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83. Chemicals offer *Pythium* control for today and beyond. Chase, A. Greenhouse Management and Production 27(6):88-90. 2007.

Chemicals offer Pythium control for today and beyond

PYTHIUM IS ONE OF THE MOST COMMON disease pathogens encountered in ornamental plant production. The disease is relatively easy to identify if an adequate tissue sample is tested in a diagnostic lab.

Controlling Pythium root rot is often thought to be very straightforward and the control choices appear to be many and varied. I recently reviewed aspects of Pythium control including older chemistries like etridiazole, phosphonates, Subdue MAXX resistance and new chemistries.

Symptoms of *Pythium* root rot

How many of you recognize that tip burn, plant wilt, loss of lower leaves and chlorosis (especially of older leaves) are symptoms of root disorders? I have been surprised lately to see the number of plant samples sent in for diagnosis showing above-ground symptoms when the real problem is root rot.

The next time you see something on the leaves that doesn't look right, take the time to inspect the roots, too. Don't assume that Pythium maybe involved by the fact that the outer core of the roots may pull easily away and leave the central core hanging. This may be a general sign of root rot, but it's not an indication that Pythium is the sole cause. If you submit samples for diagnosis, be sure to include part of the root system. This will allow the testing lab to identify the entire problem and provide you with a complete control strategy.

Common *Pythium* species

There are quite a few species of Pythium that have been isolated from ornamentals. A study conducted by Cornell University plant pathologist Margery Daughtrey showed some interesting trends. The most common species are P. irregulare/P. crypto-irregulare (nearly always pathogenic), P. aphanidermatum (pathogenic) and P. ultimum (pathogenic).

Non-pathogenic Pythium species include P. rostraturn, P. angustatum and P. spinosum. Daughtrey also found that poinsettias showed the greatest diversity of Pythium

Scouting Notes-

Control thrips to limit INSV. As more flowers bloom and temperatures increase, step up your efforts to monitor for thrips, which vector impatiens necrotic spot virus (INSV). Cornell University floriculture specialist Nora Catlin and Rutgers Cooperative Extension agricultural agent Jim Willmott reported that INSV was detected on spring crops of Reiger begonias and diascia.

Look for ringlike spots, irregular necrotic spots, brown stem lesions, stunting or other symptoms that can't be attributed to other causes.

If plants are diagnosed with either INSV or tomato spotted wilt virus, remove and destroy them.

For more: Jim Willmott, (856) 566-296; http://njaes.rutgers.edu/pubs/fipmnotes.

TMV and iron deficiency. Tobacco mosaic virus symptoms can be confused with iron-deficiency symptoms, reported Tina Smith and Doug Cox at University of Massachusetts. Iron deficiency symptoms generally show up as interveinal chlorosis, normally starting at the shoot tips, but often occurring throughout the entire plant. Sometimes the leaves of iron deficient plants turn almost white.

TMV symptoms appear as yellow and green mottling, upward leaf curling, leaf distortion and overall stunting. Susceptible plants include bacopa, calibrachoa, scaevola, snapdragon and petunia.

Prevent iron deficiency by controlling pH (maintain growing medium pH of 5.5-5.8) and using iron-chelate fertilizers. Don't apply chelated iron-containing fertilizers to iron sensitive plants including geranium, marigold and other crops that are sensitive to iron and exhibit iron toxicity symptoms.

For more: Tina Smith, (413) 545-5306; www.negreenhouseupdate.info.

CDFA detects white rust. On Feb. 14, California Department of Food and Agriculture confirmed the detection of chrysanthemum white rust, *Puccinia horiana* P. Henn., on field-planted mums at a San Diego County cut flower nursery. This is the third CWR detection at this production site.

As a result of this latest detection, USDA issued an Emergency Action Notice (EAN) on Feb. 16. Approximately 4,000 mum plants were destroyed.

On Feb. 27, CDFA also made an initial detection of CWR in an outdoor mum field at a cut flower nursery in Santa Barbara County. This detection was confirmed by CDFA and a USDA EAN was issued on March 1. This field had been harvested in mid-October to November 2006. National CWR Management Plan for Exclusion and Eradication was being followed for both detections. The impacted nurseries only sold product locally.

For more: Division of Plant Health and Pest Prevention Services, Department of Food and Agriculture; (916) 262-1100; www.pestalert.org.

species, including P. aphanidermatum, P. irregulare, P. myriotylum, P. syluaticum, P. ultimum, P. afertile and P. rostratum.

Not all diagnostic labs identify Pythium isolates to species, making your choice of controls based on test results alone a serious challenge.

Chemical controls

Etridiazole. One of the first fungicides available for Pythium control on ornamentals was etridiazole. This active ingredient is found in Terrazole, Truban and Banrot. I worked on these formulations while I was at the University of Florida. When I returned to California I learned that these chemicals were not registered for ornamentals in the state. I continued to place Terrazole in our Pythium trials over the past 12 years. During this time, Terrazole was registered for use in California.

Overall, Terrazole 35W was a very good to excellent Pythium control when used at a rate of at least 6 ounces per 100 gallons on less than a 28-day interval. Etridiazole fungicides have been used for more than 30 years with no resistance reported. Trials at our facility as well as reports from other researchers show that etridiazole remains a good choice for Pythium control.

Phosphonates. I started researching phosphonates (phos-acid alternatives) in 1980 before Aliette was officially labeled for use on ornamentals. Trials conducted while I was at University of Florida showed application of Aliette 80WDG on tropical foliage plants for Pythium was best at higher-than-labeled rates. Unfortunately, research showed that optimal use rate was dependent on the plant species treated. The trials showed that while Subdue 2E applications resulted in the best root systems, Aliette often resulted in the best top growth.

Subdue MAXX resistance. One of the most popular fungicides for Pythium control is Subdue MAXX (mefenoxam). This fungicide is exceptionally effective most of the time and has the ability under some circumstances to "cure" a Pythium infection. Its efficacy and relatively low cost almost ensured that it would be over-applied.

The exclusive use of Subdue MAXX has led to development of some resistance. This means the chemical will not help in these situations. Simply using a higher dose is usually not helpful. The only way to avoid resistance development and subsequent losses due to Pythium is to rotate among the products that work on Pythium.

If you have been applying Subdue MAXX to the exclusion of all other products and it doesn't provide the same control, you may have a resistant strain of Pythium. Research has shown that ebb-and-flood production can promote resistance. Inform the diagnostic lab if you suspect resistance.

New chemicals

Over the past few years, there have been some excellent reports by a variety of researchers concerning the use of some closely related products for Pythium control.

Heritage is a strobilurin fungicide while FenStop (fenamidone) and cyazofamid (an experimental from ISK Biotech) are in related chemical families. They are close enough in chemistry that rotating between a strobilurin and one of the other two would not be an effective means of preventing resistance.

These chemicals have been effective for Pythium control when used at appropriate rates. Right now the only product labeled for this use is FenStop. This fungicide has performed well at rates of 4-14 ounces per 100 gallons. Read the label for legal use rates.

Cyazofamid has performed equally well when tested at rates from 1.5-4.5 ounces per 100 gallons. We look forward to seeing this product labeled.

There has been quite a bit of testing done on Heritage for Pythium control. We started testing Heritage for control of Pythium in the mid-1990s, well before it was labeled for ornamental use. At that time, the rates were sometimes very high and the results somewhat variable. In the past few years, the most effective use rate appears to be 0.9 ounce per 100 gallons.

Minimize disease — problems

1. Be sure about the cause of the problem. Get a plant tissue diagnosis.
2. Rotate different fungicide classes to avoid resistance.
3. Do not assume chemical resistance. Have the affected tissue tested.
4. Follow fungicide labels – they are there to help you.

CONTACT INFORMATION

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Biologicals & Chemicals

Pylon (OHP): The miticide/insecticide is now labeled to control thrips, caterpillars, armyworms, hornworms and cabbage loopers on greenhouse-grown vegetables and ornamentals.

Safari (Valent): The label has been updated. New pests controlled include azalea lacebug, black vine weevil, leafhoppers, glassy-winged sharpshooter and several species of mealybugs and armored and soft scales. Growers can now apply Safari by soil injection or as a banded soil surface spray. The restricted-entry has been eliminated when Safari is soil injected or drenched as long as workers don't contact treated surfaces.