

# Some Love It Wet, Others Dry:

## The Many Cucurbit Pathogens & Their Management

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# Cornell Vegetables

Resources for commercial growers

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Home > Pest management > Disease factsheets and articles

## Disease factsheets and articles

If you were a big fan of the pioneering [Vegetable MD Online](#) website, much of that content has been moved here. We are in the process of moving over the rest.

- **(LIHREC)** indicates information from the Long Island Horticultural Research and Extension Center Vegetable Pathology website.
- List also **includes some herbs** (parsley, basil) and **abiotic disorder**
- Some content is available as printer-friendly .pdf versions.

## Diseases and management practices affecting multiple crops

- [Phytophthora Blight and Its Management in Cucurbit Crops](#)  
[Other Vegetables](#)
- [Reduced-tillage for Managing Phytophthora Blight and Other Borne Pathogens](#)
- [Biofumigation for Managing Phytophthora Blight and Other Borne Pathogens](#)
- [White Mold and Its Management in Cabbage, Beans, and Other Vegetables](#)
- [Diseases of Winter Greens: Downy Mildews, Powdery Mildew, Cladosporium Leaf Spot, and Root Rot](#)
- [Table: Fungicides for Cucurbit Crops](#)
- [Table: Mobile Fungicides for Managing Three Major Cucurbit Diseases: Powdery Mildew, Downy Mildew, and Phytophthora Blight](#)
- [Weeds and Crops Susceptible to Viruses in the Northeast](#)
- [Disease-resistant varieties](#)
- [Managing Pathogens Inside Seed with Hot Water](#)
- [Treatments for Managing Bacterial Pathogens in Vegetables](#)
- [Do Rotations Matter within Disease Management Programs?](#)
- [Cropping Sequences and Root Health](#)
- [On-Farm Soil Bioassays for Assessing Root Pathogens](#)
- [General Guidelines for Managing Fungicide Resistance](#)
- [When is the Best Time to Apply Fungicides for Foliar Diseases?](#)
- [Managing Diseases With Sulfur: Is There A Role For Buried Sulfur Evaporators?](#)
- [Organic Management of Vegetable Diseases](#)
- [Biopesticides for Organic and Conventional Disease Management in Vegetables](#)
- [Copper Fungicides for Organic and Conventional Disease Management in Vegetables](#)
- [Minimizing Injury from Copper Fungicides](#)

## Diseases and management practices affecting specific crops

### Arugula

- [Downy mildew](#) (LIHREC)
- [Powdery mildew](#) (LIHREC)

### Asparagus

- [Herbicide injury](#) (LIHREC)

### Basil

- [Basil downy mildew](#)

### Beans

- [Anthracnose](#)
- [Bacterial brown spot](#)
- [Bacterial diseases](#)
- [Chimera \(genetic disorder\)](#) (LIHREC)
- [Ozone injury](#) (LIHREC)

### Phytophthora blight

- [Tomato chlorotic spot virus \(TCSV\)](#)
- [Virus diseases of snap and dry beans](#)

### Beets and Swiss Chard

- [Alternaria leaf spot](#)
- [Bacterial leaf spot](#)
- [Cercospora leaf spot](#)
- [Cercospora leaf spot](#) (LIHREC)
- [Phoma leaf spot and root rot](#)
- [Rhizoctonia crown and root rot](#)

### Carrots

- [Leaf blight diseases](#)
- [Powdery mildew](#) (LIHREC)

### Celery

- [Anthracnose](#)
- [Septoria leaf spot](#) (LIHREC)

### Corn (sweet)

- [Sweet corn diseases and control measures](#)
- [Common corn smut](#) (LIHREC)

### Crucifers (aka brassicas and cole crops)

- [Alternaria leaf spot of brassicas](#)
- [Alternaria leaf spot of brassicas](#) (LIHREC)
- [Bacterial leaf spot on cauliflower](#) (LIHREC)
- [Black leg on kale](#) (LIHREC)
- [Black rot on Brussels sprouts](#) (LIHREC)
- [Black rot on cabbage](#) (LIHREC)
- [Black rot on ornamental kale and ornamental cabbage](#) (LIHREC)
- [Cabbage chimera \(genetic disorder\)](#) (LIHREC)
- [Clubroot of crucifers](#)
- [Clubroot on bok choy](#) (LIHREC)
- [Diseases of winter greens: downy mildew, Cladosporium leaf spot, Botrytis crown rot and root rot](#)
- [Downy mildew on cabbage](#) (LIHREC)
- [Downy mildew on seedlings](#) (LIHREC)
- [Fusarium yellows of cabbage & related crops](#)
- [Head rot \(soft rot\) of broccoli](#) (LIHREC)
- [Heat stress damage to broccoli heads](#) (LIHREC)
- [Powdery mildew](#) (LIHREC)
- [Virus diseases of crucifers](#)

### Cucurbits

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- [Fusarium fruit rot of other cucurbits](#) (LIHREC)
- [Gummy stem blight and black rot](#) (LIHREC)
- [Ozone injury](#) (LIHREC)
- [Phytophthora blight](#)
- [Plectosporium blight](#) (LIHREC)
- [Powdery mildew](#)
- [Pythium fruit rot](#) (LIHREC)
- [Pythium root rot](#) (LIHREC)
- [Scab](#)
- [Sunscauld of pumpkin and winter squash](#) (LIHREC)
- [Virus diseases of cucurbits](#)
- [White mold on cucurbits](#) (LIHREC)
- [Xanthomonas leaf spot \(formerly Bacterial leaf spot\)](#)

### Dill

- [Cercosporoid leaf blight](#) (LIHREC)

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## Cucurbit Powdery Mildew

**Updated:** June 2022 [Printer-friendly .pdf version of the management information on this page.](#)

### See also:

- Newsletter articles:
  - [Why Manage Cucurbit Powdery Mildew?](#)
  - [Managing Cucurbit Powdery Mildew Organically – Key Points for Success](#) [Updated 2022-01-25]
  - [Managing Cucurbit Powdery Mildew Conventionally – Key Points for Success](#) [Updated 2022-01-25]
  - [Conventional Fungicide Recommendations for Cucurbit Powdery Mildew](#)
- [LIHREC Cucurbit powdery mildew photo gallery \(includes diagnostic images\)](#)
- [Research](#) on powdery mildew conducted at LIHREC.
- [Guidelines on managing cucurbit powdery mildew in 2022.](#)
- Podcast: [Avoiding the Powdery Mildew Blues](#) – Meg McGrath, plant pathologist at Cornell's Long Island Horticultural Research and Extension Center, discusses how with other members of the Great Lakes Vegetable Working Group on 24 June 2020. This and other recordings are in the green-bordered box at the bottom of [this page](#).
- Listen to Meg McGrath talk about managing powdery mildew in a teleconference hosted by Steve Bogash of Marrone Bio Innovations on 22 July 2020. Dial 515-604-9875. At prompts enter 832191 for access code and 14 for reference number.
- [Results from research on fungicide resistance in the cucurbit powdery mildew pathogen](#)
- [Targeted Fungicides for Cucurbit Powdery Mildew](#)
- [Table: Fungicides for Cucurbit Crops](#)
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### Topics on this page:

- [Impact and causal fungi](#)
- [Symptoms and signs](#)
- [Disease cycle](#)
- [Managing cucurbit powdery mildew – Overview](#)
- [Cultural and biological controls including resistant varieties](#)
- [Chemical control – General information](#)
- [Recommended targeted fungicides](#)
- [Organic fungicides for powdery mildew](#)
- [Summary points about managing powdery mildew successfully](#)



## Vegetable Pathology – Long Island Horticultural Research & Extension Center

HOME ABOUT PHOTO GALLERY RESEARCH EXTENSION & OUTREACH SITE NEWS

### Topics:

- **About** – Research and Extension info.
- **Photo gallery** – Images of and disorders on vegetable, herbs
- **Research** – Annual program s current applied research proj publications, presentation file
- **Extension & Outreach** – Pro proceedings, presentation file
- **Organic** – Info on managing c
- **News** – Recent additions to t

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### Research reports

#### Organic Disease Management

#### Biopesticide Evaluations

#### Fungicide Resistance

#### Cucurbit Downy Mildew

#### Cucurbit Powdery Mildew

#### Phytophthora Blight

#### Basil Downy Mildew

#### Late Blight of Tomato

#### Foliar Diseases of Tomato

#### Ozone on Long Island and its Impact on Plants





# Cucurbit Powdery Mildew



# Integrated Disease Management

## Cucurbit Powdery Mildew

- Resistant varieties provide limited (pumpkin, squash) to excellent (cucumber, cantaloupe) suppression.
- Onset coincides with start of fruiting.
- Many biopesticides and protectant fungicides (sulfur, chlorothalonil) effective on upper leaf surfaces.
- Targeted fungicides can be excellent.

Effective on lower leaf surface.

Resistance is major issue.

Isolates with multi-fungicide resistance.

Inherent differences in efficacy including within FRAC group



Betternut 1744



Copyright © Rupp Seeds

Powdery mildew tolerant. Developed by Rupp breeders. Slightly larger than Betternut 900 for farm markets and roadside stands.

Taybelle PM



Copyright © Seminis

A direct conversion from Taybelle to include intermediate resistance to powdery mildew.



**HARRIS**  
EST SEEDS 1879

**Pumpkin Gladiator**

Our #1 variety! Its improved disease protection and grower-preferred fruit size have made Gladiator the number one variety of growers across the country. Raised next to other varieties in field comparisons, Gladiator shows improved homozygous intermediate resistance to powdery mildew. The round, deep orange fruit have moderate ribbing and measure 13" wide x 12" high. Gladiator's long handles are thick and firmly rooted to the 20 to 25 lb. fruit. Vigorous, semi-vine plants produce good yields of these classic, attractive pumpkins that are uniform for size and shape. US Patent 7,166,772.

**Squashes and Pumpkins**  
**Intermediate resistance**  
**Powdery mildew tolerant**  
**Homozygous best**  
**control improved with fungicides**



# Cantaloupe: **Race specific resistance.** Excellent but specific

## Arangina



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Arangina is a delicious mid-season ESL Italian melon. Strong plant vigor with good and uniform fruit setting. The fruit is blocky shaped, hard course netting, deep green sutures, dark orange flesh with great firmness and small cavity. Outstanding eating quality. Harvest indicator is when rind changes colors.

### Disease Resistance

Fusarium Wilt (0,1,2)

Powdery Mildew (1,2)

### Disease Resistance

Fusarium Wilt 0,1,2

Powdery Mildew 1,2,3,5

## Athena



Copyright © Syngenta

Firm flesh, harvest closer to slip than Super Star. Resembles Saticoy. Excellent disease tolerance.

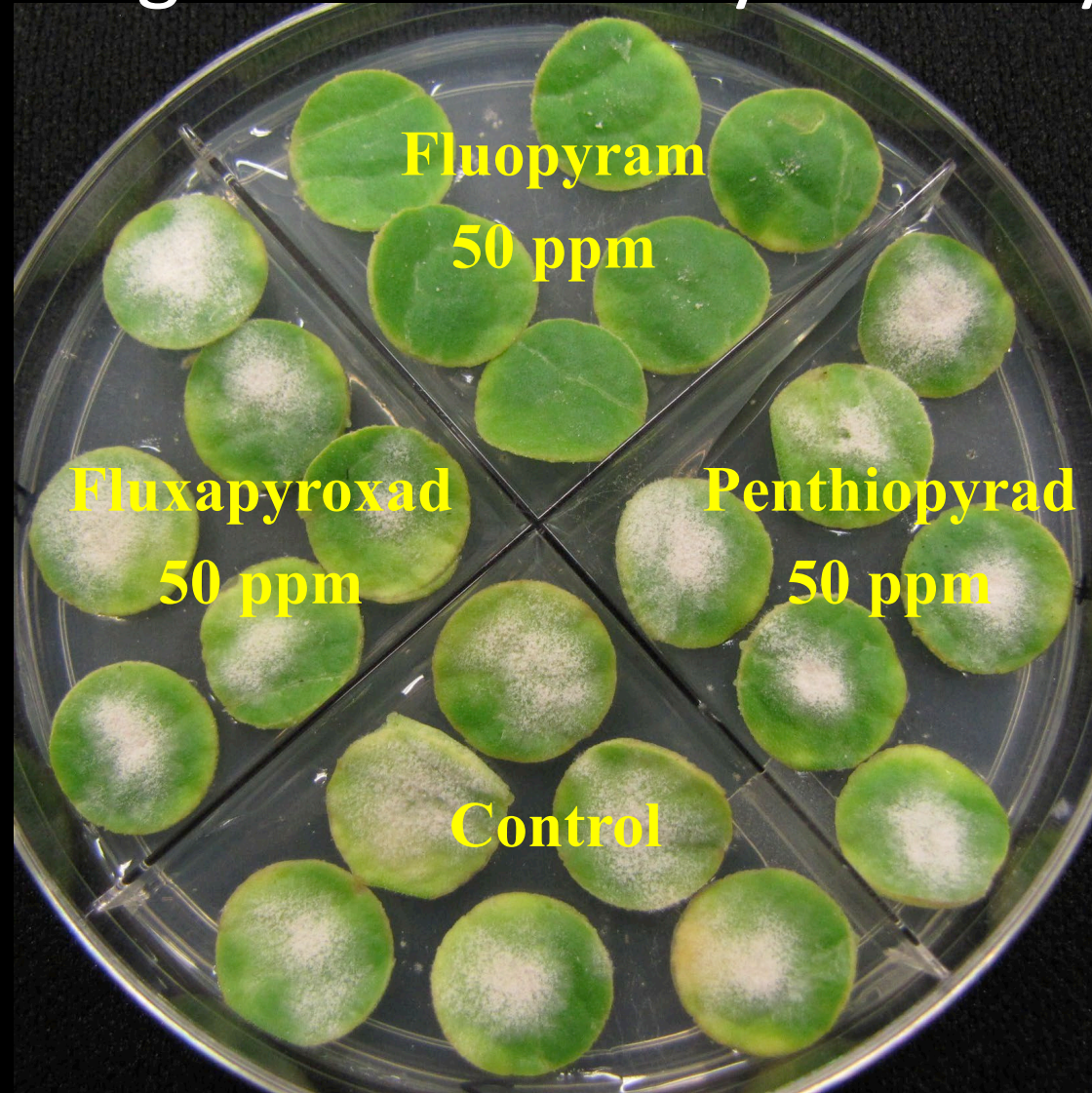


# Fungicide Evaluation - Pumpkin





# Fungicide Sensitivity Bioassay





# Powdery Mildew Isolate Bioassays – Fungicides

Endura (7)	500 ppm (= field rate)	Resistant
Torino (U6)	50 ppm (= field rate)	
Quintec (13)	200 ppm (= field rate)	
Rally (3)	40, 80 ppm (field rate = 300 ppm)	Reduced Sensitivity
Vivando (50)	50, 150 ppm (field rate = 600 ppm)	
Luna Privilege (7)	50, 150 ppm (field rate = 390 ppm)	

**Field rate** = highest label rate applied at 50 gpa.

Luna Privilege used instead of Luna fungicides labeled for this use because Luna Experience and Luna Sensation have another AI.

Fungicide resistance is result of change in single or multiple genes.



**Quintec**

**Sensitive  
Isolate**

**Luna Privilege**

**Torino**

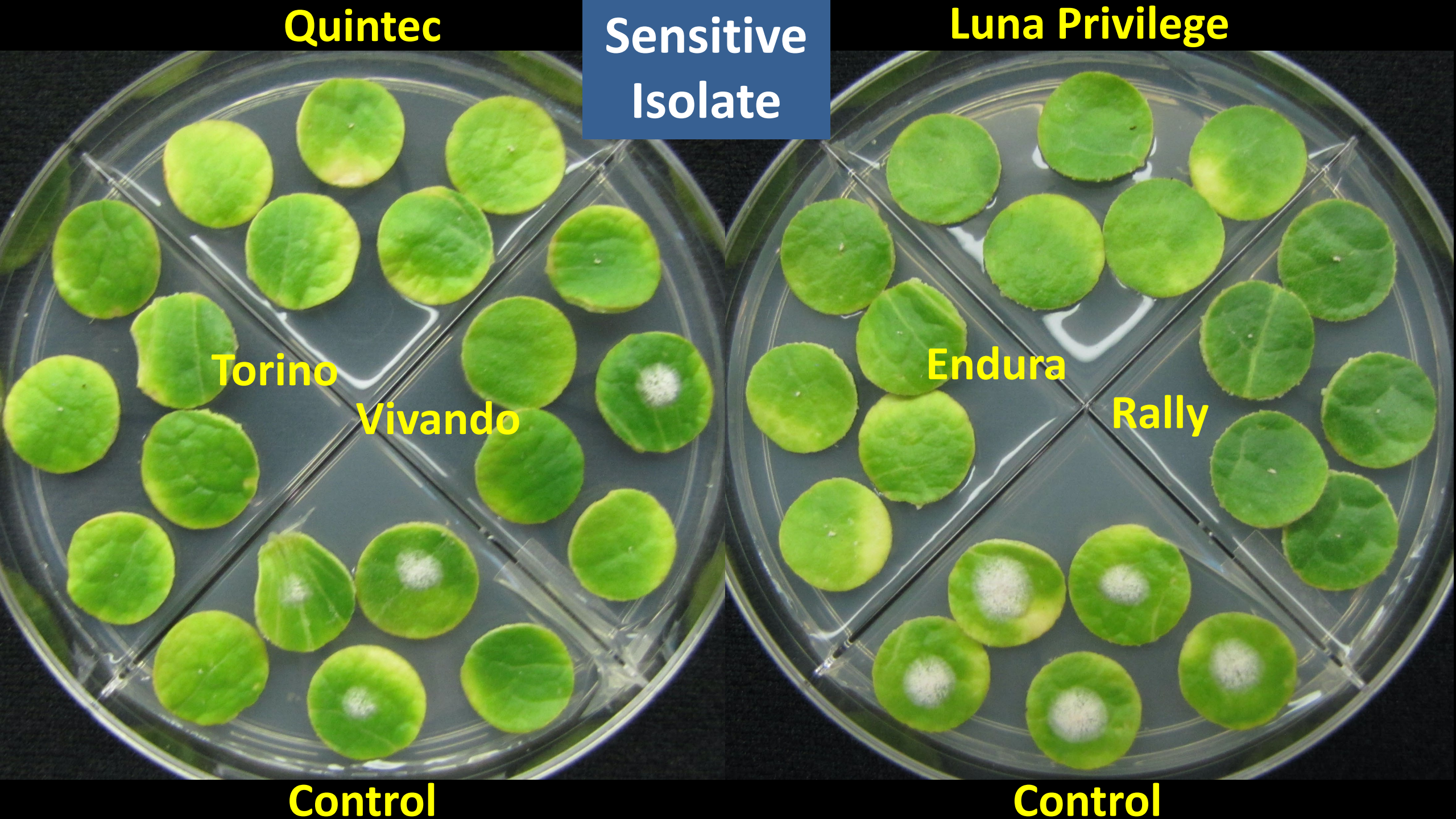
**Vivando**

**Endura**

**Rally**

**Control**

**Control**





**Quintec**

**Resistant  
Isolate**

**Luna Privilege**

**Torino**

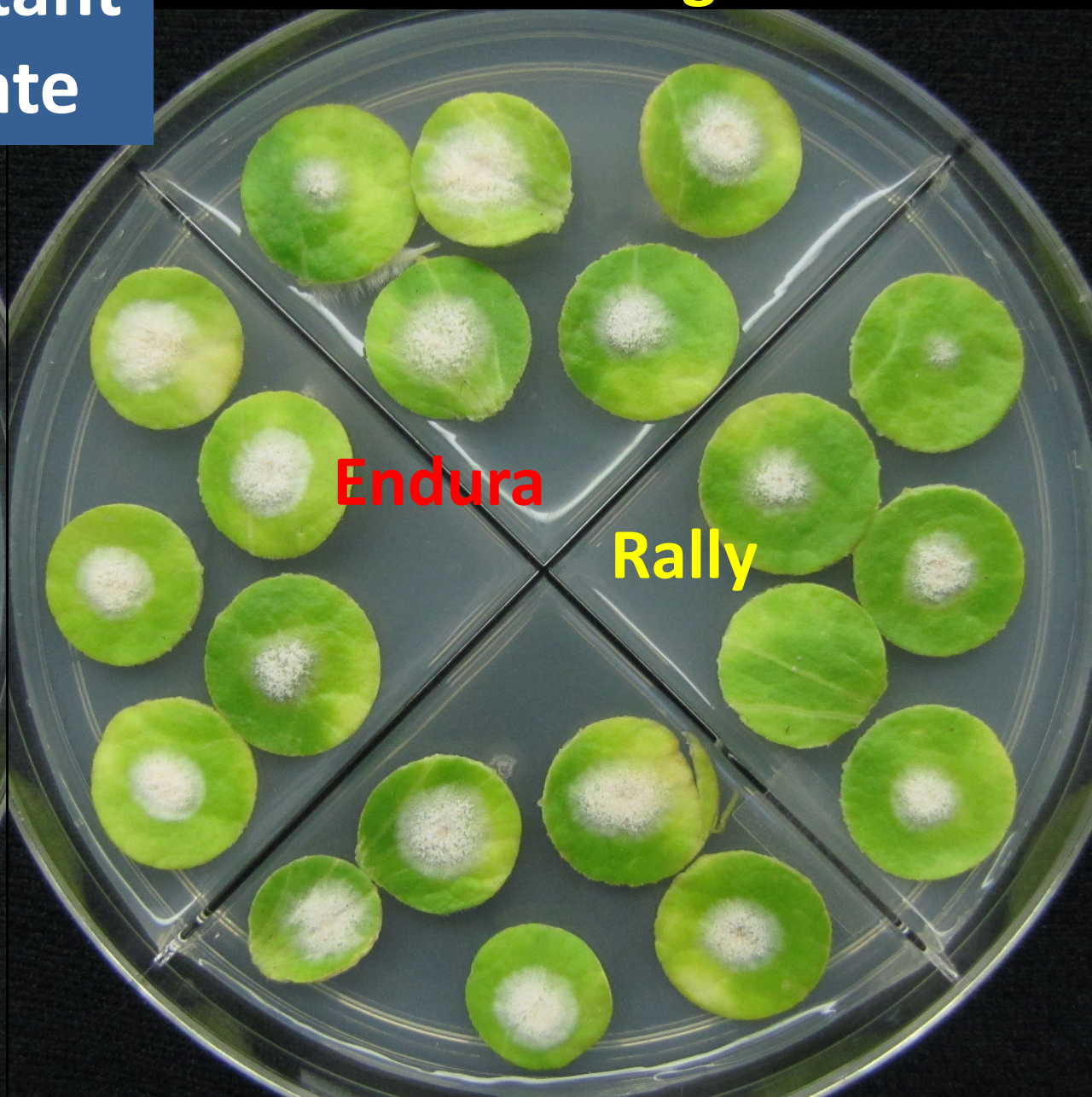
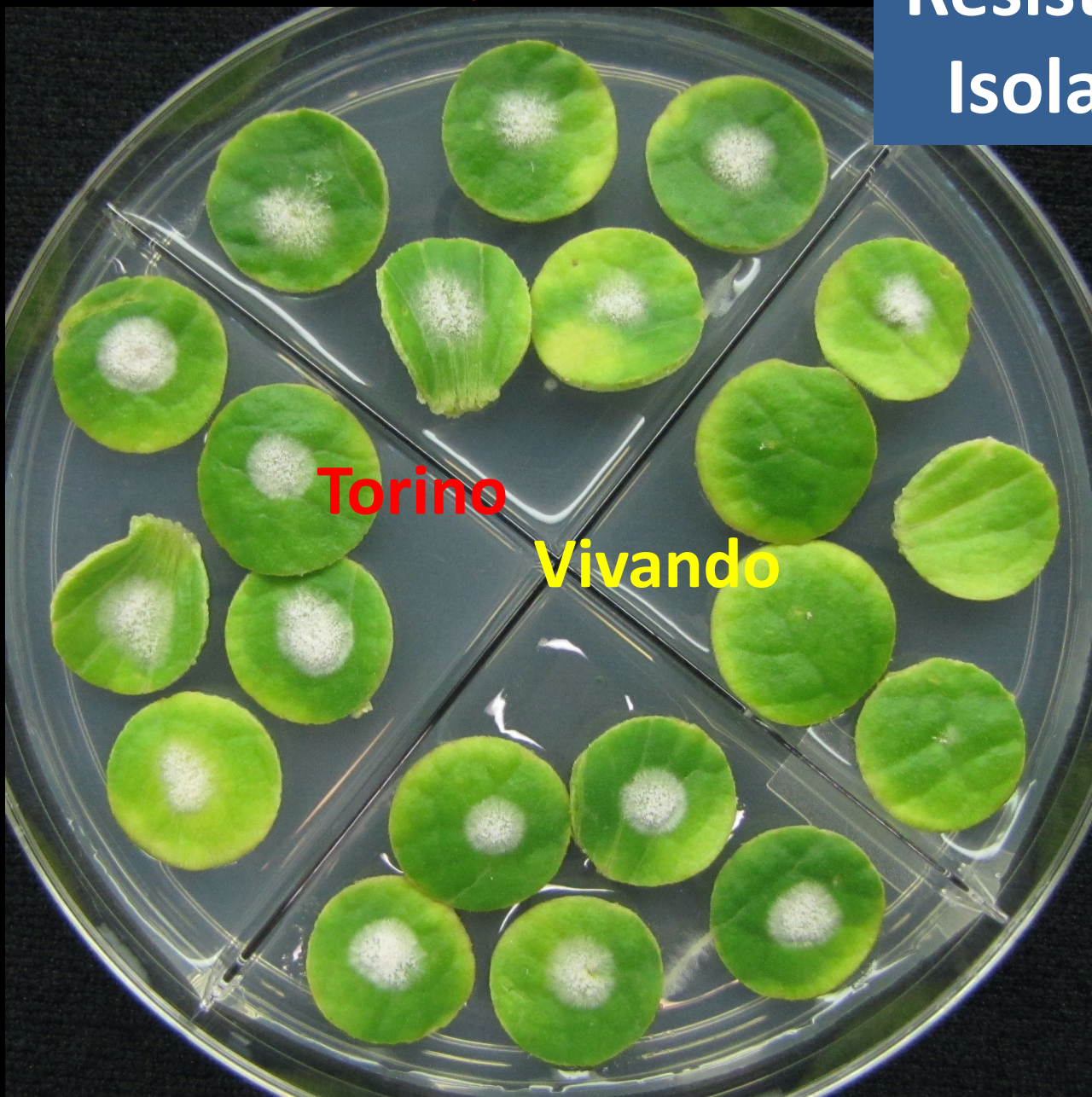
**Vivando**

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**Rally**

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**Control**





# Fungicide Resistance Occurrence in Powdery Mildew Isolates from Cucurbit Crops, Eastern NY, 2021

Powdery Mildew Fungicides used	Percent Resistant Isolates		
	Torino	Quintec	Endura
Just protectants (copper, chlorothalonil)	0	0	14

# Fungicide Resistance Occurrence in Powdery Mildew Isolates from Cucurbit Crops, Eastern NY, 2021

Powdery Mildew Fungicides used	Percent Resistant Isolates		
	Torino	Quintec	Endura
Just protectants (copper, chlorothalonil)	0	0	14
Quintec, Vivando, Vivando (all applied with protectants)	0	0	56

# Fungicide Resistance – Powdery Mildew - Eastern NY, 2021

Powdery Mildew Fungicides used	Resistant Isolates (%)		
	Torino	Quintec	Endura
Just protectants (copper, chlorothalonil) **	0	0	14
Quintec, Vivando, Vivando *	0	0	56
Vivando, Quintec, Rhyme, Vivando, Quintec *	0	67	67
Quintec, Vivando, Quintec + Vivando *	67	100	100
Quintec, Rhyme, Prolivo, Gatten, Prolivo, Quintec, Prolivo, Gatten * **	71	71	86

\* all applied with protectants

\*\* Fields about 2 miles apart



# Fungicide Resistance – Powdery Mildew - Eastern NY, 2021

Powdery Mildew Fungicides used	Resistant Isolates (%)		
	Torino	Quintec	Endura
Just protectants (copper, chlorothalonil)	0	0	0
Quintec, Vivando, Vivando *	0	0	14
Vivando, Quintec, Rhyme, Vivando, Quintec *	0	67	67
Quintec, Vivando, Quintec + Vivando *	50	100	100
Quintec, Rhyme, Prolivo, Gatten, Prolivo, Quintec, Prolivo, Gatten *	71	71	86
Gatten, Vivando, Gatten *	11	11	44

\* all applied with protectants

# Fungicide Resistance - Cucurbit Powdery Mildew

Resistant isolates are fit. Found in plantings not treated.

Frequency of resistance in a planting can change with fungicide use during a season.

Applying a fungicide ineffective due to resistance may not be evident when other fungicides used are effective.

Pathogen isolates with resistance to multiple fungicide chemistry groups have been found increasingly. Until 2022??

All 2020 isolates found to be resistant to Quintec were also resistant to Torino, Endura, and QoI fungicides.

Expect resistance to develop to additional fungicides.

# Fungicide Resistance - Cucurbit Powdery Mildew

## 2022 Preliminary Results:

76 isolates tested.                      37 resistant to Endura.

6 resistant to Torino.                8 resistant to Quintec.

JUST ONE MULTI-FUNGICIDE RESISTANT ISOLATE SO FAR!!

Fungicides used: Quintec applied once in 1 crop.

Vivando or Prolivo. Rhyme, Inspire Super. Miravis Prime



# Fungicide Programs - Cucurbit Powdery Mildew

Proline, Vivando, Proline, Vivando, Procure, Vivando

Vivando, Vivando, Aprovia Top, Aprovia Top, Vivando

FRAC: 50 3 3 + 7 7

Others: Prolivo Rhyme Luna Experience Miravis Prime

leftover Quintec or Torino 1 application

Gatten has not been as effective in efficacy trials.

**Start preventive (start of fruit formation) or  
at threshold (1 of 50 older leaves)**

**Apply with protectant:**

sulfur, mineral oil, chlorothalonil, biopesticide

# Fungicide Resistance - Cucurbit Powdery Mildew

## **Luna Experience – sensitivity to fluopyram (FRAC 7)**

Most 2022 isolates tolerate 50 ppm. Few tolerate 150 ppm.

Luna Experience 6 fl oz/A applied at 50 gpa = 165 ppm.

Luna Experience 17 fl oz/A applied at 50 gpa = 468 ppm.

Higher gallonage, lower concentration.

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## Cucurbit Powdery Mildew

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  - [Managing Cucurbit Powdery Mildew Organically – Key Points for Success](#) [Updated 2022-01-25]
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Table contains many conventional fungicides labeled for diseases of cucurbit crops, approximate cost per acre of an application, number of acres that can be treated with the package size available, and diseases labeled. Most products listed have mobility and/or targeted activity. The last three are contact protectant fungicides.

Fungicide	Price	Unit	Rate/A	Unit	Cost/A	Pkg Size	A/treated	AB	AL	A	ALS	BLS	DM	F	GSB	PhB	PIB	PM	S
Actigard	\$57.08	oz	0.5-1	oz	\$29-57	8 oz	8-16				R	R	L					L	L
Aprovia Top 1.62 EC	\$389.91	gal	10.5-13.5	fl oz	\$32-41	1 gal	9.5-12.2	R	R	R					R		R		R
Curzate 60 DF	\$57.16	lb	3.2-5	oz	\$11-18	4 lb	12.8-20						R						
Elumin 4 SC	\$467.99	gal	8	fl oz	\$29	1 gal	16						R			R			
Endura	\$92.11	lb	6.5	oz	\$37	6.5 lb	16	R							nr			nr	
Forum 4.17 SC	\$391.96	gal	6	fl oz	\$18	1 gal	21.3						R/nr			R			
Gatten	\$125	qt	6-8	fl oz	\$23-31	1 qt	4-5.3											R	
Gavel 75 DF	\$12.49	lb	1.5-2	lb	\$19-25	30 lb	15-20						R			R			
Inspire Super 2.82 EW	\$325.13	gal	16-20	fl oz	\$41-51	1 gal	6.4-8.0	R	R	R					R		R	nr	
Luna Experience 3.34 SC	\$5.93	oz	6-17	fl oz	\$36-101	32 oz	1.9-5.3		R	R					R			R	
Miravis Prime 3.34 SC	\$569.08	gal	9.2-11.4	fl oz	\$41-51	2.5 gal	28.1-34.8	R	R						R			R	R
Omega	\$506.68	gal	0.75-1.5	pt	\$48-95	2.5 gal	13.3-26.7		R				R		R	R			
Orondis Gold	\$1,838.30	case			\$92-184											R			
Orondis Opti	\$210.49	gal	1.75-2.5	pt	\$46-66	2.5 gal	8.0-11.4						R						
Orondis Ultra	\$1,018.50	gal	5.5-8	fl oz	\$44-64	1 gal	16.0-23.3									R			
Phiticide (phosphorus acid)	\$21.40	gal	2.5-5	pt	\$7-13	2.5 gal	4.0-8.0						nr			R			
Presidio 4 SC	\$350.93	qt	3-4	fl oz	\$33-44	1 qt	8.0-10.7						R/nr			R			
Previcur Flex 6F	\$92.09	gal	1.2	pt	\$14	2.5 gal	16.7						R/nr						
Pristine 38 WG	\$3.90	oz	12.5-18.5	oz	\$49-72	120 oz	6.5-9.6											nr	
Procure 480 SC	\$113.69	qt	4-8	fl oz	\$14-28	1 qt	4.0-8.0											R	
Proline 480 SC	\$655.94	gal	5.7	fl oz	\$29	2.5 gal	56.1							R	R			R	
Prolivo	\$4.40	oz	4-5	fl oz	\$18-22	32 oz	6.4-8.0											nr	
Quintec 2.08 SC	\$4.46	oz	4-6	fl oz	\$18-27	30 oz	5-7.5											R	
Rally 40 WSP	\$3.93	oz	2.5-5	oz	\$10-20	20 oz	4-8											nr	
Ranman 400 SC	\$1,180.93	gal	2.1-2.75	fl oz	\$19-25	1 qt	11.6-15.2						R			R			
Revus	\$505	gal	8	fl oz	\$32	1 gal	16.0						R/nr			R			
Rhyme 2.08 SC	\$3.46	oz	5-7	fl oz	\$17-24	50 oz	7.1-10.0								R			R	
Switch	\$6.96	oz	11-14	oz	\$77-97	28 oz	2-2.5	R	R						R			L	
Tanos 50 DF	\$57.65	lb	8	oz	\$29	7.5 lb	15						nr						
Torino 0.85 SC	\$8.94	oz	3.4	oz	\$30	34 oz	10.0											nr	
Vivando 2.5 SC	\$311.87	gal	15.4	fl oz	\$38	1 gal	8.3											R	
Zampro 525SC	\$3.30	oz	14	fl oz	\$46	140 oz	10.0						R			R			
Zing! 4.9 SC	\$97.91	gal	36	fl oz	\$28	2.5 gal	8.9						R			R			

# Fungicides – Cucurbit Powdery Mildew – Cost + Acreage

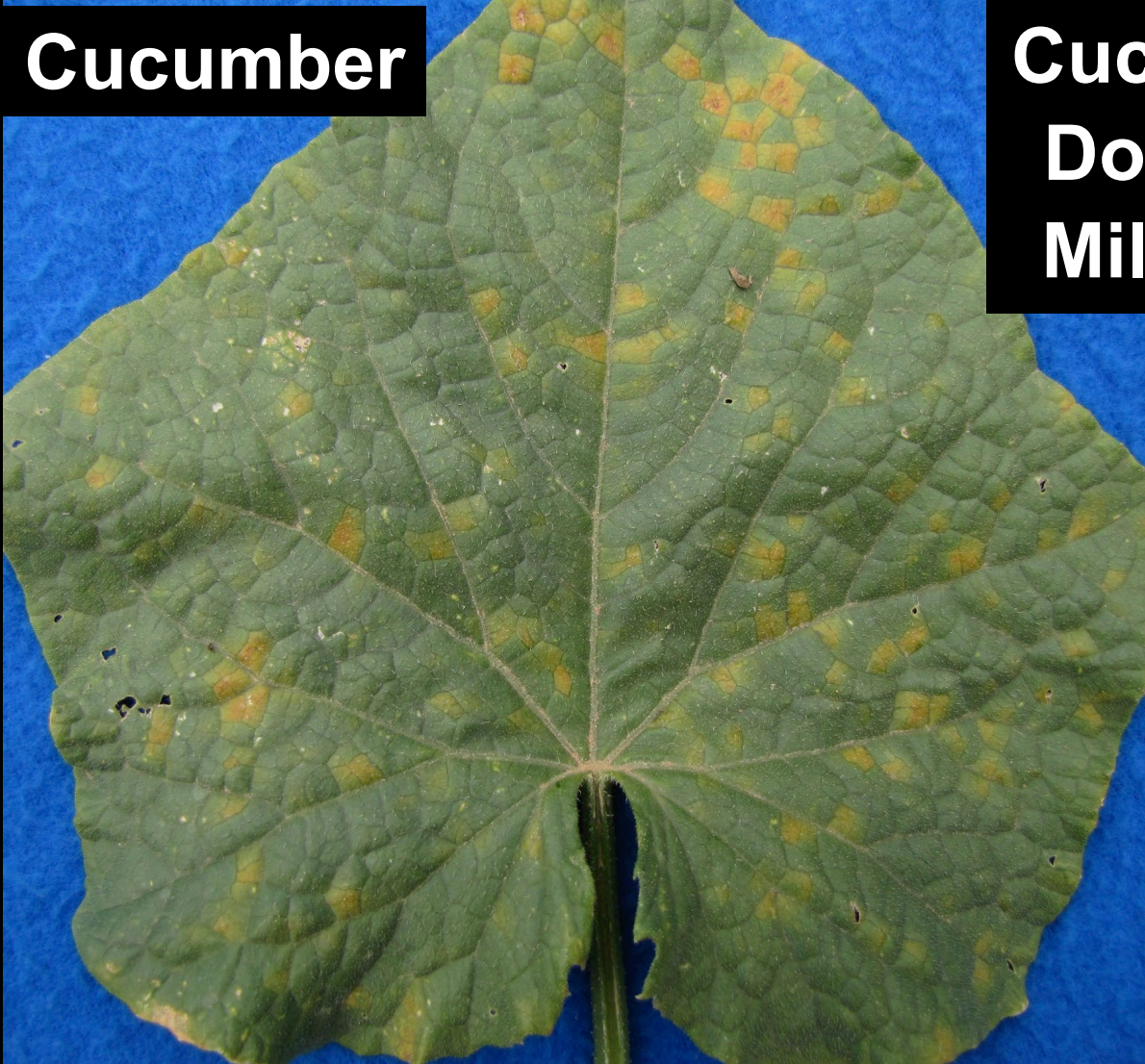
Microthiol Disperss	\$10 - 40/A	(low rate effective)
Bravo Weather Stik	\$8 - 15/A	
Proline (3)	\$32	56 A (2.5 gal)
Procure (3)	\$16 - 33/A	4 - 8 A
Rhyme (3)	\$24 - 33/A	7 - 10 A
Inspire Super (3 + 9)	\$32 - 40/A	6 - 8 A
Aprovia Top (3 + 7)	\$32 - 41/A	10 - 12 A
Luna Experience (3 + 7)	\$34 - 96/A	2 - 5 A
Miravis Prime (7 + 12)	\$37 - 45/A	28 - 35 A (2.5 gal)
Vivando (50)	\$35/A	7 - 10 A
Prolivo (50)	\$19 - 23/A	2 - 3 A



# Fungicides – Cucurbit Powdery Mildew – Other Diseases

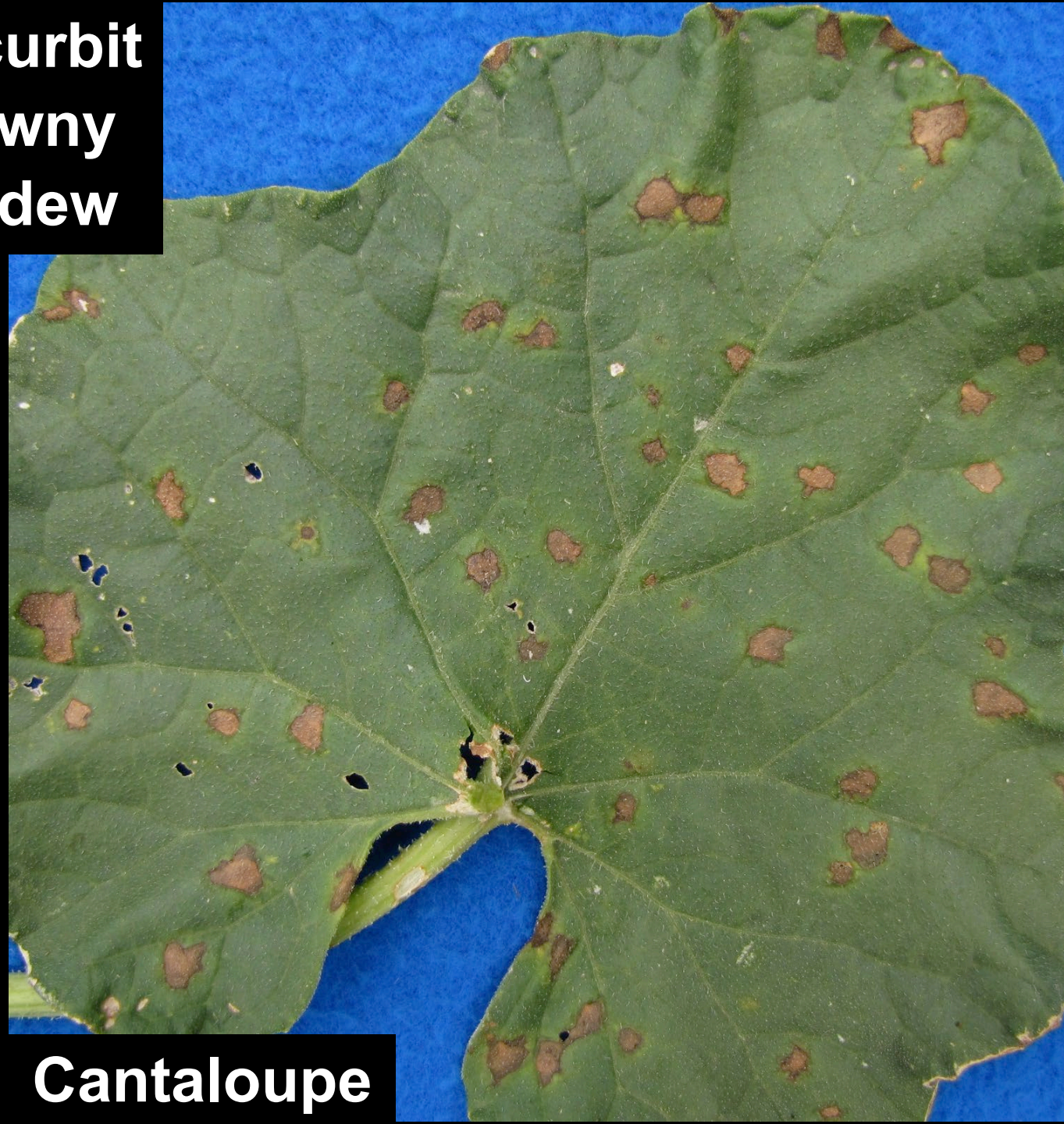
Microthiol Disperss	\$10 - 40/A	
Bravo Weather Stik	\$8 - 15/A	Alternaria, Anthracnose, DM, GSB, Scab
Proline (3)	\$32	Fusarium, Gummy Stem Blight (GSB)
Procure (3)	\$16 - 33/A	
Rhyme (3)	\$24 - 33/A	Gummy Stem Blight
Inspire Super (3 + 9)	\$32 - 40/A	Alternaria, Anthracnose, GSB, Plectosporium
Aprovia Top (3 + 7)	\$32 - 41/A	Alternaria, Anthracnose, GSB, Plecto, Scab
Luna Experience (3 + 7)	\$34 - 96/A	Alternaria, Anthracnose, GSB
Miravis Prime (7 + 12)	\$37 - 45/A	Alternaria, Gummy Stem Blight, Scab
Vivando (50)	\$35/A	
Prolivo (50)	\$19 - 23/A	





**Cucumber**

**Cucurbit  
Downy  
Mildew**



**Cantaloupe**





# Cucurbit Downy Mildew – important facts

- Pathogen survives overwinter in S Florida, moves northward.
- Occurrence is monitored, but no longer forecasted. Sign up for alerts. <https://cdm.ipmpipe.org/>
- Pathogen is host-specialized. Cucumber + cantaloupe affected first; pathogen Clade 2.
- Squash, pumpkin, and watermelon affected later in season if at all pathogen Clade 1.

# Managing Cucurbit Downy Mildew

- **Learn about the disease** at <https://www.vegetables.cornell.edu/pest-management/disease-factsheets/downy-mildew-of-cucurbits/>.
- **Plan fungicide program** based on information at above website about fungicide efficacy, resistance, and label use restrictions.
- **Select resistant varieties.** Cucumber: DMR 401, Brickyard, new Tokita lines. Cantaloupe: Trifecta.
- Sign up to **receive alerts** when downy mildew has been detected nearby at **The Cucurbit Downy Mildew Forecast webpage:** <https://cdm.ipmpipe.org/>.
- **Monitor** <https://cdm.ipmpipe.org/> to know when and where downy mildew is developing in different cucurbit crops.
- Become familiar with **early symptoms**. See <http://blogs.cornell.edu/livepath/gallery/cucurbits/downy-mildew-o-cucurbits-early-symptoms/>
- **Scout** for symptoms at least weekly, especially cucumbers.
- **Report** occurrence to extension specialist or post at <https://cdm.ipmpipe.org/>.
- Start applying **targeted fungicides** as soon as symptoms detected in crop or nearby, ~~or risk high~~. Apply in alternation and with protectant fungicides (chlorothalonil, mancozeb, copper, biopesticides). Protectants alone recommended when preventive application used.
- **Rate success** of management program and identify ways to improve if inadequate.



# Seedling Bioassay - Fungicide Resistance





# Fungicide Efficacy - Cucumber Bioassay LI

FRAC Code	Fungicide	2021	2019	2018	2017	2016
4	Ridomil	not tested	not tested	not tested	not tested	not tested
11	Quadris	ineffective	ineffective	ineffective	ineffective	Mod. effective
40	Revus	ineffective	ineffective	ineffective	ineffective	Mod. effective
43	Presidio	ineffective	Mod. effective	ineffective	EFFECTIVE	EFFECTIVE
40	Forum	Mod. effective	Mod. effective	EFFECTIVE	ineffective	ineffective
22	<b>Gavel, Zing!</b>	EFFECTIVE	Mod. effective	EFFECTIVE	EFFECTIVE	EFFECTIVE
27	<b>Curzate, Tanos</b>	EFFECTIVE	EFFECTIVE	EFFECTIVE	poor	EFFECTIVE
28	<b>Previcur Flex</b>	EFFECTIVE	EFFECTIVE	EFFECTIVE	poor	EFFECTIVE
21	<b>Ranman</b>	EFFECTIVE	EFFECTIVE	EFFECTIVE	EFFECTIVE	EFFECTIVE
45 + 40	<b>Zampro</b>	not tested	not tested	EFFECTIVE	EFFECTIVE	EFFECTIVE
29	<b>Omega</b>	EFFECTIVE	EFFECTIVE	not tested	not tested	not tested
49	<b>Orondis</b>	EFFECTIVE	EFFECTIVE	EFFECTIVE	not tested	not tested



# Fungicide Efficacy - Bioassays - South Carolina

FRAC Code	Fungicide	Cucumber, LI, 2021	Cucumber, Clade 2	Butternut squash, Clade 1	Watermelon, Clade 1
11	Quadris	ineffective	ineffective *	ineffective *	ineffective *
40	Revus	ineffective	ineffective *	EFFECTIVE	EFFECTIVE
43	Presidio	ineffective	EFFECTIVE	EFFECTIVE	EFFECTIVE
40	Forum	Mod. effective	ineffective *	ineffective *	ineffective *
22	<b>Gavel, Zing!</b>	EFFECTIVE	not tested	not tested	not tested
27	<b>Curzate, Tanos</b>	EFFECTIVE	ineffective *	ineffective *	ineffective *
28	<b>Previcur Flex</b>	EFFECTIVE	EFFECTIVE	ineffective *	ineffective *
21	<b>Ranman</b>	EFFECTIVE	EFFECTIVE	EFFECTIVE	EFFECTIVE
45 + 40	<b>Zampro</b>	EFFECTIVE when tested: 2016-18	not tested	not tested	not tested
29	<b>Omega</b>	EFFECTIVE	EFFECTIVE	EFFECTIVE	EFFECTIVE
49	<b>Orondis</b>	EFFECTIVE	not tested	not tested	not tested

**\* Ineffective in some bioassays, 2018 – 2020.**





# Phytophthora Blight

all cucurbits  
pepper, eggplant  
tomato  
snap beans  
weeds (purslane)

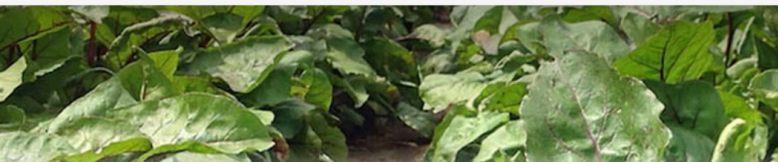




## Cornell Vegetables

Resources for commercial growers

HOME ABOUT CROPS SOIL PEST MANAGEMENT FOOD SAFETY BUSINESS



[Home](#) > [Pest management](#) > Disease factsheets and articles

### Disease factsheets and articles

If you were a big fan of the pioneering [Vegetable MD Online](#) website, much of that content has been moved here. We are in the process of moving over the rest.

- **(LIHREC)** indicates information from the Long Island Horticultural Research and Extension Center Vegetable Pathology website.
- List also **includes some herbs** (parsley, basil) and **abiotic disorder**
- Some content is available as printer-friendly .pdf versions.

#### Get started:

[General tips on diagnosing plant diseases](#)

#### Diseases and management practices affecting multiple crops

- [Phytophthora Blight and Its Management in Cucurbit Crops and Other Vegetables](#)
- [Reduced-tillage for Managing Phytophthora Blight and Other Soil-Borne Pathogens](#)
- [Biofumigation for Managing Phytophthora Blight and Other Soil-Borne Pathogens](#)
- [White Mold and Its Management in Cabbage, Beans, and Other Vegetables](#)
- [Diseases of Winter Greens: Downy Mildews, Powdery Mildews, Cladosporium Leaf Spot, and Root Rot](#)
- [Table: Fungicides for Cucurbit Crops](#)
- [Table: Mobile Fungicides for Managing Three Major Cucurbit Diseases: Powdery Mildew, Downy Mildew, and Phytophthora Blight](#)
- [Weeds and Crops Susceptible to Viruses in the Northeast](#)
- [Disease-resistant varieties](#)

[Home](#) > [Pest management](#) > [Disease factsheets and articles](#) > Phytophthora Blight and Its Management in Cucurbit Crops and Other Vegetables

### Phytophthora Blight and Its Management in Cucurbit Crops and Other Vegetables

Updated January, 2022.

Phytophthora blight is one of the more destructive diseases of vegetable crops. Most cucurbit crops and pepper are very susceptible. Cantaloupe is less commonly affected than other cucurbits. Eggplant, tomato, snap bean, and lima bean are also susceptible. Snap bean is the most recently identified host for the pathogen.



Symptoms include crown rot, stem and vine lesions, tip blight, leaf spots, lesions on petioles, root rot, and fruit rot. Type of symptoms that occur vary among crops. Fruit rot is typically the only symptom with cantaloupe, cucumber and tomato.

View symptoms in several crops at the LIHREC website where there is also information about Phytophthora blight and its management:

- [Beans](#)
- [Cucurbits](#)
- [Eggplants](#)
- [Peppers](#)
- [Tomatoes](#)

The pathogen causing Phytophthora blight, *Phytophthora capsici*, is thought to move into a field primarily in contaminated water or soil moved from an affected field. It can infect seed. This pathogen can survive in a field for many years in the absence of a host crop as oospores or by infecting roots of weeds including purslane, thus it is difficult to manage through rotation.

Recommended management program includes cultural practices combined with fungicides. It is considered key to minimize opportunity for there to be standing water in a field after rain or irrigation as this provides ideal conditions for blight to develop. A preventive fungicide program is recommended.

Detailed information about Phytophthora blight and its management are in the following articles and tables:

- [Phytophthora Blight](#) (brief factsheet)
- [Phytophthora Blight of Cucurbits](#) (includes management information pertinent to other crops)
- [Biopesticides for Organic Management of Phytophthora Blight](#)
- [Reduced tillage for Managing Phytophthora Blight and Other Soil-Borne Pathogens](#)
- [Biofumigation for Managing Phytophthora Blight and Other Soil-Borne Pathogens](#)
- [Fungicides for Managing Phytophthora Blight in Cucurbits and Other Vegetables](#)

# Phytophthora Blight Management

Mustard biofumigation (optional)

Reduced tillage (optional)

Leave driveways unplanted or plant to low cover crop (ryegrass, clover)

Good preventive fungicide program

Soil moisture management:

don't plant in low areas

drip irrigation

avoid over-irrigating

sub-soil

Destroy affected plants promptly



# Fungicides – Phytophthora Blight

FRAC Code	Fungicide	Active Ingredient	Registered	Resistance	Downy Mildew
4	Ridomil	mefenoxam	mid-1990s	Common	Resistance common
33	multiple	phosphorous acid			Not effective
43	Presidio	fluopicolide	2008 (spring)	Common, southeast	Resistance – Clade 2?
21	Ranman	cyazofamid	2004	Detected, southeast	EFFECTIVE
22	Gavel	zoxamide	2002 (Feb)	lab	EFFECTIVE
49	Orondis	oxathiapiprolin	2016	lab	EFFECTIVE
40	Forum	dimethomorph	2002 (Nov)		Resistance – all
40	Revus	mandipropamid	2008		Resistance – Clade 2
27	<b>Tanos</b>	cymoxanil	2005		Resistance – Clade 1
45 + 40	<b>Zampro</b>	armetoctradin + dimethomorph	2012 (June)		EFFECTIVE
29	<b>Omega</b>	fluazinam	2012 / 2016		EFFECTIVE

# Fungicides – Phytophthora + Downy Mildew

**Cucumber and Cantaloupe** (downy mildew pathogen clade 2):

**Omega** early. PHI is 30 days.

**Zampro, Orondis, Gavel. Tanos?**

**Ranman** if not used a lot for Phytophthora in past on farm.

**Squash, Pumpkin and Watermelon** (downy mildew pathogen clade 1; concern late summer - fall):

**Revus or Forum, Tanos** early when downy mildew not a concern.

**Revus, Zampro, Omega (7 d PHI), Orondis, Gavel.**

**Ranman and Presidio** if not used a lot for Phytophthora.





**Virus**  
**Symptoms**

**Leaves**  
**Fruit**





# Cucurbit Virus Survey 2022

Area	# Locations	# Samples	Viruses Detected (# samples)
Western NY	1	1	ZYMV (1)
Eastern NY	2	7	ZYMV (7), CMV (7), SqMV (1)
Long Island	2	7	ZYMV (7)
Virginia	3	3	ZYMV (1), WMV (2)

## Zucchini Yellow Mosaic Virus

Seed-borne. Volunteer plants potential source.

Aphid, mechanical transmission.

Potyvirus.





Leaves  
that tested  
positive for

**ZYMV**





