

# CHASE NEWS

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## FLOWERS CANADA MEETING AT NIAGARA FALLS, ONTARIO

Mike and I recently attended a meeting held by Flowers Canada in Niagara Falls. One of the highlights was doing a tour of some greenhouse operations the day before the meeting that was facilitated by Engage. One of the most impressive elements was the implementation of sanitation in most of the greenhouses we toured. The need for fungicides and insecticides was reduced by their extreme dedication to keeping the greenhouses clean and clutter-free.



By the end of the day I was wondering what fungicides were legal for use on ornamentals in Canada. I have put together a listing in the table to the right FYI. You can see that the Canadian growers can still use Funginex (triforine) although we lost that registration in the US over 10 years ago. One thing that I had not seen before was the single site registration. This is true for Actinovate on greenhouse gerberas and Heritage for nursery daylilies for rust control only. The majority of the fungicides have registration in a limited way for either greenhouse or nursery. The fact that sometimes a single product is all that is labeled for a particular pathogen makes rotation for resistance management impossible. Next time you feel sorry about what you don't have available here in the States, check out what is listed here and what is not listed. Even in California and New York there are many more fungicides that are registered.

Fungicides	Registrations
Actinovate	Greenhouse gerberas only
Banner MAXX	Limited nursery
Compass	Greenhouse seedlings/nursery
Daconil Ultrex	Greenhouse/nursery
Dithane	Limited nursery
Funginex	Nursery
Heritage	Daylily nursery only
MilStop	Greenhouse
MycoStop	Greenhouse
Nova (Hoist)	Limited greenhouse/nursery
Phyton 27	Greenhouse
Rhapsody (Cease)	Limited greenhouse/nursery
Subdue MAXX	Limited greenhouse
Truban	Greenhouse only

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## PHYTOPHTHORA SPECIES FROM CALIFORNIA NURSERIES

Phytophthora diseases of nursery crops remain a primary concern throughout the United States. The outbreak of Sudden Oak Death (Ramorum Blight) led to a considerable amount of research in both nurseries and the native woodlands. Plant Pathologists Yakabe et al. at the University of California—Davis and California Dept. of Food and Agriculture recently reported on extensive studies performed on *Phytophthora* spp. obtained from California nurseries. The studies were conducted over a 2 year period (2005-2006) in which 377 isolates of *Phytophthora* were collected from nurseries in 32 California counties. All of the symptoms were described as leaf spots.

I have summarized some of their results in the table to the right. I omitted certain plants and species of *Phytophthora* that were relatively rarely found. The number of x's in each column show the relative frequency of each *Phytophthora* species for that host (x=4-9, xx = 10-19 and xxx=more than 20). You will note the omission of *P. ramorum* which the researchers reported as found in 1% of the total samples examined.

Overall, the most common species of *Phytophthora* was *syringae* followed by *citricola*. Some of the species were thought to be strictly forest inhabitants including *nemorosa* and *pseudosyringae*. The most commonly infected plants were azalea, *Arbutus*, camellia and rhododendron. Azalea and *Pieris* tended to have the most variety in the species of *Phytophthora* recovered from their leaf spots. It is interesting to note that some of those listed have species that are native to the California chaparral such as *Arcostaphylos* (manzanita) and *Rhamnus*. The complete research study can be seen in **Plant Disease** 93:883-890 (September 2009).

Source Plant	cactorum	citricola	citrophthora	foliorum	hibernalis	nemorosa	syringae
<i>Arbutus</i>		XX					XX
<i>Arcostaphylos</i>		X	X				X
<i>Azalea</i>		XXX	X	XXX			X
<i>Camellia</i>		XX				X	X
<i>Laurus</i>		X					
<i>Magnolia</i>							X
<i>Photinia</i>	XX						XX
<i>Pieris</i>		X	X		X	X	X
<i>Pyracantha</i>	X						XX
<i>Rhamnus</i>	XX	X					
<i>Rhododendron</i>		X					XXX
<i>Syringa</i>		X					
<i>Viburnum</i>							X

## CHEMICAL AND HOT WATER TREATMENT FOR RHIZOCTONIA AG P ON AZALEA

Copes and Blythe (USAD-ARS and MS State University) have reported on use of chemicals and hot water to control the cause of web blight—*Rhizoctonia* AG P—on azalea cuttings. These researchers found that disinfectants (sodium hypochlorite, hydrogen dioxide and quaternary ammonium chloride compared) to two fungicides (a mixture of chlorothalonil and thiophanate methyl and flutolanil) failed to eliminate the fungus from stem sections even when used above labeled rates. They then tested the effect of hot water emersion finding that 50 C did eliminate the pathogen although 45 C did not. The exposure time and temperatures for 99% kill were 20 minutes 16 seconds at 50 C and 5 minutes 19 seconds at 55 C. They also reported that only minor tip damage was seen when azalea cuttings were exposed to 50 C for 40 minutes, making this treatment a possibility. Copes and Blythe conclude that 21 minute submersion in 50 C water eliminated this binucleate *Rhizoctonia* from azalea cuttings with least risk for phytotoxicity. A full report is given at: HortScience 44 (5):1370-1376.



**CHRYSANTHEMUM WHITE RUST REPORTS**

Chrysanthemum white rust in the US is really getting a lot of attention lately. The table to the right was adapted from a very nice article by Dr. Jane Trolinger, Syngenta Seeds at Gilroy, CA published in the September 2009 issue of **Greenhouse Product News**.

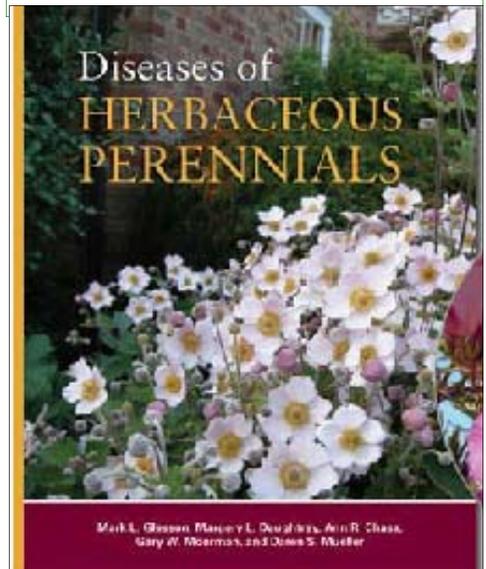
Larger outbreaks (4 or more years since 1977)	Outbreaks (2-3 years since 1977)	Outbreaks (1 year since 1977)	Trace forwards only
British Columbia, Canada	Connecticut	Hawaii	Maine
California	Delaware	Massachusetts	North Carolina
New Hampshire	Maryland	Michigan	
New Jersey	Oregon	Ontario, Canada	
New York	Rhode Island		
Pennsylvania	Washington State		



The image to the left shows the typical symptoms of white rust on mums from the upper and under sides of the leaves (Marge Daughtrey, Cornell University). I wish I had some of my own pictures but it is a tribute to our quarantine procedures that in 30 plus years I still have not seen this disease up close and personal.

**Diseases of Herbaceous Perennials** is available now!

Marge made me promise to keep this on the **Perennial Plants Page** until you each have one! 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 if you buy it on the web in our store — [www.chaseresearch.com](http://www.chaseresearch.com)

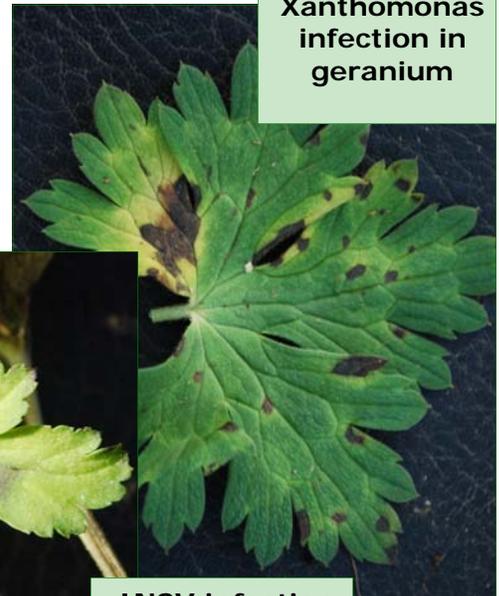


Mark E. Glenn, Ph.D., and L. Douglas, Ph.D., with R. Chase, Gary W. Moorman, and James S. Mueller

**BLACK LEAF SPOTS CAN HAVE MANY CAUSES**

There are a number of causes of black leaf spots on perennials. IN the past month our diagnostic lab has received perennials to test for foliar nematodes which can cause black to brown angular leaf spots. We also received several samples of geranium with angular black spots and yellow margins that were identified as *Xanthomonas* leaf spot (upper photo on right). Most recently, we had samples of anemone plugs submitted that had distinct black markings that were in some cases more like spots. Testing revealed that they were infected with Impatiens Necrotic Ring Spot Virus (INSV). IN any of these cases, guessing what is wrong would have led to using ineffective control strategies. The result is eventually loss of the crop. Don't guess!

**Xanthomonas infection in geranium**



**INSV infection in Anemone plugs (left)**



**IR-4 Sponsors More Bactericide Work in 2009—Erwinia control on Orchids**

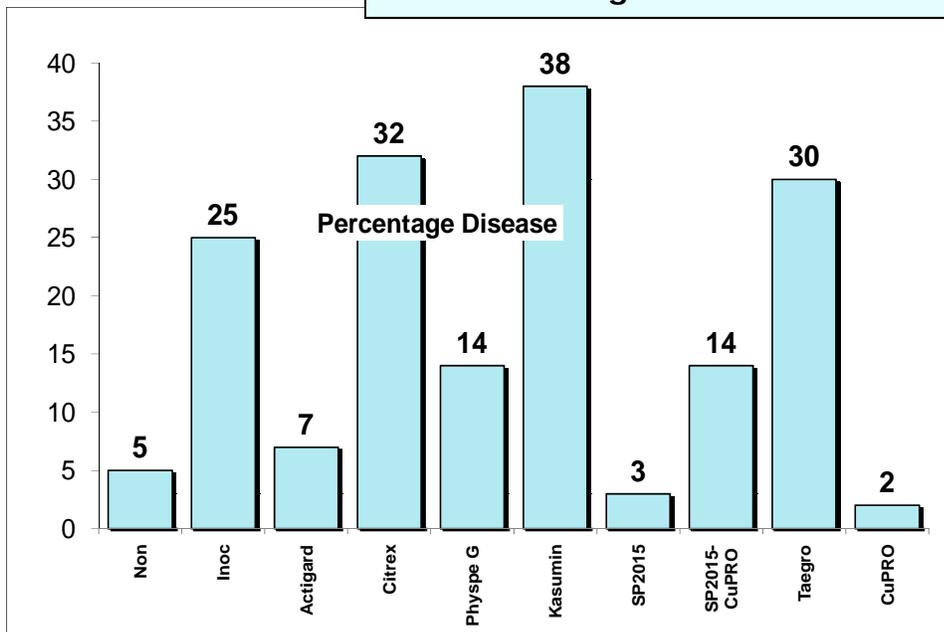
We worked on some experimental bactericides last summer for IR-4 and are once again testing products this summer. The emphasis this year was for *Erwinia* soft rot so we have completed one trial on orchids and are starting another trial on poinsettia today.

For the orchids we had *Oncidium* and *Phalaenopsis* donated from Hawaii and California. The trial was started by treating plants three times on a weekly interval. All products except Taegro were applied as foliar sprays for a total of five times on a weekly basis. The Taegro was applied on a 14 day interval and alternated between drenching and spraying. Plants were inoculated with *Erwinia chrysanthemi* on 31 August and the first symptoms were rated a week later. Only the *Oncidium* developed symptoms which were rated as the percentage of the plant with soft rot (shown in the graph below). The best control was seen with SP2015 or CuPRO closely followed by Actigard. Physpe G and the combination of SP2015 and CuPRO were somewhat effective. The Kasumin, Citrex and Taegro treatments were not effective in this trial.

These *Oncidium* did not show any adverse symptoms due to the treatments. In contrast, the *Phalaenopsis*, while developing no disease, did show a phytotoxic response to some of the same treatments. Actigard, CuPRO and Physpe G each resulted in significantly lower top grades when compared to the non-inoculated control. It looks like the rate of CuPRO (a copper product) was too high for weekly use on *Phalaenopsis*. If you are particularly interested in the rates we used, please contact me for details.



**Erwinia blight on *Oncidium***



**Susceptibility of Geraniums to *Ralstonia***

Norman et al. (University of Florida) recently published work on the susceptibility of geranium cultivars to *Ralstonia solanacearum*. I have summarized part of their work in the table to the right. Only the scented geraniums showed any resistance but even then there were no cultivars that were resistant to all six strains of *Ralstonia* tested or could act as a symptomless carrier for the bacterium. This is not good news for trying to avoid disease based on resistance but also serves as an alert that even geraniums without symptoms might be infected and serve as a source of the bacterium in other crops. For a complete report see HortScience 44(5)1504-1508.

Geranium type	Cultivar response
Zonal ( <i>Pelargonium x hortorum</i> )	All 32 cultivars susceptible
Ivy ( <i>Pelargonium peltatum</i> )	All 10 susceptible
Regal ( <i>Pelargonium x domesticum</i> )	Not equally susceptible to the strains of <i>Ralstonia</i> used
Scented ( <i>Pelargonium</i> spp.)	Some resistance depending on the <i>Ralstonia</i> strain used

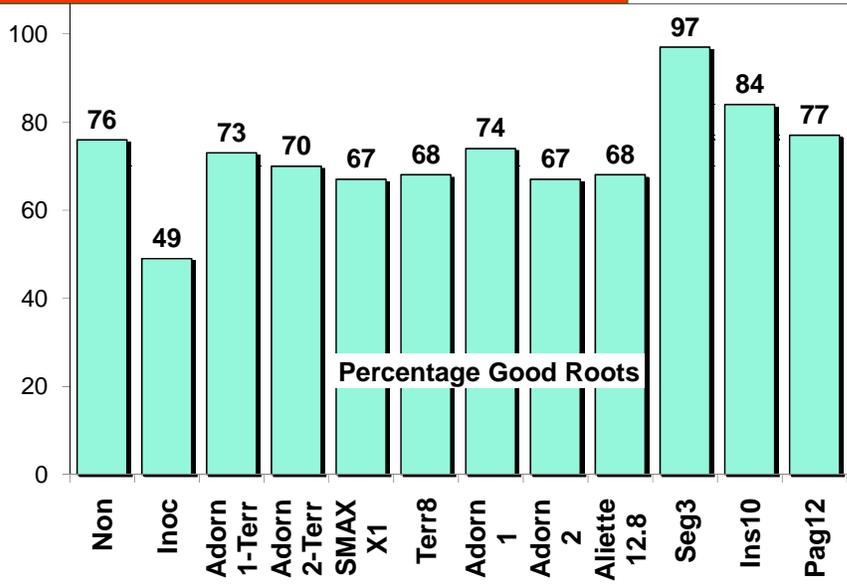
# PYTHIUM AND PHYTOPHTHORA ROOT ROT CONTROL UPDATE

There has been quite a bit of activity in testing and introducing new fungicides for control of Pythium and Phytophthora on ornamentals. The IR-4 program identified this as a key area several years ago and the resulting testing has been very helpful in getting new products registered for our crops.

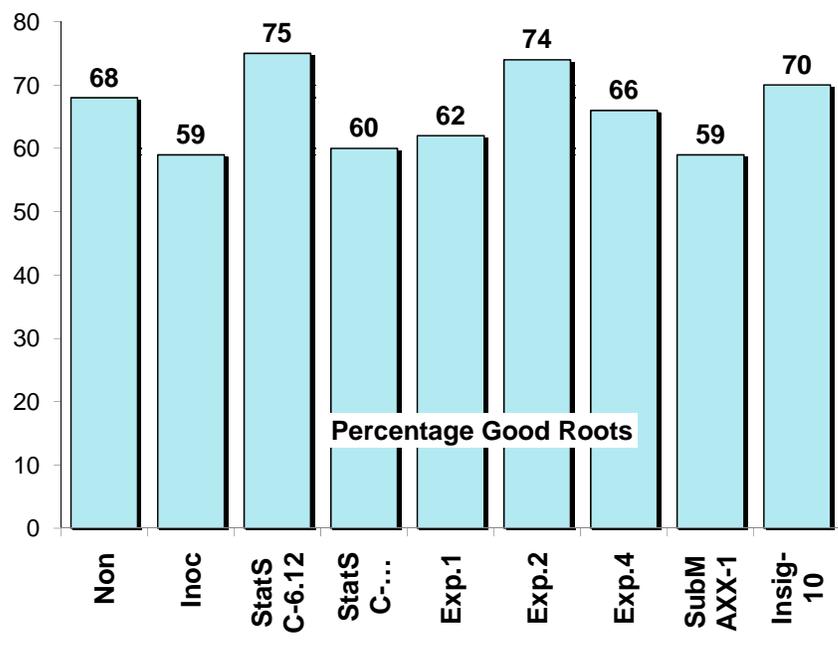
We tested several of these products in the past summer for control of Pythium root rot on geranium and Phytophthora root rot on vinca.

As usually we start with healthy plants and treat once with the appropriate fungicide before we inoculate. Plants were drenched in each test 4 times on a 14 day interval. We started rating them after 4 weeks for top responses which were minimal in both tests. The final rating of the percentage of healthy appearing roots was made at the end of each trial and the data are shown in the graphs to the right.

The best roots for the Pythium trial were consistently found on plants treated with the 3 oz/100 gal rate of Segway. This fungicide is relatively new from FMC and contains the active ingredient cyazofamid which represents a new chemical class for ornamental fungicides. The next best control was seen with Insignia used as a 10 oz/100 gal drench. We have seen very good results with this strobilurins fungicide from BASF over the past two seasons of testing for Pythium root rot. All other products tested were as good as the non-inoculated control although they were not quite as good as Segway and Insignia. Adorn is a new fungicide from Valent which contains fluopicolide, yet another new mode of action. You can see from the data that it worked as well alone as when Terrazole was added.



Efficacy of fungicides on Pythium root rot on Geranium (above) and Phytophthora root rot on vinca (below)



Results for the Phytophthora root rot trial on vinca were not as clear cut. In this case, the best roots were found on plants treated with Stature SC at 6.12 oz/100 gal, the new formulation of dimethomorph from BASF. We also tested an experimental product from BASF that worked best at the middle rate tested. Finally, Insignia was as good as the non-inoculated control.

It is great to see very good to excellent control of root rot caused by Pythium or Phytophthora with some of the newest fungicides and that they are in new mode of action groupings. Rotating between MOA groups is the best way to keep fungi from becoming resistant to our fungicides. Remember to always follow the LABEL!

Dr. Raymond Cloyd (entomologist at Kansas State University) and I recently attended a Flowers Canada meeting in Niagara Falls. We had a great chance to get better in touch with our interests over the two days we spent in Ontario. Ray was kind enough to make sure I had copies of his latest research work. I am sure you will be interested in two of these studies that I summarize here.

### RICE HULLS AND FUNGUS GNATS

Cloyd et al. published a very interesting study on the attractiveness of parboiled rice hulls (PBH) to adult fungus gnats (*Bradysia*). The researchers compared media with PBH with peat moss and pine bark media. The adult fungus gnats were not particularly attracted to any of the media although the moisture content of the medium was an important factor in fungus gnats attraction. Since some volatiles may act as lures for fungus gnat adults, the specific volatiles of the media tested were evaluated. Dr. Cloyd also found that volatiles—palmitic acid—was actually in higher concentrations in the peat moss medium than that containing the PBH. Thus, the researchers conclude that using PBH in growing media should not increase attractiveness of that medium to fungus gnat adults. For the full research report see: HortScience 44(5):1366-1369.

### ESSENTIAL OILS FOR INSECT CONTROL

Plant-derived essential oils have been developed in the past ten years or so for use in our industry to control certain pests including powdery mildew, insects and liverworts. Dr. Raymond Cloyd researched efficacy of some of these products for control of citrus mealybug, western flower thrips, green peach aphid, two-spotted spider mite and sweet-potato whitefly.

Flower Pharm and Indoor Pharm were most effective (>90% mortality) on citrus mealy bug. GC Mite and Bugzyme resulted in >90% mortality of two-spotted spider mite and SMC, Neem and Bug Assassin resulted in >80% mortality of two-spotted spider mite. Only Monterey Garden Insect Spray (contains 0.5% spinosad) gave acceptable control of western flower thrips (100% mortality). None of the products tested gave sufficient control of either sweet potato white fly or green peach aphid. Dr. Cloyd also determined that many of these essential oil based products were phytotoxic to the plants themselves. For the full report see: J. Econ. Entomol. 102(4):1567-1579.

### SOOTY MOLD—NO INSECTS INVOLVED

We are used to the idea that if we see sooty mold we can find an insect infestation too. Indeed, many times the sooty mold is more obvious than insects like scales and mealy bugs that are cryptic, hiding in the tight terminals of a plant. Ray and I did see a classic sooty mold outbreak in cut Gerber production in Canada where controlling whiteflies can be a real challenge.

When I got back to California we had a sample in our diagnostic lab of sooty mold on hibiscus without any insects present. I checked it out under the microscope to make sure it was sooty mold and it fit the description of *Capnodium* (a very common sooty mold). These fungi are almost never parasitic on the plants they grow on but are indeed related to a group of fungi called the black mildews which can be parasitic. One hint that insects might not be involved was the fact that the sooty mold was growing on leaf undersides as happily as the top surface. The layer of sooty mold was quite even (see image to the right). As I recall, hibiscus have nectarines that exude sugary substances that would be fine food for the sooty mold fungi.

So what do you do if you have sooty mold and not insects? The only suggestion is that you do not spray your plants with a sugary solution (like Mountain Dew used to attract thrips or milk for virus control). Try to keep the humidity lower with fans and venting at sundown. Imagine you are trying to alter the environment to control downy mildew or Botrytis. Finally, it is possible that a broad-spectrum product like one containing copper might help kill some of this saprophytic fungus. Check labels!



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