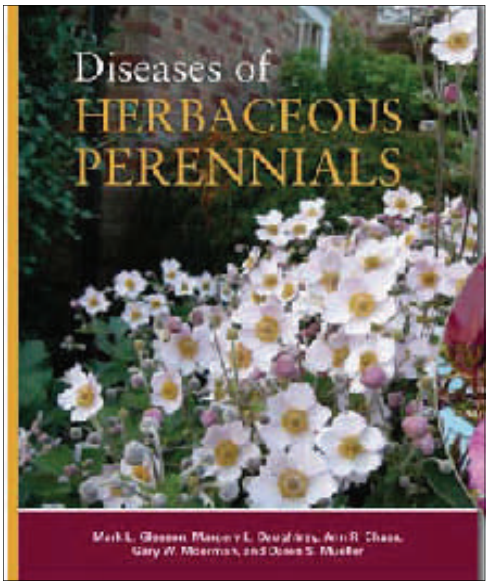
CHASE NEWS

Chase Horticultural Research, Inc. Volume 8—Issue 6 (June)

News from Chase Horticultural Research, Inc.



Visit us this summer and fall at these trade shows:

Ohio Florist Association-Columbus, OH July 12-14

FarWest Tradeshow-Portland, OR August 20-22

BFG Hort EXPO—Brooklyn Center, MN August 25-26

Flowers Canada—Niagara Falls September 11

Announcing our newest book !

Diseases of Herbaceous Perennials is available now. This book features the most up to date information on diseases of this popular group of ornamentals. The book includes 150 plants with 700 color pictures. It also has an introductory section on basic diseases such as root rots, powdery mildew and nematodes. It is arranged by plant alphabetically and ends with a glossary. We are currently offering the book at the same price as the publisher (APS Press) of only $79. In addition we are extending our introductory free shipping and handling until the end of this year.

PowerPoint PDF's available on our website

I am often asked for copies of my PowerPoint presentations and have declined in most cases. I wondered at how helpful these presentations might be on their own without the commentary that accompanies my talks. We did decide to post seven of these presentations (listed in the box below) on our website **www.chasehorticulturalresearch.com** for free download.

Bacterial Diseases
Diagnosis of Common Diseases
Downy Mildew 2008
Biological Products for Ornamental Diseases
Sanitation for the Greenhouse
Rose Diseases
Rust Diseases on Ornamentals

We used a PDF format for them to keep their size manageable since I often include over 100 MB of pictures. We are very interested in any feedback you might have regarding the process, and any of the information on the on the PDF, Are they helpful? What can we add? Is the PDF format good for you? Are there other topics you would like to see presented this way? If you have the time, check these out now. After the end July we will evaluate this feature and it may be discontinued. Your responses will help determine the future.

CONTENTS

Update on ZEBA—For the past two months I have been reporting on a trial we performed using ZEBA from Absorbent Technologies. Results have been encouraging and I have been talking about the product to some of our cooperators in nurseries and greenhouses. One nursery in Sacramento, CA (Matsudas of Sacramento) has completed a quick trial on rooted *Ceanothus* cuttings. I was lucky enough to obtain a picture of the trial from Marty Keil who is in charge of propagation and pest control there. They say a picture is worth a thousand words and this one lives up to the claims. Matsudas is starting some more trials and we have started one with four plants at our place too.

***Ceanothus* cuttings in potting media without ZEBA (left) and with ZEBA (right) at 2 lbs/cubic yard**

Botryosphaeria and its relatives—It is an unfortunate fact of life that there are very few researchers working on ornamentals. There are many more working on agricultural crops like grapes. In the June issue of Plant Disease, Urbez-Torres and Gibler reported on studies of Botryosphaeria and its relatives on grapevine cankers. Since this group of fungi is also often found on trees and woody ornamentals I thought it was important to do a quick review. Their research showed that nine of the fungi tested were able to infect both green and mature tissues of grapevine causing cankers and vascular streaking. *Lasiodiplodia* and *Neofusicoccum* were the most damaging in their studies with *Botryosphaeria* intermediate. It seems likely that these fungi would act similarly on ornamentals making the need to predict all stages of plant development since green and mature tissues are each susceptible. For a full report see Plant Disease 93:584-592.

Anthracnose on euonymus—Cole et al., at Oklahoma State University, reported on efficacy of spraying with a 10% bleach solution immediately after pruning or weeding to reduce pathogen spread. The pathogen tested was *Colletotrichum gloeosporioides* and the plant was *E. fortunei* 'Emerald 'n Gold'. They also tested use of black plastic sheeting under containers which might reduce disease incidence by keeping crop debris from collecting around plants and serving as inoculum for new infections. The trial was conducted for two years and neither the bleach sanitation treatment nor the plastic under plants affected disease severity. The temporary benefits of disinfectants is quite limited for prevention of many diseases as these results show. For a full report see J. Environ. Hort. 27(1):115-118.

Fungicides for Entomosporium on Photinia - We have been getting some samples in our diagnostic lab recently of Entomsporium leaf spot on Photinia. On the west coast we often see them same disease on Raphiolepis (Indian Hawthorne). I decided to review the available reports on fungicide trials. The vast majority of this work was performed by Dr. Austin Hagan at Auburn University and published in **Fungicide and Nematicide Reports** over the past 7 years. The table below shows a summary including the rate and interval used. Overall, the best control has been achieved with weekly sprays of Daconil Ultrex. Spectro also contains chlorothalonil and it performed very well too. Finally, Heritage also gave very good control when used weekly at 4 oz/100 gal.

Fungicide	Rate/100 gal	Interval	Efficacy
3336	16 oz	2 week	Some-very good
Banner MAXX	6 oz	3 week	None-some
Compass O	0.5 oz	1 week	Some-good
Daconil Ultrex	20 oz	2 week	Very good
Daconil Ultrex	1.4 lb	1 week	Excellent
Heritage	4 oz	1 week	Very good
Medallion	2 oz	1 week	None
MilStop	2.5-5 lb	1-2 weeks	Worse than water
Phyton 27	30 oz	1 week	Very good
Spectro 90WDG	16 oz	2 week	Good-excellent

PERENNIAL PLANTS PAGE

One of the most common diseases of perennials is anthracnose. The more new perennials we introduce, the more we see of this group of diseases. Since many of the plants are so new, there is relatively little research performed on them directly. This page summarizes some recent work done on anthracnose on other crops that can be applied to perennial anthracnose.

Anthracnose control with fertilizer or fungicide dips—Daugovish, Su and Gubler reported recently on the efficacy of fungicide dips for controlling anthracnose on strawberry (HortTechnology 19(2):317-323). The strawberry anthracnose they tested was caused by *Colletotrichum acutatum*. While you might not be growing strawberries you may be growing another crop with anthracnose issues (many woody ornamentals are susceptible to a variety of these fungi). The most effective products tested included azoxystrobin (Heritage), a combination of boscalid and pyraclostrobin (Pageant) and a combination of fludioxinil and cyprodinil (not legal for use on ornamentals at this time). These three products reduced disease by 50-92% and increased plant growth (100%) and subsequent fruit yield. Dipping in chlorothalonil (Daconil) or captan decreased anthracnose but did not increase growth. Finally, propiconazole (Banner MAXX) and trifloxystrobin (Compass) did not consistently reduce disease severity.

In another recent research article, Smith (USDA-ARS at Poplarville, MS) reported on the effect of nitrogen on severity of strawberry anthracnose caused by *Colletotrichum fragariae*. The level of P and K did not influence disease severity while disease did increase as nitrogen fertilizer increased. Nitrogen source was also important with less severe disease when the source was Ca(NO3)2 Than when it was ammoniacal. Some research performed at the University of Florida proved that the exact fungus that causes cyclamen anthracnose may be the same as one fo the attacking strawberries. This it seems likely that this information on controlling strawberry anthracnose can be applied to some perennials suffering from Colletotrichum anthracnose diseases. See Plant Health Progress doi:10.1094/PHP-2009-0609-01-RS.

The table to the right is a summary of our trials in the past three years on cyclamen anthracnose. The best control has been seen with strobilurins (Disarm C, Heritage, Insignia, and Pageant). Choosing one of these and rotating with Phyton 27 or Spectro (do not use if flowers are present). Always rotate to avoid resistance development

Summary of CHR trials on Cyclamen anthracnose

Fungicide	Rate/100 gal	Efficacy
Chipco 26019	16 oz	some-good
Cleary 26/36	64 oz	very good
Cleary 3336	16 oz	some
Clevis	32 oz	good
Cygnus	6.4 oz	some
Daconil Ultrex	22.4 oz	some
Disarm C*	2-4 oz	some to excellent
Endorse	1.1-2.2 lb	some
Heritage	2-4 oz	good-excellent
Insignia	10 oz	excellent
Medallion	4 oz	good-very good
MilStop	2.5 lb	poor
Pageant	8 oz	good-excellent
Palladium*	4-6 oz	very good-excellent
Pentathlon	24 oz	good
Phyton 27	15 oz	excellent
Rhapsody	128 oz	good
Spectro	24 oz	excellent
Tanos*	8-10 oz	poor-good
Terraguard	8 oz	none
Trinity	4 oz	some
Veranda O	7 oz	poor

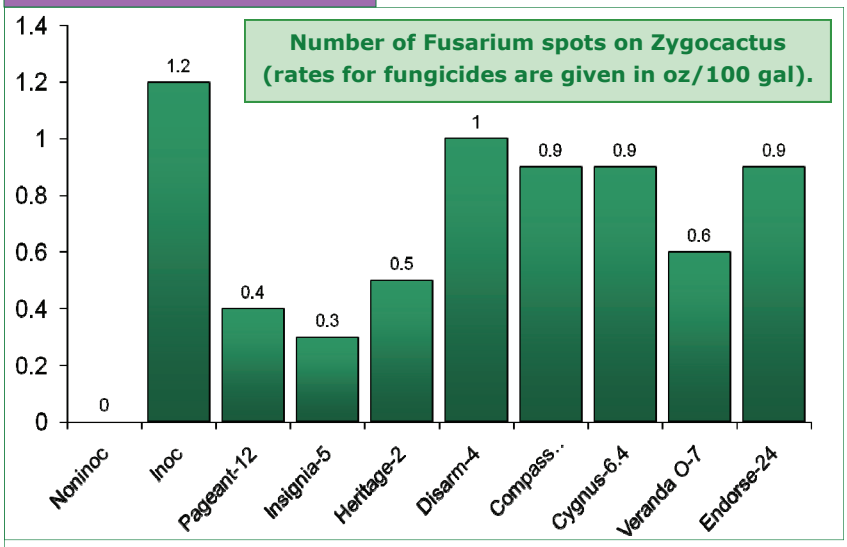
*** Not currently labeled for ornamental use—so don't!**

DISEASE ALERT

Papaya mosaic virus on *Portulaca*—I recently saw this disease (PapMV) for the first time (confirmed by Agdia Inc. in Elkhart, IN). In 1997, researchers in Florida first reported this potexvirus on *Portulaca.* Symptoms might not be as obvious during cooler periods but plants showed stunting and distorted leaves with yellow mottling. The virus is spread mechanically by tools and hands as well as using contaminated cuttings. It is therefore very important to discard all plants that have tested positive for PapMV. One reference lists treatment of pots, tools and benches with 10% household bleach as well as eliminating weeds in the growing area. Viruses have a habit of hanging around greenhouses when their symptoms are mild or they invade weeds. Remember that they do reduce plant vigor and thus increase production costs even if they do not kill their host plant.

RESEARCH TRIALS

Fusarium stem rot on Zygocactus—We struggle with trials on Fusarium in a different way from most trials. We don't usually have trouble creating the disease but we do have trouble finding a fungicide that actually controls Fusarium. This month we report on a trial we ran with Zygocactus for control of *Fusarium oxysporum* causing stem rot. The plants were treated twice on a weekly interval with the inoculation occurring between the two fungicide sprays directed to their crowns. We rated severity of Fusarium by counting the number of active spots 14 days after the second spray. The products and rates are shown in the graph. We chose to test many strobilurin fungicides (Pageant, Insignia, Heritage, Disarm O 480SC, Compass O and Cygnus) and two fungicides with polyoxorim (Veranda O and Endorse). None of the products performed better than the inoculated control based on statistics. However, the lowest number of spots was found on plants treated with Insignia and Pageant, each of which contain pyraclostrobin. In our trials on Fusarium disease on other ornamentals we have found good control with pyraclostrobin as well.



Botrytis blight on Hydrangeas during storage– One of the most difficult disease situations occurs during long-term storage of crops. Access is limited and the products labeled for use are minimal. We decided to conduct a trial last winter-spring on hydrangeas in cold storage (to initiate flowers). The plants were treated the day before going into storage with the no treatment, the grower standard (Daconil) or Pageant (18 oz/100 gal). They then were stored for 9 weeks at 39 F. When removed from storage the severity of Botrytis blight was recorded using the following scale: 1 (no *Botrytis* sporulation or damage), 2 (slight *Botrytis* sporulation or damage) and 3 (moderate *Botrytis* sporulation and damage). None of the plants were killed by *Botrytis* during this test. Untreated plants had an average rating of 2.1 with only 14% of the plants without any *Botrytis*. Plants treated with Pageant had an average rating of 1.7 with 46% of the plants without any *Botrytis* and those treated with Daconil had a rating of 1.6 with 48% of the plants without any *Botrytis*. Both Daconil and Pageant provided a reduction in overall severity of Botrytis and dramatically reduced percentage of plants with active Botrytis.

Thanks to Laurie Constable, Romeo Packing for all her help.

NEW PRODUCTS FOR PYTHIACEOUS FUNGI

There has been a minor explosion of new active ingredients and thus products for control of pythiaceous fungi in the past few years. The table to the right shows some of the newer products as well as some industry standards. You can see if you check the mode of action column that this list represents many different groupings making resistance management through rotation a real possibility. Many of the newer products are in MOA groups that are new to our industry too. Some of the new products work better on *Phytophthora* than on *Pythium* (mandipropamid and Adorn).

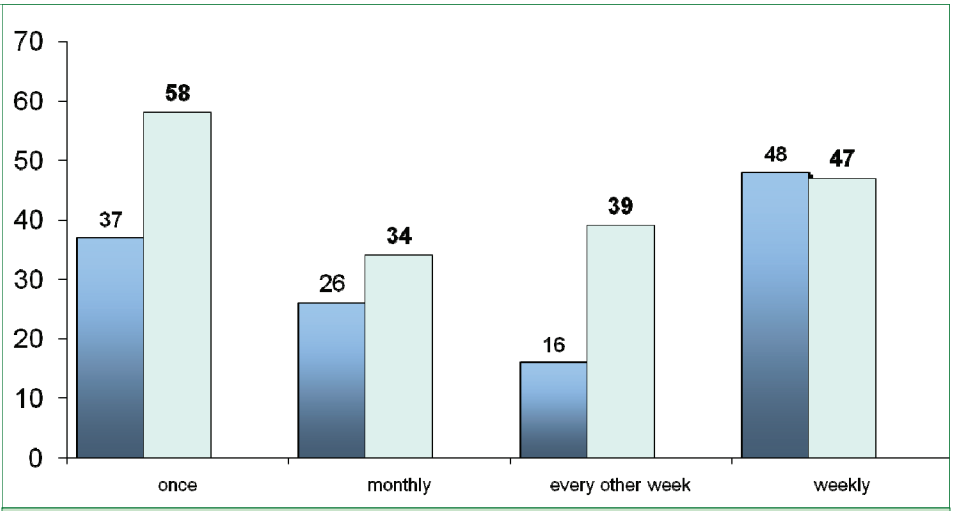
Fungicide trade name	Active ingredient	Mode of action group	Manufacturer
Adorn 4SC	Fluopicolide	43	Valent
None at present	Mandipropamid 250SC	40	Syngenta
FenStop 500SC	Fenamidone	11	OHP
Segway 400SC	Cyazofamid	21	FMC Corporation
Subdue MAXX	Mefenoxam	4	Syngenta
Terrazole, Truban	Etridiazole	14	OHP, Scotts
Aliette	Fosetyl aluminum	33	OHP

Many trials have been performed by researchers at Michigan State University (Hausbeck), North Caroliina State University (Benson) and the University of Florida (Norman). The most recent results are shown in the table below (work conducted at Michigan State mainly). It is clear that some industry standards remain excellent choices for both *Phytophthora* and *Pythium:* newer products like Adorn have proven excellent on most Phytophthora diseases in trials I have seen but results on Pythium control are variable and less impressive. Mandipropamid appears to be similar with excellent control of *Phytophthora* and little if any control of *Pythium*. FenStop and Segway are also recently labeled for ornamentals and they are each excellent on *Phytophthora*. Segway has also been very good on *Pythium* spp. control in our trials while results on FenStop have been variable on this pathogen. If you can keep track of research on new fungicides it should save you from making costly mistakes. It is the only way to get an idea of how they compare to the standards you are currently using.

Fungicide	Rate/100 gal	Pathogen and plant	Efficacy
Adorn 4SC	1-2 oz	Phytophthora on poinsettia, gerber daisy, snapdragon	Excellent
		Pythium on geranium and snapdragon	None to good
Mandipropamid	8.2 oz	Phytophthora on gerber daisy and snapdragon	Excellent
		Pythium on geranium and snapdragon	None
FenStop 500SC	14 oz	Phytophthora on gerber daisy and snapdragon	Excellent
		Pythium on geranium	None
Segway 400SC	3-6 oz	Phytophthora on poinsettia and gerber daisy	Some to excellent
Subdue MAXX	1 oz	Phytophthora on poinsettia, gerber daisy and snapdragon	Excellent
Terrazole 35WP	8-10 oz	Phytophthora on poinsettia, gerber daisy and snapdragon	Variable from poor to excellent
		Pythium on geranium and snapdragon	Excellent

MORE RESEARCH HIGHLIGHTS

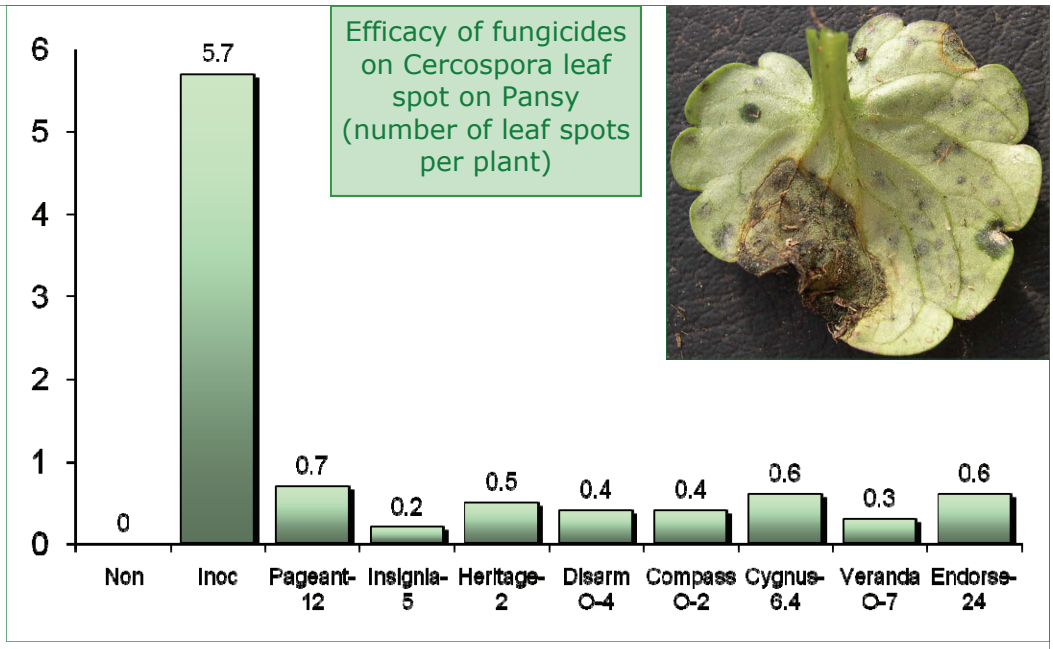
Pythium root rot control on Callas—We have worked for a number of years to find a successful treatment for callas to prevent Pythium root rot. This year we tried two rates of Phyton 27 (25 or 50 oz/100 gal) used on different intervals (once, weekly, every other week or monthly). Since you cannot tell whether your callas may get *Pythium, Erwinia* or more rarely *Rhizoctonia* it may pay to use a product that can combat all three such as a copper fungicide/bactericide like Phyton 27. It is also true that many crops we have tested were free of these pathogens. In this case, we had Pythium root rot.



Effect of Phyton 27 rate and interval on percent of healthy roots on Calla (blue bars = 25 oz/100 gal and green bars = 50 oz/100 gal)

We started the trial in February and completed it in late May. By this time, the plants were just starting to flower. We rated top growth and at the end root growth. The graph shows the response of the plants with a percentage of healthy appearing roots. In general, the plants treated with the 25 oz rate (blue bars) of Phyton 27 had fewer healthy roots than those treated with the 50 oz rate (light blue bars). The rates were equally effective when used weekly. The best roots were those on plants treated a single time with the 50 oz rate. This may indicate that repeated use at the high rate might hurt the plant somewhat but the benefits in fighting *Pythium* outweigh the damage. I wish these results had been seen routinely but unfortunately, results vary from crop to crop. At this point, I would use a single one-time drench with 50 oz/100 gal of Phyton 27.

Cercospora on pansy—we just finished a quick trial on Cercospora leaf spot on pansy ('Supreme Yellow'). Plants were sprayed three times on a weekly interval with inoculation after the first spray. They were maintained under intermittent mist to promote disease. The graph to the right shows the products, rate (per 100 gal) and results. We tested many of the strobilurins fungicides (Pageant, Insignia, Heritage, Disarm O, Compass O and Cygnus) which all provided excellent prevention of Cercospora leaf spot on pansy. In addition, Veranda O and Endorse (each containing polyoxorim) were equally effective. These products were safe used at the rates indicated. Specific products that are closely related may give equal control in some cases such as the one reported here.



Efficacy of fungicides on Cercospora leaf spot on Pansy (number of leaf spots per plant)

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