

## Hot Peppers & Specialty Sweet Peppers

### Introduction

Hot peppers, also known as chili (or chile) peppers, owe their “heat” or pungency to a chemical substance called capsaicin. This chemical is concentrated in the cross walls of the fruit and around the developing seeds. Chili peppers can be mild to fiery hot, depending on the amount of capsaicin present. Peppers that do not contain capsaicin, such as bell peppers, are considered “sweet.” In addition to the hot types, other specialty peppers include sweet varieties of unusual shape, size, and/or color.

### Types of Hot & Specialty Sweet Peppers

Unless otherwise noted, the following peppers are classified as the species *Capsicum annum*.

**ANAHEIM** peppers, also known as **NEW MEXICAN CHILI**, are a mild to hot pepper that are considerably longer than jalapeños. They are bright green to red when fresh, and brownish red when dried.

**BANANA** peppers have long fruits that are pale yellow-green to yellow, maturing to bright red. Both hot and mild (sweet) varieties are available. Some varieties of hot banana peppers are referred to as Hungarian Wax.

**CHERRY** peppers are small ( $\frac{3}{4}$  inch to  $1\frac{1}{2}$  inches) sweet to hot peppers. They are medium green when immature and ripen to red.

**HABANERO** peppers (*Capsicum chinense*) are extremely hot peppers that are small and lantern-shaped. They are light green to bright orange when ripe.



**ITALIAN** or **CUBANELLE** types are sweet to mildly hot, long, and somewhat flattened. These flavorful peppers change from yellow-green to orange, then to red as they ripen.

**JALAPEÑO** peppers range from sweet to mild to very hot. They are bright green to purplish-green at the immature stage and ripen to red. The skin of the ripened fruit of some varieties show a characteristic cracking or “checking” that may or may not be a desirable trait, depending on the buyer.

**POBLANO** and **ANCHO** peppers are mild to hot. They are called Poblano when they are green and Ancho when dried.

**PIMIENTOS** or **PIMENTOS** are sweet, heart-shaped peppers that ripen from green to red. When dried and ground, pimientos are sold as sweet paprika.

**SERRANOS** are small and usually very hot peppers that ripen from green to red.

**SPECIALTY BELL** peppers include sweet bell cultivars that ripen to a color other than red. They may be yellow, orange, brown, and even purple at maturity. Good

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potential exists for high tunnel or rain shelter production of colored bell peppers in Kentucky. Miniature bell peppers are 1 to 2 inches at maturity and ripen from green to yellow or red.

TABASCO peppers (*Capsicum frutescens*) are small but extremely hot. These peppers grow pointing upward and are generally harvested when red. They are grown primarily for hot sauces.

UBA TUBA (*Capsicum baccatum*) is a mild pepper with a distinctive flavor. The novel flower-shaped fruit ripens from green to ruby red; fully ripened fruit are sweet. Researchers at the University of Kentucky have evaluated this pepper for both culinary and ornamental uses.

## **Marketing**

Specialty peppers are grown in Kentucky primarily for fresh market sales, although a few red bell and banana peppers are still harvested for processing. Some hot peppers are also sold dried.

Fresh market options include roadside stands, local wholesalers and retailers, wholesale markets, farmers markets, community supported agriculture, and produce auctions. Hot peppers, which are popular in Latin American, Cajun, and Asian cuisine, may be marketed to restaurants specializing in those dishes. Ethnic grocers may also be interested in fresh, locally grown hot and specialty peppers.

## **Market Outlook**

Fresh vegetable acreage in Kentucky is increasing, with bell peppers as one of the top five vegetable crops in the state. All types of peppers are considered a definite growth crop and the production of specialty peppers is becoming more common. Many consumers find uniquely colored bell peppers aesthetically pleasing and are willing to pay the higher market price this crop demands. The popularity of hot foods has also increased the demand for locally grown fresh chili peppers. During the decade from 2000 to 2009, per capita consumption of all chilies (fresh and processed) in the U.S. increased from 5.2 pounds to 6.6 pounds per capita.

## **Production considerations**

### *Plant and cultivar selection*

Cultivar selection is a critical decision for commercial pepper growers, but with thousands of varieties available it can seem a daunting task. The great diversity of pepper types and cultivars makes it extremely important to know what characteristics buyers prefer.

Pepper varieties differ in fruit size, color, shape, flavor, capsaicin levels, and number of lobes. The level of pungency, which can even vary between cultivars in the same pepper type, is a major consideration in choosing chili pepper varieties. Fruit color and shape are important in selecting specialty sweet peppers. While standard bell cultivars ripen from green to red, specialty bells may ripen to various shades of yellow, orange, brown, white, and purple. Compared to green bell peppers, colored bells are often more difficult and expensive to produce because a longer time to maturity is required.

Disease resistance to Phytophthora blight, various virus diseases, and bacterial spot is available in some hot and specialty pepper cultivars. Due to the prevalence of bacterial spot in Kentucky, it is highly recommended that commercial growers select hybrid varieties with resistance to this disease, whenever possible. While resistance to bacterial spot has helped reduce losses to this devastating disease, new races of the pathogen have been isolated to which there is currently no resistance.

Growers should select well-adapted varieties that have the qualities in demand for the intended market. Hot and specialty peppers are a niche item and should be test-marketed before growing large acreages.

### *Site selection and planting*

Most (but not all) types of hot and specialty peppers can be grown using the same techniques and spacing that is used for bell pepper production. Peppers prefer deep, moderately 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. Many hot and specialty peppers are much more susceptible to bacterial spot than resistant bell pepper varieties and special precautions should be taken (refer to the section on Peppers in the latest edition of Kentucky's *Vegetable Production Guide for Commercial Growers*).

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 tobacco, tomatoes, potatoes, eggplants, or vine crops for a period of 3 years since these crops are susceptible to some of the same diseases. Producers should also avoid fields where long-residual corn or soybean herbicides have been used, because herbicide carry-over can cause serious injury to peppers. Peppers do extremely well following fescue sod.

Growers can produce their own transplants or purchase certified disease-free plants from a reputable dealer. Greenhouse-grown transplants can be set by hand or with a mechanical setter, such as a tobacco setter. 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. The same system has also worked well for hot and specialty peppers. A bed shaper/plastic layer and a setter that will transplant through plastic are essential for this production system.

Some specialty pepper types require staking and tying. Serrano peppers, Anaheims, poblanos, and some cubanelle varieties should be staked and tied when using plasticulture and high plant populations. Tomato stakes are placed every 6 to 10 feet on each side of the double row beds. Tomato twine is looped and tightened around each stake at 7 to 9 inches above the soil to fence

in the plants. Second and third strings can be used higher on the stakes as needed during the season. Even bell peppers benefit from short stakes and strings on the outside of the beds in areas exposed to high winds.

#### *Pest management*

Bacterial spot remains a serious risk to pepper plantings in many parts of the state. Specialty peppers can vary in their tolerance or resistance to this disease. It is recommended that Kentucky growers use varieties with high tolerance or resistance when available and follow a preventative spray regimen. Growers should also be extremely careful when growing their own transplants or purchasing plants from out-of-state sources. Transplants infected with bacterial spot can result in complete losses for growers. It is recommended that Kentucky growers follow a preventative spray program. Other diseases that can 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 and scouting to monitor populations can help the grower determine when and how often insecticides should be applied. Organic commercial-scale bell pepper production is also feasible by releasing tiny wasps (*Trichogramma ostriniae*) that attack European corn borer eggs. This system has been successful in eliminating corn borer sprays both in small plots at UK research farms and in farmers' fields.

Fruit allowed to fully color in the field are more susceptible to disease and insect damage, as well as growth cracks and sunscald. 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*

Peppers are hand-picked at the appropriate maturity stage. Colored bell peppers are allowed

to fully ripen and color on the plant. Many chili peppers are harvested green for fresh market sales or allowed to fully ripen for drying or processing. Hot peppers can be dried in the sun or artificially dried.

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. Storage temperature must be carefully monitored since fruit ripening, and therefore coloring, can continue to occur at temperatures above 50° F and chilling injury can occur below 45° F. Do not store with ethylene-producing fruit.

#### *Labor requirements*

Production will require approximately 25 hours per acre for transplanting. Harvest will require 140 hours per acre, with an additional 75 hours for grading and packing. Post-harvest black plastic removal will require an additional 10 hours per acre.

### **Economic considerations**

Hot and specialty peppers can be a niche market item for farmers market sales or direct to retail stores. Potential growers need to find outlets that use peppers in volume to justify growing a specialty product. Initial investments include land preparation and the purchase of seed or transplants. Additional start-up costs can include the purchase or rental of equipment needed to apply black plastic mulch and install drip irrigation.

Production costs for fresh market specialty peppers (trickle irrigated) are estimated at \$1,890 per acre, with harvest and marketing costs at \$4,045 per acre. Total expenses per acre, including both variable and fixed costs, are approximately \$6,500.

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. Conservative estimates represent the University of Kentucky's average statewide cost and return estimates for 2010.

PESSIMISTIC	CONSERVATIVE	OPTIMISTIC
\$(110)*	\$1,990	\$4,310

*\*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)  
<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>
- Potential of *Capsicum baccatum* as a New Crop for Kentucky Farmers (University of Kentucky, 2003)  
<http://www.uky.edu/Ag/cdbrec/capsicum.pdf>
- Vegetable and Melon Budgets (University of Kentucky, 2008)  
<http://www.uky.edu/Ag/cdbrec/vegbudgets08.html>
- Vegetable Production Guide for Commercial Growers, ID-36 (University of Kentucky)  
<http://www.ca.uky.edu/agc/pubs/id/id36/id36.htm>
- Bell and Chili Peppers (Agricultural Marketing Resource Center, 2010)  
[http://www.agmrc.org/commodities\\_\\_products/vegetables/bell\\_and\\_chili\\_peppers.cfm](http://www.agmrc.org/commodities__products/vegetables/bell_and_chili_peppers.cfm)
- Bell and Chili Pepper Profile (Agricultural Marketing Resource Center, 2010)  
[http://www.agmrc.org/commodities\\_\\_products/vegetables/bell\\_and\\_chili\\_peppers\\_profile.cfm](http://www.agmrc.org/commodities__products/vegetables/bell_and_chili_peppers_profile.cfm)
- Chile Pepper Institute (New Mexico State University)  
<http://www.chilepepperinstitute.org/>
- Commercial Production of Hot Peppers in Mississippi, IS-1509 (Mississippi State University Extension, 2010)  
<http://msucare.com/pubs/infosheets/is1509.pdf>

- Commercial Production of Pimiento Pepper in Mississippi, IS-1508 (Mississippi State University Extension, 2010)  
<http://msucares.com/pubs/infosheets/is1508.pdf>
- Commercial Pepper Production Handbook, B-1309 (University of Georgia, 2009)  
[http://www.caes.uga.edu/Publications/displayHTML.cfm?pk\\_id=7461](http://www.caes.uga.edu/Publications/displayHTML.cfm?pk_id=7461)
- Control Pepper Disease (Mississippi State University Extension, 2010)  
<http://msucares.com/pubs/publications/p0801.pdf>
- Hot Pepper: Disease Resistance Table (Cornell University, 2009)  
<http://vegetablemdonline.ppath.cornell.edu/Tables/HotPepperTable.html>
- Hot Pepper Variety Database (Chile-Head)  
<http://www.g6csy.net/chile/database.html>
- Local Foods No. 5 — Hot Peppers (Chili Peppers) (ATTRA, 2010)  
<http://attra.ncat.org/attra-pub/summaries/summary.php?pub=348>

*The inclusion of a commercial Web site as a resource does not represent an endorsement of the company or its products by the University of Kentucky.*

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*Reviewed by Brent Rowell, Extension Specialist (Issued July 2006)*

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*Photo courtesy of Howard F. Schwartz, Colorado State University, Bugwood*

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For additional information, contact your local [County Extension](#) agent