sizes and can be spread over turf using standard granular application equipment.

The product is applied at a fixed rate of 1.5 pounds per thousand square feet. Repeat applications can be 2 to 4 weeks later in soils with chemical residues

or poor growing conditions.

Upon application to turf, T-22 is designed to fall into the thatch layer where natural moisture is usually enough to activate the organisms. However, watering in ensures full activation.

The organisms progress down into the soil where they form a symbiotic relationship with the plants.

Aggressively colonizing the root surfaces, they grow as microscopic filaments about the consistency of a spider web and

produce spores so they can survive when they are not growing in vegetative plant form. The colony continues to involve all new root growth throughout the life of the plant, feeding on the various materials that exude from the plant roots.

The biological fungicide is designed to renew itself right where it is needed — on the root surface. When pathogens — such as *pythium*, *rhizoclonia solani*, *sclerotinia homeocarpa*, or *fusarium* — attempt to move in,

T-22 defends its home and food source. It extends branching structures to entwine the hypha of its competition, drills into the hypha, and secretes an enzyme to kill the pathogen, which then decomposes in the soil.

The T-22 organisms prefer neutral or slightly acidic soil. However, they will thrive in normal soil pH ranges suitable for turf, even in somewhat alkaline soil.

Because they are sensitive to soil temperature and grow faster above 50 degrees F., populations may decrease through winter.

By applying the biological fungicide to well-established turf as soils begin to warm and turf begins its seasonal growth, an established colony can be settled in to reduce the number of infection points and delay onset of disease.

When planting new turf or re-seeding, the granules are applied to the top 1-inch of soil. Organisms colonize new roots as soon as seeds sprout and form a shield against *pythium*, so tender plants put all their energy into growth.

Turf plots, some treated with T-22 and some without, were monitored by Cornell University scientists.

T-22-treated plots showed 20 percent less severity of *sclerotinia homeocarpa* after a 60-day period, and its early use avoided a 33-day delay in beginning treatment.

In similar tests, *pythium* levels measured in soil planted to bentgrass were significantly lower in the sample treated with T-22.

While the biological fungicide provides early defense against invading pathogens and, therefore, reduces appearance of surface symptoms, evidence of disease may eventually surface. At that point, chemical sprays should be applied.

However, usage will be reduced because of the early work of the biological fungicide.

Pathogens can develop chemical mechanisms to avoid toxicity of chemical products, requiring increased usage that can cause chemical build-up in soil. That is not the case with the biological fungicide, which has no side effects.

In a wide variety of conditions, this product passed all the EPA-required tests for toxicity, pathogenicity, and effects on wildlife and the environment, posing no threat to humans, plant life, animals, or ground water.

Consequently, the EPA exempted T-22 from the requirement for residue tolerances, even on food crops. However, proper handling procedures must be followed, such as avoiding inhalation of dust during application.

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