CUCURBIT FUNGICIDES (Labeled & Rates/A) as of JULY 2014
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Underlined are Registered in NYS for Agricultural Use; Group Nos. appear before the Trade Name and are from the Fungicide Resistance Action Committee and EPA, and last no. = Days to harvest ex. [FRAC no.:4 DTH] (ALL means for all cucurbits unless noted otherwise; (Fungicide Resistance* concerns are given in RED italics) (Important comments also in red); Strobilurins are no longer effective for *PM*, because of widespread resistance, and should not be relied upon for *DM* or *GSB*. Systemic fungicides are in BOLD. OMRI listed products are indicated and are also registered in NYS.

Major fungicide groups have been color coded to aid in finding products and are categorized by MOA (mode of action): *Phosphorous acids* = Blue; *Strobilurins* or Group 11 (translaminar) = violet; *chlorothalonils* = black; *coppers* = green; and *sulfurs* = orange. Fungicide usage for soil application or foliar or greenhouse use.

Alphabetical Fungicide List for Cucurbits

- **Acrobate 50WP** *(dimethomorph) See Forum*
- **Bio Actinovate AG** *(OMRI)* and **Bio Actino-Iron** *(OMRI)* (EPA 73314-1), REI 1 hr or till dry as foliar application *(Streptomyces lydicus WYEC 108, biological)* (Natural Industries) (ALL) AG as Soil drench at planting, seedling or transplanting for *Fusarium, Rhizoctonia, Pythium, Phytophthora*, 3-12 oz/A in sufficient water; Foliar treatment for PM, Downy mildew, *Botrytis, Alternaria*, 3-12 oz/20-150 gal/A. 0 DTH. SP as Greenhouse drench 4-6 oz in 100 gal water (smaller quantities use at rate of 1 gal per cubic foot of growing media, saturated soil w/o runoff) or 1 tsp./2 gallons water for smaller treatments; SP as Greenhouse foliar, 6-12 oz in 50-100 gal water and applied to foliage. 0 DTH.
- **Bio Actino-Iron** *(OMRI)* Biological Fungicide (EPA 73314-2), REI 4 hrs. *(Streptomyces lydicus WYEC 108, biological)* (Natural Industries) (ALL); for *Fusarium, Rhizoctonia, Pythium, Phytophthora* in Greenhouse potting mix at rate of 5 lbs/cubic yard; In-furrow application. 10-15 lbs/A; also used as a side-dress followed by watering in. 0 DTH.
- **Agri-Fos** *(EPA 71962-1) REI 4 hrs *(phosphorous acid) (Liquid Fertilizer) (ALL) Phytophthora root and fruit rot, 1-3 qts/100gal; DM, 1 1/4-2 qts combined with mancozeb/A. 0 DTH.
- **Aliette 80% WDG** *(EPA 264-516) REI 12 hrs *(fosetyl-Al) (limit 7 applications) (Bayer) (ALL) DM, Phytoph Root and Fruit Rot 2-5 lb. *(Do not mix with copper); 12 hrs DTH.*
- **Armicarb** *(EPA 5905-541-AA) REI 4 hrs *(potassium bicarbonate) (Church & Dwight, Helena); (C. M, WM, SS, P, Acorn squash), primarily for PM (several species), but also for An, Alt, DM 2.5-5 lbs/A. 0 DTH. *(Also for greenhouse use).*
- **Armicarb** *(OMRI)*, Ecomate *(EPA 5905-541) REI 4 hrs *(potassium bicarbonate, 85%) (Helena) (ALL see above). 0 DTH. *(may be used in GH).*
- **Badge SC** *(EPA 80289-3) REI 48 hrs *(copper oxychloride + copper hydroxide, 20% metallic equiv. w/w) (Isagro) (ALL) 1-2.5 pts. /A for Alt LS, Angular LS, anthracnose, DM, GSB, PM. 0 DTH. *(Greenhouse and shadehouse use) for crops on label; ie. for cucumber Ang LS and DM, 1-2.5 TBS/1000 sq ft.)*
- **Badge X** *(OMRI)* DF (EPA 80289-12) REI 48hrs. *(copper oxychloride + copper hydroxide, 28% metallic equiv. w/w) (Isagro) (ALL) multiple diseases, 0.5-1.25 lbs/A, limit to 5.25lb/A. 0 DTH *(Greenhouse and shadehouse use) for crops on label; ie. for cucumber Ang LS and DM, 0.5-0.8 TBS/1000 sq ft.)*
- **Basic Copper** *(OMRI)* (EPA 45002-8), REI 24 hrs *(basic copper sulfate, 53% metallic equiv.) (Albaugh) (ALL) Ang LS, Alt LS, Anth, DM, PM, GSB, *Scab* 2 lb/A. 0 DTH.
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- **M1 Basic Copper Sulfate** (EPA 46923-9) REI 24 hrs (*basic copper sulfate, 53% metallic equiv.*) (Old Bridge) (ALL) Ang LS, Anth, Alternaria LS, Bac. wilt (does nothing), DM, PM, GSB, Scab, 2 lbs/A. 0 DTH.
- **Bio-Tam** (EPA 80289-9-69592) (AgraQuest/Isagro) (ALL) BIO-TAM is a biofungicide containing naturally occurring and selected strains of antagonistic fungi, *Trichoderma asperellum* strain ICC 012 and *Trichoderma gamsii* strain ICC 080. For soil application in assorted ways. See label for details. 0 DTH.
- **M5 Bravo Weather Stik 6SC** (EPA 50534-188-100) REI 12 hrs (*chlorothalonil*) (limit 21 pts.) (Syngenta) (ALL) *Plecostorium 2ec* for Ultrex, AN, DM; 1 ½-2 pts; GSB, Alternaria L. B., Scab, PM 2-3 pts. 0 DTH. (Not for greenhouse-grown crops).
- **M5 Bravo Ultrex 82.5 WDG** (EPA 50534-201-100) REI 12 hrs (*chlorothalonil*) (limit 19.1 lbs.) (Syngenta); (ALL) *Plecostorium 2ec* AN, DM 1.4-1.8 lbs/A; GSB, Alternaria L. B., Scab, PM 1.8-2.7 lb. 0 DTH (Not for greenhouse-grown crops). See also Bravo ZN
- **Cabrio EG** (EPA 7969-187 REI ‘12 hrs (pyraclostrobin) (limit 64 oz) (BASF) (No aerial application in NYS) (ALL) *DM* 8-12 oz; Alternaria L. B., AN, *GSB*, *Plecostorium*, *PM* 12-16 oz; *Because of resistance to *PM* in NY, do not use QoI fungicides specifically for *PM* control; *Do not use for *GSB* control if resistance to QoI exists; For *DM* resistance concerns choose an alternative product listed for DM control* Do not make more than 1 application before alternate to a labeled fungicide with diff. MOA and limit to 4 applications per season. 0 DTH. (Not for greenhouse use or in transplant production).
- **M1 Camelot** (EPA 67702-2-67690) REI 4 hrs. (10% octanoic acid, copper salt) (W. Neudorff) 0 DTH.
- **M5 33 Catamaran** (EPA 42519-31) REI 12h (*chlorothalonil, 16.7% + potassium phosphite, 38.9%*) (limit 50 pts.) (Luxembourg-Pamol) ALL, Anth, DM, Target spot in south, 4 pts/A; Cercospora leaf spot (south), Gummy Stem blight, Alternaria LS, Scab, 6 pts/A. 0 DTH.
- **Bio Cease** (EPA 69592-19-68539), REI 4h, (B. subtilis, biological) (Bayer/BioWorks); (ALL), ALS, Anth, DM, GSB, PM, 3-6 qts/A. 0 DTH.
- **M1 Champ Formula 2F** (EPA 55146-64) *Champ WG*, REI 24 hrs. (*copper hydroxide* 37.5%, or 24.4 % metallic equiv.) (Nufarm) (ALL) Alt LS, Ang LS, Anth, DM, PM, GSB, 1 1/3 pt. 0 DTH (for greenhouse crops as listed) ex. Cucumber Ang LS and DM, 1.25-1.5 lbs/1000 sq ft).
- **M5 Chlorothalonil 720 SC** (EPA 66330-362) REI 12 hrs (*54% chlorothalonil*) (limit 21 pts.) (Arysta) (ALL), Anth, DM, 1 ½ -2 pts/A; GSB, Alt LB, Alt. LS, Scab, PM 2-3 pts/A. 0 DTH. (Note on spraying mature watermelons).
- **M1 C-O-C-S WDG** (EPA 34704-326) REI 48 hrs. (*74.8% copper oxychloride + 14.2% basic copper sulfate, 50% metallic equiv.*) (Loveland). (ALL), DM, Leaf spots, Anthracnose, 2-4 lbs/A. 0 DTH. (limit of 10.2 lbs/A)
- **Bio Contans WG** (EPA 72444-1), REI 4 hrs (*Coniothyrium mimitans*, biological) (Sylvan Bioproduchts/Prophyta); (ALL) WM in agricultural and greenhouse soils, 1-4 lbs/A or 0.75-1.5 oz per 1000 sq ft. 0 DTH.
- **M1 Cueva** (EPA 67702-7-0051) REI 4 hrs. (10% copper octanoate) (Neudorff/Certis) (ALL) multiple diseases on generic label, 0.5-2 gal/100 gal. 0 DTH. (limit of 1750 gal diluted spray per year)
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- **Cuprofix Ultra 40 Disperss** (EPA 70506-201) REI 48 hrs (40% equiv. basic copper sulfate 71.1%) (UPI) (ALL) Alt l. s., Ang. L. s. AN, DM, GSB, PM, 1.25-2 lbs/A. (may also be used on plants grown in a greenhouse or shadehouse) (limit of 13 lbs/A/yr). 0 DTH.

- **Curzate 60DF** Must Tank-Mix 50% (EPA 352-592) REI 12 hrs (cyloxanil) (limit 30 oz) (locally systemic) (DuPont) + protectant; DM (3.2 oz) + mancozeb or chlorothalonil = (ALL crops); 3 or 5 DTH as determined by mixing protectant chosen.

- **Decree 50WDG** (EPA 66330-35) REI 12 hrs (fenhexamid) (Arysta/SePro); For Cucumber only on transplants and greenhouse production. Botrytis Gray mold; standalone (1.5 lbs/A) or tank mixed with product approved for gray mold (1-1.5lb/A); (For greenhouse crops or transplant production; Do not apply in the field; do not make more than 2 consecutive sprays). 0 DTH.

- **Dithane M-45** (EPA 62719-387) The most complete vegetable label w/o the need for supplemental labels; REI 24 hrs (80% mancozeb) (limit 24 lbs.) (Dow) (ALL) for Altern LS, Anth, DM, GSB, Plectosporium, Scab at 2-3 lbs. 5 DTH.

- **Dithane F-45 Rainshied** (EPA 62719-396) REI 24 hrs (75% mancozeb) (limit 19.2 qtrs.) (Dow); (ALL) Anth, Alternaria L. B., DM, GSB, Scab 2-3 lb. 5 DTH. Also Dithane DF Rainshied (EPA 62719-402)

- **Double Nickel 55 WDG 0, OMRI** (EPA 70051-108) REI 4 hrs (Bacillus amyloliquefaciens strain D 747) (Certis) (ALL) Foliar Application: for Powder mildew (Erisiphe and Sphaerotheca spp.) Downy mildew (Pseudoperonospora spp.) Gummy stem blight (Didymella bryoniae and Phoma cucurbitacearum), apply as a spray at a rate of 0.25 to 3 pounds per acre in sufficient water to achieve thorough coverage; Soil application: for Vine decline (Monosporascus cannonballus) Charcoal rot (Macrophomina phaseoli) “Damping off,” seedling blights, and root or crown diseases caused by Pythium, Rhizoctonia, Fusarium, Phytophthora, or Verticillium spp. (suppression only), apply Double Nickel 55 at 0.125 to 1 pound per acre (see label for full explanation). 0 DTH. Double Nickel LC 0, OMRI (EPA 70051-107) is also registered on (ALL).

- **Echo 720** (EPA 60063-7) REI 12 hrs (54% chlorothalonil) (limit 15.75 lbs. ai) (Sipcam). (ALL) Ant, DM, 1 1/2 - 2 pts; GSB, Alt l. b., Scab, PM, 2-3 pts. 0 DTH (OLF Echo 90DF) (Do not use on greenhouse-grown crops)

- **Endura** (EPA 7969-197) REI 12h (boscalid) (limit 26 oz, 4 applic.) (BASF) (ALL) Alt LB, GSB, resistance for PM. 0 DTH.

- **Equus 720 SST** (EPA 66222-154) REI 12 hrs (54% chlorothalonil) (limit 21 pts.) (MAMA); (ALL) Ant, DM, 1.5-2 pts; GSB, Alt 1b, Scab, PM, 2-3 pt. 0 DTH. (OLF are Equus 500 ZN and Equus DF) (Do not use on greenhouse-grown food crops; do not apply more than 21 pts per season).

- **Flint 50WG** (EPA 264-777) REI 12 hrs (trifloxystrobin) (limit 16 oz) (Bayer) (No aerial application in NYS); PM 1.5-2 oz (ALL); DM* suppression 4 oz; Plectosporium 2ee 2 oz. *Because of resistance to PM* in NY, do not use QoI fungicides specifically for PM control. For DM* resistance concerns, choose an alternative product listed for DM control. 0 DTH. (Not for greenhouse use).

- **Fontelis** (EPA 352-834) REI 12hrs. (penthiopyrad) (Limit to 67 fl oz/season) (DuPont) ALL, Altern LS, Gray mold, GSB, PM at 12-16 fl oz.; Sclerotinia stem rot, 16 fl oz.. Do not make more than 2 sequential applications of product before rotating to a fungicide with a different MOA. In the case of GSB, Tank Mix Fontelis with 1.5 lbs ai of chlorothalonil. 1 DTH.
 Forum 4.18 SC (EPA 241-427) REI 12 hrs (43.1% dimethomorph), (limit to 30 fl oz) replaces Acrobat 50WP (BASF) (ALL as determined by protectant) (Must be tanked mixed with protectant; do not make more than 2 sequential applications before alternating with another material for specific control of DM or Phytophthora for at least one application; Do not make more than 5 applications per season) DM, 6 fl oz/A; Phytophthora blight and crown rot, 6 oz/A. 0 DTH. (Not for greenhouse crops or transplant production).

 Fosphite (EPA 68573-2) REI 4 hrs (53% mono- and di-potassium salts of phosphorous acid) (JH Biotech) Phythophyrm, DM, 1-3 qts/min. 20 gal/A, Do not use at intervals of less than 3 days; Do not apply Fosphite foliarily to plants treated with copper at less than 20 day interval. 0 DTH

 Fungi-Phite (EPA 83472-1) REI 4 hrs (45.5% mono- and di-potassium slats of phosphorous acid) (Plant Protectant) (ALL) Phytophthora and Pythium, DM, 1-2 qts in a minimum of 30 gal water. 0 DTH.

 Gavel 75DF (EPA 10163-6414) REI 48 hrs (zoxamide 8.3% and mancozeb 66.7%) (limit 16 lbs.) (Gowan) (ALL) Alternaria, DM, Phytophthora Fruit and Stem rot 2ee; 1.5-2 lb. 5 DTH. (Use preventatively for DM control); (Not for greenhouse crops or transplant production).

 Incognito 85 WDG (EPA 66222-145) REI 24 hrs. (thiophanate-methyl) (limit 2.5 lbs.) (MANA) (C, M, P, WS, SS) Anth, GSB, Res, PM, Belly rots) 1 DTH.

 Initiate 72O (EPA 34704-881) REI 12 hrs, (chlorothalonil, 54%) (limit 21 pts.) (Loveland) (ALL); Anth, DM, Target Spot, 1 1/2 – 2 pts; GSB, Alternaria leaf blight, Scab, Powdery mildew, 2-3 pts/A. 0 DTH. Also M Initiate ZN 0.

 Inspire Super (EPA 100-1317) REI 12hrs (8.4% difenoconazole + 24.1% cyprodinil) (limit 80 fl oz) (Vanguard) (Syngenta) (ALL) (ground application only); Multiple diseases including PM, Alt. leaf blight, and leaf spot, Anthracnose, Gummy stem blight, Septoria leaf blight, Plectosporium blight, 16-20 fl oz/A (No more than 2 sequential applications before alternating to another fungicide with a different MOA. 7 DTH.

 JMS Stylet-Oil (OMRI) (EPA 65564-1) REI 4 hr, (paraffinic oil, Not classified) (JMS Flower Farms) (ALL) Alternaria blight, PM, GDB, mites, whiteflies, 3-6 qts/A. 0 DTH (may be used in GH; see label for compatibility information)

 Kaligreen (OMRI) (EPA 11581-2), REI 4 hrs (potassium bicarbonate 82%) (Toagosei); PM for ALL cucurbitis 2 1/2 -5 lbs/A. 1 DTH. (May be used in GH).

 Kentan DF (EPA 80289-2) REI 48 hr, (copper hydroxide 61.3% = 40% metallic cu) (Isagro); (ALL), Ang LS, Alt LS, Anth, DM, GSP, PM, 1-2.62 lbs (limit of 5.25 lbs). 0 DTH. May be used for greenhouse crops on label.

 Kphite7LP (EPA 68573-2) REI 4 hrs. (53% Mono & di-potassium salts of phosphorous acid) (Plant Food Systems); (ALL) Generic label for Phytophthora and Pythium and DM, 1-3 qts in 20 gal water. 0 DTH.

 Kocide 3000 (EPA 352-662), REI 48 hrs. (copper hydroxide 46.1% = 30% metallic equiv.) (DuPont); (ALL) Alt LS, Ang LS, Anth, DM, GSB, PM, 0.5-1.25 lb. 0 DTH. (Limit to 17.5 lbs): May be used for greenhouse crops i.e. cucumber and others on label; 1 level TBS per 1000 sq. ft. is equivalent to 0.5 lbs per A). See also Kocide 101 and Kocide 2000.
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- **M2** Kumulus De⁰, OMRI (EPA 51036-352), REI 24 hrs. (80% sulfur) (Arysta). (C, M, S) Rates vary by cucurbit. 0 DTH.
- **7+3** Luna Experience⁷ (EPA 264-1091) REI 12hrs. (fluopyram + tebuconazole) (Limit to 34 fl oz/season) (Bayer); currently only on watermelon, 6-17 fl oz PM, 8-17 fl oz Altern LS, suppression of GSB, Belly rot and Anthracnose at 17 fl oz. Do not make more than 2 sequential applications of this and other Gr. 7 or 3 containing fungicides before rotating to a fungicide with a different MOA. 7 DTH.
- **7** Luna Privilege⁰ used as spray (EPA 264-1078) REI 12hrs. (fluopyram) (Limit to 13.7 fl oz/season) (Bayer); currently only registered on watermelon, 2.4-6.84 fl oz PM; 6.84 fl oz for GSB, Gray mold, Altern.LS. Do not make more than 2 sequential applications of this or other Gr. 7 containing fungicides before rotating to a fungicide with a different MOA. 0 DTH.
- **7+11** Luna Sensation⁰ used as spray (EPA 264-1090) REI 12hrs. (fluopyram + trifloxystrobin) (Limit to 27.1 fl oz/season or 4 applications/season) (Bayer); currently only for watermelon, PM, 4-7.6 fl oz; Botrytis Gray mold, Alternaria LS, Anthracnose, 7.6 fl oz. Do not make more than 2 sequential applications of this or other Gr. 7 or 11 containing fungicides before rotating to a fungicide with a different MOA. 0 DTH.

- **M** M-Pede⁰, OMRI Insecticide & Miticide (EPA 10163-324) REI 12 hrs (49% potassium salts of fatty acids) (Gowan); (ALL) Insects and PM, Greenhouse and field; (avoid close contact with sulfur) 0 DTH.
- **M3+M1** ManKocide³ (EPA 352-690) REI 48 hrs (mancozeb + copper hydroxide, metallic copper equiv. 30%) (limit 24 lbs.) (DuPont) (C, M, WM, Sm Squ) Ang LS, DM, GSB, Anth, PM, varies 2-3 lbs/A. 5 DTH.
- **M3** Manzate Pro-Stick³ (EPA 70506-234) REI 24 hrs (75% DG, mancozeb) (limit 24 lbs.) (UPI); (ALL), Anth, Alt LS, DM, GSB, Scab, 2-3 lbs/A. 5 DTH. (Not for Gr. Hs. Use).
- **M1** Mastercop⁰ (EPA 55272-18-66222) REI 48 hrs. (copper sulfate pentahydrate, 21.5%) (limit 7 pts.) (MANA) (ALL) Alt LS, Ang. LS, Anth. DM, GSB, PM. 0 DTH.
- **Bio** MeloCon WG (EPA 72444-2) REI 4 hrs. (Paecilomyces lilacinus strain 251) (Prophyta) For control of plant-parasitic nematodes in the soil, as soil application before planting or transplanting, to transplants, or to soil after planting. 0 DTH.
- **M2** Microfine Sulfur⁰ Not labeled for cucurbits due to injury.
- **M2** Microthiol Dispers⁰, OMRI (EPA 70506-187) REI 24 hrs. (80% sulfur) (UPI); (C, M, P, Sm Wn Squash), PM 5-10 lbs; for use in alternating weeks following other effective sprays for PM control; do not use if temperature will exceed 90 F within 3 days following the spray. 0 DTH.
- **M2** Micro Sulf⁰, OMRI (EPA 55146-75) REI 24 hrs. (sulfur) (Nufarm) C = 2-4 lbs (limit to 2 lbs if temps exceed 95 F; Sq = 5-10lb, avoid use on sulfur sensitive varieties. 0 DTH.
- **M** MilStop⁰, OMRI (EPA 70870-1-68539) REI 1 hrs (potassium bicarbonate), (BioWorks); (ALL), 2.5-5 lbs/100 gal. 0 DTH. (May be used in Gr. Hs.)
- **Bio** Mycostop⁰, OMRI (EPA 64137-5) REI 4 hrs (Streptomyces griseoviridis, biological) (Verdera Oy) (ALL) Product may be used in a variety of application methods per label; for a variety of root pathogens. 0 DTH. Also Bio Mycostop Mix⁰.
- **M1** Nordox75WG⁰, OMRI (EPA 48142-4) REI 12 hrs. (cuprous oxide) (limit not given) (Nordox) Alt LS, Ang. LS, Anth, DM, GSB, PM, 1-1 ¼ lbs. /A. 0 DTH.
Greenhouse or transplant production recommended; application before alternating to a non-product when

11+7 Phytophthora rot mixed with chlorothalonil and *M* Incorporate into such as damping 32% (Verdera Oy) Bio or Gr Hs transplants fungicide; m MOA; no more than 2 sequential applications before alternating to another effective blight (EPA 33). (Phosphorus acid 33% (BioSafe Systems); (ALL) Belly rot, root rots, Fus. Wilt, Alt, AN, DM, GSB, PM (see label for specifics). 0 DTH.

**M** Oxidate 0 OMRI (EPA 70299-2) REI 1 hr (hydrogen peroxide) also **M** Oxidate 2.0 OMRI (BioSafe Systems); (ALL) Belly rot, root rots, Fus. Wilt, Alt, AN, DM, GSB, PM (see label for specifics). 0 DTH.

**M** Penncozeb 75DF5 (EPA 70506-185) REI 24 hrs (75% mancozeb) (limit of 24 lbs.) (UPI); (ALL), AN, Alt. l. s., DM, GSB, Scab, 1.5-3 lbs/A. 5 DTH. (Not for Gr. Hs. use). Also Penncozeb 4FL 37% (EPA 70506-194); Penncozeb 80WP, 80% (EPA 70506-183).

**M** Phostrol0 (EPA 55146-83) REI 4 hrs. (Mono- and dibasic Na, K and NH3 phosphites = phosphorus acid 6.69 lbs ai/gal = 4.32 lbs./gal) (limit 7 applications/season) (Nufarm); (ALL) Phy Root and Fruit Rot, DM 2.5-5 pts/8-50 gal/A (use 7 days hi risk). 0 DTH.

**M** Presidio2 (EPA 59639-140). REI 12 hrs (fluopicolide) (limit of 12 fl oz) (Valent). (mesosystemic) (ALL) Use for the control of selective oomycetes. DM, Phytophthora blight (P. capsici) 3-4 fl oz/A. (must be tank mixed with another fungicide with a different MOA; no more than 2 sequential applications before alternating to another effective fungicide; make no more than 4 applications per season; do not apply to Gr Hs food crops or Gr Hs transplants). 2 DTH.

**Bio** Prestop WP o OMRI (EPA 64137-11) REI 0 hrs. (Gliocladium catenulatum Strain J1446, 32%) (Verdera Oy) (ALL) PRESTOP controls seed-borne and soil-borne plant diseases such as damping-off, root and stem rot, and wilt caused by Alternaria, Cladosporium, Fusarium, Penicillium, Phytophthora, Plicaria, Pythium, Rhizoctonia and Verticillium. Incorporate into potting media, or use as soil drench. For foliar application: for control of Didymella and Botrytis. 0 DTH.

**M** Prev-Am Ultra0 (EPA 72662-3) REI 12 hrs (sodium tetraborohydrate decahydrate, borax) (Citrus Oil); (C, M, P, S) DM, PM, 50 fl oz/100 gal. water (also insects). 0 DTH.

**M** Previcur Flex2 (EPA 264-678) REI 12 hrs (propamocarb) (limit 6 pts.) (systemic) used with protectant (Bayer); Field (ALL); DM; 1.2 pts OR 0.6 – 1.2 pts when tank-mixed with chlorothalonil and fixed copper 2 DTH, with mancozeb 5 DTH; Pythium root rot and Phytophthora see label: **Greenhouse use as soil treatment for Pythium and Phytophthora spp.**

**11+7** Pristine0 (EPA 7969-199) REI 12 hrs (pyraclostrobin + boscalid) (limit 74 oz) (BASF); (ALL); 12.5-18.5oz/A; Alt, *DM*, *PM*, *GSB*; AN 18.5 oz; Use as an alternative product when *PM*, *GSB*, or *DM* resistance is an issue; Do not make more than 1 application before alternating to a non-strobilurin fungicide; Use at the highest rate is recommended; No aerial application within 100’ of surface water in NYS; Not for use in Greenhouse or transplant production. 0 DTH

**3** Procure 480 SC0 REI 12 hrs (triflumizole, [imidazole]) (limit 40 fl oz) (Chemtura); PM (ALL), 4-8 oz; Use in an alternating program because of *PM* resistance; used at the highest rate of 8 oz and mixed with protectant like chlorothalonil; Also for greenhouse cucurbit transplants; Restricted due to toxicity for fish. 0 DTH.
• **33 ProPhyt** (Syngenta; EPA 42519-22-AA-5905) REI 4 hrs (54.5% potassium phosphate equiv \(\text{phosphorus acid} = 34.3\%) \text{ (Luxembourg-Pamol, Helena); DM} \text{ for (ALL), 2-4 pts/A tank mixed with dithiocarbamate approved for crop; Phytophthora see label.} 0 \text{ DTH.}

• **11 Quadris** (EPA 100-1098) REI 4 hrs (azoxystrobin) (limit of 92.3 fl oz) (Syngenta); (ALL) 11-15.4 fl oz (0.18-0.25 lbs ai) AN, Belly Rot, *DM*, *GSB*, Alternaria, *PM*; Because of resistance to *PM* in NY, do not use QoI fungicides specifically for *PM* control; Do not use for *GSB* control if resistance to QoI exists; For *PM* resistance concerns choose an alternative product listed for DM control (Do not apply sprays near apples; Do not apply Quadris or other QoI fungicide before alternating with a fungicide with a diff. MOA, and limit to 4 applications per season). 1 DTH. (Not for use for greenhouse-grown food crops).

• **11+M5 Quadris Opti** (EPA 100-1171) REI 12 hrs (4.6 % azoxystrobin + 46% chlorothalonil) (limit see label) (Syngenta); 3.2 pts (0.1 lbs ai azyoxy; 1 lb ai chloro); (ALL) AN, Belly Rot, *DM*, *GSB*, Alternaria L. B., *PM*; Because of resistance to *PM* in NY, do not use QoI fungicides specifically for *PM* control; Do not use for *GSB* control if resistance to QoI exists; For DM resistance concerns, choose an alternative product listed for DM control; (Do not apply sprays near apples; Do not apply Quadris Opti or other QoI fungicide before alternating with a fungicide with a diff. MOA, and limit to 4 applications per season). 1 DTH.

• **11+M5 Quadris Top** (EPA 100-1313) REI 12hrs (azoxystrobin + difenoconazole) (limit 56 fl oz) (Syngenta); (ALL) Alt LB, Alt LS, Anth, Belly Rot, Cercospora LS, DM, GSB, Plectosporium Blt, PM, Septoria LB 12-14 fl oz/A. 1 DTH.

• **13 Quintec 2.08 SC** (EPA 62719-375) REI 12 hrs (quinxyfen) (limit see label) (EPA 71512); (Muskemelon and other spec. melons and watermelon) (with new section 3 also for Winter squash, gourds and pumpkins); PM, 4-6 fl oz, 10-14 day schedule; Rotate to a product with a different mode of action than Quintec after application using highest rate; apply the alternate product within at least 14 days of the Quintec. 3 DTH.

• **3 Rally 40WSP** (EPA 62719-375) REI 24 hrs (mioclubutalin [triazole]) (limit 1.5 lbs.) (Dow) *PM* 2.5-5 oz for (ALL); Use in an alternating program because of *PM* resistance; used at the highest rate of 5 oz and mixed with protectant like chlorothalonil. 0 DTH. (Not for Gr. Hs. use).

• **33 Rampart** (EPA 34704-924) REI 4 hrs (Mono- and dipotassium salts of phosphorous acid) (Loveland); (ALL), generic label for Phytophthora blight, Pythium and Downy mildew, 1-3 quarts in a minimum of 20 gal water/A; do not apply at intervals less than 3 days. 0 DTH.

• **21 Ranman 400SC** (EPA 71512-3) REI 12 hrs (cyazofamid) (limit 16.5 fl oz) (ISK/FMC); (ALL) DM, 2.1 to 2.75 fl oz/A; Phytophthora blight, 2.75 fl oz/A (alternate sprays with a different MOA; mix Ranman with an organosilicone surfactant when water volumes are up to 60 gal/A). 0 DTH.

• **11† Reason 500 SC** ↑NOT labeled in Nassau or Suffolk Co. (EPA 264-695) REI 12 hrs (fenamidone) (limit 22 fl oz) (Bayer); (ALL) 5.0 oz; *DM* and Alternaria L. B.; For DM resistance concerns, alternate with chlorothalonil or mancozeb or choose an alternative product listed for DM control; Do not use QoI fungicides specifically for PM control. 14 DTH.

• **SAR Regalia EC** (OMRI; EPA 84059-3) REI 4h, (*Reynoutria sachalinensis* extract, biological SAR) (Marrone) (ALL); PM, DM, GSB, 2-4 qts/50-100gal. 0 DTH.
• **Resist 57** (EPA 82940-1) REI 4 h. (mono- and dipotassium salts of phosphorous acid) (Actagro); (ALL) Foliar Generic label for Phytophthora blight and DM, 1-3 quarts in a minimum of 20 gal water/A. 0 DTH.

• **Revus** (EPA 100-1254) REI 12 hrs. (mandipropamid) (limit 32 fl oz) (Syngenta) (ALL) Suppression only for DM and Phytophthora blight, 8 fl oz (silicone-based adjuvant recommended (i.e. Silwet L-77); For DM, make no more than 1 consecutive application of Revus tank-mixed with another DM fungicide with a different MOA before switching to an effective fungicide other than Group 40; For Phytophthora, apply Revus in a mixture with copper and alternate with another effective fungicide. Not for use on transplants). 0 DTH.

• **Ridomil Gold SL** (EPA 100-1202) REI 48 hrs (mefenoxam) (Syngenta); (ALL); Damping off, cottony leak; pre-plant, soil surface spray 1-2 pts; **Not in transplant water for dipping; not for GH use.** 0 DTH; Pythium root rot, directed soil spray, 0.25-0.4 pt. 5 DTH.

• **Ridomil Gold Bravo SC** (EPA 100-1221) REI 48 hrs (mefenoxam + chlorothalonil) (limits see label) (Syngenta) (ALL) DM, 2 lbs; An, GSB, Alt L. B., Scab, 2-3 lbs; avoid late season applications when plants begin senescence. 0 DTH.

• **RootShield Granules** (EPA 68539-3) 0 REI if soil incorporated (Trichoderma harzianum Rifai strain T-22, 1.15%) (BioWorks); in-furrow 2.5-6.0 lbs/1/2 A.

• **RootShield WP** (EPA 68539-7), 0 hrs or until dry REI (1.15% Trichoderma harzianum Rifai strain KRL-AG2) (BioWorks); Gr Hs soil drench. Tsp. starter solution, Chemigation (Gr Hs or Field), rates vary; provides protection against plant root pathogens such as Pythium, Rhizoctonia, Fusarium, Cylindrocladium and Thielaviopsis. 0 DTH.

• **RootShield Plus Granules** (EPA 68539-10), 0 REI if soil incorporated (Trichoderma harzianum Rifai strain T-22, 1.15% + Trichoderma virens strain G-41, 0.61%) (BioWorks), in-furrow 2.5-6.0 lbs/1/2 A. 0 DTH.

• **Roper DF** (EPA 34704-1063) REI 24 hrs. (58.1%, mancozeb) (Loveland) (ALL) Alt LS, Anth, DM, GSB, Scab at 2-3 lb (limit 25.6 lb). 5 DTH.

• **Serenade ASO** (EPA 264-1152) REI 4 hrs (Bacillus subtilis) (Bayer); (ALL) Field PM; 4-8 qts/A (best if used with copper). 0 DTH.

• **Serenade MAX WP** (EPA 264-1151) REI 4 hrs (Bacillus subtilis) (Bayer); (ALL) Field and Greenhouse (uses are the same) PM, GSB, DM, 1-3 lb/A/100gal. 0 DTH.

• **Sil-Matrix** (EPA 82100-1) REI 4 hrs. (29% potassium silicate) (PQ Corp) (ALL) for use as a Fungicide/Insecticide. 0 DTH.

• **Sonata** (EPA 264-1153) (Bacillus pumilus) REI 4 hrs (Bayer); (ALL) Field and Greenhouse (uses are the same) Foliar application for PM, DM, 2-4 qts/A/100gal. 0 DTH.

• **Sovran** (EPA 7969-154) (kresoxim-methyl) (BASF); (ALL), *PM*, 3.2-4.8 oz/A; *GSB*, 4.8 oz/A. (Not for use on Long Island) Do not use QoI fungicides specifically for PM or GB control; do not make more than 1 application before to a non-strobilurin fungicide with a different mode of action). 0 DTH.

• **Sulfur 6L** (EPA 66330-211), REI 24 (sulfur) (Arysta) (melons, cucumbers, squash), PM 4 gal/A. 0 DTH.

• **Surround** (EPA 61842-18) REI 4hrs. (Tessenderlo) Kaolin clay (ALL) 0 DTH.
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- Switch 62.5WG\textsuperscript{1} (EPA 100-953) REI 12h, (cyprodinil, 37.5\% + fludioxonil, 25\%) (limit 56 oz) (Syngenta); (ALL), Altern leaf blight, Altern leaf spot, Gummy Stem Blight, Powdery mildew, 11-14oz/A. 1 DTH. *Not for use on Long Island, only there for Onions and Strawberries.

- \textsuperscript{11+27} Tanos\textsuperscript{3} (EPA 352-604) REI 12 hrs (famoxadone 25\% + cyloxanil 25\%) (limit 72 oz) (DuPont) (ALL); for Alternaria L. B., AN, DM\textsuperscript{*}; use 8 oz; (must be tank mixed with either mancozeb 5 DTH or fixed copper or chlorothalonil or OLF); Do not use Tanos for \*PM\textsuperscript{*} or \*GSB\textsuperscript{*}; for DM resistance concerns, alternate with chlorothalonil or mancozeb or choose an alternative product listed for DM control ie. Gavel; \textit{2ee} for suppression of Phytophthora blight in the foliar and fruit phase only, use 8 oz/A, and tank mixed with a copper or mancozeb fungicide. Do not make more than one application before rotating with a fungicide that has a different mode of action; do not make more than 4 applications of Tanos or other Group 11 fungicide per cropping cycle. (3 DTH).

M\textsuperscript{2} That Flowable Sulfur\textsuperscript{0} (EPA 57538-5) REI 24 hrs. (Sulfur) (Stoller); (ALL); PM, 2-4 pts/A. (Do not use if air temperatures exceed 90\%). 0 DTH.

- Thiophanate-methyl 85 WDG\textsuperscript{0} (EPA 66222-145) REI 12 hrs (thiophanate-methyl + protectant recommended) (limit 2.5 lbs.) (MANA) (C. M. SS, WS, P) AN, \*GSB\textsuperscript{*}, *Res. PM\textsuperscript{*}, 0.2-0.4 lbs./A; Belly rot, 0.4 lb/A. 0 DTH.

- \textsuperscript{1+prot} Tansin M 70WP\textsuperscript{1} (EPA 73545-11-70506) REI 12 hrs (thiophanate-methyl + protectant is recommended) (limit 3 lbs.) (UPI), (ALL); AN, \*GSB\textsuperscript{*}, \*PM\textsuperscript{*} (Do not use specifically for these diseases), Belly rot (Rhizoc. and Fusarium), 0.5 lb. 0 DTH. Also Tansin M 70WSP.

- \textsuperscript{1+prot} Torino\textsuperscript{0} (EPA 8033-103-10163) REI 4hrs. (cyflufenamil) (Gowan); PM (ALL) 3.4 oz/A. No more than once every 7 days and limit to 2 applications/year; Treat as a protectant, although translaminar and vapor action do exist. 0 DTH.

- M\textsuperscript{3} Trilogy\textsuperscript{0} OMRI (EPA 70051-2) REI 4 hrs (70\% clarified hydrophobic extract of neem oil) (Certis); (ALL). Listed for multiple diseases including PM and DM and insects, 0.5-1\% in 25-100 gal/A. 0 DTH.

- \textsuperscript{1+prot} Ultra Flourish\textsuperscript{0} soil (EPA 55146-73) REI 48 hrs (mefenoxam) (limits see label) (Nufarm) (ALL) Pythium DO, cottony leak, use 2-4 pts/A \textit{at planting}. (Do not dip plants in solution; do not use for gr. hs. crops). 0 DTH.

- \textsuperscript{1+prot} svgdate\textsuperscript{1} (Not for use on Long Island) (EPA 352-372) REI 48 hrs (oxamyl, insecticide/nematicide) (DuPont) (ALL) for nematodes (root knot, lesion, ring, sting and stunt) and insects, see label for preplant and foliar applications. 1 DTH.

- 45+40 Zampro\textsuperscript{0} (EPA 7969-302), REI 12 hrs (ametocradin + dimethomorph) (BASF); for DM and Phytophthora blight @ 14 fl oz (limit to 42 fl oz/season). 0 DTH.

This summary is provided as a helpful guide to most of the products that are available for Cucurbit Disease Control and is not a substitute for Pesticide Labels. Refer to the 2014 Cornell Vegetable Guidelines or the product label before buying any Pesticide. Every effort has been made to provide correct, complete, and up-to-date information at the time of this presentation/publication. Trade names used are for convenience only. No endorsement of products intended, nor is criticism of unnamed products implied. These recommendations are not a substitute for pesticide labeling. Always read the product label before applying any pesticide.

Abbreviations: ALL = registered for all the major cucurbit species (crops); \textsuperscript{*} = Restricted use pesticide prevented on LI; \* = Restricted to commercial applicator use; M = Multi-site activity; OLF = Other labeled formulation or OLP = Other labeled products exist; *PM\textsuperscript{*}, *GSB\textsuperscript{*}, \*DM\textsuperscript{*} = Fungicide resistance concern with product for this particular disease pathogen.

AN = Anthracnose, Colletotrichum obiculae; Alternaria leaf blight = Alternaria cucumerina; *DM\textsuperscript{*} = Downy mildew, Pseudoperonospora cubensis; \*PM\textsuperscript{*} = Powdery mildew, Podosphaera fusca (syn. Podosphaera xanthii), Erysiphe cichoracearum (not important); \*GSB\textsuperscript{*} = Gummy Stem Blight/Bik Rot, Didymella bryoniae (Pomace cucurbitacearum); Phytophthora blight, P. capsici; Plecto = Plectosporium blight, Plectosporium tabacinum; Scab, Cladosporium cucumerinum; Ang LS = Angular leaf spot, Pseudomonas syringae pv. lachrymans.
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- **Topin M** (OLP) (limits 2 lbs.) tank-mix with protect. (Mitob), Anh, Belly into (Rut and Fusi) (Alt L. Bt, DM), PM, PM, PM, PM, GSB, Phy, Phy (limits)

DM and Phythophthora Options ( Q: DM used "preventatively" or & use "after disease is present")

- M2 M1 Hapalo (limit 16.8 lbs.) (oxazamide + mancozeb), DM, Phytophthora
- M1 Hapalo (limit 32 oz.) (Alt L. Bt, DM, Phytophthora bit)
- M2 M1 Hapalo (limit 6 lbs.) (propamocarb + protectant), DM, Phytophthora root rot
- M1 Hapalo (limit 16.5 fl oz) (cymazolin), (DM, Phytophthora)
- M1 Hapalo (limit 12 fl oz) (flujopicolide) (DM, Phytophthora Bit)
- M1 Hapalo (limit 24 fl oz) (cymazolin + dimethomorph) (DM and Phytophthora bit)

Others listed for DM and Phythophthora

- 1C Cymazolin (limit 50 lbs.) (Alt L. Bt, DM, SAS, Altern L. SB, DM, Phytophthora)
- M1 Cythal (limit 32 oz.) (Suppression only for both DM and Phytopthora bit)
- M1 Hapalo (limit 6 oz.) (DM, Phytophthora)
- M1 Hapalo (limit 7.7 oz) (DM, Phytophthora)
- M1 Hapalo (limit 2.2 oz) (DM, Phytophthora)

Scab Products on labels

- 1B Valiant (limits see label) (DM, Phytophthora)
- 1B Valiant (limits see label) (DM, Phytophthora)
- 1B Valiant (limits see label) (DM, Phytophthora)

OTHER PRODUCTS: (Phytophthora)

- M1 Ridomil Gold Ultra (CPOsodium) (see limits on label) (Phytophthora root rot)
- M1 Ridomil Gold Ultra (CPOsodium) (see limits on label) (Phytophthora root rot)
- M1 Ridomil Gold Ultra (CPOsodium) (see limits on label) (Phytophthora root rot)
- M1 Ridomil Gold Ultra (CPOsodium) (see limits on label) (Phytophthora root rot)
- M1 Ridomil Gold Ultra (CPOsodium) (see limits on label) (Phytophthora root rot)

GREENHOUSE Crops: (specifically)

- M1 Ridomil Gold Ultra (CPOsodium) (see limits on label) (Phytophthora root rot)
- M1 Ridomil Gold Ultra (CPOsodium) (see limits on label) (Phytophthora root rot)
- M1 Ridomil Gold Ultra (CPOsodium) (see limits on label) (Phytophthora root rot)
- M1 Ridomil Gold Ultra (CPOsodium) (see limits on label) (Phytophthora root rot)
- M1 Ridomil Gold Ultra (CPOsodium) (see limits on label) (Phytophthora root rot)

Other Products: (Bacterial, Fungal, Viral)

- M1 Ridomil Gold Ultra (CPOsodium) (see limits on label) (Phytophthora root rot)
- M1 Ridomil Gold Ultra (CPOsodium) (see limits on label) (Phytophthora root rot)
- M1 Ridomil Gold Ultra (CPOsodium) (see limits on label) (Phytophthora root rot)
- M1 Ridomil Gold Ultra (CPOsodium) (see limits on label) (Phytophthora root rot)
- M1 Ridomil Gold Ultra (CPOsodium) (see limits on label) (Phytophthora root rot)

**Key**:

Orange = Soil borne; **Blue** = Group 12 strobilurins; **Blue + phosphorous acid** = Group 12 strobilurins + phosphorous acid; Stalks = Black + chlorothalonil; **Green** = fixed copper; **Gray** = restricted to registered applicants; **Not for use on Long Island. Every effort has been made to provide correct, complete, and up-to-date information at the time of this presentation/publication. Trade names are used for convenience only. No endorsement of products named, nor is criticism of unrelated products implied. These recommendations are not a substitute for pesticide labeling. Always read the product label before applying any pesticide.**
Fungicides are labeled for all cucurbits unless noted.

**Systemic** fungicides are in **Bold**. Protectants include: chlorothaneol; sulfur; mancozeb; copper (2ee), ManKocide.

A.) **Powdery Mildew (PM)** - occurs every year, so make sure to use of tolerant varieties if available for squash or pumpkins. Beginning when lesions are 1” detected inside the canopy on lower leaves (top or bottom). PM sprays should include:

- Quintec® (quinxyfen) (NOW registered on winter squash, pumpkins, gourds, muskmelon, and watermelon, but not cucumber or summer squash); begin usage early in the PM cycle then alternate with one of the following:
  - Torino® (cyflufenamid) only for PM, consider tank mix with protectant
  - Sulfur® (good protectant, alone or tank-mixed with Quintec)
  - Procure® (triflumizole) at Hi rate 8 oz + Bravo® (or OLP) or Rally® (myclobutanil) at Hi rate 5 oz + Bravo® (or OLP) (NOTE: both Procure and Rally are in the same fungicide group, choose only 1 (Procure preferred)
- Or consider Pristine® (pyraclostrobin + boscalid)
- Or consider Protects like Novel Stylet® mineral oil or coppers
- Or consider Inspire Super® (difenconazole + cyprodinil) or Switch® (cyprodinil + fluazoxonil)

**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:

- Pencozeb® (or OLP) 
- Bravo® (or OLP) 
- Inspire Super® (GSB)

**Note:** The strobilurin (Group 11) fungicides are not listed due to fungicide resistance for GSB, and include Cabrio, Flint, Quadris, Quadris Opti, Sovran, and

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Pristine. Also 1+ Prot. Topspin M1® (or OLP) (thiophanate-methyl) is no longer effective.

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 Plectosporium sprays (for above crops only) should include:

- Bravo® (or OLP) 
- Inspire Super® (Plectosporium) 
- Quadris®, Quadris Top® 
- Cabrio®, Flint® (but don’t rely on sprays of these products for PM or GSB control)

D.) **Phytophthora (P) and Downy Mildew (DM)** – if P has previously occurred on your farm (must utilize disease management practices) or if DM is reported on tracking maps: [http://edc.ipmPIPE.org/scripts/map.php](http://edc.ipmPIPE.org/scripts/map.php) (which monitors airborne spores of DM from Michigan, Ontario, Pennsylvania or New Jersey), Then the Top 5 DM/P choices used "preventatively":

- Gavel® (zoxamide + mancozeb) (DM, P) 
- Presidio® (fluopicolide) (DM, P) + must use protectant
- Previcur Flex® (propamocarb) (DM) + protect. 
- Ranman® 400SC® (cyazofamid) (DM, P) + protect. 
- Tanos® 50WG® (DM, P suppression) + protectant

Top 4 DM choices “after disease is already present”:

- Presidio® (fluopicolide) (DM, P) + must use protectant 
- Previcur Flex® (DM) + protect. 
- Ranman® 400SC® (DM, P) + protect. 
- Tanos® 50WG® (DM, P suppression) + protectant

E.) **If Scab should be an issue:**

- Bravo® WS® or OLP 
- fixed coppers® (if on a few labels) 
- ManKocide® 
- mancozeb® (all) 
- Ridomil Gold®

Key: MOA= Modes of Action; OLP= other labeled product and/or formulation; M= multi-site activity and mixing partner to reduce risk of developing fungicide resistance; NA= not assigned; 2ee = allowed for specific disease not on original label. *= Restricted to use by registered applicators; †= Not for use on Long Island