

Growing Peppers in Home Gardens

Abstract:

There are few vegetables easier to grow in the home garden and more colorful than peppers. Peppers usually cost more per pound in the store than most other vegetables. Botanically speaking, peppers are fruit of the plant species *Capsicum annuum*. This species includes bell, or sweet, peppers as well as most of cultivars that we recognize as hot peppers, including paprika, cayenne and jalapeños. This factsheet discusses how home gardeners select plants, choose a planting site within the home landscape and provides gardeners with tips on how to grow and maintain pepper plants. The common pests and horticultural problems encountered with peppers are discussed as well as pest management strategies.

Crop at a Glance

Growing season: Summer

Time of planting: Spring after date of last killing frost

Spacing: 18 to 24 inches between plants; 12 to 24 inches between rows

Days to harvest: 60 to 90 days, up to 150 days for the hotter peppers

Average yield: Roughly 2-4 peppers per plant per week to first autumn frost (~3 lbs/plant)

Common starting method: Indoor as seed, then outdoor as transplant

Introduction: There are few vegetables easier to grow in the home garden and more colorful than peppers. Peppers usually cost more per pound in the store than most other vegetables. Botanically speaking, peppers are fruit of the plant species *Capsicum annuum*. This species includes bell, or sweet, peppers as well as most of cultivars that we recognize as hot peppers, including paprika, cayenne and jalapeños. Typically peppers are used to add flavor and color to foods, but peppers may be dried, pickled, eaten fresh or constitute a meal on their own.

Selecting Types to Plant:

Pepper cultivars have been bred for and are categorized by fruit color, shape, flavor and spiciness. While you want to plant peppers that appeal to your culinary and esthetic tastes, be very cautious to choose peppers that match your tolerance to spiciness or hotness. Bell peppers are considered to be sweet with no significant heat. Pepperoncini, banana pepper, and Anaheim pepper are relatively mild flavored peppers. Meanwhile cayenne, Hungarian wax, jalapeño, serrano and chipotle peppers may pack significant heat. Habanero and pequin peppers can be insanely spicy hot. Since pepper plants, particularly *C. annuum*, originated in the tropical Americas, be sure to select a pepper cultivar that matures within the growing season of your geographic area (see WSU's Home Vegetable Gardening in Washington EM057E, <http://cru.cahe.wsu.edu/CEPublications/EM057E/EM057E.pdf>). In reference to pepper seed packets, most pepper plants require 60 to 70 days from planting to first harvest. Some of the spicier pepper varieties may require more time.

Choosing a Planting Site: Peppers grow best in fertile, well-drained soils with high levels of organic matter and full sun exposure (*i.e.*, at least six hours of direct sunlight each day). Since peppers thrive in a soil pH ranging from 6.0 to 7.5, it would be prudent to have your soil tested at the planting site *prior to* planting. Information on soil testing laboratories is available at <http://puyallup.wsu.edu/analyticallabs/>. Knowing the fertility of your soil may prevent unnecessary and wasteful fertilizer applications. Peppers have moderate water needs, particularly during the heat of summer, so plant in an area close to a source of water in the home landscape.

Planting Guidelines: Peppers can be started in the garden from seed. We recommend that you purchase certified seed from seed catalogs and garden centers. Pepper seeds saved from last year's harvest are unlikely to produce the same pepper as the parent plant. Beware: peppers are frost-tender vegetables. Seeds may not germinate in cold soil and seedlings can be killed off by spring frosts. Peppers are planted in rows that are spaced 12 to 24 inches apart. Sow seeds spaced roughly 10 to 12 inches apart to a depth of ¼ to ½-inch in mid- to late May, depending on the date of the last killing frost (see WSU's Home Vegetable Gardening in Washington EM057E, <http://cru.cahe.wsu.edu/CEPublications/EM057E/EM057E.pdf>). Later, as the plants develop 2 to 3 leaves, thin plants to a distance of 18 to 24 inches apart to avoid competition for water, nutrients and daylight between adjacent pepper plants.

Most gardeners start plants in the home or greenhouse 6 to 8 weeks prior to transplanting seedlings into the garden. Consider hardening off the plants 10 days before planting by taking the transplants outside and leaving them in the shade for a few hours each day. Alternatively, pepper transplants are often available at garden centers. When moving the transplants to the garden, keep 18 to 24 inches between each plant in a row. Pepper transplants will do best once outdoor soil temperatures reach 65 to 70 degrees F.

Plant Maintenance: The first couple of weeks after planting are critical to the survival and productivity of peppers. If seeds fail to germinate, or germinate unevenly, investigate why (planted too deep, cold soil, old seed, pest-damaged seed, etc). Familiarize yourself with the appearance of normal, healthy plants and periodically (2-3 times a week) scout your pepper plants for any signs of stress or pests. The most common sign of stress is leaf-wilting associated with either too little or too much water. Check the moisture level of the soil near the root zone of the pepper plant: It should be moist and pliable, not dry and crumbly or wet and dripping. Watch out for stunted plants with pale leaves or for vigorous plants that fail to bloom and set fruit; these are signs of low soil fertility or excessive soil fertility.

Pest Management:

Insects. In gardens where the homeowner plants a few solanaceous crops (*i.e.*, potato, tomato, egg plant) each year and rotates these plants with other vegetable crops within the landscape, insect pest problems are few and rarely impact pepper quality. Healthy plants are better able to tolerate pest damage, while stressed (often water-stressed) plants can attract arthropod pests. By periodically scouting your pepper plants for insect presence or signs of damage (leaf discoloration, feeding damage, leaf dieback, surface marking on fruit), you may anticipate problems and control pests before they jeopardize the health of the plant. Learn to recognize the beneficial arthropods, especially insect predators, and encourage their

presence in your home landscape. Do not hesitate to contact your local WSU Extension office or Master Gardener program < <http://mastergardener.wsu.edu/program/county/> > to assist you in identifying pests and beneficial insects.

Diseases. There are only a few plant diseases may impact pepper production in your backyard. The incidence of diseases are reduced by 1) planting certified disease-free seed, 2) vegetable crop rotation, 3) planting pepper plants in warm, light, well-drained soils, 4) keeping water from splashing on pepper foliage, 5) avoiding plant overcrowding (weed and properly thin), and 6) cleaning up any plant debris. If you notice any pepper plants that are unthrifty, discolored, or dying, and these symptoms spread to other plants, we recommend that you rogue out and destroy these potentially infected plants. Investigate what is wrong with these unthrifty plants. Again, contact your local Master Gardener program to assist you in identifying why these plants are not growing normally. The best strategy to combat plant diseases is to avoid planting susceptible plants in an infected area or by planting pepper cultivars bred for resistance to the specific disease problem.

Weeds. Any plant that competes with your pepper plant for water, soil nutrients and light is considered a plant pest or a weed. Be sure to keep all weeds roughly 12 to 24 inches away from the base of your pepper plants (Be sure to thin your pepper plants to this desired spacing as well). Hand pulling weeds when possible is always the most environmentally friendly weeding strategy in the home garden. Use care when mechanically removing weeds with hoe or weeding tool not to cultivate too deep or injure pepper roots or plant stems. Consider a good organic mulch to keep weeds from germinating as well as conserving soil moisture.

Common Pest Problems in Peppers

Box #1

Aphids- primarily the Green Peach Aphid, *Myzus persicae*

Description: Aphids, including the green peach aphid, are abundant in many vegetables, fruits and weeds throughout Washington State. Adult aphid size is roughly 0.125 inch long (Figure 1).

Symptoms: Pepper leaves curl downwards enclosing colonies of aphids. Leaves yellow, wilt and may drop from plant. Pepper foliage, including fruit, may become covered with whitish cast skins of aphids, sticky fluid (= honeydew) (Figure 2) and sooty molds.

Corrective Action: If aphids become a problem to pepper, wash them from plants with strong stream of water. Grow peppers under row cover fabrics. There are a number of predators (lady beetles, lacewings, parasitic wasps) that control aphids. Learn to recognize these beneficial insects. Note: There are several pesticides available to homeowners.* Avoid broad-spectrum insecticides that kill beneficial predators.



Figure 1- A wingless adult aphid.



Figure 2- Whitish cast skins and honeydew on upper leaf surface.

Photos by M. Bush, WSU Extension

Box #2

Spider mites- *Tetranychus* spp.

Description: Spider mites are abundant in most landscape plants throughout Washington. Mites tend to be more of a problem in the drier areas of Eastern WA. Actual adult size is 1/60th of an inch (Figure 3).

Symptoms: Whitish yellow stippling along the leaf midrib. Whole leaves yellow, then bronze, then die. Mites and webbing are found on the underside of leaves (Figure 4).

Corrective Action: If mites become a problem on pepper, wash them from plants with strong stream of water. Irrigate plants properly to avoid drought stress. There are insecticides labeled for use in squash to control these mites *. Avoid broad-spectrum insecticides that kill beneficial predators like lady beetles, lacewings, and predatory mites.



Figure 3- Adult two-spotted spider mites.



Figure 4- Leaf bronzing caused by spider mites on bean.

Photos by Elizabeth Beers, WSU- Wenatchee & M. Bush, WSU Extension

Box #3

Flea beetles- Western potato flea beetle, *Epitrix subscinita*

Description: Adult flea beetles, including the western potato flea beetle, are common pests of vegetables and landscape plants throughout Washington. Adult size is about 1/10-inch long (Figure 5). Adult flea beetles escape by jumping when disturbed.

Symptoms: Flea beetles chew characteristic, small, irregular “shotholes” or scalloped scoops in the lower leaves (Figure 6) closest to the ground surface. Early in the spring, this damage can kill emerging seedlings and newly transplanted plants. In late summer and early autumn, feeding damage has little effect on a full grown pepper plant.

Corrective Action: Weed control in your home landscape adjacent to peppers will discourage flea beetles. Clean out all plant debris from the garden at the end of the growing season. There are insecticides labeled for use in peppers to control these flea beetles early in the season *.



Figure 5- Adult western potato flea beetle.



Figure 6- Leaf damage caused by flea beetle on potato.

Photos by M. Bush, WSU Extension

Box #4

Whiteflies- numerous species including Greenhouse whitefly: *Trialeurodes vaporariorum*

Description: Both nymphs and adult whitefly are common pests of vegetables and landscape plants throughout Washington. Adult size is about 1/10th of an inch long (Figure 7). Adults escape by flying away when the plant is approached.

Symptoms: Whitefly adults and nymphs feed on plant sap on the underside of infested pepper leaves. At high infestation rates, damaged leaves may wilt, turn yellow and drop prematurely from the plant. Overall, the plant may wilt or stunt in response to whitefly feeding. Whiteflies also produce small droplets of honeydew that cover the upper surfaces of leaves located beneath infested leaves (Figure 8).

Corrective Action: Check new plants before buying/planting for the presence of whitefly nymph and adults. There are insecticides labeled for use in pepper to control whiteflies *. Avoid broad-spectrum insecticides that kill beneficial predators of whiteflies like lady beetles, and lacewings.



Figure 7- Adult whitefly.



Figure 8- Whitefly honeydew on upper leaf surface of petunia.

Photos by M. Bush, WSU Extension

Blossom end rot – A physiological plant disorder

Description: Blossom end rot is often associated with a calcium deficiency or nutrient imbalance within the tissues of a developing pepper. This disorder may be associated with a lack of sufficient calcium in the soil, but is more often triggered by inconsistent plant watering or the result of alternating wet and cool with dry and hot periods. Uneven watering and fluctuating temperatures can decrease calcium uptake from the soil by plants. Keep soil about the plant roots moist, but not too dry nor too soggy.

Symptoms: Blossom end rot first appears as a water-soaked, light brown spot on the distal or blossom end of the fruit. As the fruit matures, the spot becomes sunken, leathery, and brown to black in color (Figure 9). Secondary plant pathogens can infect the area and cause fruit rot.

Corrective Action: Soil surface mulches, appropriate irrigation timing and frequency throughout the growing season, soil amendment with limestone at planting (test pH to check for soil deficiency first), and foliar applications of calcium *may* reduce the incidence of this disorder.



Figure 9- Bell pepper with blossom end rot.

Photo by M. Bush, WSU Extension

Sun burn – A physiological plant disorder

Description: Sun burn damage is sometimes confused with blossom end rot and is common in central Washington in response to intense sun, heat and dry conditions. Typically, symptoms appear on outermost peppers that are not adequately shaded by the leaf canopy.

Symptoms: Sun burn will appear first as light discolored areas on the surface of the pepper that are most exposed to the direct rays of the sun. Later these areas can turn into sunken, cracked leathery areas and may provide entry routes for rot and decay organisms. Unlike blossom end rot, these areas are not necessarily associated with the blossom end of the pepper fruit, but may appear anywhere on the fruit's surface.

Corrective Action: Be sure to adjust (shorten) irrigation timings to provide more soil moisture during the heat of the summer when plant transpiration rates and need for water is the highest. Shading with shade cloth and other materials is an option during those days when day time temperatures approach or exceed the mid-90s.

Verticillium wilt –A plant disease associated with *Verticillium* spp.

Description: A soil-borne fungal disease.

Symptoms: Leaves wilt and collapse. Leaf edges develop V-shaped yellow areas. Entire leaves turn yellow and dry up (Figure 10A). Plant's root system is poorly developed (Figure 10B).

Corrective Action: Do not plant pepper varieties in soil known to harbor this disease. Rotate pepper plantings every year with other crops or plants, but not with potato, tomato, eggplant, or squash. Note: there are no recommended pesticides for homeowners.



Figure 10A-Verticillium wilt symptoms on tomato leaves; 10B- Verticillium wilt symptom on squash roots. The plant on the right shows normal root growth while the plant on left suffers from verticillium wilt. These symptoms are also visible on peppers infected with verticillium wilt.

Photos by Lindsey du Toit & Debra Inglis, WSU- Mount Vernon

* For a list of products available for home garden pests, consult the WSU Hortsense website at <http://pep.wsu.edu/hortsense>

Harvest & Storage:

Both sweet and hot pepper fruit can be harvested and eaten at all stages of growth, but are most flavorful when mature and fully ripe. Color and size give you the best indication of ripeness. Fully ripe colors include yellow, orange, purple, red, or chocolate brown depending on the cultivar. Once peppers turn their final color, they deteriorate quickly and should be picked. Mature peppers will break easily from the plant. However, less damage is done to the plants when the fruits are cut off. Use gloves or wash hands immediately when harvesting hot peppers to prevent skin blister or burns.

Fresh peppers have a short storage life of only one to two weeks. Cool, moist conditions (45°F to 50°F and 85 to 90 percent relative humidity) are ideal for storing peppers. Refrigerate unwashed peppers in a ventilated plastic bag in the warmest location in the refrigerator. Rinse peppers just before eating or cooking. To rinse peppers, gently rub them under cold running water and pat dry with paper towels.

End Uses:

Caution: While handling or cutting hot peppers, wear plastic or rubber gloves and do not touch your face. If you do not wear gloves, wash hands thoroughly with soap and water before touching your face, eyes or using the restroom.

Freezing Peppers: Wash peppers, and then remove stem, core and seeds. Raw peppers can be chopped or sliced, placed in a container with no headspace then frozen immediately. Alternatively, peppers may be frozen after blanching. To blanch peppers, wash, seed and cut peppers into ½ inch strips or rings, then drop into boiling water for 2 minutes. Blanch pepper halves for 3 minutes. Cool quickly and drain. Package blanched peppers with ½ inch headspace.

Drying Peppers: Wash peppers, and then remove stem, core and seeds. Small peppers may be dried whole. Otherwise, cut peppers into 1/4 to 1/2" strips or rings. Blanching is not needed. Place peppers on dryer trays. Start dryer at 140°F for 2 hours and then reduce temperature to 130°F. Dry peppers until they are tough to brittle. Dry whole hot peppers until they are shriveled, dark, red, and crisp. Cool. Store dried peppers in airtight container in a cool, dark place.

Canning Peppers: Peppers can be canned as per the guidelines listed under **Further Readings**.

Further Readings:

Andress, E. & J. Harrison. 2006. So Easy to Preserve, 5th ed. The University of Georgia Cooperative Extension Bulletin 989. 375 pp.

Miles, C., G. Sterrett, L. Hasnault, C. Benedict & C. Daniels. 2013. Home Vegetable Gardening in Washington. Washington State University Extension EM057E. 29 pp.
<http://cru.cahe.wsu.edu/CEPublications/EM057E/EM057E.pdf>

National Center for Home Food Preservation. 2009. *Selecting, Preparing and Canning Vegetables: Peppers*. http://nchfp.uga.edu/how/can_04/peppers.html.

Ngouajio, M. 2011. Hot and sunny days promote sunscald in peppers and other vegetables. Michigan State University Extension, Dept. of Horticulture.
http://msue.anr.msu.edu/news/hot_and_sunny_days_promote_sunscald_in_peppers_and_other_vegetables

Powers-Hammond, L., C Raab & S. McCurdy. 2011. Canning Vegetables. *Pacific Northwest Extension Publication* PNW172. <http://cru.cahe.wsu.edu/CEPublications/PNW172/PNW172.pdf>

United States Department of Agriculture. 2009. Complete Guide to Home Canning. Agriculture Information Bulletin No. 539. 153 pp.

Washington State University Hortsense (Cooperative Extension) 2012, <http://pep.wsu.edu/hortsense>.

Pacific Northwest Vegetable Extension Group 2012. Photo Gallery of Vegetable Problems
http://mtvernon.wsu.edu/path_team/diseasegallery.htm

Additional Photos for Consideration:



Figure 11- Green, purple and red bell peppers.

Photos by M. Bush, WSU Extension



Figure 12- Anaheim pepper plant.

Photos by M. Bush, WSU Extension



Figure 13- Miscellaneous pepper display.

Photos by M. Bush, WSU Extension



Figure 14- Purple and yellow cayenne pepper plants.

Photos by M. Bush, WSU Extension