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## Botrytis in mixed containers and cell-pack flats

*While visiting several greenhouses and garden centers recently, I saw quite a bit of Botrytis in large mixed containers, hanging baskets, and cell-pack flats. Botrytis (“gray mold”) can kill crowded plants under low light and wet conditions.*

The fungal pathogen, *Botrytis cinerea*, produces spores profusely on senescing and injured tissues under moist, humid, low light conditions. This can lead to explosive epidemics of the pathogen, as well as loss in sales of large mixed containers due to individual plant death. Smaller, shaded plants (often where watering was inconsistent) can be infected and eventually killed by *Botrytis*. With close container spacing and hanging baskets produced over bench crops, senescing flowers from



Figure 1. Close spacing, low light, and full containers can lead to conditions favoring *Botrytis* infection. (Image by J. Williams-Woodward)

hanging baskets can land on leaves on the crop below and provide an entry point for *Botrytis* infection (Figures 4 and 5).

*Botrytis* symptoms include blighting of tissues often at the soil line that moves upward in the plant causing tan lesions and leaf/plant death (Figure 2). Often “fuzzy”, gray- to white-colored sporulation is visible on the killed tissues (Figures 5 and 6). Within finished cell-pack flats and larger containers planted with multiple plants and plant species, *Botrytis* can start in one plant and then quickly move into adjacent plants causing leaf death and a shortening of flower life (Figure 3). With mixed containers, it is unusual for

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the whole container to be affected; however, infection of a few plants can lead to holes in the plant coverage, shortening of flower life, and container culling or a reduction of sale price.

Scout for *Botrytis* and remove infected tissues and plants to reduce disease spread. Water management is also important for *Botrytis* infection and control. It only takes 4-8 hours of plant wetness for *Botrytis* spores to germinate and infect. High humidity (above 85%) allows *Botrytis* to produce an abundant number of spores (Figure 6). Management of *Botrytis* is multi-pronged. Plant wetness should be minimized by avoiding wetting the foliage as much as possible. Using drip irrigation, directing water to the base of the plant, and irrigating at times when the plants will dry quickly can help reduce infection. Increasing plant spacing to allow more light penetration and air movement can aid in plant drying as well. Humidity levels within the greenhouse can be reduced by heating and venting the air at dusk; however, this only works when the air moisture outside the greenhouse is less than inside. Fungicides also play an integral part of *Botrytis* management.

Preventive fungicide applications should be applied to protect plants during periods of high risk of a *Botrytis* outbreak. Preventive fungicide application as plants are headed to retail outlets can reduce *Botrytis* infection where plant care is often not optimal. There are numerous fungicides labeled for *Botrytis* management (Table 1). Fungicide resistance is known, especially to thiophanate methyl and iprodione. It is extremely important to apply no more than two applications of a particular fungicide before rotating to a fungicide with a different mode of action (different numerical FRAC code) to reduce fungicide resistance development. Be sure to read all fungicide labels and follow directions



Image 2. Annual vinca in a large mixed container was killed from *Botrytis* infection. *Botrytis* is now also infecting adjacent plants. (Image by J. Williams-Woodward)

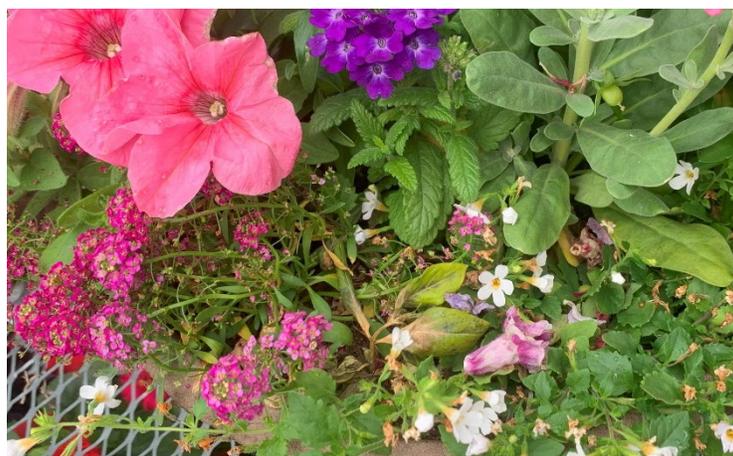


Figure 3. *Botrytis* infecting annual vinca in the mixed container has spread infection the adjacent Alyssum, verbena, and petunia flowers can result in container culling or at the very least a reduction in sale price. (Image by J. Williams-Woodward)



Figure 4. A spent petunia flower dropped from a hanging basket about the geranium crop can spread *Botrytis* into the geranium leaf causing leaf death and loss of plant sales. (Image by J. Williams-Woodward)



Figure 5. Botrytis sporulation and leaf blighting in the shape of a petunia flower that had fallen onto a snapdragon leaf in a mixed container growing beneath a hanging basket of petunias.



Image 6. Botrytis spores produced off killed coleus leaves can be water-splashed to adjacent leaves and plants during irrigation events. Sanitation is important in reducing Botrytis sporulation. (Image by J. Williams-Woodward)

for rates and use precautions. Several fungicides can cause damage when applying to plants in bloom. Chlorothalonil is known to discolor blooms. Pageant (pyraclostrobin + boscalid) can discolor impatiens and petunia blooms. Several others can cause stunting and phytotoxicity on impatiens, New Guinea impatiens, ferns, Pothos, or some geranium cultivars. Follow label directions and precautions when applying any fungicide.

Table 1. Fungicides labeled for *Botrytis* management

FRAC	Active Ingredient(s)	Brand Name	Efficacy
2	Iprodione	Chipco 26019	Fair to Good
7	Isofetamid	Astun SC	Good to Excellent
7 + 11	Benzovindiflupyr + Azoxystrobin	Mural	Good
7 + 11	Boscalid + Pyraclostrobin	Pageant Intrinsic	Fair to Good
7 + 11	Fluopyram + Trifloxystrobin	Broadform SC	Good to Excellent
7 + 11	Fluxapyroxad + Pyraclostrobin	Orchestra SC	Good to Excellent
9 + 12	Cyprodinil + Fludioxonil	Palladium WDG	Good to Excellent
12	Fludioxonil	Medallion, Spirato	Fair to Good
17	Fenhexamid	Decree 50DF	Good to Excellent
19	Polyoxin D Zinc salt	Affirm	Good
M5	Chlorothalonil	Daconil Weatherstik, etc.	Good

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