

# Bell Peppers

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## Introduction

The bell pepper (*Capsicum annuum*) is a warm-season annual when grown in temperate regions. However, it is actually an herbaceous perennial when cultivated in tropical areas, such as its native Latin America. Bell peppers are considered “sweet” since they lack the pungent chemical (capsaicin) present in hot peppers.

## Marketing

Peppers are grown in Kentucky primarily for fresh market sales. Fresh market options include roadside stands, local wholesalers and retailers, wholesale markets, farmers markets, community supported agriculture (CSA) subscriptions, produce auctions, and cooperatives. There has been little in-state market potential for processed peppers due to the loss of local vegetable processing companies. California (51 percent) and Florida (26 percent) dominate bell pepper production, according to the USDA Economic Research Service. The other major producing states are Georgia, Michigan, New Jersey, North Carolina and Ohio.

## Market Outlook

Fresh bell pepper consumption in the U.S. increased from 7.1 pounds per capita in 1992 to 8.3 pounds in 2002. Consumption rose more rapidly in the 2000s, with 11.7 pounds per capita estimated for 2012. Peppers were one of the top three vegetables that accounted



for Kentucky’s increase in fresh vegetable acreage from 1998 to 2005. Fresh bell peppers (including organic peppers) remain a growth category for produce growers in Kentucky and nationwide, though consumption growth may not continue the pace of the early 2000s. The U.S. has imported more and more bell peppers from Canada, Mexico and Europe to satisfy the increasing quantity demanded.

## Production considerations

### *Cultivar selection*

Bell pepper cultivars differ in such horticultural traits as fruit size, shape (e.g. blocky versus elongated), number of lobes, flavor, and disease resistance. Standard green bell



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cultivars typically ripen to red; however, specialty bell peppers include cultivars that ripen to a color other than red. These specialty bells may be yellow, orange, brown, white, and even purple at maturity. Compared to green bell peppers, colored bells are often more difficult and expensive to produce because a longer time to maturity is required. Growers should select only adapted varieties that have the qualities in demand for the intended market. Due to the prevalence of bacterial leaf spot in Kentucky, only hybrid varieties with leaf spot resistance are recommended for commercial production. While resistance to bacterial leaf spot has helped reduce losses to this devastating disease, new races of the pathogen have been isolated to which there is currently no resistance.

#### *Site selection and planting*

Bell peppers prefer deep, fertile, well-drained soils. Avoid planting in low-lying fields next to creeks and rivers since these sites are subject to high humidity and moisture conditions and, therefore, especially prone to bacterial spot epidemics. Producers should also avoid fields where long-residual corn or soybean herbicides have been used, since herbicide carryover can cause serious injury to peppers.

Pepper fields should be located as far away from tobacco plantings as possible due to potential spread of aphid-vectored viruses from tobacco to peppers. It is also advisable not to grow peppers after other solanaceous crops (such as tobacco, tomatoes, potatoes, and eggplants) or vine crops for a period of three years since all of these crops are susceptible to some of the same diseases. Peppers do extremely well following fescue sod.

Growing hybrid bell pepper varieties in double rows on raised beds covered with black plastic mulch and drip irrigation has resulted in high yields of excellent quality peppers. This double row system will require approximately 14,500 transplants per acre depending on in-row spacing. While many growers choose a 12-inch in-row spacing, those with markets for extra-

large or jumbo peppers generally space plants farther apart (from 15 to 18 inches within row). A bed shaper/plastic layer and a setter that will transplant through plastic are essential for this production system as well as an adequate water source for irrigation.

#### *Pest management*

Bacterial spot remains a serious risk to pepper plantings in many parts of the state. It is recommended that all Kentucky growers use resistant varieties and follow a copper-plus-maneb preventative spray regimen. Growers should also be extremely careful when growing or purchasing transplants from out of state. Transplants infected with bacterial leaf spot can result in complete losses for growers. Other diseases that may result in crop losses include Phytophthora blight, viruses, anthracnose fruit rot, and bacterial soft rot. The most important insect pest of peppers is the European corn borer. Using pheromone traps or scouting to monitor populations can help the grower determine when and how often insecticides should be applied. Controlling weeds will also aid in disease and insect pest control. Herbicides, plastic mulch, and a good rotation system can help control weeds.

#### *Harvest and storage*

Green bell peppers are hand-harvested for fresh market when they are at the mature green stage. Colored or specialty bell peppers are allowed to fully ripen on the plant. Colored peppers generally weigh more than green fruit. Fruit must be handled carefully to prevent skin breakage and punctures that could lead to decay. Cooling peppers as soon after harvest as possible will extend their shelf life. Once the fruit is cooled, peppers can be stored for two to three weeks under the proper conditions. Peppers are usually packed in 1<sup>1</sup>/<sub>9</sub>-bushel waxed corrugated cartons (33 pounds), or according to the preference of your particular market/buyer.

#### *Labor requirements*

Production will require approximately 25 hours per acre, while harvest needs are 125 hours per

acre. Grading and packing require another 75 hours per acre. Black plastic removal (post-harvest) will require an additional 10 hours per acre. Currently there are no options for recycling black plastic so it will need to be disposed of; a plastic roller that reels up the plastic and drip tape will reduce the volume requiring disposal.

### Economic considerations

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

Production costs for 1,500 boxes (1<sup>1</sup>/<sub>9</sub>-bushel) of fresh market bell peppers (trickle irrigated) are estimated at \$1,891 per acre, with harvest and marketing costs at \$6,983 per acre. Total expenses per acre, including both variable and fixed costs, are approximately \$9,500.

Since returns vary depending on actual yields and market prices, the following per acre returns to land and management are based on three different economic scenarios. Each scenario includes a \$600 owner/operator labor cost. Conservative estimates represent the University of Kentucky's statewide cost and return estimates for 2014.

	PESSIMISTIC	CONSERVATIVE	OPTIMISTIC
Fresh market, black plastic/trickle	\$(301)*	\$1,759	\$3,518
Fresh market, bare ground	\$(329)*	\$510	\$1,139
Processing, black plastic/trickle	\$(750)*	\$204	\$442
Processing, bare ground	\$(1,521)*	(\$765)*	\$244

*\*Parentheses indicate a negative number, i.e. a net loss*

### 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>
- Kentucky Pepper Integrated Crop Management (University of Kentucky, 2000) <http://www.uky.edu/Ag/IPM/manuals/ipm13pep.pdf>
- Vegetable and Melon Budgets (University of Kentucky, 2013) <http://www.uky.edu/Ag/CCD/vegbudgets13.html>

- Vegetable Production Guide for Commercial Growers, ID-36 (University of Kentucky) <http://www.ca.uky.edu/agc/pubs/id/id36/id36.htm>

#### Podcast

- Value-added Pepper Products (University of Kentucky, 2014) <http://www.uky.edu/Ag/CCD/podcasts/peppers.mp3>

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*Reviewed by Shawn Wright, Extension Specialist (Revised 2014)*

*Photo by Howard F. Schwartz, Colorado State University, Bugwood.org*

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