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CHASE NEWS

CHASE RESEARCH GARDENS, INC.

CANWEST Celebrates its 25th Anniversary

Last week, Mike and I attended a meeting and tradeshow in Vancouver, British Columbia. We have always wanted to visit this part of Canada and were very happy with the opportunity to finally do so.

Before the meeting and tradeshow we walked around downtown Vancouver for about 3 1/2 days. We visited all of the local attractions (see totem poles to the left) and on our trips I spotted some diseases that we have commonly in the US. The weather in Vancouver appears to be relatively mild with plenty of rain. I saw powdery mildew on some hydrangeas and many begonias and the maples were clobbered with this disease. I also found some zinnias with a probable mixed infection of *Xanthomonas* and

Alternaria (above). I only thought for a split second about the fact that I could not verify the cause(s). I also spied some brown rust on geraniums and some rust on Hypericum

On Wednesday, I actually had to give a two-hour talk on detection and diagnosis of ornamental diseases. There was a good crowd and they had a lot of great questions. It always is interesting to find out what I still do not know about diagnosis. The best one is how are *Botrytis* and *Sclerotinia* related? The question was are they the same? I really need to go back to my graduate school days and get an answer to that one.

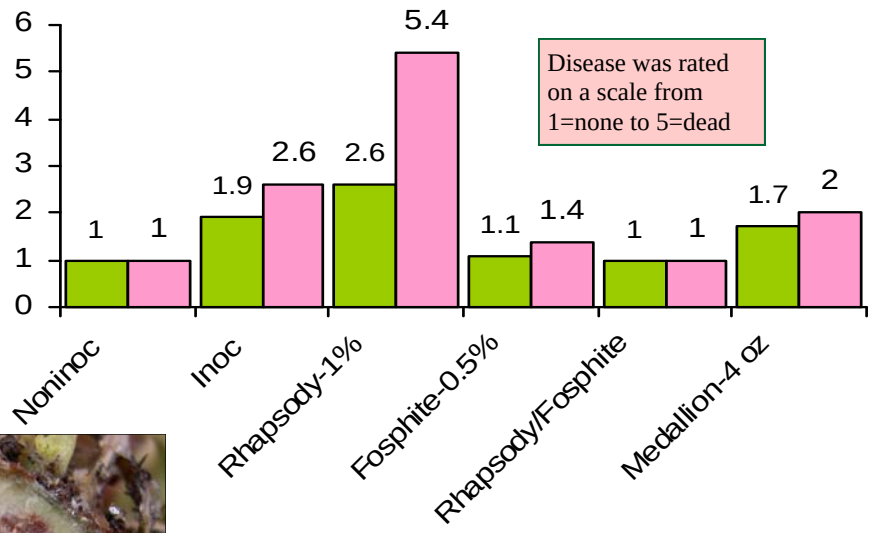
The biggest difference between the US and Canada for the ornamental grower seems to be the number of products they can use on their crops. They really have their hands tied in many instances. Next time you are feeling bad about what you can do about a disease outbreak think for a minute about our northern neighbors. In walking the tradeshow that afternoon we found only one chemical manufacturer present (Phyton Corp.) and I collected 6 fungicide labels (from two distributor booths). The US ornamental market is huge and we receive quite a lot of attention from companies of all sizes. Count your blessings!

Inside this issue:

Phosphonates—Some Unusual Uses—Fusarium wilt on Cyclamen

Last spring we met with AgraQuest researchers to design some trials for Rhapsody. They asked for a couple of trial to compare use of Rhapsody alone and in combination with the phosphonate, Fosphite. Both trials were for use in soil-borne diseases—in this case Fusarium wilt on Cyclamen and Pythium root rot on geranium. Since I had not tested Fosphite for *Fusarium*, I wondered what it would do alone and with Rhapsody.

We started the Fusarium wilt trial at the end of June by treating the plants the day before inoculation with *Fusarium oxysporum* fsp. *cyclamenis* spores. The fungicides were applied as a drench every 14 days for a total of four applications. Rhapsody was used alone at 1%, Fosphite was used alone at 0.5%. The combination was for 0.5% of each and they were all compared to the fungicide standard, Medallion at 4 oz/100 gal. We started seeing significant symptoms of disease about 4 weeks after inoculation. In this trial, we did not see any significant control with Rhapsody alone. Fosphite alone worked significantly more effectively than Medallion. When Fosphite and Rhapsody were used as a tank mix, no symptoms of Fusarium wilt developed during the trial.



AgraQuest reports some similar results in vegetable disease trials. It will be interesting to see if a similar interaction occurs in the Pythium root rot trial on geranium. Watch for the results!

Phosphonates Control Bacterial Wilt of Geranium

Bacterial wilt occurs on some important ornamental crops including pothos and geranium. The disease is caused by *Ralstonia solancearum* (=*Pseudomonas solanacearum*). The bacterium infects plants through water or infected propagative materials (ie. cuttings). In field crops, infested river water is often a source of an infection.

Prevention of disease in greenhouse crops depends on strict sanitation including raised benches, cement floors, purified water, sterilization of cutting tools and use of soil-less potting medium.

Dr. David Norman, research plant pathologist at the Mid-Florida Research and Education Center (U of F) reported on efficacy of a variety of bactericides for prevention of bacterial wilt on geranium (Plant Disease 90:798-802).

The first trial Dr. Norman performed was to determine which bactericides were most effective on bacterial wilt on pothos and geranium. Copper products (Kocide 2000, Phyton 27 and Camelot), Zerotol, Multiguard, a quaternary ammonium product, Serenade (=Rhapsody) and phosphonates (Aliette and K-Phite) were each tested. The only available products that actually prevented infection were phosphonates.

Phosphonates were applied as a drenches on different intervals. Disease was reduced when they were applied a single time but it eventually did result in significant plant loss from bacterial wilt. When products were applied on a 14-day interval twice it was further reduced but only drenches on a weekly interval were 100% effective in protecting the plants. These applications prevented root infection with *R. solancearum* but they did not prevent foliar infections.

Other phosphorus containing compounds (fertilizers like H3PO4 and P205) were not effective.

Can Compost Affect Disease?

Every month I collect scientific reports and articles that interest me and summarize them in his newsletter. Last month I found two that studied effects of compost in one form or another for disease control.

Scheuerell and Mahaffee performed trials to evaluate compost teas on severity of Botrytis blight on geranium. The compost teas were made in different ways (aerated and non-aerated) with different nutrient additives, different production times and use of application adjuvants. Some batches did significantly reduce disease but overall the compost teas were not an effective way to reduce severity of Botrytis on geranium. Increased production time did result in better results with those batches that were effective. Using aeration and nutrient additives had an inconsistent result. The variation in results indicated that the level of control would not meet commercial standards. (Plant Dis. 90:1201-1208).

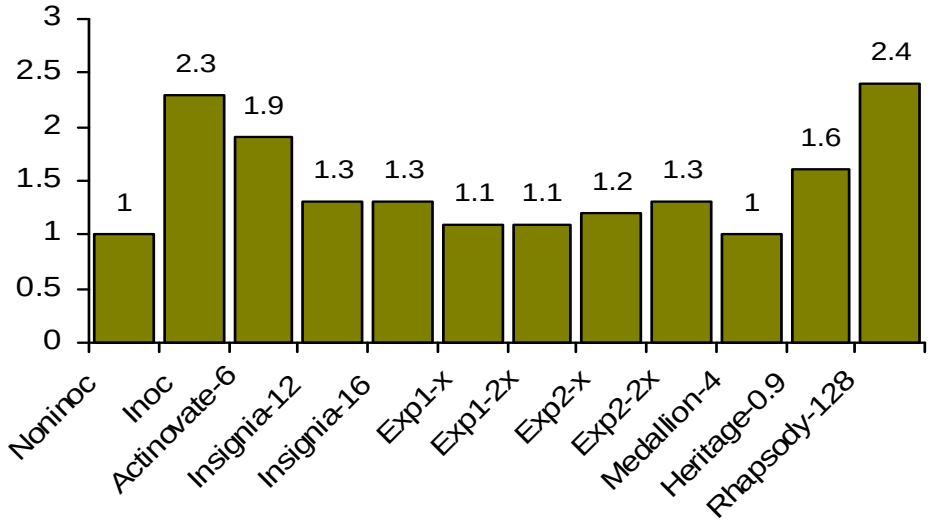
The other study evaluated survival of *Phytophthora* species (including *P. ramorum* the cause of Sudden Oak Death and Ramorum Blight) in different potting media by Linderman and Davis (HortTechnology 16(3):502-507). Potting medium components included peat moss, Douglas-fir bark, redwood sawdust, coir (coconut fiber), sand, clay loam soil and a custom soilless mix (1 Douglas-fir bark: 1 pumice: 1 peat-moss) and a dairy manure-based compost. Isolates of four species of *Phytophthora* were tested (*P. cactorum, P. citricola, P. citrophthora* and *P. ramorum*). The researchers found that the *Phytophthora ramorum* survived in these potting media components as well as other species of *Phytophthora*. Recovery for 6-12 months (depending on which spore was used to inoculate the potting medium) was proven. None of the components was effective in reducing survival.

Cylindrocladium Root and Petiole Rot on Spathiphyllum

After working for the University of Florida for about 10 years, I roughly tallied up the time I spent working on Cylindrocladium on Spathiphyllum. I guessed it to be an entire year. That is a lot of time to spend on one disease on a single ornamental. However, it does indicate the serious nature of the disease and the horrendous losses it caused in the Spathiphyllum production in the 1980's. It also indicated the large number of fungicides that were being researched for ornamentals at the time.

We are currently, entering another opportunity to a large number of new fungicides for ornamentals. We performed a single trial this summer on Cylindrocladium root rot on *Spathiphyllum* 'Sweet Pablo'. We started the trial with a drench applied to plants in 4 inch pots. Most of the plants were inoculated with a spores suspension of the pathogen 4 days later. The plants were drenched every 14 days for a total of 5 applications before we did the final rating of disease.

The disease was rated on the following scale: 1 (none, healthy), 2 (slight yellowing of lower leaves), 3 (moderate wilting, yellowing and browning of lower leaves). None of the plants developed advanced levels of disease in this trial.



Optimal disease prevention occurred with use of Medallion (4 oz/100 gal) or Exp1 (both rates). Exp2 and Insignia were also very effective in preventing Cylindrocladium on Spathiphyllum. Heritage was used at the highest drench rate (0.9 oz/100 gal) and it provided control that was statistically as good as the Exp1, Exp2 and Insignia but was not as good as Medallion.

We also tested two biologicals against this disease with rather poor results. Actinovate (6 oz/100 gal) did provide significant control compared to the inoculated control but Rhapsody (1%) did not give significant control in this trial. It may be that insufficient time was allowed between their application and inoculation with the pathogen.

It is especially interesting to me to see that there are some experimental fungicides being developed with a high level of control of this tough pathogen.

Cyclamen Anthracnose Diseases

Cyclamen anthracnose can be caused by two different fungi. They are *Colletotrichum gloeosporioides* (the perfect state is *Glomerella cingulata*) and *Gloeosporium cyclaminis* (=*Cryptocline cyclaminis*. Interestingly enough, we received samples of each from California growers in the past few months.

Colletotrichum spp. cause anthracnose on lots of different ornamentals from tropical foliage plants to potted flowering crops like primrose, verbena and dahlia. Spots are sunken and small fruiting bodies that are black form in concentric rings. The spores are orange in mass and form in the dead portions of leaves or stems when conditions are moist. They are mainly spread by splashing water since the wind or fans are not sufficient to dislodge them from their sticky mass. Spots can start small but eventually will coalesce and form large blighted areas. On the cyclamen (above) the leaves became tattered and started to fall apart.


COLLETOTRICHUM

Overhead irrigation should be avoided whenever possible and keep the leaves dry by watering when they will dry quickly. The spores do not need wounds to penetrate leaves or petioles. The host range of *C. gloeosporioides* is very wide and when isolates from different hosts were compared they were found to infect nearly all susceptible plants. So it is possible for anthracnose on another plant to become the source of the disease on cyclamen.

The other anthracnose is caused by *Cryptocline*. We have only seen this disease occasionally in the United States although it appears more common in Europe. The spots on leaves are round and brown. The disease can cause stunting and deformity of young petioles and leaves. The vascular system can be discolored and appear reddish brown as when infected with Fusarium. The newest leaves may be tiny and look like they are infested with tarsonemid mites. Sporulation of the fungus is pink-orange and not really very different than that of *C. gloeosporioides*. As far as we know this fungus only attacks Cyclamen. When we saw the disease, I thought it was Fusarium. The leaves were small and there was distinctive browning and actual cavity formation in the infected plants (below). The severity of disease increases as temperatures increase from 60 to 80F. Temperatures either below 60 or above 80F are not favorable for disease development. Although, apparently not proven, seed transmission is suggested as a possibility. In Europe, resistance to benzimidazole fungicides like benomyl and thiophanate methyl has been seen.


CRYPTOCLINE

We are planning to do some trials on both Cyclamen anthracnose diseases in the next few months. Until we have some specific experience with these anthracnose diseases you might consider using products that have been shown effective against other anthracnose diseases.

Update from England

This month, **ADAS Hardy Ornamentals Plant Notes,** reports two diseases as gaining ground in their area. The first is grey mould (*Botrytis cinerea*). They report the disease is primarily affecting the foliage that was scorched during the high temperatures in July. I was surprised to see that as far away as England may be, they actually experienced a heat wave similar to that seen in much of the US. They recommend improving air movement around the plants with ample spacing and minimizing irrigation in the late afternoon. They further suggest a protectant program with fungicides many of which we do not have for ornamental use in the US. Eradicant fungicides listed for Botrytis were iprodione (such as Chipco 26019), Scala (a fungicide being developed for ornamentals by Bayer and OHP) and yet another fungicide we do not have.

The other disease the report focused on is white blister (sometimes called white rust in our literature). This disease (caused by *Albugo candida*) was reported on ornamental cabbage. We see a related pathogen (*Albugo tragopogonis*) on dusty miller. The best fungicides for white blister are those that perform well on downy mildew diseases since the two groups of fungi are closely related.

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