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PUMPKIN (*Cucurbita pepo*)

Whether grown for pies, jack-o'-lanterns, or seeds for snacking, pumpkins are a staple crop for many growers. While generally easy to grow, there are a few cultural factors to keep in mind in order to ensure success. Most importantly, pumpkins are a heat-loving crop. Seedlings are very sensitive to frost and cold injury and they require a relatively long period to harvest; growers in short-season zones should consider starting the plants early indoors. Pumpkins can be susceptible to some pests and diseases; selection of disease-resistant varieties and use of preventative cultural practices can be helpful in protecting the crop.

SITE SELECTION:

Pumpkins are heavy feeders and prefer fertile, well-drained soil with a pH of 5.8–6.8. Add additional fertilizer as recommended by soil test results and your local cooperative extension.

CULTURE:

Time sowing so that fruits will be ready for October sales. In short-season zones, you will want to start seeds early indoors to get a jump on the season and ensure the fruits ripen before the first fall frost. In longer-season climates, direct seed in June. If sowing hullless seeds, we recommend transplanting, as they may germinate poorly when direct seeded.

- **Transplanting:** Sow 2–3 seeds per 2" container or plug flat about 3 weeks prior to transplanting. Germinate at 75–95°F/24–35°C. Thin with scissors to 1 plant/container or cell. Gradually introduce plants to outdoor conditions for 4–7 days prior to transplanting. After danger of frost has passed, transplant out. Handle seedlings carefully when transplanting, as they dislike root disturbance. Seedlings are very sensitive to cold temperatures; use cloches or row cover if necessary to protect newly transplanted seedlings from cool nights.
- **Direct Seeding:** Sow in late spring when the soil is at least 70°F/21°C and frost danger has passed. Sow 2 seeds at the appropriate spacing interval, 1/2–1" deep. Thin to 1 plant per spacing interval after seedlings are established.

Space plants according to their type. See chart (below) and check the variety-specific recommendations within each product description on our website.

Spacing <i>(check the product description on our website for variety-specific spacing recommendations)</i>	
In-row	Small-fruited varieties: 18–24"
	Medium-fruited varieties: 24–36"
	Large to extra-large-fruited varieties: 36–72"
Between-row	Bush: 4'–5'
	Short-vine: 6'
	Long vine: 12'

Mulch with a thick layer of straw or with plastic mulch. Mulch helps to conserve water, suppress weeds, and reduce fruit rot by keeping developing fruit off the soil. Plastic mulch can also help with soil warming.

Where pest pressure is high, cucumber beetles can destroy young plants. We recommend using fabric row cover (AG-15) to exclude insect pests during the seedling stage in areas of high cucumber beetle pressure. Apply row cover immediately after planting and remove as soon as plants begin to flower; otherwise, pollinators will not be able to access the flowers.

Keep the plants well-watered. The most critical period for irrigation is while fruits are sizing. Stress related to lack of water can lead to blossom-end rot and/or poor fruit size and yield. For seedlings, irrigate with 1/2" water whenever the top 6 inches of

soil becomes dry. Once plants begin to vine and until the first bloom, increase the amount of water to $\frac{3}{4}$ " of water every 5 days (or more frequently if plants wilt in the daytime heat). After the first bloom, ensure the plants receive 1" of water every four days (or more frequently in extremely hot weather). Sandy soils and/or drip irrigation systems may necessitate more frequent, lighter irrigation than heavier soils or overhead irrigation. Do not over water to the point where the soil is consistently saturated.

FLOWERING, POLLINATION, & FRUIT PRODUCTION

Pumpkins produce both male and female flowers on the same plant. Male flowers appear first, followed by female flowers. Only female flowers produce fruit, so the first flowers, which are male, will not produce fruit.

If female flowers are not producing fruit, lack of pollination is a likely culprit. Large-scale growers are encouraged to maintain at least one hive of honeybees per acre of pumpkins to help with pollination. Yield increases have been achieved with up to three hives per acre. Native bees are usually adequate for home gardens.

HARVEST & CURING

Mature fruits can tolerate 1–2 light frosts. Harvest when the fruit color is fully developed. For long "handles," clip fruit stems close to the vine. Avoid picking up fruits by the handles and take care not to damage the skin/rind.

Curing is recommended. Curing heals wounds to the fruit, enhances color, and ensures a longer shelf life. Sun cure the fruits in the field for 5–7 days or cure indoors by keeping fruits at 80–85°F/27–29°C and 75–85% relative humidity with good air ventilation. White varieties should always be cured indoors to keep the sun from yellowing the skin of the fruit.

STORAGE: Store at 50–60°F/10–15°C, 50–75% relative humidity and good ventilation. Repeated exposure to temperatures below 50°F/10°C may cause chilling damage. Sort fruits on a regular basis to remove any rotten fruits. Fruits store up to 2–3 months.

SEED HARVEST

Choose a variety specifically for seed production. Seeds may have a shell or be without a shell (these hullless seeds are called pepitas, which means "little seeds of squash" in Spanish). Harvest and

cure pumpkins as described above, then extract the seeds, wash them, and allow them to dry.

BLOSSOM HARVEST

Like squash blossoms, pumpkin blossoms have a mild, squash-like flavor and can be stuffed, fried, or used as a garnish in soups and salads. Because they are so perishable, pumpkin blossoms are an exclusively local delicacy.

Blossoms are very delicate and have a short shelf life; harvest early in the morning while temperatures are cool, and the flowers are opening. Select large male blossoms that aren't wilted. You can identify male flowers as those that do not have small fruit at the base of the flower. Clip flowers 1–2 inches below the flower base.

Gently shake each flower after you harvest it to make sure no insects remain in the flower. Refrigerate immediately.

DISEASES:

Avoid disease through the following preventative measures:

- Choose varieties with disease resistance.
- Plant in sites with good air circulation and adequate drainage.
- Keep weeds down to promote good airflow.
- Do not handle the plants when they are wet (to avoid spreading foliar disease from plant to plant).
- Practice crop rotation. Plant pumpkins in soils that have not grown a crop of watermelons, muskmelons (cantaloupes), summer or winter squash, cucumbers, or another member of the Cucurbit family in the past 2 to 3 years.
- Control pests, as they can introduce and spread disease. For example, cucumber beetles can spread bacterial wilt and squash bugs can carry squash yellow vine disease.

If disease occurs, immediately remove affected vines and destroy (don't compost) them. We recommend contacting your local Cooperative Extension Service to definitively identify disease issues and to provide treatment recommendations.

Powdery Mildew: Powdery mildew is a fungal disease caused by several different species of fungus. It begins with pale yellow spots on the leaves. As the disease progresses, fuzzy white spots develop on the leaves. The leaves may look

as if they are covered in baby powder. Affected leaves will become brown, wither, and die. If the plant is defoliated by the disease, the fruit may ripen prematurely and/or suffer from sunscald. The disease reduces fruit shelf life. For pumpkins, powdery mildew is more common than downy mildew. Choose resistant varieties.

Downy Mildew: Downy mildew is caused by an oomycete pathogen. The disease causes irregular or angular yellow-brown spots on leaf surfaces. Downy gray-purple spots may also develop on the undersides of leaves. Symptoms often appear first on older leaves near the center of the plant. The downy mildew pathogen does not overwinter in the northern U.S., but it spreads annually northward each season as spores get blown north by storms. In the northernmost U.S., the disease is rare.

If the pathogen is present in the environment, the disease can spread rapidly through a crop during wet weather, and eventually, the leaves will turn brown and die. Downy mildew does not infect the fruit itself, but it can decrease overall plant vigor, resulting in small and poor-quality fruits or causing fruits to sunscald as the diseased plant loses its leaves. Because downy mildew spreads in wet conditions, replacing overhead with drip irrigation can be a helpful preventative measure.

Phytophthora: *Phytophthora capsici* is an oomycete pathogen that favors wet conditions and poorly drained soil. It can persist in the soil for 10 years or more and can spread via runoff and rain splash. It can cause damping off—sudden wilt and death at the seedling stage—and can also infect mature plants and fruit. Infection in mature plants shows as wilting and rotting of the stem. Mature plants can also develop infection higher up on the vines. The vines will show dark green lesions that turn brown, and the leaves above the lesions will wilt. Leaves may also develop dark brown spots. Fruit rot can occur, normally where the fruit is in contact with the soil. *Phytophthora* can spread via surface water; if irrigating with surface water, you may want to test for the presence of the pathogen in the water.

Bacterial Wilt: Bacterial wilt is transmitted by insects, especially the striped and spotted cucumber beetles. It causes the leaves to wilt and eventually die. You may find leaves drooping during the heat of the day but recovering in the evening. The leaves may yellow around the edges. The plant will often die about two weeks after the onset of wilting.

Yellow Vine Disease: yellow vine disease is caused by the bacterium, *Serratia marcescens*. The bacteria survive the winter in squash bugs and are spread to the crop when squash bugs feed on the plants. Young seedlings are more susceptible to disease transmission than older seedlings. The disease has a relatively long incubation period and symptoms, which include yellowing of the leaves and stem, and which progress to plant death, do not usually appear until just prior to harvest.

INSECT PESTS:

To help discourage pests, keep field borders mowed and remove plant debris each fall.

Squash Vine Borers: The adult squash vine borers are orange and black wasp-like moths that lay eggs at the base of the plants in early summer. You may see the very tiny red and orange eggs at the base of the plant. The larvae of the squash vine borers are 1" long white caterpillars that tunnel into the plant stems, causing the vine to wilt and die. Look for entry holes at the base of the plants, surrounded by yellow, sawdust-like droppings. You may be able to make a shallow slice into a damaged stem and remove the larvae. You can also inject the stems with *Bacillus thuringiensis* (Bt). Hill up soil around wounds to encourage the plant to re-root.



Squash Vine Borer

Squash Bugs: Squash bugs are large $\frac{3}{4}$ " grayish-brown bugs. They lay their eggs, which are a bronze color, in a mass on the underside of leaves. They suck the sap from the plant and, if their numbers are high enough, they can cause the leaves to turn brown and die. The damage can also cause the vine to wilt under hot, dry conditions. Additionally, squash bugs can carry squash yellow vine disease. Cover young plants with row cover until the first blossoms appear. After row cover

removal, either treat with insecticides or handpick and destroy eggs. If using insecticides to control squash bugs, time your spraying with the early life stages of the insects when they are most vulnerable. Some farms plant a sacrificial trap crop of Blue Hubbard slightly ahead of the main crop. The squash bugs congregate on the trap crop where they can then be heavily sprayed.



Squash Bug

Striped and Spotted Cucumber Beetles: These beetles can carry bacterial wilt and mosaic viruses. They are about ¼” long and yellow or greenish yellow with black spots or stripes (depending on the type of beetle) on their back. Protect young plants by covering them with floating row cover until the first blossoms begin to open. Controlling weeds can help to reduce the likelihood that the beetles will transmit bacterial wilt to the crop.



Striped Cucumber Beetle

ADDITIONAL RESOURCES

- [Jack-o'-Lantern Pumpkin Varieties Comparison Chart](#)
- [Pie Pumpkin Varieties Comparison Chart](#)
- [Specialty Pumpkin Varieties Comparison Chart](#)
- [White Pumpkin Varieties Comparison Chart](#)
- [Winter Squash Types & Varieties Comparison Chart](#)
- [Eating Quality in Winter Squash & Pumpkins](#)
- [Storage Crops: Post-Harvest Handling Guidelines](#)

Tell us what you think!

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