



Mary Hausbeck
hausbec1@msu.edu



Blair Hartan
hartanbl@msu.edu



Nikki Lukasko
lukaskon@msu.edu



Heidi Lindberg
wollaege@msu.edu

Volume 10 Number 21 April 2021

Scouting and Treatment of Gray Mold in Greenhouse Crops

While March 2021 was one of the sunniest on record here in Michigan, cloudy and cool weather inevitably rolls in during April and May. Peak color in the greenhouse coincides with cloudy, damp weather that creates a favorable environment for the fungus *Botrytis cinerea*, which causes gray mold on many greenhouse ornamentals. Unlike other diseases that require intensive scouting, inspection, and root examination, *Botrytis* only affects the above-ground portions of plants and is comparatively easy to find. It can cause symptoms such as leaf spots (Photo 1), blight, and stem canker (Photo 2).



Photos 1 and 2. Gray mold causes leaf spots (left) and stem canker (right) on greenhouse crops. Photo credits: 1) Michelle Grabowski, University of Minnesota Extension, Bugwood.org and 2) Mary Hausbeck, MSU

2021 Sponsors



Funding Generations of Progress
Through Research and Scholarships

Baill®

fine



P.L. LIGHT SYSTEMS

THE LIGHTING KNOWLEDGE COMPANY

Reprint with permission from the author(s) of this e-GRO Alert.

Botrytis' calling card includes the large masses of gray conidia or spores that are produced (Photo 3). It is this gray conidial fuzz that gives this disease the name "gray mold."

When scouting for *Botrytis* (Photo 4), growers should look in the lower canopy of plants and examine any leaves (alive and dead) resting on the surface of the growing media (Photo 5, 6). *Botrytis* is very common during peak flower season in the greenhouse. Spent flower petals that drop onto leaves serve as a food base for *Botrytis*, allowing the pathogen to easily infect leaves and stems of nearby plants (Photo 7). A small leaf spot or dead leaves/flower petals sitting on the soil surface can quickly spread to infect a large region of plants. *Botrytis* behaves similarly to dust and can travel through air currents in a greenhouse. Take precautions when moving large numbers of plants around the greenhouse because it is likely that spores will be spread with movement.

If *Botrytis* is prevalent among the crop, recognition is not difficult. Gray fuzzy masses can be seen easily when growers are watering or walking their crop. Start by scouting indicator crops that are the most susceptible to *Botrytis*, such as geranium and petunia.

Water and high relative humidity are the key drivers for *Botrytis*. In order to prevent *Botrytis* infection and minimize disease occurrence, growers should:

- Increase air flow through the crop with horizontal air flow (HAF) fans and increase venting of the greenhouse
- Water in the morning so that the foliage can dry rapidly



Photo 3. Large masses of gray spores are a trademark of *Botrytis*. Photo: Mary Hausbeck, MSU



Photo 4. Growers should be scouting for *Botrytis* especially as the canopy fills out and plants begin to flower late in the growing season. Photo: Heidi Lindberg



Photo 5. When scouting for *Botrytis*, examine the lower canopy to determine the level of disease pressure in the greenhouse. Photo: Heidi Lindberg



Photo 6. Leaves resting on the moist surface of the growing media are very susceptible to *Botrytis*. Photo: Heidi Lindberg



Photo 7. *Botrytis* infection beginning on petunia petals that dropped onto leaves in the lower canopy. Photo: Nikki Lukasko, MSU

- Scout by looking for the brown/gray fuzziness on lower leaves that signals the need for active disease control
- Remove dead plant tissue from greenhouse benches and floors, which can harbor *Botrytis*

Growers should also verify that *Botrytis* is the primary disease affecting the plants. *Botrytis* is a common secondary pathogen that infects plant tissue that is already dead or dying as a result of another disease.

The Hausbeck Lab at Michigan State University releases our recommended fungicides yearly for control of common greenhouse diseases. The [2021 recommendations](#) are available on the [Michigan State University Extension Floriculture](#) website. Current research in the Hausbeck involves collecting *Botrytis* from Michigan ornamental greenhouses and screening for resistance to site-specific fungicides. It is a combination of many years of fungicide product testing and recent *Botrytis* screening that yields a list of “A” and “B” Team products. The products listed in the “A” Team are the most effective against *Botrytis*. The “B” Team products also limit disease but may not be as effective. “B” Team products are recommended for use when disease pressure is not severe and rotation with a different Fungicide Resistance Action Committee (FRAC) code is needed. The recommendations list the product name, the FRAC code, and the active ingredient.

Again, as with any insecticide or fungicide program, growers should always alternate among fungicide products with different modes of action (FRAC codes) to prevent the development of fungicide resistance in *Botrytis* populations. Good coverage is important and short intervals between applications may be required to slow the disease, when disease pressure is high. Growers should consider tank-mixes and a shortened time between applications in order to turn back an outbreak. Here is an example of a program:

Make applications at five-day intervals:

- Spray No. 1: Affirm WDG + Chipco 26019
- Spray No. 2: Decree 50DF + Daconil Weatherstik SC
- Spray No. 3: Affirm WDG + Pageant Intrinsic 38WG

Botrytis A Team		
Product	FRAC*	Active ingredient
Affirm WDG	19	polyoxin D zinc salt
Astun SC	7	isofetamid
Broadform SC	7/11	fluopyram + trifloxystrobin
Daconil Weatherstik SC	M5	chlorothalonil
Decree 50DF	17	fenhexamid
Pageant Intrinsic 38WG	11/7	pyraclostrobin + boscalid
Orkestra	7/11	fluxapyroxad + pyraclostrobin
Palladium	9/12	cyprodinil + fludioxonil
Mural	11/7	azoxystrobin + benzovindiflupyr
Medallion/Emblem**	12	fludioxonil

*The FRAC code is an alphanumeric code assigned by the Fungicide Resistance Action Committee and is based on the mode of action of the active ingredient.

**Do not use fludioxonil on geraniums.

Botrytis B Team *		
Product	FRAC*	Active ingredient
Chipco 26019	2	iprodione

*Not recommended when disease pressure is high.

This research was supported by funding from the Floriculture Nursery and Research Initiative of the Agricultural Research Service under Agreement #58-8062-8-014 and by the American Floral Endowment.

For more information about this and other production topics, visit <https://extension.msu.edu>.

e-GRO Alert

www.e-gro.org

CONTRIBUTORS

Dr. Nora Cattin
Floriculture Specialist
Cornell Cooperative Extension
Suffolk County
nora.cattin@cornell.edu

Dr. Chris Currey
Assistant Professor of Floriculture
Iowa State University
ccurrey@iastate.edu

Dr. Ryan Dickson
Greenhouse Horticulture and
Controlled-Environment Agriculture
University of Arkansas
rvand@uark.edu

Thomas Ford
Commercial Horticulture Educator
Penn State Extension
tf2@psu.edu

Dan Gilrein
Entomology Specialist
Cornell Cooperative Extension
Suffolk County
dog1@cornell.edu

Dr. Joyce Latimer
Floriculture Extension & Research
Virginia Tech
jlatime@vt.edu

Heidi Lindberg
Floriculture Extension Educator
Michigan State University
wolleage@anr.msu.edu

Dr. Roberto Lopez
Floriculture Extension & Research
Michigan State University
rglopez@msu.edu

Dr. Neil Mattson
Greenhouse Research & Extension
Cornell University
neil.mattson@cornell.edu

Dr. W. Garrett Owen
Greenhouse Extension & Research
University of Kentucky
wgowen@uky.edu

Dr. Rosa E. Raudales
Greenhouse Extension Specialist
University of Connecticut
rosa.raudales@uconn.edu

Dr. Beth Scheckelhoff
Extension Educator - Greenhouse Systems
The Ohio State University
scheckelhoff.11@osu.edu

Dr. Ariana Torres-Bravo
Horticulture/ Ag. Economics
Purdue University
torres2@purdue.edu

Dr. Brian Whipker
Floriculture Extension & Research
NC State University
bwhipker@ncsu.edu

Dr. Jean Williams-Woodward
Ornamental Extension Plant Pathologist
University of Georgia
jwoodwar@uga.edu

Copyright ©2021

Where trade names, proprietary products, or specific equipment are listed, no discrimination is intended and no endorsement, guarantee or warranty is implied by the authors, universities or associations.

Cooperating Universities

Cornell CALS
College of Agriculture and Life Sciences

**Cornell Cooperative Extension
Suffolk County**

IOWA STATE UNIVERSITY

**University of
Kentucky**



PennState Extension

**VT VIRGINIA
TECH**

UCONN

**MICHIGAN STATE
UNIVERSITY**



**College of Agricultural &
Environmental Sciences
UNIVERSITY OF GEORGIA**

**P PURDUE
UNIVERSITY**

**NC STATE
UNIVERSITY**



**THE OHIO STATE
UNIVERSITY**

**U of A DIVISION OF AGRICULTURE
RESEARCH & EXTENSION**
University of Arkansas System

In cooperation with our local and state greenhouse organizations

MAUMEE VALLEY GROWERS
Choose the Very Best.



Metro Detroit Flower Growers Association

