

CHASE NEWS

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Have You Seen These Diseases?

I spent a couple of days in Texas last week and enjoyed meeting with some of the people who have worked with us on diagnostics and as well some new growers. Over the course of the nursery visits, I saw some diseases that were cropping up over and over. Some of these are more common in the warmer states but since we cannot control our weather, we all should watch out for them.

Choanephora Wet Rot on Hibiscus

Wet rot is caused by the fungus *Choanephora cucurbitarum*. The fungus is most common in vegetable production with losses in green beans, pepper and squash. I saw the disease occasionally when I worked at the University of Florida,



primarily on hibiscus (left). It has also been troublesome on petunia, poinsettia, *Althea* (Rose-

of-Sharon), and cotton from time to time. In 1999, McGovern reported on chemical control of wet rot on poinsettia. The best treatment was Phyton 27 (25 oz/100 gal) used on a 7-day interval. Daconil Ultrex (1.4 lb/100 gal) was almost as effective on a 14-day interval followed by Heritage (4 oz/100 gal) on a 7-14 day interval.

Rhizopus Blight on Vinca

I also saw *Rhizopus* blight on vinca (*Catharanthus*) (right). This disease has been found on Crossandra, poinsettia, phlox and vinca in years past. The cause is *Rhizopus stolonifer* which is a relative of *Choanephora*. It is possible that fungicides



that are effective on one will be effective on the other. I have not been able to find any trials reporting chemical control, although the Daconil (chlorothalonil) label does list *Rhizopus* as a flower blight it can control. Be sure to follow the label for appropriate rates and intervals. In our trials, we have seen flowers damage when chlorothalonil is used on open flowers. Perhaps the disease is controlled partially by the death of the infected flowers.

Anthracnose on Mandevilla

I have been seeing problems on Mandevilla cuttings in the past three years with *Phytophthora* and *Fusarium* most common. When we looked at these plants, it seemed likely that one or both of these fungi were involved. I was surprised to see only *Colletotrichum* on the culture plates. *Colletotrichum* is common on woody ornamentals like *Camellia* and *Euonymus*.



The most effective fungicides for other anthracnose diseases caused by *Colletotrichum* include chlorothalonil, mancozeb and azoxystrobin. Be sure to get an accurate diagnosis since even "experts" like me can guess wrong. A lab diagnosis is

the best way to avoid the cost of applying the wrong fungicide.

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Fungicide Drenches for Bulbs Infected with Pythium

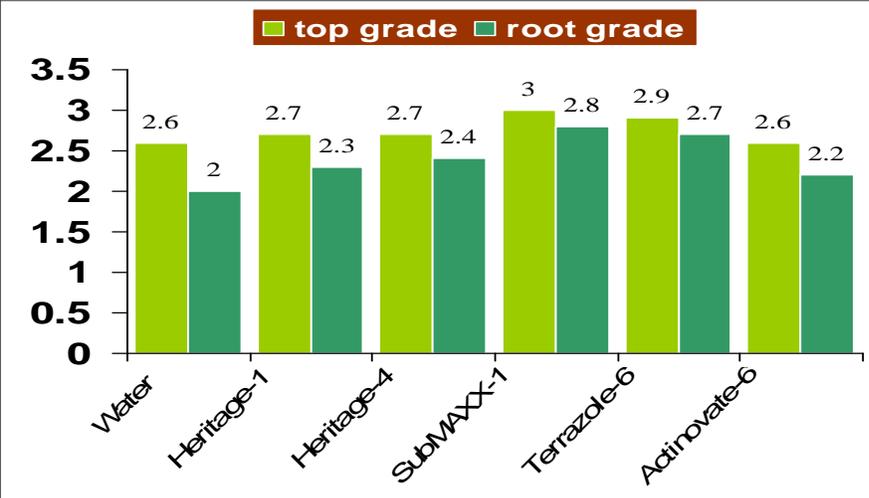
We have been working on different bulbs, corms and rhizomes in the past few months to determine the potential benefits of using fungicide drenches after planting. Results have been variable. I present here those for the most recent trials—one on Ranunculus and one on Calla lilies.

At the end of March, we started a test on Ranunculus with a few products. The fungicides were applied as drenches on a 14-day interval, starting the day after they were planted. We used 3.5 inch pots and Sunshine No. 1, top dressed with Osmocote Plus 15-9-12. Due to variation in reaction of bulbs in previous trials we used 30 bulbs per treatment (each in their own pot).

Treatments were applied a total of four times. The treatments included were: water, Heritage at 1 or 4 oz/100 gal, Subdue MAXX at 1 oz/100 gal, Terrazole 35W at 6 oz/100 gal and Actinovate at 6 oz/100 gal. Products were applied a drenches at 35 ml per 3.5 inch pot which resulted in a full pot drench with a small amount of product dripping through the drainage holes. Plants were grown in an unheated greenhouse.

The date each bulb emerged was recorded and after 95% had emerged we evaluated the effect of fungicide treatment on emergence. We found that none of the fungicides significantly affected emergence although all fungicide treated plants emerged a little faster than the water treated controls.

We rated top grade and root grade at the end of the trial (mid May) on the following scale: 1 (dead), 2 (poor), 3 (good), 4 (very good) and 5 (excellent). The data are shown in the graph to the right, above. Top grade (light green bars) was not significantly affected by fungicide treatment and was overall rated good. Root grade (dark green bars) was significantly affected with Subdue MAXX treated plants having better roots than the water-treated control. In previous isolations we have found Pythium root rot on Ranunculus and the positive root growth resulting



Ranunculus—Fungicide rates are given in oz/100 gal applied as a drench. Root and top grade were rated on the following scale: 1 (dead), 2 (poor), 3 (good), 4 (very good) and 5 (excellent).

from Subdue MAXX is consistent with a Pythium infection.

The other trial recently completed was on Callas. In this trial we planted calla ‘Rubylite’ bulbs in 5 inch pots containing Sunshine No. 1. Bulbs were top-dressed with Osmocote Plus 15-9-12 and the trial was conducted in a heated greenhouse starting on 8 February. We included: water, Terrazole 35W (6 oz/100 gal), Rhapsody (1%), Fosphite (32 oz), Fosphite combined with Rhapsody (same rates), Phyton 27 (25 oz), Camelot (48 oz), Actinovate (6 oz) and Actino-Fe (incorporated in the potting medium at the rate of 5 lbs/cubic yard). Drenches were applied on a 14-day interval a total of five times.

Emergence date was not affected by fungicide treatment. Number of shoots per pot, top grade and number of flowers per pot were also not affected by treatment. The

only rating we made that was affected significantly was the percentage of healthy roots (estimated 2 weeks after the final drench treatment). A small number of the plants had Erwinia and they were eliminated from the root rating. Numbers in the table followed by the same letter are not significantly different using Student-Newman-Kuels method for mean separation.

The best roots were found on plants treated with Phyton 27 and the poorest quality roots were found on those treated with Terrazole. The application of Terrazole on a 2 week interval appears to have caused some phytotoxicity.

I am hard-pressed to suggest an effective fungicide program for most bulbs. It is clear to me that benefits are real but they will be based on the specific disease affecting the bulb and choosing the right product. Overuse reduces root quality the same way that Pythium reduces root

Treatment	% Healthy Roots
Water	68 ab
Terrazole	49 a
Rhapsody	66 ab
Fosphite	64 ab
Rhapsody/Fosphite	68 ab
Phyton 27	74 b
Camelot	55 ab
Actinovate	65 ab
Actino-Fe	56 ab

quality.

Controlling Fusarium Crown Rot on Phormium

Phormium is one of the fastest growing crops in the nursery industry . The disease can appear on un-rooted cuttings or divisions and remains a problem on some cultivars throughout the crop cycle. Even establishment of 5 gallon landscape plants can be a problem since wounding during transplanting can give the Fusarium another entry point. Symptoms are usually loss of older leaves by rotting at their bases.

In mid-February, we obtained one gallon plants with a Fusarium infection. Plants were divided and replanted into fresh potting media (Sunshine No. 1) in 6 inch pots. They were top-dressed with Osmocote Plus 15-9-12 (3-4 month release) and placed on a greenhouse bench. All treatments were applied as a spreng at 50 ml per 6 inch pot as listed above on February 14, March 2, 14, and 28. Actino-Fe was applied only on February 14 when the test was started. On 18 April and 3 May, products were applied as drenches at the rate of 75 ml per pot.



We started evaluating disease control by counting the number of basal leaves lost every month due to Fusarium infection. The cumulative number of leaves lost are given for two dates (8 weeks of treatment and 12 weeks of treatment). At the first rating (April 17) we saw that plants receiving the Heritage had the least leaf loss while four weeks later those receiving the Medallion had the least leaf loss. These two fungicides have been very good to excellent in Fusarium trials on other ornamentals in our trials. We had hopes that Fosphite might be effective after a cyclamen Fusarium wilt trial last summer but it was not effective in this trial on Phormium.

By the end of the trial the best roots and highest top grades were found on the plants in the Actino-Fe treatment. Although these differences were not statistically significant, they were quite noticeable. Further work on this disease is planned for later this year using other fungicides known for Fusarium control including Terraguard and Insignia.

Effect of fungicides treatment on Fusarium crown rot and growth of Phormium

Treatment	Rate/100 gal.	# dead leaves 4-17-07	# dead leaves 5-15-07	% healthy roots 5-18-07	Top Grade 5-18-07
Water	-----	11.4 ab	16.0 ab	24 a	2.9 a
Rhapsody	128 oz	16.0 ab	21.2 ab	22 a	3.0 a
Rhapsody	256 oz	16.3 ab	21.7 ab	24 a	3.0 a
Fosphite	32 oz	12.4 ab	17.1 ab	28 a	3.2 a
Rhapsody/ Fosphite	128 oz/ 32 oz	10.8 ab	13.4 ab	30 a	3.2 a
Medallion	4 oz	10.0 ab	12.0 a	32 a	3.4 a
Heritage	4 oz	9.5 a	12.9 ab	28 a	3.5 a
Actinovate	6 oz	14.0 ab	19.4 ab	25 a	3.4 a
Actino-Fe	5 lb/cubic yd	17.5 b	22.6 b	37 a	3.9 a



Common *Fusarium* Diseases

Boxwood blight, Christmas cacti (cutting rot), Cyclamen wilt, Dianthus crown rot, Dieffenbachia (cutting rot), Dracaena (leaf spot and cutting rot), Gladiolus bulb rot, Hosta crown rot, Iris bulb rot, Juniper (cutting rot), Liriope crown rot, Lisianthus stem rot and wilt, Mandevilla (cutting rot), Ophiopogon crown rot, Phormium crown rot, Prunus (coral spot)

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Research Update—Phytophthora

Two research papers were published in Plant Disease recently targeting Phytophthora.

The first reported on efficacy of propamocarb HCl (Banol and Previcur N) on Pythium control on ornamentals. Hu, Stromberg and Moorman tested the ability of this fungicide to affect growth of *Phytophthora nicotianae* from Virginia nurseries. All 71 isolates were found to be resistant to the fungicide when tested in the lab. However, the fungicide was able to protect geraniums from a zoospore infection but not a mycelial infection when tested in a greenhouse. The researchers suggested propamocarb HCl works best as a preventative and not a curative application for Pythium root rot control. They also mention that testing for fungicide resistance using a culture plate method may not be a reliable indicator of usefulness of the product in the real world. For a full report see: **Plant Disease** 91:414-420.

The second study was performed by Rebollar-Alviter et al. on leather rot of strawberry caused by *Phytophthora cactorum*. These researchers tested ability of several important Phytophthora fungicides to control diseases before and after infection. I have summarized their results in the table below. The two strobilurins (azoxystrobin = Heritage and pyraclostrobin = Insignia for ornamentals) provided excellent preventative control but were less effective in curative action. Mefenoxam (Subdue MAXX for ornamentals) and phosphite (many forms available in ornamentals) provided both excellent preventative and curative action. For a full report see: *Plant Disease* 91:559-564. Research on other crops including grapes (downy mildew) and turf (Pythium blight) has shown excellent curative activity of both phosphite and mefenoxam. In contrast, efficacy of strobilurins in curative situations has been limited (downy mildew on grape and Cercospora leaf spot on beet). This works clearly demonstrates the need to apply products according to label instructions for best effects. Not all products work the same in curative action even when they provide the same level of control in a preventative use pattern.

In March, I attended a meeting held by Syngenta for ornamental researchers. As part of my preparation, I reviewed the research reports I could find on Phytophthora and Pythium control. The table to the right, below shows the results of the summary for phosphites. I included the specific product used, rate, plant and the percentage of control that was achieved.

Overall, the phosphites provide excellent control of Phytophthora diseases. In a few cases, there was 0% control (failure) it may have been due to the rate of product used. Aliette applied as a soil drench at 12.8 oz/100 gal is not always effective on Phytophthora crown rot (calibrachoa, poinsettia, snapdragon, verbena and vinca). The same rate was excellent for aerial blights on pothos and spathiphyll-

Effect of fungicide timing on prevention of fruit rot on strawberry		
Treatment	Curative action	Preventative action
Azoxystrobin	Some control at 13 hrs, none 24 –48 hrs	Excellent up to 7 days before
Mefenoxam	Excellent control up to 36 hrs—some control at 48 hrs	Excellent up to 7 days before
Phosphite	Excellent control up to 36 hrs—some control, at 48 hrs	Excellent up to 7 days before
Pyraclostrobin	Some control at 13 hrs, none 24 –48 hrs	Excellent up to 4 days before, very good at 7 days before

Efficacy of Phosphites on Phytophthora			
Treatment	Rate/ 100 gal	Plant	Degree of control
Biophos	64 oz	Poinsettia	50%
	32-128 oz	Poinsettia	100%
	256 oz	Spathiphyllum	99%
Fosphite	32 oz	Gerbera	100%
Aliette	12.8 oz	Calibrachoa	0%
	12.8 oz	Poinsettia	50%
	12.8 oz	Snapdragon	0%
	12.8 oz	Spathiphyllum	100%, 95%, 72%
	12.8 oz	Pothos	100%
	10 oz	Verbena	0%
	1.1 lb	Vinca	0%
Vital	64 oz	Spathiphyllum	99%
	20-96 oz	Vinca	100%
Phostrol	72 oz	Snapdragon	100%
K-phite	67-267 oz	Spathiphyllum	90%
		Pothos	100%
Alude	32-64 oz	Vinca	50%, 100%

lum.. The use rates for each product are unique and the best rate for your crops and situations is something for you to work out. Starting in the middle of the label range for the phosphate you are using is the best place to start. Remember that it is not always better to use a higher rate.