Peppers

By Eldon Everhart, Cindy Haynes, and Richard Jauron

Peppers were domesticated in Mexico. As early as 6,000 years ago, red peppers were used in tropical South America as a spice to disguise the taste of bland or unpalatable food. Chili peppers are called chile in Mexico and Central America and aji in South America and the West Indies. Columbus took peppers back to Europe where they rapidly became popular.

Pepper cultivars, which number in the hundreds, are usually classified as sweet or hot. Peppers also vary by fruit shape, flavor, pungency, color, and culinary use. Pickling, grinding, roasting, drying, and freezing can influence flavor.

All bell peppers belong to the species Capsicum annuum. Hot peppers may belong to several other species. The C. chinense varieties Habanero and Scotch Bonnet are considered the hottest.

Cultivars

Bell peppers are large, blocky, 3- or 4-lobed fruit that taper slightly at the bottom. Most bell peppers are sweet and dark green. Depending on the cultivar, the fruit will turn red, yellow, orange, or some other color at maturity.

<table>
<thead>
<tr>
<th>Sweet peppers</th>
<th>Size</th>
<th>Shape</th>
<th>Wall</th>
<th>Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bell Boy F1</td>
<td>large</td>
<td>blocky, few elongated</td>
<td>thick</td>
<td>fresh, cooked</td>
</tr>
<tr>
<td>Bell Captain F2</td>
<td>large</td>
<td>heart-shaped</td>
<td>thick</td>
<td>processing</td>
</tr>
<tr>
<td>Big Bertha F1</td>
<td>large</td>
<td>long, blocky</td>
<td>thick</td>
<td>fresh</td>
</tr>
<tr>
<td>California Wonder</td>
<td>large</td>
<td>long, thin tapering</td>
<td>thin</td>
<td>fresh, dried, processed</td>
</tr>
<tr>
<td>Jupiter</td>
<td>medium</td>
<td>very thin, tapering</td>
<td>thin</td>
<td>processed, fresh</td>
</tr>
<tr>
<td>Keystone Resistant Giant</td>
<td>large</td>
<td>irregular, blunt</td>
<td>thin</td>
<td>processed, fresh</td>
</tr>
<tr>
<td>Lady Bell F1</td>
<td>small</td>
<td>oblong, blunt</td>
<td>thick</td>
<td>processed</td>
</tr>
<tr>
<td>North Star F1</td>
<td>small</td>
<td>slim</td>
<td>thick</td>
<td>fresh</td>
</tr>
<tr>
<td>Yolo Wonder</td>
<td>small</td>
<td>round, flattened</td>
<td>thick</td>
<td></td>
</tr>
<tr>
<td>Yolo Wonder</td>
<td>medium</td>
<td>oblong</td>
<td>thick</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Pepper type</th>
<th>Size</th>
<th>Shape</th>
<th>Wall</th>
<th>Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bell or Sweet</td>
<td>large</td>
<td>blocky, few elongated</td>
<td>thick</td>
<td>fresh, cooked</td>
</tr>
<tr>
<td>Pimiento</td>
<td>large</td>
<td>heart-shaped</td>
<td>thick</td>
<td>processing</td>
</tr>
<tr>
<td>Ancho</td>
<td>large</td>
<td>long, blocky</td>
<td>thick</td>
<td>fresh</td>
</tr>
<tr>
<td>Anaheim</td>
<td>large</td>
<td>long, thin tapering</td>
<td>thin</td>
<td>fresh, dried, processed</td>
</tr>
<tr>
<td>Cayenne</td>
<td>medium</td>
<td>very thin, tapering</td>
<td>thin</td>
<td>processed, fresh</td>
</tr>
<tr>
<td>Cubanelle</td>
<td>large</td>
<td>irregular, blunt</td>
<td>thin</td>
<td>processed, fresh</td>
</tr>
<tr>
<td>Jalapeno</td>
<td>small</td>
<td>oblong, blunt</td>
<td>thick</td>
<td>processed</td>
</tr>
<tr>
<td>Ornamental</td>
<td>small</td>
<td>slim</td>
<td>thick</td>
<td>fresh</td>
</tr>
<tr>
<td>Cherry</td>
<td>small</td>
<td>round, flattened</td>
<td>thick</td>
<td></td>
</tr>
<tr>
<td>Wax or Hungarian Wax</td>
<td>medium</td>
<td>oblong</td>
<td>thick</td>
<td></td>
</tr>
</tbody>
</table>

TMV = Tobacco Mosaic Virus
How hot is hot?
The pungency or heat of a pepper depends on seven closely related alkaloids or capsaicinoids. In the early 1900s, Wilbur L. Scoville devised a test to determine the relative hotness of different peppers. Capsaicin from a known weight of pepper was extracted with alcohol and mixed in various concentrations with sweetened water. Human tasters were asked to identify the point at which water neutralized the hotness. The volume of water required for each sample was assigned a rating in Scoville units—the larger the number, the more water needed and the hotter the pepper. A high-pressure liquid chromatography test replaced this technique in the early 1980s, but the measurements are still expressed in Scoville units. The following peppers are listed from most hot to least hot, according to Scoville units.

Find it on the thermometer!

Habanero
- Caribbean Red 100,000–445,000
- Red 80,000–285,000
- Scotch Bonnet 80,000–260,000
Jamaican Hot 100,000–200,000
Chiltepini 50,000–100,000
Santaka
Thai Cayenne 50,000–70,000
Charleston Hot
Piquin 30,000–50,000
Aji Cayenne
Tabasco
Thai Dragon 35,000–45,000
De Arbol 15,000–30,000
Serrano 5,000–23,000
Yellow Wax 5,000–15,000
Jalapeño 2,500–5,000
Mirasol
Cascabel 1,500–2,500
Rocotillo
Sandia
Ancho 1,000–1,500
Chilaca
Espanola
Pasilla
Poblano
Anchatto 500–1,000
Big Jim
New Mexico
Cherry 100–500
Mexi-Bell
Peperoncini
Bell 0
False Alarm
Pimento
Sweet Banana
Sweet Italian

Planting
Pepper plants grow best in warm, well-drained soils of moderate fertility. The plants are not particularly sensitive to soil pH, but best results are obtained in the 6.0 to 6.8 range.

Peppers are a warm-season crop and need a long season for maximum production. Temperature has a large effect on the rate of plant and fruit growth and the development and quality of the red or yellow pigments. Ideal temperature for red pigment development is 65–75°F. Above this range the red color becomes yellowish. Below it, color development slows dramatically and stops completely below 55°F.

Pepper plants can be purchased at garden centers or started indoors 6 to 8 weeks before the intended outdoor planting date. Transplant peppers into the garden after the danger of frost is past. In central Iowa, May 15 is the suggested planting date. Gardeners in southern Iowa can plant one week earlier, while those in northern areas should wait an extra week. The last practical date for planting peppers is approximately June 20.

Water plants thoroughly after transplanting.

Spacing
Space plants 18 inches apart in rows 24 to 30 inches apart.

Estimated yield
Average yield with good management practices should be approximately 80 pounds per 10-foot row.

Fertilizing
It is generally safe to apply 2 to 3 pounds of 5-10-5 per 100 square feet to the garden area where peppers will be planted. Conduct a soil test for specific P and K recommendations.

After transplanting, feed the pepper plants with a starter fertilizer solution. Dissolve 2 tablespoons of a 5-10-5 fertilizer in a gallon of water, then pour 1 cup of the solution at the base of each plant.

Potential problems

Blossom end rot
Water-soaked areas that develop near the blossom end of the fruit characterize blossom end rot. The affected tissue desiccates, becoming brown and leathery. Affected fruit may ripen prematurely. Secondary fungi and bacteria may colonize the dead tissue, causing it to turn dark and rot. Blossom end rot is caused by a calcium deficiency in developing fruit. It occurs in fields with low or moderate soil calcium levels. Fluctuating soil moisture due to over watering or drought, high nitrogen fertilization, and root pruning during cultivation also can cause blossom end rot.

Poor crop
Blossoms of sweet bell peppers are sensitive to temperature extremes. Flowers will drop off when night temperatures are below 60°F or above 85°F. Maximum set of sweet bell peppers occurs between constant temperatures of 60–70°F. Temperature tolerance for sweet bell peppers varies with cultivar. Hot peppers usually set well in warm weather. An adequate moisture supply during flowering and fruit set also is important. Mulching helps conserve soil moisture.

Sunscald
The heat of the sun may burn the side of the fruit exposed to the sun. Initially, a soft, light-colored area develops on the fruit. Later the area dries, becoming white and paper-like in appearance. The risk for sunscald can be reduced by controlling leaf diseases that may defoliate the plants, and by lightly fertilizing plants to promote growth.

Harvest and storage
Hot peppers and bell peppers can be harvested in the immature green stage or when fully ripe. They can be eaten fresh, used in sauces, pickled, frozen, or dried.

Bell peppers are usually harvested when large and firm in the immature green stage. They also may be allowed to fully ripen to red, yellow, orange, purple, or other colors. Fully ripe bell peppers are slightly sweeter and have a higher vitamin content than do the immature green peppers.

Fresh peppers may be stored for up to 3 weeks in cool, moist conditions (45 to 50°F and 85 to 90 percent relative humidity).
Wearing gloves and working in a well ventilated room is recommended when working with hot peppers because their volatile oils can cause burns or irritate sensitive skin. Avoid touching your eyes and other sensitive areas after handling hot peppers.

For more information
Contact your local Iowa State University Extension office for additional information or copies of the following publications.

- *Canning Vegetables*, PM 1044
- *Container Vegetable Garden*, PM 870B
- *Freezing Fruits and Vegetables*, PM 1045
- *Garden Soil Management*, PM 820
- *Organic Mulches for Gardens and Landscape Plantings*, RG 209
- *Planting a Home Vegetable Garden*, PM 819
- *Preserve Food Safely*, N 3332
- *Questions about Composting*, RG 206
- *Small Plot Vegetable Gardens*, PM 870A
- *Starting Garden Transplants at Home*, PM 874
- *Watering the Home Garden—Use of Trickle Irrigation*, PM 823
- *Where to Put Your Vegetable Garden*, PM 814

Additional information also is available from these Web sites.

**ISU Extension publications**
http://extension.iastate.edu/Pubs

**ISU Horticulture**
http://www.hort.iastate.edu/

Questions also may be directed to the ISU Extension Hortline by calling 515-294-3108 during business hours (8 a.m.–12 noon, 1 p.m.–5 p.m. Monday–Friday).

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