

## Greenhouse Tomatoes

### Introduction

Greenhouse tomato production has attracted a great deal of attention in recent years. However, of all the greenhouse crops, tomatoes are the most complicated to grow because they require the most management, the most labor and the most light. A grower must be committed to meeting the daily demands of production in order to be successful. Prospective growers need to get as much information as they can about all aspects of greenhouse production before beginning such an enterprise.

### Marketing

Farmers markets, roadside farm markets and produce auctions across the state offer significant opportunities to sell produce from the farm. Tomatoes can be sold directly from the greenhouse at retail prices. Wholesale markets include supermarkets, restaurants, caterers and wholesale distributors.

### Market Outlook

The U.S. greenhouse tomato market is increasing dramatically as consumers demand the better flavor of “vine ripened” greenhouse produce. Many consumers will now pay an increased price for a red, ripe tomato. It would be possible for Kentucky growers to sell greenhouse tomatoes in this expanding market.

Excellent light, moderate heating costs, high yields and good prices make spring the best time for greenhouse tomato production in Kentucky. On the



other hand, fall and winter production generally results in low returns due to reduced yields and high fuel costs. For this reason, it is difficult to recommend the production and harvest of greenhouse tomatoes from December 15 to February 15.

### Production Considerations

#### *Production systems*

There is no single best system for successfully growing greenhouse tomatoes. Many production systems will work if the grower correctly manages fertilization and watering. With experience, individual growers will be able to determine the best and most economic techniques to use in their greenhouse.

Many different types of growing media can be used for greenhouse tomatoes, including good field soil, packaged commercial mixes and various types of hydroponic media. Use only soils or materials that have been sterilized, pasteurized or manufactured under clean, disease-free conditions. Small



growers often use soil culture in the beginning, but switch to perlite or rockwool culture as they learn more about tomato production. A drip irrigation system is used for the distribution of water and nutrients. Tomatoes require 4 square feet of space per plant.

This crop will require daily attention to its many exacting and complicated cultural requirements. Equipment (such as fans, vents, and irrigation emitters) must be checked daily to be sure they are functioning properly. The application of water and fertilizer, while generally controlled automatically with a time clock, needs to be monitored daily. Greenhouse tomatoes are pruned to a single stem and suckers must be removed regularly. If flower clusters are hand-pollinated they must be shaken daily as soon as the petals open. Bumblebees are available from insect companies for pollination, as well.

Actively growing tomatoes must be tied or clipped weekly to a string or twine support. A plant fully loaded with fruit may weigh as much as 10 to 15 pounds. Because the typical greenhouse structure is not strong enough to support a tomato crop, a separate support system may have to be constructed inside the greenhouse. Greenhouses designed to support a tomato crop are available from some manufacturers.

#### *Pest management*

Environmental conditions that favor tomato growth also favor the rapid build-up and spread of insects and diseases. Few pesticides are labeled for greenhouse vegetables. Those that are cleared must be applied thoroughly and regularly due to their low toxicity. However, most greenhouse tomatoes are grown pesticide-free by manipulating the greenhouse environment and using cultural controls as the primary defenses against diseases. Sticky yellow cards are used to monitor pest populations. Insect pests, such as white flies, are typically controlled by predatory insects.

#### *Harvest and storage*

The stage of maturity at harvest will depend upon the market requirements; however, the longer the fruit can remain on the vine, the better the quality. Tomatoes should be harvested two to three times per week and cooled immediately after picking.

#### *Labor requirements*

Greenhouse tomato production is a labor-intensive enterprise, requiring approximately 25 person-hours per week (averaged over the season) for a 30 X 100 foot house (3,000 square feet). Transplanting and harvesting will require more time, while less time is needed from transplanting to the first harvest. Hand pollination alone will require 30 to 40 minutes each day for an experienced worker in a 30 X 100 foot greenhouse.

### **Economic Considerations**

Greenhouse tomatoes require a significant start-up cost, as well as demanding labor and management. Initial investments include greenhouse construction, production system costs and equipment. The cost of a production-ready greenhouse, excluding land costs, can run approximately \$10 per square foot. Total operating costs of approximately \$4 to \$5 per square foot can be expected. Gross revenues of approximately \$6.25 per square foot are possible.

### **More Information**

- The Greenhouse Business in Kentucky – A Review of Crops and How to Begin a Business (University of Kentucky, 2002)  
<http://www.uky.edu/Ag/HLA/anderson/greenhousesinkentucky.pdf>
- Greenhouse Tomato Production Practices (University of Kentucky, 2002)  
<http://www.uky.edu/Ag/Horticulture/anderson/greenhousetomatoes.pdf>
- Managing the Greenhouse Environment to Control Plant Diseases, PPFS-GH-1 (University of Kentucky, 2004)  
[http://www.ca.uky.edu/agcollege/plantpathology/ext\\_files/PPFShtml/PPFS-GH-1.pdf](http://www.ca.uky.edu/agcollege/plantpathology/ext_files/PPFShtml/PPFS-GH-1.pdf)

- Production of Greenhouse Tomatoes in Soil Beds (University of Kentucky, 2002)  
<http://www.uky.edu/Ag/Horticulture/anderson/greenhousetomatoesinsoil.pdf>
- Selected Resources and References for Commercial Greenhouse Operators (University of Kentucky, 2002)  
<http://www.uky.edu/Ag/Horticulture/anderson/greenhousereferences.pdf>
- Greenhouse and Hydroponic Vegetable Production Resources on the Internet (ATTRA, 2004)  
<http://attra.ncat.org/attra-pub/ghwebRL.html>
- Greenhouse Tomato Production (North Carolina State University)  
[http://www.ces.ncsu.edu/depts/hort/greenhouse\\_veg/topics/topics-pages/GH\\_Tomato\\_Production.html](http://www.ces.ncsu.edu/depts/hort/greenhouse_veg/topics/topics-pages/GH_Tomato_Production.html)
- Greenhouse Vegetable List of References (North Carolina State University, 2001)  
<http://www.ces.ncsu.edu/depts/hort/hil/hil-32-a.htm>
- Greenhouse Tomatoes (Mississippi State University Extension)  
<http://msucare.com/crops/comhort/greenhouse.html>
- Growing Greenhouse Tomatoes in Soil and in Soilless Media (Agriculture Canada, 1991)  
<http://www.hydro-gardens.com/PDF%20Files/Growing%20GH%20Tomates.pdf>
- Growing Hydroponic Tomatoes (University of Arizona)  
<http://ag.arizona.edu/hydroponictomatoes/index.htm>
- Hydroponic Greenhouse Tomato Budget Analysis (Ohio State University, 2005)  
[http://www2.oardc.ohio-state.edu/hydroponics/Economics/intro\\_tomato\\_quonsethouse200.htm](http://www2.oardc.ohio-state.edu/hydroponics/Economics/intro_tomato_quonsethouse200.htm)
- Integrated Pest Management for Greenhouse Crops (ATTRA, 1999)  
<http://attra.ncat.org/attra-pub/gh-ipm.html>