CHASE NEWS

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CHASE HORTICULTURAL RESEARCH, INC.

New Research Findings on Pythium

There has been a real effort made in the past few years to better understand Pythium diseases on ornamentals. The *Floriculture and Nursery Research Initiative* has sponsored a group of researchers at Cornell University (Marge Daughtrey), Pennsylvania Sate University (Gary Moorman), Washington State University (Gary Chastagner) and Clemson University (Steve Jeffers). *Pythium* spp. cause many diseases including root rot, damping-off, bulb rot and wilts.

The researchers collected many hundreds of isolates from greenhouse crops suffering from disease as well as the greenhouse environment. The isolates were identified, characterized for fungicide resistance, tested for pathogenicity and sometimes fingerprinted.

The most common species of *Pythium* found were *P. irregulare* and *P. aphanidermatum.* They were associated with root disease but also were found on benches, healthy appearing plants, in potting media and in organic debris throughout the greenhouse. In some cases, a particular isolate of *Pythium* was shown to be present in the same greenhouse for years (using the fingerprint method). This once again indicates the need for sanitation and cultural controls. There were many species of Pythium recovered and all were tested for pathogenicity on geraniums. All of the *P. aphanidermatum*, 95% of the *P. irregulare*, all of the *P. myriotylum* and all of the *P. ultimum* isolates were pathogenic on geraniums.

The sensitivity of these isolates was also tested for propamocarb (Banol) and mefenoxam (Subdue MAXX) and in some cases isolates were resistant to both fungicides. The incidence of resistance to mefenoxam was described as common.

Another group of researchers (Elliott, Elmer and Pasura) have been investigating the ability of biological control agents to control Pythium root rot on geraniums (**Greenhouse Product News**—June, 2007). They inadvertently found an interaction with potting media. The results of testing six common media by inoculating with *Pythium ultimum* showed that potting medium was very important in the severity of disease (Table to the right, above). The researchers eventually concluded that while certain microbial inoculants (biological control agents) were able to suppress Pythium in some soilless media, they were ineffective when the medium was conducive to Pythium. Comparing efficacy of Banrot in the same six media showed that in some media even this industry standard sometimes failed to reduce mortality. Unfortunately, plant stress due to both chemical fungicides and biological control agents does occur and can result in increased severity of Pythium disease.

Potting medium	Severity of Pythium
Berger BM-3	None
Fafard 3B	Very low
Premier HP	none
Metro-Mix 360	Low
Metro-Mix 360 Coir	Moderate
SunGro SB400	Moderate

This article was very interesting to me since it helps to explain the variable results we have seen over the years in our trials with biological control agents. It appears that controlling Pythium root rot may be more affected by the potting medium than secondary steps including biological and chemical agents. Check some recent results on two Pythium root rot trials (snapdragons and geraniums) on pages 2 and 3.

Inside this issue:

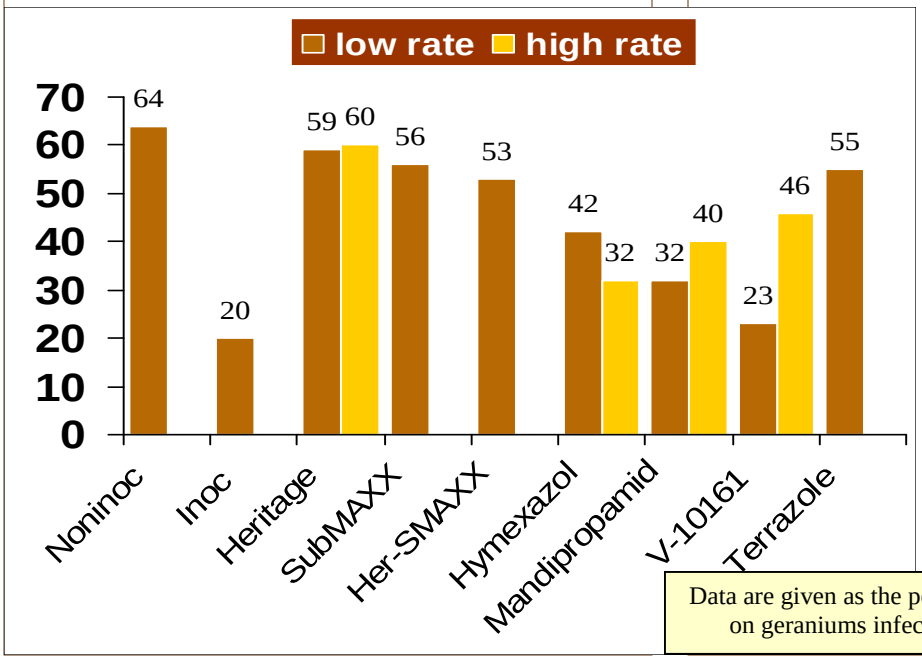
Pythium Root Rot Control on Geraniums with New Fungicides

Last October, I attended the annual meeting of the IR-4 Ornamentals working group in Denver. We heard about quite a few newer fungicides and their ability to control Phytophthora diseases. The researchers present decided to continue to focus on Phytophthora as a goal but expanded the testing to Pythium. So, this summer we conducted an IR-4 sponsored trial on controlling Pythium root rot on geranium. The plants were potted into Fafard 2Mix in 3.5 inch pots and were top-dressed with Osmocote Plus 15-9-12 (3-4 month release). Treatments started on 13 June and continued weekly in most cases (the high rate of mandipropamid was applied every 14 days).

The fungicides tested included: Heritage (0.9 and 1.8 oz/100 gal), Subdue MAXX (1 oz), a combination of Heritage and Subdue MAXX (0.9 and 1 oz), hymexazol (6 and 12 oz), mandipropamid (4 and 8 oz), V-10161 (2 and 4 oz) and Terrazole 35W (8 oz). We evaluated the growth of the plants (height and top grade) several times over the course of the experiment and at the end of the trial we also rated the % of healthy appearing roots and the fresh weight of tops. The graph below shows the results of the root data. This was one of the few tests on Pythium where the tops also showed dramatic indication of Pythium root rot severity but the roots were the best demonstration of the reaction to the different fungicides.

Results showed that both Heritage and Subdue MAXX were very effective at the rates either alone or in combination. Terrazole was also very effective in this trial. The experimental products were not as effective. The higher rate of hymexazol apparently caused some phytotoxicity that resulted in lower root quality than the lower rate. In contrast, the higher rates of both V-10161 and mandipropamid were needed for controlling the Pythium root rot in this geranium trial. Overall, the best control was found with the currently available products of Subdue MAXX and Terrazole. In addition, the possibility of label expansion with Heritage to include Pythium is supported by this trial. Minimizing the chance of resistance to Subdue MAXX by adding Heritage appears to be an effective method for Pythium root rot on geraniums. I look forward to seeing what the other researchers find in their Pythium trials this year at the next IR-4 meeting (October in New Jersey). I will report back in the November **Chase News** .

Some symptoms of Pythium root rot on geranium.

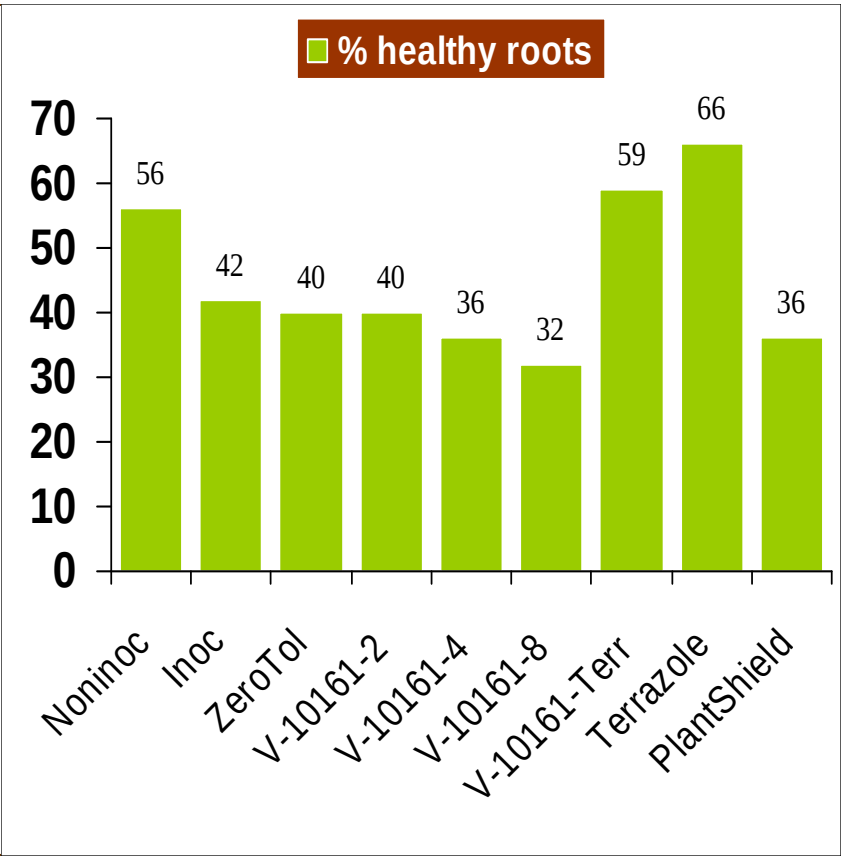


Data are given as the percent healthy appearing roots on geraniums infected with Pythium root rot.

Pythium Root Rot Control on Snapdragons

This summer has been one Pythium or Phytophthora trial after another. I just wish they had all worked according to plan. But perhaps those that failed were affected by the potting medium we chose for that trial. In any event, here is one that did work using snapdragons planted as plugs into Fafard 2 Mix. The plants were inoculated after the second fungicide application (11 days). Drenches were made at the rate of a little over one ounce per 3.5 inch pot. The fungicides included were: ZeroTol (applied at 1% three days in a row and continuing once per week), V-10161 (2, 4 or 8 oz/100 gal applied once), V-10161 combined with Terrazole (2 and 6 oz, respectively applied once), Terrazole 35W (6 oz applied once) and PlantShield HC (5 oz applied 6 days before transplanting and then 1 day after transplanting).

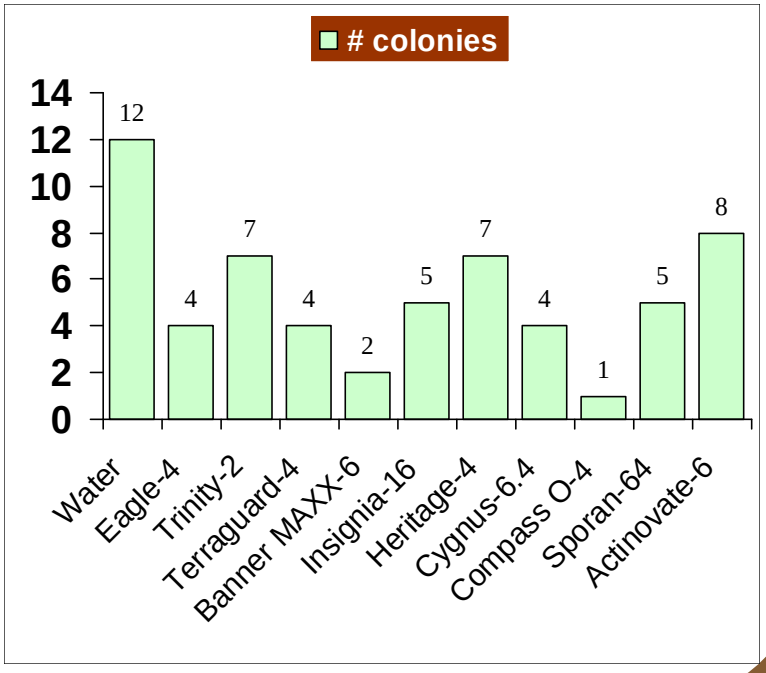
The height of the snapdragons was recorded three times and the final percentage of healthy appearing roots was recorded at the end of the trial. As the graph to the right shows, only the two treatments with Terrazole gave a good response in root growth. None of the other treatments resulted in control of Pythium on these snapdragons when used in the manner they were tested.



Powdery Mildew Control on Rose

Sometimes we have plants left over from contracted trials and since just dumping them seems wasteful we set up a trial on our own. This happened last month with some rose cuttings. The cultivar was 'Nearly Wild Medium Pink' and they were just starting to develop powdery mildew. We sprayed them twice on a 10-day interval to see if we could stop the development of this disease. The treatments included some sterol inhibitors and strobilurins as well as Sporan and Actinovate. The rates per 100 gal are given after the fungicide in the graph to the right. We counted the number of powdery mildew colonies twice and the data from the second rating are shown.

All fungicides gave significant and equal control of this powdery mildew compared to the water sprayed control. The most effective sterol inhibitor was Banner MAXX and the most effective strobilurin was Compass O. Sporan and Actinovate also resulted in significant control that was equal statistically to the best fungicides in the trial.



LAB FOCUS—FUSARIUM , PPHYTOPHTHORA and BACTERIA

Some pathogens occur during the winter while others appear more commonly in the summer. For the past few weeks we have been seeing some typical summer pathogens. The most common one lately has been *Fusarium*. This pathogen actually can cause losses year-round but during the summer it grows quickly and attacks pants (or cuttings) weakened by wilt. The table below shows a list of the plants we have isolated *Fusarium* from in the past month alone. Some of the most commonly affected plants include: Phormium, Mandevilla, tropicals like Alocasia and Dracaena and bulbs like callas and Liatris.

We have seen a variety of symptoms but actually crown rot or stem rot is the most common expression of a Fusarium disease. The picture at the bottom of this section shows the one-sided death that is also a common characteristic of Fusarium on some plants.

Plant	Symptom
Liatris	Stem rot
Alocasia	Leaf blight
Rose	Stem canker
Acorus	Crown rot
Phormium	Crown rot
Mandevilla	Dieback and cutting rot
Calla lily	Root rot
Lisianthus	Stem rot
Dracaena	Crown rot
Chrysanthemum	Stem rot

Fusarium cutting rot on Mandevilla

Fusarium stem rot on Mum

Another common summer disease is Phytophthora. I usually have to schedule trials on this pathogen for the summer only since it thrives on heat. This pathogen causes stem rot, cankers, root rot (sometimes), aerial blight and a rapid death. In the past month we have seen a few examples of Phytophthora including stem rot on Poinsettia. Other common hosts of Phytophthora include *Petunia*, *Calibrachoa*, snapdragons, *Choysia*, boxwood, apple trees, azalea, *Spathiphyllum* and schefflera.

Phytophthora stem canker on poinsettia

The final group of pathogens that has been very active this month is bacteria. We have seen a few examples of Erwinia soft rot (callas, and bird's nest fern), *Pseudomonas* (Pentas and bird's nest fern) and *Xanthomonas* (zinnia and oak leaf hydrangea).

As we move into the fall, start watching for more Pythium root rot since watering accurately will be especially challenging with unpredictable temperatures. Rust and powdery mildew will also appear more commonly with overnight cooling and accompanying condensation. Finally, watch the poinsettias. They are progressively more prone to Pythium root rot, powdery mildew and finally Botrytis crown rot as the production cycle progresses. Right now, however, watch for Erwinia soft rot and Rhizoctonia stem rot. Examine your cuttings carefully when they come in and keep you eye open the mist (especially overnight) to minimize propagation diseases.

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Education for Horticulture