

CHASE NEWS

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Downy Mildew is on the Rise

We seem to be consumed with downy mildew diseases in the past few years. The pictures above show the types of sporulation that occurs on grape, statice, rudbeckia and basil (left to right). You can see the typical white spores and even lavender to gray. The real shock for me was the black spores found on infected basil.

Rose downy mildew continues to increase most years with the changes in rose genetics leading to serious outbreaks. This is probably due to a misunderstanding in marketing “no spray” roses or assuming that roses resistant to black spot are resistant to all diseases - NOT!

In the early 1980’s, and on into the late 1990’s, we really only saw rose downy mildew in especially rainy years in the areas where roses were being field grown. In the 14 years I lived in Florida, I only saw rose downy mildew once. Now it seems that it is happening all over the country almost regardless of the rainfall. Roses themselves man

“No spray roses are not resistant to all diseases.”

something different today than 10-20 years ago when hybrid tea roses were the mainstay. Now varieties of roses, including those for mass landscape planting being produced all over the country on their own rootstock, have changed the face of disease control as well.

Then we have been seeing some “new” downy mildew diseases including the basil downy mildew which does appear to be relatively new (described about 8-10 years ago) and the impatiens downy mildew which is a new problem but not a new disease. The downy mildew on impatiens was actually discovered in the US in 1897 - not so new. Add to that coleus, salvia, lamium, digitalis and buddleia downy mildews and we have serious issues no matter what crops we are growing.

Another interesting change is that until salvia downy mildew appeared, we only really saw problems with the disease during the cooler times of the year - or in areas of the country where

the conditions were always favorable like the West Coast. Now we see one or more downy mildews almost year round. The Impatiens downy mildew caused serious losses in the landscape last fall in Long Island, Illinois, Southern California and South Florida. That represents a very wide range of tolerances for temperature. I have recently heard of serious outbreaks in Louisiana, Texas and New York.

So we need to do a few things to avoid making a mistake in our efforts to control downy mildew.

1. Make sure you are accurate in identifying the disease. Fungicides for black spot do not control downy mildew on rose.
2. Not all downy mildew spores are white or lavender - basil is black.
3. Do not assume warm-hot weather stops all downy mildew diseases.
4. Do not rely on a single MOA. Downy mildew can become resistant to fungicides easily if they are not rotated.

Entomosporium Leaf Spot Control

I recently had a chance to review all of the trials on Entomosporium leaf spot on *Photinia* (red-tip) and *Raphiolepis* (Indian Hawthorn). The disease has been a serious problem in the southern US starting in the 1980's and continues to this day. At one point it threatened the continued use of red-tip (*Photinia*) in landscapes throughout the southern US. The host range of the pathogen (*Entomosporium maculatum*) is confined to members of the rosaceae family including pear (*Pyrus*), loquat (*Eriobotrya*), *Photinia*, *Pyracantha*, quince and *Raphiolepis*.

Most of the trials were conducted in the southern states where summer rainfall is common making this a tough disease to control. The trials were run with natural infection for both Indian Hawthorn and Red-tip. The table below shows the summary I made after reviewing more than 20 trials from the past 10-15 years.

Optimal control is achieved with weekly sprays although occasionally using sprays every 2-3 weeks can yield good results. Under high disease pressure, weekly applications appear to be necessary. The best products included Banner MAXX, Daconil Ultrex, Eagle 40W (Hoist), Heritage and Insignia. Most of the other products listed provided inconsistent or inadequate control.

Banner MAXX has been used by some growers for its PGR affect on Red-tip resulting in a better plant form. Alternating with Daconil Ultrex and one of the strobilurins is the best method to obtain optimal disease control and manage resistance development. Remember that there are other diseases of these plants and getting a lab ID is always the best place to start.

Fungicide	Rate/100 gal	Interval	Efficacy
3336	16 oz	2 week	Some-very good
Banner MAXX 6 oz		3 week	Some-none
Banner MAXX 6 oz		1-2 weeks	Very good-excellent
Compass O	0.5-2 oz	1 week	Some-good
Daconil Ultrex	1.25 lb	2 week	Very good
Daconil Ultrex	1.4 lb	1 week	Excellent
Eagle 40W	6 oz	1-2 weeks	Very good-excellent
Heritage	4 oz	1 week	Very good
Insignia	4-12 oz	1 week	Good-very good
Medallion	2 oz	1 week	None
MilStop	2.5-5 lb	1-2 weeks	Worse than nothing
Pageant	18 oz	1 week	Good-excellent
Palladium	6 oz	1 week	Poor
Phyton 27	30 oz	1 week	None-some
Spectro 90WDG	16 oz	2 week	Good-excellent

Entomosporium on Photinia



Entomosporium on Pear (above) and Raphiolepis (below)



Switchgrass Disease Control

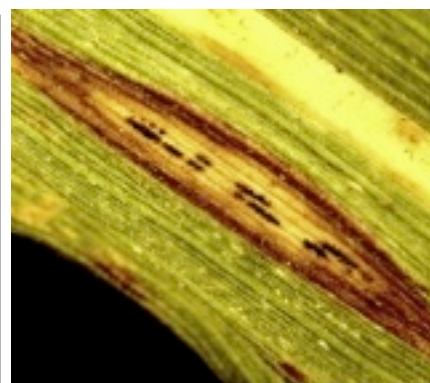
Switchgrass (*Panicum virgatum*) has become a topic for quite a bit of research both as a source of biofuel and as an ornamental landscape plant. There has been a lot of information published on diseases of switchgrass and the response of different cultivars to these diseases. Anthracnose is caused by *Colletotrichum navitas* (image on top, right). Rust is caused by *Puccinia emaculata* (image on bottom, right). Both diseases appear to be relatively common wherever switchgrass is grown.

Hagan, Bowen and Akridge (Auburn University) published results of trials on some fungicides for control of both rust and anthracnose on switchgrass. The plants used for the anthracnose trial were 'Prairie Sky' and those used for the rust trial were 'Dallas Blues'. Fungicides were applied in both trials as sprays to drip on a 2 week interval: anthracnose (15 June to 6 September) and rust (1 June to 6 September). Disease severity was rated periodically and the final data shows results.

None of the products in this trial provided very good control of this rust. Best control of rust was achieved with Eagle 40W and Heritage. These ratings (4-5) indicated some lesions and pustules noticeable and up to 25% of the foliage dead. The other products were significantly less effective. The two week spray interval may have been longer than required for these products to work well under the test conditions.

Anthracnose control was better than rust control. In this case, the most effective products were Heritage, Banner MAXX 3336 and Eagle. These products resulted in few lesions in the canopy. The least effective product in the anthracnose trial was Compass which had numerous lesions and up to 50% of the leaves blighted.

Controlling anthracnose and rust on switchgrass in the landscape may need to rely on use of resistant cultivars since weekly spraying is often impractical.



Anthracnose (above) and rust (below) on switchgrass



FUNGICIDE	RATE/ 100 GAL	RUST SEVERITY	ANTHRACNOSE SEVERITY
Non-treated	-----	8.0 a	8.5 a
3336 4.5F	20 oz	7.3 b	2.5 de
Banner MAXX 1.3 EC	8 oz	6.7 c	2.0 e
Daconil Ultrex 82.5 WDG	1.4 lb	7.3 b	4.0 bcd
Eagle 40W	8 oz	4.4 d	2.5 de
Heritage 50WDG	4 oz	5.1 d	2.0 e
Medallion 50W	4 oz	7.2 bc	not tested
Palladium 62.5 WG	6 oz	7.8 a	3.5 cde
Compass 50W	4 oz	not tested	6.0 ab
Insignia 20WDG	8 oz	not tested	4.1 bc

Numbers in the same column followed by the same letter are not significantly different using Fisher's protected least significant difference.

Effect of Sugar-Based Compounds on Insecticide Efficacy for Western Flower Thrips

For several years, I have been hearing about the belief that using sugary products as attractants for Western flower thrips (WFT) can improve insecticide control although I have not seen any controlled studies demonstrating this interaction.

Cloyd and Gillespie (Kansas State University) published a series of studies conducted on insecticide efficacy for WFT. Their study included Mountain Dew, Diet Mountain Dew, white sugar and brown sugar at different rates. Some of their studies allowed the insects to choose between water or these sugary substances. None of the studies showed that WFT adults or nymphs were attracted to these sugars. Greenhouse studies further showed that addition of Mountain Dew or brown sugar did not enhance efficacy of the insecticides (tau-fluvalinate, spinosad and pyridalyl). For a complete copy of the study see: HortTechnology April 2012 22(2):177-184.

Average Height for Zinnia Series

SERIES (# CVS)	AVERAGE HEIGHT	HEIGHT CLASS
Short Stuff (6)	9 in	short
Thumbelina Mix	9 in	short
Dreamland (7)	11 in	short
Dasher (3)	11 in	short
Peter Pan (9)	11 in	short
Pulcino Mix	14 in	short
Small World (2)	16 in	medium
Liliput Mix	24 in	medium
Pumila Mix	28 in	medium
Splendor Pink	28 in	medium
Sun (2)	28 in	medium
Ruffles (3)	29 in	medium
Sunbow Mix	29 in	medium
State Fair Mix	34 in	tall
Oklahoma (5)	36 in	tall
Dahlia Flowered Mix	43 in	tall
Giant Dahlia Bluepoint (12)	46 in	tall

Disease Resistance in Zinnia Cultivars

Combination of Alternaria and Xanthomonas on Zinnia elegans

One of the best ways to prevent plant diseases is to grow only plants that resist them naturally. This is not easy in today's market driven environment but knowing what is likely to occur makes preventing it possible.

Zinnias come in many species, cultivars and sizes and are susceptible to a variety of diseases from powdery mildew (*Erysiphe cichoracearum*) to Alternaria leaf and petal blight (*Alternaria zinniae*) and bacterial blight (*Xanthomonas campestris* pv. *zinniae*).

Gombert, Windham and Hamilton (University of Tennessee) published on work evaluating 57 cultivars of *Zinnia elegans* for susceptibility to these three common diseases. The goal of their research was to find cultivars or series of zinnias that would perform well in the southeastern landscape from May through October.

They grew the test plants out first to determine their relative sizes (results shown to the left). There were a few mixes tested but many were series with at least two cultivars. They were classified as short, medium or tall (cut flower cultivars). The trial was performed in a landscape type setting with natural infection for the three target diseases. Severity of each disease was recorded at 4, 10 and 17 weeks after planting.

Alternaria leaf spot - At week 4 there were significant differences in disease severity but no overall differences were found between different series. At this time all were judged acceptable based on

Alternaria leaf spot alone. However, by 10 weeks, severity had increased dramatically and no significant differences between cultivars existed. The lowest disease was found in all three cultivars of the Ruffles series. Responses within a series were not consistent showing that they may not be closely related to each other. By the end of the trial, all cultivars were badly affected by Alternaria leaf and petal blight and none were acceptable.

Powdery Mildew - This disease was not observed until near the end of the trial at week 17. By this time, most cultivars were badly affected by the disease. Best cultivars were 'Peter Pan White' and 'Short Stuff Orange'.

Xanthomonas blight - At the week 4 rating, all cultivars showed symptoms of bacterial leaf spot and at week 10 there were no significant differences between cultivars or series. The lowest level of disease was found on 'Ruffles Pink'. At the end of the trial (week 17) all cultivars had severe disease with 10 of them dead due to Xanthomonas blight and perhaps Alternaria leaf spot.

Conclusions - The definition of acceptable for these researchers was that they would survive and look good for the full 17 weeks which would normally be expected for landscape plantings in the southern US over the summer months. The researchers concluded that although none of the cultivars met this criterion, zinnias would do well for short-term color (10-12 weeks).

Research Reports

Rhizoctonia root rot on Zinnia

Hausbeck and Harlan (Michigan State University-MSU) performed a trial in 2011 to evaluate fungicides for control of Rhizoctonia root rot on zinnia. They looked at different rates of Trinity (triticonazole - not labeled yet) compared to Veranda O and Heritage as a drench before inoculation and again about 2 weeks later. The table below shows the final data.

TRT OZ/ 100 GAL	DISEASE	HEIGHT (IN)
Non-inoculated control	1.0 a	8.4 a
Inoculated control	3.8 b	2.0 c
Trinity 6 oz	1.3 a	5.0 b
Trinity 8 oz	1.0 a	6.7 ab
Trinity 12 oz	1.0 a	4.5 b
Trinity 24 oz	1.2 a	4.1 b
Veranda O 8 oz	1.0 a	5.3 b
Heritage 4 oz	1.3 a	6.4 ab

Numbers in the same column followed by the same letter are not statistically different. 1=no disease and 5=severe disease.

All rates of Trinity and the two standards (Veranda O and Heritage) controlled Rhizoctonia root rot in this trial. The optimal rate of Trinity appears to be 8 oz/100 gal since this was the only rate that did not significantly stunt the zinnias. This triazole fungicide can have PGR effects similar to others in the MOA 3 group. It was interesting to see that the Veranda O treatment also resulted in some significant stunting even though it provided very good control of Rhizoctonia root rot.

Bacterial Blight on Lilac

Pscheidt and Bassinette (Oregon State University) completed a study on bacterial blight on lilac caused by *Pseudomonas syringae* pv. *syringae* for IR-4 in 2011. Treatments were applied on March 3 (buds were swollen), March 11 (bud break) and three more times on weekly intervals. Inoculation occurred on March 17. The treatments and results are shown in the table below.

TRT OZ/ 100 GAL	% BLIGHT	HEIGHT GAIN
Non-inoculated control	86 ab	2.8 c
Inoculated control	80 ab	3.5 c
A91800A 1 oz	94 a	4.7 c
Citrex 18.2 oz	98 a	3.7 c
HM-0736 14.4 oz	94 a	4.3 c
Kasumin 45 oz	32 c	14.8 a
Kasumin 64 oz	21 c	13.1 ab
CG100 38.4 oz	94 a	5.2 c
Regalia 1%	97 a	1.8 c
Aliette 12.8 oz	71 b	7.9 bc
Nu-Cop 16 oz	32 c	15.6 a

Numbers in the same column followed by the same letter are not statistically different.

Results showed that none of the experimental, new products provided any control with the exception of Kasumin (an antibiotic). This was shown with the disease severity and also the height (growth data). Controlling the disease = growth in this plant. Aliette provided slight control but the Nu-Cop was overall the best in this trial.

Downy Mildew Control - Basil and Coleus

Harlan and Hausbeck (MSU) have been working on downy mildew control for a number of years. One of the first research products was sampling air to determine when the spores were released. They also spent time flying back and forth to Florida to do rose downy mildew trials. Most recently, we are benefiting from their work on coleus and basil.

The two trials reported here were conducted in 2009 and 2010. Many of the same treatments were evaluated so I decided to put them into the same table.

In both trials, plants were sprayed (or drenched) once only with inoculation one day after fungicide treatment. You can see that all treatments (including the Subdue MAXX drench) were 100% effective in preventing these two downy mildews.

TRT OZ/ 100 GAL	BASIL DISEASE	COLEUS DISEASE
Untreated	45.0 b	72.0 b
Micora 4 oz Capsil 6 oz	0 a	0 a
Micora 6 oz Capsil 6 oz	0 a	0 a
Micora 8 oz Capsil 6 oz	0 a	0 a
Adorn 2 oz	0 a	not tested
Heritage 4oz	0 a	0 a
Subdue MAXX 1 oz drench	0 a	0 a
Stature SC 12.25 oz	not tested	0 a

Disease is the % leaves with spores. Numbers in the same column followed by the same letter are not statistically different.

IR-4 Liverwort Control and Plant Safety Summary Hester, Vea and Palmer

In March 2012, IR-4 presented results of more than five years of research trials performed all over the US. I present here the abstract (verbatim) from this report. The full report can be found on the IR-4 ornamental website.

Data in this report were generated to evaluate several products for post-emergent control of liverworts (*Marchantia* sp.). Liverworts are among the most serious weeds of container grown ornamentals. Classified as bryophytes these simple plants thrive on water and nitrogen for reproduction but can also survive long dry periods. The Society of American Florists ranked liverwort seventh in a national survey for worst nursery pests while Oregon regards it as No. 1. (Miller, Laura, Ornamental Outlook, *Liver What?*, 2007). During the 2004 and 2009, IR-4 Ornamental Horticulture Workshops, a project was prioritized to screen for efficacious products to manage post-emergent liverwort in container grown ornamentals grown primarily under cover in greenhouses or hoop houses, use sites with very few registered herbicides. This research was conducted across the United States in 1976, 2005, 2006, and 2009 through 2011 to evaluate several registered products for liverwort control.

Treatments with proven effectiveness in multiple trials include Bryophyter (oregano oil) at 2% v/v, Greenmatch (d-limonene) at 20% v/v, Racer (ammonium nonanoate) at 5% v/v, Scythe (pelargonic acid) at 5-10% v/v, SureGuard (flumioxazin) at 0.375 lb ai/A, Terracyte Pro (sodium carbonate peroxyhydrate) at 10 lb/1000 sq. ft., V-10233 (flumioxazin) at 10 fl oz/A, and WeedPharm (acetic acid) 10- 20% v/v. In limited experiments, Broadstar 0.25G (0.25 lb/A), indaziflam (0.065 lb ai/A), Ronstar 2G (4.0 lb ai/A) and EC (2 lb ai/A) and Showcase 2.5G (2.5 lb ai/A) also demonstrated good control. Contact type treatments such as Scythe and Bryophyter were fast acting but generally required more than one application to remain effective (>80% control) during the trial period. Treatments with unacceptable or inconsistent liverwort control include Champ, FlowerPharm,

Freehand, Junction, M-Pedi, Quicksilver, Sporan, Sporatec, and Xeroton. In a single trial the following products were effective in controlling bittercress and crabgrass, as well as, liverwort: Bryophyter, GreenMatch, Scythe, SureGuard, and WeedPharm. Silwett alone also controlled these weeds but was ineffective in controlling liverwort.

The results from this study successfully identify several options for postemergent control of liverwort. Further research should focus on products that can be safely applied as a conventional application or as a dormant treatment to container grown ornamentals which provide residual well as, other weeds.



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Thoughts from Mike

Ann & I have been on the road with BASF for their "US Road Show", after all is said and done we will have gone coast to coast. Steve Larson shares plant health info for Pageant Intrinsic (left). Next week we'll be in Grand Rapids, Kalamazoo & Cleveland. For those of you in this region, this is a great conference to attend. For everyone else, you can either call your local BASF rep to get the details or go to their website. I will be posting some of the videos on our new YouTube channel---stay tuned!

As far as business goes, I've been hearing from several people that business is picking up for their company...that's great! I know the state that the economy is in has really put all our dreams, livelihood, etc to the test or on hold. Proceed with caution!!!

Please keep in mind a common courtesy---Acknowledgment!

Mike

