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CHASE RESEARCH GARDENS, INC.

CHASE NEWS

Fungicide Efficacy—Filling the Data Gaps

Last year we published our first wall chart on efficacy of fungicides on ornamentals. This summary reflected the previous nine years of testing at Chase Research Gardens. Each year we do about 100 trials and I try to keep up with the summary by adding trials at the end of each year. Last year I also started reviewing published trials by other researchers and have incorporated these results into the current version as well.

We won't be coming out with a new disease chart until 2006, since this year we are doing a chart on insecticides/miticides. However, I thought I would give a quick overview of the data gaps. In some cases, the work needs to be done while in other cases there really aren't any suitable fungicides for a specific disease.

Fungicides we need to know more about

We know relatively little about how well the biological control products work. These include Actinovate, Companion, PlantShield and Rhapsody to mention the most widely used. We also do not know much about how they can be mixed or alternated with chemically based products.

Another group of products that has made great inroads is the phos acid group. Although we are (we think) somewhat familiar with Aliette, we really don't know what the others work on and in truth expect less of Aliette than is possible (see age 3 of this issue). In this case, we have started to try phos acids on many diverse targets with very interesting results.

Diseases we are ignoring

I rarely see any chemical information on fireblight (*Erwinia amylovora*) or soft rotters (*Erwinia carotovora* and *chrysanthemi*) and other bacterial leaf spots caused by *Pseudomonas* spp. and *Xanthomonas* spp. Some of these diseases are very hard to work with while others are just rare and cannot command much attention due to dwindling University personnel.

As important as downy mildew diseases have become one would think they would be worked on more actively. I can say from personal experience that they are among the most frustrating critters to try to instigate. We have done one test five times in the past year in a vain attempt to fulfill a contract.

Who is working on Rhizoctonia control? This serious pathogen causes problems on cuttings, roots and even leaves when the weather is hot and wet. Not much being reported that I can find.

Plants we are ignoring

Where is the research on diseases of herbaceous perennials? This is the fastest growing segment of plants and although we have a pretty impressive group of virologists working on identifying new disease, I don't see much being done on things we can control (bacteria and fungi).

We could also use some fresh information on controlling problems in plug production. The need to apply fungicides during plug production is usually lower than during normal production but if it is not done well then downy mildew and bacterial diseases can snowball into national disasters.

Pathogens that are poorly controlled

It is interesting that although we have a multitude of products that work very well on powdery mildew, Botrytis and Pythium, these remain the only targets for some chemical manufacturers.

What we really need is something for black root rot besides thiophanate methyl and something that will kill Fusarium inside bulbs. We need a product for bacteria that can move inside the plants better than copper or at least do a better job inside the plants. We really need something for Phytophthora that cannot be overcome by severe disease pressure. We have seen a fantastic increase in the products available in the past five years but some of these pathogens are really tough to control. What we need is an arsenal of magic bullets!

Inside this issue:

Controlling Phytophthora in Rosemary Propagation

Diseases of woody ornamentals often start during the process of rooting the cuttings. We have seen a real explosion of new cultivars of lavender and rosemary in the past few years and unfortunately this has been accompanied by frequent plant losses due to *Pythium* and *Phytophthora*. Although disease may start in propagation it often does not become evident until sudden plant death in full grown plants in gallon containers. We reported on a lavender trial a few months ago in Chase News and this month include a trial on *Phytophthora* root rot on un-rooted rosemary cuttings.

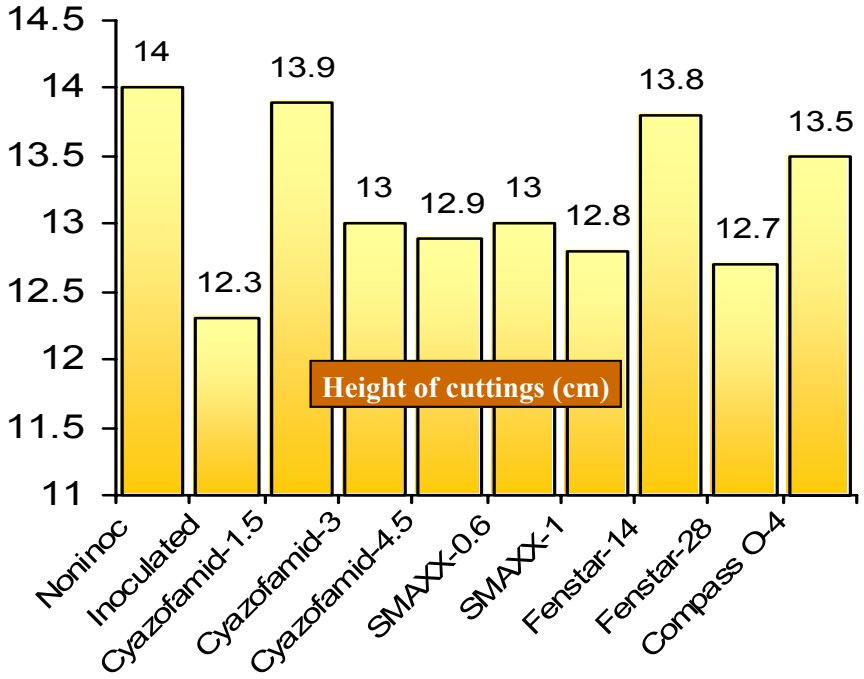
The test was started on 16 September when cuttings were stuck. We used Oasis rooting cubes and included four blocks of three each per treatment. The cuttings were held in a plastic tray and kept in a plastic covered box to maintain humidity and allow rooting. Treatments were applied as foliar sprays directed to the stem bases on a 14 day interval four times. The first drench was applied about a week before inoculation with an isolate of *Phytophthora* sp. originally isolated from rosemary.

After 8 weeks, we rated the top grade of the cuttings (1= dead, 2 = poor, 3 = good, 4 = very good and 5 = excellent) as well as degree of rooting and height of cuttings. The graph at the top, right shows the height data while that at the bottom, right shows the top grade data.

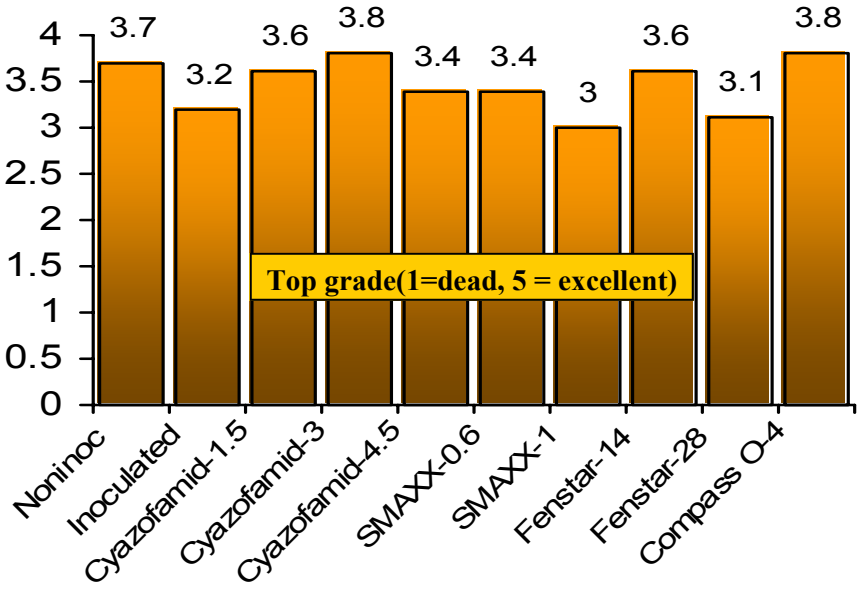
The best growth of the cuttings was seen on those that were not inoculated or treated with cyazofamid (1.5 oz/100 gal), Fenstar (14 oz/100 gal) and Compass O (4 oz/100 gal). Other treatments were only slightly effective. Since higher rates of some fungicides gave poorer results it may be that they were phytotoxic under these conditions. Top grades showed the same results.

Cyazofamid is an experimental fungicide under joint development by ISK BioSciences and FMC Corporation. The product has worked very well in our trials on downy mildew, Pythium root rot and Phytophthora stem and root rot. It does not have a trade name yet and I have not heard when registration is expected.

Fenstar is another new product. This fungicide is marketed by Olympic Horticultural and has been available for a few months with the exception of California.



Our trials have shown very good to excellent control of downy mildew and Phytophthora especially. The active ingredient is fenamidone and is related to strobilurins fungicides like Compass O, Cygnus and Heritage. Be sure to rotate products form different fungicide classes to avoid development of resistance. Alternatives include Subdue MAXX, Terrazole or Truban and phos acids like Aliette.



Choosing the Right Targets for Phos Acid Fungicides

The first phos acid fungicide to reach he ornamental market was Aliette in the early 1980's. Since then we have seen may other products introduced including Alude and Vital as well as numerous products that are "fertilizers" such as pHortress. Most recently, we have been exploring the efficacy of Mimik, an experimental product.

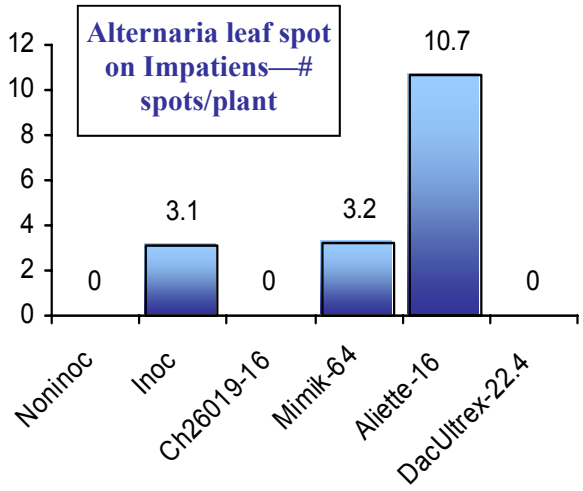
We all know about the benefits of using phos acids for prevention of *Phytophthora, Pythium* and downy mildew. For years, some growers have used Aliette for control of certain bacterial leaf spots caused by *Pseudomonas* an *Xanthomonas* with some success. Our trials in 2003 and 2004 tested some phos acids (including Aliette) for these diseases.

A search of the literature also shows activity against other pathogens. These include Phomopsis on grapevines, a viral disease on beans, anthracnose, bean rust and some Fusarium diseases. A lot depends on the plant too since sometimes the host is important in the reaction.

Our work with Mimik has led to some new explorations into the world of phos acids. This month I am reporting three trials testing Mimik powdery mildew on Gerber daisy, Alternaria leaf spot on Impatiens and Xanthomonas blight on Ranunculus. In each case, we included industry standards as well as inoculated and noninoculated controls.

Impatiens Wallerana 'Super Elfin Violet' were planted on 29 November and the test was started on 20 December when they were sprayed for the first time. They were treated with Chipco 26019 (16 oz/100 gal), Mimik (64 oz), Aliette (16 oz) and Daconil Ultrex (22.4 oz). Three sprays were applied on weekly interval and plants were inoculated with Alternaria on 21 December. On 5 January, number of spots/plant, residue and top grade were recorded and the test was discarded. Residue was significant but slight for Chipco 26019 and Daconil only. Top grade was unaffected by treatment. The number of spots are shown in the graph to the right, above.

We saw excellent control with both industry standards (Chipco 26019 and Daconil Ultrex). Neither of the phos acids provided control of Alternaria leaf spot in this trial. In fact, Aliette resulted in significantly more disease than the inoculated controls.



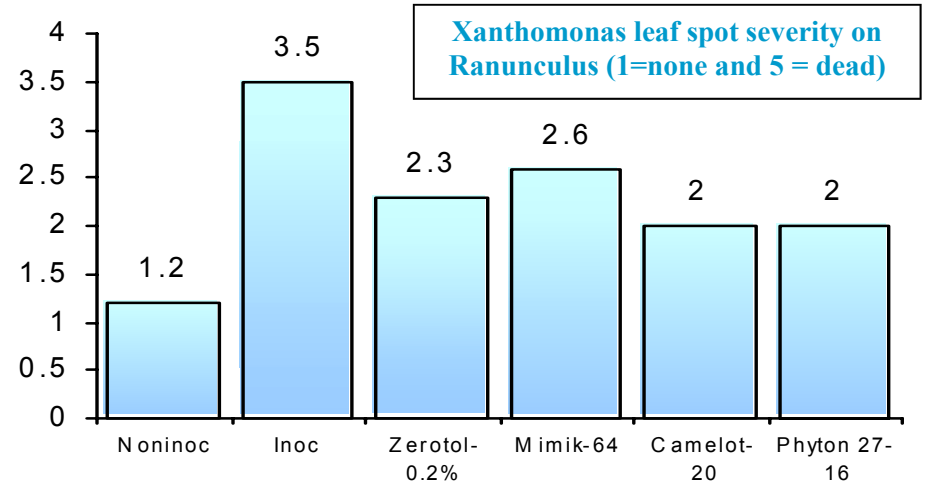
The second trial evaluated Mimik (64 oz/100 gal), Phyton 27 (25 or 45 oz/100 gal) and Systhane (2 oz/100 gal) for prevention of powdery mildew on Gerber daisy. In this case, plants were sprayed on a 10-day interval three times in October and November. All treatments were 100% effective in preventing powdery mildew and were safe on Gerber daisy.

Finally, we trialed Mimik (64 oz), Zerotol (0.2%), Camelot (20 oz/100 gal) and Phyton 27 (20 oz/100 gal) on Ranunculus. We sprayed plants on a weekly interval four times in December. By January 5 we were able to evaluate disease severity and top grade. Disease was rated on the following scale (1 = none, 2 = few spots, 3 = moderate spots, 4 = severe spots—all leaves, and 5 = plant dead). The graph below shows the results of the disease control data.

The best control of Xanthomonas on Ranunculus was achieved with Camelot and Phyton 27 (both copper compounds). Zerotol also provided significant control that was nearly equivalent to the copper products. Finally, Mimik use resulted in slightly less control than Zerotol, although they were the same statistically. None of the products damaged the Ranunculus in this trial. We did see a few spots on the noninoculated control plants that should have been completely free of disease. These spots could have occurred with water splashing during the trial or perhaps indicate a low level of seed contamination with Xanthomonas.

These tests indicate that phos acids can affect more than *Pythium, Phytophthora* and downy mildew. The degree of benefit is controlled by the rates used, the plants being produced and the exact pathogen targets.

Be sure to read labels carefully and trial any new product or even a new use of a familiar product on a few plants at a time. Remember a little phytotoxicity can lead to a lot of disease.



Quick Guide to Leaf Spot Control—Overview of F and N Reports

There are many researchers across the US that perform trials on ornamental disease control. In the past five years, some of these trials have been reported in an annual publication called "Fungicide and Nematicide Reports." I have summarized these reports in the table below for leaf spot diseases. I have added the chemical classes for these products and a color code for quick review. Be sure you rotate products in different chemical classes to avoid resistance. There are many choices for leaf spots and rotation should be relatively easy. Any product with two colors is a mixture and rotation will not be needed. Remember that this list does not include all of the possibilities - some of the best products are not being actively researched at this time. These would include Chipco 26019 and Protect. Finally, not all products are legal at this time—check labels!

	Alternaria	Cercospora	Diplocarpon (black spot)	Entomosporium	Sphaceloma (scab)	Fungicide Class
Aliette			N			Phos acid
Banner MAXX		G	VG	S		Sterol inhibitor
Biophos			N			Phos acid
Camelot	VG				VGE	Copper
Compass 0	VG	VGE	VG	S	E	Strobilurin
Daconil Ultrex	G	VG	VGE	VGE	E	Nitrile
Dithane	VG				E	Carbamate
Endorse	E					Antibiotic
Folicur			VGE			Sterol inhibitor
Funginex			E			Sterol inhibitor
Heritage	VGE	VG	G		VGE	Strobilurin
Insignia	E		VG			Strobilurin
Junction					E	Carbamate
Kaligreen			S			Bicarbonate
Kocide		S				Copper
Medallion	E		N			????
Milsana			S			Plant extract
Milstop			N	N		Bicarbonate
Phyton 27		VG	N		E	Copper
Rhapsody	P	S				Biocontrol
Rubigan		VG				Sterol inhibitor
Spectro				VG	E	Nitrile
SunSpray		S				Oil
Systhane	P	VG	VG		VG	Sterol inhibitor
Terraguard	VG				VGE	Sterol inhibitor
Triact		P	N			Oil-Plant Extract
Zyban					E	Thiophanate methyl/carbamate
3336	P	SG	S	S	VG	Thiophanate methyl