



# STROBILURIN FUNGICIDES UPDATE

This "new" chemical class continues to gain usage among growers. Below are the latest developments in strobilurin research.

BY A. R. CHASE



Curative control of *Hydrangea* powdery mildew. (All photos courtesy of A.R. Chase.)



*Alternaria* leaf spot control on *Dusty Miller*

In 2000, I wrote a summary of then current information on one of the newest classes of fungicides for ornamentals — strobilurins. The original compound, strobilurin A, was isolated from a mushroom called *Strobiluris tenacellus* found growing on decaying wood in a European forest. The products that have been developed, however, were synthetically derived. Zeneca (then ICI) started working on this new chemistry in 1982, with BASF following in 1983 and Syngenta (then Ciba Geigy) following thereafter.

## THE PRODUCTS

The first of the strobilurins to reach the ornamental market was Cygnus 50WDG from BASF Corporation with the active ingredient kresoxim-methyl. Ornamental marketing of Cygnus has recently been transferred to Scotts Professional Horticulture. Cygnus is described as a surface-systemic (translaminar movement) with anti-sporulant activity. This means that the product moves into and through the leaf, distributing chemical on the other side. Practically speaking, the active ingredient reaches areas on the same leaf that were not directly sprayed, which is a big help in controlling many leaf diseases.

Heritage 50WG (Syngenta) was the next strobilurin to reach the ornamental market. The active ingredient of Heritage is azoxystrobin, which has systemic activity with upward move-

ment. This means that when sprayed onto the base of a leaf, Heritage will move out to the edges (tip). If drenched, it will move into the root system and throughout the plant. If it is sprayed onto leaves, however, it will not move downward into the stem and roots.

Compass (trifloxystrobin) was originally developed and marketed by Novartis Crop Protection. With the merger of Novartis and Zeneca last year, Compass was sold (factory and all) to Bayer. Olympic Horticultural Products now markets Compass to our industry. Movement of trifloxystrobin is described as mesostemic to indicate both protectant and curative capacity. In this case, the active ingredient "penetrates the plant tissue, has laminar activity, but there is little or no transport within the vascular system of the plant."

The newest strobilurin is Insignia (formerly BAS 500F) from BASF Corporation. This product has mainly been developed for control of turf grass diseases and its use in ornamentals is not widely known at this time. The product will be recommended primarily as a protectant.

## EFFICACY

Heritage and Compass have been extensively tested on ornamental crop diseases over the past five years (Table 1). The two products work to a similar degree on *Alternaria* leaf spots, black spot on rose, downy mildews,



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Fusarium diseases, Myrothecium leaf spots, powdery mildews and poinsettia scab. Heritage tends to be more effective on downy mildews — probably because of its systemic capacity. Compass tends to be more effective on powdery mildews since movement into the leaf is not as desirable as presence on the leaf surface and immediate vicinity. Addition of a non-ionic surfactant (NIS), such as Latron B 1956, has improved efficacy of both fungicides for powdery mildew diseases. This is presumably due to better penetration of the powdery mildew colony when an NIS is added.

Some more obvious differences in efficacy have been found for Botrytis diseases where Compass is slightly more effective than Heritage. In contrast, Cylindrocladium is more effectively controlled by Heritage than Compass, although the level of control provided by either fungicide is rarely better than “good” for this pathogen.

Since these tests were limited in scope and number, I summarized results that were reported for these active ingredients on vegetable, fruit and other nonornamental crops (Table 2). Extensive tests on powdery mildew indicate very good to excellent control with all three strobilurins currently available. As with ornamental trials, trifloxystrobin works better than azoxystrobin on Botrytis. A higher degree of control of Phytophthora and Rhizoctonia is achieved with azoxystrobin compared to trifloxystrobin (similar to ornamental trial results).

There appears to be an overall profile for the strobilurin fungicides with the highest efficacy on powdery mildews, sometimes rusts, downy mildews and leaf spot diseases (Alternaria, Septoria, and Myrothecium). Relatively, a lower efficacy is found for control of Botrytis, Sclerotinia (related to Botrytis), Cylindrocladium, Phomopsis and Pythium. The differences noted between the systemic azoxystrobin and locally systemic trifloxystrobin are due to that factor and the nature of the target disease. Those diseases that are deeper in the host tissue (especially systemic infections with Fusarium) are more effectively controlled with azoxystrobin and the more superficial are better controlled with trifloxystrobin.

## CONCLUSIONS


The introduction of Cygnus, Heritage and Compass into the ornamentals market has been interesting. The strobilurins are broad-spectrum in their activity, effective at low rates on many diseases, environmentally friendly and fairly safe for our crops. These chemicals should be considered by most producers as an alternative to the products they rely upon presently. The new class of chemistry affords an excellent opportunity for resistance management. Adding one or more of these new fungicides to most control programs should result in superior control of the target disease. 

Table 1. Reports of strobilurin testing on ornamental diseases for 1997 through 2001.

Disease-Plant	Azoxystrobin Heritage	Trifloxystrobin Compass	Kresoxim methyl Cygnus
Alternaria-dusty miller, impatiens, marigold, poinsettia	B+	B+	Not tested
Anthraco-nose-azalea, dusty miller	B	Not tested	Not tested
Black spot-rose	B+	B+	Not tested
Botrytis-exacum, geranium, poinsettia	B-	A-	Not tested
Cylindrocladium-azalea, spathiphyllum	C	D	Not tested
Downy mildew-alyssum, pansy, rose, snapdragon, stock	A	A-	Not tested
Entomosporium-raphiolepis	C	D	Not tested
Fusarium leaf spot-dracaena, cyclamen	B+	B+	Not tested
Myrothecium-dieffenbachia, New Guinea impatiens	A+	A+	Not tested
Phomopsis-juniper	B	Not tested	Not tested
Phytophthora-azalea, petunia, spathiphyllum, vinca	B	D	Not tested
Powdery mildew-crape myrtle, dogwood, gerber daisy, hydrangea, impatiens, poinsettia, rose, zinnia	A-	A	B+
Pythium-dieffenbachia, Easter lily, geranium, lisianthus, poinsettia, snapdragon	C	Not tested	Not tested
Rhizoctonia-impatiens	A	C	Not tested
Rust-hypericum, rose, snapdragon	C	A	Not tested
Scab-poinsettia	A	B+	Not tested
Septoria-rudbeckia	A	Not tested	Not tested

A=excellent, B=very good, C=good, D=slight, F=none.

Table 2. Reports of strobilurin testing on nonhorticultural crop diseases for 1999.

Disease	Azoxystrobin	Trifloxystrobin	Kresoxim methyl
Alternaria-tomato, carrot, citrus	B	B	A+
Anthraco-nose-citrus, cucumber	C	B	Not tested
Botrytis-grape (bunch rot), bean, strawberry	C	B+	A-
Cercospora-corn, celery, beet	B-	Not tested	Not tested
Downy mildew-broccoli, cucumber, grape, tobacco, zucchini	C+	C+	B
Phomopsis-grape	C	Not tested	C
Phytophthora-pepper, potato, squash	B-	D	F
Powdery mildew-apple, cherry, grape, lettuce, melon, pumpkin, strawberry, zucchini	A-	A-	A-
Rhizoctonia-cucumber, peanut, rice, soybean	B	D	Not tested
Rust-corn, wheat	A+	D	Not tested
Sclerotinia-bean	D	C-	Not tested
Septoria-pistachio, wheat	A-	A+	Not tested

A=excellent, B=very good, C=good, D=slight, F=none.

**A. R. Chase is plant pathologist and president of Chase Research Gardens, Inc. in Mt. Aukum, Calif. You can obtain additional information at [www.chaseresearchgardens.com](http://www.chaseresearchgardens.com).**

The author would like to thank the many researchers who kindly reported results of their work on disease control on ornamentals, vegetables and fruit crops in fungicide and nematicide tests over the past few years.