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PEPPERS (*Capsicum annuum*, *C. chinense*)

From the classic bell to sweet specialty and hot peppers, a wide range of varieties are suited to field conditions. Though not especially hard to grow, peppers prefer warm temperatures and will only flower and fruit within a set temperature range. With careful attention to environmental conditions, especially during the seed-starting phase, you can achieve a successful crop.

SITE SELECTION

Peppers do best in light, well-drained soil with a pH of 6.5 but will perform well in most soil types. Excess nitrogen in the soil can produce heavily vegetative plants with few fruits. Abundant levels of phosphorus and calcium are beneficial for fruit production.

Peppers are naturally slow-growing and need warm temperatures for fast growth. A southern exposure and use of row covers and plastic mulch can help achieve those temperatures. Peppers prefer full sun. To reduce the occurrence of disease, avoid planting in beds in which peppers and other members of the nightshade family (e.g. tomatoes, eggplant) have been grown in the last three years.

STARTING PLANTS

Start seeds indoors (direct seeding is not recommended). Sow seeds 4 seeds per inch, ¼ inch deep, into 20-row flats 6-8 weeks prior to transplanting. Maintain a constant, 80–90°F (27–32°C) soil temperature to achieve ideal germination percentage and uniformity — heat mats can be beneficial for maintaining a consistent temperature.

When the first true leaves show, about 2 weeks post-germination, transplant the seedlings. Two inches or larger containers will produce larger, stronger root systems; 50- or 72-cell plug flats are ideal. Grow the seedlings at 70°F (21°C) during the day and 60°F (16°C) at night. Use a well-drained growing medium in the cells, and take care not to overwater seedlings; wait until the soil is fairly dry before watering. To maintain good green color, fertilize the seedlings with a fish emulsion or a balanced, soluble fertilizer diluted to 100 ppm.

OPTIONAL COLD TREATMENT

Exposing seedlings to controlled cold temperature can increase the number of flowers, and subsequently fruits, that develop. When the seedlings have 3 true leaves, grow plants at a minimum night temperature of 53–55° (12–13°C) for 4 weeks. After 4 weeks, adjust the temperature to 70°F (21°C) day and night. Should you expose the seedlings to this cold treatment, seed 1–2 weeks earlier than usual.

TRANSPLANTING

A week before transplanting to the field, harden seedlings off by reducing water and temperature. Gradually introduce them to direct sunlight and outdoor conditions, as appropriate, over the course of ten days.

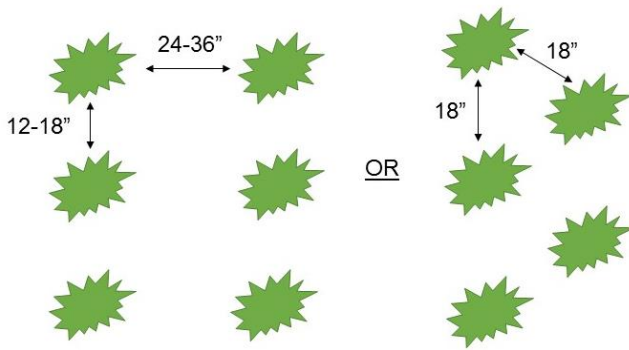
Transplant into the field in June, when soil temperatures are at least 70°F/21°C and the weather is settled. The seedlings should have buds, but no open flowers. If possible, choose a cloudy day or transplant in the early evening to help reduce shock and stress to the plant. Bury the plant a bit deeper than the root ball to encourage additional root growth that will make the plants sturdier.

Like tomatoes and eggplants, peppers are a warm-season crop. The ideal temperature range for fruit set is 65°F (18°C)–85°F (29.4°C). Peppers will not thrive when temperatures are below 60°F/16°C and very little fruit set occurs above 90°F/32°C, especially with bell peppers (some hot peppers are more heat-tolerant). Of course, the weather is beyond a grower's control, and the ideal conditions may not always occur. In such cases, early yield

may be reduced but plants will grow and resume fruit set when conditions improve.

Space plants 12–18” apart in the row and 24–36” between rows. An alternative spacing is 2 rows of plants 18” apart, staggered in a zigzag pattern (see graphic, below).

If intending to save seeds of open-pollinated plants, keep sweet peppers away from hot peppers to avoid the risk that the two will cross-pollinate.



Two options for planting distances

Water-in the transplants with a high phosphorus solution. If the soil is not deficient, then peppers should not need additional fertilizing, however, if plants develop pale leaves and stunted growth, then additional fertilizer, such as manure tea, may be necessary.

Peppers perform best with 1” of water per week. Maintain even moisture and be sure to water sufficiently during dry spells, as lack of water can compromise the crop. Mulch such as straw or grass will help maintain soil moisture.

Some growers remove the first 1–2 fruits because the first fruits are prone to being misshapen or becoming sunscalded. Removing the first fruits helps the plant direct energy early in its life cycle toward becoming a vigorous plant more capable of producing higher yields later.

OPTIONAL TRELLISING

Trellising can help reduce fruit-to-soil contact while improving plant health and increasing marketable yields. Trellised plants remain upright, are easier to harvest, and help maintain air circulation. Trellising will also promote vertical growth which promotes a better canopy for reducing sunscald of fruits.

Most sweet peppers will benefit from a basket-weave trellis, however, habaneros and small

ornamental varieties do not typically need trellising. To learn more, see our [Basket-Weave Trellising Instructions](#) tech sheet.

ROW COVER

Since peppers like consistently warm conditions, plastic mulch and row covers will result in earlier crops and better yields. In addition to the added warmth, row covers also exclude insect pests when used preventatively, before the first appearance of the pest. Support row covers with wire hoops to protect the upright flowers from being abraded by the row cover. Remove row covers when outdoor temperatures are above 85°F/29°C to prevent blossom drop and heat damage.

DISEASES

The best means for controlling disease are preventative:

- use drip irrigation instead of overhead irrigation
- plant in well-drained soils
- follow a 4-year crop rotation for nightshades (nightshades include tomatoes, eggplants, and peppers)
- ensure adequate calcium levels in the soil (to prevent blossom end rot (see p. 3))
- keep plots free of plant debris such as fallen fruit
- to ensure good air circulation, keep weeds down via hand pulling or shallow cultivation
- select cultivars with resistance to diseases prevalent in your area

Some of the more common diseases of peppers include anthracnose fruit rot, bacterial leaf spot, *Botrytis* blight (gray mold), early blight, *Phytophthora* blight (damping off), *Pythium*, *Fusarium*, *Verticillium* wilt, tobacco mosaic virus (TMV), and potato virus y (PVY).

For information on diseases most common in your region, and for help with positive identification of suspected disease, please consult your local Cooperative Extension Service.

PESTS

In most areas, peppers are not plagued by many pests. That being said, pest infestations are easier to control if caught early; therefore, we recommend that you scout your crops weekly for signs of pests. You may also want to use yellow sticky traps to monitor pest pressure in your fields.

Listed below are some common pests. In addition to these, other potential pests include aphids, flea beetles, Colorado potato beetles, European corn borers, hornworms, thrips, and tarnished plant bugs. Consult your local Cooperative Extension Service if you have questions about pests in your area.

- **Cutworms:** Cutworms are the caterpillar larvae of several species of night-flying moths. They get their name because they cut plants down by gnawing through the plant stem at ground level. One type of cutworm, the climbing cutworm, not only attacks the stem, but also the leaves and fruit buds. You can control cutworms by placing aluminum foil or cardboard collars around the plants—one end of the collar is pushed a few inches into the soil and the other end extends several inches above the ground around the stem. It may also be possible to control cutworms with *Bacillus thuringiensis* (bt).
- **Pepper Maggot:** Pepper maggots are small (1/3") yellow fruit flies with brown-striped wings. They lay their eggs under the skin of the fruit. You may be able to see small white round scars on the surface of the fruit where the fly has entered the fruit. These scars are particularly apparent on red peppers. The larvae are white or yellow. Pepper maggots feed on the inside of fruits, causing the peppers to rot. The best deterrence is to use floating row covers.
- **Pepper Weevil:** The pepper weevil is primarily a pest of the southern United States, Central America, and the Caribbean, although it is possible for it to travel north on transplants during the growing season. It is a brass-colored beetle about 1/8" long. Its larva is a white worm, 1/4" long with a beige head. Pepper weevils chew holes in the blossoms and flower buds, causing irregularly shaped and discolored fruit. Damage may often cause the plants to drop fruit. Pepper weevils can also introduce *Alternaria* fungus into the fruit. Pyrethrins are effective against pepper weevils.

OTHER ISSUES

- **Sunscald:** Often a result of lack or loss of leaves, sunscald is the pepper equivalent of sunburn. Fruits with sunscald develop blisters that may become lighter in color and change to a papery texture. Sunscald damage also makes infection by disease or infestation from pests more likely. If you live in an area with intense light in the summer, choose varieties with good leaf canopies.
- **Blossom end rot:** As the name suggests, blossom end rot is a brown-colored sunken area of rot on the bottom (blossom end) of the fruit. The cause is calcium deficiency in the fruit.

Drought stress can exacerbate calcium deficiency. If the plant does not receive enough water, it cannot transport calcium and other nutrients to the fruit. Inadequate soil pH can also affect a plant's ability to take up nutrients.

Fruits affected by blossom end rot cannot recover from it and should be discarded. However, if adequate watering and proper fertilization occur, fruits that develop subsequently should develop normally.
- **Excessive vegetation:** Big bushy plants with few peppers can be the result of an excess of nitrogen, hot or cold temperature extremes during the flowering period, injury by the tarnished plant bug, and/or the choice of late, poorly-adapted varieties.

HARVEST

Fruit can be harvested green but is more flavorful when harvested ripe. You may want to harvest the first fruits of the season early, before they ripen, in order to encourage the plant to keep bearing fruit. Using pruners or a knife, cut the fruit off flush with the main stem of the plant.

STORAGE

Peppers store best at 45°F(7°C) and 95% relative humidity. In these storage conditions, they should retain good quality for 14–21 days. Do not store them with ethylene-producing vegetables like tomatoes, as ethylene will promote ripening to the point of being overripe.

ADDITIONAL RESOURCES

- [Greenhouse Pepper Production Guide](#)
- [Basket-Weave Pepper Trellising](#)
- [Growing Tips for Successful Pepper Transplants](#)

Tell us what you think!

We would love your feedback about this information! Please take 1 minute to [answer 3 short questions](#) to share your thoughts!

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