

# Tips for Tomato Disease Prevention in High Tunnels

## Growers Guide

The 2011 Midwest Vegetable Production Guide for Commercial Growers is another excellent source of information. You can view it at

<http://www.btny.purdue.edu/Pubs/ID/id-56/ID-56.pdf>

For fertilization tips, and diagnosis and prevention of tomato problems related to environmental and nutrient factors, see page 88

For disease control options, see pages 89-93

For control of insect problems, see pages 95-100

For more photos of tomato



High tunnels offer excellent protection from damaging winds and frosts, enhance early maturity, and produce better-quality products. In high tunnels, growers can control water, nutrients, humidity in the air, and temperature. The optimum levels of these factors need to be monitored constantly to ensure that plants grow healthy and to avoid environmental conditions that are conducive to disease development. You may want to consider the following tips for your high tunnel growing season:

## Cultural Practices that can Help Minimize Disease Development:

### 1. Environmental Management

- Maintain optimum crop growth by providing adequate nutrients and soil moisture. Plants will grow healthy and less prone to suffer from disease and insects. Avoid periods of little or too much water. One technique to monitor soil moisture is to use a tensiometer. A tensiometer measures soil moisture tension as centibars (cb). The drier the soil becomes, the higher the centibar reading from the tensiometer. Generally, for tomatoes, the soil moisture tension should be maintained between



10-20 cb. When soil moisture tension exceeds 20 cb, irrigation should occur.

- Use raised beds covered with plastic mulch and drip irrigation tape buried beneath each bed. This increases soil temperature promoting earlier crop maturity, higher yields, increased quality, improved disease and insect resistance, and more efficient water and fertilizer use.
- If possible, use wider plant spacing to increase air circulation. Older leaves are more susceptible to fungal infections.
- Provide ventilation as early and as late in the day as possible. **All of the foliar fungal diseases are favored by high relative humidity (> 85%) in the tomato canopy.** The length of time above



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90% relative humidity should be limited.

- Remove suckers and the oldest leaves to increase air circulation.
- Provide adequate **drainage** around the base of the structure to make sure no water flows or seeps into the high tunnel.

## 2. Sanitation

- Proper sanitation is critical. Weeds, which may harbor insect pests and some pathogens, and also reduce air movement, should be removed from inside and outside the structure. Diseased tissue should be removed and disposed of. **Cull piles are a source of pathogen and waste tissue should be burnt or buried.**
- Do not allow any volunteer plants to become established in the structure at any time.
- Surfaces should be cleaned thoroughly after each crop, and tools should be cleaned regularly to reduce the risk of disease spread. Workers should wash hands often – at least at the end of each row – to minimize the spread of pathogens, particularly *Botrytis* grey mold and bacterial canker.

Keep in mind that some diseases are difficult to manage once they become established. However, if diseases are identified early in the epidemic and all the appropriate cultural tactics have been employed, fungicides can be applied to reduce disease spread throughout the high tunnel.

## Effects of Soil and Air Temperature on Tomato Production:

- Tomatoes grow best at temperatures between 75 - 85°F and when night temperatures stay above 50°F.
- Growth of tomato plants will stall when the soil temperature is 56°F or less, but begin to grow when the soil temperature hits 58°F.
- Fruit set does not occur at low night temperatures (consistently below 50°F); fruits will not develop properly when temperatures exceed 95°F.
- At temperatures between 50 and 60°F, 'rough', irregular fruit growth (cat-facing) may occur.
- Temperatures above 95°F can damage tomato blossoms causing flowers to drop or to develop irregular shaped fruit.



*Septoria leaf blight (Septoria lycopersici), a common fungal disease of field-grown tomatoes.*



*Early blight (Alternaria solani), a common fungal disease of field-grown tomatoes that affects both foliage and fruit.*

### References:

Miller, S.A. 2010. *Managing Diseases of Organic Tomatoes in Greenhouses and High Tunnels*. <http://www.extension.org/pages/18337>(accessed 01/10/11)

Jett, L.W. 2004. *Production of Tomatoes within a High Tunnel*. Univ. of Missouri Extension publication M-170