



Organic Commercial Spray Schedule for Field Production of Summer Squash & Zucchini

Nicole Gauthier
*Plant Pathology
Extension Specialist*

Kim Leonberger
*Plant Pathology
Extension Associate*

Sara Long
*Plant Disease
Diagnostic Assistant*

Rachel Rudolph
*Horticulture
Extension Specialist*

INTRODUCTION

Commercial field production of organic summer squash and zucchini allows growers to yield premium crop prices. However, numerous plant pathogens can cause disease, resulting in plant damage and yield loss. Applications of fungicides and bactericides are often necessary to limit the impact of plant diseases. These products provide the greatest efficacy when applied prior to disease onset. Growers should develop a preventative spray schedule for each crop and season to limit the impact of diseases. Organic growers will rely on specific products to maintain certifications or be able to market produce as organically produced. This document provides information on the timing of the most common squash diseases, as well as an example spray schedule. Fungicides recommended here include a few of the most common products; a complete list of registered fungicides can be found in *Vegetable Production Guide for Commercial Growers* (ID-36) and *Southeastern U.S. Vegetable Crop Handbook* (SEVEW); generic products may also be available. Information on OMRI approved products is available at <https://www.omri.org/>.

| Summer Squash & Zucchini | |
|---------------------------|-------------|
| Disease | Time Period |
| Pythium root rot | May - June |
| Bacterial wilt | June - Aug |
| Cercospora leaf spot | June - Aug |
| Fusarium wilt | June - Aug |
| Powdery mildew | June - Aug |
| Downy mildew | July - Aug |
| Angular leaf spot | July - Sept |
| Fusarium crown & foot rot | July - Sept |

TIMELINE OF COMMON AND IMPORTANT DISEASES OCCURRING ON SUMMER SQUASH AND ZUCCHINI.



BACTERIAL WILT (*left*) AND ANGULAR LEAF SPOT (*right*) CAN BE CAUSE SERIOUS DAMAGE IN ORGANIC PRODUCTION OF SUMMER SQUASH AND ZUCCHINI.

Disease Management for Organic Field Summer Squash & Zucchini

GENERAL NOTES

The following includes an example of products; this list is not comprehensive. A complete list of fungicides and their efficacy can be found in the *Vegetable Production Guide for Commercial Growers* (ID-36) and the *Southeastern U.S. Vegetable Crop Handbook*. See Additional Resources section.

Always read product labels for specific use instructions. The label is the law.

PREPLANT

Rotate out of cucurbit crops for at least 3 years in the same field, especially for sites with a history of soilborne diseases. Space plants for maximum air circulation. When available, use resistant cultivars (e.g. powdery mildew resistant cultivars). Follow cultural practices (rotate crops, improve drainage, practice sanitation).

AT PLANTING (Approximately early May)

Apply LalStop K61, Obtego, or RootShield Plus if Pythium root rot or damping off disease emerges or if field has a history of belly rot, cottony leak, or Fusarium fruit rot. To prevent bacterial wilt, manage cucumber beetles beginning at seedling stage (See *Cucumber Beetles* Entfact-311 publication).

VEGETATIVE GROWTH (Approximately early May through mid-June)

Practice good sanitation, such as removing diseased or senescing tissue regularly and removing clippings and debris from the field.

| Application Timing <i>Weeks after planting</i> | Application Notes | Fungicides ² | Target Diseases |
|---|--|--|-----------------|
| Week 1 to 5 | Use fungicides preventively before disease develops. Applications should be made every 1 to 2 weeks. A SAR inducer can help plants build immunity. | Cease/Stargus Copper ^{3,4} OSO SAR inducer Actinovate/Regalia | Leaf diseases |

FLOWERING THROUGH HARVEST (Approximately mid-June through mid-August)

| Application Timing <i>Weeks after planting</i> | Application Notes | Fungicides/Bactericides ² | Target Diseases |
|---|--|---|---|
| Week 6 to 10 | Use fungicides preventively before disease develops. Applications should be made every 1 to 2 weeks. | Cease/Stargus Copper ^{3,4} OSO | Cercospora leaf spot, powdery mildew |
| As needed ¹ | For severe powdery mildew or high risk plantings, add an additional product to tank mix or add additional sprays. | Sulfur ⁵ Cease/Stargus MilStop EcoSwing | Powdery mildew |
| As needed ¹ | Applications should be made every 1 to 2 weeks when risk is high. Monitor disease via ipmpipe.org forecasting site. | Copper ^{3,4} MilStop Zonix | Downy mildew |

¹ Application necessary when diagnostic results confirm presence of disease or if field has history of disease.

² See SEVEW Table 3-51 Biopesticides for alternative products. (Note: This production guide is revised annually and location of this information could change.)

³ Copper products can include Badge, Basic Cop, Nordox, or NuCop.

⁴ Combining copper fungicides with SAR products like Actinovate, Regalia, and some Bacillus products can enhance efficacy of copper-based fungicides.

⁵ Sulfur should not be applied within 7 days of Bacillus products.

Disease Management for Organic Field Summer Squash & Zucchini

FLOWERING THROUGH HARVEST (Approximately mid-June through mid-August) *(cont'd)*

| Application Timing <i>Weeks after planting</i> | Application Notes | Fungicides/Bactericides ² | Target Diseases |
|---|---|--------------------------------------|---------------------------|
| As needed ¹ | Applications should be made every 1 to 2 weeks. A SAR inducer can help plants build immunity. | Copper ^{3,4} | Angular leaf spot |
| | | Cease/Stargus | |
| | | Leap | |
| | | SAR inducer Actinovate/Regalia | |
| As needed ¹ | Applications should be made every 1 to 2 weeks. | LalStop K61 | Fusarium crown & foot rot |
| | | Obtego | |
| | | RootShield Plus | |
| | | Cease/Stargus | |

¹ Application necessary when diagnostic results confirm presence of disease or if field has history of disease.

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⁴ Combining copper fungicides with SAR products like Actinovate, Regalia, and some Bacillus products can enhance efficacy of copper-based fungicides.

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EXAMPLE SPRAY SCHEDULE FOR ORGANIC FIELD PRODUCTION OF SUMMER SQUASH AND ZUCCHINI.

| Summer Squash & Zucchini | | |
|--------------------------|------------------|-----------------|
| Weeks after Planting | Fungicide(s) | Target Diseases |
| 1-5 | Actinovate+Cease | LS |
| Weeks during Harvest | Fungicide(s) | Target Diseases |
| 6 | Cease+EcoSwing | LS, PM |
| 7 | NuCop+MilStop | DM, LS, PM |
| 8 | Cease+EcoSwing | DM, LS, PM |
| 9 | NuCop+MilStop | DM, LS, PM |
| 10 | Cease+EcoSwing | DM, LS, PM |

DM – DOWNY MILDEW; LS – FUNGAL LEAF SPOTS;
PM – POWDERY MILDEW

DISCLAIMER

Fungicides listed here include a few of the most common products available and were selected to simplify information in this publication. No endorsement is intended nor is criticism implied of similar products that are not named.

ADDITIONAL RESOURCES

Additional information can be found on the UK Plant Pathology Extension Publications webpage <https://plantpathology.ca.uky.edu/extension/publications>

- Vegetable Production Guide for Commercial Growers (ID-36)
- Southeastern U.S. Vegetable Crop Handbook (SEVEW)
- OMRI Product Website <https://www.omri.org/>

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Editor: Cheryl Kaiser, Plant Pathology Extension Support

Photos: Bugwood.org—Howard F. Schwartz, Colorado State University (bacterial wilt) and Gerald Holmes, Strawberry Center, Cal Poly San Luis Obispo (angular leaf spot)