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## How to control *Phytophthora*

**P**hytophthora root rot is more difficult to control than *Pythium* and *Rhizoctonia*. While *Phytophthora* can contaminate greenhouse floors and used flats, it can also come in on rooted cuttings or prefinished plants. Early on, infected plants may not show symptoms until the infection is established or the plant becomes stressed, such as from over- or under-watering.

### What to look for

Inspect the roots of all plants brought in for finishing. Roots should be white. If they aren't, send samples to a diagnostic lab to determine if a pathogen is present.

The sooner that *Phytophthora* is found, the better the chances of treating it before an outbreak

occurs. Once this pathogen has been introduced into the greenhouse, it moves through water splashing or by recirculating irrigation water.

Water is *Phytophthora's* driving force. Under warm, wet conditions many spores develop on infected plants and lead to a rapid buildup of the disease.

While the best way to control *Phytophthora* is to keep the pathogen off the production site, what can you do once you have it? Start by removing visibly diseased plants. Sanitation, such as removing plant debris and disinfecting pots and production surfaces, is also important.

Fungicide treatment is generally required to ensure that the *Phytophthora* has been brought under control and won't cause further plant harm.

## Evaluation of control products of *Phytophthora* on snapdragon

Treatment and rate per 100 gallons, applied at 14-day intervals (unless otherwise indicated)	% Death*
Untreated uninoculated	0 (a)
Untreated inoculated	100 (c)
**Cyazofamid 400SC, 3 fluid ounces	40 (b)
**Cyazofamid 400SC, 6 fluid ounces	30 (ab)
FenStop 500SC, 7 fluid ounces	0 (a)
FenStop 500SC, 14 fluid ounces	10 (a)
**MultiGard, 500 parts per million (7-day)	100 (c)
**MultiGard, 1,000 ppm (7-day)	100 (c)
**NOA 446510, 4.1 fluid ounces	10 (a)
**NOA 446510, 8.2 fluid ounces	0 (a)
**V-10161 4FL, 1.02 fluid ounces	0 (a)
**V-10161 4FL, 2.04 fluid ounces	0 (a)
Stature DM 50WP, 6.4 ounces	20 (ab)
Truban 30WP, 6 ounces	100 (c)
**V-10161 4FL, 4 fluid ounces	0 (a)
**V-10162 5.73FL, 16 fluid ounces	0 (a)

\*Column means with a letter in common are not significantly different (Student-Newman-Keuls;  $P=0.05$ ).

\*\*These products are not registered.

Check label for application intervals. Application intervals can be shortened when different fungicides are used in alternation as part of an overall treatment program.

Drenching plants with mefenoxam (Subdue MAXX) has long been an industry standard for this disease and continues to offer excellent control. However, no fungicide should be relied on exclusively for disease management and the industry needs additional tools that can be used in a program with Subdue MAXX.

### Testing current, new products

Studies conducted at Michigan State University in partnership with the USDA IR-4 Project and fungicide manufacturers included registered and unregistered fungicides for their ability to control *Phytophthora* on



These snapdragon roots are infected with *Phytophthora*.

snapdragon. Controlling *Phytophthora* on herbaceous crops that are tender plants is especially challenging.

In our trials, all plants infected with *Phytophthora* that did not receive a fungicide treatment died. Subdue MAXX performed well and kept all plants healthy. Other registered products, including Stature DM, Terrazole 35WP and Insignia 20WG, looked promising and treated plants were significantly healthier than those that were not treated. Truban 30WP did not perform especially well in these trials with some treated plants dying and others showing wilt symptoms.

A new fungicide called FenStop performed very well. Other products such as NOA 446510 (Syngenta),

V-10161 (Valent), and V-10162 (Valent) that are not labeled yet also looked very good when tested.

It is exciting for the industry to have so many promising products on the horizon to assist growers in managing *Phytophthora*.

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