

State of Fungicides for Pythium on Ornamentals

Although there have been a multitude of new products for Phytophthora and downy mildew over the past five years, almost no ground has been gained in the fight against Pythium diseases. A few years ago, IR-4 determined that they would support trials on Pythium control for several years and came out with a summary of that work in the middle of 2011. I have used the summary many times and appreciate the efforts made by Vea and Palmer in summarizing this work.

Just this week, I noticed a summary table that really showed the sad state of affairs we face when choosing a product to control this common and so variable disease. Symptoms can include:

- stem rot - called black leg at times
- chlorosis - yellowing - especially on lower leaves
- stunting
- wilting - can recover overnight sometimes
- loss of lower leaves
- poor root development
- root loss - outer core can die leaving just the core

Unfortunately very few products really give us better than 50% control of Pythium root rot. The Pythium species included in the IR-4 trials were: *aphanidermatum*, *dissoticum*, *irregulare*, *mammilatum*, *ultimum* and *vipa*.

The best product overall was Terrazole at 92% control in 8 trials with Subdue MAXX providing an average of 65% control in 21 trials. Both of these products are industry standards. Although both have been used for over 30 years, resistance has not developed to etridiazole (ai for Terrazole and Banrot). In contrast, resistance to mefenoxam in Pythium isolates has been reported consistently over the past 18 years.

One of the newest fungicides for Oomycetes (includes *Pythium*, *Phytophthora* and the downy mildew fungi) is Adorn. Interestingly, Adorn showed 64% Pythium control in 25 trials. This product must be tank-mixed with another MOA group fungicide for any use.

Strobilurins (MOA 11) provide varying levels of control but can reach the 50% mark. Finally, Segway (MOA 21) provided an average of 56% control in 21 trials.

Many growers rely on use of phosphonates (MOA 33) like Aliette and Alude. The IR-4 trials show that Aliette and Alude also provide about 50-58% control.

The biological control product most often used for soil-borne diseases like Pythium root rot is RootShield. BioWorks recently introduced RootShield Plus which has two different fungi (*Trichoderma harzianum* T-22 and *T. virens* G-41). The IR-4 trials show rather poor results with this new formulation. In most cases control is less than acceptable with an average of 23%. Trials run at Chase Horticultural Research, Inc. showed

IR-4 trials for Pythium disease control

PRODUCT (MOA)	PERCENT CONTROL	NUMBER OF TRIALS
Adorn (43)	64	25
Aliette (33)	58	14
Alude (33)	50	5
Disarm O (11)	41	12
FenStop (11)	50	19
Heritage (11)	53	32
Insignia (11)	54	5
Kocide 2000 (M1)	34	5
Micora (40)	39	8
Pageant (11 and 7)	35	12
RootShield Plus (44 and ?)	23	11
Segway (21)	56	15
Subdue MAXX (4)	65	21
Terrazole (14)	92	8

similar results with no significant control in most trials. We actually had excellent control in only two trials - *Pythium aphanidermatum* on poinsettia (once only) and in one trial on Phytophthora root rot on vinca. The results on Fusarium diseases and others are shown on the next page.

Conclusions

At this point the most effective products are those that include:

- etridiazole (Terrazole, Truban and Banrot)
- mefenoxam (Subdue MAXX - resistance is possible)
- fluopicolide (Adorn - remember to follow label directions to tank mix with another effective fungicide)
- phosphonates (Aliette, Alude and many others - I have seen these work only 50% of the time against Pythium root rot in our own trials)
- strobilurins (Disarm O, Heritage, Insignia) OR fenamidone (FenStop - use lower end of label rates to avoid possible root damage that can be confused with root rot).

The efficacy with biologicals remains low and inconsistent. As always read labels BEFORE use and rotate between MOA groups. These are the two most important ways to get the most out of your fungicide dollars.