

# CHASE NEWS

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## Climate Change and Diseases and Food

So, I have not actually decided whether or not I believe everything we are hearing about climate change but a lot of very knowledgeable scientists do believe it. I was reading an article published in 2011 in the UK journal *Plant Pathology* that discussed the topic of what climate change would mean to our food supply. I am not providing any interpretation but I did find this an interesting article. The authors are S. Chakraborty CSIRO - Queensland, AU and A. C. Newton SCRI - Dundee, UK.

Global food production will have to increase by 50% by 2050 if we are to meet the needs of the world's expanding population. Although improvements in disease and pest control over the past 40 years have resulted in doubling our food supply, pathogens still reduce it globally by 10-16% annually.

Pest control critically relies on an integrated approach and changes in temperature and water availability will

affect the delicate balance we have achieved. In some cases, diseases which are now under "management" may emerge again and new diseases may develop as the climate changes.

**"In the US alone, costs due to disease losses are \$220 billion."**

The areas of the world most at risk include parts of Central and South America, Central Asia, India, Southeast Asia and most especially Sub-Saharan Africa. Both production and storage of our food will be challenged with the climate changes that are anticipated. In the US alone, costs due to disease losses are \$220 billion annually (not including post-harvest losses of 6-12%).

Some predictions of increased yields due to increased fertility resulting from higher CO<sub>2</sub> may be offset by the yield reductions that will result from water limitations and increased temperatures. Grain production has doubled over the past 40 years partially due to a 15-20 fold increase in the use of pesticides worldwide.

One feature of the predicted climate change is an increase in weather variability. Extreme weather events like hurricanes have been proven to spread diseases.

Increasing food production by 50% over the next 40 years, will take a substantial and sustained input in capital, time and effort. It is complicated by the fact that we are losing land areas for agricultural to urbanization as well as potential additional losses due to climate change. A major component of this will have to come from improved technology. It will have to be applied globally as our world truly is one world facing these challenges.

There is a direct link between the funding for agricultural research and yield. Conveying these needs to the general public will be a challenge due to the nature of scientific research. Our ability to predict climate change and the exact inputs required to adapt to it and/or combat losses is limited. It may be that the development of technology is less problematic than making the public understand the need for a worldwide, sustained and substantial capital input. To read the entire article see: *Plant Pathology* (2011)60, 2-14.

# Coniothyrium Canker on Rose

A few years ago, we tested fungicide control of Coniothyrium canker on rose canes. The images to the right show typical common canker symptoms on roses. Cankers often start at wounded areas on canes including those from pruning and eye removal. In order to make sure we were testing the right fungus, we tested several on rose canes to see which ones could create a canker. The image to the right (lower) shows the type of response we got. The cane marked “A” shows the control (no disease) and the cane marked “F” shows an advanced canker.

All three trials are shown in the table below with the last column showing an average of the three trials. The smaller numbers are for lower levels of canker development. Numbers in the same column followed by the same letter are not significantly different. NT - not tested.

Treatment	Rate/100 gal	Test 1	Test 2	Test 3	Mean
Water - noninoculated	-----	1.8 ab	2.2 a	1.7 a	1.9
Water – inoculated	-----	3.1 b	2.6 a	4.3 a	3.4
Insignia	16 oz	3.3 b	1.0 a	1.7 a	2.0
Compass O	4 oz	NT	1.1 a	2.3 a	1.7
Heritage	4 oz	2.3 ab	3.1 a	1.7 a	2.4
Chipco 26019	16 oz	3.1 b	1.5 a	1.3 a	2.0
Phyton 27	25 oz	3.4 b	2.1 a	2.7 a	2.7
Medallion	4 oz	2.0 ab	2.1 a	2.0 a	2.0
Daconil Ultrex	22.4 oz	0.7 a	2.0 a	2.7 a	1.8

The best products overall were Daconil Ultrex and Compass O. Chipco 26019, Insignia and Medallion also were moderately effective. None of them were excellent and the use of fungicides should be the least relied on method for preventing canker on rose. On their own, little can be expected of them - they are preventative only.

It is critical to rely on excellent scouting, sanitation and careful pruning as these are more likely to be effective for rose canker control. Whenever you receive rose stock, it should have a thorough examination followed by pruning out areas with cankers and dieback. You could then apply one of the products with the best results above. Apply the product as soon as practical after the examination. Waiting a few days can give the fungus the time needed to establish an infection that the fungicide can no longer prevent. Anytime roses are trimmed, a fungicide should be applied if the cultivar has been shown sensitive to canker development. Other applications are probably not going to be effective since once a canker or dieback tip starts it will not stop simply because you spray it with a fungicide.

## Common Canker on Rose



**Reaction of rose canes to inoculation with different fungi.  
A=non-inoculated control and  
F=advanced canker.**



# Keeping Leaves Dry for Disease Control

## It's Not All Good

I was looking for some data on black spot control on rose and ran across some very interesting work conducted by Dr. Jay Pscheidt at Oregon State University. I contacted Jay and he kindly gave me an overview of work he conducted over five years to evaluate the effect of plastic shelters on severity of black spot on rose and on rose rust. Here are the conclusions in Jay's words:

"I played around with plastic covers for a few years but only published the 2003 data in F&N. I compared plastic covers to nothing in 1997, 2002, 2003, 2004 and 2006. Plastic covers were generally much like a standard hoop house but one year they were clear umbrellas with zippered sides (that was sold like a mini greenhouse for a single plant. Some years we had low disease pressure, others high.

The first year we got 80% control of black spot but an increase in rust of 14 times. Overall, 4 trials had black spot with plastic covers resulting in an average of 91% control. Great if you have a rust

resistant cultivar. In two years with low rust pressure, plastic covers resulted in 55 and 99% control of rust. But in three rust favorable years, we had 14 times, 1.2 times and 1.3X times as much rust under the plastic as in the open. This was a significant increase in rust severity of disease 3 out of 5 years. We never did get powdery mildew to show up any of those years."

I show the summary of two of the five years of data Jay collected along with some fungicide data. You can see when the plastic shelters were used for the black spot control was excellent in both 2003 (dark bars) and 2004 (light bars). Plastic shelters were as effective as some very good retail products including Rose Pride Funginex, Immunox and Daconil 2787 for black spot control.

In contrast, putting roses under plastic shelters actually increased severity of rose rust. The environment was obviously more favorable to rust development than those in the open - probably through increasing humidity around the roses. Two excellent rust

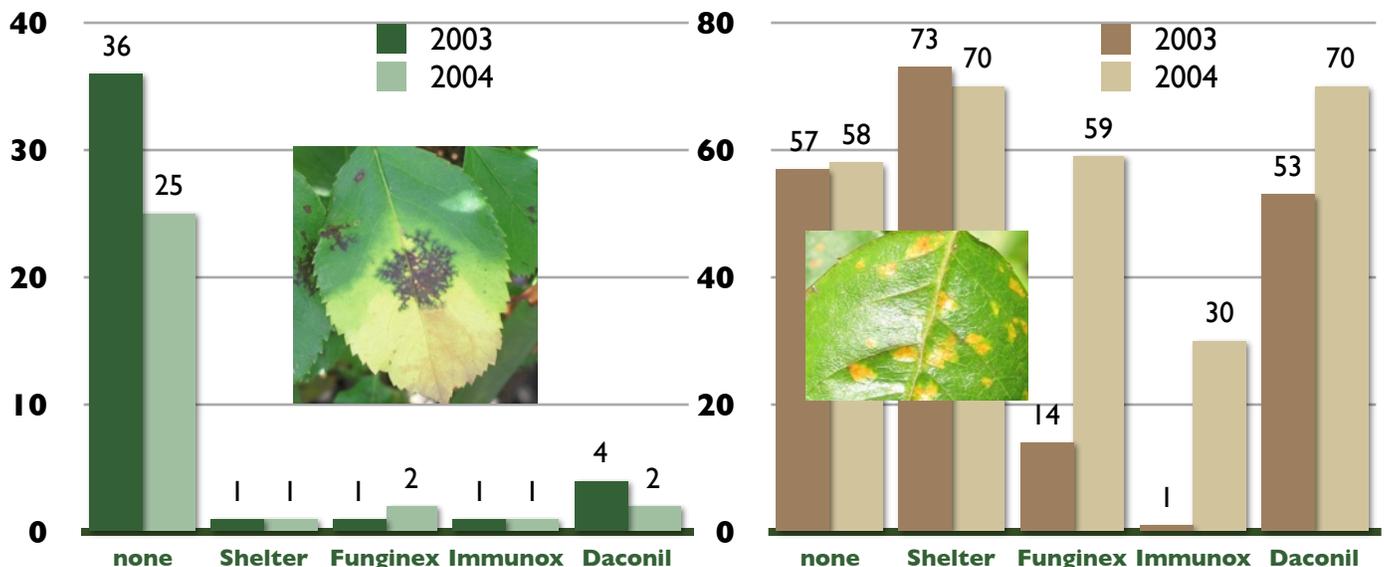
fungicides performed very poorly in at least one year (Funginex and Immunox). Daconil 2787 was not effective at all in these two tests for rust control.

This reminded me of some work I did when I first started at the University of Florida. I tested three leaf spots on foliage plants and also showed that in this case, all were less severe when protected from overhead irrigation and rainfall than those exposed to it. The diseases I included were Alternaria leaf spot on schefflera, Fusarium leaf spot on dracaena and Helminthosporium leaf spot on palms. These fungi have more in common with the black spot pathogen (*Diplocarpon rosae*) than they do with rust (*Phragmidium* spp.)

It is important for you to know what type of disease you are trying to prevent before choosing cultural controls as well as fungicide controls. If they need free water on leaves then shelters may help. If they need only high humidity and do not like free water then shelters might be a bad idea.

### Effect of fungicides and plastic shelters on severity of on black spot (green bars on left graph) and rust on rose (brown bars on right graph).

Data are given as % infected leaf area.



## CULTIVAR RESISTANCE

Quite a bit of testing has been done with different cultivars of crape myrtle to test them for their susceptibility to this disease. The table below shows the worst affected cultivars in three years of testing in a landscape setting in Alabama.

Consistently worst disease	Variable disease response
Biloxi	Cherokee
Miami	Raspberry Sundae
Potomac	Cotton Candy
Country Red	Natchez
Sioux	Centennial Spirit
	Muskogee

The plants in the first column nearly always showed severe Cercospora leaf spot while those in the second column were variable with severe symptoms sometimes but much less severe in other trials.

If you have any control of which cultivars you produce, it would be good to avoid those with known high susceptibility to Cercospora leaf spot. Otherwise, you might consider segregating very susceptible cultivars from less susceptible crape myrtle. This will allow you to differentially spray the highly susceptible cultivars and keep the least susceptible ones on a less intense program. It will also let you easily find the disease in its earliest stages thus making fungicides used for control more effective.



## Control of Cercospora Leaf Spot on Crape Myrtle



I am going to Texas next week to visit some nurseries and was asked to summarize control strategies for some diseases including Cercospora leaf spot on crape myrtle. I found fungicide, fertilizer and cultivar information.

### FUNGICIDES

I reviewed all of the work I could find on Cercospora leaf spot control on crape myrtle. I included everything. They are shown in the table to the right.

Most of the trials have been done as a preventative evaluation. In the rare case of a curative trial, only thiophanate methyl really worked well. If you have a serious outbreak you should consider trying thiophanate methyl (like 3336) mixed with something else every week for four weeks to see if you can break the cycle. Most of the products listed should be compatible with thiophanate methyl. I would ask a Syngenta representative about combining Daconil Ultrex and a thiophanate methyl fungicide.

I think the tank-mixing T-methyl with another fungicide (those listed) will be more effective than spraying twice a week. Even these trials showed that nothing really worked any better than good on this disease. In Cercospora trials on other plants, we see the same products perform better in some cases. Clearly, on crape myrtle, other things must be done since fungicides cannot solve the problem.

Efficacy trials on ornamentals for Cercospora leaf spot control (rate per 100 gal). All products were applied on a one or two week interval.

Fungicide	Efficacy (rate/100 gal)
3336 50WP	(20 oz) good in 4 trials
Banner MAXX	(8 oz) none to some in 2 trials
Daconil Ultrex	(1.4 lb) none to some in 2 trials
Eagle 40W	(8 oz) good in 2 trials
Heritage 50WDG	(4 oz) some to good in 4 trials
Medallion 50WP	(2 oz) none in 2 trials
Palladium	(2-6 oz) none in 1 trial

### FERTILIZER

Extensive testing on the effect of fertilizer on severity of Cercospora leaf spot and powdery mildew on crape myrtles. The trials showed that powdery mildew was not affected by the level of nitrogen applied but Cercospora leaf spot was reduced up to 90% with higher rates of nitrogen. This indicates that you should maintain a high nutrition level to avoid making the problem worse with low nitrogen.

# Corynespora Leaf Spot Control

When I worked at the University of Florida research and education center in Apopka, I saw a lot of “new” diseases on tropical foliage plants. One of the ones I described was *Corynespora* leaf spot on lipstick vine and other gesneriads. The fungus *Corynespora cassiicola* is found a number of ornamentals including salvia, ficus, Zebra plant, hydrangea, ligustrum and African violet and vegetables including tomato and pepper.

Lesions appear first as tiny sunken areas which are slightly brown. These areas enlarge to about 1/2 inch in diameter and darken with age. A bright purple or red margin and a chlorotic halo about 1/16 inch wide are usually present on some plants. Leaf abscission is common under optimal conditions for disease expression.

Ross et al. (University of Tennessee) reported on the effect of irrigation on spread of *Corynespora* in African violet.

Their comparison of mist, drip and ebb and flood showed that disease spread equally well in all systems. The work evaluated natural disease spread from a single infected plant. Drip irrigation did slow disease spread in July but not in November.

In another trial, Clark et al. (University of Tennessee) tested sensitivity of *Corynespora cassiicola* to different fungicides. Their research was conducted in the lab which may not be a good indicator of what will happen during actual production of the crop. They did find that the 325 isolates of *C. cassiicola* (collected in 2007) were still sensitive to thiophanate methyl (like 3336), iprodione (like Chipco 26019) and fludioxiol (Medallion). The authors recommend rotation to avoid residue issues, phytotoxicity and manage resistance development.

Hagan, Olive and Stephenson recently reported on a trial on this leaf spot on landscape hydrangeas. They compared many retail fungicides for efficacy on *H. macrophylla* ‘Dooley’. Fungicides were applied on different intervals between 7 July and 27 October, 2011.

All products provided a high level of powdery mildew control in the trial (data not shown). The control of *Corynespora* was very good to excellent with copper products but caused leaf rugosity, small leaves and overall plant stunting.

It was significant but not as effective when Heritage was used on a 3 week interval which obviously was too long.

Neem, MilStop and Serenade (same active as Cease) were not effective on *Corynespora* leaf spot even when used weekly but did control powdery mildew significantly.

## Annual and perennial flowers susceptible to *Corynespora cassiicola*

Allamanda	<i>Allamanda</i> spp.
Asiatic jasmine	<i>Trachelospermum</i> sp.
Azalea	<i>Rhododendron</i> spp.
Basil	<i>Ocimum basilicum</i>
Beebalm	<i>Monarda punctata</i>
Begonia	<i>Begonia</i> spp.
Bird-of-paradise	<i>Strelitzia</i> spp.
Blue daze	<i>Evolvulus glomeratus</i>
Bugleweed	<i>Ajuga reptans</i>
Calla lily	<i>Zantedeschia</i> sp.
Cardinal's guard	<i>Pachystachys</i> spp.
Chinese wisteria	<i>Wisteria sinensis</i>
Coleus	<i>Coleus X hybridus</i>
Crossandra	<i>Crossandra</i> spp.
Foxglove	<i>Digitalis</i> spp.
Gay-feather	<i>Liatis</i> sp.
Hydrangea	<i>Hydrangea</i> spp.
Impatiens	<i>Impatiens</i> spp.
Jasmine	<i>Jasminus</i> spp.
Lantana	<i>Lantana</i> spp.
Madagascar periwinkle	<i>Catharanthus roseus</i>
Mandevilla	<i>Mandevilla</i> spp.
Pepper (ornamental)	<i>Capsicum</i> spp.
Petunia	<i>Petunia x hybrida</i>
Poinsettia	<i>Euphorbia pulcherrima</i>
Sage	<i>Salvia</i> spp.
Sedum	<i>Sedum</i> spp.
Shrimp plant	<i>Justicia</i> spp.
Snapdragon	<i>Antirrhinum majus</i>
Wedelia	<i>Wedelia trilobata</i>



**Corynespora Leaf Spot on African Violet (above) and Lipstick Vine (below)**



## Effect of fungicides on severity of *Corynespora* leaf spot on Hydrangeas

TREATMENT (interval)	DISEASE SEVERITY
Non-treated control (---)	58 a
Bonide Liquid Copper (1 wk)	17 cd
Green Light NEEM (1 wk)	58 a
Heritage 50WDG (3 wk)	33 bc
So. Ag. Liquid Copper (1 wk)	2 d
MillStop (1 wk)	54 a
Serenade Ready-to-use (1 wk)	50 ab

Numbers followed by the same letter are not significantly different (Fisher's Protected LSD)

# BASF Launches Pageant Intrinsic

We have been working on Pageant for the past 10 years or so. It has been very effective as a fungicide in our trials and those I find reported by researchers all over the US. I have often written about what fungicides have worked best in trials for specific diseases but rarely evaluated the fungicide with a disease present.

BASF has been evaluating Pageant for its ability to help reduce environmental stresses like drought, cold and heat. In order to let growers know about this feature, BASF decided to do a series of educational meetings all over the US.

They have asked Paul Pilon (Perennial Solutions, perennial plant specialist and consultant) to share his field experiences with Pageant as a plant health promoter.

Mike and I will also be attending. Mike is giving an update on our business and how we can work with companies like BASF and growers to solve disease problems. I am hoping to be able to show the best ways to incorporate Pageant into spray programs for prevention of ornamental diseases. I am including work by researchers all over the US



to make sure I can give a realistic view of Pageant use regardless of the ornamental crop or area of the country.

I hope you will try to attend a meeting near you and take advantage of this chance to learn about some interesting characteristics of Pageant Intrinsic Fungicide. There are a few other meetings planned - so if you don't see one near you contact your local BASF rep. Hearing from the in house BASF researchers, University researchers and on the ground experience is not typical and a unique opportunity. I know that most of the meetings will be offering CEU credits for that state.

You can get more information on a meeting near you by contacting the BASF technical/sales specialist listed in the first column. If you are interested in this topic in general, you can check the BASF website for more information on the health benefits of Pageant Intrinsic Fungicide.

<b>Michael Kropp</b>	Dinuba, CA	30-May
	Watsonville, CA	31-May
	Sacramento, CA	1-Jun
<b>Jennifer Bergh</b>	Wilsonville, OR	5-Jun
	Bellingham, WA area	7-Jun
	South Tacoma, WA area	8-Jun
<b>Ronnie Holder</b>	Grand Rapids, MI	19-Jun
	Kalamazoo, MI	20-Jun
	Western Cleveland, OH	21-Jun
<b>Frank Fornari &amp; Brian McCaffrey</b>	Homestead, FL	26-Jun
	West Palm Beach, FL	27-Jun
	Tampa/Baum, FL	28-Jun
	Apopka, FL	29-Jun
<b>Fred Eckert</b>	San Diego, CA	9-Jul
	Oxnard, CA	10-Jul
	Nipomo, CA	11-Jul



## Thoughts from Mike

With Mother's Day upon us and most growers either frantically getting their last orders out or have already done so, it will be nice to see a lot of bouquet's in our houses as well as our mother's house. Going out to a good restaurant should even bring more bouquet's. I don't know how you feel, but I can see a big improvement on how people are starting to spend money on things, flowers included! Ann & I went to our local Verde Valley fair last week and walked around a bit. Then we had to sit and drink beer (this was the hard part), personally, I got a good feeling watching families having fun....especially the little ones.

Happy Mother's day to all mothers! Mike



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