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CHASE RESEARCH GARDENS, INC.

CHASE NEWS

Anthracnose and Close Relatives

There are several different fungi that are collectively called anthracnose fungi including: *Colletotrichum*, *Gloeosporium* and *Glomerella*. These fungi are closely related and form their spores in an open cup-like structure called an acervulus. Anthracnose diseases are usually characterized by leaf spots and blight but also can cause stem rot and fruit rot on some crops. These disease spread by spores that are easy to splash with irrigation water or rainfall but since they are somewhat sticky they do not easily spread by simple air movement from the wind or fans. Wounding can increase disease severity but it is not necessary.

Many plants can be attacked by anthracnose fungi especially those grown outdoors like woody ornamentals and tropical foliage plants. There are fewer examples in the greenhouse potted crops and the bedding plants. Some of the most commonly affected are *Euonymus*, *Vinca minor*, azalea, *Aglaonema*, *Cordyline*, *Dieffenbachia*, palms, cacti and succulents. Some susceptible perennials were listed in an article by Leanne Pundt (GrowerTalks-May 2004): *Alcea*, *Bergenia*, *Digitalis*, *Epimedim*, *Heuchera*, *Hosta*, *Liatris*, *Liriope*, *Lupinus*, *Malva*, *Miscanthus*, *Panicum*, *Pennisetum*, *Phlox*, *Rudbeckia* and *Tiarella*.

Sometimes different fungi are cultured from anthracnose-like diseases. We have consistently recovered *Glomerella*, *Colletotrichum*, *Phyllosticta*, *Phyllostictina* and *Diplodia* from *Vinca minor* (periwinkle) all over the country. The non-acervuli fungi in this list form their spores in an enclosed flask-like structure but are relatively closely related in the big picture. For the purposes of control we can consider them together.

The table to the right shows a summary of the reports I could find on azalea, euonymus, *Cordyline*, lupine and periwinkle. In 2001, LaMondia reported on resistance in *Colletotrichum gloeosporioides* from Euonymus in the northeastern US. The study was undertaken when widespread fungicide failures occurred. Lab testing indicated resistance to thiophanate methyl and chlorothalonil but little if any resistance to iprodione or mancozeb fungicides. Field trials showed that tank-mixing was more effective than rotation in managing severity of anthracnose on Euonymus when resistant populations were present.

Product	oz per 100 gal	Efficacy
Banner MAXX	5.2	Poor
Camelot	16	Very good
Chipco 26109	8	Good
Cygnus	3.2	Good
Daconil Ultrex	22.4	Some- very good
Dithane Rainshield	24	Very good
Heritage	4	Good-excellent
Insignia	8	Some-good
Milstop	40	Good
Medallion	2	Good
Phyton 27	25	Some-good
Protect T&O	16	Some-very good
Spectro	32	Very good
Stature MZ	28	Very good
Systhane	2	Very good
Terraguard	8	Poor
3336	16	Poor-very good

The variable results with a single product (Table) indicate that all anthracnose diseases are not the same and that fungicide resistance adds to the difficulty of controlling these diseases. The strobilurins (Cygnus, Heritage and Insignia) show some promise in these tests. Be sure to follow their labels carefully since they are designed to minimize resistance development. If the work on Euonymus anthracnose is representative of anthracnose in general, then tank-mixing may provide superior control than rotation. As always—get a diagnosis before spraying.

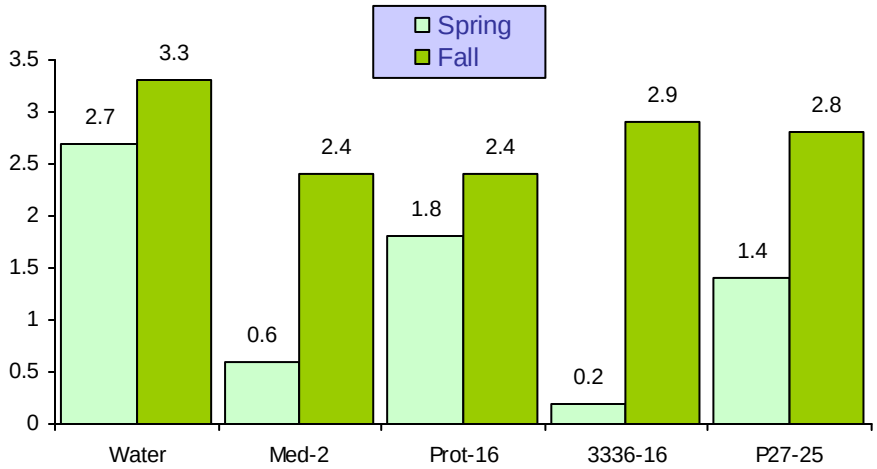
Inside this issue:

Fungicides for Control of Anthracnose and Phyllosticta

Over the years I have performed relatively few anthracnose (*Colletotrichum*) or Phyllosticta trials. While working at the University of Florida I worked on Euonymus anthracnose for the cut foliage industry and Phyllosticta leaf spot on peperomias. Since returning to trial work in California I once again worked on Euo-

nymus anthracnose as well as anthracnose on Cordyline. We have also attempted a series of trials on Phyllosticta leaf spot on *Dicksonia* ferns and *Vinca minor* (periwinkle). Most of these trials have been disappointing with little disease and/or no control apparent. The trials I report here were the best of the lot.

The two trials on Euonymus were performed a few years ago. In the first we started with plants that had leaf anthracnose while in the second we inoculated plants instead. In both trials we used the following treatments: fludioxinil (Medallion at 2 oz/ 100 gal), mancozeb (Protect T&O at 16 oz), thiophanate methyl (3336 at 16 oz) and copper pentahydrate (Phyton 27 at 25 oz). Sprays were applied on a weekly interval three times (first trial) or twice (second trial). Disease severity was rated using the following scale:1 (no disease), 2 (slight spotting), 3 (moderate spotting), 4 (heavy spotting) to 5 (dead).



Euonymus anthracnose sprays

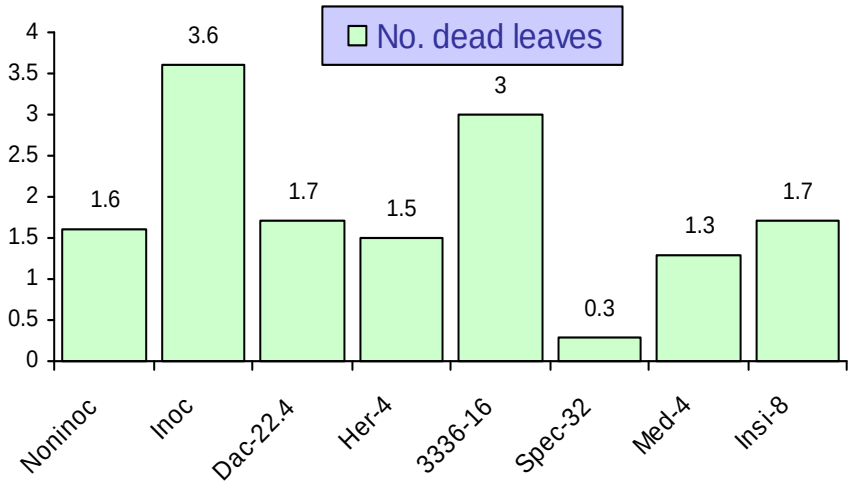
Medallion (2 oz/100 gal)

Protect T&O (16 oz)

3336 (16 oz)

Phyton 27 (25 oz)

In the first test, the best eradication occurred with Medallion or Protect. In the second test, the best prevention was given by 3336 and again Medallion. I don't know if these differences mean anything. The first test was performed in late spring while the second was performed early fall. It is possible that the maturity of the leaves played a role in fungicide efficacy.



The *Vinca minor* or periwinkle trial was completed in June of this year. The pathogen in this case was Phyllosticta and we inoculated plants. Plants were sprayed with: chlorothalonil (Daconil Ultrex at 22.4 oz/100 gal), azoxystrobin (Heritage at 4 oz), thiophanate methyl (3336 at 16 oz), the combination of chlorothalonil and thiophanate methyl (Spectro at 32 oz), fludioxinil (Medallion at 4 oz) and pyraclostrobin (Insignia at 8 oz). They were treated on a 14 day interval five times before inoculating on June 16. In this case we wanted to see if repeat preventative treatments could be effective. On 21 June, the number of dead leaves per plant was recorded.

Best control of Phyllosticta leaf spot on periwinkle was seen with Spectro. All of the other products were moderately effective with the exception of 3336 which failed to give any disease control. There is possibly a synergy between thiophanate methyl and chlorothalonil in Spectro since this product gave far better than either fungicide alone or even what you could have reasonably expected by adding the two together. Further testing on anthracnose and related diseases is obviously warranted since results have been so variable and the diseases are so important.

Phyllosticta leaf spot sprays

Daconil Ultrex (22.4 oz/100 gal)

Heritage (4 oz)

3336 (16 oz)

Spectro (32 oz)

Medallion (4 oz)

Insignia (8 oz)

Eradicating Powdery Mildew on Miniature Roses

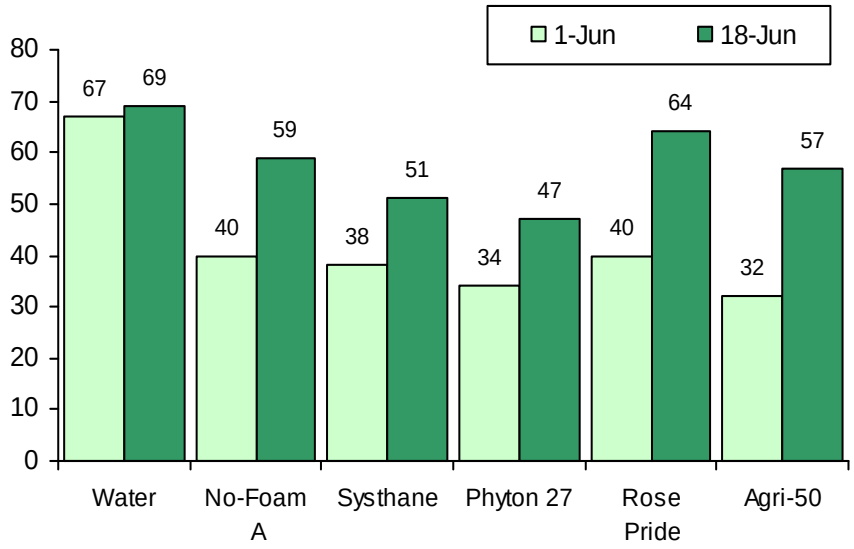
Rose powdery mildew is caused by *Sphaerotheca pannosa*. This fungus attacks almost all roses with equal fervor from garden roses to cut roses and finally miniature roses. There are large differences between cultivars in terms of sensitivity to powdery mildew.

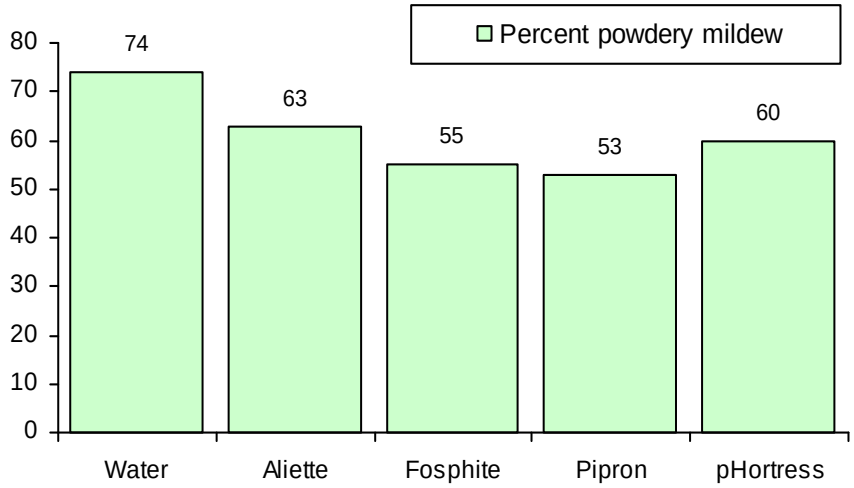
As with most diseases, powdery mildew is best prevented. Our experience over the past ten years has been that powdery mildew is one of the easiest diseases to eradicate. Trials on hydrangea, azalea, Gerber daisy, salvia and herbs have shown that even very advanced infections can be stopped and reversed. Our previous trials with powdery mildew on miniature roses failed to indicate how difficult this pathogen can be to stop even with some of the best fungicides.

We started two trials on 'Raspberry Sunblaze' in late May. The rooted cuttings of this miniature rose cultivar came to us with an active infection of powdery mildew that rapidly reached epidemic proportions. We performed the trials in a poly and shade covered greenhouse on raised benches in 3.5 or 4 inch pots containing Sunshine No. 1. Plants were top-dressed with Osmocote Plus 15-9-12.

The first trial compared a wetting agent (No-Foam A at 8 oz/100 gal), myclobutanil (Systhane at 3 oz), copper pentahydrate (Phyton 27 at 25 oz), triforine (Rose Pride at 50 oz) and Agri-50 (1:300). Products were applied at a 10-day interval four times and only 4 days between the final two sprays. We rated disease (percent infection) every week starting June 1 and ending June 28. The top graph shows the results from two of these ratings.

After a single spray, we were able to see significant and some reduction in powdery mildew infections with all of the products tested to approximately the same degree. We kept spraying and rating and found that disease did not continue to decrease. In fact, disease increased to the level shown at the June 18 rating and by the end of the test several experimental products (not shown) had failed to give any significant reduction of powdery mildew. When we saw the lack of control on a 10-day interval we applied a final spray only 4 days after the fourth spray. The final rating showed that even with a closer interval, poor control was achieved.





The second test started a week after the first and compared some phos-acid products to Pipron a well-known eradicant (8 oz/200 gal). The phos-acids are demonstrated to control downy mildew but little is known about their ability to affect other foliar diseases like powdery mildew. Taking a grower's lead I decided to evaluate a few of them for powdery mildew.

The products were applied as weekly sprays twice at the following rates: Aliette (16 oz), Fosphite (64 oz) and pHortress (64 oz). We found that each of the phos-acids worked as well as the Pipron in this trial although Fosphite was slightly better than the other two.

These two trials show that wetting agents, like No-Foam A, Silwet, Latron B and Capsil (in previous trials on Gerber daisy) can significantly reduce powdery mildew. We also now know that phos-acids reduce powdery mildew as well as downy mildew, Pythium and Phytophthora diseases and occasionally bacterial diseases.

Research Highlights

WESTERN FLOWER THRIPS AND FERTILIZER ON IMPATIENS– Chen, Williams, Harbaugh and Bell recently reported on the effects of tissue phosphorus (P) and nitrogen (N) on populations of Western flower thrips (WFT) and the damage they caused (**HortScience 39:545-550**). The work was performed on Impatiens wallerana 'Dazzler violet' by fertilizing them at two different rates each of phosphorus and nitrogen. WFT were introduced before or after the flowering phase.

The N rates tested did not affect WFT population but the higher rate of P supported higher populations than the lower rate. Number of flowers and plant size were both reduced when plants were infested with WFT during the vegetative phase. Infestation after flowering had started resulted in less damage for obvious reasons. Tissue N was lower in plants infested with WFT than non-infested plants.

HOT WATER DRENCHES FOR BURROWING NEMATODE CONTROL IN PALMS— Quarantine regulations for this serious nematode have led to research on *Radopholus similis* on tropical plants. There are no nematicides approved for certification so Hawaiian researchers, Arcinas, Sipes, Hara and Tsang performed trials on efficacy of hot water drenches. Both Rhapis and fishtail palms were exposed to 50C water for 10 or 16 minutes (**HortScience 39:578-579**). On fishtail palm, a relatively poor host for burrowing nematode, the pest was eradicated after only 10 minutes while on *Rhapis* palm (a good host), mortality of the nematode was 99.6% after 16 minutes. The potting medium was a mixture of crushed volcanic ash and Sunshine Mix No. 4 (sphagnum peat) in a 60-40 ratio (by weight). It will be interesting to see if this treatment can be adapted to other types of plants in other production systems.

SCLEROTINIA CONTROL ON LETTUCE– Matheron and Porchas are plant pathologists at the University of Arizona, Yuma Research Center. They have performed trials for control of lettuce drop caused by *Sclerotinia minor* and *S. sclerotiorum*. Many of the active ingredients they tested are registered on ornamentals and some will be registered. Treatments were applied with a boom sprayer over the tops of the crop the day after infesting with the pathogen and again after 2 weeks. Best control of both species of *Sclerotinia* was achieved with fenhexamid (Decree). Significant control was also found with fludioxinil (Medallion) and boscalid (under development at BASF). The other two products were not better than these and will not be registered on ornamentals as far as we know. For a complete report see **Plant Disease**

Cool Crops Seminar

On June 24, Ann and I attended the Ball Tagawa Growers "Cool Crop Seminar" along with about 60 growers and other crop specialists. There were presentations by Pan American Seed and Sakata concerning new varieties of pansy, campanula, anemone, viola, snapdragon, and dianthus to name a few. John McGee, from Ball Seed and Roger Styer each spoke about growing cool season crops and the special conditions they require.

Chemical reps from SePro, Crompton UniRoyal and Scotts each discussed new products both available to growers and those in the works. Finally, Fred Hulme from Scotts, presented fertilizer information. He said there are definite trends in fertilizing. For instance, today's fertilizers are more complete, meaning that they have the trace elements like iron that plants require. As we continue to research fertilizer use, phosphorus amount has been reduced to minimize plant stretch.

Fertilizer labels now direct more frequent applications at lower rates. Due to concern over drinking water quality, growers and regular people alike are interested in containing fertilizer runoff. Drip lines rather than overhead irrigation are used to get fertilizer right to the plant rather than on surrounding ground. Finally, controlled release fertilizer, while more expensive initially, can target plants more efficiently and last longer than water-soluble types.

- Sue Harris, New Product Development, Chase Research Gardens, Inc.

This year's wall chart is a compilation of the past ten years of Chase Research Gardens' trials. Originally published in Greenhouse Product News, we now offer the updated version in a sturdy wall chart. The highlighted areas show the best products for each disease.

Order your chart today at (530)620-1624 or www.chaseresearchgardens.com. The cost is just $10 each (plus $6 shipping and handling).

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