Recommendations for Managing Important

Vegetable Diseases Based on Research

Meg McGrath

Cornell University, School of Integrative Plant Sciences
Plant Pathology and Plant-Microbe Biology Section
Long Island Horticultural Research and Extension Center
Riverhead, New York. mtm3@cornell.edu





Downy Mildew

Cantaloupe





Cantaloupe - Downy Mildew - Integrated Management

Downy Mildew Resistant Varieties (also powdery mildew resistant)

Trifecta Edisto 47 Planter's Jumbo

29% control (AUDPC values); 72% control (defoliation)

Conventional Fungicide Program

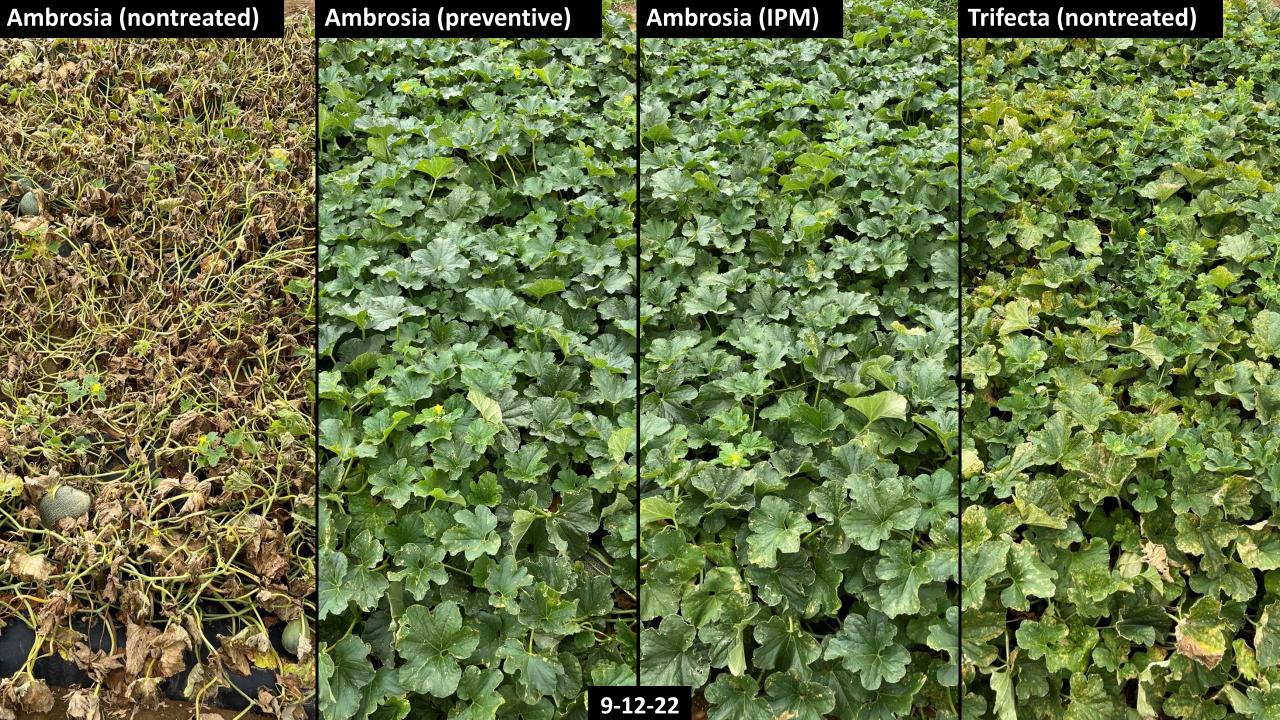
Ranman alt. Previour Flex alt. Orondis Ultra

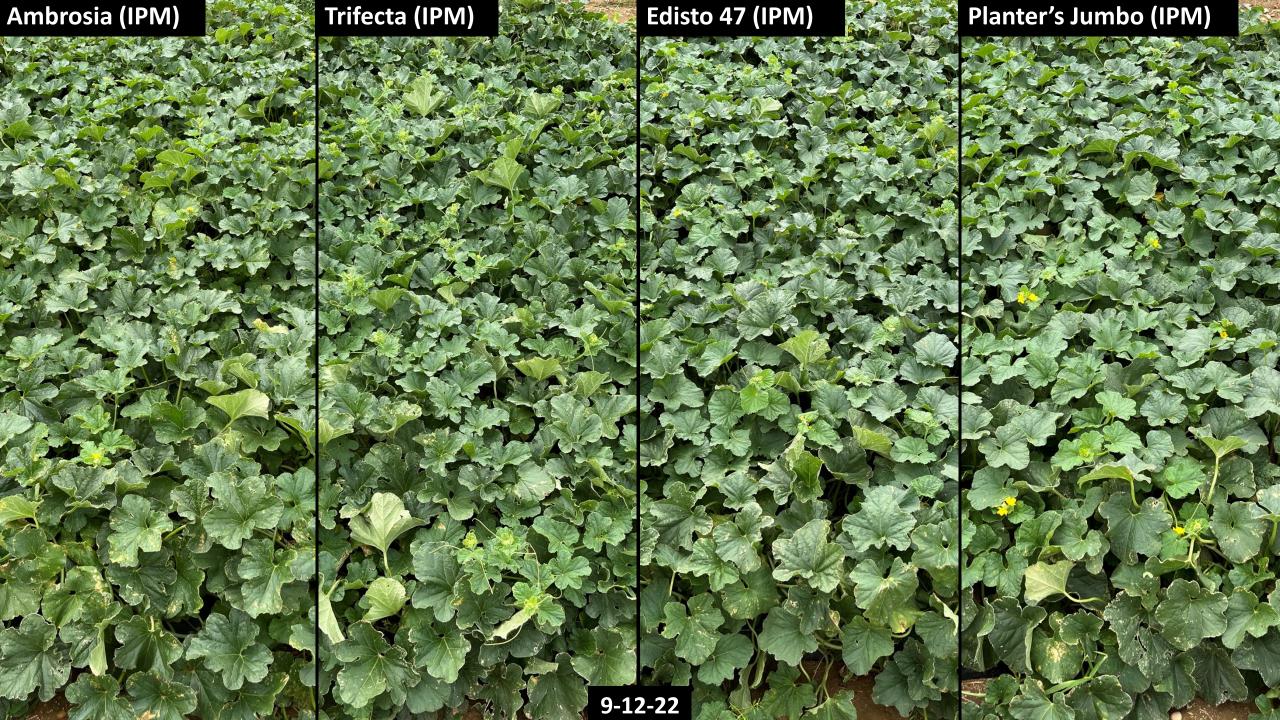
7-27 started preventive applications.

8-17 started IPM program.

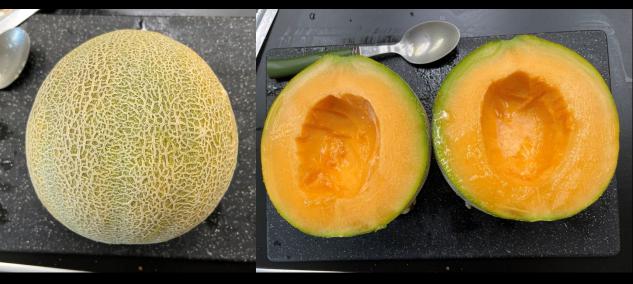
98 – 100% control including on susceptible variety.







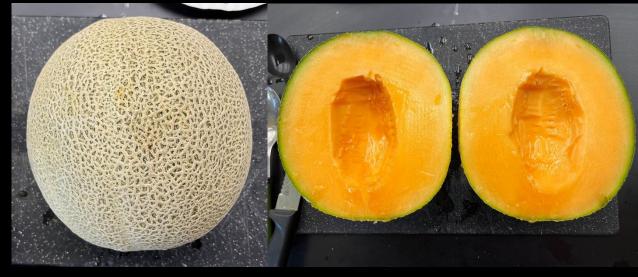
Ambrosia Trifecta



Edisto 47



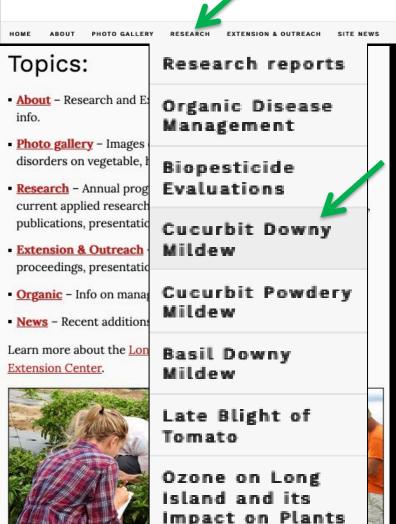
Planter's Jumbo







Vegetable Pathology – Long Island Horticultural Research & Extension Center



https://blogs.cornell.edu/livegpath/

Home > Research > Cucurbit Downy Mildew

Cucurbit Downy Mildew

This foliar disease occurs sporadically on Long Island and elsewhere in the northeast each year. Occurrence varies because the pathogen does not survive over winter in the region. Source of the pathogen is wind-dispersed spores. This oomycete pathogen exhibits host specialization. Cucumber is commonly affected every year. Downy mildew occurs more irregularly on the other cucurbit crop types. Infected leaves can be rapidly killed when fungicides are not applied to manage it, resulting in reduced yield and/or fruit quality.

Research Topics, Results and Reports

Topics on this page:

- First Observations of Cucurbit Downy Mildew in Sentinel Plots on Long Island
- Fungicide Evaluations Conventional Products
- <u>Fungicide Resistance In-Field Seedling Bioassays</u>
- <u>Fungicide Evaluations Biopesticides and other Organic Products</u>
- <u>Fungicide Evaluations Biopesticides in Programs with Conventional Fungicides</u>
- Plant Resistance Evaluations New and Experimental Varieties

Cucurbit – Downy Mildew – Integrated Management

Select downy mildew resistant varieties

Cantaloupe: Trifecta. Cucumber: Brickyard, Tokita's, Bristol, and DMR401

Check downy mildew monitoring website weekly (https://cdm.ipmpipe.org/)

Look for symptoms weekly

Apply targeted fungicides when downy mildew present or nearby

Remember: this pathogen has 2 clades. The first to appear each year infects cucumber and cantaloupe. There is some host specificity in the other clade that infects squash, pumpkin, and watermelon.

https://www.vegetables.cornell.edu/ pest-management/disease-factsheets/

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Cornell Vegetables

Resources for commercial growers



Home > Pest management > Disease factsheets and articles

Disease factsheets and articles

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Diseases and management practices affecting multiple crops

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- Reduced-tillage for Managing Phytophthora Blight and 0 Borne Pathogens
- Biofumigation for Managing Phytophthora Blight and Ot Borne Pathogens
- White Mold and Its Management in Cabbage, Beans, and Vegetables
- Diseases of Winter Greens: Downy Mildews, Powdery M Cladosporium Leaf Spot, and Root Rot
- Table: Fungicides for Cucurbit Crops

Disease-resistant varieties

- Table: Mobile Fungicides for Managing Three Major Cuc Diseases: Powdery Mildew, Downy Mildew, and Phytoph
- Weeds and Crops Susceptible to Viruses in the Northeas
- Managing Pathogens Inside Seed with Hot Water
- Treatments for Managing Bacterial Pathogens in Vegeta
- Do Rotations Matter within Disease Management Progra
- 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 Di
- Managing Diseases With Sulfur: Is There A Role For Burn Evaporators?
- Organic Management of Vegetable Diseases
- Biopesticides for Organic and Conventional Disease Mar Vegetables
- Copper Fungicides for Organic and Conventional Diseas Management in Vegetables
- Minimizing Injury from Copper Fungicides

Diseases and management Crucifers (aka brassicas and cole crops) practices affecting specific crops · Alternaria leaf spot of brassicas

Arugula

Downy mildew (LIHREC)

Powdery mildew (LIHREC)

Phytophthora blight

Tomato chlorotic spot virus (TCSV)

Common corn smut (LIHREC)

- 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) Asparagus
- Herbicide injury (LIHREC) · Cabbage chimera (genetic disorder) (LIHREC)
- Clubroot of crucifers Basil
- Clubroot on bok choi (LIHREC) Basil downy mildew · Diseases of winter greens: downy mildew, Cladosporium leaf spot, Botrytis
- Beans Downy mildew on cabbage (LIHREC)
- <u>Downy mildew on seedlings</u> (LIHREC) · Fusarium yellows of cabbage & related crops
- Bacterial brown spot · Head rot (soft rot) of broccoli (LIHREC)
- Bacterial diseases · Heat stress damage to broccoli heads (LIHREC)
- <u>Chimera (genetic disorder)</u> (LIHREC) Virus diseases of crucifers
- Ozone injury (LIHREC) Cucurbits

· Powdery mildew (LIHREC)

- Table: Mobile Fungicides for Managing Three Major Cucurbit Diseases: Powdery Mildew, Downy Mildew, and Phytophthora Blight
- · Virus diseases of snap and dry beans - Alternaria (LIHREC)
- Angular leaf spot (LIHREC) Beets and Swiss Chard
- Anthracnose Alternaria leaf spot
- Anthracnose (LIHREC)
- thomonas leaf spot) (LIHREC) Bacterial leaf spot
- LIHREC) Cercospora leaf spot
- Cercospora leaf spot (LIHREC)
- · Fusarium fruit rot of other cucurbits (LIHREC) Phoma leaf spot and root rot
 - · Gummy stem blight and black rot (LIHREC)
- Rhizoctonia crown and root rot - Ozone injury (LIHREC)
- Carrots Phytophthora blight
- Plectosporium blight (LIHREC) Leaf blight diseases Powdery mildew
- Powdery mildew (LIHREC) · Pythium fruit rot (LIHREC)
- Pythium root rot (LIHREC) Celery
- Anthracnose · Sunscald of pumpkin and winter squash (LIHREC)
- Septoria leaf spot (LIHREC) Virus diseases of cucurbits
- · White mold on cucurbits (LIHREC) Corn (sweet)
- Xanthomonas leaf spot (formerly Bacterial leaf spot) Sweet corn diseases and control measures
 - Dill
 - · Cercosporoid leaf blight (LIHREC)

Bacterial Speck Tomato









Tomato – Bacterial Speck – Fungicide Evaluation

Treatments evaluated (biopesticide); applied weekly (6/7 - 9/12):

Serifel

Timorex ACT

LifeGard applied in alternated with Cueva (copper)

Cueva (copper)

Actigard alt Badge X2 (copper) + Manzate ProStick (conv std)

What was learned:

Bacteria can move more readily than expected in greenhouse.

Dry summer weather unfavorable for bacterial speck.

Usually less speck symptoms in treated plots.

Conventional standard program was effective (67% control)



Tomato – Bacterial Speck

Management recommendations:

- Select seed that has been tested. Hot-water treated.
- Clean and sanitize in greenhouse before seeding: benches, trays.
- Rotate where tomatoes grown.
- Manage weeds around production fields.
- Clean and sanitize stakes (Greenshield; chlorox)
- Apply fungicides on a preventive schedule when conditions favorable.
- Check plants weekly to know when and where speck occurs.



https://www.vegetables.cornell.edu/ pest-management/disease-factsheets/

Cornell Vegetables

Resources for commercial growers

PEST MANAGEMENT

Home > Pest management > Disease factsheets and articles

Disease factsheets and articles

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- <u>Biofumigation for Managing Phytophthora Blight and Other Soil-Borne Pathogens</u>
- 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
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- 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

Diseases and management practices affecting specific crops

- Downy mildew (LIHREC)
- Powdery mildew (LIHREC)

Herbicide injury (LIHREC)

Basil downy mildew

- 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

- Leaf blight diseases
- Powdery mildew (LIHREC)

Celery

- Septoria leaf spot (LIHREC)

Corn (sweet)

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

Crucifers (aka brassicas and cole crops)

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- - 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 choi (LIHREC)
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Cucurbits

- Table: Fungicides for Cucurbit Crops
- Table: Mobile Fungicides for Managing Three Major Cucurbit Diseases: Powdery Mildew, Downy Mildew, and Phytophthora Blight
 - Alternaria (LIHREC) Angular leaf spot (LIHREC)
 - - Anthracnose (LIHREC)
 - Bacterial leaf spot (renamed Xanthomonas leaf spot) (LIHREC)
 - · Choanephora fruit rot (LIHREC)
 - Downy mildew
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 - Virus diseases of cucurbits White mold on cucurbits (LIHREC)
 - Xanthomonas leaf spot (formerly Bacterial leaf spot)
 - Dill

Anthracnose (LIHREC)

Managing Tomato Diseases Successfully

• Table: Fungicides for Managing Bacterial Diseases in Tomato

Bacterial canker of tomatoes

Tomatoes

- Bacterial canker of tomatoes (LIHREC)
- Bacterial speck of tomatoes
- Bacterial speck of tomatoes (LIHREC)
- Blossom-end rot (fruit disorder) (LIHREC)
- Buckeye fruit rot (LIHREC)

Chimera (genetic disorder) (LIHREC)

- Drought stress (LIHREC) Early blight (LIHREC)
- Gray mold (LIHREC)
- Late blight
- Late blight resistant tomato variety evaluations
- Leaf mold
- Ozone injury (LIHREC)
- Phytophthora blight
- Pith necrosis (LIHREC)
- Powdery mildew (LIHREC)
- Septoria leaf spot (LIHREC)
- Stemphylium (aka gray) leaf spot (LIHREC)
- Tomato brown rugose fruit virus
- Tomato chlorotic spot virus (TCSV)
- Tomato spotted wilt virus (LIHREC)
- White mold (timber rot) (LIHREC)
- Zippering (fruit disorder) (LIHREC)
- Cercosporoid leaf blight (LIHREC)

Bacterial speck of tomato

Bacterial speck is the most common disease of tomato caused by a bacterial pathogen on Long Island. Symptoms develop on leaves, fruit spurs, stems and petioles, and occasionally fruit.

Often symptoms first appear and are most common on more susceptible younger leaves, but they can appear first on older leaves. Leaf spots appear water-soaked when they are starting to develop and during rainy periods. They are dark brown to black, sometimes with a yellow halo, and typically small (up to 1/4 inch wide). But on young, developing leaves spots are often larger, irregular in shape, and cause leaves to be distorted and sometimes torn. Also as the disease progresses, spots coalesce forming large, irregular brown areas. Margins of leaves can be brown, sometimes extending down into the leaf forming a wedge of brown tissue. Severely affected leaves often turn yellow and then die.







Fruit spots are try (socially less than 118 in), dark timen, and expedical (socially removable by





Occasionally symptoms have been seen on banquiants governg in a greenhouse. This can cook wonterminated seed is pointed or their was not indequate sanitation of the greenhouse and planting.

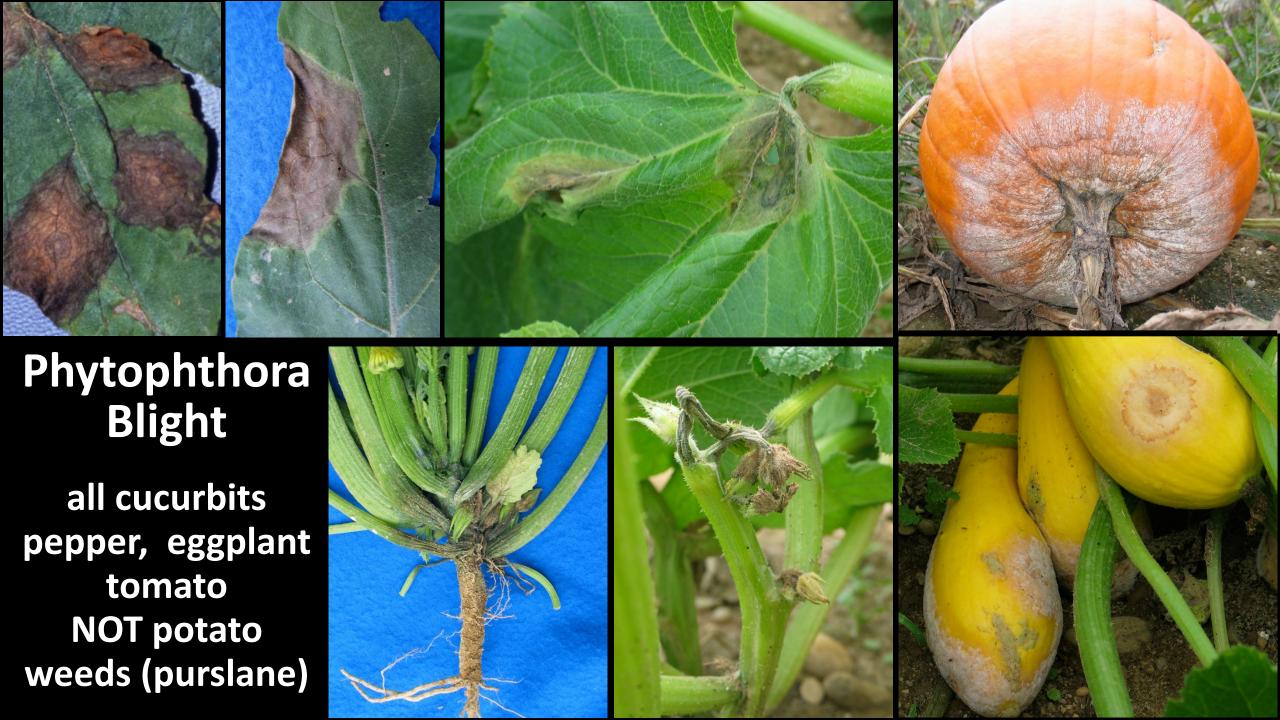


Initial sources of the pathogen include infested seed, infected transplants, wind-driven rain from affected plants in another planting nearby, and contaminated tools or hands from exposure at another planting. After bacterial speck has occurred in a field, the bacteria can survive in plant debris and seeds in the soil, on stakes used to support plants, and in weeds (especially those in the nightshade family). Bacteria can also survive on greenhouse structures and planting materials after developing on seedling. These are all potential sources of the pathogen for subsequent crops. This pathogen can become established in an area, surviving on the surface of non-host plants.

Manage bacterial speck by selecting resistant varieties. There are few currently available. See resistant variety tables. Clean and disinfect before planting including greenhouse benches and trays plus other planting materials that are being re-used. Use seed that was tested and/or treated for bacteria causing speck. When using your own seed or seed from a non-commercial source, before planting treat it with hot water following guidelines carefully to increase success and not damage seed.

Inspect transplants carefully at time of purchase: select plants with no leaf spots, but note that plants without symptoms could be infected. Rotate where tomatoes are grown so there is at least 2 years between plantings. Destroy any volunteer tomato plants. Manage weeds in the nightshade family. Use drip rather than overhead irrigation. Mulching under plants with straw or plastic minimizes the potential for any bacteria on debris to be splashed from the soil up onto the plants. Trellising will improve air movement around the plants, thereby promoting drying and reducing the time plant tissue is wet and able to be infected.

Actigard is the most effective fungicide to use in commercial plantings, but applications need to start before infection to obtain the most benefit as this is a plant activator. It can be applied starting within one week of transplanting for up to 8 weekly sequential applications until 2 weeks before start of harvest. LifeGard is a new biological activator approved for organic production that can be applied from before transplanting through harvest (0 day PHI). Other fungicides are also best used on a preventive schedule. BacStop, Double Nickel, OxiDate, Regalia, and Serenade are approved for use on organically-produced crops. There are several copper fungicides, including organic formulations. They differ in amount of metallic and biologically active copper. The conventional fungicide ManKocide also has mancozeb, which can increase copper activity. Do not use an air-blast sprayer when a bacterial disease is present as these pathogens can be easily moved in the spray as it is driven through the plant canopy to adjacent rows.





Pumpkin – Phytophthora Blight Fungicides

Program			total: \$578/A
7/10	Omega 24 fl oz/A (soil)	\$105/A	Powdery mildew less
7/15	Omega 16 fl oz/A	\$70/A	severe during August on upper leaf surface.
7/23	Presidio 4 fl oz/A	\$61/A	
7/30	Revus 8 fl oz/A	\$35/A	8/30 first symptoms;
8/6	Presidio 4 fl oz/A	\$61/A	fruit rot in untreated, non-plot areas.
8/13	Orondis Ultra 7 fl oz/A	\$57/A	
8/20	Ranman 2.75 fl oz/A	\$25/A	9/8 – 10/12 less fruit rot in
8/27	Orondis Ultra 7 fl oz/A	\$57/A	treated plots.
9/3	Ranman 2.75 fl oz/A	\$25/A	
9/9	Orondis Ultra 7 fl oz/A	\$57/A	Very little fruit rot until Oct in other
9/25	Ranman 2.75 fl oz/A	\$25/A	experiments.

Pumpkin – Phytophthora Blight Fungicides

Favorable rain events:

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16 July (0.46 in.), 18 July (2.41 in.)
22 Aug (0.15 in.), 23 Aug (1.15 in.)
6 Sep (1.1 in)
13 Sep (1.39 in.)
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30 Aug first symptoms; fruit rot in untreated, non-plot areas.



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HOME ABOUT CROPS SOIL PEST MANAGEMENT FOOD SAFETY BUSINESS

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 $\label{lower} \begin{tabular}{ll} Home > Pest management > Disease factsheets and articles > Phytophthora Blight and Its Management in Cucurbit Crops and Other Vegetables \\ \end{tabular}$

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

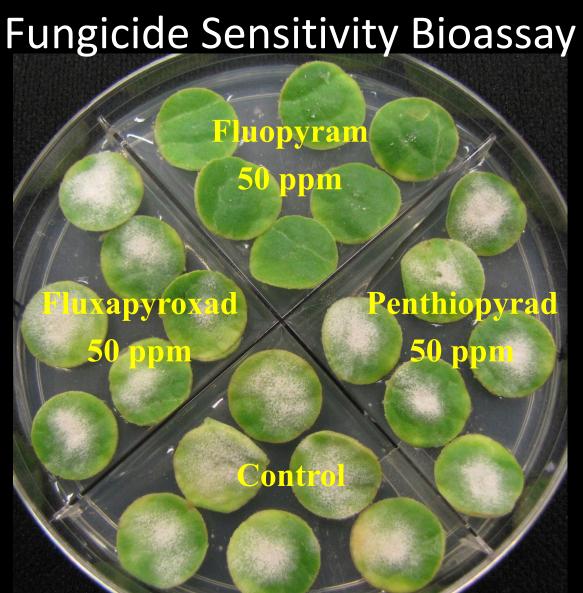


Fungicides - Cucurbit Powdery Mildew

Fungicide Group	FRAC Code	Fungicide	Active Ingredient	Registered In U.S.	Resistance In U.S.
MBC	1	Benlate	benomyl	1972	1967
DMI	ω	Bayleton	triadimefon	1984	1990
Qol	11	Quadris	azoxystrobin	1999	2002
DMI	В	multiple	multiple	2000-	
SDHI	7	Pristine	boscalid + Qol	2003	2009
Aza-naphthalene	13	Quintec	quinoxyfen	2007	2015
Phenyl-acetamide	U6	Torino	cyflufenamid	2012	2017
Aryl-phenyl-ketone	50	Vivando	metrafenone	2014	







Fungicide Resistance - Cucurbit Powdery Mildew

- MBC fungicides (FRAC 1) resistance common, single gene.
- QoI fungicides (11) resistance common, single gene.
- DMI fungicides (3) resistance partial. Also range in inherent activity: Proline and Procure most effective. Cevya least.
- SDHI fungicides (7) resistance common to Endura (Pristine, Fontelis, Merivon). partial to Aprovia Top; recommended. Also partial to Luna fungicides; not permitted used on Long Island.
- Quintec (13) resistance detected since 2015. Variable occurrence partly due to use. Efficacy can be impacted.
- Torino (U6) resistance detected since 2017. Variable occurrence partly due to use. Efficacy can be impacted.
- Vivando (50) reduced sensitivity. Prolivo efficacy inconsistent.
- Gatten (U13) ??. Inherently less effective.

Powdery Mildew Isolate Bioassays – Fungicides

Endura (7	500 ppm	(= field rate)
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Luna Privilege (7) 50, 150 ppm (field rate = 390 ppm)

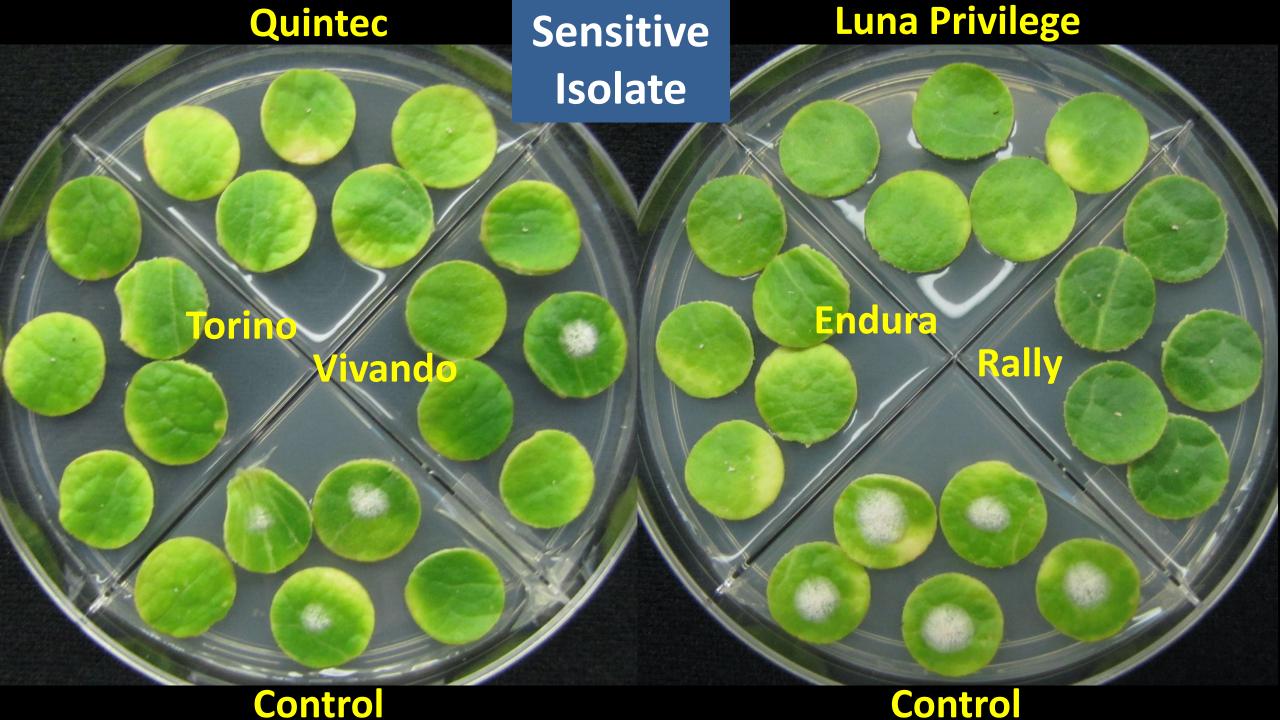
Field rate = highest label rate applied at 50 gpa.

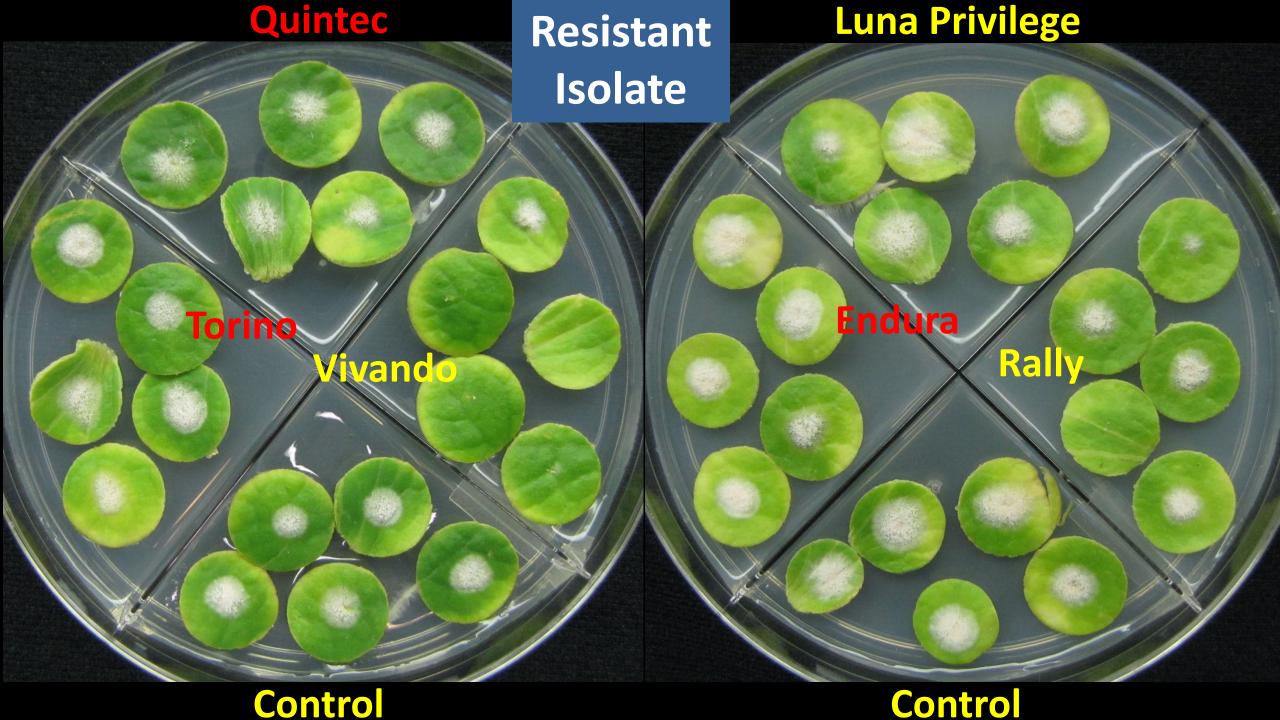
Luna Privilege used instead of Luna fungicides labeled for this use because Luna Experience and Luna Sensation have another Al.

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

Reduced Sensitivity

Resistant





Fungicide Resistance – Powdery Mildew - Eastern NY, 2021

Resistant Isolates (%)

Powdery Mildew Fungicides used	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 *	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.

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 Programs - Cucurbit Powdery Mildew

Proline, Vivando, Proline, Vivando, Procure, Vivando.

Vivando, Vivando, Aprovia Top, Vivando, Aprovia Top.

Vivando, Aprovia Top, Aprovia Top, Vivando, Aprovia Top.

FRAC: 50 3 3 + 7

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

Apply with protectant: sulfur, chlorothalonil, mineral oil, biopesticide

organic Biopesticides Cucurbit Mildews + Other Diseases

Double Nickel. Bacillus amyloliquefacinens strain D747

Taegro 2. Bacillus amyloliquefaciens strain FZB24

Serifel. Bacillus amyloliquefacinens strain MBI 600

LifeGard. Bacillus mycoides isolate J

Sonata. Bacillus pumilus strain QST 2808

Aviv. Bacillus subtilis strain IAB/BS03

Companion. Bacillus subtilis strain GB03

Serenade. Bacillus subtilis strain QST 713

LALSTOP G46 / Prestop. *Gliocladium catenulatum* J1446

Romeo. cerevisane (cell walls of Saccharomyces cerevisiae)

Howler. Pseudomonas chlororaphis strain AFS009

Carb-O-Nator. potassium bicarbonate

Kaligreen. potassium bicarbonate

MilStop. potassium bicarbonate

Regalia. extract of giant knotweed.

EcoSwing. extract of *Swinglea glutinosa*.

Problad Verde. Banda de Lupinus albus doce.

ECOWORKS. cold pressed neem oil.

Rango. cold pressed neem oil.

TerraNeem. cold pressed neem oil.

Trilogy. extract of neem oil.

Timorex Act. tea tree oil.

Thymox Control. thyme oil.

GreenFurrow BacStop. several botanical oils.

GreenFurrow EF400. several botanical oils.

Mildew Cure. several botanical oils.

Sporan EC². several botanical oils.

Sil-MATRIX. potassium silicate

OSO. polyoxin D zinc salt

PerCarb. sodium carbonate peroxyhydrate

Seican. cinnamaldehyde

Roles for Biopesticides in Disease Management

Organic production.

Good coverage important because of contact activity.

Conventional production:

In place of contact fungicides (chlorothalonil, copper) tank mixed with targeted fungicides.

Applied in place of targeted fungicides.

Preventive and late season best.

Bacterial diseases and root diseases.

Biopesticide Efficacy - Powdery Mildew - Pumpkin

% Control based on AUDPC on both leaf surfaces 2022

Fungicid	Fungicide (7-day)		Upper		Lower	
Theia (2),	Proline alt Vivando (3), Theia (2)	95	С	83	b	
Serifel (2)	Proline alt Vivando (3), Serifel (2)	93	bc	87	b	
TACT (2),	Proline alt Vivando (3), TACT (2)	91	bc	84	b	
	Proline alt Vivando (3)	68	b	83	b	
	Proline alt Vivando alt Procure (5)	99	С	90	b	

Trial conducted on powdery mildew susceptible 'Gold Challenger'.

First application 21 July before powdery mildew seen.

TACT = Timorex ACT

Values in column with same letter not statistically different. a=ineffective.











DiGenova (Susceptible Control Variety)

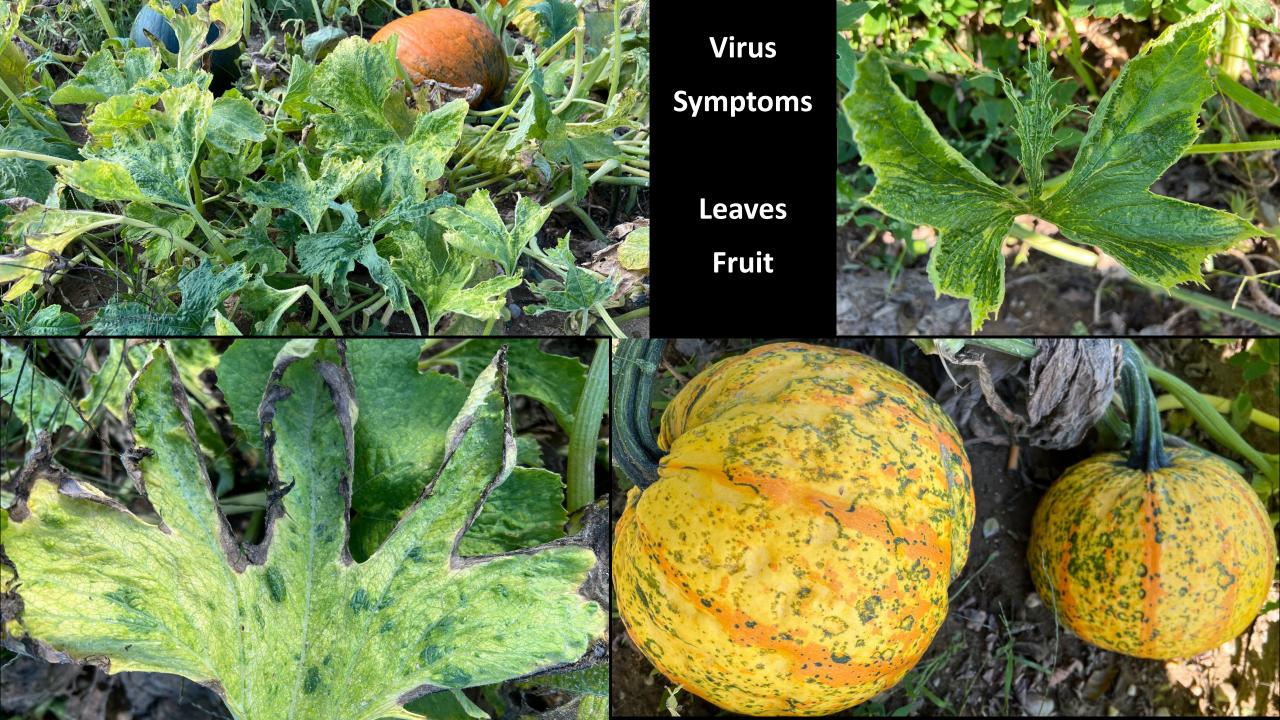












Cucurbit Virus Survey 2022

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.

