Fungicides on the Horizon

It's only been in the last three months that we've started seeing more experimental products available for testing, and with that, we definitely have something to look forward to — increased diversity.

By Ann Chase

It seems like only a short while ago since I was trying to write this article for 2001. Now it is 2002, and I wonder what has changed in the past 12 months. Although we have seen registrations for new fungicides during the past couple of years, availability of experimental products for development has been low. In the past three months, however, we have started seeing a wide variety of products come into testing on ornamentals. Many of these are a couple or more years away from registration, but at least there are more in the pipeline.

Top: Pseudomonas leaf spot on delphinium. Bottom: Fusarium wilt on cyclamen. (Photos courtesy of Chase Research Gardens)

One of the more interesting aspects of the new products is their diversity. They range from newer, better strobilurins (and their close relatives) to really old (from the 1960s) chemistry being tried in a new arena. Some of the products are already registered on turf, and we should see ornamental labels soon. For those that are not even registered in this country, the wait may be longer, although everyone is looking for reduced-risk products, and that significantly shortens the wait.

Another development is use of products described as "fertilizer" for disease control. I have been working with Aliette for the past 20 years. This is the only phosphorous acid product that is labeled as a fungicide that I am aware of in this country — at least on ornamental diseases. At present, many local manufacturers and distributors have their own version of "Phos-acid" products, but they are registered as fertilizers or growth promoters. In the next 12-24 months this is due to change.

THE NEWCOMERS

In a downy mildew trial last spring, we saw excellent control on pansies with two Phos-acid alternatives, although one of them caused significant damage to the pansies. Aliette was effective and safe. One big difference between Aliette and some of the "fertilizers" is the presence of aluminum. Without side-by-side comparisons, we cannot be sure the alternatives will work the same way as Aliette. I am looking forward to these trials for Pythium, Phytophthora and downy mildew.

I have updated the efficacy table that was printed in *GPN*'s December 2001 issue (see Table 1, right). One new addition is a new column for Sclerotinia blight. Sclerotinia is gaining a real foothold on the West Coast, especially in cut flowers, bedding plants and potted flowering crops. One of the problems is that the disease is going uncontrolled until entire greenhouses are contaminated with huge, black, ugly sclerotia. Using a fungicide at this point may prove completely ineffective since eradicating sclerotia will be almost impossible without use of methyl bromide or steam. We were lucky enough to get three trials done on Sclerotinia blight on petunia this past winter-spring and are hoping to do some this winter on Gerber daisies and larkspur.

Some of the new products I listed in the efficacy table are Contrast, Cygnus and Fungo. Contrast is primarily a Rhizoctonia compound, although we have been hearing about very good control of Southern blight (*Sclerotium rolfsii*) too. Cygnus is a strobilurin compound (the first one we had in ornamentals) that is very good for powdery mildew. Our trials this past year show some control of Alternaria leaf spot, downy mildew and rust. We also have been testing Fungo (thiophanate methyl like 3336) and Truban (etridiazole like Terrazole). Finally, I decided to include some recent testing on Hurricane. This product is a combination of active ingredients from Subdue Maxx (mefenoxam) and Medallion (fludioxinil). It works exactly the way one would expect such a combination to work.

I am starting to get excited about a couple of new bactericides, too. Neither is currently labeled for ornamentals but they have been promising in our early trials. One is a biological agent (*Bacillus subtilis* — Rhapsody from Agraquest) and the other is an SAR (Actigard from Syngenta). SAR is "systemic acquired resistance" and acts by alerting the plants' defense systems before the pathogen attacks it. We have seen up to 98 percent prevention of bacterial diseases and similar results on powdery mildew when Actigard is used. Rhapsody has been shown to be effective

against powdery mildew in trials by other researchers. The results on Pseudomonas leaf spot on impatiens and delphinium were very good. One or both of these products would give us a real shot at a rotation for bacterial disease control.

Camelot is a relatively new fungicide/bactericide effective on a wide variety of diseases from the standard Pseudomonas leaf spot to Alternaria leaf spot and powdery mildew. This year, we kept up our testing on Pythium root rot as well. Our most recent trial showed excellent control with soil drenches of Camelot at one or three pints per 100 gallons. This particular Pythium on snapdragons is apparently resistant to Subdue Maxx and Aliette, as both products failed in snapdragon trials for the second time this year. We have found good results with Phyton 27 used as a drench for Pythium root rot as well.

AWAITING THE EPA

I am on a mission to find a really effective product for Fusarium wilt in container ornamentals. Our best fungicides (Medallion, Terraguard and Heritage) are not 100-percent effective on this deadly disease. Another serious problem has been Phytophthora on many ornamentals. When conditions are ideal, nothing stops these pathogens. We are still waiting for registration of dimethomorph (Stature DM) from SePRO. This new active ingredient is excellent on Phytophthora root rot. It is combined with mancozeb in a currently registered product from SePRO (Stature). Unfortunately, Stature cannot be drenched due to the mancozeb component so we will have to wait for Stature DM.

Over the past year, I have been involved with the California Cut Flower Commission as coordinator of its efforts to find a methyl bromide replacement. By January 2005, we hope to have a number of products researched and labeled for some of the serious and debilitating diseases on field-grown cut flowers. While the loss of methyl bromide may not directly affect many ornamental producers, it will change the face of cut flower production in California and Florida, at the very least. Other industries that will be hurt are the bulb crop ➧

Table 1. Efficacy of some fungicides and bactericides for diseases of ornamentals.

Product	Alternaria	Anthracnose	Bacteria	Botrytis	Cylindrocladium	Downy Mildew	Fusarium	Myrothecium	Phytophthora	Powdery Mildew	Pythium	Rhizoctonia	Rust	Scab	Sclerotinia	Thielaviopsis
Aliette			Fair			Exc			Vgood-exc			Exc				
Banner Maxx	Fair-vgood									Exc			Vgood-exc			
Camelot	Fair-good	Vgood	Fair	Some-exc	Fair-good	Poor-vgood			Poor	Vgood	Fair-exc	Poor-some	Poor-good		None	
Chipco 26GT	Vgood-exc			Exc			Vgood-none wilt	Good	None		None	Good-exc			Exc	
Cleary 3336	None			Poor-fair	Good-vgood		Vgood		None	Poor-vgood	None	Good-exc				Vgood
Cinnamite						None			None	Good-exc						
Compass	Good-exc			Vgood	Good-vgood	Fair-vgood	Good	Vgood-exc		Vgood-exc	Poor-good		Poor-exc		Vgood-exc	None
Contrast												Vgood-exc				
Cygnus	Some					Some				Vgood-exc			Some			
Daconil	Vgood			Exc		Some	Vgood-exc	Good-vgood	None		None	Exc			Exc	
Decree	Fair			Exc	Fair	None	Fair		Fair	Fair	None	Fair	Fair-good		Poor-exc	None
Dithane	Good-vg	Vgood		Good-exc		Good-vgood						Poor-fair	Vgood-exc	Exc		
Erase				Poor		Vgood				Vgood			Some			
FirstStep						None-vgood		Poor		Exc				Some		
Fungo												Vgood-exc	Vgood-exc			
Heritage	Good-exc			Fair-good	Fair-vgood	Exc	Good-vgood	Vgood-exc	Vgood	Vgood-exc	Poor-vgood	Exc	Exc	Vgood	Exc	None
Hurricane					Vgood				Vgood		Vgood-exc	Vgood-exc				
Junction	Good		Vgood	Poor-exc		None-vgood		None			Fair-exc	Vgood	None-good	Good		
Kocide TNO			Vgood	Fair	Fair	Poor-vgood					Fair-vgood	Poor	None			
Medallion	Exc			Exc	Vgood-exc	None	Vgood-exc	Exc	None		None	Exc				Good
PathGuard	Good	Good		Fair-good		Some									Exc	
Phyton 27	Fair-exc		Vgood-exc	Poor-good	Poor-good	Vgood	None-vgood	None	Poor-vgood	Vgood-exc	Fair-good	Poor-good	Poor-vgood	Fair	None	Fair
Pipron										Vgood-exc						
PlantShield	None				Good-vgood	Poor-fair	None wilt	Fair	Fair-good	Fair	Poor-vgood	None-exc	Fair-vgood			Fair
Protect	Good-vg			Vgood		Fair-good		None	Fair				Vgood-exc	Exc		
Rubigan										Vgood-exc			Vgood	Vgood		
Spectro	Vgood			Poor		None		Fair	Vgood		Exc	Vgood-exc	Vgood	Vgood		
Stature	Exc	Good				Exc			None-exc	Vgood			Some-exc	Exc		
Strike				Good		Poor-exc				Good-exc		Fair	Good-exc			
Subdue Maxx									Good-exc		Good-exc					
Systhane	Good-exc	Vgood								Vgood-exc			Exc	Vgood		
Terraclor												Good-exc				
Terraguard	Good-exc			Good-vgood	Good-vgood		Vgood	Good		Vgood-exc		Fair-vgood	Good-exc	Exc		Good
Terrazole/ Truban									Good-vgood		Vgood-exc					
Triact				Fair-good		Poor-fair				Vgood-exc		Fair	Vgood-exc			

Data compiled between 1996 and 2001 by Chase Research Gardens, Inc. Not for publication. See GPN, *December 2001 for a complete version of this table.*

Table 2. Trials conducted at Chase Research Gardens Inc. from 1996 to present.

Disease	Disease expression by crop
Alternaria	Alternaria leaf spot on dusty miller Alternaria leaf spot on impatiens Alternaria leaf spot on pittosporum Heterosporium leaf spot on dianthus Leaf streak on daylily
Anthracnose	Colletotrichum leaf spot on cordyline
Bacteria	Pseudomonas leaf spot on delphinium Pseudomonas leaf spot on impatiens Xanthomonas leaf spot on geranium Xanthomonas leaf spot on ranunculus
Botrytis	Cyclamen, exacum, geranium, gerber daisy, lisianthus, pansy, petunia, poinsettia
Cylindrocladium	Cutting rot on azalea Root and petiole rot on spathiphyllum
Downy mildew	Alyssum, pansy, rose, snapdragon, stock
Fusarium	Leaf spot on dracaena Stem rot on lisianthus Wilt on cyclamen
Myrothecium	Leaf spot on dieffenbachia Leaf spot on New Guinea impatiens Petiole rot on spathiphyllum
Phytophthora	Aerial blight on petunia Aerial Blight on vinca Root rot on pothos Root rot on spathiphyllum
Pythium	Easter lily, geranium, lisianthus, snapdragon
Rhizoctonia	Aerial blight on fern Leaf spot on spathiphyllum Root rot on poinsettia Stem rot on impatiens Stem rot on poinsettia Stem rot on vinca
Rust	Geranium, hypericum, snapdragon
Scab	Poinsettia
Sclerotinia	Petunia
Thielaviopsis	Black root rot on pansy


Sclerotinia blight on Salvia.

producers (Caladiums in Florida) and anyone still using natural soil as a component of their potting medium.

So I think the overall news for disease control in ornamentals is improving every year. We have more tools at our fingertips than ever before. They are diverse in their efficacy, plant, human and environmental safety and even in their cost of use. Since the stock market, the weather and almost everything else is not cooperating, having so many choices is a real break. GPN

Ann Chase is a plant pathologist and president of Chase Research Gardens Inc., Mt. Aukum, Calif. Further information on disease control is available at www.chaseresearchgardens.com.

Editor's Note: The use of specific trade names in this publication does not constitute endorsement of these products in preference to others containing the same active ingredients. The use of trade names is solely for the purpose of providing specific information and does not signify that they are approved to the exclusion of others. Mention of a product does not constitute a guarantee or warranty of the product by the author or magazine.

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