

Cucurbit Disease Management Strategies for 2014 T.A. Zitter PI Path

Diseases of Cucurbits (pumpkins, cucumbers, muskmelons, watermelons, summer and winter squash, and even gourds) can be difficult to control because they are susceptible to so many diseases that can potentially destroy an entire field. Management strategies need to include the following:

- 1.) Begin with a **resistant or tolerant Powdery Mildew (Fig 1)** variety (IR) available for squash and pumpkins and some muskmelon and **Downy mildew (Fig 7)** varieties for cucumber. See [Table 1](#) (Page 2). Since some varieties have only intermediate resistance, these can still benefit from the use of reduced fungicide sprays.

Fig 1. Powdery mildew upper & lower leaf.



- 2.) **Crop rotation** is critical for reducing the number of diseases found in cucurbits, so a minimum of 2 years, with a 3yr rotation out of all cucurbits being preferred. Diseases for which rotation is an important criterion are:

A. **Gummy Stem Blight (GSB)**/also called **Black rot (BR) (Fig.2)**.

Fig 2. Gummy stem blight (Blk rot) Pumpkin & B'nut. squash.



Foliar symptoms of GSB are rarely seen in NY on pumpkin, spaghetti squash or winter squash, but typical symptoms can appear on fruit in the field, which of course is too late to take corrective actions. BR is also a **postharvest storage problem**, especially for Butternut.

- B. **Plectosporium Blight (Fig.3)** - this disease only affects Zucchini Squash and Pumpkins, with the soilborne inoculum surviving for at least 2 years.



Fig 3. Plectosporium on Pumpkin handle & fruit; leaf bottom.

- C. **Phytophthora Blight (Fig 4)** – is the quintessential disease since it can infect multiple crops including cucurbits. In addition to rotation, water management is necessary to reduce standing water in fields (create waterways, subsoiling to remove hardpans, and use dome-shaped beds for bush-type crops).



Fig 4. Phytophthora blight on pumpkin fruit.

- 3.) Always **purchase seed from a reputable seed company**. **Scab (Fig 5L, fungal)** or **Angular Leaf Spot (Fig 5R, bacterial)** does not occur on a regular basis which suggests that seed may introduced the pathogen into the greenhouse or field.



Fig 5L. Scab/pumpkin; Fig 5R. Angular leaf spot/zucchini.

- 4.) If you choose to spray, then spray preventatively as determined by scouting for PM or following **DM (Fig 6)** tracking maps: <http://cdm.ipmpipe.org/scripts/map.php> (which monitors airborne spores of DM from Michigan, Ontario, Pennsylvania or New Jersey)



Fig 6. DM lesions on top, sporulation bottom; Upright curling of

- 5.) Page 3 provides **fungicides** for conventional, organic and home garden use. For commercial, select fungicides to be used for the entire season from those with different Modes of Action (MOA). Follow the label to avoid making sequential applications before alternating MOA. (Prepared NOV 2013 by T.A. Zitter, Dept. Plant Path. Ithaca, NY). Additional Cucurbit Disease Resource at:

<http://vegetablemdonline.ppath.cornell.edu/DiagnosticKeys/CucKey.html>



2014 Powdery mildew resistant (IR or 2X)¹ Pumpkins

Table 1. Powdery Mildew (PMR)¹

Pumpkins – Large (25-45 + Lbs)	Pumpkins – Sm (2-7+ Lbs) / Pie	Pumpkins - Specialty
Aladdin ^{H, IR, FI (25-30lbs)}	Cannon Ball ^{H, IR, FI (5lbs)}	Bumpkin ^{H, IR, FI (6-8oz)}
Apogee ^{OS, IR, FI (40-60lbs)}	Darling ^{AC, IR, FI (6-8lbs)}	Casperita ^{J IR WMV (8oz-1lb) White}
Apollo ^{H, IR, FI (18-30lbs)}	Field Trip ^{H, IR, FI (5-7lbs)}	Gold Dust ^{R, S, IR, Sem-Bh, FI (2oz)}
Captain Jack ^{R, IR, FI (30+lbs)}	Gargoyle ^{H, IR, FI (3-5lbs)}	Half Pint ^{S, IR, FI (1-2lbs)}
Conestoga Giant ^{S, IR, FI 22-40lbs)}	Iron Man ^{H, IR, Phyt, FI (3-4lbs)}	One Too Many ^{R, IR (20lbs)}
Cronus ^{H, IR, FI (25-50lbs)}	Jack Sprat ^{S, IR, Restricted, FI (3lbs)}	Silver Moon ^{H, IR, ZYMV (10-15lbs) White}
Denali ^{OS, IR, FI (40-60lbs)}	Little Giant ^{H, IR, FI (2-4lbs)}	WeeeeeOne ^{R, IR (8oz)}
Dynasty ^{OS, IR, FI (40-60lbs)}	Mischief ^{H, IR, FI (2-4lbs)}	
Everest ^{OS, 2X, FI (35-45lbs)}	Mystic Plus ^{H, IR, FI (7-8lbs)}	
Gemini ^{OS, 2X, FI (30-40lbs)}	Prankster ^{H, R, IR (3lbs)}	
Spartan ^{SWy, IR, FI (25-30lbs)}	Rockafellow ^{S, IR, Semi-Bush, FI (2-3lbs)}	
Summit ^{OS, 2X, FI (30-40lbs)}	Touch of Autumn ^{R, S, IR, Semi-Bush (2-3lbs)}	
Super Herc ^{H, IR, FI (30-40lbs)}		
Pumpkins – Medium (10-30lbs)		
20 Karat Gold ^{R, IR, Semi-bush (18-22lbs)}		
Charisma ^{J, IR, FI (14-18lbs)}		
Corvette ^{IR, FI, WMV, ZYMV (12-15lbs)}		
Cougar ^{IR, FI (10-12lbs)}		
Early King ^{AC, IR, FI, (22-28lbs)}		
Gladiator ^{H, X2, FI (20-25lbs)}		
Magic Lantern ^{H, IR, BWS (16-24lbs)}		
Magic Wand ^{H, IR, FI (15-25lbs)}		
Magician ^{H, X2, IR ZYMV (10-16lbs)}		
Pegasus ^{OS, 2X, FI (20-25lbs)}		
Orange Rave ^{SWy, IR, FI (15-20lbs)}		
Racer Plus ^{J, IR, FI, Semi-Bush (14-18lbs)}		
Rival ^{J, IR, FI (15-20lbs)}		

¹IR= Intermediate resistance, has PMR resistance from 1 parent; X2 – has PM resistance from both parents; Phyt = Phytophthora tolerant; BWS = Bac. Wilt sus.; H = Harris or HMoran, J = Johnny's, R = Rupp, S = Siegers, SWy = Seedway and others.

Summer and Winter Squash (Resistance for PM and Viruses) see:

<http://vegetablemdonline.ppath.cornell.edu/NewsArticles/NewsList.htm> under Cucurbits Heading

Downy Mildew Resistant Cucumber hybrids (Rupp, Seedway, Siegers, Stokes)

SV3462CS – vigorous, Uniform Dk. Gr., High Res. for Scab, Ang LS, Anth; IR for DM and PM

Sv4719CS – Mod. Vigorous, Uniform Dk. Gr., HR for Scab, Ang LS, Anth; IR for DM and PM

Numbers used before or after the Product (registered NYS) refer to fungicides with different MOA, followed by preharvest interval. [^{FRAC No. ie 40} Product^{4PHI}], Ratings for efficacy are: (+++=Exc); (+=Good); (+=Fair); See: <http://vegetablemdonline.ppath.cornell.edu> (NOV 2013) (Prepared by T. A. Zitter, Department of Plant Pathology, Ithaca, NY)

Note on Fungicides (Conventional, **Organic**, and **Home** = Garden) are for all cucurbits unless noted. **Systemic** fungicides are in **Bold**, and **protectants** include: *chlorothanil, sulfur, mancozeb, copper*, or combination sold as ManKocide (*mancozeb + cu hydroxide*).

A.) Powdery Mildew (PM) - occurs every year, so use a tolerant variety if available for squash or pumpkins. Beginning when lesions are 1st detected inside the canopy on lower leaves (top or bottom).

- ¹³Quintec³ (*quinoxifen*) (+++) (not registered on cucumber or summer squash); begin usage early in the PM cycle then alternate with one of the following:
- ^{U6}Torino⁰ (cyflufenamid) (+++) (for ALL) (2X/sea.)
 - ^{M2}Sulfur⁰ (++) (good protectant, alone or tank-mixed with Quintec); **Organic** = Kumulus or OLP (++)
 - ³Procure⁰ (*triflumizole*) at Hi rate 8 oz + ^{M5}Bravo⁰ (or OLP) (+++) or ³Rally⁰ (*myclobutanil*) at Hi rate 5 oz + ^{M5}Bravo⁰ (or OLP) (++) (NOTE: both Procure and Rally are in the same fungicide group, choose 1(1st is preferred)
 - Also consider ¹¹⁺⁷Pristine⁰ (*pyraclostrobin + boscalid*) (++) , ³⁺⁹Inspire Super⁷ (+) (*difenoconazole + cyprodinil*), or ⁹⁺¹²Switch¹ (+)
 - Protectants & **Organic** = ^{NA}JMS Stylet⁰, ^{M1} (++) coppers⁰ like Champ WG (+), ^{NA}M-Pede⁰ (+); ^MMilStop⁰ (+) or OLP; **Home** = Bonide Fung-onil (+), Bonide Copper (+), Trilogy XL (+), or OLP

Note on PM: The strobilurin (Group 11) fungicides are not listed due to fungicide resistance for PM, and include Cabrio, Flint, Quadris, Quadris Opti, Sovran, Tanos, etc.

B.) Gummy Stem Blight (GSB)/also called Black rot - occurs most seasons when moisture is adequate after fruit set (end of July or beginning of Aug), and if rotation of less than 2 years is practiced. GSB sprays should include:

- ^{M3}Penncozeb⁵ (+) (or OLP) or ^{M5}Bravo WS⁰ (++) (or OLP)
- ³⁺⁹Inspire Super⁷ (++) or ⁹⁺¹²Switch¹ (++)
- Protectants & **Organic** = ^{M1} coppers⁰ like Champ WG (+); **Home** = Bonide Fung-onil (++) , Bonide Copper (+).

Note on GSB: The strobilurin (Group 11) fungicides are not listed due to fungicide resistance for GSB, and include Cabrio, Flint, Quadris, Quadris Opti, Sovran, and Pristine. Also ^{1+Prot.}Topsin M¹ (or OLP) are no longer effective for GSB.

C.) Plectosporium - if disease has been previously found in Zucchini Squash or Pumpkins, and less than 2 year rotation is practiced, and if

July-August rains occur (wet soils) then sprays (for above crops only) should include:

- ^{M5}Bravo Ultrex⁰ 2ec (++)
- ³⁺⁹Inspire Super⁷ (Plectosporium) (++)
- ¹¹Quadris¹ (++) , ¹¹⁺³Quadris Top¹ (++) , ¹¹Cabrio⁰ (++) , ¹¹Flint⁰ (++) (but don't rely on sprays of GRP 11 for PM or GSB control)

Note on Plectosporium: Rare for **Organic** or **Home** production.

D.) Phytophthora (P) and Downy Mildew (DM) – if P has previously occurred on your farm, you must utilize disease management practices (see over). **IF DM** is reported on tracking maps : <http://cdm.ipmpipe.org/scripts/map.php> (which monitors airborne spores of DM from Michigan, Ontario, Pennsylvania or New Jersey), **Then** all cucumbers require protection.

Top 5 DM/P choices used “preventatively” (all ++)

- ^{*22+M3}Gavel 50WG⁵ (*zoxamide + mancozeb*) (not Pumpkin or W. Squash) (DM, P)
- ^{*43}Presidio² (*fluopicolide*) (DM, P) + must use protectant
- ^{*28}Previcur Flex² (*propamocarb*) (DM) + protect.
- ²¹Ranman 400SC⁰ (*cyazofamid*) (DM, P) + protect.
- ¹¹⁺²⁷Tanos 50WG³ (*famoxadone + cymoxanil*) (DM, P suppression) + protectant

Top 4 DM choices used “after disease is already present”; **The same four fungicides listed above less Gavel 50WG** (all ++).

Note on Phytophthora blight: Disease is rare for **Organic** or **Home**, but DM can occur in both. **Organics** = ^{M1} coppers⁰ like Champ WG; **Home** = Bonide Fung-onil, Bonide CU. (all are +)

E.) If SCAB occurs: ^{M5}Bravo WS⁰ or OLP (++) ; ^{M1}fixed coppers⁰ (+, per label) ^{M3+M1}ManKocide⁵ , ^{M3}mancozeb⁵ (all +); ^{4+M5}Ridomil Gold Bravo⁰ (++) ; **Organic** = Basic CU 53 or OLP; **Home** = Bonide Cu

F.) Angular leaf spot bacterial (ALS) = (all +), ^{M3+M1}ManKocide⁵, all coppers; **Organic** = all OMRI coppers; **Home** = Bonide CU or OLP.

See: <http://vegetablemdonline.ppath.cornell.edu/NewsArticles/Cuc-OverviewRoster.pdf> for complete roster and OLPs.

Key: MOA= Modes of Action; OLP= other labeled product and/or formulations are available; ^M = multi-site activity and mixing partner to reduce risk of developing fungicide resistance; NA= not assigned; * = Restricted to use by registered applicators; † = Not for use on Long Island