GEORGESON BOTANICAL GARDEN

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Stem Rot--A Serious Plant Disease at the GBG

by
Pat Wagner, Pat Holloway and Jenifer McBeath

Every year in mid-summer the petunias start dying in the GBG. They are followed by some cultivars of sunflowers, lavatera, schizanthus, and marigolds. By August, the garden appears as if it had been hit by an early frost. The problem is not frost, but a disease called stem rot or *Sclerotinia sclerotiorum.*

Stem rot is caused by a fungus that lives in Alaska's soil. The fungus grows into the plant, and fruiting bodies called sclerotia develop inside the pith. These sclerotia are dark-colored knots with creamy white centers that resemble mouse droppings. You can feel them by running your thumb and forefinger along the stem. Susceptible plants wilt and dry out because the water-conducting cells called xylem are blocked by the sclerotia. This process takes time, so the symptoms usually appear in mid to late summer.

We have also seen the sclerotia develop on stored carrots. On green beans it is called cottony rot. A white, cottony mold often covers developing pods, especially where they touch the ground.

The common control mechanisms include application of fungicides and removal of all diseased plant parts to prevent spread of the sclerotia. We have used the fungicide, Topsin M®, but it is expensive and has had little effect on reducing the disease over the years.

One possibility for controlling stem rot is by the application of biocontrol agents (living organisms used for pest control purposes). One such biocontrol agent is *Trichoderma*, a common soil-borne fungus in many parts of the world. *Trichoderma* is a soil antagonist. It competes against other microorganisms in the soil and either suppresses or kills the disease organism.

Dr. Jenifer McBeath isolated a cold-tolerant strain of *Trichoderma* from soils near Fairbanks that appears to have potential as a biocontrol agent. Preliminary experiments have shown some control of *black scuif* (*Rhizactonia*) on potatoes and damping off (*Pythium*) on peas. We were interested in learning if this cold-tolerant *Trichoderma* could be useful in suppressing or controlling the stem rot in our flower garden.

We originally planned to drench petunia (*Petunia hybrida*) seedlings with a liquid suspension of the *Trichoderma* just before they were transplanted in early June. However, because of the usual hectic pace of planting the flower beds, treatments were not made until July 7. On that date, the stem rot disease was not visible, and 20 milliliters of the suspension were squirted onto the base of 10 plants of each cultivar using a syringe. Ten other plants per cultivar remained untreated as a control. Plants were hand watered at least 30 minutes after innoculation. Fifteen petunia cultivars were treated, and they were evaluated on August 11-12 for evidence of the disease (Table 1).

The rating system evaluated plants on visible symptoms of the disease. The lower the rating, the fewer plants that showed symptoms of stem rot. This system showed few real differences between plants innoculated with the *Trichoderma* and untreated plants. In other words, the treatment didn't work. We did see some resistance to the disease in some cultivars. For instance, 'Orchid Daddy' and 'Midnight Madness' had many plants that showed few symptoms by the August evaluation date.

We have not yet given up on *Trichoderma*. It is very possible that we did not get the plants treated early enough to do any good. During the 1994 season, we will treat petunias with a soil drench before they leave the greenhouse. The experiment will be located in the grassy area near the entrance to the GBG. All of the treatments will be labeled, so you can see for yourself if the treatment works.

Table 1. Occurrence and severity of stem rot disease in petunias grown in the GBG annual flower display garden.

	Rating*	
Petunia cultivar	**Innoculated with Trichoderma**	**Uninnoculated**
Midnight Madness	0	0.1
Orchid Daddy	0.3	0.9
Primetime Plum	0.8	0.7
Horizon Rose Halo	1.0	1.5
Celebrity Pink Morn	1.0	1.0
Horizon Deep Rose	1.1	1.0
Highlight Mix	1.2	1.4
Prism Coral Halo	1.2	1.4
Polo Salmon	1.2	1.1
Prism Coral	1.2	1.3
Polo Burgundy Star	1.2	0.8
Purpole Pirouette	1.2	1.3
Ultra Crimson Star	1.4	1.4
Horizon Ruby	1.5	1.6
Primetime Burgundy	1.6	1.3
*Average rating of 10 innoculated or 10 uninnoculated plants.		
0 = no signs of infection, 1 = infected but alive, 2 = dead		

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