

## Biocontrol of *Botrytis*

*Botrytis cinerea* is one of the most ubiquitous and damaging fungal pathogens in the world, and is a major pest in both container and bareroot nurseries. Because high humidity is such a major predisposing factor, the fungus is particularly destructive in greenhouse nurseries. *Botrytis* can cause damping-off, but it is most damaging as a foliar blight called grey mold, which quickly develops into branch and stem cankers, and can eventually kill the host seedling. Because this fungus thrives at unusually low temperatures, *Botrytis* develops into a devastating storage mold if infected seedlings are not culled during the grading process.

Both chemical and cultural controls are effective against *Botrytis*, especially when incorporated into an IPM program. Aggressive scouting for early detection, followed by roguing of infected seedlings, and careful management of irrigation and ventilation is recommended. A wide variety of fungicides have been used against *Botrytis*, but the fungus has developed resistance to several of the more commonly-used products (Figure 7).

New research, however, has produced several biocontrol agents which show promise against both *Botrytis* foliar blight and storage mold. Greygold™ is a biocontrol for grey mold that is currently undergoing EPA registration, and should be commercially available by this fall. The product is a mixture of three beneficial microorganisms: a filamentous fungus (*Trichoderma hamatum*), a yeast fungus (*Rhodotorula glutinis*), and a bacterium (*Bacillus megaterium*). Greygold™ attacks *Botrytis* in several different ways: 1) with the production of antibiotics that suppress spore germination and growth, 2) by physical competition which reduces sites for *Botrytis* colonization, and 3) by direct parasitism of *Botrytis* mycelia and sclerotia. While it is most effective as a preventative treatment, Greygold™ has also worked as an eradicant to suppress disease outbreaks in conifer seedlings. The easy-to-use formulation mixes well with water, and can be injected through irrigation systems or applied with tank sprayers. And, like most biocontrol products, Greygold™ has a minimal re-entry period, instead of the twelve or more hours required for most chemical fungicides. If you would like more information or want to obtain a sample for your own operational trials, contact:

EDEN Bioscience Corporation  
5795 NE Minder Road  
Poulsbo, WA 98370 USA  
Tel: 800-635-6866  
Fax: 360-297-7369

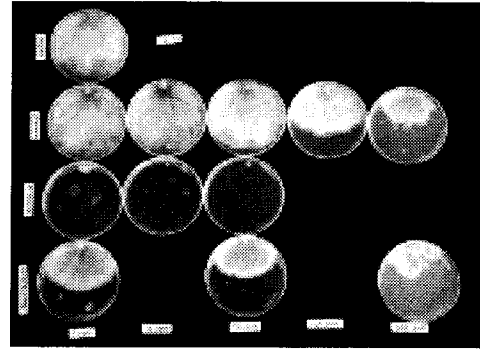


Figure 7. The *Botrytis* fungus has developed resistance to many of the common fungicides as illustrated by the lack of mycelial growth on these petri dishes.

*Gliocladium roseum* is a fungus that has shown considerable promise against both the germination of *Botrytis* spores and elongation of the mycelium. Suspensions of the asexual spores of *Gliocladium*, called conidia, significantly suppressed grey mold infections in container black spruce crops, even under epidemic conditions. At the higher application rates, *Gliocladium* was about twice as effective as the fungicide chlorothalonil in controlling sporulation, and also reduced seedling mortality by as much as 80% (Figure 8).

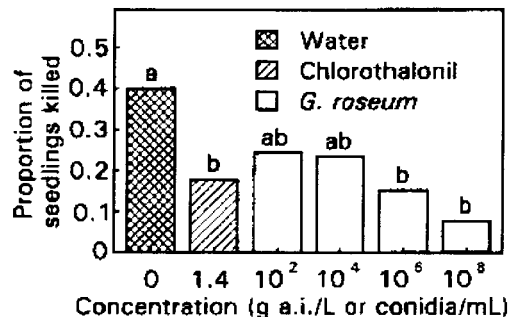


Figure 8. Spores of the biocontrol fungus *Gliocladium roseum* were shown to reduce the amount of container black spruce mortality due to *Botrytis cinerea*, and high concentrations even outperformed the fungicide chlorothalonil (Zhang and others 1996).

Researchers at the Horticulture and Food Research Institute in New Zealand have been conducting experiments to control *Botrytis* on stored kiwifruit. They are using an aromatic extract from the *Trichoderma* fungus which is apparently a natural fungicide and prevents *Botrytis* from penetrating plant tissue. The extract, called "6-PAP" (6-pentyl-alpha-pyrone), smells like a combination of coconut and celery. 6-PAP is not a new discovery, but was originally isolated by researchers at the USDA Agriculture Service back in the 1970's, but no more work was done with it until recently. Treated kiwifruit has remained disease-free for as long as 12 months of refrigerated storage, and if this research proves conclusive, there may hope for a way to treat tree seedlings prior to long-term storage.

**Source:**

Biocontrol for kiwi mold. 1995. Science 270(1): 1443.

McElroy, F. 1996. Personal communication. Poulsbo, WA: Eden Bioscience Corporation.

Zhang, P.G.; Sutton, J.C.; Hopkin, A.A. 1996. Inoculum concentration and time of application of *Gliocladium roseum* in relation to biocontrol of *Botrytis cinerea* in black spruce seedlings. Can. J. For. Res. 26(3): 360-367.

## Biocontrol for Fungal Root Pathogens

Bio-Trek 22G™ contains a new strain of a beneficial fungus called *Trichoderma harzianum*, and offers preventative control of common root pathogens, including: *Pythium*, *Rhizoctonia*, and *Fusarium*. When incorporated into soils or growing media, the *Trichoderma* fungus quickly colonizes the seedling's root system, and prevents the attack of pathogen through both competition and mycoparasitism. Because it functions as a preventative rather than curative treatment, Bio-Trek 22G™ must be applied early in the growing season, but will grow along with the seedlings as they mature, and even remains effective after transplanting. Because it is compatible with chemical fungicides such as Subdue and Terrachor, Bio-Trek 22G™ is perfect for IPM programs. This EPA-approved biopesticide is safe for workers, animals and the environment, and has one of the shorter re-entry intervals of only 4 hours. In the Pacific Northwest, Bio-Trek 22G™ is being distributed by Wilbur-Ellis Company:

Kurt Spingath  
Wilbur-Ellis  
PO Box 8838  
Portland, OR 97208 USA  
Tel: 503-227-3525  
Fax: 503-243-7645