

Control of Pansy Downy Mildew 2002

As pansy production increases, so too does the occurrence of downy mildew. Fortunately, we have a wide range of highly effective control options.

By Ann Chase

Leaf yellowing and thickening on pansies infected with Peronospora violae. (All photos courtesy of Ann Chase)

Downy mildews have gained a strong foothold in the horticultural industry throughout the United States and Canada over the past few years. During the fall-winter of 2002, we experienced a severe outbreak of pansy downy mildew across the United States. Since the disease had previously been confined somewhat to the Pacific Northwest, where it has caused severe losses annually, we wondered if it was a different downy mildew pathogen. It was identified by Dr. G.W. Simone as *Peronospora violae*, the most common downy mildew pathogen on pansies.

The opportunity to concentrate on this downy mildew has not been frequent in our facility so we spent much of our efforts on this disease. Several new fungicides were available for evaluation, and they were each tested over the course of the season. We also expanded the work to include eradication as well as prevention with currently available and experimental fungicides. The trials reported here were funded in part through a grant from the Washington State Department of Agriculture as well as SePRO Corporation, Cal-Agri Products, Whitmire Micro-Gen, Aventis and my own relentless curiosity. I also want to thank the growers who so generously gave me healthy (and occasionally not so healthy) pansies to work with.

CULTIVAR RESISTANCE

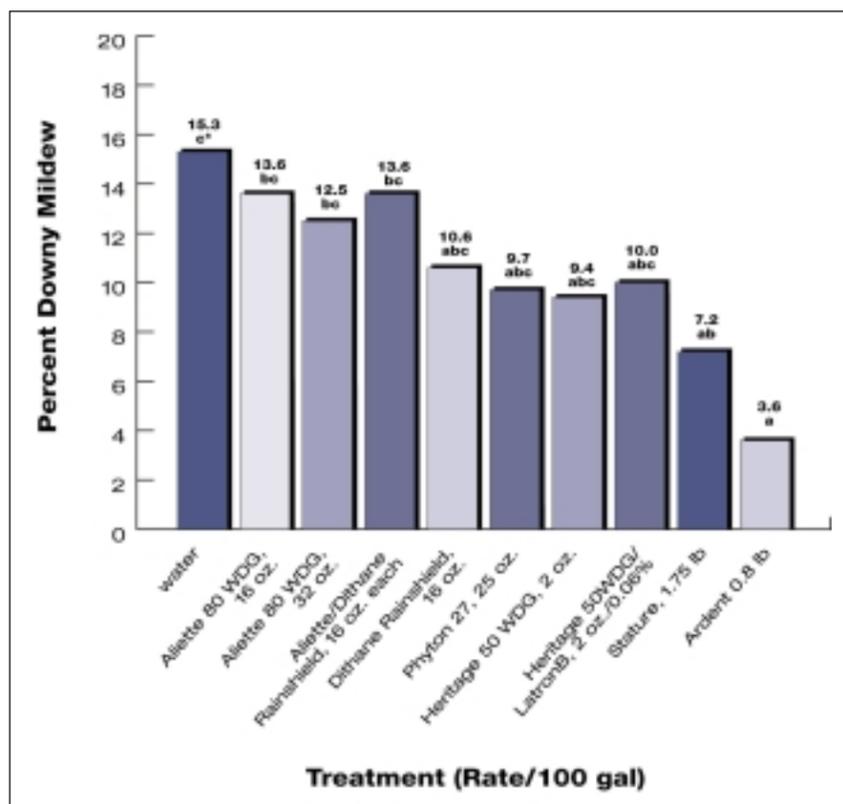
Over the course of the season, we ran a series of trials on pansies and violas for response to downy mildew (see Figure 2 below right). It appears that most, if not all, are susceptible to downy mildew, but there are a few that are very resistant, such as 'Crown Rose' and 'Dancer Beaconsfield', and a few that are very susceptible, such as 'Crown Yellow' and 'Bingo Light Rose with Blotch'. While some of the Bingo cultivars were very low in disease, others were some of the highest. This research confirms, once again, that one cannot pick a series of bedding plants resistant to disease since responses from plant to plant are so individual.

ERADICATION

The first trial conducted was an evaluation of the best fungicides for eradication of pansy downy mildew. The plants were obtained from a commercial producer, and they were pretty clobbered when the test started. We sprayed once per week for three weeks and then re-checked them for disease (see Figure 1, below left). The best eradicator proved to be Ardent (dimethomorph from SePRO), though there was still not 100 percent eradication. The same active ingredient, dimethomorph, is

Figure 2. Response of Pansy and viola cultivars to downy mildew in 2001-2002 trials.

Figure 1. Eradication of downy mildew on pansies (fall 2001).



Cultivar	Response
Crown Rose	very low
Dancer Beaconsfield	very low
Bingo Blue Frost	low
Bingo Light Blue	low
Bingo w/Blotch	low
Bingo White w/Blotch	low
Colossus Deep Blue	low
Crown Orange	low
Crown Rose	low
Crystal Bowl Primrose	low
Crystal Bowl Supreme True Blue	low
Delta Formula Blotch Mix	low
Delta Red w/Blotch	low
Delta Pure Color Mix	low
Delta Red & Yellow	low
Delta White with Blotch	low
Majestic Giant 2 Yellow Blotch	low
Maxima Orange	low
Pure Red	low
Ultima Morpho Mix	low
Ultima Silhouette	low
Bingo Clear Yellow	moderate
Bingo Red/Yellow	moderate
Crystal Bowl White	moderate
Supreme True Blue	moderate
Crown Yellow	high
Bingo Light Rose w/Blotch	high



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Figure 3. Phos-acid alternatives to Aliette for downy mildew on pansy.

Treatment	Rate/100 gal	# Flowers	Top Grade	Phytotoxicity	% Downy mildew
Water	—	1.9 ab	4.0 b	1.0 a	17.1 c
Bio-Phos	1%	2.7 b	4.3 b	1.3 b	0.0 a
Nutri-Phite PK	1%	1.9 ab	3.3 a	2.1 c	0.0 a
Aliette 80WDG	16 oz	1.9 ab	4.2 b	1.0 a	2.5 a
Aliette 80WDG	32 oz	0.7 a	4.1 b	1.0 a	0.8 a
PathGuard 6F	20 oz	1.9 ab	4.2 b	1.0 a	10.8 b
Ardent	0.6 lb	1.8 ab	4.1 b	1.0 a	0.0 a

* Numbers in the same column that have a different letter after them are statistically different than each other.

also found in Stature, which contains mancozeb, too. Ardent worked a little better than Stature, presumably since the amount of dimethomorph was a little higher.

Phyton 27 and the combination of Aliette and Dithane RainShield caused very slight phytotoxicity. We later discovered that our Phyton had been exposed to cold temperatures during shipment to us — thus the slight phytotoxicity. All Dithane RainShield treatments and Stature treatments resulted in slight residue. Heritage worked about the same whether or not we added Latron B 1956 (a wetting agent). We have seen this before with Heritage and downy mildew control, but don't leap to the conclusion that you can skip the wetting agent. It is mandated on the Heritage label and critical for control of other diseases, especially rust and powdery mildew.

WHAT'S COMING UP?

One of the trials was conducted preventatively to evaluate copper formulations and an experimental product called Agri-50 from Cal Agri Products. This is a sodium lauryl sulfate

(the soapy part of shampoo). We also tested an experimental formulation of Camelot, which may not be pursued (one of the hazards of working on experimental products). We were pleased to see very good to excellent control of downy mildew with all of the treatments in this test (see Figure 5, below left). Some of the products did damage open flowers, but they were safe on the rest of the plant.

In the second trial, we were able to check out two new experimental compounds that I will call EXPA and EXPB. EXPA was tested as both a drench and spray with excellent prevention (see Figure 6, below right). The second product, EXPB, also gave excellent control when used as a spray at 8-16 ounces per 100 gallons. These compounds fall into the same chemical class as the strobilurin fungicides Heritage and Compass. The standards, Aliette, Heritage and Compass did not give 100 percent control but performed very well, as usual. Cygnus (another strobilurin from Scotts) was not as good as Compass and Heritage. All products were safe in this trial at the rates tested.

Figure 5. Strobilurin and related fungicides for pansy downy mildew control (2002).

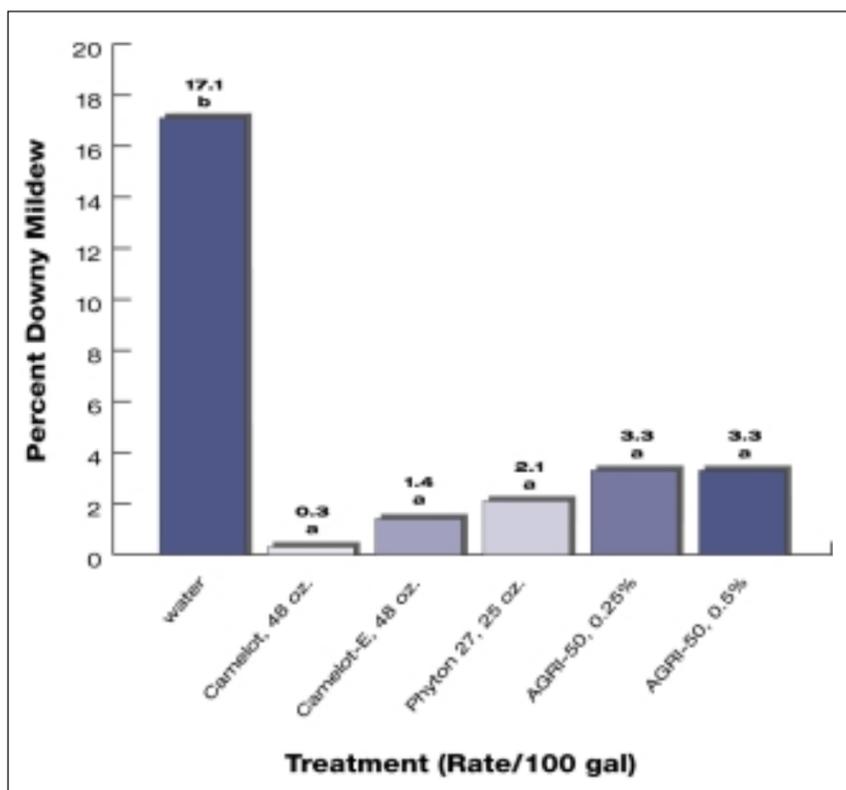


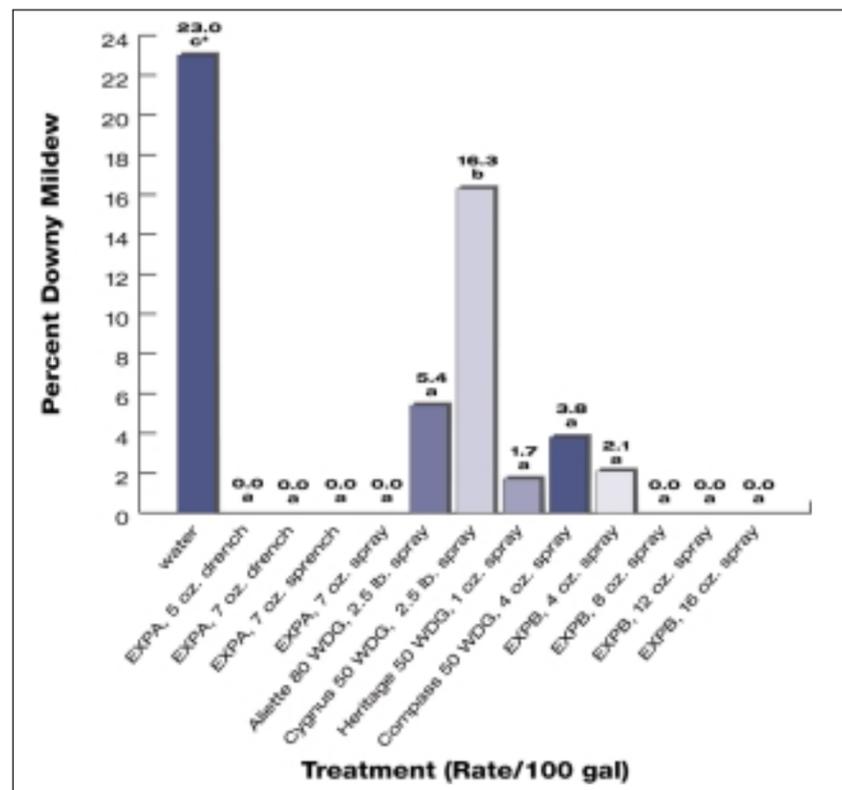
Figure 4. Classes of fungicides and their control of downy mildew on ornamentals.

Fungicide	Active ingredient	Control grade
ORGANIC PHOSPHATE		
Aliette 80WDG	Fosetyl aluminum	A
Bio-Phos	"fertilizer"	A
Nutri-Phite PK	"fertilizer"	A
CINNAMIC ACID DERIVATIVE		
Ardent	Dimethomorph	A
Stature MZ	Dimethomorph and mancozeb	A
STROBILURIN		
Compass	Trifloxystrobin	B+
Cygnus	Kresoxim methyl	B
Heritage 50WG	Azoxystrobin	A
AROMATIC - SUBSTITUTED BENZENE		
Daconil Ultrex	Chlorothalonil	D
PathGuard	Chlorothalonil	C
BIOLOGICALS		
RootShield	<i>Trichoderma harzianum</i>	C
EBDC (CARBAMATE)		
Dithane Rainshield	Mancozeb	B+
Protect T/O	Mancozeb	B
INORGANIC COPPER		
Camelot	Cupric hydroxide	C
Junction	Mancozeb and cupric hydroxide	C
Kocide TNO	Cupric hydroxide	C
Phyton 27	Copper pentahydrate	B

ALTERNATIVES TO ALIETTE

Our final trial was conducted with some phosphorous acid alternatives to Aliette. I have been getting questions for at least three years regarding these products but have skillfully dodged them until now. Both of the products we tested are labeled as

Figure 6. Phos-acid alternatives to Aliette for downy mildew on pansy.



“fertilizer” but both Nutri-Phite PK and Bio-Phos were 100 percent effective in preventing downy mildew when used at one percent (see Figure 3, page 25). They did, however, cause slight phytotoxicity (especially Nutri-Phite). Aliette was safe even at one pound per 100 gal-

lons but did not give 100 percent control in this test. At two pounds, Aliette reduced the number of flowers. We have a couple of new experimental Phos-acid alternatives in our testing programs now (Pythium, Phytophthora and downy mildew this fall).

The final treatments were PathGuard (chlorothalonil active ingredient similar to Daconil) and Ardent. As we had found in a couple of trials on other crops, chlorothalonil gives some control of downy mildew, but the level does not make me an enthusiastic supporter of its use for downy



Typical sporulation of downy mildew fungus on underside of leaf.

mildew. Ardent gave excellent results, as it has in all of our downy mildew trials over the past three years.

I incorporated the results of these trials (and a few on crops other than pansy) into Figure 4, page 25. Figure 4 lists the products we have been evaluating for the past five years with an overall grade for efficacy on downy mildew diseases (mainly snapdragon, stock, alyssum and pansy). It is arranged by type of chemical class to allow you to check how fungicides in the same grouping compare.

You must rotate fungicides between classes to make sure that resistance to an important product does not develop. The best grades have been found in the organic phosphate (e.g., Aliette), cinnamic acid derivative (e.g., Stature), strobilurin (e.g., Heritage) and carbamate (e.g., Dithane) groupings. Each group has more than one alternative to choose from. **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: To help pinpoint the most effective fungicide rotation, Ann has developed a rotation guide that can be purchased at www.chaseresearchgardens.com



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