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CHASE RESEARCH GARDENS, INC.

CHASE NEWS

Phytophthora ramorum Research Update

Sudden oak death (SOD) or Ramorum Blight is a popular topic of conversation in many circles. While lawyers are fighting out legal issues surrounding this serious disease, researchers have been busy looking for it everywhere and testing susceptibility of many of our horticultural crops. By 2002, there were teams of researchers scouring our woodlands and nurseries for any signs of this pathogen. Last month I saw the results of some of this work presented as posters at our annual American Phytopathological Society (APS) meeting.

Olson et. al reported on surveys of Oklahoma nurseries. They processed 99 samples in 2002 and 72 in 2003 with all negative. In 2004, 2 positive samples were found of the 178 tested as a result of the infamous outbreak on Camellia in the late spring. Apparently, other species of Phytophthora can easily outgrown *Phytophthora ramorum* making its detection using standard isolation techniques somewhat difficult.

Zwart et al. reported on incidence of *Phytophthora* spp. In a hardwood forest in the southern Appalachian mountains. There work identified *P. cinnamomi, P. heveae* and other unidentified species of *Phytophthora* occurring naturally in these North Carolina woodlands. There were no visual signs that these *Phytophthora* were present making screening for *P. ramorum* in the woods a needle in a haystack.

Meanwhile, researchers in Oregon are checking *P. ramorum* isolates for relative virulence. Parke and Roth obtained isolates of the pathogen from evergreen huckleberry, tanoak, *Pieris, Viburnum* and rhododendron and tested them for ability to produce sporangia as well as cause disease on known hosts of Ramorum blight. There are two genotypes of *P. ramorum* and these researchers found that the European type (A1) produced more sporangia and was more virulent than the North American genotype (A2). It is hoped that this type of research will eventually allow us to determine how serious each outbreak can be.

Two papers were printed in Plant Disease (September, 2004—PD 88:993-999). A team of researchers in Maryland and Rhode Island completed studies on susceptibility of 51 Ericaceous ornamentals to *P. ramorum*. They developed an inoculation method that compared susceptibility without wounding. The table below summarizes some of their results.

Plant	Susceptibility
Cranberry	Very low
Highbush blueberry	Very low
'Hino Crimson' azalea	Very low
Leucothoe spp.	Very low
Pieris japonica	Low-moderate
California bay laurel	Low-moderate
Rhododendron 'Cunnigham's White'	Moderate
Rhododendron 'Nova	High
Mountain laurel (*Kalmia spp.*)	Extremely high

Finally, Maloney et al. reported on disease progression on Pacific madrone (*Arbutus menziesii*) infected with both *P. ramorum* and *Botryosphaeria dothidea* (Plant Disease 88:852-857). When seedlings were exposed to natural levels of *P. ramorum*, 50-66% died. Both pathogens were capable of attacking these seedlings. While *P. ramorum* does most damage during the winter rainy months, *B. dothidea* causes most damage during the summer drought. The authors speculate that *P. ramorum* may initiate branch dieback during the winter with *B. dothidea* furthering the damage during the summer. *Botryosphaeria dothidea* is considered an opportunistic pathogen and this interaction may be a serious problem on madrone. This interaction should alert us all to the potential for similar syndromes developing in our nursery crops. Another possible outgrowth of this information is use of madrone seedlings or of course Kalmia as biological assays either in the forest itself or in our detection facilities.

We all have a tendency to ignore information that does not obviously or immediately affect us. However, we would be wise to look at research on many crops for potential use in preventing or treating ornamental diseases. It may save us major losses in the future.

Inside this issue:

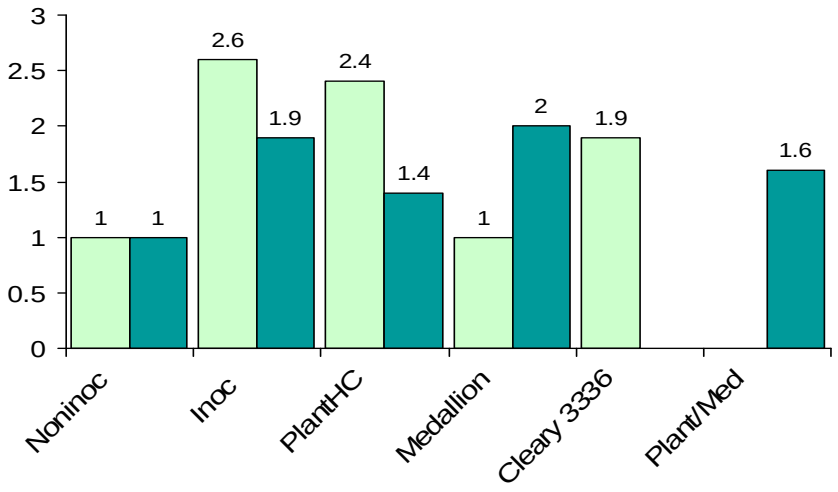
Efficacy of PlantShield HC on Two Soil-borne Diseases

We have been testing PlantShield HC and some experimental biological control products (data not shown) over the past year. Two of the most recent trials were against Rhizoctonia stem rot (canker) on Impatiens and Fusarium wilt on Cyclamen. Trials were performed preventatively with the biological agents compared to chemical standards like Medallion and 3336.

The Fusarium trial was performed using Cyclamen 'Intermezzo White' planted in 4 inch pots containing Sunshine No. 1. Plants were top-dressed with Osmocote Plus 15-9-12 and grown on a greenhouse bench. Fungicide drenches were applied at the rate of 1 pint/square foot surface area on a 14 day interval. This allowed a full drench of the pot with slight drip through. The first of four applications was made on 16 June and plants were inoculated on 18 June. Treatments are shown in the turquoise box directly below the table.

Symptoms started as early as 4 August but we continued the trial until 19 August when disease was rated on the following scale: 1 (no disease, healthy), 2 (slight yellowing of lower leaves or wilting), 3 (moderate yellowing and wilting), 4 (severe yellowing and wilting) and 5 (plant dead).

PlantShield did not control Fusarium wilt on Cyclamen in this trial. Previous trials this year using 8 oz/100 gal showed good disease control so our rate in this trial was apparently too low. Medallion has been one of the best fungicides for control of this disease but at the 2 oz/100 gal rate tested it too failed. Previous trials with this product have usually shown best control when using 4 oz/100 gal. Even the combination of PlantShield HC and Medallion was ineffective. This brings up the question of whether or not you can reduce recommended rates of products when you tank-mix them. At least in this case the answer is apparently not.



FUSARIUM TREATMENTS

PlantShield HC—4 oz/100 gal

Medallion—2 oz/100 gal

PlantShield HC and Medallion—4 oz and 2 oz/100 gal

RHIZOCTONIA TREATMENTS

PlantShield HC—8 oz/100 gal

Medallion—1 oz/100 gal

Cleary 3336—16 oz/100 gal

The trial on Rhizoctonia canker on Impatiens was run using 'Dazzler White' planted in 3.5 inch pots containing Sunshine No. 1 and top-dressed with Osmocote Plus 15-9-12. They were treated using a sprench (about 1/2 inch of the potting medium is saturated). Treatments are given in the light green box above and were applied four times on a 14 day interval starting on 5 July. Plants were inoculated on 9 July and again on 29 July as we were seeing so few symptoms.

PlantShield HC failed to give any control of this Rhizoctonia canker at the rate tested. Although, PlantShield is very effective on Rhizoctonia root rot it may not be ideally used in cases of stem rot. Tests on control of poinsettia cutting rot have indicated good control with PlantShield so I thought it could be effective in this case as well. We do inoculate the potting medium around the plant and not the plant directly.

Medallion gave 100% prevention of Rhizoctonia canker on Impatiens in this trial but 3336 was only slightly effective even when used at 16 oz/100 gal.

Be sure to use the recommended rate of all products and don't assume that a lower rate will be effective even when tank-mixing products.

Fusarium wilt on Cyclamen

Rhizoctonia canker on Impatiens

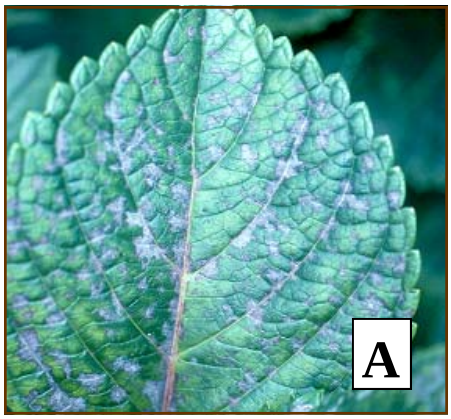
Answers to Crossword Puzzle

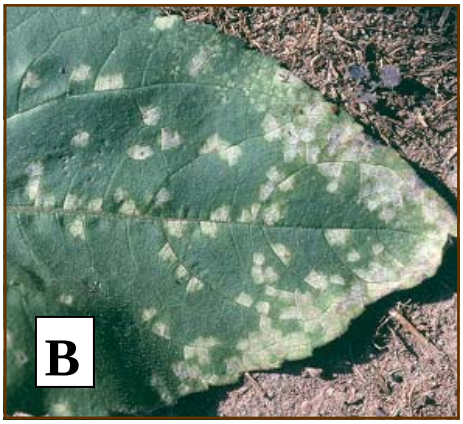
ACROSS	DOWN
1-Phyton 27	2-OHP-6672
4-Strike	3-Heritag
5-Cygnus	5-Camelot
6-Chipco 26019	8-Subdue MAXX
7-Systhane	9-Banrot
14-Terraguad	10-Rhapsody
16-Aliette	11-Banner MAXX
17-Contrast	12-Medallion
18-Terraclor	13-Stature
	15-Decree

Late Summer-Early Fall Disease Focus

I spent a few days recently visiting growers. As usual I found some things I recognized as well as some that were new to me. A few of the diseases that are causing losses right now are Pythium root rot on hydrangea and poinsettia, powdery mildew on hydrangea (A-right), Botrytis on hydrangea, downy mildew on sunflowers (B-right) and Fusarium on cyclamen. I also had a chance to see some foliage plants including African violets and *Aphelandra* (Zebra plant) both with Corynespora leaf spot (C-right).

In one operation, it was a treat to see some of the newer flowering pot plants including *Mimulus* (monkey flower) and *Thunbergia* (black-eyed Susan). There were three species (or cultivars) of *Thunbergia* and all were affected by an unidentified leaf spot that also attacked flowers on the purple version (D-right). When we cultured from the spots we recovered both *Fusarium* and *Corynespora* (related to *Alternaria* and *Helminthosporium*). I worked on *Corynespora* while at the University of Florida. You will find below a partial listing of the plants that are attacked by *C. cassiicola*. The host range is very large and appears to be increasing as fast as we develop new plants for it to attack.





A—Powdery mildew on Hydrangea

B—Downy mildew on sunflower

C—Corynespora leaf spot on Aphelandra

D—Corynespora/Fusarium leaf spot on Thunbergia

Some Reported Hosts of *Corynespora cassiicola*

Aeschynanthus pulcher (lipstick vine)	*Dracaena* sp.	*Lonicera* (honeysuckle)
Ananas comosus (banana)	*Epipremnum aureum* (pothos)	*Lupinus* spp.
Aphelandra (Zebra plant)	*Euphorbia pulcherrima* (poinsettia)	*Molucella* (Bells of Ireland)
Begonia sp.	*Ficus* spp.	*Passiflora* sp.
Capsicum annum (pepper)	*Fittonia* (nerve plant)	*Peperomia* spp.
Carica papaya (papaya)	*Hydrangea macrophylla*	*Phaseolus* spp. (beans)
Catharanthus roseus (Vinca)	*Ipomoea batatas* (sweet potato)	*Radermachera* (China doll)
Cattleya sp.	*Jasminum* sp.	*Saintpaulia ionantha*
Columnea sp.	*Lantana* sp.	*Salvia* spp.
Cordyline	*Ligustrum chinense*	*Tolmiea*

Some of the other diseases was are seeing lately are *Pythium* and *Phytophthora* on *Salvia*, *Lavandula* spp. and of course rosemary. These plants are drought tolerant but not very tolerant of excess water and fertilizer commonly found in container nurseries. Growing these crops and others that prefer drier climates (like *Cistus*—rock rose) in a nursery can be a challenge. Try to back off on water and fertilizer and consider a preventive fungicide drench (or in the case of Aliette—spray) for *Pythium* and *Phytophthora*. These two pathogens are so common on these crops that prevention may be the best way to control losses.

As the season changes, plants are especially stressed and more susceptible to Pythium. Try to keep up with the weather patterns and water accordingly to minimize the damage.

Products in Review—Milstop

Milstop has been known as a powdery mildew product for quite a few years. The active e ingredient is potassium bicarbonate and was sold for a time as FirstStep by Cleary Chemical. Currently, the one of the product is sold by BioWorks. There are a very long list of diseases listed on the MilStop label, although little research has been published.

In February, at the SAF Pest Management Conference I presented a summary of research experience with MilStop. Tests on Botrytis blight, downy mildew and scab (poinsettia) each showed some control. Powdery mildew trials were best with very good to excellent control. Myrothecium leaf spot control was poor with MilStop. In addition, reports in **Fungicide and Nematode Tests** on control of black spot on rose and Entomosporium leaf spot on Photinia showed no control was achieved with MilStop. Control of powdery mildew was reported as some to good.

Over the past year, we have been testing the limits of Milstop. We tested three rates (1.25, 2.5 and 5 lbs/100 al) on Botrytis (pansy and primrose), powdery mildew (Gerber daisy), downy mildew (stock), rust (geranium) and Pseudomonas leaf spot (snapdragon). The table shows the results of these six trials. We evaluated efficacy and safety (in parenthesis). Most trials were preventative but we did do one Botrytis trial on primrose with a moderate infection when we started.

MilStop gave good to very good control of Botrytis on pansy flowers at 2.5 and 5 lb/100 gal but caused leaf burn at both rates. It gave some control of Botrytis on primrose and was safe at all rates tested. Downy mildew on stock (*Matthiola incanae*) is caused by *Peronospora parasitica*. Control with MilStop was very good to excellent at 2.5 or 5 lbs/100 gal. Leaf distortion did occur on stock sprayed with the 5 lb rate. Powdery mildew on Gerber daisy was effectively controlled with all rates tested, although control was best with the 5 lb rate. All rates were safe on this crop. Rust (*Puccinia*) on geranium was also effectively controlled with higher rates giving the best control. All rates were safe on geranium.

Finally, I was interested to see if MilStop would control bacterial leaf spot. We tested prevention of Pseudomonas leaf spot on snapdragons. Unfortunately, the product had not effect on this bacterial leaf spot.

It remains to be seen whether or not MilStop can provide acceptable levels of control of all of the diseases on the label. Our recent trials do show that this fungicide can provide good control of more than just powdery mildew, including Botrytis, downy mildew and rust.

Disease	Host plant	Preventative or Curative	1.25 lb/ 100 gal	2.5 lb/100 gal	5 lb/100 gal
Botrytis	Pansy flowers	Preventative	Some (phyto)	Good (phyto)	Very good (phyto)
Botrytis	Primrose leaves/flowers	Curative	Some (safe)	Some (safe)	Some (safe)
Downy mildew	Stock	Preventative	Not tested	Very good	Excellent
Powdery mildew	Gerber daisy	Preventative	Good (safe)	Good (safe)	Excellent (safe)
Pseudomonas leaf spot	Snapdragon	Preventative	None (safe)	None (safe)	None (safe)
Rust	Geranium	Preventative	Good (safe)	Very good-excellent	Excellent (safe)


Geranium rust


Gerber daisy powdery mildew


Stock downy mildew