Transitioning from Gray Mold to White Mold

A. R. Chase
Chase Research Gardens, Inc.

As winter turns into spring through much of California gray mold is slowly retreating and white mold is advancing. In coastal regions where cut flowers are grown, this change of season may have already occurred. In these regions, gray mold and white mold may be year round problems. Seasonal fogs appearing in early summer can cause outbreaks of both diseases.

Gray mold (*Botrytis*) and white mold (*Sclerotinia*) are related fungi with *Botrytis cinerea* being the asexual state of some species of *Sclerotinia.* Botrytis blight is very common on dahlia, fuchsia, geranium, cyclamen, exacum, poinsettia, pansy and lisianthus but really all ornamentals can be affected by this non-discriminating fungus. We often see it causing losses in production of plugs and cuttings where humidity must be maintained at a high level. We have seen Sclerotinia crown rot or blight on alyssum, petunia, lilies, lobelia, wallflower, pansy, stock, larkspur and many other bedding, perennial and cut flower crops. On some crops, *Botrytis cinerea* infections are confined to flower spots while on others cutting rot, stem rot and leaf spot also occur. *Sclerotinia* spp. usually causes crown rot (bedding plants) and stem or crown rot (perennials and cut flowers). Table 1 lists the plants we have received in our diagnostic clinic since January that were infected with one or both of these fungi. As you can see, in the first couple of months we found *Botrytis* but now we are just starting to find *Sclerotinia* with both fungi present in some cases.

Figure 1. Botrytis blight often gets a start on flowers. Infected petals fall onto leaves or plants below and spread disease.

Figure 2. *Botrytis* sporulation can be seen in the leaves in the centers of plants or flats.

Figure 3. Sclerotinia blight is characterized by white masses of mycelium and hard, black structures called sclerotia.

Table 1. Summary of *Botrytis* and *Sclerotinia* isolations from ornamentals (Chase Research Gardens, Inc. Diagnostic Lab - January through April 2006).

Plant	Date	Disease	Pathogen
Geranium	1-10-06	Cutting rot	*Botrytis*
Wax flower	2-3-06	Post-harvest-starting in the field	*Botrytis*
Cyclamen	2-9-06	Leaf spot	*Botrytis*
Oleander	2-10-06	Stem rot	*Botrytis*
Bacopa	2-16-06	Plug/crown rot	*Botrytis*
Lily	2-22-06	Flower spots	*Botrytis*
Citrus	2-23-06	Tip blight due to cold	*Botrytis*
Peony	3-8-06	Tip blight due to cold	*Botrytis*
Phylliopsis	3-8-06	Crown rot	*Botrytis*
Ruscus	3-8-06	Petiole canker	*Botrytis*
Osteospermum	3-17-06	Crown rot	*Botrytis* and *Sclerotinia*
Rose	3-22-06	Dieback and tip blight due to cold	*Botrytis*
Petunia	3-22-06	Crown rot	*Sclerotinia*
Lobelia	3-22-06	Crown rot	*Sclerotinia*
Oenothera	3-21-06	Crown rot	*Botrytis*
Autumn fern	4-7-06	Leaf blight	*Botrytis* and *Sclerotinia*
Australian tree fern	4-7-06	Leaf blight	*Botrytis* and *Sclerotinia*
Succulents	4-11-06	Leaf spots	*Botrytis*

Lab trials for Botrytis and Sclerotinia

Sometimes we perform tests in the lab to give us a preliminary idea of what we might expect from a fungicide in a greenhouse trial. This allows us to test products at times when the disease does not naturally occur and also to test the response of many different isolates of a single fungus. Not all isolates of a pathogen respond the same to a fungicide, especially if resistance to that fungicide has occurred. Although lab trials may be interesting, they must be followed up with greenhouse or field trials to make sure of the results. They are not always the same.

We performed a trial about a year ago with four isolates of *Botrytis cinerea* and four of *Botryotinia sphaerosperma* (isolated from Asiatic and Oriental lilies). This year we performed trial with two additional *B. cinerea* and two isolates of *Sclerotinia sclerotiorum.* The results of these trials are shown in Table 2. *Sclerotinia* was more easily controlled in the lab than either *B. cinerea* or *Botryotinia sphaerosperma*. The best growth reduction overall was seen with Medallion and poorest was seen with the strobilurins, Compass O and Heritage. Decree performed better at 24 oz than 16 oz, as might be expected. The results with Daconil and Decree were not very impressive. These products perform very well against the diseases in the field so relying on lab testes alone is a chancy proposition in predicting field activity.

Table 2. Percent growth control with fungicides in Petri dishes for *Botrytis, Botryotinia* and *Sclerotinia* isolates.

Product	Rate/100 gal	*Botrytis cinerea*	*Botryotinia sphaerosperma*	*Sclerotinia sclerotiorum*
Chipco 26019	16 oz	82	97	100
Compass O	4 oz	16	0	Not tested
Daconil Ultrex	1.4 lb	52	56	85
Decree	16-24 oz	63	48	100
Heritage	4 oz	22	Not tested	64
Insignia	16 oz	62	Not tested	100
Medallion	4 oz	97	95	100

Sclerotinia Greenhouse Trials

When I was a Professor at the University of Florida I rarely saw either Botrytis or Sclerotinia diseases since they are not favored by the heat typical of most of the Florida year. Since returning to California 12 years ago, I have become much more familiar with these pathogens on our ornamentals. We have performed more than 20 trials on Botrytis blight. We have found chlorothalonil (Daconil and Spectro), fenhexamid (Decree), fludioxinil (Medallion) and iprodione (Chipco 26019 and 26GT) to be the most effective labeled fungicides for prevention and eradication of Botrytis blight. These four active ingredients fall into distinct and separate chemical classes making rotation for resistance management possible. Since Botrytis has been demonstrated many times to develop resistance to some fungicides, rotation or tank-mixing should be the cornerstone of every Botrytis control program.

We started testing fungicide control of Sclerotinia in 2002 when we performed three trials on petunia. A few weeks ago we were able to once again test some products for Sclerotinia control –this time on both petunia and primrose. Table 3 summarizes these trials. The copper products we have tried in the 2002 trials did not control Sclerotinia blight due to phytotoxicity which simply gave the fungus an entry into the plant. We saw the same response with a couple of experimental products in our recent trial. These products damaged the plants and actually resulted in increased severity of Sclerotinia blight in one case. The strobilurins (Insignia, Compass O, Cygnus and Heritage) provided different levels of control. Insignia was the safest but Heritage was the most effective in this group. Daconil Ultrex was reasonably safe and gave very good to excellent control. Iprodione was one of the best active ingredients giving excellent control but each fungicide we tried (Chipco 26019, Chipco 26GT and Sextant) resulted in moderate to severe damage on very small petunias but was safe on larger plants.

Table 3. Fungicide efficacy on Sclerotinia blight on Petunia and Primrose.

Product	Supplier/manufacturer	Rate/100 gal	Disease control
Camelot	Whitmire Microgen/ SePRO	48 oz	None due to phytotoxicity
Compass O	OHP	4 oz	Very good
Chipco 26GT	Bayer	1-1.5 quart	Excellent
Cygnus	Scotts/BASF	3.2 oz	No control
Daconil Ultrex	Syngenta	1.4 lb	Good to excellent
Decree	SePRO	16-24 oz	Very good to excellent
Heritage	Syngenta	1-8 oz	Very good
Insignia	BASF	4-16 oz	Some at rates of 8 oz or higher
Medallion	Syngenta	2 oz	Very good to excellent
Phyton 27	Phyton	25 oz	None due to phytotoxicity

Conclusions

Our trials show that both *Botrytis* and *Sclerotinia* are best controlled with the same four fungicides. These include Chipco 26019 (or Chipco 26GT and Sextant), Daconil formulations, Decree and Medallion. Be sure to read their labels carefully and use all products according to their labels only. There are a number of experimental products with a high degree of activity against these two fungi. Watch for announcements of their registration in the upcoming year.