Pumpkin Disease Management

Francesca Rotondo

Plant and Pest Diagnostic Clinic -Department of Plant Pathology

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Pumpkin BootCamp
January 31st, 2024

THE OHIO STATE UNIVERSITY
COLLEGE OF FOOD, AGRICULTURAL, AND ENVIRONMENTAL SCIENCES

Phytophthora Blight

- Favored by warm, rainy conditions
- Often starts in low spots or other areas with poor drainage
- Affects roots, stems, leaves and fruit
- Pathogen survives 4 - 5 years in soil and in surface water
- Increasing problem in Ohio

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Managing Phytophthora Blight

- Partially resistant varieties (peppers)
- Cultural practices – mainly water management
- Fungicides
    - **Orondis Gold, Orondis Ultra**
    - **Elumin**

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Cultural Practices – Water Management

- Well-drained soil
- Raised beds
- Plastic mulch – may reduce splashing on to foliage and fruit
- **<u>Avoid surface water</u>**
  - Ponds, irrigation ditches, contaminated with *P. capsici* by late July in OH

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Phytophthora Blight Fungicides - Cucurbits

Product	PHI (days)	FRAC Code	Rel. Eff.	Use
Orondis Gold Orondis Ultra	3 1	U15 + 4 U15 + 40	++++ ++++	Soil or foliar but not both; foliar max 1/3 total applications
Elumin	2	22	+++	Foliar; max 2 applications/year; alternate w/ non-FRAC 22 fungicide
Ranman 400SC	0	21	+++	Soil and foliar; max 6 applications
Presidio 4SC	2	43	+++	Soil and foliar; max 4 applications; tank mix with effective fungicide with diff. FRAC #
Revus	1	40	+++	Foliar; max 4 applications
Gavel 75DF	5	22 + M3	++	Foliar; use in a program when disease pressure is low-moderate
Zampro	0	40 + 45	++	
Phosphite & phosphor. acid	Varies K-Phyte 0	P7	++	

Cucurbit Downy Mildew

Destructive disease of vine crops

All vine crops are susceptible

- But susceptibility varies

Pathogen does not survive the winter outdoors in Great Lakes Region– requires living green tissue

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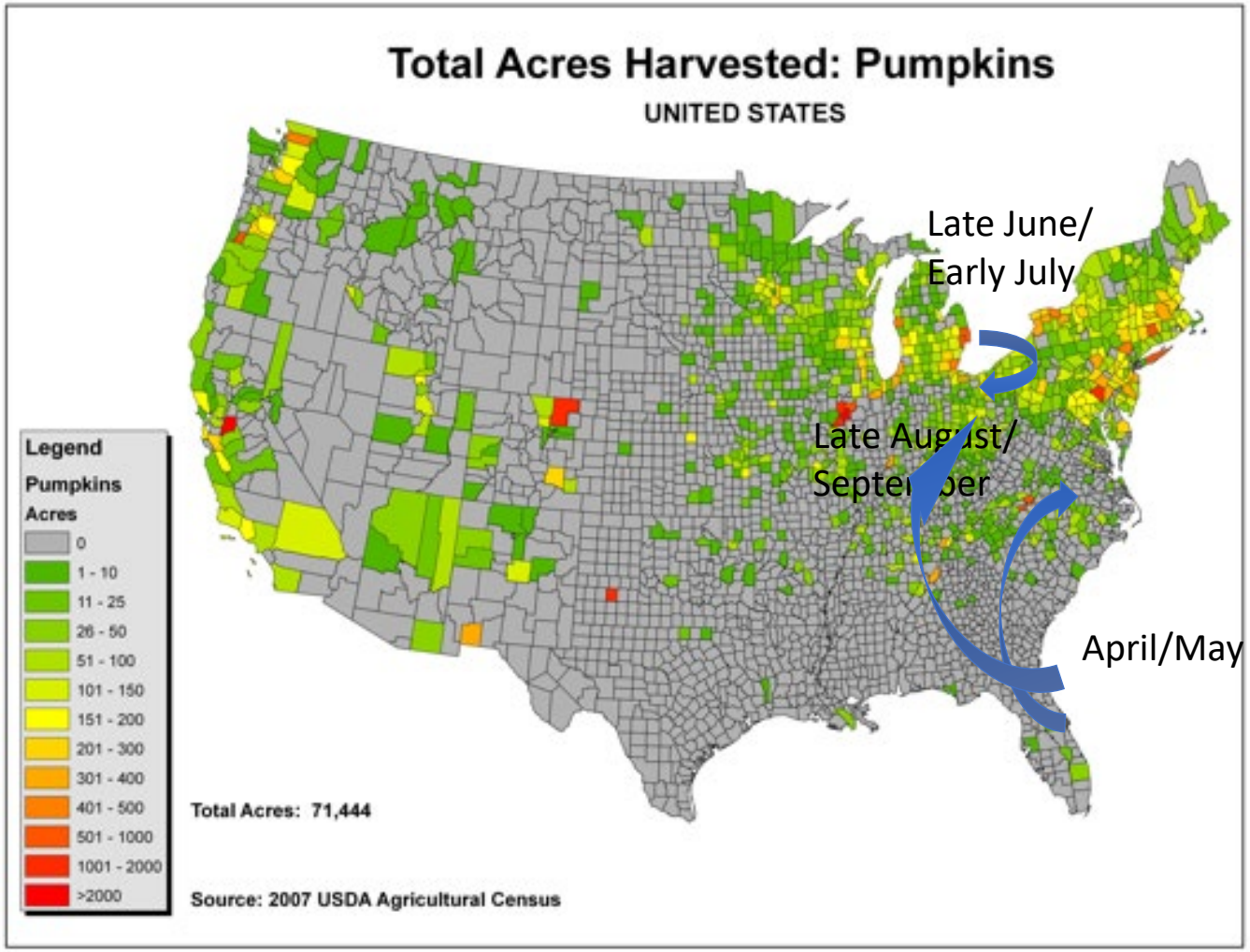
Migrations of Downy Mildew Spores

Two separate migrations:

- Great Lakes Region -
  - Group II
- Southeastern US to MW and NE
  - Group I



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Managing Downy Mildew

- Downy mildew-resistant varieties
    - Cucumber (partially resistant)
- Monitoring to time fungicide applications
    - Sentinel plots
        - **Wooster**
        - **NCARS (Fremont)**
        - **Muck Crops**
        - **Waterman Farm (Columbus)**
    - Samples submitted to OSU Vegetable Pathology Lab or PPDC
    - Cucurbit Downy Mildew forecasting site: cdm.ipmpipe.org (new version!)

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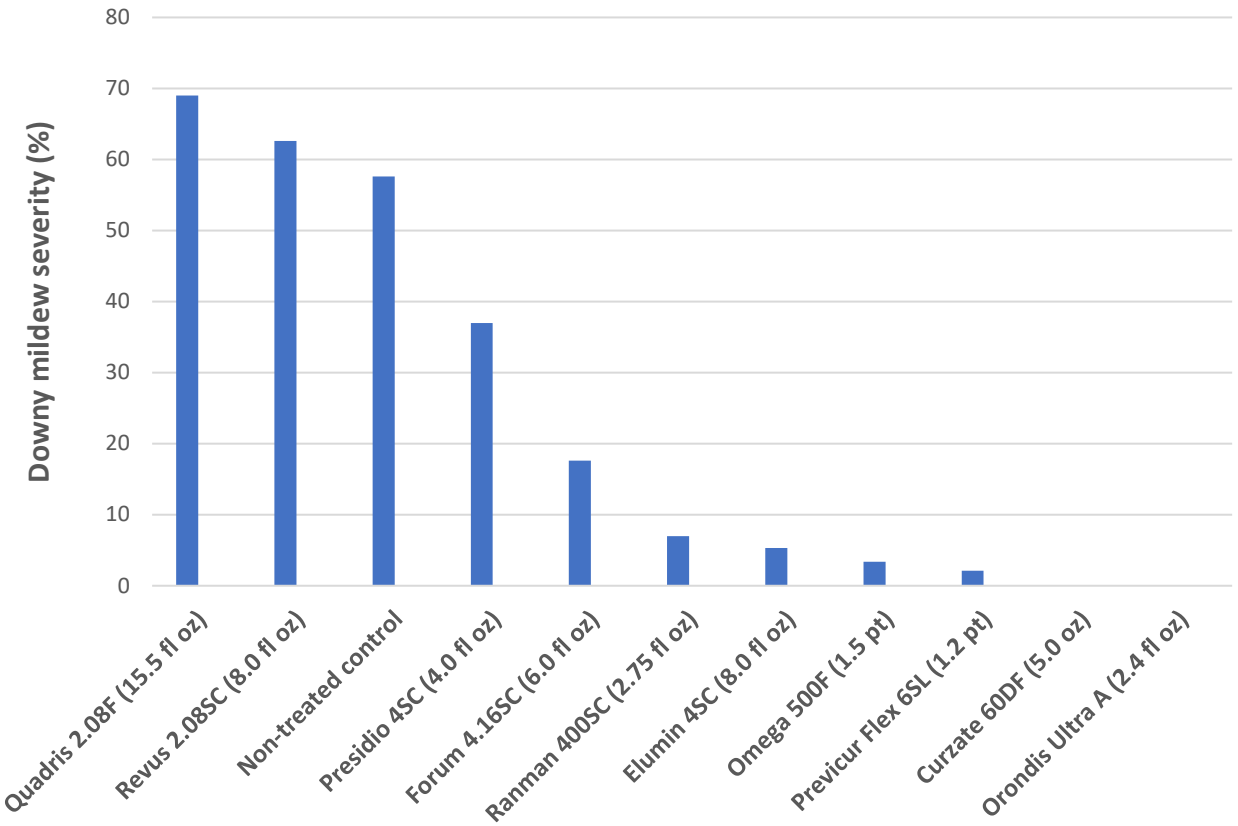
Cucumber Downy Mildew Seedling Bioassay for Fungicide Efficacy 2021

Cucumber seedlings sprayed with fungicide at label rate in greenhouse

Plants moved to cucumber fields in Celeryville (data not shown – low disease pressure) and Wooster with active downy mildew for 48 hrs

Plants returned to greenhouse for 7 days

Bioassay: 2021 Fungicide Efficacy for Cucurbit DM



- Effective (very good):
  - Orondis A, Curzate, Previcur Flex, Omega, Elumin, Ranman
- Moderately effective (good)
  - Forum
- Ineffective fungicides (poor):
  - Quadris, Revus, Presidio
- Chlorothalanil (good) should be used in combination and/or alternation with effective fungicides

Recommended Downy Mildew Fungicides

Product	PHI (days)	FRAC Code	Rel. Eff.	Comments
Orondis Opti	3	U15 + M	++++	After downy mildew has been reported: Apply more selective fungicides in a program that alternates modes of action Tank mix with protectant fungicide unless applying Orondis Opti, Gavel or Zing!
Ranman 400SC	0	21	++++	
Elumin	2	22	++++	
Zampro	0	40 + 45	++++	
Omega 500F	30	29	++++	
Gavel 75DF	5	22 + M	+++	
Zing!	0	22 + M	+++	
Manzate ProStick 75DG	5	M	+++	Apply protectant fungicides until downy mildew appears ”locally”
Bravo WeatherStik	0	M	+++	

Take-Home Messages – Cucurbit Downy Mildew

- Downy mildew continues to arrive in late June to early July in Ohio and Michigan
  - Group II isolates aggressive on cucumbers and melons circulate in the Great Lakes region, probably originating from GH-grown cucumbers; Group I isolates come later

- Orondis A, Curzate, Previcur Flex, Omega, Elumin, and Ranman were highly effective in the 2021 bioassay; Forum was moderately effective
  - These fungicides should be tank-mixed and/or alternated with chlorothalanil for resistance management and to suppress other diseases

Cucurbit Downy Mildew Fungicide Efficacy in Ohio 2018-2021 – Bioassay Results

FRAC Code	Fungicide	Efficacy against cucumber downy mildew[a]			
		2021 (Wayne County)	2020 (# locations[b])	2019 (# locations[c])	2018 (# locations[d])
28	Previcur Flex 6SL	Effective	Effective (3)	Effective (2)	Effective (2)
22	Zing!/Gavel	Not tested	Not tested	Not tested	Effective (2)
21	Ranman 400SC	Effective	Effective (3)	Effective (1) Mod. effective (1)	Effective (2)
29	Omega 500F	Effective	Effective (3)	Effective (2)	Effective (2)
49	Orondis A	Effective	Effective (3)	Effective (2)	Effective (2)
22	Elumin 4SC	Effective	Effective (3)	Effective (2)	Not tested
27	Curzate 60DF	Effective	Mod. effective (2) Ineffective (1)	Mod. effective (1) Ineffective (1)	Effective (2)
40	Forum 4.16SC	Mod. effective	Mod. effective (1) Ineffective (2)	Mod. effective (2)	Ineffective (2)
43	Presidio 4SC	Ineffective	Mod. effective (1) Ineffective (2)	Effective (1) Mod. effective (1)	Ineffective (2)
11	Quadris 2.08F	Ineffective	Mod. effective (1) Ineffective (2)	Ineffective (2)	Ineffective (2)
45	Zampro	Not tested	Not tested	Not tested	Effective (1) Ineffective (1)
40	Revus 2.08SC	Ineffective	Ineffective (3)	Ineffective (2)	Ineffective (2)

Plectosporium blight

- The biology is still unclear
- The fungus survives in the soil and/or in crop debris for 3 years
- Cool, wet weather favor disease development
- Also observed during warm weather.
- Conidia are easily splashed from lesions with rain or irrigation water

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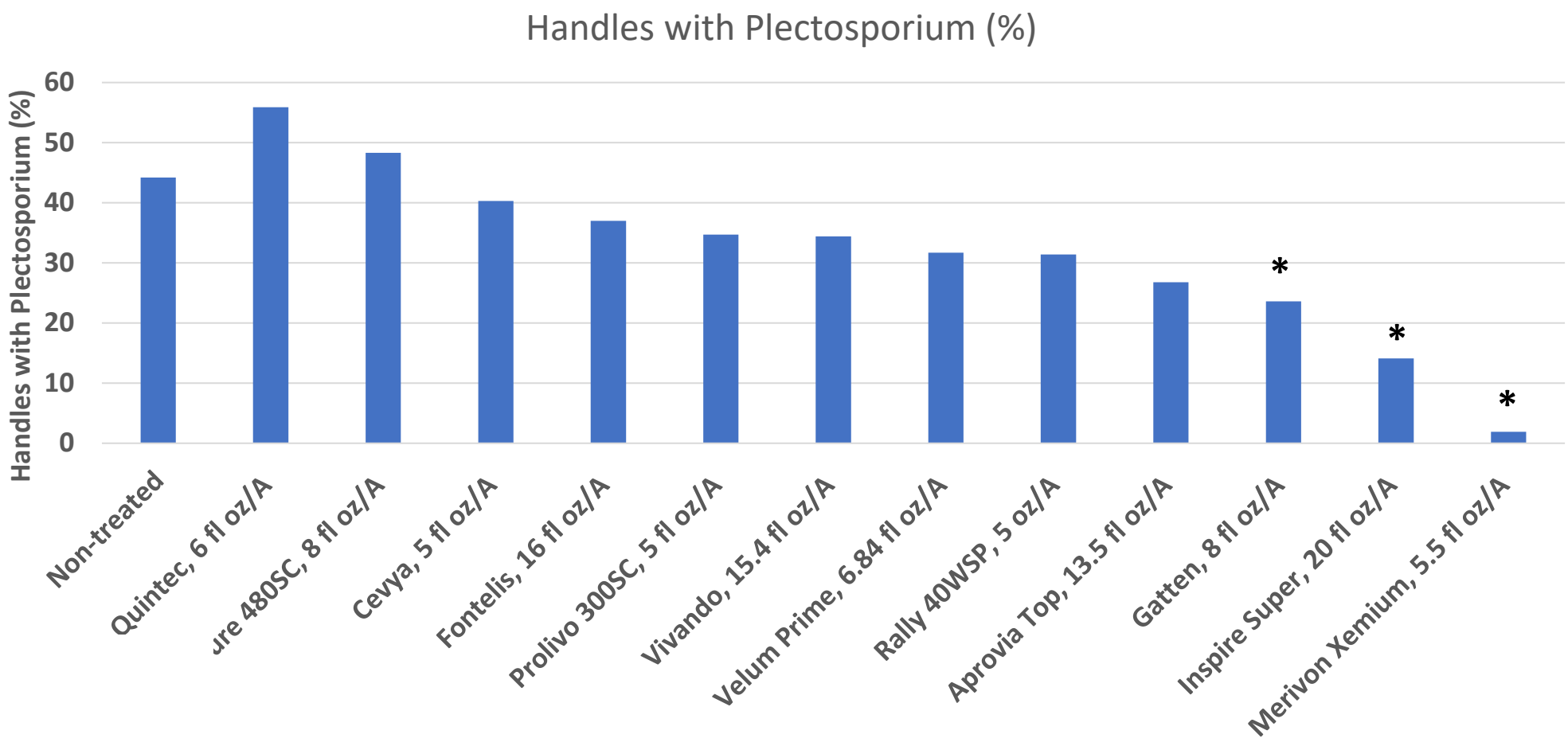
Merivon Xemium, Inspire Super and Gatten Suppress Plectosporium on Pumpkin Handles



Plectosporium blight developed naturally in powdery mildew trial at OSU NCARS - Funded by OVSFRDP 2021

Cultural Controls and Prevention

- Crop rotation for two years
- Choose sunny, well drained sitews for cucurbit production
- No resistant cultivars of pumpkins have been reported
- Scout for disease and apply protectant fungicides when the disease first occurs
    - Thorough coverage of foliage, vines, and fruit is necessary for good control

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Bacterial Leaf Spot

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Angular Leaf Spot

- Cucumber most susceptible but all cucurbits may be affected
- **Favored by moderate temperatures and high moisture**

Cultural controls and Management

- Resistant varieties (cucumber) vs Angular Leaf spot
- Buy clean seed from a reputable source
- Crop rotation
- Do not work in plants when leaves are wet
- copper may be effective in reducing its spread at the early stage
    - Proper scouting

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6-Step Integrated Management Program

1. Use clean seed
2. Choose a resistant variety
3. Use pathogen-free transplants
4. Choose the best site and rotate
5. Use appropriate cultural practices
6. Use crop protectants as needed

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Yellow Vine Decline

- Leaves turn yellow, phloem discolored (honey yellow), plants collapse

Bacterial Wilt

- Wilt and eventually shrivel of individual leaves
- Leaves show a darker green color around the infected area
- Stem collapse and discolored

- Cucumber beetles (both spotted and striped) are the vectors for the bacterium

Sample Preparation

For entire plant

- Wrap the roots in a plastic bag and secure with string
  - Dig down into the surrounding soil about 6 to 8 inches
  - Include soil if needed
- Put everything in a second plastic bag and secure with string
- Mail sample in a sturdy container

- If the entire plant cannot be submitted,
  - Collect the crown and root apparatus by digging around the plants- Place it in a plastic bag
  - Collect leaves/canopy showing symptoms but that are not completely dead (brown)

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Sample Preparation

For leaf or stem tissue

- Place the sample in a zip-seal bag as soon as it is collected. **Do not use paper bags.**
- Separate fruit (i.e. berries, apples, peaches) samples from roots and top growth material.
- Fruit with tender skin (strawberries, blueberries, currants, raspberries, peaches etc.) should be placed in a paper bag as soon as it is collected.
- Mail sample in a sturdy container

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Submission and Submission Form

- Pack the plant in a box that large enough to hold the entire plant
- Add the **Plant Diagnostic Form** in a separate plastic bag
- Seal the box and ship using **next day** delivery service

The submission form is important

For a prompt and accurate diagnosis

- plant variety
- history of the problem
- recent pesticide applications
- symptoms distribution
- weather conditions
- soil

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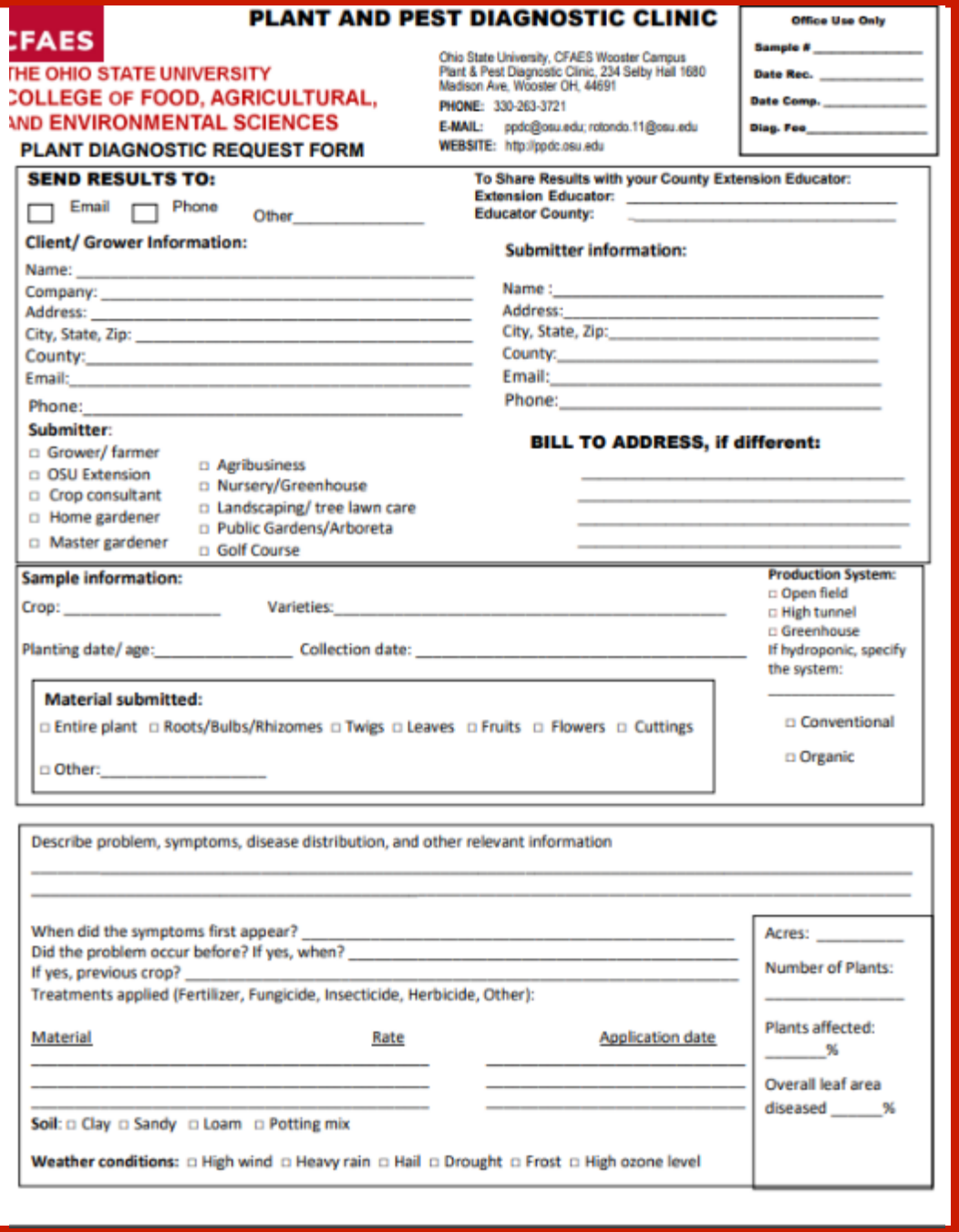

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PLANT AND PEST DIAGNOSTIC CLINIC

Ohio State University, CFAES Wooster Campus
Plant & Pest Diagnostic Clinic, 234 Selby Hall 1680 Madison Ave, Wooster OH, 44691
PHONE: 330-263-3721
E-MAIL: ppdc@osu.edu; rotondo.11@osu.edu
WEBSITE: http://ppdc.osu.edu

Office Use Only
Sample #
Date Rec.
Date Comp.
Diag. Fee

PLANT DIAGNOSTIC REQUEST FORM

SEND RESULTS TO: ☐ Email ☐ Phone Other

To Share Results with your County Extension Educator:
Extension Educator:
Educator County:

Client/ Grower Information:
Name:
Company:
Address:
City, State, Zip:
County:
Email:
Phone:

Submitter information:
Name :
Address:
City, State, Zip:
County:
Email:
Phone:

Submitter:
☐ Grower/ farmer
☐ OSU Extension
☐ Crop consultant
☐ Home gardener
☐ Master gardener
☐ Agribusiness
☐ Nursery/Greenhouse
☐ Landscaping/ tree lawn care
☐ Public Gardens/Arboreta
☐ Golf Course

BILL TO ADDRESS, if different:

Sample information:
Crop: Varieties:
Planting date/ age: Collection date:

Material submitted:
☐ Entire plant ☐ Roots/Bulbs/Rhizomes ☐ Twigs ☐ Leaves ☐ Fruits ☐ Flowers ☐ Cuttings
☐ Other:

Production System:
☐ Open field
☐ High tunnel
☐ Greenhouse
If hydroponic, specify the system:
☐ Conventional
☐ Organic

Describe problem, symptoms, disease distribution, and other relevant information

When did the symptoms first appear?
Did the problem occur before? If yes, when?
If yes, previous crop?
Treatments applied (Fertilizer, Fungicide, Insecticide, Herbicide, Other):

Material	Rate	Application date

Acres:
Number of Plants:
Plants affected: %
Overall leaf area diseased %

Soil: ☐ Clay ☐ Sandy ☐ Loam ☐ Potting mix

Weather conditions: ☐ High wind ☐ Heavy rain ☐ Hail ☐ Drought ☐ Frost ☐ High ozone level

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Contact and Information

Francesca Rotondo
rotondo.11@osu.edu
ppdc.@osu.edu

Website:
ppdc.osu.edu