



for the Gardener

UCSC FARM & GARDEN
Center for Agroecology
& Sustainable Food Systems,
UC Santa Cruz

Garden Beans Offer Year-Round Source of Great Flavor, Nutrition

Garden beans (principally *Phaseolus vulgaris*) are tender, warm-season annuals grown for their edible pods and seeds. The pods are eaten at the immature stage with minimal seed formation (green or snap beans). The seeds are eaten while still moist and succulent, but with the pods leathery and thus discarded (fresh shell beans). After maturing further many of the fresh shell varieties are harvested, stored, and cooked at the dry bean stage.

Beans are grouped in the Fabaceae family, the third largest plant family after the Orchidaceae and Asteraceae. Previously classified as the Leguminosae, the Fabaceae family consists of approximately 700 genera and 17,000 species. Additionally there are over 2,000 varieties of beans grown and catalogued worldwide. *Phaseolus* beans originated in both the lowlands and highlands of Mexico through South America. There are records of beans being in cultivation as long as 9,000 years ago.

Ingenious and enterprising gardeners can have beans in the kitchen in one manner or another the year round: fresh snap beans from midsummer to fall; fresh shell beans from midsummer to fall; dried beans from fall to spring; and of course, as a reminder of summer, snap beans pickled throughout the year. All beans are an excellent source of vegetable protein and are rich in vitamins A and B as well as calcium, phosphorous, and iron.

GROWING TIPS

Planting conditions and germination. Because of their tropical origins, beans are tender, warm-season crops. They are directly sown when soil temperatures average greater than 60°F, with 70°–85°F an optimal range for germination. Cold, wet soils induce seed rot, reduce percentage of germination, and lengthen time to emergence. Continued cool air and soil temperatures will slow the growth of bean seedlings and cause chlorosis (yellowing); 70°–90°F is an ideal range for growth, pod set, and maturation.

Being a large-seeded crop, bean seeds are not overly sensitive to a soil dry down to 50% of field capacity between waterings before the seedling emerges. Because of the seed's ability to imbibe and hold water, the soil can feel frighteningly dry during this process with no negative effects.

Soils and planting. Depth of planting can vary from 1/2" to 1 1/2", depending on soil texture and specific weather patterns at planting time. Lighter textural classes of soils

(sands and silts) favor deeper planting; cool, wet weather favors shallow planting. It is important to remember that germination and seedling root growth require significant amounts of oxygen. Thus a soil that has been appropriately managed over time will display a good structural arrangement of soil particles and facilitate the diffusion of air into the soil (a passive process) and the exit of excess CO₂.

Beans are seeded with 6–9 seeds per foot and then thinned to 3"–6" between plants. Spacing between rows is generally 20"–36" for bush types and 4'–5' for pole types. A soil pH of 6.0–6.8 is optimal for beans.

Weed management. Weed management (suppression via hoeing) should be practiced 1–2 times within 30 days of emergence. Both bush and climbing types possess moderately deep (1'–2' and 3'–4' respectively), branched tap root systems, and are good at outcompeting weeds as the crop advances.

Watering. Water requirements for beans are moderate, 1.5"–2" per week until flowering. From flowering through harvest lack of water has a severe negative effect on flowering, fruit set, and quality of the pods. Thus a steady supply is recommended, especially with fillet beans.

Fertilizers. Beans are among the least responsive vegetable to fertilizer inputs. As legumes they can meet some of their nitrogen need by fixing soil atmospheric nitrogen (see below). Unless soil tests indicate a deficiency, neither phosphorous nor potassium need be applied.

Harvesting. Harvests must be consistent (every 2–5 days) and thorough. Like peas, squash, and many annual flowers, a few fruit left on the vine will truncate further production.

Rhizobium bacteria

One of the remarkable features of most legumes, including beans, is their ability to host symbiotic soil bacteria on root nodules. This association allows the bacteria to take nitrogen gas from air in the soil and convert or "fix" it chemically into a form available to plants. The bacteria residing in the legume root nodules are called Rhizobia (*Rhizobium* spp.). Each species of legume hosts a specific species of the Rhizobium; that is, the species that associate with clovers won't inoculate beans. Growers with low levels of inoculum in the soil can increase the vigor and yield of bean plants by inoculating the seeds with the appropriate Rhizobium prior to planting.

TYPES OF BEANS

Green Beans/Snap Beans

Green beans or snap beans fall into two basic plant types—bush (determinate) and pole or climbers (indeterminate), and several different pod types—6"–8"-long round-podded, pencil thin and straight Blue Lake types; 8"–10"-long round, slightly curved Kentucky Wonder types; and 8"–12"-long flat, broad-podded Romano types. Within each type there are many colors, with shades of green, yellow, purple, speckled, or mottled.

Snap beans were formerly called string beans, referring to the string-like, tough tissue that developed along one edge of the pod and had to be removed by hand prior to cooking. Most modern varieties have had the "stringiness" bred out of them.

Breeding efforts over recent decades have been towards developing bush varieties with an erect, self-supporting habit, pods held well above the foliage, and a concentrated set of flowers and pods. Plant habit, texture, and taste are biased toward machine harvest and processed fruit. Thus home gardeners and fresh market producers need to be aware of and select for appropriate varieties.

Bush types mature in 50–70 days and crop for 2–3 weeks. Climbers take an additional 20 days to begin harvest and need support (sturdy 7'–10' fencing) but crop for 2–3 months and sometimes even longer.

Romano Types

Romanos or Italian flat beans come in both bush and climbing types. While the taste of bush types is acceptable, the climbers offer much better texture and taste. Romanos are big (8"–12" long, 3/4"–7/8" wide), flat-podded, meaty, rich-flavored snap beans. In fact, full taste doesn't express itself until pods are greater than 6"–8" long up to 12" in

length. Romanos are the densest, full-flavored kings of fresh green beans. The climbers offer 2–3 months of cropping, with the first 2 months offering continuous, heavy cropping and diminishing yields, but still high flavor in the later period of harvest.

Romano Bush Varieties (in general bush varieties feature "floppy" plants)

Romanette (55 days) – Medium dark green beans, flat 6"x 3/4" pods that retain full flavor even when beans enlarge in pods. Plants more upright and sturdy than other bush Romano varieties.

Roma II (59 days) – 20"-tall plants, medium green flat beans, smooth exterior. Roma II are good fresh and good for canning.

Green Crop (55 days) – Longer (8"–10"), narrower pod than other bush types; excellent tender taste when fresh, good for canning.

Romano Gold (56 days) – Features attributes of Romanos with wax types combined with yellow, golden color. Smaller beans are 4 1/2"–5" long. Pods held well above foliage. Light buttery yellow pods. Distinctive looks, productive and high flavor.

Romano Climbing (pole) Varieties

Musica (67 days) – Moderately vigorous 6'–8'- tall plants with good foliage; pod balance. Pods are 9"–11" long, flat, and straight. High quality, high quantity—among the most productive and yet highest flavored of all Romanos.

Helda (60 days) – Early maturing 6'–7'-tall vines bearing 9"–10"-long flat pods. Romano stringless and succulent even at larger sizes. Productive over a 2–3 month period.

Neopolitan (70 days) – Improved Romano with high yields and uniformly long pods (9"–11"). Sugary sweet flat pods with a rich, long-lasting taste.

Golden of Bacau – An old heirloom from Romania, with a high yield and long cropping period. Long (9"–12"), flat, golden pods. Excellent taste even after beans have formed in pods.

Kentucky Wonder Types

Classic, original "string" beans with a much richer, fuller, meatier flavor than any modern snap bean. They bear profuse crops of 6"–8"-long, slightly curved oval pods of silvery green color. The staple bean of American pioneer homesteads. New improved types are snap beans with the stringiness bred out of them.

Kentucky Wonder Varieties

Kentucky Wonder (pole), Kentucky Blue (pole), and Kentucky Wonder Wax (yellow pole)

Blue Lake Types

Blue Lake varieties (bush and climbing) define the look, taste, and texture of summer's cornucopia in the snap bean domain. Blue Lake types are excellent raw, steamed, and as "dilly" canned beans. The bush types feature sturdy, erect

Bush vs. Climbers

Bush types

- Mature quickly, 50–70 days
- Concentrated cropping period, 2–3 weeks
- Less effort and materials for fencing or trellising
- Increasingly greater varietal possibilities
- Require bending and stooping to harvest
- Lower overall yield
- Higher pod to vine ratio

Climbers

- Slower maturing, 60–75 days
- Extended cropping period, 2–3 months or longer
- Require extensive trellising
- Almost vanishing varietal possibilities
- Picker can stand tall and straight to harvest
- Significantly higher overall yield
- Lower pod to vine ratio

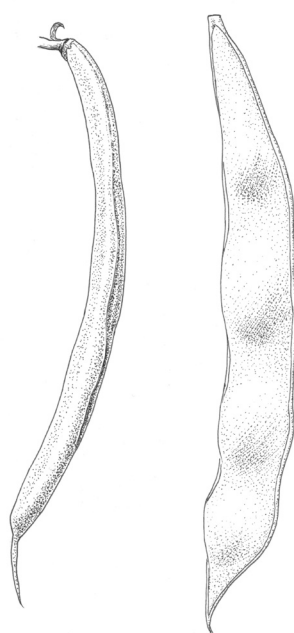
2'-3'-tall plants with pods set both concentrated and held distinctly above the foliage for easier harvest. The pods are round, pencil-shaped, long (6"-8") and perfectly straight. They are virtually fiber-free and "snappy" with a light, slightly sweet taste. *Caveat emptor* (buyer beware)—increasingly, bush Blue Lake varieties are being bred for even maturity (short cropping period of 57-60 days), machine harvest, and processing. Thus fresh taste is poor. There are yellow- and purple-podded varieties, and although good looking, the taste is often disappointing.

Blue Lake Bush Varieties

Strike (54 days) – Early maturation, extended harvest (3-4 weeks) for a bush type, good taste. Standard of Blue Lake types for over 20 years.

Blue Lake beans (left) are the typical snap beans of mid summer.

Scarlet runners (right) produce abundant bright flowers and meaty, delicious beans.



Blue Lake

Scarlet Runner

Eliza Jewett

Blue Lake (55 days) (and Blue Lake 274) – Unique flavor, stringless, slow fiber and seed development, with dark green, round 6-8-inch long pods.

Grenoble (52 days) – Hey, if it's French and a bean, it must be extraordinary, and it is. Tasty 5"-6"-long pods, perfectly straight and a dark green luster. Short, concentrated harvest period (2 weeks).

Provider (50 days) – Early harvest; 5"-long pods are medium green, fleshy, and round, on compact, erect plants. Germinates in cool soils, performs well under adverse and diverse conditions. A tasty and reliable producer, thus keeping it on the market for 30 years.

Tenderpod (50 days) Early developer, long-time favorite. Deep green, meaty flavor, smallish 4"-5"-long round pods, good flavor, fresh and steamed.

Blue Lake Climbing Varieties

Blue Lake (70 days) – Straight, round, 6"-long pods, stringless, crisp, tender and sweet even at maturity. Long harvest period (2-3 months). Far superior in taste to any bush Blue Lake variety.

Kentucky Blue (65 days) – Combines the straight, stringless pods and light taste of the Blue Lakes with the rich, meaty, old time bean gusto of Kentucky Wonder types.

Fortex (60 days) – Rich taste, crunchy, snappy texture, extra long (10"-12"), round pods. Very early for a climber. Picked at the 6"-7" stage, it is very much like a fillet bean.

Northeaster (56 days) – Vigorous vines, earliest pole bean, huge (8"-12" long), flat, buttery pods.

Bush Wax Beans

Bush wax beans are much like bush snap beans except they tend to be yellow with a distinct waxy exterior and a crunchy snap. These beans are good steamed but make the best pickled beans as they do not get soggy. They are at their best if harvested slightly before attaining full color.

Bush Wax Varieties

Roc d'or (50 days) – Classic, early, high class yellow wax beans are long (6"-7"), slender, and golden yellow. Harvest young for best quality and taste.

Sunburst (51 days) – A good early wax bean. Tolerates cool, wet conditions.

Nugget (52 days) – Sturdy plants, short, straight, plump, bright yellow pods. Rich, buttery taste.

Gold Mine (53 days) – Best texture for canning.

Major (63 days) – Tender, yellow, waxy pods, high yields of 5"-6"-long, straight pods. Seeds are slow to develop, thus extending the harvest period.

French Fillet Beans

French fillet beans (also called *haricots verts*) are a distinctive class of green-podded snap bush beans (*Phaseolus vulgaris*). They feature slender (1/8"-1/4" diameter) stringless, low fiber beans. Fillet beans are light, buttery, and crisp at the same time. They can be used whole and raw, marinated, or steamed quickly (3-5 minutes) in salted boiling water. If presentation is an issue, they fit nicely on a plate whole.

To ensure flavorful succulence and justify their high market prices (\$3-\$6/pound) fillet beans must be grown in a moderate temperature range (75°-85°F), supplied constantly with water from the flowering stage on, picked every 36-48 hours (72 hours under cooler conditions), and picked at an immature stage (2"-5" long).

Fillet bean plants are short (20"-28") and often hide their beans amidst the foliage—making thorough harvesting a hide-and-seek challenge. Also the plants are not as sturdy and erect as their snap bean counterparts.

The plants tend to flower and set their beans in concentrated waves. Even at that, the overall harvest period is short

(10 days–3 weeks), and yield per plant is low (less than 1/2 pound/plant). Successive sowings every 10 days to 2 weeks will guarantee a steady harvest.

Some recent varietal developments permit a larger bean length (6"–8"), longer interval between harvests, and greater heat tolerance.

Fillet Bean Varieties

Nickel (53 days, open pollinated [O.P.]) – Tolerates both hot and cold temperatures better than most varieties. Stronger and more erect plants than other fillets. Plants reach 22"–26" high, bearing dark green pods. Excellent eating quality.

Cupidon (55 days, O.P.) – A prized English variety. Short plants (18"–22"). High yields over a sustained period. Extremely flavorful.

Totem – French fillet type that has many of the same characteristics of bush snap beans: tall plants (36"), snappy slender pods 6"–8" long, easy picking, slow to become leathery and tough.

Maxibel (60 days, O.P.) – The first fillet variety to retain all its positive qualities at a large size (1/4" x 8"-long beans). Concentrated fruit set makes for easier harvests.

Cherie (52 days) – 4"–5" long, round, dark green pods, medium height plant (24"–28"), excellent taste and texture.

Scarlet Runner Beans, *Phaseolus coccineus*

The scarlet runner bean has long been prized by the cultures of Northern Europe (Ireland, Germany, Great Britain, and Scandinavia). Gardeners in these climates, with their cool summers and restricted warm growing seasons, find it difficult to ripen pole varieties of *P. vulgaris*. Scarlet runners “come a cropper” in such areas. While associated with Northern Europe, they are native to the highlands of Central and South America, and were brought back to Europe by Cortez in the 1500s.

America thinks of the scarlet runner bean as merely a quick, annual screen with attractive flowers that draw hummingbirds. In reality, they are perennial and highly productive over a long season, and are among the sweetest, richest, and most exquisitely flavored of all beans.

The scarlet runner plant features a large, fleshy, almost tuberous rooted perennial crown, which develops during the first growing season. This 8" x 12" crown can be left in the ground and over-wintered in mild and/or dry climates. The dividend of this perennial bean is early plant establishment the second (and subsequent) seasons and early cropping (mid to late May–June). Additionally, scarlet runners have a greater tolerance for cool soil and air temperatures than any other bean. In cold climates the perennial rootstock can be lifted from the ground, over-wintered in a root cellar and replanted the following spring. In this fashion a seed-propagated plant can persist for at least 3 to 5 years.

Scarlet runners are remarkable in their vigor, often reaching 12'–15' tall and necessitating a tall, sturdy trellis. The

beans feature 8"–12"-long, flat, slightly irregular, fuzzy pods. Unlike snap or fillet beans, they do not achieve their full, sweet, rich, “meaty” flavor until the pods are at least 7"–8" long.

The name scarlet runner has always been a mystery to me. The flowers are either a brilliant orange-red, or bi-colored (Painted Lady variety) orange-red standards with a white banner and keel. The beans are pink mottled with black and can be used as fresh shell beans or dried beans as well as eaten at the snap bean stage—quite a versatile performer.

Scarlet Runner Varieties

Scarlet Emperor (75 days) – Richest taste, more savory than all but the best Romano beans. Large extremely showy flowers, prolific producer (from June – 1st frosts) of plump, sweet, and savory pods.

Painted Lady (80 days) – Heirloom variety grown in English gardens since the early 1800s, 10"–14" long rough but sweet pods on 8'–10'-tall vines. Pinkish brown seeds. Flowers are bi-colored orange-red and white.

Dwarf Bees (80 days) – A dwarf half runner variety. Plants are 24"–36" tall with spikes of brilliant orange, showy blooms that attract hummingbirds and are highly edible. The pods are smaller, edible, and should be harvested young (4"–6" long).

Fresh Shell Beans (aka “Shelley”/Horticultural beans)

These varieties are simply mature but not fully dried beans that are laboriously shelled by hand and are versatile in taste and texture. They mature sooner (in 70–90 days) than dried beans and can start contributing to mid-late summer dishes.

Fresh shell beans are often “precooked”—simmered in herb water with the sliced allium of your choice (up to 30 minutes or until tender) and then added to diverse dishes. It is critical to harvest when the pods are lumpy, indicating plump, moist beans inside, and the individual beans are still somewhat moist and succulent. The pods are tough and dry but still retain some of their original color.

Fresh shell beans have a very short season (10 days–3 weeks) before they pass on and become dried beans for the kitchen larder.

Fresh Shell Bean Varieties

French flagolet types

Flambeau (80–90 days) – The classic green-tinted bean of French cuisine. Used as a fresh bean as well as a dried bean. Tediously difficult to shell but well worth the effort. Small yield, small bean size.

Flagrano (76 days) – A vast improvement on Flambeau as it is much easier to shell by hand. Plump, mint green-colored seeds, high flavor.

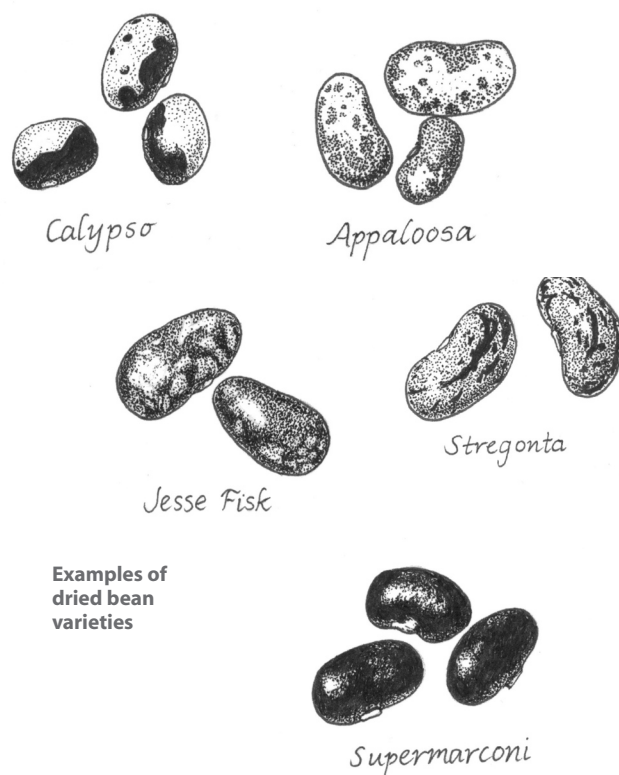
Tongue of Fire (70 days) – One of the highest-flavored fresh shell types. Red-streaked pods 6"–7" long can also be harvested very young as snap beans. Originally from Tierra del Fuego at the southern tip of South America.

Vermont Cranberry (75 days) – Bright red, mottled pods. Old time, early New England settlers' variety. Large, upright bush plants. Shelled beans are plump, mid sized, and streaked red and pink. Good as a dried bean but loses red color.

Dried Beans

Dried beans are selected varieties of *Phaseolus vulgaris* that are grown to full plant senescence. The individual fully mature, dry bean seeds are shelled from the dried leathery pods by shaking, beating, flailing, or hand shelling. If fully mature and stored under dry, cool conditions, they will retain optimal flavor for up to 9 months. Many varieties have a higher heat requirement than snap beans and a considerably longer time to maturation (90–130 days).

There are probably close to 1,000 varieties of dried beans grown worldwide. In addition to the amazing array of visual



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patterns and a diversity of tastes and textures, dried beans offer a cross-section profile of human trials, travails, and triumphs through 7,000–9,000 years of cultivation. They offer hints at cultural histories and a snapshot lesson in social-cultural anthropology.

Some examples –

Cannellini – A rich, meaty, white kidney-type bean that defines the famous Tuscan region of Italy's Minestrone soup. This bean evokes regional pride and chauvinism amongst Italians as the best bean on earth.

Cherokee Trail of Tears – Carried by Native American Cherokee tribe members on their infamous death march from the Smoky Mountains to Oklahoma in the fall and winter of 1838-39. This brutal exodus left 4,000 graves in its wake. The variety was passed on to subsequent generations.

True Red Cranberry – Used as a staple by Abnaki Indians on their cook shack rafts, which floated down rivers during spring lumber drives in Maine and fed the participants.

Montezuma Red – The dried bean grown by Mexican native tribes when Cortez arrived.

Other dried bean varieties of note –

Appaloosa (Anasazi) – Named for the Native American civilization that thrived for 1,000 years in the Southwest and suddenly vanished. A slender, curved, oval bean with mottled purple-white markings; cooks to a pink, burgundy with a piney, herbaceous taste.

Calypso – Ying yang black-and-white colored heirloom that is closely related to Cannelini beans. Has a nutty, slightly onion-like flavor and crumbly texture. Cook slowly at a simmer so as not to break up the beans.

Black Valentine – A type of turtle bean related to the kidney bean. Turns purple after cooking. Has a meaty, rich texture and a nutty flavor.

Jacob's Cattle – A bean of Mexican origin (despite the biblical-sounding name). Brown speckled white, resembling cowhide but cooking to a smooth, nutty flavor and texture. A tepary bean that likes desert conditions but, surprisingly, thrives as far north as New England.

Dried beans should be the staple winter cooking ingredient for soups and stews.

– ORIN MARTIN

Seed Sources

W. Atlee Burpee & Co.
300 Park Ave.
Warminster, PA 18991
(800) 888-1447 www.burpee.com

The Cook's Garden
PO Box C5030
Warminster, PA 18974 (order center)
(800) 457-9703 www.cooksgarden.com

Johnny's Selected Seeds
955 Benton Ave..
Winslow, ME 04910-9731
(877) 564-6697 www.johnnyseeds.com

Seed Savers Exchange
3094 North Winn Rd.
Decorah, IA 52101 www.seedsavers.org

Territorial Seed Co.
P.O. Box 158
Cottage Grove, OR 97424
(800) 626-0866 www.territorial-seed.com

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