



Field-grown Tomatoes

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Introduction

Tomato (*Lycopersicon esculentum*) is a warm-season crop that originated in South America. Tomatoes are one of the most popular and profitable crop alternatives in Kentucky. Growers able to provide the earliest locally grown tomatoes can often demand a premium price.

Marketing

Tomatoes are grown in Kentucky primarily for fresh market sales. Fresh market options include roadside stands, local wholesalers and retailers, national wholesale markets, community supported agriculture (CSA) subscriptions, produce auctions, local restaurants, and farmers markets. Season extension techniques, especially high tunnel and greenhouse tomato production, have resulted in a longer marketing season for Kentucky-grown tomatoes. Planting for very early or for late fall markets may be more profitable because prices tend to be higher.

More popularity of locally produced tomato-based products, like salsas and sauces, has created some market niches for tomatoes grown for processing in Kentucky. Although there is a significant processing tomato industry in Indiana and other nearby states, Kentucky grows only a small acreage of tomatoes for processing. This is probably because of the lack of processors close by; tomato processors usually contract directly with farmers to grow mechanically harvested tomatoes for processing. New tomato producers in Kentucky usually begin selling tomatoes in lower-volume, direct markets like farmers markets or on-farm stands.



Market Outlook

Fresh tomatoes remain foundational for most fresh produce marketing programs, especially as consumers increase year-round tomato consumption. Per capita fresh tomato use increased from about 15 pounds per person in the 1990s and has remained at 20 pounds, or more, since 2010. Year-round supplies, including imports, and growth in the “snacking” tomato category – cherry, grape and some Roma



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types – have helped increase fresh volumes. Growth potential continues for most fresh tomato markets.

Production Considerations

Variety selection

Cultivar selection is a critical decision for commercial tomato growers, but with thousands of varieties available it can seem a daunting task. Cultivars differ in such horticultural traits as fruit characteristics (e.g. size, color, shape, flavor and intended use), earliness (early, mid- and late-season), growth habit (determinate and indeterminate), and disease resistance. Consideration needs to be given to regional preferences, as well as whether to grow hybrids and/or heirloom cultivars. Growers should select only adapted varieties with the qualities in demand for the intended market.

Site selection and planting

Choose a site with well-drained soil that warms up quickly in the spring. Tomatoes are quite sensitive to cold, so avoid low-lying fields that are subject to late frosts and high humidity. Locate tomato fields where plants will not be damaged by herbicide carryover or drift. In addition, fields should be rotated out of tomatoes and related solanaceous crops (e.g. tobacco, eggplant, pepper and potatoes) for a period of three years. Tomatoes do well when transplanted to a field where fescue sod was plowed under the previous fall.

Stocky, container-grown transplants are most desirable for transplanting as they will result in higher early yields than bare-root plants. Early tomatoes generally command higher prices, which usually offset the higher cost of good quality container-grown plants. Many growers produce transplants in 72- or 128-cell trays, although some grow transplants for their earliest crops in larger cells. Tomatoes will tend to get “leggy” if produced in smaller cell trays where plants are tightly spaced. Transplanting is done during the latter part of April or early May for a spring crop and in mid-July for a fall crop. Most growers use approximately 4,200 to 5,000 plants per acre.

Tomato plants are pruned, staked and trellised to obtain higher and earlier yields. Trellising not only improves fruit quality, but allows for quicker harvests and better spray penetration for pest management. University of Kentucky on-farm demonstrations have shown that the highest profits can be obtained with

raised beds covered with black plastic and using drip irrigation and fertigation. The moisture levels under the plastic must be carefully monitored when using this plasticulture system so that they are relatively constant during the growing season. Allowing soils to dry then rapidly applying large volumes of water can lead to cracking in the fruit. Alternating wet and dry soils can also impact root growth, which in turn leads to problems with calcium absorption and the development of blossom end rot.

Pest management

Tomatoes are subject to a large number of diseases, which include anthracnose, bacterial canker, bacterial spot, early blight, Fusarium wilt, root knot nematode, Septoria leaf spot, southern blight and Verticillium wilt. Resistant varieties are available for several diseases, but the control of foliar and stem diseases will require regular sprays of both bactericides and fungicides for most of the season. Timing of sprays, good coverage, weed management and sanitation are critical to disease control. Blossom end rot is a common physiological disorder related to poor calcium uptake. It usually results from sporadic irrigation and insufficient calcium movement into the fruit via the plant’s transpiration stream. This disorder can largely be prevented with careful water management.

Potential insect pests include aphids, cutworms, flea beetles, fruitworms, mites and stinkbugs. Scouting to monitor populations can help the grower determine when and how often insecticides should be applied. Herbicides, plastic mulch and a good rotation system can help manage weeds.

Harvest

Tomato fruit is easily damaged and should be handled as carefully as possible in all picking, grading, packing and hauling operations. Fruit is harvested at the maturity stage preferred by the intended market. Vine-ripe tomatoes must be harvested as often as twice a week, whereas mature-green tomatoes are only harvested three or four times during the season. Pack tomatoes in the type and size container the market requires. Typically the stem is removed to prevent damage to other tomatoes in the box.

Labor requirements

Labor needs per acre for staked tomatoes are approximately 125 to 200 hours for planting and produc-

tion, 250 hours for harvest, and 100 hours for grading and packing 1,600 25-pound boxes. Additional labor needs may include removal and disposal of plastic mulch used in plasticulture. Labor requirements can vary widely according to producer and harvester experience and the type of production system.

Economic Considerations

Initial investments include land preparation, the purchase of seed or transplants, and the purchase of stakes or other training system. Additional start-up costs can include the installation of an irrigation system and black plastic mulch.

Production costs (2018) for staked, trickle-irrigated tomatoes are estimated at \$5,830 per acre, with harvest and marketing costs for 1,600 boxes at \$8,900 per acre. Total expenses are approximately \$14,980 per acre.

Tomato returns vary depending on actual costs, and returns are very sensitive to different yields and market prices. The following estimated returns to land and management per acre are based on three different scenarios. These represent estimated returns above a \$1,500 cost for operator labor (100 hours at \$15 per hour). Conservative estimates represent an estimated return for 2018.

Pessimistic	Conservative	Optimistic
\$930	\$5,125	\$6,560

Smaller scale tomato production can also be profitable, especially when selling through direct markets.

Interactive budgets with production assumptions for heirloom varieties grown on 0.1 acre were developed using assumptions for the 2017-18 Kentucky season. Returns to land and management (assuming 50 hours of operator labor valued at \$15 per hour) were estimated at \$1,820 for 2,400 pounds of tomatoes sold at \$2 per pound.

Selected Resources

- IPM Scouting Guide for Common Pests of Solanaceous Crops in Kentucky, ID-172 (University of Kentucky, 2008) 2 MB file <http://www.ca.uky.edu/agc/pubs/id/id172/id172.pdf>
- Vegetable and Melon Budgets (University of Kentucky, 2017) <http://www.uky.edu/ccd/tools/budgets>
- Vegetable Production Guide for Commercial Growers ID-36 (University of Kentucky) <http://www.ca.uky.edu/agc/pubs/id/id36/id36.pdf>
- Commercial Tomato Production Handbook, B-1312 (University of Georgia, 2017) <http://extension.uga.edu/publications/detail.cfm?number=B1312>
- Fresh Tomatoes Profile (Agricultural Marketing Resource Center, 2018) <https://www.agmrc.org/commodities-products/vegetables/tomatoes/>
- Organic Tomato Production (ATTRA, 2012) <https://attra.ncat.org/attra-pub/summaries/summary.php?pub=33>

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