

# Department of Plant Sciences

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## BEANS FOR THE TENNESSEE VEGETABLE GARDEN

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*Natalie Bumgarner, Residential and Consumer Horticulture Extension Specialist  
Department of Plant Sciences*

### Crop Description

Beans are in the legume family (Fabaceae) known for their symbiotic association with bacteria that fix atmospheric nitrogen. This publication will focus on the most well-known garden beans, including common beans (bush and pole), lima and edamame, which is also known as edible soybean.

Common beans (*Phaseolus vulgaris*) described as bush are determinate plants (much like determinate tomatoes) that develop flowers at the end of branches. Pole beans are vining because they are indeterminate and keep producing leaves on a main stem while also producing flowers and fruit along the stem. Half runner beans have a growth habit between bush and pole. Pods are typically green, but novelty cultivars can produce yellow, purple or speckled pods with a range of bean size and color. Many cultivars of beans have been bred to have less distinctive strings, and are called “stringless.” Because of this stringless characteristic, “snap” is commonly used to describe many beans. The many different types of dry beans (kidney, navy, etc.) are the same species as snap beans, but will not be discussed here because they are a less common garden crop. Lima beans (*P. lunatus* and *P. limensis*) are larger seeded beans that also can be found in bush and vining types.



All of these types of beans are self-pollinated, so there is often little movement of pollen between flowers (outcrossing). This means many types can be grown together without the cross-pollination concerns of sweet corn. This feature makes beans relatively simple for seed savers to maintain local or family heirlooms. Also, beans gardeners find in stores or catalogs are open-pollinated due to the difficulty and expense of hybridization.

Crop (species)	Cultivar suggestions
Bush beans ( <i>Phaseolus vulgaris</i> )	Provider, Jade II, Blue Lake 242, Roma II, Mascotte, Maxibel, Crockett, Bronco
Half runner bean ( <i>P. vulgaris</i> )	Mountaineer, Volunteer, White
Pole beans ( <i>P. vulgaris</i> )	Kentucky Blue, Kentucky Wonder, Seychelles
Lima beans ( <i>P. lunatus</i> )	Fordhook 242, Henderson Bush, Dixie Butterpea
Edamame/edible soybeans ( <i>Glycine max</i> )	Envy, Midori Giant, Chiba Green

## Planting and Growing

Well-drained soil and full sun are needed for beans, which can grow well in a range of mineral soils from sandy to clayey. Be careful seeding in soils that form crusts because it can delay or reduce emergence of young plants. Optimum pH is between 5.8 and 6.5, and recommended pre-plant fertilizer should be added to the garden site. While beans are able to fix nitrogen, they still require fertilization. Often, pre-plant nutrients are supplied by banding the fertilizer beside (3-4 inches) the seeding row to enable easy access for the young plant while preventing the fertilizer from burning the seedling.



*Immature edamame*

As tender, warm-season crops, seeding is best done after the danger of frost has passed because beans cannot withstand frost. To increase seed germination, soil temperatures should be 60-65 F, and lima beans prefer soil temperatures around 70 F or above for the most rapid germination. Because of the symbiotic association with bacteria in the soil for nitrogen fixation, often beans being planted in a garden area for the first time are inoculated to ensure that bacteria are present. If a garden site has been used for beans before, then inoculation is not generally needed.

Often beans are treated with a fungicide to reduce seed loss in the soil due to seed rots or damping off and to increase germination percentages. Treated seeds will have a bright (many times pink) dye to indicate that a fungicide has been used as a coating.

The designation of determinate, semi-determinate or indeterminate beans is a good guide as to the structure that might be needed to support them. Determinate, or bush beans, will produce a compact plant less than 2 feet in height and width and require no support. Edamame typically have a bush habit that will not require support. Semi-determinate or vining, often called half-runners, can be grown without support, but picking time and bean contact with the ground can be reduced with some support. Indeterminate or pole beans will require support, which can be a trellis, mesh or simple poles to climb.

Bush beans are often sequentially seeded to provide fresh harvest for longer periods. Bush and pole beans are described as day neutral, so the length of days doesn't impact their production. Edamame, however, are sensitive to day length in a similar manner to field soybeans. So, select a cultivar that is appropriate for the latitude. For growing in Tennessee gardens, select a cultivar that will perform well in the 35 to 40 degrees latitude range.

Crop	Planting dates in Tennessee		Seeding Depth	Seed Spacing In Row/Between Rows	Days to harvest
	East	West			
Bush and pole beans	4/20-6/20, 7/15-8/20	4/1-6/1	1-1 ½ inches	2-4 inches/2-4 feet	50-65
Lima beans	5/1-6/30, 7/15-8/20	4/15-7/15	1-1 ½ inches	4-6 inches/4 feet	75-85
Edamame	4/20-6/20	4/15-6/15	1-1 ½ inches	3 inches/3 feet	75-90

Cultivate for weed control at a shallow depth to prevent root damage or consider using a mulch such as straw to reduce weed pressure. It is not common to use plastic mulches because beans are direct seeded in rows. A consistent supply of moisture will increase production. In small to moderate garden plots, drip irrigation could be used to ensure that the approximately 1-2 inches of weekly water is available.

Beans, due to their ability to fix some nitrogen, are not known as heavy feeders, and application of side-dressing is not common for beans. Generally, fertilizer is primarily added pre-plant.

## Harvesting and Storage

**Bush and pole beans** — Most beans are harvested when the pods are still tender and succulent (will snap) and low in fiber. Many times they are harvested before the seeds fully enlarge and mature. However, seed enlargement is a matter of taste and can vary among gardeners. Beans should be stored at 40-45 F with high humidity with about a one-week storage life.

**Lima beans** — Pick when seeds have enlarged. Lima beans can be picked at a shelling stage when the pod is still green or as a dry bean when the pods are dried and brittle. Storage will depend on use and picking time. Shelled limas are best stored at 37-41 F with high humidity for up to a week. Dried beans can be stored for much longer periods if kept free from moisture and safe from pests.

**Edamame** — Harvest when seeds are immature. The pods should be plump with beans, but still bright green. Harvest before the pods turn yellow for best quality. They can be stored for a few days at 40-45 F in the refrigerator, but are best cooked and eaten or frozen soon after harvest. Edamame should be cooked and shelled before eating.

## Common Pests, Diseases and Issues in Bean Crops

Description	Possible cause(s) and indicators	Prevention/Control Steps
Defoliated leaves — skeleton appearance	<ul style="list-style-type: none"> <li>• Mexican bean beetles (feeding by immature stages- larvae- that are fuzzy yellow)</li> </ul>	Trap crops, early planting, handpicking or insecticide treatment. Remove overwintering sites for adults.
Wilting of plant — yellowed leaves	<ul style="list-style-type: none"> <li>• Damping off (young plants)</li> <li>• Root rots (Fusarium)</li> <li>• White mold (can also infect stems, pods)</li> <li>• Southern blight</li> </ul>	Lab ID may be needed for confirmation. Crop rotation (often long rotations are needed), well-drained sites. Avoid under- or overwatering. Warm soil and fungicide treated seeds can reduce damping off.
Water-soaked spots that enlarge and are surrounded by yellow, then drop out	<ul style="list-style-type: none"> <li>• Bacterial diseases (can also infect pods)</li> <li>• Halo blight often starts with yellow bleached areas of the leaf</li> </ul>	Use clean seed, reduce soil and water splash in field, remove infected crop debris in field. Resistant varieties, copper sprays may be useful.
Small yellow or white spots that enlarge to raised reddish spots with halos	<ul style="list-style-type: none"> <li>• Rust fungus (can also infect stems and cause leaf drop)</li> </ul>	Resistant varieties, remove infected debris, use fungicides.
Distorted shape or mottled color on bean leaves	<ul style="list-style-type: none"> <li>• Mosaic viruses (plants can be stunted or appear to wilt)</li> </ul>	Use clean seeds and select cultivars with resistance.
Beans with circular dark, sunken spots	<ul style="list-style-type: none"> <li>• Anthracnose fungus (stem and leaf infection also occur)</li> </ul>	Can be spread through seed and crop debris in field. Use clean seed, resistant varieties, and plow under infected debris. Avoid overhead irrigation.
Flowers dropping off	<ul style="list-style-type: none"> <li>• Environmental conditions</li> </ul>	High heat (above 90-95 F) or water stress can cause blossom drop.



*Damage by Mexican bean beetle larvae*



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