CHASE NEWS

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2012 in Review - What is coming next?

Well - as a plant pathologist I tend to think of what happened in 2012 with diseases and their control.

There were a number of big diseases that got their start earlier but exploded onto the national scene in 2012. The top two were impatiens downy mildew(far right) and boxwood blight caused by Cylindrocladium (far left). We also saw a real epidemic of basil downy mildew (lower middle, left) continue in 2012. There has been a great response from the small pool of researchers across the US to try to work out methods to limit losses and spread of these diseases.

There were also quite a few products registered in 2012 for control of diseases on ornamentals.

Micora - Syngenta, MOA 40 (downy mildew and Phytophthora)

Orvego - BASF, MOA 40 and 45 (downy mildew and Phytophthora)

Phyton 35 - Phyton Corp., MOA M1 (all types of diseases on ornamentals and vegetables in the greenhouse)

Regalia - Marrone Bio Innovations, MOA nc (natural plant extract - most effective on mildews and bacterial and fungal leaf spots, for ornamentals and food crops). This product is labeled for organic use.

RootShield Plus - BioWorks, MOA 44 and ?? (soil-borne pathogens on ornamentals and food crops in the greenhouse and outdoors). This product is labeled for organic use.

Trinity TR - BASF, MOA 3 (total release for foliar disease in greenhouse crops - see page 3 for a more thorough review).

What diseases we can expect to continue to be problematic in 2013? I am guessing that bacterial leaf spots and Fusarium will remain a more or less uncontrolled problem on many ornamental and vegetable crops. Nothing miraculous has happened to aide in our control of either Fusarium or bacteria.

I also think that some of the more common diseases on vegetables and herbs will increase in severity as more and more ornamental producers add these crops to their mix. The fact that the products labeled for control are not the same. Just choosing something that is labeled does NOT solve the problem. I think many organic basil growers have found this to be true.

Downy mildew on impatiens may or may not get worse since so many landscapers are abandoning the crop. Unfortunately, they do not seem to understand that spraying fungicides (or using a soil incorporation) can be very effective in the landscape. I am sure many people are looking for a substitute for use of common impatiens - at least for a few years.

For those of you growing woody plants - watch out for crown gall (top middle). This is another sleeping giant as far as I am concerned. As our growing methods modify, we are seeing some very old diseases resurge in importance and crown gall is one of these. The only thing that has ever been shown to work at all is a combination of cultural methods and biological control.

Finally - watch out for more fungicide resistance. More and more scientific reports are being published reporting development of resistance in fungi to key MOA groups. Although little is being done in ornamentals into this area, the active ingredients are the same and the types of pathogens very similar.

Watch next month for the first issue of **Chase Digest**! I hope you like it.

Olive Knot on Ornamentals

Olive knot used to be a disease that only olive growers had an interest in. Unfortunately, the disease (or a closely related one) has been found more and more on some woody ornamentals across the US in the past five years or so. I saw it on oleander in Arizona when I lived there in 1995. It was a problem in the landscape around our apartment complex where the hedges were trimmed with mechanical shears.

Olive knot is caused by *Ps. savastanoi* pv. *savastanoi* in cultivated and wild olive and ash (*Fraxinus excelsior*). Although strains from olive have been reported to infect oleander (*Nerium oleander*), this is generally not the case; however, strains of *Ps. savastanoi* pv. *nerii* can infect olive. Pathovars *fraxin*i and *neri*i are differentiated from pathovar *savastanoi* mostly in their host range, and were not formally recognized until 1996.

The olive knot pathogen, *Pseudomonas savastanoi*, causes galls on shoots, branches, fruit, and leaves. Shoots girdled by galls die. Any fresh wound is susceptible to infection which makes pruning operations and taking cuttings very susceptible stages.

Tests with copper bactericides on olives grown in California have been performed by University personnel. Generally, disease control improved with more applications of copper. Disease incidence increased if more inoculum was present so removing galled branches can help control the disease spread. Disease was lower on shoots treated with Kocide. Rigorous use of copper bactericides might help reduce the incidence of olive knot on ornamentals but relying on bactericides only will simply maintain the disease at a low level. In a management document from South Australia Research and Development Institute (SARDI) the best way to handle this disease on olive is shown below:

"Managing the disease is aimed at preventing infection, as it is difficult to eradicate established

Olive knot on olive (above) and loropetalum (below)

infections. This includes a summer pruning to remove galls to reduce the inoculum load and applying copper based products to protect wounds.

The following practices are recommended:

- Provide good growing conditions - healthy trees are less susceptible.
- Avoid excessive fertiliser application – trees should be kept balanced to ensure they only produce the leaves necessary for development.
- Avoid wounding trees.
- Prune healthy plants before infected ones.
- Practice good hygiene - tools should always be disinfected after pruning suspect trees.
- Do not prune in wet weather or just before wet weather. Wounds remain susceptible for up to 10 days.
- Shoots and twigs damaged during harvesting should be pruned out.
- Pruned branches should be burned immediately on site.
- Plants such as Oleander, Ligustrum (Privet), Forsythia, Fraxinus (Ash), Jasmine, Phillyrea and any other plants of the Oleaceae family should not be planted near your olives as they are possible hosts of the bacteria.
- Copper sprays should be applied in autumn and spring, before rain and after pruning and leaf fall to protect wound sites. Use label rates and apply at least once in each season."

For those of us more interested in ornamental production, I can add a few thoughts. Olive knot is relatively common on oleander and also found on myrtle, pomegranate, mandevilla and now loropetalum (in addition to the list given above). Systemic infection is believed common in oleander but rare in olive. Propagation through use of infected stock plants therefore will keep this around forever.

Using bactericides may help if they are applied at the highest legal rate very routinely. Waiting to see a symptom will not work since eradication is not likely with any bacterial disease. The possibility of using them in propagation where overhead misting is common if not always the case, makes it even less likely that you can prevent disease spread and incidence.

If you do find a gall in one of your crops, it would be a good idea to send a sample to a lab for ID. Crown gall, caused by *Agrobacterium tumefaciens* creates rather similar looking galls (as do some fungi). Knowing which disease you are seeing is critical since crown gall is very wide in host range and cannot be controlled with bactericides according to years of trials. In contrast, some of the fungal galls can be controlled somewhat through use of the appropriate product and may have a very narrow host range. If you don't know what the problem is you may end up applying fungicides or bactericides needlessly.

Trinity TR Receives National Label

Trinity TR (total release from BASF) just received national labeling for use in greenhouses on *Alternaria, Botrytis, Cercospora, Cylindrocladium*, Downy Mildew, *Fusarium, Myrothecium*, Powdery Mildew and *Rhizoctonia* diseases. The active ingredient is triticonazole (currently not labeled for ornamentals in any other form). It has a 4 or 12 hour REI depending on ventilation. I cannot tell exactly what it is labeled on (plants).

We performed a number of trials on this TR product between 2009 and 2011 (Table to the right). This is the second TR product that has reached the market since we started working with Whitmire Micro-Gen in 1998. The first was Mozart TR which has the active ingredient fludioxonil.

We saw that the TR formulation typically gave the same level of control as the normal wet spray application of Trinity (not currently labeled for ornamentals). Excellent control of Alternaira leaf spot, Cylindrocladium leaf spot and powdery mildew on gerber daisy occurred. In contrast, neither formulation had any effect on eradicating hypericum rust although fungicides in this MOA group (3) typically would provide some control of rust diseases.

The results for Botrytis blight were variable with none on gerbera daisy and excellent on geranium and stock (*Matthiola*).

It was unexpected (at least by me), to see that both formulations provided excellent prevention of Rhizoctonia seedling rot on celosia , very good control of Myrothecium petiole rot on pansy and good control of Fusarium crown rot on lisianthus. Both diseases do occur above the soil-line where either the wet spray or the TR could deliver the triticonazole.

Summary of Trinity TR trials (Chase Horticultural Research, Inc.)

Disease (plant)	Trinity	Trinity TR	Phytotoxicity
Alternaria (Impatiens)	Excellent	Excellent	Safe (1/2 x TR) Slight (x rate TR) Safe (wet)
Botrytis (stock, geranium)	Excellent	Very good to excellent	Safe (wet) Safe (TR)
Botrytis (gerbera)	None	None	Slight (x rate TR) None (½ x or wet sprays)
Cercospora (pansy)	Good	Some	Stunting (wet) Moderate burn and stunting (TR)
Cylindrocladium (myrtle)	Excellent	Excellent	Safe (wet or TR)
Fusarium crown rot (lisianthus)	Good	Good	Safe (wet) Slight-moderate (TR)
Myrothecium petiole rot (pansy)	Very good	Very good	Moderate (wet) Severe (TR)
Phyllosticta (*Vinca minor*)	Appeared to increase disease	Appeared to increase disease	Phytotoxic (wet and TR)
Powdery mildew (gerbera)	Excellent	Excellent	Safe (wet) Safe (TR)
Rhizoctonia damping-off (celosia)	Excellent	Excellent	Moderate stunting (wet) Slight stunting (TR)
Rust (hypericum)	None (eradication trial)	None (eradication trial)	Safe (wet or TR)

The use rates are 1 or 2 cans per 300 square feet (depends on the target disease). Treatments can be made on a 7 day interval and the label suggest changing to another MOA group after three sprays (2 for pansy).

The safety of the TR vs. wet spray Trinity differed based on the plant treated. In general, the TR was safe at the lower rate we tested but sometimes caused damage at the higher rate. Pansy especially appeared sensitive to Trinity regardless of formulation and it might be prudent to skip using it on this crop. Phytotoxicity symptoms were typical of the products found in the sterol inhibitor MOA group (3) including stunting.

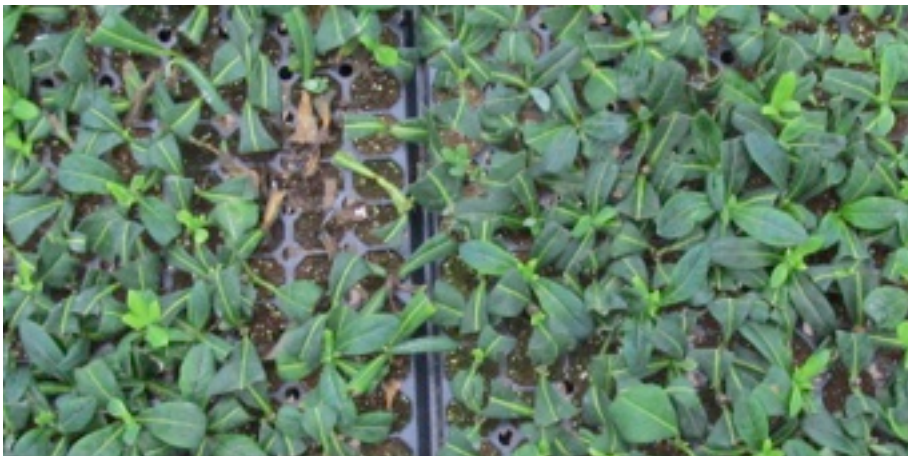
My suggestion is to test Trinity TR on a small group of any plant you wish to treat to determine safety to that crop under your conditions. Start with the lower end of the labeled use rates first (1 can/3000 square feet).

Making use of the total release delivery can be an improvement in foliar disease control due to the lack of water.

Pageant Intrinsic Fungicide and Control of Cutting Diseases

We have been working with Pageant to determine possible benefits of using this fungicide in propagation of unrooted cuttings. A trial was conducted in late 2011 at a commercial propagators which evaluated Pageant and two biological control agents based. The products were applied as a drench once right after sticking the cuttings. Four plant types were chosen: Pittosporum, Abelia, Dianthus and Buddleia.

This trial showed that the losses in Abelia (due to *Botrytis*) were lowest for the plants treated once with 12 oz/100 gal of Pageant. Neither the bacteria or fungal biological control had any significant effect on cutting loss or top grade in Abelia. For Pittosporum, none of the treatments affected cutting loss or top grade. Dianthus showed a slight response to the treatments but none were significantly different than the water treated controls. Dianthus treated with Pageant or the fungal product were significantly better than those treated with the bacterial product. For the Buddleia, the Pageant treatment actually reduced top grade sightly (not significantly) compared to the other treatments.



Untreated control (left) and Pageant (8 oz/100 gal) treated (right) Lonicera.

Effect of Pageant on cutting loss on 5 January 2012					
Treatment	Rate/100 gal.	Pittosporum	Abelia	Dianthus	Buddleia
Untreated	-----	2.2 a	12.5 b	0	0 a
Bacterial	-----	3.0 a	9.5 b	0	0.8 a
Fungal	-----	5.5 a	8.5 b	0	0 a
Pageant	12 oz	2.8 a	1.2 a	0	1.5 a

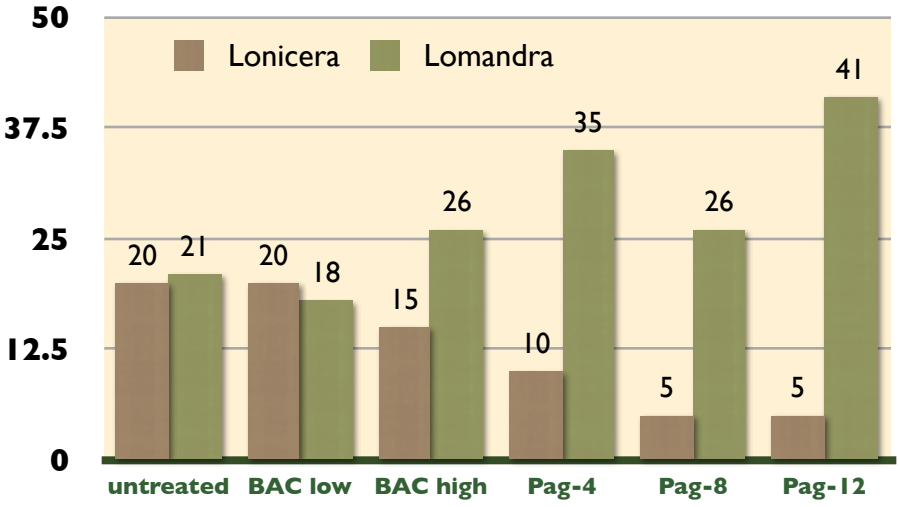
Effect of Pageant on top grade on 5 January 2012.					
Treatment	Rate/100 gal.	Pittosporum	Abelia	Dianthus	Buddleia
Untreated	-----	3.0 a	3.1 a	4.2 ab	4.4 a
Bacterial	-----	3.4 a	3.2 a	3.8 a	4.2 a
Fungal	-----	2.9 a	3.5 a	4.9 b	4.4 a
Pageant	12 oz	3.1 a	4.2 b	4.6 b	3.8 a

Numbers in the same column were followed by a different letter were significantly different.

Later in 2012, another set of trials with unrooted cuttings was performed. In this trial, products were applied as sprenches, twice on a 14 day interval (Nov. 3 and 17). Plants were evaluated about four weeks after cuttings were stuck. The graph to the right shows data for *Lonicera* (number cuttings rotted with Botrytis) and Lomandra (# cuttings with new growth). As you can see from the graph, the amount of Lonicera cuttings with Botrytis was not affected by the bacterial product at either a low or high concentration. However, the Pageant reduced the amount of Botrytis at all rates tested. The effect of Pageant on new growth for Lomandra increased over the untreated control and the low rate of bacterial stimulant.

These trials show the benefit of using Pageant when cuttings are attacked by Botrytis. Using any fungicide routinely is not always beneficial. Other trials show reduced cutting quality when treated with the 12 oz rate of Pageant in the absence of Botrytis.

Effect of sprenching with a bacterial stimulant or Pageant at different rates on disease and quality of two unrooted cuttings.



Non-Parasitic Fungal Pests

You have probably heard the expression “All that glitters is not gold”. The same holds true of some of the fuzzy fungi that we find on our plants and the potting media we use. Since they are not easy to distinguish from pathogens like Botrytis, powdery mildew, downy mildew and rust, we sometimes react more strongly than necessary.

The first image to the right is of a fungus called a slime mold that was found growing on the leaves of bird-of-paradise. These fungi grow on most any moist surface and can be extremely variable in their appearance. They do not damage the leaves of a plant but are certainly not salable. Slime molds undergo a radical change in shape almost overnight. They can also disappear as rapidly when the conditions change. This shipment of liners was badly contaminated when the container was opened but once they had been allowed to dry out and were exposed to normal conditions, they vanished.

In the next image, this Elle plug shows signs of a bright green fungus which turns out to be *Trichoderma*. I see a lot of this in propagation, especially in the winter when plugs may stay wet a little longer. If you remember, some *Trichoderm*a spp. are effective biological control organisms. Wiping the out may not be a good goal.

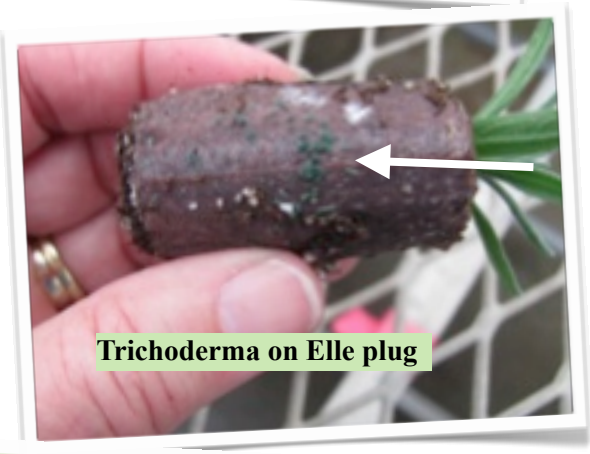
In the next image, we are looking at a planting of wheatgrass sold for fresh food consumption. The black growth at the junction of the roots and shoots is *Rhizopus* (also called common bread mold). It is not acceptable to have this mold growing on the wheatgrass but there is no fungicide that could be used either. This problem must be attacked through management of the cultural conditions used to produce the crop and not through use of unlabeled and potentially hazardous products.

The bottom image shows a fuchsia plug with a mustard colored fungus growing on its leaves. This is a little like the *Trichoderma* on the Elle plug in that it is a sign that the conditions may be a little too wet. It is also a sign that the natural balance of fungi and bacteria is off. We used to see this fungus - *Ostracoderma* - all over the surface of freshly steam-sterilized potting media. The only reason it grew rampantly across the potting medium was that it moved in by airborne spores and was the first to arrive on the potting medium surface where nothing challenged its growth.

You may be asking,what can I spray on this type of problem to get rid of it. Nothing I know of, since none of these are plant pathogens and there won’t be any legal choices. What’s more, the chance that something will work in a “disinfectant” category is slim and I would be more concerned with phytotoxicity than anything else.

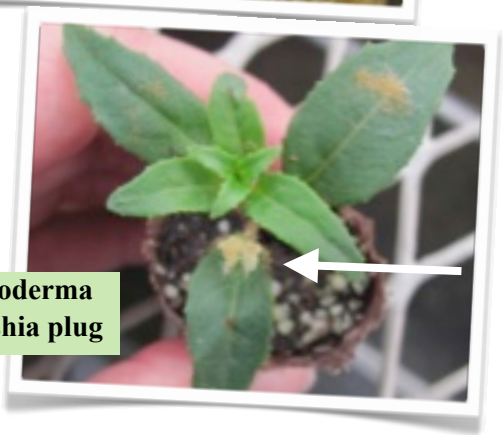
I suggest trying to control these types of situations culturally through modifying the growing environment. The next time you see something odd - send me a picture!

Slime mold on bird-of-paradise



Trichoderma on Elle plug

Rhizopus on wheatgrass



Ostracoderma on fucshia plug

The Origin of the Poinsettia

Do you ever wonder how some plants got their start? Even a plant like poinsettia which seems to have always been part of our Christmas had to start sometime, somewhere.

The poinsettia was named after Joel Roberts Poinsett who lived from 1779 - 1851. He was the son of a French physician and the first United States Ambassador to Mexico (1825 - 1829). Poinsett had medical training but his real love was in botany (this happens a lot even now). Mr. Poinsett later founded the institution which we know today as the Smithsonian Institution - another interesting connection - I LOVE the natural history museum!

On one of his trips to Mexico, Poinsett was impressed by the bright red display exhibited by the 'Flame flower' plant that bloomed at Christmas time. He sent some of them back to South Carolina, where he began propagating the plants and sending them to friends and botanical gardens.

Another critical step in acceptance of this new plant into the horticultural trade was made when Robert Buist, a Pennsylvania nurseryman. Mr. Buist is thought to be the first person to have sold the plant under its botanical name, *Euphorbia pulcherrima* (literally, "the most beautiful Euphorbia"). It is believed to have become known by its more popular name of "poinsettia" around 1836 and remains an important feature of our holiday crop production and worldwide celebrations.

This is interesting but also serves a real purpose for our production of the poinsettia crop. Remember about 10 years ago when poinsettias all of the sudden had issues with powdery mildew? We leapt into action with fungicide sprays that were very effective. Where did this new disease come from? Knowing the origin of the plant helps us know the origin of a disease or insect pest and also find natural enemies of the pests. They all evolve together and knowing that can give us a head start in finding a solution. History offers us solutions to current difficulties if we can take a moment to look back.

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Thoughts from Mike

Well....it's the end of another year. I hope all of us did some good this year in either increased production or sales. With the fiscal cliff coming, I'm not sure where Ann & I will end up after just about like everyone else. Recently I'm sure everyone's heard about the Hostess issue. Personally I don't get it, in the state that the economy and unemployment are in, **WHY** on earth would you decide to go on strike. Understanding the way the unions work (or not) in this case did not help along with bad management. If these major corporations are REALLY trying to reorganize/restructure, than it needs to start at the top. Mr. CEO that's making $1,000,000+ a year along with benefits should be the first in line and be willing to give up some of that. Lead by example, as I watch the business news and hear that some of the big companies are laying off or asking employees to take pay cuts. I wonder if the CEO included him/herself in that process. If they REALLY want to keep the company afloat, the rules should apply to all. With most businesses having a hard time, I think we need to do whatever needs to be done (maybe even some drastic measures like benefits) until the economy turns around. I think we should be happy to have our jobs we have and standing in a picket line asking for a raise or better benefits now is not the time.
Both Ann & I are very happy with where we are, we most definitely value each and every one of you for your continued support in Chase Agricultural Consulting, we in turn will continue to help you with all your plant disease issues.

Starting next month, *Chase News* will have a new name along with a new look. It's been a long 10 years since we've started *Chase News* and think it's time for a fresh new look. So....starting next month *Chase News* will become ***Chase Digest.*** As we move forward we will be working on a new delivery method as well, this will help for those who have lost issues in the past.

Ann & I hope everyone has a safe & warm holiday season and look forward to working with you once again in 2013.

Mike