Martin-Gatton
College of Agriculture, Food and Environment
Cooperative Extension Service

Plant Pathology Fact Sheet **PPFS-VG-31**

Commercial Spray Schedule for High Tunnel Production of Tomatoes

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Introduction

High tunnel tomato production allows growers to plant earlier in spring or later in autumn, resulting in fruit available for sale before field tomatoes can be marketed. However, numerous plant pathogens can infect tomatoes resulting in plant and/or fruit loss. Applications of fungicides and bactericides are often necessary to limit the impact from plant diseases. Fungicides and bactericides provide the greatest efficacy when applied preventively (prior to disease onset). Growers should develop a spray schedule for each season in order to limit the impact of the various fungi and bacteria that can affect tomatoes. This document provides information on the timing of the most common high tunnel tomato diseases, as well as example spray schedules for conventional and organic systems. 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 *Southeast U.S. Vegetable Crop Handbook* (SEVEW); generic products may also be available. High tunnels are considered greenhouses; use only products that are labeled for greenhouse application.

Timeline of common and important diseases occurring on tomato crops in high tunnel production.

Disease	Time Period
Gray mold	Apr – Aug
Pythium root rot	Apr – Aug
Timber rot	Apr – May
Bacterial spot	May – July
Leaf mold	May – Aug

Disease	Time Period
Rhizoctonia root & crown rot	May – Aug
Early blight	June – Aug
Fusarium wilt	June – July
Southern blight	June - Aug

Numerous plant diseases can affect tomato crops in high tunnel production.

Disease Manangement for Conventional High Tunnel Tomato Production

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 in *Vegetable Production Guide for Commercial Growers* (ID-36) and *Southeast U.S. Vegetable Crop Handbook* (SEVEW). See Additional Resources section.

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

PREPLANT

Rotate out of tomato for at least 3 years, especially for sites with a history of soil-borne diseases. Space plants for maximum air circulation. For sites with a history of timber rot, incorporate Contans into the soil in January. Follow cultural practices (rotate crops, improve drainage, select resistant cultivars, practice sanitation).

TRANSPLANT (Approximately early April)

If tunnel has a history of Rhizoctonia root rot or southern blight, apply Blocker at pre-plant, transplant, or side dress application (see precautions). Apply Ridomil for Pythium root rot and damping-off if disease emerges.

VEGETATIVE GROWTH (Approximately mid-May through mid-June)

Maintain RH below 70% by opening end or side walls for air circulation, even when raining. This is the most critical step for disease prevention and control. If above 50°F outside, it is safe to open the tunnels without damaging tomatoes. Install at least one humidity meter in each tunnel.

Sucker and prune tomato plants early while suckers are small to avoid creating large open wounds. Use clean tools. Practice good sanitation (e.g., remove diseased or senescing tissue regularly, remove clippings and debris from the tunnel).

Application Timing *Weeks after transplant*	**Application Notes**	**Fungicides/Bactericides[2]**	**Target Diseases**
Week 1 to 8	Use fungicides and bactericides preventatively before disease develops. Applications should be made every 1 to 2 weeks. Rotate products between applications to avoid resistance development.	Mancozeb	Leaf mold, leaf spots
		Coppper	
As needed[1]	Apply as a drench during April and May.	Botran	Timber rot
		Endura	
		Fontelis	
		Cabrio	
		Priaxor	
As needed[1]	Target applications in April and May.	Fontelis	Botrytis gray mold

HARVEST (Approximately mid-June to mid-August)

Maintain RH below 70% all season. Practice good air circulation. Unless there is extreme wind, the tunnel should remain open during this time period. Sanitation is critical.

Application Timing *Weeks after transplant*	**Application Notes**	**Fungicides/Bactericides[2]**	**Target Diseases**
Week 9 to 15	Applications should be made every 2 weeks. Rotate products between applications to avoid resistance development.	Fontelis	Early blight, leaf mold, leaf spots
		Quadris Top	
		Inspire Super	
As needed[1]		Inspire Super	Leaf mold
		Quadris Top	
As needed[1]		Copper	Bacterial diseases
		Actigard	
As needed[1]		Fontelis	Southern blight

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

[2] See SEVEW Table 3-53 Biopesticides for alternative products. (Note: This production guide is revised annually and location of this information could change.)

Disease Management for Organic High Tunnel Tomato Production

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 *Vegetable Production Guide for Commercial Growers* (ID-36) and *Southeast U.S. Vegetable Crop Handbook* (SEVEW). See Additional Resources section.

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

PREPLANT

Rotate out of tomato for at least 3 years, especially for sites with history of soil-borne diseases. Space plants for maximum air circulation. For sites with a history of timber rot, incorporate Contans into the soil in January. Follow cultural practices (rotate crops, improve drainage, select resistant cultivars, practice sanitation).

VEGETATIVE GROWTH (Approximately mid-May through mid-June)

Maintain RH below 70% by opening end or side walls for air circulation. This is the most critical step for disease prevention and control. If above 50°F outside, it is safe to open the tunnels without damaging tomatoes. Install at least one humidity meter in each tunnel. Sucker and prune tomato plants early while suckers are small to avoid creating large open wounds. Use a pair of shears or snips to make good cuts rather than breaking or ripping suckers by hand. Clean tools after each use. Practice good sanitation (e.g., remove diseased or senescing tissue regularly, remove clippings and debris from tunnel).

Application Timing *Weeks after transplant*	**Application Notes**	**Fungicides/Bactericides[2]**	**Target Diseases**
Week 1 to 8	Use fungicides and bactericides preventatively before disease develops. Applications should be made every 5 to 10 days.	ZeroTol OSO + Copper (tank mix) Cease/Double Nickel (or other product containing *Bacillus* spp.)	Leaf mold, leaf spots
As needed[1]	Apply as a drench during April and May.	Botrystop Howler	Timber rot
As needed[1]	Target applications in April and May.	Botrystop Cease Fracture	Botrytis gray mold

HARVEST (Approximately mid-June to mid-August)

Maintain RH below 70% all season. Practice good air circulation. Unless there is extreme wind, the tunnel should remain open during this time period. Sanitation is critical.

Application Timing *Weeks after transplant*	**Application Notes[1]**	**Fungicides/Bactericides[2, 3]**	**Target Diseases**
Week 9 to 15	Applications should be made every 5 to 10 days.	ZeroTol Cease/Double Nickel	Early blight, leaf mold, leaf spots
As needed[1]	Target applications June/July through harvest.	Copper Zonix	Leaf mold
As needed[1]		Actigard Copper	Bacterial diseases

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

[2] See SEVEW Table 3-53 Biopesticides for alternative products. (Note: This production guide is revised annually and location of this information could change.)

Example high tunnel spray schedules for conventional and organic tomato production.

Conventional Production		
Weeks after Transplant	**Fungicide**	**Target Diseases**
1	Mancozeb	LM, LS
2	Copper	LM, LS
3	Mancozeb	LM, LS
4	Copper	LM, LS
5	Mancozeb	LM, LS
6	Copper	LM, LS
7	Mancozeb	LM, LS
8	Copper	LM, LS
Weeks during Harvest	**Fungicide**	**Target Diseases**
9	Quadris Top	EB, LM, LS
10	Copper	EB, LM, LS
11	Quadris Top	EB, LM, LS
12	Copper	EB, LM, LS
13	Quadris Top	EB, LM, LS
14-18	Copper	EB, LM, LS

EB – early blight; LM - leaf mold; LS – leaf spots

Organic Production		
Weeks after Transplant	**Fungicide(s)**	**Target Diseases**
1	OSO+Copper	LM, LS
2	Double Nickel	LM, LS
3	OSO+Copper	LM, LS
4	Double Nickel	LM, LS
5	OSO+Copper	LM, LS
6	Double Nickel	LM, LS
7	OSO+Copper	LM, LS
8	Double Nickel	LM, LS
Weeks during Harvest	**Fungicide(s)**	**Target Diseases**
9	OSO+Copper	EB, LM, LS
10	Double Nickel	EB, LM, LS
11	OSO+Copper	EB, LM, LS
12	Double Nickel	EB, LM, LS
13	OSO+Copper	EB, LM, LS
14	Double Nickel	EB, LM, LS
15	OSO+Copper	EB, LM, LS
16	Double Nickel	EB, LM, LS

A – anthracnose; BS – bacterial spot; RZ – Rhizoctonia; SB – southern blight

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

- Vegetable Production Guide for Commercial Growers (ID-36)
  http://www2.ca.uky.edu/agcomm/pubs/id/id36/id36.pdf
- Southeast U.S. Vegetable Crop Handbook (SEVEW)
  https://www.aces.edu/blog/topics/vegetable-crops/southeastern-us-vegetable-crop-handbook/
- UK Plant Pathology Extension Publications
  https://plantpathology.ca.uky.edu/extension/publications

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