Botrytis-New Management Strategies for an Old Pest

Grey mold caused by the fungus (Botrytis cinerea) is one of the most common and destructive pests of forest and conservation nurseries. Although it can also be a serious problem in bareroot nurseries in wetter climates, Botrytis blight is best known as a foliage blight and stem canker of container seedlings (Figure E). If left untreated, the fungus thrive at cold temperatures, and can develop into a serious storage mold. Botrytis is a common fungus, so spores are always present in the nursery environment. The fungus typically infect weak or damaged foliar tissue when free moisture is present. In fully-enclosed propagation structures, these conditions develop during the late summer and fall when seedling crown canopies close, and the lower foliage is shaded out and begins to senesce. At the same time, night temperatures are lowered for the Hardening Period, which results in moisture condensation on the foliage, especially after irrigation.

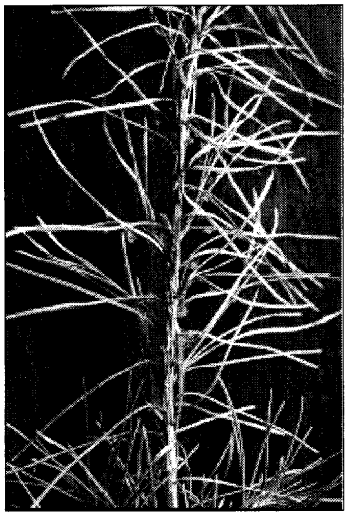
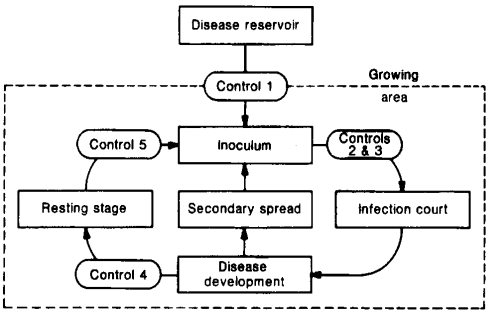


Figure E: The grey mold fungus (Botrytis cinerea) produces abundant airborne spores that can quickly spread the disease.

The disease cycle of Botrytis is very short, and inoculum levels can build up quickly in the favorable container nursery environment. The secret to successfully controlling Botrytis is to develop an integrated program of both cultural and chemical control measures (Figure F).

Many growers have found that if they use preventative cultural controls and are vigilant, they can almost eliminate the need for chemicals.



Disease Control Techniques

1. Keep surroundings clean of weeds
2. Apply protectant fungicides
3. Use cultural techniques to keep foliage dry
4. Rogue out diseased seedlings
5. Clean and disinfect growing area between crops

Figure F: An integrated pest management (IPM) program for grey mold consists of both cultural (1,3,4,5) and chemical (2,5) control measures

Cultural Management - The first level of defense is to keep the inoculum level of Botrytis spores low by removing dead and dying seedlings from the propagation area, and eliminating weeds from around the nursery **(Figure F-Control 1)**. The second phase is to use protectant fungicides when warranted **(Figure F-Control 2)**. The next step is to keep the seedling foliage dry, as much as is possible, by irrigating early in the day and venting immediately after irrigation. Injecting surfactants into the irrigation water causes the foliage to drip dry faster. Under the bench heating, ventilation is very effective, but horizontal airflow (HAF) systems, and even portable fans, will help. Some innovative growers use portable leaf blowers **(Figure F-Control 3)**. The fourth level of defense

is to teach your crew to constantly keep an eye open for any evidence of the grey, cottony markings of Botrytis **(Figure E)**, which often develops on suppressed foliage or dead seedlings. As soon as they find a disease pocket, then the infected seedling should be removed and the area spot-treated with a fungicide **(Figure F-Control 4).** The final phase of the control program is to keep the propagation environment clean between crops and to sterilize used containers **(Figure F-Control 5).**

Chemical controls—Fungicides can be used as either protectants or eradicants for controlling Botrytis; of the latter group, the chlorothalonil products are the most effective. Recent research has shown that a tank mix of half-strength chlorothalonil and half-strength mancozeb provides both good protection and effective eradication (Powell 1995). Unfortunately, the Botrytis fungus has developed resistance to many common fungicides, so the best plan is to rotate fungicides between applications. Although they have the longest Restricted Entry Intervals, the mancozeb, copper, and chlorothalonil fungicides are less likely to promote the development of resistance strains **(Table 3).**

Sources:

Landis, T.D.; Tinus, R.W.; McDonald, S.E.; Barnett, J.P. 1990. The Biological Component: Nursery Pests and Mycorrhizae, Vol. 5, The Container Tree Nursery Manual. Agric. Handbk. 674. Washington, DC: USDA Forest Service. 171 p.

Powell, C.C. 1995. Botrytis: new management strategies for an old blight. Nursery Management & Production 11(5): 58-59.

If You Can't Beat Them, Eat Them

Weeds are a continual headache to nursery managers, and some species seem to defy all attempts at control. Common purslane (*Protulaca oleracea*—Figure G) is persistent in nurseries because it flowers quickly, produces billions of tiny seeds, and each leaf segment can root if not removed from the seedbed. A new weapon in the IPM arsenal could be consumption. Nutritionists report that the leaves of purslane have more vitamin C than spinach, and is rich in omega-3 fatty acids and antioxidants, making it an attractive health food.

Source:

Anonymous. 1994. Abstract 8780. Horticultural Abstracts 64(11):1162.

Table 3. Comparison of current Botrytis fungicides (Powell 1995)

Class/Type	Fungicide	Restricted Entry Interval (hrs)	Resistance Likely?
chlorothalonil	Daconil2787®	48	No
	Thalonil®	48	No
mancozeb	Protect T/O®	24	No
	Dithane T/O®	24	No
	Fore®	24	No
copper	Phyton-27®	24	No
	Kocide®	48	No
thiophanate	Cleary's 3336®	12	Yes
	Domain®	12	Yes
dicarboximide	Chipco 26019®	12	Yes
	Ornalin®	12	Yes
	Botran®	12	Yes