**Integrated Pest Management in High Tunnels**

Although the first year of growing in a high tunnel may feel easier than growing in the open field, it is a common misconception that high tunnel production has fewer issues. There are not fewer pests or diseases in high tunnels compared to the open field, but there may be *different* pests and diseases compared to crops grown in the field. Management may also be different compared to the field. Growing a profitable crop requires having a plan in place for pest and disease management to prevent, identify, and respond to problems in your high tunnel.

Integrated pest management (IPM) is a phrase that describes a well-rounded approach to dealing with all types of crop pests, which include insects, diseases, weeds, and even animals. Prevention is an important component of IPM. When issues arise, management of pests should be a combination of approaches rather than relying on only one method. Your approach to management in the current season impacts the next growing season. A successful high tunnel grower will create a plan to not only address the present problem, but also develop a long-term IPM plan that will help prevent and address future issues.

**Scouting in a High Tunnel**

*An IPM Scouting Guide for Common Problems of High Tunnel and Greenhouse Vegetable Crops in Kentucky, ID-235 (Resource ###)*

This guide covers common diseases, pests, weeds, and abiotic (meaning not caused by an organism) challenges encountered in Kentucky high tunnels with images to assist with identification of issues.

The guide can be accessed digitally, or a printed copy may be available at your county Cooperative Extension office.

<https://publications.ca.uky.edu/files/ID235.pdf>

The mobile friendly web page, Veggie Scout, hosted by the University of Kentucky Department of Plant Pathology, can assist with identifying what problem you have in your high tunnel:

 <https://veggiescout.ca.uky.edu/high-tunnel-greenhouse-vegetable-crops-scouting-guide>

*MyIPM APP for Vegetables (Resource ###)*

This application was developed by Extension Specialists across the United States

It is available as a free download on smartphones and smart devices to assist with in-field scouting of diseases and pests.

The app includes training modules with management recommendations for a specific disease or pest. <https://myipm.app/vegetables/>

The How-To Guide walks you through downloading the app onto your device and navigating the resource.

MyIPM How-To Guide PDF: <https://myipm.app/wp-content/uploads/2024/01/MyIPM-for-Vegetables_final-SECURED.pdf>

*Abiotic and Physiological Disorders of Tomato (Resource ###)*

These are issues that are not caused by plant pathogens, but by too much or not enough of certain nutrients or by environmental factors such as high air temperatures or humidity.

* In this 36-minute video the University of Kentucky Extension Vegetable Specialist discusses how abiotic disorders differ from diseases, what the different abiotic disorders are, and how to prevent them.
* <https://www.youtube.com/watch?v=hlAsPyNgx8Q>

**Crop Rotation**

**Crop rotation is crucial for an effective IPM strategy. Rotating crops can break the cycle of host plants for insect pest and soilborne pathogens. See Chapter 6 for more information on crop rotation resources.

**Weed Management**

1. *Weed Management Options in High Tunnels (Resource ###)*

This 30-minute video from University of Kentucky Horticulture Specialists goes through weed management options for high tunnel production.

<https://www.youtube.com/watch?v=RSOUemStq0A>

**Insect Pest Management**

*Controlling Pests on High Tunnel Tomatoes (Resource ###)*

This is a 34-minute video from the University of Kentucky Vegetable Extension Entomologist summarizing a pest management program for high tunnel tomato production.

<https://www.youtube.com/watch?v=sIAQQnaRVp4>

*High Tunnel Insects (Resource ###)*

In this seven-minute video, the University of Kentucky Extension Entomologist explains active and passive monitoring for pests in your high tunnel.

<https://www.youtube.com/watch?v=XN42qaUt9Pk>

*Sustainable Pest Management in Greenhouses and High Tunnels (Resource ###)*

* + - This is a 10-page fact sheet from Sustainable Agriculture Research & Education (SARE) that provides guidance and recommendations for using natural pests as form of control for common high tunnel insect pests, called biocontrol.
		- <https://www.sare.org/wp-content/uploads/Sustainable-Pest-Management-in-Greenhouses-and-High-Tunnels.pdf>
1. *Biological Control of Arthropod Pests in High Tunnels and Greenhouses, Entfact-327 (Resource ###)*
	* This two-page guide from University of Kentucky Entomologists focuses on how to manage key arthropod pests in high tunnel production systems.
	* <https://entomology.ca.uky.edu/files/ef327.pdf>
2. *Biological Products for Insect Control in Greenhouses (Resource ###)*
* Page 10 in the *Vegetable Production Guide for Commercial Growers, ID-36*, a comprehensive crop management guide by the University of Kentucky, provides a list of beneficial insects that can be released in high tunnels to assist with reducing pest populations.
* <https://publications.ca.uky.edu/files/ID36.pdf>
* **See Chapter 6—Growing Your First High Tunnel Crop for a full description of this production guide resource.

**Plant Disease Management**

*Beginner Disease Management for Vegetable Production(Resource ###)*

* This resource is a recorded 40-minute presentation by University of Kentucky Plant Pathologist about vegetable disease basics.
* <https://www.youtube.com/watch?v=Nn_DLwZ0d4M>

*Disease Management Roadmap for Small Acreage Growers, PPFS-GEN-25-IG (Resource ###)*

* This infographic walks you through the key steps to disease management in small scale operations.
* It could be printed and posted for farm workers to reference.
* <https://plantpathology.ca.uky.edu/sites/plantpathology.ca.uky.edu/files/PPFS-GEN-25-IG_P.pdf>

*Managing Greenhouse & High Tunnel Environments to Reduce Plant Diseases, PPFS-GH-01 (Resource ###)*

* This is a guide from University of Kentucky Plant Pathology on the best practices for sanitation and management of climate, water, and soil in a high tunnel to minimize disease challenges.
* <https://plantpathology.ca.uky.edu/files/ppfs-gh-01.pdf>

*Disease Management through Sanitation in a High Tunnel (Resource ###)*

* This three and a half-minute video from the University of Kentucky Plant Pathologist discusses the importance of sanitation in a high tunnel as part of disease prevention and management.
* <https://www.youtube.com/watch?v=rRxCJAmdzro>

*Cleaning & Disinfecting Hand Tools & Planting Supplies, PPFS-GEN-17 (Resource ###)*

This resource is a four-page fact sheet from University of Kentucky Plant Pathology discussing both the importance of using clean equipment and ways to sanitize tools used on the farm.

<https://plantpathology.ca.uky.edu/sites/plantpathology.ca.uky.edu/files/PPFS-GEN-17.pdf>

*Management of Common High Tunnel Tomato Diseases (Resource ###)*

* This is an 18-minute presentation by University of Kentucky Plant Pathologist, highlighting common disease problems encountered by high-tunnel tomato growers in Kentucky and how to manage them.
* <https://www.youtube.com/watch?v=4YseHDPCyAk>

 *Root-knot Nemtoade in Vegetable Cropping Systems (Resource ###)*

Root-knot nematodes are microscopic plant-parasites that reside in the soil and cause decreased plant vigor and yield.

* This resource explains plant symptoms, identification and diagnosis, and management.
* <https://plantpathology.ca.uky.edu/files/ppfs-vg-28.pdf>

*Commercial Spray Schedule for High Tunnel Production of Tomatoes, PPFS- VG- 31*

* This resource from University of Kentucky Plant Pathology covers disease management for conventionally and organically grown high tunnel tomatoes.
* It includes an example spray schedule to limit the impact of tomato diseases to crop yield.
* <https://plantpathology.ca.uky.edu/files/ppfs-vg-31.pdf>

*Commercial Spray Schedule for High Tunnel Production of Cucumbers, PPFS- VG- 33* *(Resource ###)*

* This three-page fact sheet from the University of Kentucky contains a timeline of when common diseases of cucumber crops occur in Kentucky high tunnels.
* It also has recommended management strategies to combat these pathogens including a spray schedule based on plant growth stage.
* <https://plantpathology.ca.uky.edu/files/ppfs-vg-31.pdf>
1. **Soil solarization**

Soil solarization uses thin, clear plastic to trap solar energy and heat soil to temperatures that can be detrimental to weeds and plant pathogens. Because temperatures can be so much higher in high tunnels, soil solarization may be even more effective in high tunnels compared to the open field.

*Benefits of Soil Solarization (Resource ###)*

* This five-minute video discusses the potential benefits of soil solarization, including management of weeds, diseases, and insect pests.
* <https://www.youtube.com/watch?v=DH4lY-8IdNk>

*How to Solarize Soil (Resource ###)*

* This 10-minute video from the University of Kentucky Extension Vegetable Specialist is a step-by-step guide on how to effectively solarize soil, how long to solarize, and the tools you will need.
* <https://www.youtube.com/watch?v=LB2G3E0OPsU>

*Additional Benefits of Solarization for Weed & Insect Management (Resource ###)*

* This is a recorded five-minute conversation between the University of Kentucky Extension Entomologist and Vegetable Specialist on the potential of soil solarization for weed and pest management.
* <https://www.youtube.com/watch?v=iR8TJaAlRKs>



See Chapter 7 Soil Health for more information on managing high tunnel soils to support crop production

**7. Wildlife Pests**

*Management of Wildlife and Domestic Animals on Your Farm, ID-243 (Resource ###)*

* This three-page extension publication from the University of Kentucky includes Good Agricultural Practices (GAPs) for managing both domestic animals and wildlife around food production and includes recommendations on fencing, population control, and best practices.
* <https://publications.ca.uky.edu/sites/publications.ca.uky.edu/files/ID243.pdf>

*Make Your Own Vole Trap (Resource ###)*

* A five-minute video from the University of Kentucky on how to make an effective vole-trap, which can be used in a high tunnel.
* <https://www.youtube.com/watch?v=u6uuQd-1HNA>