Fungicides listed by crop grouping and disease, then by product. Effective products in bold; ‘effective’ means disease severity on plants treated with the product was significantly less than on untreated plants. Sometimes qualifiers such as ‘somewhat’ are included to indicate degree of control was low and other treatments were better. Often in an experiment a product listed as ‘ineffective’ had numerically less disease than untreated plants, but not significantly less.

Almost all results are from Plant Disease Management Reports (PDMR); some are from its precursor, Fungicide & Nematicide Tests. References to studies include state, year of study, PDMR volume and report number. Reports almost always published year after study. All field studies with weekly spray schedule except where noted. Almost all experiments were ‘general’ fungicide evaluations that also included testing products for conventional growers. Very rarely are these experiments focused on evaluating organic products and conducted in an organic production system.

CTE = Conventional treatment effective. AUDPC (Area Under Disease Progress Curve) is a cumulative measure of disease severity over the rating period.

* indicates there is additional information about the experiment at the end of the crop section.

While focus is on biopesticides, some results with copper and sulfur are included.

**HERBS - Basil**

**Downy mildew**

2 GH exps. Actinovate (12 oz/A) effective in both. Regalia SC (1% v/v), Companion (32 fl oz/A), and Sonata (4 qt/A) effective in one. Serenade (3 lb/A) ineffective. Prophyt (4 pt/A) was much more effective. Prophyt (2 pt/A) + Quadris (9 fl oz/A) was excellent. 3 experimentals also examined. FL, 2010, PDMR 6:V059.

Actinovate 12 oz/A + Induce moderately effective (FL, 2007, PDMR 2:V068). *

Actinovate 10 oz/A + ThermX70 slightly effective at 1 of 2 sites. Preventive schedule. (CT, 2011, PDMR 6:V073). *

Actinovate 10 oz/A + ThermX70 ineffective, 2 sites. Preventive schedule. Also ineffective applied in alternation with OxiDate (CT, 2012, PDMR 7:V045). *


Copper: Cueva 1 gal/A ineffective applied twice weekly. (FL, 2016, PDMR 11:V045). *

Copper: Badge X2 2 lb/A slightly effective. CTE. Started 2 d after symptoms seen. (IL, 2018, PDMR 13:V028)
Copper: Nordox 75WG 14oz/A ineffective (IL, 2011, PDMR 6:V131).
Copper: Nordox 75WG 8 oz/A + TriTek 2% (v:v) ineffective (IL, 2011, PDMR 6:V131).
Double Nickel 0.5 lb/A ineffective applied 6X with Cueva 2X, or applied 4X with Regalia 1 qt/A with Cueva applied for 3rd app. All twice weekly schedule. (FL, 2016, PDMR 11:V045).

**MilStop** 2.5 lb/A **moderately effective**, 2 sites. Preventive schedule. (CT, 2011, PDMR 6:V073).

MilStop 2.5 lb/A ineffective, 2 sites. Preventive schedule. (CT, 2012, PDMR 7:V045).


**OxiDate** 0.6 and 1.2 gal/A (rate increased after symptoms seen) + Yucca Ag-Aide **moderately effective**. 2 sites. Preventive schedule. (CT, 2011, PDMR 6:V073).

**OxiDate** 0.6 gal/A + Yucca Ag-Aide **slightly effective** at 1 of 2 sites. Preventive schedule. (CT, 2012, PDMR 7:V045).


**Procidic** 20 fl oz/A **moderately effective** on 3-day interval with Cueva applied for 3rd app; one of the 3 most effective treatments, others not organic or labeled biopesticides, but not considered commercially acceptable control. (FL, 2016, PDMR 11:V045).


**Regalia** 1% **moderately effective**, slightly more effective applied with Sonata 4 qt/A, but neither were sufficiently effective to yield marketable stems (6-in stem tips with no symptoms). Control not improved by applying Regalia with Kocide 3000 2 lb/A (FL, 2010, PDMR 5:V155).


Serenade 2 qt/A + Regalia 1% (v:v) ineffective (IL, 2011, PDMR 6:V131).
**Serenade Max** WP 4 lb/A + Biotune **moderately effective** (FL, 2007, PDMR 2:V068).

**Serenade MAX** 2 lb/A + ThermX70 **slightly effective** at 1 of 2 sites. Preventive schedule. (CT, 2011, PDMR 6:V073).

**Sil-Matrix** 3 qt/A **effective** applied 6X with Cueva 2X; twice weekly schedule. (FL, 2016, PDMR 11:V045).

**Sonata ASO** 4 pt/A + Biotune **moderately effective** (FL, 2007, PDMR 2:V068).


Timorex Gold 0.75% ineffective. Preventive. Conventional fungicides also ineffective. (NY, 2010, PDMR 5:V098, MTM).
**Trilogy** 77 fl oz/A *slightly effective* at 1 of 2 sites. Preventive schedule. (CT, 2011, PDMR 6:V073).

* In CT trials, symptoms were confirmed during third week of treatments in 2011, second in 2012. Mean ratings for basil receiving best treatment (MilStop) were 1.6 and 2.0 versus 2.4 for non-treated basil at both sites. The rating scale used was based on percent leaf area with sporulation: 1 = <10%, 2 = 10-50%, and 3 = >50%.
* In IL trial, all organic treatments tested were ineffective; conventional treatments were all very effective (9 provided complete control).
* In FL trial in 2007 some conventional treatments provided effective control.
* In FL trial in 2016 treatments were applied to susceptible (Large Leaf) and resistant (Eleanora) varieties. Treatments were applied twice weekly starting at 1-2 true-leaf stage. Disease pressure was extreme from the start. Cotyledon drench treatment of conventional fungicide (Orondis) was applied to all plots to slow disease onset. No treatment afforded a level of downy mildew control that would have produced a marketable crop.

**Asparagus**

**Beet**

**Cercospora leaf spot**

- **Actinovate** 12 oz/A *effective*, preventive schedule (NY, 2014, PDMR 9:V007).*
- **Copper: Cueva** 1 gal/A *effective*, preventive (NY, 2014, PDMR 9:V007). *
- **Double Nickel** 55 LC 1 qt/A + copper *very effective* (NY, 2018, PDMR 13:V022).*

- **LifeGard** 1 qt/A *effective, very effective* in a program alternated with Double Nickel + Cueva (NY, 2018, PDMR 13:V022).
- **Regalia** 2 qt/A *effective, + copper very effective* (NY, 2018, PDMR 13:V022)*
- **Serenade Optimum** 1 lb/A *effective*, preventive (NY, 2014, PDMR 9:V007). *
- **Stargus** 2 qt/A *effective*, better than 4 qt/A (NY, 2018, PDMR 13:V022).*

* NY, 2014: all organic treatments equally effective; less disease on untreated resistant varieties. Serenade + Cueva not better then either alone.
* NY, 2018: preventive. Inoculated. Double Nickel only tested mixed with Cueva, therefore cannot conclude Double Nickel is effective.

**Bean** – see ‘Legumes’

**Brassica (cruciferous) crops** (broccoli, cabbage, cauliflower, kale, kohlrabi, etc.)

**Alternaria leaf spot**
Actinovate 12 oz/A ineffective tested on collards. CTE (MA, 2013, PDMR 8:V223).
Actinovate 6 oz/50 gal ineffective (NY, 2013; see below). *

**Double Nickel** 55 LC 6 qt/A effective tested on collards, as effective as conventional fungicide (MA, 2013, PDMR 8:V223).

**Double Nickel** 1 lb/A effective after 2 applications in second trial and 1 wk after the one application made in first trial. (NY, 2012, PDMR 7:V054; NY, 2012, PDMR 7:V032)


EF 400 64 oz/100 gal ineffective. Cauliflower. (NY, 2013; see below). *

**Regalia** 3 pt/A effective 1 wk after the one application made. (NY, 2012, PDMR 7:V032)

Regalia 3 pt/50 gal ineffective (NY, 2013; see below). *


Serenade Max 3 lb/A ineffective (NY, 2013; see below). *

Serenade Optimum 20 oz/A ineffective tested on collards. CTE (MA, 2013, PDMR 8:V223).

Serenade Optimum 20 oz/A ineffective tested on cabbage and cauliflower.

Sonata ASO 4 qt/A ineffective tested on collards. CTE (MA, 2013, PDMR 8:V223).

Sonata 4 qt/A ineffective (NY, 2013; see below). *

Sporatec 3 pt/A ineffective (NY, 2013; see below). *

**Stargus** 3 qt/A effective, similar to copper. Control not improved by applying with copper or with Regalia. (NY, 2018, PDMR 13:V107). *

* NY, 2013: products applied 7X weekly at 40 gpa starting 2 days before inoculation, none effective, copper also ineffective (PDMR 8:V260)

**Black rot**

Actinovate 12 oz/A ineffective tested on collards. CTE (MA, 2013, PDMR 8:V223).

**Cease** 1 gal/100 gal + **MilStop** 2 lb/100 gal effective tested on cabbage. (OH, 2017; see below) *

Cease 1 gal/100 gal + MilStop 1 lb/100 gal ineffective on cabbage. (OH, 2018; PDMR 13:V012) *

**Double Nickel** 55 LC 6 qt/A effective tested on collards, as effective as copper (MA, 2013, PDMR 8:V223).

**Double Nickel** LC 2 qt/A + **Cueva** effective tested on cabbage. Neither tested alone. (OH, 2017) *

Double Nickel LC 2 qt/A + Cueva ineffective; cabbage. (OH, 2018; PDMR 13:V012) *

**LifeGard** 4.5 oz/100 gal effective tested on cabbage. (OH, 2017; see below) *

**LifeGard** 4.5 oz/100 gal slightly effective tested on cabbage. Other products ineffective. (OH, 2018; PDMR 13:V012) *
**LifeGard** 4.5 oz/100 gal *slightly effective* tested on cabbage. Less severe than nontreated only at less rating but same for Kocide; only Kocide reduced % heads with symptoms. Actigard ineffective. Inoculated 6 days before first app. (NY, 2017, PDMR 12:V087).

LifeGard plus Timorex Act alt Serifel ineffective; cabbage. Other treatments including conventional fungicides ineffective. (NY, 2018; PDMR 13:V037)

Oxidate 2 1 gal/100 gal + AquaSil Spreader + TerraGrow 0.6 oz/1000 sq ft ineffective tested on cabbage. (OH, 2017; see below) *

Oxidate 2 1 gal/100 gal ineffective on cabbage. (OH, 2018; PDMR 13:V012) *

**Proud 3** 1 gal/100 gal *effective* tested on cabbage. (OH, 2017; see below) *

Proud 3 1 gal/100 gal ineffective on cabbage. (OH, 2018; PDMR 13:V012) *

**Regalia 2 qt/A effective.** Tested combined with Stargus 2 qt/A or Badge X2, or with Badge alternated with Stargus, all applied with NuFilm. Preventive. Inoculated. (OH, 2019: PDMR 14:V045).

Regalia 3 pt/50 gal applied at 40 gpa ineffective applied alone in both experiments and didn’t improve control achieved with Kocide 3000 in 2012 (NY, 2011, PDMR 6:V106; NY, 2012, PDMR 7:V060).

Serenade Optimum 20 oz/A ineffective tested on collards. CTE (MA, 2013, PDMR 8:V223).

Sonata ASO 4 qt/A ineffective tested on collards. CTE (MA, 2013, PDMR 8:V223).

**Stargus 3 qt/A effective,** similar to copper. Control not improved by applying with copper or with Regalia. (NY, 2018, PDMR 13:V107). *

**Stargus 2 or 4 qt/A effective.** Tested alone and in programs with Regalia and/or copper (Badge X2); 5 treatments total, all applied with NuFilm. Stargus 4 qt/A alone and Stargus 2 qt/A + Regalia 2 qt/A were significantly better than Badge X2 alone but not better than the other treatments. Preventive. Inoculated. (OH, 2019: PDMR 14:V045).

Stargus 1% + NuFilm P ineffective on cabbage. (OH, 2018; PDMR 13:V012) *

**TetraCURB 0.5 gal/100 gal effective** tested on cabbage. (OH, 2017) *

TetraCURB 2 gal/100 gal ineffective on cabbage. (OH, 2018; PDMR 13:V012) *

Timorex Act alt Serifel ineffective tested on cabbage. Other treatments including conventional fungicides ineffective. (NY, 2018; PDMR 13:V037)

* OH, 2017: products applied 12X weekly starting 35 days before inoculation.
  Disease pressure low. 5 treatments effective; no conventional treatments tested. (PDMR 12:V061)

* OH, 2018: Inoculated. First done to seedlings in GH didn’t result in disease developing after transplanting; inoculated in field after 5th + 7th of 14 sprays.

**Downy mildew**


**Regalia 2 qt/A somewhat effective** similar to copper. Regalia + copper more effective than either alone. Preventive. CTE. (FL, 2018, PDMR 13:V015).

**Bulb Crops** (onion, garlic, shallots)
Carrot

**Alternaria leaf blight**

- **Serenade ASO** 1 gal/A + **Serenade Opti** or **Serenade ASO** (4 trt combos) *slightly effective*. Preventive. (GA, 2017, PDMR12:V054).

Corn

**Common rust**

- **Serenade** 32 fl oz/A *effective* (MI, 2009, PDMR 5:FC002)

**Grey leaf spot**

- **Serenade** 32 fl oz/A *effective* (MI, 2009, PDMR 5:FC002)

Corn, Sweet

**Cucurbit crops** (cucumber, melon, pumpkin, squash, watermelon, etc.)

**Anthracnose - Watermelon**

- **Actinovate** 6 oz/A *ineffective*, preventive schedule, assessed 3 wks after last spray, CTE (OK, 2006, 1:V036).
- **OxiDate 1% effective** but not enough to increase yield compared to nontreated (IN, 2010, PDMR 5:V022).

**Bacterial spot - Pumpkin**

- **Actinovate** 12 oz/A *effective* for controlling disease on leaves in both experiments and on fruit in 2013 (IL, 2012)(IL, 2013, PDMR 8:V284).
- **LifeGard 2.25 oz/A effective** for controlling disease on leaves, not fruit; only organic treatment tested; only CTE for fruit rot. (IL, 2019, PDMR14:V066).
- **Regalia** 1 qt/A *effective* for controlling disease on leaves and fruit; most effective treatment for protecting fruit in 2012 (IL, 2012)(IL, 2013, PDMR 8:V284).
- **Serenade** 6 qt/A *effective* for controlling disease on leaves and fruit (IL, 2012)(IL, 2013, PDMR 8:V284).
- **Sonata** 4 qt/A *effective* for controlling disease on leaves and fruit (IL, 2012)(IL, 2013, PDMR 8:V284).

**Downy mildew - Cucumber**

- **Actinovate somewhat effective** after 2 applications at lower rates (6 and 8 oz, but not at 12 oz/A), started 2 days after first symptoms; ineffective at last rating 1 wk later. CTE. (PA 2016, PDMR 11:V065)
- **Actinovate** 12 oz/50 gal applied at 40 gpa alone or tank mixed with Regalia 3 pt effective but authors concluded not sufficient control. Control similar to copper (3 products tested). (NY, 2015, PDMR 10:V015).
- **Actinovate** 6 oz/50 gal *effective*; copper numerically better but not significantly; preventive schedule used (NY, 2013, PDMR 8:V227).
- **Actinovate** 12 oz/A + Biolink *somewhat effective*, same as copper; preventive schedule (NY, 2008, PDMR 3:V116).
**Actinovate** 12 oz/A **moderately effective**, copper slightly better; symptoms present at first application (NY, 2009, PDMR 4:V123).

Actinovate 12 oz/A applied in alternation with copper (Champ) effective but less so than Champ weekly (MD, 2013, PDMR 8:V210).

Actinovate 6 oz/A applied at 60 gpa ineffective. CTE. (FL, 2015, PDMR 10:V065).

Actinovate 12 oz/50 gal applied at 40 gpa alone or tank mixed with Regalia 3 pt ineffective. (NY, 2016, PDMR 11:V015).

Actinovate 12 oz/A did not improve control achieved with resistant varieties, Peacemaker and Citadel; experiment conducted twice (NC, 2018, PDMR 13:V072; NC, 2019, PDMR 14:V117).

**AVIV** 20 or 40 fl oz/A alt **Timorex ACT** 16 or 32 fl oz/A was **effective**. Preventive (FL, 2018, PDMR 14:V085).

**Double Nickel** LC 1.25 lb/A applied at 40 gpa **effective** but authors concluded not sufficient control. Control similar to copper (3 products tested). (NY, 2015, PDMR 10:V015).

Double Nickel 0.75 lb/A ineffective. CTE. (FL, 2016, PDMR 11:V060).


LifeGard 4.5 oz/100 gal ineffective tested on susceptible and resistant varieties. Preventive. Also ineffective in program alternated with Regalia 3 qt/A and Double Nickel 1.5 lb/A + Cueva applied to moderately resistant variety. (NY, 2018, PDMR 13:V118, MTM)

LifeGard 4.5 oz/A ineffective; applications started 3 days after first symptoms seen in experiment. Experimentals also tested (MD, 2019, PDMR 14:V054).

**Neem oil** 1 fl oz/gal **somewhat effective**; copper more effective (OH, 2013, PDMR 8:V177).

Organocide 1 oz/gal applied with low rate copper (NuCop HB 1 lb/A) at 75 gpa effective, same as copper at high rate (1 lb/A); symptoms present at first application (NY, 2009, PDMR 4:V123).

OxiDate 1% weekly schedule ineffective. CTE. (NC, 2015, PDMR 10:V086).

**OxiDate** 1% weekly schedule **effective**, copper numerically better but not significantly (OH, 2013, PDMR 8:V177).

**OxiDate** 128 oz/A **effective** only when applied with Yucca Ag Aide; preventive schedule used; copper more effective (NY, 2012, PDMR 7:V049).

**OxiDate** 128 oz/A **effective**, no benefit to using Yucca Ag Aide; copper numerically better, not significantly; preventive schedule (NY, 2013, PDMR 8:V227).

OxiDate 128 oz/A ineffective applied with Yucca Ag Aide; preventive schedule used; copper effective (NY, 2011, PDMR 6:V103).

OxiDate 4 pt/A ineffective applied every 4-6 days; 5% infection when started sprays; conventional fungicides effective (MI, 2009, PDMR 4:V057).

OxiDate 3 pt/A applied in alternation with copper (Champ) less effective than Champ weekly (MD, 2013, PDMR 8:V210).

**Regalia** 3 pt/50 gal applied at 40 gpa **alone or tank mixed with Actinovate** 12 oz effective but authors concluded not sufficient control. Control similar to copper (3 products tested). (NY, 2015, PDMR 10:V015).
**Regalia** 0.5% **limited efficacy**, copper better; symptoms present at first application (NY, 2009, PDMR 4:V123).

Regalia 1% ineffective; copper effective (OH, 2013, PDMR 8:V177).

Regalia 3 pt/50 gal applied at 40 gpa ineffective; copper effective; preventive schedule used (NY, 2013, PDMR 8:V227).

Regalia 1 qt/A applied in alternation with copper (Champ) less effective than Champ weekly (MD, 2013, PDMR 8:V210).

Regalia 3 pt/50 gal applied at 40 gpa alone or tank mixed with Actinovate 12 oz/50 gal ineffective. (NY, 2016, PDMR 11:V015).

**Serenade Max** 3 lb/A **limited efficacy**, copper better; symptoms present at first application (NY, 2009, PDMR 4:V123).

Serenade Max 1.5 lb/A ineffective, started 2 days after first symptoms. CTE. (PA 2016, PDMR 11:V065)

Serenade Max 2 lb/A ineffective; copper effective (OH, 2013, PDMR 8:V177).

Serenade Max 3 lb/A ineffective; copper effective (NY, 2011, PDMR 6:V103)).

Serenade 3 lb/A ineffective applied every 4-6 days; 5% infection when started sprays; conventional fungicides effective (MI, 2009, PDMR 4:V057).

**Serifel** 3 lb/A **moderately effective**, as effective as coppers tested (Champ and Nordox). Started day symptoms seen. (NY, 2018, PDMR 13:V096).

**Serenade Opti** 14 oz/A **moderately effective**. CTE. (FL, 2016, PDMR 11:V060).

Serenade Soil 2 qt/A applied in alternation with copper (Champ) as effective as Champ weekly (MD, 2013, PDMR 8:V210).

**Sil-Matrix** 4 qt/100 gal **slightly effective**. CTE. (NC, 2016, PDMR 11:V096).

**Sonata** 2 qt/A + BioTune **somewhat effective**; Bravo more effective (GA, 2006, PDMR 1:V166).


**Sonata** 3 qt/A **somewhat effective**; numerically more severe DM with Manzate (GA, 2010, PDMR 5:V169)

**Sonata** 4 qt/A **effective**; preventive schedule used; numerically better but not significantly (NY, 2011, PDMR 6:V103).

**Sonata** 4 qt/A **moderately effective**, copper slightly better; symptoms present at first application (NY, 2009, PDMR 4:V123).

Sonata 4 qt/A ineffective; copper effective (NY, 2012, PDMR 7:V049).

**Sporatec AG** 2 pt/A applied with Biolink 2 fl oz/gal was **effective**, as effective as copper; symptoms present at first application (NY, 2009, PDMR 4:V123).

**Sporatec** 2 pt/A **somewhat effective**, other biopesticides more effective; preventive schedule (NY, 2008, PDMR 3:V116).

Sporatec 3 pt/A ineffective; preventive schedule used; copper effective (NY, 2011, PDMR 6:V103).

**Taegro** 3.5 oz/A **somewhat effective**, same as copper; preventive schedule (NY, 2008, PDMR 3:V116).

**Taegro** 3.5 oz/100 gal applied at 75 gpa **somewhat effective**, copper better; symptoms present at first application (NY, 2009, PDMR 4:V123).

Taegro 4 oz/A ineffective. CTE. (FL, 2016, PDMR 11:V060).

**Timorex ACT** was **effective** at some concentrations tested (10 and 20 fl oz/A); not others (15, 25, 30 fl oz). Preventive (FL, 2018, PDMR 14:V085).

**Zonix** 38 fl oz/50 gal applied at 40 gpa **effective** but authors concluded not sufficient control. Control similar to copper (3 products tested). (NY, 2015, PDMR 10:V015).

**Zonix** 38 fl oz/50 gal **somewhat effective**, not as effective as Nordox. Started day symptoms seen. (NY, 2018, PDMR 13:V096).

Zonix 38 fl oz/50 gal applied at 40 gpa **ineffective** (NY, 2016, PDMR 11:V015).*

*FL, 2016. Symptoms seen day before first application.

*NY, 2010. Downy mildew started to develop late, severity remained low. Preventive schedule. None of the 9 organic treatments including copper were effective; conventional fungicide program effective (PDMR 5:V100).

* NY, 2016. Other organic treatments and copper also ineffective. Preventive: first application 18 days before symptoms seen; rapidly increased.

**Downy mildew - Cantaloupe**

**Actinovate** 12 oz/A applied in alternation with copper (Champ) as **effective** as Champ weekly (MD, 2013, PDMR 8:V210).

**OxiDate** 3 pt/A applied in alternation with copper (Champ) as **effective** as Champ weekly (MD, 2013, PDMR 8:V210).

**Regalia** 1 qt/A applied in alternation with copper (Champ) as **effective** as Champ weekly (MD, 2013, PDMR 8:V210).

**Serenade Soil** 2 qt/A applied in alternation with copper (Champ) as **effective** as Champ weekly (MD, 2013, PDMR 8:V210).

**Downy mildew – Summer Squash**

Double Nickel 1 qt/A tested in 2 programs with Oso and Cueva. Control achieved with Oso applied weekly, not when alternated with Double Nickel suggesting later ineffective (SC, 2013, PDMR 8:V219).

**Downy mildew – Butternut Squash**

**Regalia** 1 qt/A applied in alternation with copper (Champ) as **effective** as Champ weekly (MD, 2013, PDMR 8:V211).

**Serenade Soil** 2 qt/A applied in alternation with copper (Champ) as **effective** as Champ weekly (MD, 2013, PDMR 8:V211).

**Downy mildew – Hubbard Squash**

Regalia 1 qt/A applied in alternation with copper (Champ) ineffective; Champ weekly effective (MD, 2013, PDMR 8:V211).

Serenade Soil 2 qt/A applied in alternation with copper (Champ) ineffective; Champ weekly effective (MD, 2013, PDMR 8:V211).

**Downy mildew - Pumpkin**

**Regalia** 1 qt/A applied in alternation with copper (Champ) as **effective** as Champ weekly, which was moderately effective (MD, 2013, PDMR 8:V211).

**Serenade Soil** 2 qt/A applied in alternation with copper (Champ) as **effective** as Champ weekly, which was moderately effective (MD, 2013, PDMR 8:V211).

**Fusarium wilt - Watermelon**
Serenade Soil 2 or 4 qt/100 gal ineffective applied as soil drench at transplanting and also when followed by 2 qt/A foliar spray (GA, 2011, PDMR 6:V138).

**Gummy stem blight - Watermelon**

Regalia 2 qt/A ineffective, preventive schedule (5 applications before symptoms seen), CTE (GA, 2009, PDMR 4:V146).
Regalia 2 qt/A ineffective, preventive schedule (3 applications before symptoms seen), CTE (GA, 2009, PDMR 4:V152).

**Timorex ACT** 20 fl oz/A effective. Preventive. Inoculated (FL, 2019, PDMR 14:V027).

**Phytophthora blight - Pumpkin**

Bio-Tam + Taegro alt Stargus to soil; Actinovate + Cueva alt Stargus ineffective. Disease onset conditions very favorable (NY, 2018, PDMR 13:V117).

**Powdery mildew - Cantaloupe**

Actinovate 6 oz/A moderately effective (AZ, 2006, PDMR 1:V073).
Actinovate 6 oz/A somewhat effective (AZ, 2012, PDMR 7:V107).
Actinovate 6 oz/A very limited efficacy (AZ, 2013, PDMR 8:V197).
Actinovate 6 oz/A very limited efficacy. CTE. (AZ, 2016, PDMR 11:V003).
Actinovate (rate not specified) very limited efficacy, other organic products more effective (AZ, 2015, PDMR 10:V010).
Actinovate 12 oz/A applied in alternation with copper (Champ) as effective as Champ weekly (MD, 2013, PDMR 8:V210).
Companion 32 fl oz/A effective both rating dates; preventive schedule (FL, 2009, PDMR 4:V103).
Double Nickel 1.5 lb/A somewhat effective, other organic products better. CTE. (AZ, 2018, PDMR 13:V043).
Kaligreen 4.1 lb/A moderately effective (AZ, 2006, PDMR 1:V073).
Kaligreen 5 lb/A among least effective treatments (AZ, 2012, PDMR 7:V107).
OxiDate 3 pt/A applied in alternation with copper (Champ) more effective than Champ weekly (MD, 2013, PDMR 8:V210).
Regalia 5% moderately effective (GA, 2009, PDMR 4:V145).
Regalia 1% very effective at 5/13 assessment, not 5/28; preventive schedule (FL, 2009, PDMR 4:V103).
Regalia 4 qt/A among least effective treatments (AZ, 2012, PDMR 7:V107).
Regalia 1 qt/A applied in alternation with copper (Champ) more effective than Champ weekly (MD, 2013, PDMR 8:V210).

**Serenade Max** 2 lb/A **moderately effective** (AZ, 2006, PDMR 1:V073).

**Serenade ASO** 3 qt/A **moderately effective**. CTE. (AZ, 2018, PDMR 13:V043). Serenade applied in alternation with copper (Champ) more effective than Champ weekly (MD, 2013, PDMR 8:V210).

**Sonata** 4 qt/A **moderately effective** (AZ, 2006, PDMR 1:V073).

**Sonata** 4 qt/A **somewhat effective**, other organic products better, Timorex Gold best. (AZ, 2015, PDMR 10:V010).

Sonata 4 qt/A ineffective (AZ, 2013, PDMR 8:V197).

**Taegro** 5.2 oz/A **effective** (AZ, 2013, PDMR 8:V197).

**Taegro** 5.2 oz/A **moderately effective**, other organic products better (AZ, 2015, PDMR 10:V010).

**Taegro** 4 oz/A **moderately effective**. CTE. (AZ, 2018, PDMR 13:V043).

**Taegro** 5.2 oz/A **limited efficacy**. CTE. (AZ, 2016, PDMR 11:V003).


Timorex Gold 20.3 fl oz/A ineffective. CTE. (AZ, 2016, PDMR 11:V003).

**Powdery mildew - Cucumber**

Regalia 2.5 qt/A **effective**. Symptoms present at first application. CTE. (MO, 2016, PDMR 12:V085).

**Sil-Matrix** 3 qt/A (1%) **effective**. Symptoms present at first application. CTE. (MO, 2016, PDMR 12:V085).

**Powdery mildew - Acorn Squash**

**Double Nickel** 2 lb/A + **Cueva** alternated with **Timorex Gold** 0.6 fl oz/gal **somewhat effective** for PM on upper leaf surface. Adding LifeGard to each application did not improve control. (NY, 2018, PDMR 13:V121, MTM).

**LifeGard** 4.5 oz/100 gal **limited efficacy**. (NY, 2018, PDMR 13:V121,MTM).

**LifeGard** 3.5 oz/A preventive, then **Milstop** 3 lb/A alt Serifel 8 oz/A alt **Suffoil-X 1% effective** on upper not lower leaf surface. (NY, 2019, PDMR 14:V078,MTM).

**M-Pede** 2% **effective** until last assessment, copper (Nordox) more effective (KY, 2013, PDMR 8:V203).


**Powdery mildew – Butternut Squash**

**Microthiol Dispersss** 5 lb/A very **effective** for PM on upper leaf surface, ineffective on lower. (MA, 2018, PDMR 13:V081).

**Microthiol Disperss** 5 lb/A very **effective** for PM on upper leaf surface, ineffective on lower. (NY, 2018, PDMR 13:V122, MTM).

**MilStop** 3 lb/A **moderately effective**, IPM schedule. (NY, 2009, PDMR 4:V024,MTM).


Serenade Max 2 lb/A + Biotune 1 pt/100 gal ineffective, preventive schedule. CTE (GA, 2006, PDMR 1:V164).
Sonata AS 2 qt/A + Biotune 1 pt/100 gal somewhat effective but not signif dif from Serenade Max (other organic trt that was ineffective), preventive schedule. CTE (GA, 2006, PDMR 1:V164).


Powdery mildew – Delicata

Microthiol Disperss 5 lb/A very effective for PM on upper leaf surface, moderately effective on lower. (NY, 2018, PDMR 13:V122, MTM).

Microthiol Disperss 5 lb/A very effective for PM on upper leaf surface, ineffective on lower. (MA, 2018, PDMR 13:V081).

Tritek 2% effective, not as good as sulfur on upper leaf surface, similar on lower. (NY, 2018, PDMR 13:V122, MTM).

Tritek 2 gal/100 gal moderately effective. CTE. (MA, 2018, PDMR 13:V081).

Powdery mildew – Scallop Squash


Powdery mildew – Summer Squash


OxiDate 2 1% ineffective, applied with Yucca Ag Aide, treatment started 3 days after first symptoms seen. CTE (GA, 2013, PDMR 8:V272).

Regalia 0.5% moderately effective, preventive schedule (VA, 2010, PDMR 5:V128).


Regalia 1% effective at first assessment (FL, 2010, PDMR 4:V112).


Powdery mildew - Pumpkin


**Microthiol Disperss** 4 lb/A somewhat effective, CTE (WI, 2015, PDMR 10:V070).

**Microthiol Disperss** 5 lb/A effective (TN, 2014, PDMR 10:V027).

**Mildew Cure** 1% (was named GC-3 organic fungicide) very effective on upper leaf surfaces, some efficacy on lower (2004). Ineffective; provided some control early in disease development based on assessment after 2 applications when severity low (2005). Effective on upper surface only (2006).

**Milstop** 2.5 lb/A effective on upper surface only (2006).

**Milstop** 5 lb/A very effective applied in alternation with **Microthiol Disperss** and **TriTek** on upper leaf surface; somewhat on lower (PA, 2019, PDMR 14:V004).

MilStop 3 lb/A ineffective, IPM schedule. (NY, 2007, PDMR 2:V141).

**Organocide** 2 oz/gal very effective on upper leaf surfaces, some efficacy on lower (2004). Effective on upper surfaces, provided some control on lower early in disease development based on rating after 2 applications when severity low (2005). Effective only on upper surface (2006).


Organocide 1.5% ineffective, Microthiol Disperss effective (TN, 2014, PDMR 10:V027).

OxiDate 128 fl oz/100 gal ineffective applied following the IPM or a curative schedule starting with three consecutive applications when powdery mildew reached a level of being easily seen but not severe (average severity on older leaves was 1% on upper surfaces and 2% on lower surfaces). IPM treatment provided some control early in disease development based on assessment after 3 applications when severity low. (2004). Similar results with applications twice weekly (2005).

**PerCarb** 3 lb/10 gal very effective applied in alternation with **Microthiol Disperss** and **OxiDate 2 + TriTek** on upper leaf surface; ineffective on lower (PA, 2019, PDMR 14:V004).


**Regalia** pre-cursor MOI-106 1% effective on upper surface, provided some control on lower early in disease development based on rating after 4 applications when severity moderately low (2008).

**Regalia** 1 qt/A applied in alternation with copper (Champ) more effective than Champ weekly, which was moderately effective (MD, 2013, PDMR 8:V211).

**Serenade** 1 gal/A effective on upper surfaces, applied with compost tea, which was ineffective applied alone (2003, 2004a). Effective on lower surfaces in 2004 only.

Serenade Opti 20 oz/A ineffective. CTE. (NY, 2016, PDMR 11:V025).

**Serenade Soil** 2 qt/A applied in alternation with copper (Champ) as effective as Champ weekly, which was moderately effective (MD, 2013, PDMR 8:V211).
Sonata 2 qt/A ineffective applied alone or combined with compost tea. Copper effective on both leaf surfaces (2003, 2004a).
Sporan (aka Sporatec) 1.5 qt/A + NuFilm P ineffective. Provided some control early in disease development based on assessment after 3 or 2 applications when severity low (2004b, 2005).
**Trilogy** 1% **moderately effective** on upper leaf surfaces, no efficacy on lower (2004) or limited efficacy (2005).
Kocide ineffective (WI, 2015, PDMR 10:V070).

**Powdery mildew - Zucchini**

*MilStop* 2.5 lb/A **effective**. Preventive. (NY, 2016, PDMR 11:V013).
*MilStop* 2.5 lb/A **very effective**, best in 2 trials (NY, 2011, PDMR 6:V104; NY, 2012, PDMR 7:V051). *
*M-Pede* 2% **very effective**. (NY, 2011, PDMR 6:V104). *
*OxiDate* 128 oz/100 gal **moderately effective**. (NY, 2016, PDMR 11:V013).
*OxiDate* 128 oz/A **moderately effective** applied with Yucca Ag Aide (both trials) or without (in 2012). (NY, 2011, PDMR 6:V104; NY, 2012, PDMR 7:V051). *
*Serenade Max* 3 lb/A **moderately effective**. (NY, 2011, PDMR 6:V104). *
*Sonata* 4 qt/A **very effective**. (NY, 2011, PDMR 6:V104).
*Sporatec* 3 pt/A **moderately effective**. (NY, 2011, PDMR 6:V104). *
*NY, 2011 and 2012. Applications started after first symptoms found.*
*NY, 2016. Sulfur most effective.*

**Lettuce**

*Drop* (caused by *Sclerotinia minor* and *S. sclerotiorum*)

*Actinovate* 12 oz/A **effective** against both pathogens applied twice as soil spray. Inoculated plots. (AZ, 2013, PDMR 8:V198).
*Bio-Tam* 3 lb/A **effective** for both pathogens, better for *S. sclerotiorum*. Double Nickel better for *S. minor*. (AZ, 2017,PDMR 12:V004) *
*BioTam* 4.0 lb/A ineffective. (AZ, 2013, PDMR 8:V198).
*Contans* WG 4.0 lb/A **very effective** against both pathogens, better for both than conventional fungicides tested. Applied once as soil spray at thinning, incorporated. Control not improved by re-applying 18 days later. Inoculated plots. (AZ, 2011, PDMR 6:V077).
*Contans* WG 4.0 lb/A **very effective** against *S. sclerotiorum*, not *S. minor*.
Similar results applied 1 or 2 times as soil spray. (AZ, 2013, PDMR 8:V198).
*Contans* applied with Soilgard (AZ, 2011) or Serenade Soil (AZ, 2013) did not improve control.
*Double Nickel* 2.5 pt/A **effective** for both pathogens. (AZ, 2017,PDMR 12:V004) *.
**Procidic** 10 fl oz/A **effective** for both pathogens, better for *S. sclerotiorum*. Double Nickel better for *S. minor* (AZ, 2017, PDMR 12:V004) *.

**Procidic** 15 and 20 fl oz/A **limited efficacy** for both pathogens applied 5 times, low rate better. CTE. Inoculated. (AZ, 2016, PDMR 11:V006).

**Serenade Soil** 1 gal/A **effective** for both pathogens, better for *S. sclerotiorum*. (AZ, 2017, PDMR 12:V004) *.

**Serenade Soil** 4.0 qt/A **limited efficacy** for only *S. sclerotiorum*. Inoculated plots. (AZ, 2013, PDMR 8:V198).

**SoilGard** 12G 4.0 lb/A **effective**. Control of *S. sclerotiorum* better with 2 applications but not significantly; control same for *S. minor*. Inoculated plots. (AZ, 2011, PDMR 6:V077).

**SoilGard** 12G 4.0 lb/A **effective** especially for *S. sclerotiorum*. Inoculated plots. (AZ, 2013, PDMR 8:V198).

**Taegro-2** 4 oz/A **effective** for both pathogens, better for *S. sclerotiorum*. (AZ, 2017, PDMR 12:V004) *.

**Timorex Gold** 20.3 fl oz/A **limited efficacy** for both pathogens applied twice. CTE. Inoculated. (AZ, 2016, PDMR 11:V006).

*AZ, 2017. Plots inoculated with sclerotia of one pathogen at thinning. CTE.

**Powdery mildew**

**Oxidate** 2.0 1.5 gal/A **effective**. CTE. (AZ, 2017, PDMR 12:V002).

**Serenade Soil** 2.0 qt/A **limited efficacy** applied twice, 17-day interval. Preventive. Rated almost 4 wk later. CTE. (AZ, 2016, PDMR 11:V004).

**Leafy vegetables other than lettuce + spinach** (celery, parsley, radicchio, etc.)

**Legumes** (succulent and dried beans and peas)

**Damping-off** (pea)

Actinovate STP was ineffective (emergence not increased). (WA, 2011, PDMR 6:ST012).

Actinovate seed treatment was ineffective. Several unregistered organic materials tested also; only copper increased emergence (WA, 2007, PDMR 2:V153).


Mycostop Mix was ineffective. (WA, 2011, PDMR 6:ST012).

Mycoseed Treat was ineffective. (WA, 2011, PDMR 6:ST012).

Serenade ASO seed treatment was ineffective. Several unregistered organic materials tested also; only copper increased emergence (WA, 2007, PDMR 2:V153).

Serenade Soil drench was ineffective. (WA, 2011, PDMR 6:ST012).

Soilgard 12G drench was ineffective. (WA, 2011, PDMR 6:ST012).

T-22 HC was ineffective. (WA, 2011, PDMR 6:ST012).

**White mold** (snap bean)
**Double Nickel** 55 WG 1 qt/A as **effective** as 4 of 6 conventional fungicides tested. All applied twice before the first and third inoculations with ascospores (NY, 2015, PDMR 10:V004).

**Stargus** 1 and 2 qt/A as **effective** as conventional fungicide, both applied twice during flowering (NY, 2018, PDMR 13:V021).

EF400 + BacStop applied alone twice or once in alternation with copper. None effective but neither were the 9 conventional fungicide treatments or copper alone (WI, 2015, PDMR 10:V032).

**Pepper. Fruiting vegetables** (pepper, tomato, eggplant, tomatillo, okra, etc.)

**Bacterial leaf spot**

**Double Nickel** 1 qt/A + **Cueva** 2 qt/A **somewhat effective** (not at last assessment). (OK, 2017, PDMR 12:V007).*

**LifeGard** 2.45 oz/A **effective**. (OK, 2017, PDMR 12:V007).*

**LifeGard** 2 and 4.5 oz/A as **effective** as copper + mancozeb. Preventive. (NC, 2018, PDMR 13:V063).

OxiDate 1% ineffective on greenhouse transplants. Preventive, twice weekly schedule; sprayed twice before inoculating center plants in tray. Copper effective. (GA, 2007, PDMR 2:V160).

Regalia 3 pt/A ineffective. 4-day schedule; then 7-day. Copper effective. (GA, 2009, PDMR 4:V151).


**Serenade Max** 1 lb/A **effective** for controlling foliar symptoms, but only based on AUDPC, did not reduce % fruit affected. Preventive schedule; sprayed once before inoculating. Copper effective. (FL, 2010, PDMR 6:V038).

Serenade Max 1.5 lb/A ineffective applied alone or with Biotune (NC, 2007, PDMR 2:V003).

Serenade ASO 2 qt/A ineffective. Other organic fungicides effective (OK, 2017).*

* OK, 2017. Inoculated after application 2 of 10 (PDMR 12:V007).

**Phytophthora blight**

**Actinovate** 12.0 oz/A **limited efficacy** but copper and conventional fungicides not better (NY, 2012, PDMR 7:V017).

Bio-Tam + Taegro alt SoilGard to soil; Actinovate + Regalia alt Double Nickel + Cueva + Regalia ineffective. Disease onset conditions very favorable (NY, 2017, PDMR 12:V005).

Bio-Tam + Taegro alt Stargus to soil; Actinovate + Cueva alt Stargus ineffective. Disease onset conditions very favorable (NY, 2018, PDMR 13:V116).

**Potato.**

**Black scurf (Rhizoctonia)**

**Double Nickel** **effective** applied in furrow. Diseases pressure moderate to low. (WI, 2016, PDMR11:V102).

**Regalia** 4.4 fl oz/1000 row ft **effective** applied in furrow. (WI, 2018, PDMR 13:V104).

Regalia ineffective applied in furrow but marketable yield increased. (WI, 2016, PDMR 11:V102).

**Early blight**

**Actinovate** 9 oz/A preventive schedule **effective**; limited disease (ID, 2010, PDMR 5:V075).

Double Nickel 4.5 pt/A ineffective, also copper. CTE (WI, 2016, PDMR 11:V101).

EF 400 12 fl oz/A ineffective (WI, 2013, PDMR 8:V246).

**M-Pede** 2% preventive schedule **effective**; limited disease (ID, 2010, PDMR 5:V075).

**Regalia Max** 1 pt/A **somewhat effective**. CTE (PA, 2009, PDMR 4:V077).


**Serenade Max** 3 lb/A preventive schedule **effective**; limited disease (ID, 2010, PDMR 5:V075).

**Stargus** 3 qt/A as **effective** as copper. Control not improved by applying with copper or Regalia. Preventive. (NY, 2018, PDMR 13:V002).

**Late blight**

**Regalia Max** 20SC 1 pt/A **effective** for foliar symptoms, not tuber blight; limited residual activity as ineffective 16 d after last application when conventional fungicides still effective (MI, 2009, PDMR 4:V089).

**Nematodes** (sting, root-knot, lesion, lance, stunt)

Majestene 2 gal/A ineffective as were conventional products (Vydate, Velum); but there were fewer unmarketable tubers than nontreated. Nematode pressure low. (FL, 2019, PDMR 14:V119).

**Spinach.**

**Anthracnose**

Oxidate 1 gal/A ineffective applied weekly starting before symptoms; incidence and defoliation ratings significantly **higher** than untreated control; also occurred with an ineffective conventional fungicide. CTE for some (OK, 2007, PDMR 2:V055).

**Damping off** (*Rhizoctonia solani* and *Fusarium oxysporum* isolated from plants)

**Actinovate** 9 oz/100 gal **effective**. (MA, 2016, PDMR 11:V046). *

**Double Nickel** 1.5 qt/100 gal **effective**. (MA, 2016, PDMR 11:V046). *

**Mycostop** 2 g/100 sq ft **effective**. (MA, 2016, PDMR 11:V046). *

**Oxidate effective**. (MA, 2016, PDMR 11:V046). *

Rootshield Plus 8 oz/100 gal ineffective. (MA, 2016, PDMR 11:V046). *

**Damping off** (*Pythium* spp primarily, *Fusarium* also detected)

Kodiak Concentrate Biological Fungicide applied as a seed treatment was ineffective based on final emergence rating; product has since been discontinued (WA, 2007, PDMR 2:V133).

**Micro 108 Seed Inoculant** applied to seed + **Actinovate AG** applied as a soil drench was the most **effective** treatment (WA, 2007, PDMR 2:V133).
Mycostop Mix applied as a seed treatment was ineffective. Micro 108 + Actinovate was effective (WA, 2007, PDMR 2:V133).

SoilGard 12G applied as a soil drench was ineffective based on final emergence rating. Micro 108 + Actinovate was effective (WA, 2007, PDMR 2:V133).

T-22 Planter Box applied as a seed treatment was ineffective. Micro 108 + Actinovate was effective (WA, 2007, PDMR 2:V133).

Yield Shield applied as a seed treatment was ineffective. Micro 108 + Actinovate was effective (WA, 2007, PDMR 2:V133).

**Downy mildew**

Actinovate AG 12 oz/A effective, Taegro better, see that entry for more information. Actinovate + Taegro same as Actinovate alone (CA, 2015, PDMR 10:V016).


Oxidate 2.5%v/v effective applied with surfactant (Aquasil), as effective as Cueva; not considered commercially acceptable. (CA, 2016, PDMR 11:V017)

Oxidate 1 gal/A ineffective applied weekly starting when incidence was <1%. CTE (OK, 2007, PDMR 2:V056).

Procidic 12 and 15 fl oz/A limited efficacy applied at emergence and 9 and 16 days later. CTE. (AZ, 2016, PDMR 11:V002).

Serenade ASO 4 qt/A limited efficacy used alone or alternated with Sonata. Preventive. CTE. (AZ, 2018, PDMR 13:V044).

Taegro 5.2 oz/A effective, better than other organic trts, but none “reduced downy mildew to an acceptable level for fresh market standards”; disease pressure relatively high. (CA, 2015, PDMR 10:V016).

Timorex Gold 27.4 fl oz/A limited efficacy perhaps because not truly preventive; symptoms seen 2 days after first of 2 applications. CTE. (AZ, 2016, PDMR 11:V002).

Cueva 2% effective, Taegro better, see that entry for more information. Cueva applied with Actinovate or Taegro slightly but not significantly better than Cueva alone (CA, 2015, PDMR 10:V016).

**Stemphylium leaf spot**

LifeGard 6 oz/A effective: moderately used alone; good when applied with copper. CTE. (FL, 2017, PDMR 13:V085).

*MA, 2016. Efficacy based on plant stand; significant differences only at second of 3 ratings.

**Tomato. Fruiting vegetables** (pepper, tomato, eggplant, tomatillo, okra, etc.)

**Anthracnose**

All products tested were ineffective in an evaluation with very high disease pressure: Regalia MAXX, experimental products, std (Kocide + Manzate) (OH, 2011, PDMR 6:V061).

Serenade Max 1 lb/A + Kocide 1 lb + Biotune ineffective. CTE (Manzate + Kocide) (OH, 2006, PDMR 1: V005).

Stargus 2 and 3 qt/A ineffective. CTE. (OH, 2018, PDMR 12:V010).
Stargus 2 qt/A + copper (Badge X2) **effective**, but copper not tested alone so cannot determine if Stargus contributed to control. CTE. (OH, 2018, PDMR 12:V010).

**Bacterial canker.** Greenhouse.

Cease + MilStop ineffective. Conventional treatment (Tanoc + Kocide) also ineffective. (MS, 2012, PDMR 7:V056)

**Bacterial canker.**

Double Nickel 1 qt/A ineffective. Others effective. (OH, 2016, PDMR 11:V114).*

LifeGard 4.5 oz/100 gal **effective**, more effective alternated with Kocide 3000 (numerically best) which was as effective as applying Kocide weekly. Inoculated 3 and 10 days after 1st application. (NY, 2017, PDMR 12:V092).

LifeGard 4.5 oz/100 gal ineffective. Inoculated 2 days after 1st application and again after 3rd when first rating done. CTE. (OH, 2017, PDMR 12:V047).

Serenade Opti 20.0 oz/A + MilStop 2.0 lb/A **effective**. Numerically but not significantly better than Cueva copper. (OH, 2016, PDMR 11:V114).*

Serenade Max 1 lb/A + Kocide 1 lb + Biotune ineffective. CTE (Manzate + Kocide) (OH, 2006, PDMR 1:V005).

**Bacterial speck.**

Actinovate 12 oz/A **effective**. Actinovate + Regalia poor, some control at second rating, significantly less than Actinovate. (NY, 2016, PDMR 11:V014)*

**Actinovate 12 oz/A moderately effective**, similar to other organic treatments and copper (Champ). (NY, 2017, PDMR 12:V088). *

AgriPhage 2 pt/100 gal ineffective. CTE (NY, 2019, PDMR 14:072, MTM).

Double Nickel LC 32 fl oz/A **moderately effective**, similar to other organic treatments and copper (Champ). (NY, 2017, PDMR 12:V088). *

Double Nickel 1 qt/A **effective**. Best, numerical less severe than copper. (NY, 2016, PDMR 11:V014). *

LifeGard 4.5 oz/100 gal **moderately effective**, similar to other organic treatments and copper (Champ). (NY, 2017, PDMR 12:V088). *

**OxiDate 128 oz/A effective** at second rating, Double Nickel and Regalia better at both assessments. (NY, 2016, PDMR 11:V014). *

Regalia 1 gal/A **effective** at second rating. (NY, 2016, PDMR 11:V014). *

Regalia 1 gal/A **moderately effective**, similar to other organic treatments and copper (Champ). (NY, 2017, PDMR 12:V088). *

**Bacterial spot.**

All products tested were ineffective in an evaluation with very high disease pressure: Regalia MAXX, experimental products, std (Kocide + Manzate) (OH, 2011, PDMR 6:V061).

**Actinovate moderately effective** in GH (FL, 2013).

**Actinovate 12 oz/A moderately effective**, similar to other organic treatments and copper (Champ). (NY, 2017, PDMR 12:V089). *

AgriPhage 2 pt/A **effective**. Preventive (OH, 2019, PDMR 14:V063).


**Double Nickel LC 32 fl oz/A moderately effective**, similar to other organic treatments and copper (Champ). (NY, 2017, PDMR 12:V089). *
LifeGard 2 fl oz/A effective, numerically more effective than Kocide 3000, no treatment statistically better. Applications started 19 days before symptoms seen. (GA, 2017, PDMR 12:V056).

LifeGard 4.5 oz/100 gal moderately effective, similar to other organic treatments and copper (Champ). (NY, 2017, PDMR 12:V089). *

LifeGard 4.5 oz/100 gal alt Kocide 3000-O 1.25 lb/A moderately effective. Preventive. CTE (IN, 2019, PDMR 14:V111).

Regalia 1 gal/A moderately effective, similar to other organic treatments and copper (Champ). (NY, 2017, PDMR 12:V089). *

Regalia + Cueva alt. OxiDate + Aquasil effective. Best, numerically less severe than copper. OxiDate and Cueva alone both ineffective. GH ext with seedlings, inoculated 2 days after first spray. Disease pressure low to moderate. (NC, 2016, PDMR 11:V053).

Early blight

Actinovate 12 oz/A moderately effective, similar to other organic treatments and copper (Champ). (NY, 2017, PDMR 12:V089). *

Double Nickel LC 32 fl oz/A moderately effective, similar to other organic treatments and copper (Champ). (NY, 2017, PDMR 12:V089). *


Double Nickel 55 3 lb/A + Cueva 2 gal/A was ineffective. Preventive. (TN, 2019, PDMR 14:V034).

OxiDate 128 oz/A applied with Yucca Ag Aide ineffective; Nordox also (NY, 2011, PDMR 6:V105).

Regalia 1 gal/A moderately effective, similar to other organic treatments and copper (Champ). (NY, 2017, PDMR 12:V089). *

Serenade Max 1 lb/A ineffective (IN, 2008, PDMR 3:V135).

Serenade Max 3 lb/A ineffective; Nordox also (NY, 2011, PDMR 6:V105).

Sonata 4 qt/A ineffective; Nordox also (NY, 2011, PDMR 6:V105).

Sporatec AG 3 pt/A effective (others not) (NY, 2011, PDMR 6:V105).

Stargsus 2 and 3 qt/A ineffective. CTE. (OH, 2018, PDMR 12:V010).

Stargsus 2 qt/A + Badge X2 (copper) effective, but copper not tested alone so cannot determine if Stargsus contributed to control. CTE. (OH, 2018, PDMR 13:V010).

Stargsus 2 qt/25 gal + Badge X2 (copper) somewhat effective, but copper not tested alone so cannot determine if Stargsus contributed to control. CTE. (PA, 2019, PDMR 14:V003).

Late blight


Double Nickel 1 qt/A + Cueva 2 qt/A limited efficacy early; ineffective based on AUDPC. Other organic trt effective. Preventive. Conventional treatments all more effective. (PA, 2017, PDMR 12:V001).
**Leaf mold in high tunnel**

**Double Nickel** 1.5 gal/A effective. Preventive. (NY, 2016, PDMR 11:V029).

**Double Nickel** 1.5 gal/A effective; copper better. (NY, 2017, PDMR 12:V091).


**Regalia** 1 gal/A effective; copper better. (NY, 2017, PDMR 12:V091).

**OxiDate** 128 oz/100 gal effective. Preventive. (NY, 2016, PDMR 11:V029).

**OxiDate** 128 oz/100 gal effective; other organic treatments better. (NY, 2017, PDMR 12:V091).


**Zonix** 500 ppm effective, similar to copper (Champ). (NY, 2017, PDMR 12:V091).

**Septoria leaf spot**

**Actinovate** moderately effective (NY, 2008, PDMR 3:V127; MTM).

**Actinovate** ineffective (NY, 2009, PDMR 4:V115; MTM).

**Companion** moderately effective (NY, 2008, PDMR 3:V127; MTM).

**Companion** ineffective (NY, 2009, PDMR 4:V115; MTM).


**Organocide** ineffective (NY, 2009, PDMR 4:V115; MTM).


**Regalia** ineffective (NY, 2009, PDMR 4:V115; MTM).


**Stargus** 2 and 3 qt/A ineffective. CTE. (OH, 2018, PDMR 12:V010).

**Stargus** 2 qt/A + copper (Badge X2) effective, but copper not tested alone so cannot determine if Stargus contributed to control. CTE. (OH, 2018, PDMR 12:V010).

**Taegro** ineffective (NY, 2009, PDMR 4:V115; MTM).


*NY, 2016. Preventive sprays. Inoculated 2 days after first spray. Low disease pressure due to dry weather.

*NY, 2017. Preventive sprays all experiments. Early blight: inoculated after 1st spray; same day. Leaf mold: inoculated 1 day afterwards. Speck: inoculated 2 days afterwards. Spot: inoculated 3 and 10 days afterwards. Treatments all effective based on AUDPC; some daily ratings not significantly different from control.

**Root/Tuber and Corm Crops** (beets, carrot, potato, radish, ginger, turnip, etc.)

**Turnip - black leg, light leaf spot, and white leaf spot**

**Serenade Max** 20 oz/A ineffective. CTE. (OR, 2016, PDMR 11:V110)

**Regalia** effective only for white leaf spot. CTE. (OR, 2016, PDMR 11:V110)

**Stylet Oil** effective only for black leg. CTE. (OR, 2016, PDMR 11:V110)
Compiled by Margaret T. McGrath. Up-dated 4-9-20.