Identification of *Botrytis* spp. Causing Gray Mold on Peonies in Alaska and Washington

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Introduction

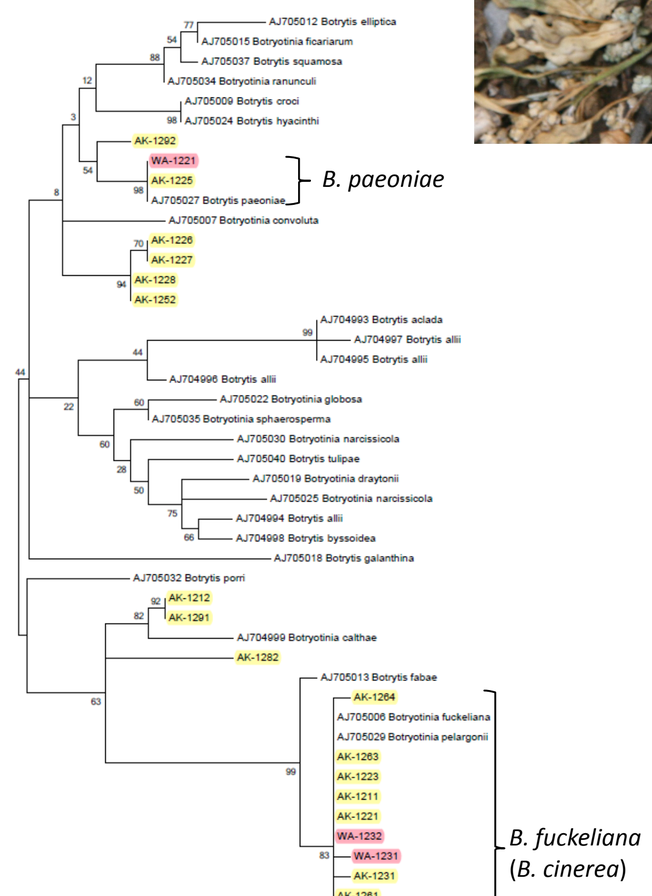
Gray mold, caused by *Botrytis paeoniae* or *B. cinerea*, is the most important disease of peonies. This fungal disease can occur as a blight of emerging shoots and a leaf spot or blight on the foliage throughout the growing season. It can also be a major issue during the postharvest storage and shipment of cut flowers.

Management of gray mold is based on sanitation and reducing periods of free moisture on the foliage during the growing season. Minimizing moisture on the foliage and avoiding plastic sleeves is commonly recommended as a way to reduce postharvest losses. In most other commodities, spore loads at harvest from pre-established infections are a significant driver of *Botrytis* development in the harvested crops. Thus, managing disease development during the growing season is likely to also help reduce postharvest losses in peony. Fungicides are often an important tool in controlling *Botrytis* diseases. Although there are only a few fungicides registered to control gray mold on peonies, there are a number of newer *Botrytis* fungicides used on other crops (grapes, berries, pome fruits) that are not registered on peony.

Summary of Initial Studies

To identify Botrytis species in production fields, samples of Botrytis were obtained from diseased peonies from eight fields in Alaska and three fields in Washington near the end of the growing season. Each individual *Botrytis* sample is an isolate. For the most part, isolates of *Botrytis* have DNA that is similar to each other, however a small fraction of the DNA of each isolate differs. It is this part, referred to as G3PDH, that was examined more closely. The technique used to examine the DNA is referred to as sequencing because it reveals the variable chemical pattern of each isolate's DNA. The sequence information for each isolate was compared to all other isolates as well as an international database (GenBank) of DNA sequences of *Botrytis* species.

The DNA sequence information was used to produce a genetic tree that shows how closely the Botrytis isolates from each farm and state are related to each other or to previously known Botrytis species (Figure 1). Based on these tests, *B. cinerea* was isolated more frequently from the samples than *B. paeoniae* in both Alaska and Washington. The molecular data also suggest that there is considerable variation in isolates compared to known isolates of *B. paeoniae* and *B. cinerea* that are in GenBank and that other *Botrytis* species may be present in some fields.



Collaborative Project

To improve the management of *Botrytis* on peonies, a collaborative research project was initiated in 2012. We are proposing to:

- Determine the identity of specific *Botrytis* species causing gray mold on peonies in Alaska and Washington.
- Determine if there are shifts in the prevalence of *B. paeoniae, B. cinerea* and other species during the growing season.
- Determine the persistence of primary inoculum and identify conditions that favor initial infection and secondary spread of the disease.
- Determine if *Botrytis* populations in grower fields are resistant to the fungicides currently being used to control this disease.
- Obtain efficacy data for newer fungicides and biocontrol agents to control gray mold during the growing season and the postharvest storage of cut flowers.

Future Plans

Only a limited number of isolates of *Botrytis* have been tested to date and they were all obtained from samples collected late in the growing season. This coming growing season, we are planning on conducting the following studies:

- Collect samples from grower fields throughout the growing season and during storage of flowers to obtain a clearer picture of the importance of *B. paeoniae, B. cinerea*, and other *Botrytis* spp. in the development of gray mold.
- Conduct controlled inoculation studies to determine the ability of other *Botrytis* spp. isolated from grower fields to cause disease on peonies
- Conduct laboratory tests to determine the sensitivity of isolates to fungicides.
- Conduct a trial to determine the effectiveness of new reduced-risk fungicides and biocontrol products in controlling the development of gray mold on field-grown peonies.