Growing Pumpkins: Disease Management

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OSU Agriculture & Natural Resources Madness
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THE OHIO STATE UNIVERSITY
COLLEGE OF FOOD, AGRICULTURAL, AND ENVIRONMENTAL SCIENCES

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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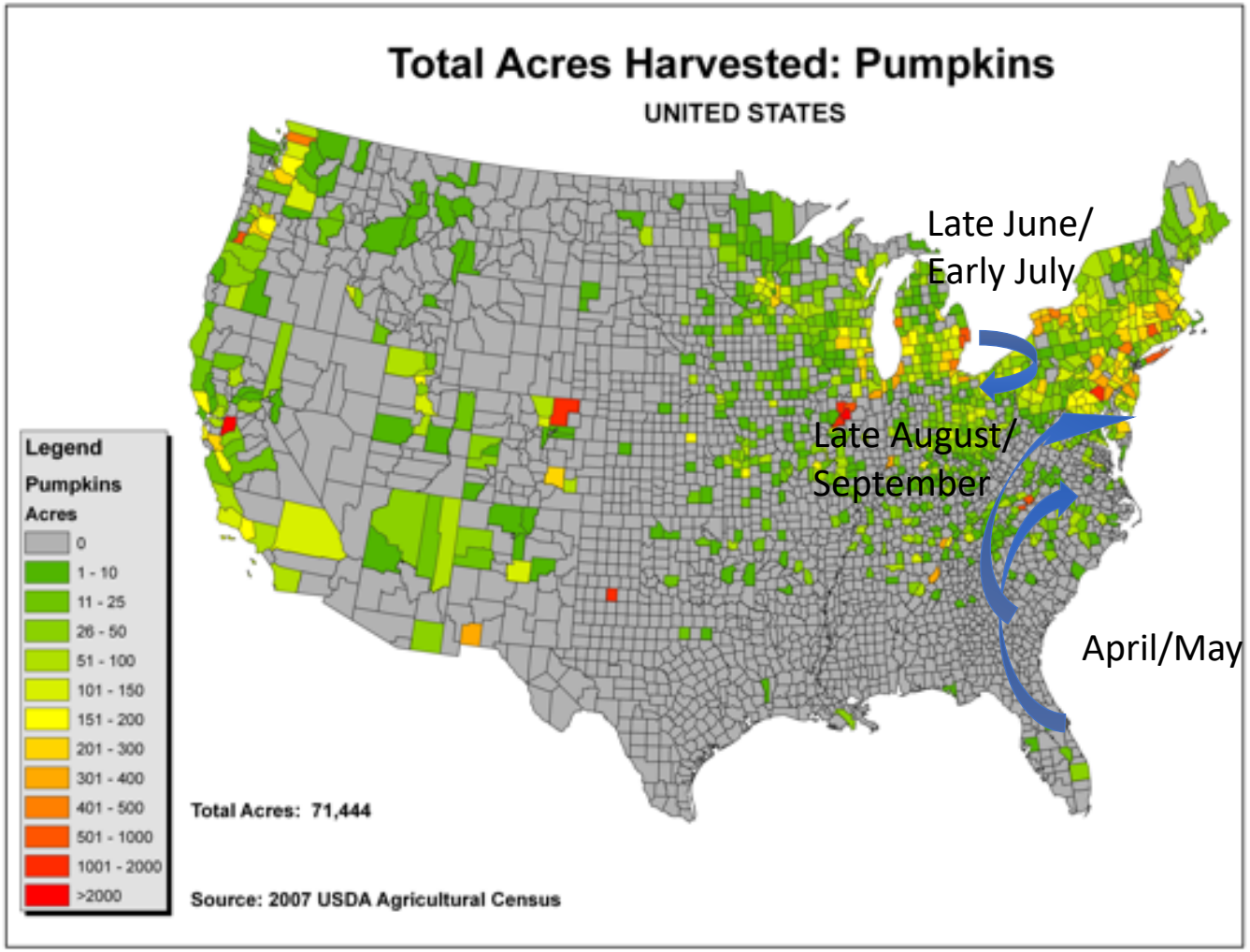
Migrations of Downy Mildew Spores

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 not available for pumpkin
- Monitoring
    - Sentinel plots
        - **Wooster**
        - **NCARS (Fremont)**
        - **Muck Crops**
        - **(Columbus)**
    - Samples submitted to OSU Vegetable Pathology Lab or PPDC
    - Cucurbit Downy Mildew forecasting site: cdm.ipmpipe.org (new version!)

Cucurbit Downy Mildew Monitoring & Alerts

- We need your help! Send (any) cucurbit suspected downy mildew samples to
  - OSU Vegetable Pathology Lab (commercial samples) https://u.osu.edu/vegetablepathologylab/diagnostic-submission/
  - OSU C. Wayne Ellett Plant and Pest Diagnostic Clinic (home garden samples https://ppdc.osu.edu/
  - Text or email photos first

- Twitter @OhioVeggieDoc
- Ohio Veggie Disease News http://u.osu.edu/miller.769/
- Ohio VegNet Newsletter http://u.osu.edu/vegnetnews/

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Management: Well-timed Fungicide Applications

- Fungicides are necessary to manage downy mildew
- Fungicide resistance management is critical
  - Fungicide insensitivity development is common in downy mildew pathogen
- Important to test fungicides for efficacy

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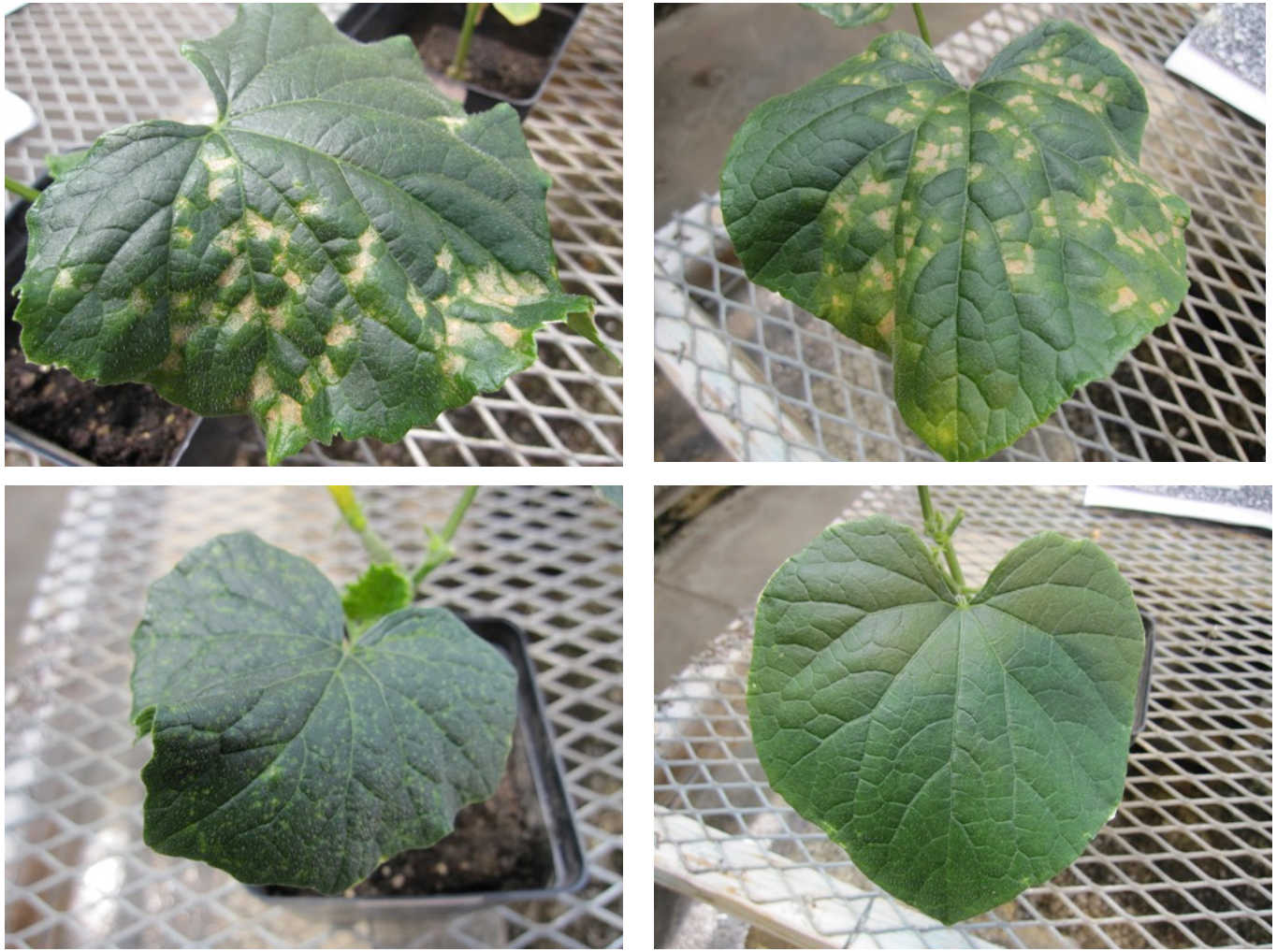
Cucumber Downy Mildew Seedling Bioassay

Cucumber seedlings sprayed with fungicide at label rate in greenhouse

Plants moved to cucumber field with active downy mildew for 48 hrs

Plants returned to greenhouse for 7 days



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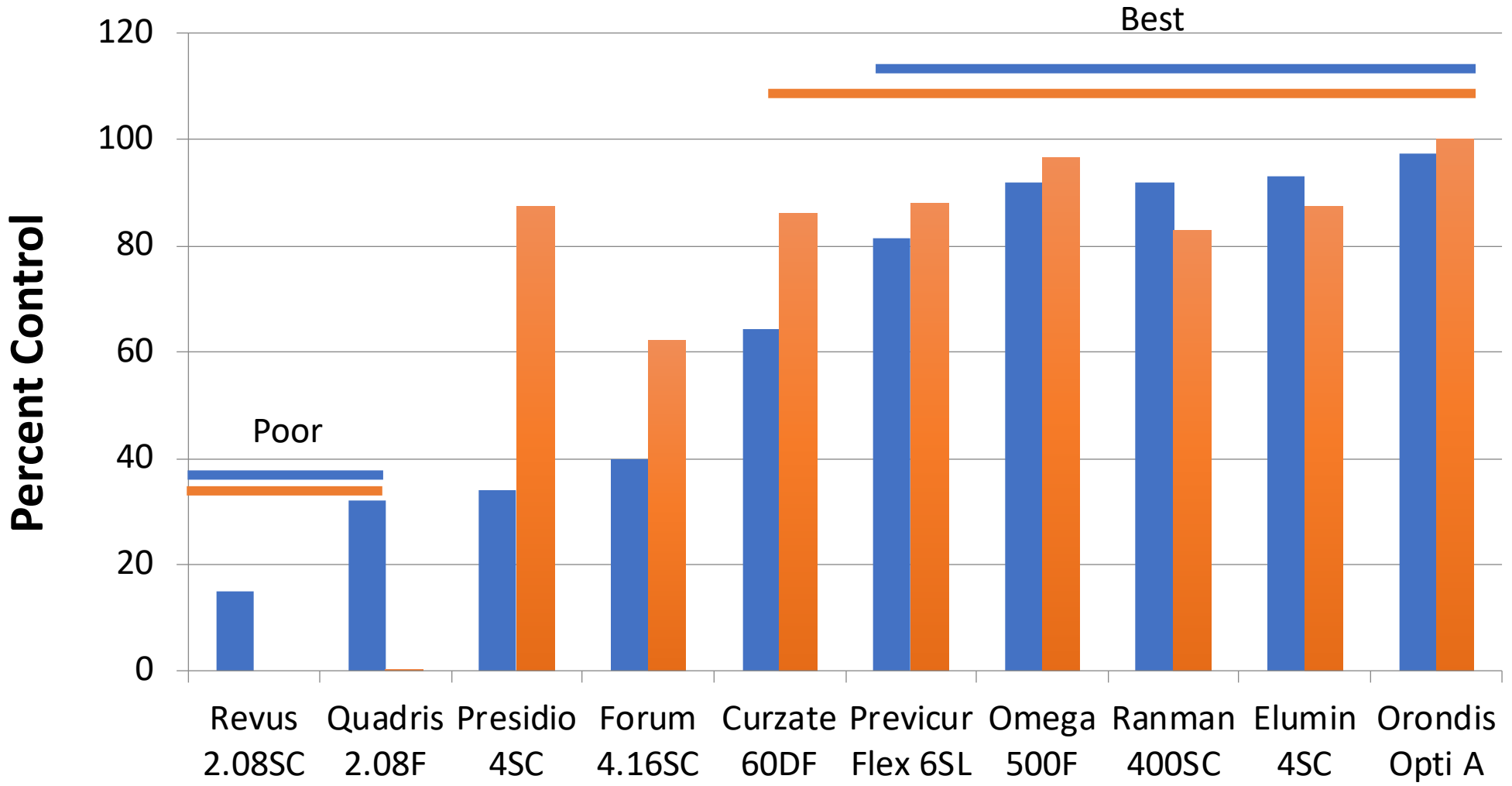
Percent Control of Downy Mildew in Cucumber Bioassay - 2019



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	+++	

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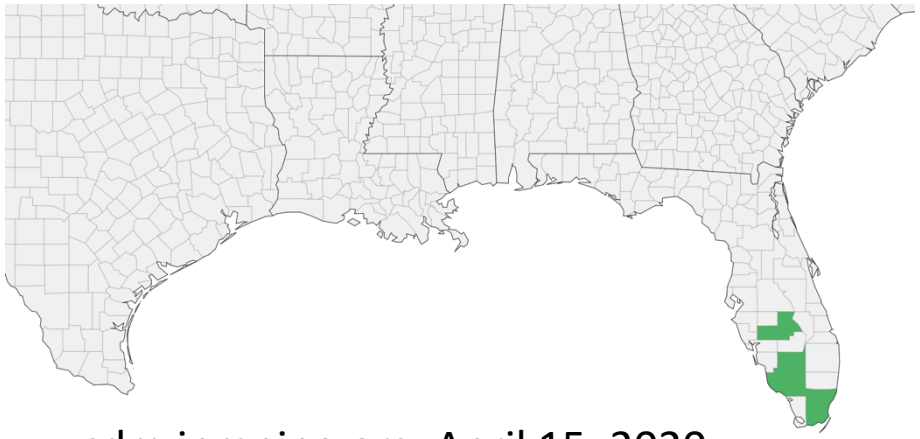
Downy Mildew – Take Home Messages

- Can’t predict when downy mildew will appear in 2020
  - Keep tabs on monitoring sites
  - Scout pumpkins



cdm.ipmpipe.org April 15, 2020

- Maintain a protectant fungicide program (mancozeb, chlorothalanil) until downy mildew appears locally

- Rotate effective fungicides with different mode of action/FRAC code to help reduce risk of fungicide resistance

Plectosporium Blight

Symptoms – typical diamond- or spindle-shaped lesions on stems, petioles, handles, leaf veins

- Fruit symptoms – small white circular lesions

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Management of Plectosporium Blight

- Sanitation
- Crop Rotation
- Resistance/Partial Resistance
- Fungicides

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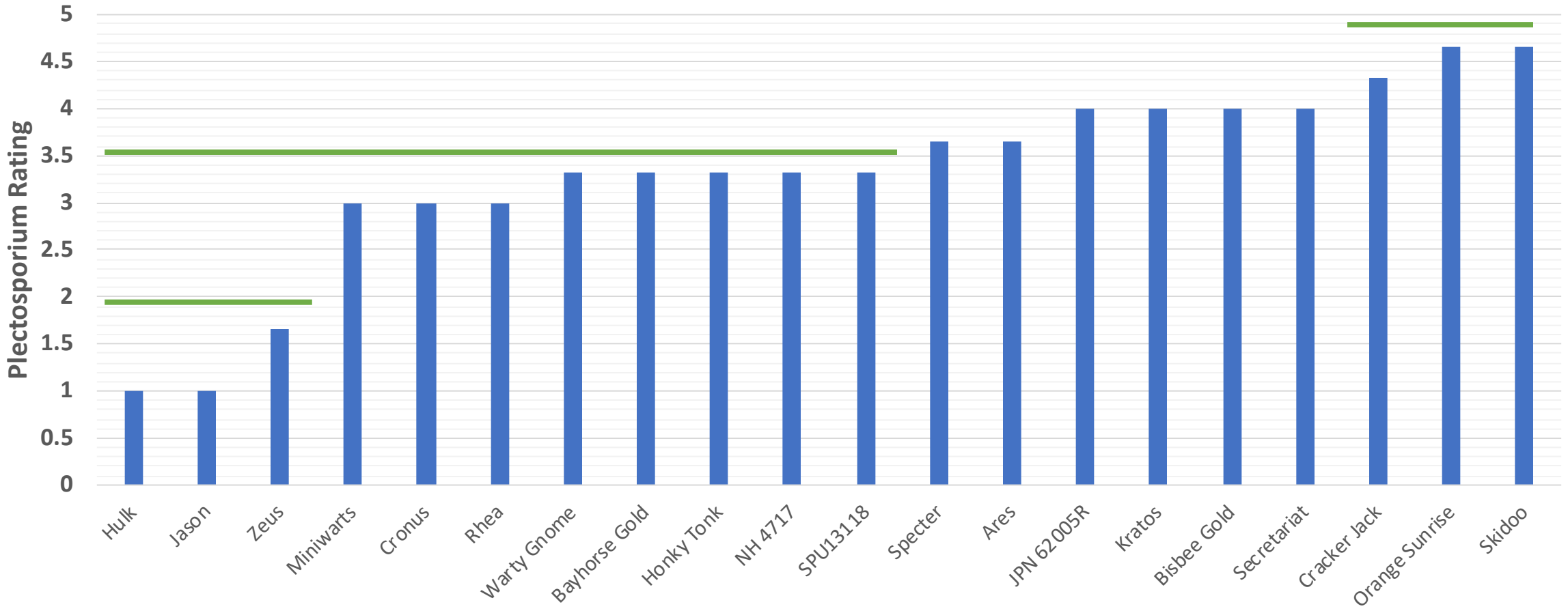
Resistance of Pumpkin Varieties to Plectosporium Blight, OSU South Centers 2018



1=1-19%; 2=20-39%; 3=40-59%; 4=60-79%; 5=80-100%
Plectosporium blight severity on stems

Fungicide Efficacy – Plectosporium Blight, Pumpkins, 2019

- Study carried out to identify effective fungicides
- Funded by OVSFRDP

Treatment, rate (application timing)	**Disease incidence %**	**Marketable %**
Aprovia Top, 13.5 fl oz (1-12)	60.2 ab	38.0 dc
Dexter MAX, 3.2 lb/A (1-12)	49.5 bcd	48.7 abc
Dexter XCEL ,72 fl oz (1-12)	47.3 bcd	49.7 abc
Flint Extra, 3.8 fl oz/A (1-12)	52.0 abc	45.8 a-d
Inspire Super, 20 fl oz (1-12)	69.6 a	28.5 d
Mural, 6.96 oz (1-12)	53.8 abc	43.5 bcd
Quadris Top, 14 fl oz (1-12)	33.1 d	63.9 a
Quadris Flowable, 15.5 fl oz (1-12)	42.0 bcd	55.2 abc
Tepera, 12.6 fl oz (1-12)	40.7 cd	57.5 ab
Tepera Plus, 15.4 fl oz (1-12)	46.8 bcd	53.1 abc
TopGuard EQ 8 fl oz (1-12)	54.4 abc	41.8 bcd
Microthiol Disperss, 4 lb/A (1,3,5,7,9,11)	36.2 cd	63.8 a
Topsin M WSB, 3.2 oz/A (1,3,5,7,9,11)		
Trionic 4 SC, 8 fl oz/A (2,4,6,8,10,12)		
Manzate Pro-Stick, 3 lb/A (2,4,6,8,10,12)		
Non-treated	54.3 abc	44.0 bcd

Take-home Messages

- None of the fungicides fully controlled Plectosporium blight on pumpkins (handles)
- However Quadris Top and a program including Topsin M (Group 1) and Manzate should be considered as options
- Others to consider:
  - Tepera (fluoxastrobin)
  - Quadris (azoxystrobin)
  - Dexter XCEL (azoxystrobin + mancozeb + tebuconazole)
  - Dexter MAX (azoxystrobin + mancozeb)

Phytophthora Blight – Pumpkins

- *Phytophthora capsici*
- Favored by warm, rainy conditions – usually start seeing it in July
- Most often observed in low spots or other areas with poor drainage
- Affects roots, stems, leaves and fruit
- Pathogen survives at least 5 years in soil

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Management

- Rotate away from susceptible crops at least 3 years
- Avoid surface water (ponds, streams, etc.) for irrigation
- Choose appropriate site
  - Well-drained soil
  - Avoid low areas
  - Improve soil - increase organic matter content
    - **Cover crops, compost**

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Management

- Scout for and remove crown rot-diseased plants and fruits, and plants and fruits 5 ft into healthy area
- Do not maintain cull piles; bury diseased plants, fruits
- Apply fungicides

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Phytophthora Blight Fungicides

Midwest Vegetable Production Guide Ratings (mwveguide.org):

G = Good
F = Fair
S = Suppression only

Product	PHI (days)	FRAC Code	Rel. Eff.	Comments
Orondis Gold Orondis Ultra Orondis Opti	0	U15 + 4 U15 + 40 U15 + M	G+	See label for restrictions Orondis Opti preferred for downy mildew
Ranman 400SC	0	21	G	
Elumin	2	22	G	
Forum 4.18SC	0	40	F	
Tanos 50WG	3	11 + 27	S	Foliar/fruit phase only
Gavel 75DF	5	22 + M3	F	
Zing!	0	22 + M5		No rating
Presidio 4SC	2	43	G	
Revus	1	40	G	
Ridomil Gold SL	7	4	(G)	Insensitivity to Ridomil occurs in some locations
Zampro	0	40 + 45	G	

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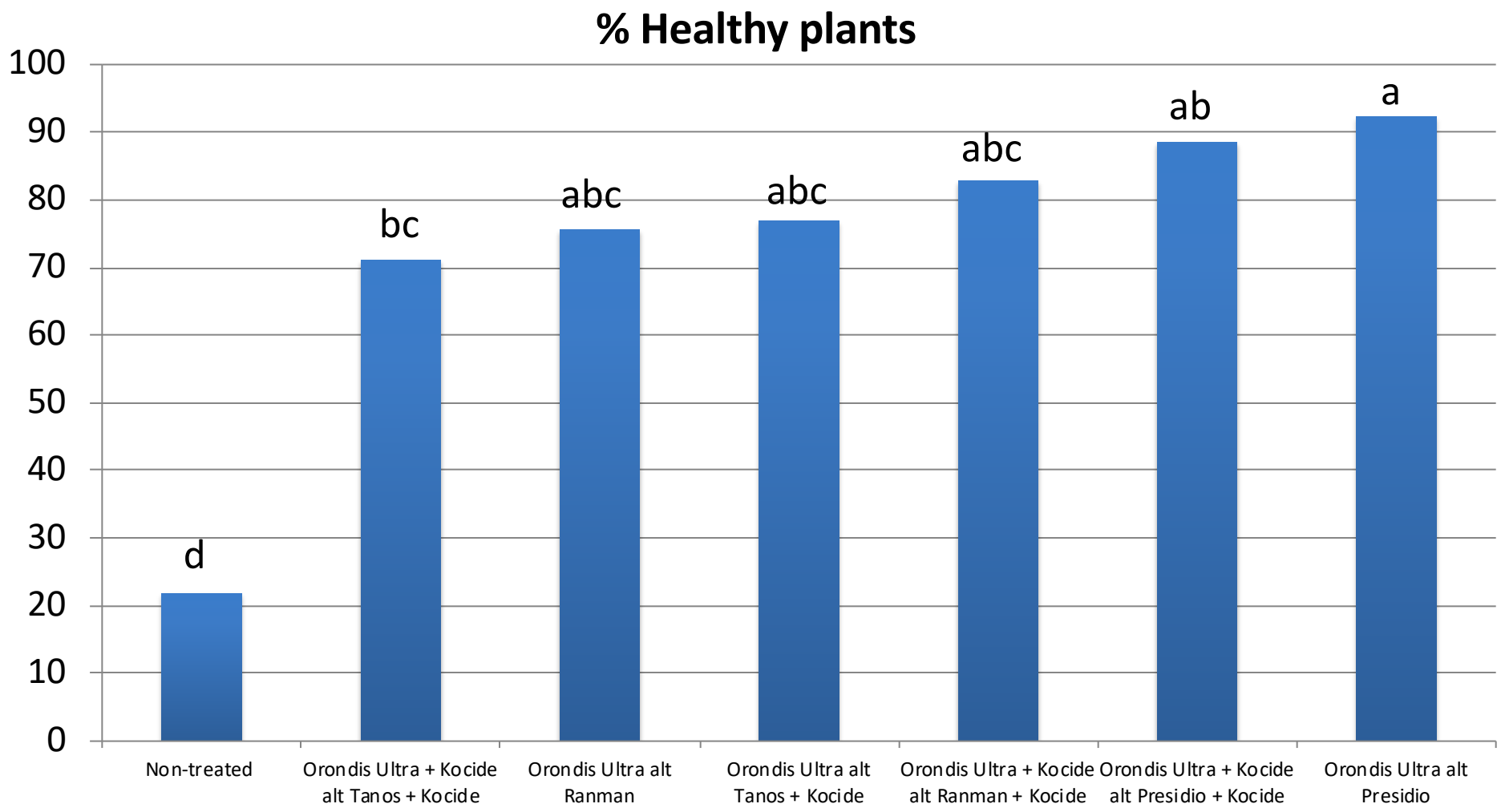
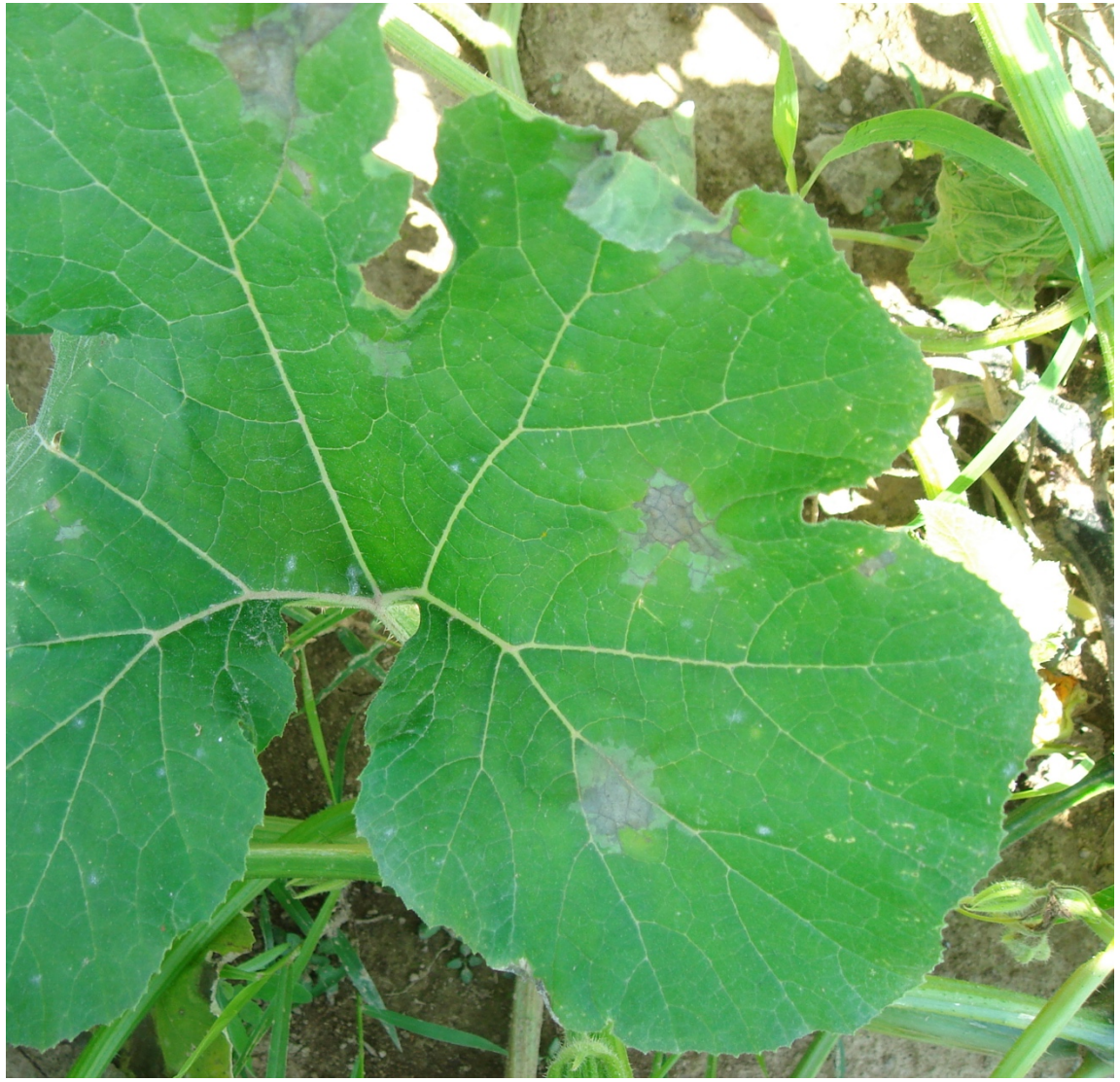
Phytophthora blight control

Foliar Fungicides Only



Take-home Messages

- Cultural practices – rotation, sanitation, water management – are critical
- No Phytophthora-resistant pumpkin varieties
- Fungicides are helpful under low-moderate disease pressure
  - Orondis Ultra (U15 + 40)
  - Elumin (22)
  - Ranman (21)
  - Presidio (43)
  - Revus (40)
  - Zampro (40 + 45)



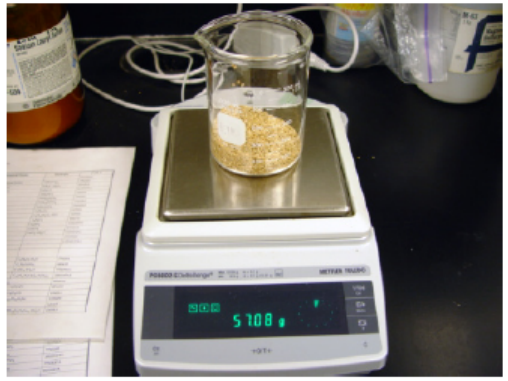
Bacterial Leaf Spot – *Xanthomonas cucurbitae*

- Seedborne disease
- Does not overwinter in cold climates
- Varieties may vary in susceptibility

- Management:
  - **Dilute bleach seed treatment**
  - **Copper bactericide applications early**

Seed Treatment with Bleach

Step 1: Agitate seed in a solution of 25 oz Clorox plus 100 oz water with one teaspoon surfactant for 1 minute. Use 1 gallon of disinfectant solution per pound of seed (conversions provided below) and prepare a fresh solution for each batch.



Step 2: Rinse seed thoroughly in cold running tap water for 5 minutes.

Plant within 2 weeks

https://u.osu.edu/vegetablediseasefacts/management/chlorine-seed-treatment/

Follow OSU Vegetable Pathology at:

Ohio Veggie Disease News

- u.osu.edu/miller.769/

Veggie Disease Facts

- u.osu.edu/vegetablediseasefacts/

High Tunnel Disease Facts

- u.osu.edu/hightunneldiseasefacts/

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Midwest Vegetable Production Guide

https://ag.purdue.edu/btny/midwest-vegetable-guide/Pages/default.aspx

https://mwveguide.org

Questions???