Molecular Pathogen and Pest Detection Lab
Department of Plant Industry
511 Westinghouse Rd., Pendleton, SC 29670
864-646-2133
www.clemson.edu/public/mppdlab

The Molecular Pathogen and Pest Detection Lab (MPPD Lab) provides a Botrytis fungicide-resistance testing service to identify potential fungicide-resistance problems among *Botrytis* isolates (gray mold) found in small fruit, stone fruit, and herbaceous crops. A total of 10 fungicides are tested. For more information regarding this service and the MPPD Lab, call (864) 646-2133 and ask for Dr. Xiao Yang, or email **xyang7@clemson.edu**.

Fungicides to be tested: boscalid, cyprodinil, fenhexamid, fludioxonil, fluopyram, iprodione, isofetamid, penthiopyrad, pyraclostrobin+SHAM, and thiophanate-methyl (e.g.: Pristine, Inspire Super/Vangard, Elevate, Switch/Miravis Prime, Luna Sensation, Rovral/Meteor, Kenja, Fontelis, Cabrio, and Topsin M)

Botrytis Fungicide-Resistance Testing: Sample Collection Guidelines

Sample Submission Forms

Include a BOTRYTIS FUNGICIDE-RESISTANCE TESTING FORM for each sample. Ensure that the form is complete and clearly identifies which sample it belongs to.

Sample Material (e.g., strawberry samples. Please consult Dr. Yang for testing other plants)

Collection of gray mold in early season:

Obtain 20-40 dead strawberry flowers **OR** 150 healthy flowers from throughout the field to be tested. **Dead flowers are preferred** (Figure 1); it is much harder to isolate the gray mold fungus out of healthy flowers. We can also isolate the fungus from dead leaves (Figure 2). You may send as many dead leaves as you would like in addition to the flowers, or 20-40 dead leaves if no flowers are submitted.

Figure 1 Dead flowers next to a healthy flower (petals and sepals were removed). The dead flowers were asymptomatic upon collection but produced gray mold after 2 days in the lab.

Figure 2 Sometimes we can isolate the gray mold fungus from dead leaves. The dead leaves in the figure were asymptomatic upon collection but produced gray mold after 2 days in the lab.

Collection of gray mold in late season:

Obtain 20-40 strawberry fruits throughout the field to be tested. Make sure the fruits bear gray mold spores (Figure 3); it is difficult to isolate the gray mold fungus out of healthy fruits. The fruits should be sent to the MPPD Lab immediately after collection with expedited shipping. Shipping over the weekend or holidays should be avoided, as the fruits will rot quickly.

Instead of fruits, **cotton swabs with *Botrytis* spores are preferred** (Figure 4). Collect spores with swabs from 10-20 individual fruits with **FRESH** gray mold lesions bearing spores (Figure 3). **Do not collect from rotten fruits, old mummies, or fruits on the ground**. Use a cotton swab for **each** fruit and carefully rub one side of the swab against a gray mold lesion **without touching the fruit itself**; there should be no strawberry tissues/juice on the swab, as they may carry contaminants (Figure 4). **The rubbed portion of the swab should look lightly gray**, but not red. A tiny bit of gray on each swab is sufficient. A minimum of 10 swabs from 10 fruits should be submitted per field. Swabs should be placed individually in small Ziploc bags or envelopes, then all together in a Ziploc bag. Label each bag with a distinct name/number of your choosing.

Figure 3 Symptomatic fruits with fresh lesions bearing gray mold spores that are suitable for the testing. It is difficult to obtain spores from healthy fruits and diseased fruits with old lesions, as they rot quickly.

Figure 4 Use cotton swabs to carefully collect spores from fresh lesions on fruits without getting juice on the swab. A tiny bit of gray is sufficient. If the gray mold spores cannot be readily seen, mark the area with a Sharpie.

Mailing Samples

Attach the BOTRYTIS FUNGICIDE-RESISTANCE TESTING FORM to the corresponding sample. Ship the sample, form, and payment of test fee to the laboratory at:

Clemson University, MPPD Lab, 511 Westinghouse Rd., Pendleton, SC 29670

Receiving Botrytis Fungicide-Resistance Testing Reports

Results will be generated approximately 7 business days after the samples are received at the MPPD Lab. Reports will be sent via email entitled “Clemson University MPPD Lab Report”.

CLEMSON UNIVERSITY

MOLECULAR PATHOGEN AND PEST DETECTION LAB

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(Lab Use Only)

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BOTRYTIS FUNGICIDE-RESISTANCE TESTING FORM

Name_____ **Company Name**_____
LAST FIRST MI (IF APPLICABLE)

Mailing Address_____
STREET CITY STATE ZIP

Phones (_____) _____ (HOME ● WORK ● CELL?) (_____) _____ (HOME ● WORK ● CELL?)

EMAIL *(reports are emailed – print clearly)*_____

☐ Copy report to Clemson specialist for comments: schnabe@clemson.edu (Dr. Guido Schnabel)

Sample Collection Site: *(if different from above)*	Name/Company_____ Address_____ _____ Phone_____ Email_____ County_____

PAYMENT METHODS

☐ **Billing Account:** _____
☐ **Check #:** _____
☐ **Cash**

☐ **Credit/Debit Card**
(scan QR code to pay online)
Marketplace order #: _____

☐ **Botrytis Fungicide-Resistance Testing**
A set of 10 *Botrytis* isolates per sample will be tested for resistance against a panel of 10 fungicides: **boscalid, cyprodinil, fenhexamid, fludioxonil, fluopyram, iprodione, isofetamid, penthiopyrad, pyraclostrobin+SHAM, and thiophanate-methyl (e.g.: Pristine, Inspire Super/Vangard, Elevate, Switch/Miravis Prime, Luna Sensation, Rovral/Meteor, Kenja, Fontelis, Cabrio, and Topsin M).**

☐ **$80.00** in-state South Carolina

☐ **$100.00** out-of-state

Name of plant_____ **Cultivar/variety**_____

Field ID/Reference_____ *(Optional, up to 20 characters. Examples: Front Yard; Lot 1205497)*

County where collected_____ **Date collected**_____

Comments:_____

Location of planting:
- ☐ Field
- ☐ Greenhouse
- ☐ Nursery
- ☐ Orchard
- ☐ Other: _____

Sample type:
- ☐ Spores on swabs
- ☐ Diseased tissue:
  - ☐ Fruits/Flowers
  - ☐ Leaves
  - ☐ Stems/Runners
  - ☐ Twigs/branches

Degree of problem:
- ☐ Light
- ☐ Moderate
- ☐ Severe

Problem is:
- ☐ Getting worse
- ☐ Staying the same

Pesticides/fungicides applied to the plants
Include names and dates:
_____
_____
_____
_____
_____