Cost-Benefit of Ornamental Fungicides

Botrytis blight on geranium. (All photos courtesy of A.R. Chase)

Having trouble choosing the “right” fungicide? Many factors should be considered — the most important of which is your return on investment.

By A.R. Chase

The natural human tendency when confronted with a problem is to spring into action. For the ornamental producer, this means you want to spray something on the disease. It is hard to stop and take the time to understand the situation, but reflection is critical if you are going to make cost-effective decisions regarding fungicides. What questions should be answered before deciding to apply a fungicide for disease prevention or cure? Here are the most important ones:

1. What disease is this and can it affect crop value?

2. Can I change the production regime to control the problem?

3. What fungicides are available and how effective are my choices?

4. How much does each choice cost for an effective dose?

WHAT DISEASE IS THIS AND CAN IT AFFECT CROP VALUE?

Diagnosing each problem as it arises or even predicting problems and treating preventatively can be a challenge for many growers. Yet proper identification is critical if the appropriate controls are to be taken. Use identification guides, diagnostic services and your own experience to learn your crops’ common diseases.

Some diseases are critical to control preventatively. Diseases that cause plant loss early in production include damping-off (Pythium and Rhizoctonia) and cutting rot caused by Cylindrocladium, Botrytis, Rhizoctonia, Phytophthora or Pythium. If these diseases are not prevented, losses will be both immediate and long-term.

I have seen many growers use defective planting materials because they cannot obtain anything better in time to make a crop cycle. Unfortunately, infected cuttings and seedlings rarely outgrow a disease. Use of pathogen-free propagative materials is better than application of fungicides, but many times, the grower cannot control the quality of cuttings or seedlings.

Diseases that cause loss late in production can include Fusarium wilt, Pythium and Phytophthora stem and root rots. These diseases result in loss of an expensive product since all of the time and input of the production cycle are wasted. Treatment of these diseases must be preventative as well.

CAN I CHANGE THE PRODUCTION REGIME TO CONTROL THE PROBLEM?

Some diseases that cause loss of appearance, and thus plant quality, include Botrytis blight, Alternaria leaf spot, powdery mildew, rust and many other leaf spots. These can, at times, be controlled by cultural methods alone

Table 1. Fungicides for common diseases on ornamentals.

DISEASE	EXCELLENT	VERY GOOD	GOOD
Alternaria leaf spots	Medallion	Chipco 26019 Compass Heritage Chlorothalonils	
Bacterial leaf spots		Phyton 27	Junction Kocide
Botrytis blights	Chipco 26019 Chlorothalonils Decree Medallion		
Cylindrocladium cutting rot or petiole and root rot		Medallion	3336 Compass Terraguard
Downy mildews	Aliette Heritage Stature	Phyton 27	Mancozebs
Fusarium leaf spots	Chlorothalonils	Chipco 26019 Compass Heritage	
Fusarium wilts			Heritage Medallion Terraguard
Myrothecium leaf spots	Medallion	Compass Heritage	Chlorothalonils
Phytophthora root rots	Aliette Stature Subdue Maxx	Etridiazoles	
Powdery mildews	Compass Triazoles	Heritage Phyton 27 Many others	
Pythium root rots	Aliette Subdue Maxx	Etridiazoles	
Rhizoctonia stem rots	Compass Heritage Medallion	3336 Terraclor	
Rusts	Heritage	Mancozebs Triact Triazoles	
Thielaviopsis root rot			3336

Top: Phytophthora on spathiphyllum. Bottom: Erwinia on cyclamen.

but often require a fungicide application sometime during the production cycle. Most fungal leaf spots will occur with water on plant leaves. Changing the way plants are irrigated can eliminate fungal leaf spots. Botrytis blight can often be controlled simply through manipulation of the greenhouse relative humidity alone. If you are not producing plants in an enclosed greenhouse, you cannot make use of these environmental modifications to control disease. Most of these diseases are relatively easy to control on many crops and available fungicides can be 100-percent effective.

Other diseases are more effectively controlled with cultural rather than chemical methods. Bacteriacides are usually not as effective in controlling disease as most fungicides. Bacteriacides are only helpful when healthy seeds or cuttings are used and overhead irrigation or exposure to rainfall is eliminated. Black root rot (Thielaviopsis) on pansy and vinca can only be prevented by keeping the potting medium pH between 5.4 and 5.8. Fungicides are helpful, but without pH management they are only marginally effective.

WHAT FUNGICIDES ARE AVAILABLE AND HOW EFFECTIVE ARE THEY?

There are many products available for disease control on ornamentals. Most diseases have more than three choices for control, including biological in some cases. Others, such as bacterial diseases, have only one or two choices. Table 1, page 18 lists some of the fungicides available for key diseases and rates their effectiveness. There are others that I have not included due to space constraints. Inclusion in the table does not constitute a warranty of efficacy or a recommendation. Some of the products are listed by trade name while others are listed by active ingredient. I choose to list active ingredients when my trial experience has indicated similar activity levels for multiple products containing that active ingredient.

HOW MUCH DOES EACH CHOICE COST FOR AN EFFECTIVE DOSE?

Once you are aware of the most effective fungicides to choose from, you can start checking prices. The cost of the product is not the only information you should consider, and it might not even be the most important. The use rate, application interval and overall effectiveness should be part of your decision. I stress that the first thing you should consider is how effective the choice is. You always want to use the most effective choice possible.

You also need to consider some basic math. You cannot simply compute the cost per volume; you need to compute the cost per treatment, which takes into account interval and dosage. Using an "expensive" product at a low rate on a monthly interval may be more cost-effective than using a "less expensive" product at a high rate once per week. I have computed the cost per pound or gallon, rate per 100 gallons and price per 100 gallons for many of the commonly used fungicides. This information will be available on my Web site at www.chaseresearchgardens.com.

Fungicide prices are subject to change and vary somewhat from distributor to distributor and state to state. Check your supplier for the most current and the best prices.

Table 2. Range of costs for controlling some serious ornamental diseases on a monthly basis.

DISEASE	POTENTIAL EFFICACY	COSTS/MONTH
Bacterial leaf spots	0-90%	$6 to 230
Botrytis	80-100%	$64 to 280
Downy mildew	Preventative up to 100%	$6 to 30
	Curative 0-85%	$41 to 88
Fungal leaf spots	75-100%	$10 to 32
Fusarium wilt	0-50%	$30 to 118
Phytophthora stem rot	50-100%	$5 to 21
Powdery mildew	75-100%	$10 to 31
Pythium root rot	75-100%	$5 to 21
Rhizoctonia stem/ root rot	80-100%	$15 to 46

CONCLUSIONS

The process of choosing the best fungicide for your situation is complex. Larger operations may be able to assign the task to a single person who has the time to determine the cost-benefit ratio of an application. However, most growers are involved in all aspects of their business and do not have the time or energy for this chore. In these situations, most growers usually rely on one of the following methods for choosing fungicides.

- Many growers become familiar with a few key products and simply stick to them.
- Another approach is to apply broad-spectrum products or combinations that will cover all of the bases. In this case, you should know that the most expensive products are not always better than the least expensive choice.
- Sometimes the choice of making a fungicide application is taken for granted, even when a disease cannot be controlled with the product chosen. These applications are the most expensive since they result in labor, product costs (even when small) and loss of income through the mistaken belief that the crop will be salable.

The final table, Table 2, below left, shows some common diseases, the potential efficacy of products available for their control and the resulting costs (product only) of monthly prevention depending on the product chosen.

The most effective means of controlling any disease is accurate diagnosis and prevention. Virtually all fungicides work better when used in conjunction with cultural controls and when used preventatively. GPN

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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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