

Planting a home vegetable garden

Planting a garden involves more than putting seeds in the ground. Preparing the seedbed, selecting seeds, and deciding when to plant come first. Will you sow seeds—and then thin them—or will you try transplants? This decision, among others, is up to the individual gardener.

Preparing the seedbed

Before planting any vegetables, prepare the soil. This includes cultivating properly, adding organic matter, and maintaining soil fertility. (See PM 820, *Garden Soil Management*, for more information.)

Early fall is the best time to begin to prepare the soil. Remove sticks, stones, and other trash. Also remove plant debris that may harbor insects and diseases. Pest-free plant debris can be tilled into the soil.

A level site can be tilled in the fall without danger of soil erosion. The freezing and thawing action in winter will break up the clods. Fall-tilled soils need only be leveled before planting in the spring. To determine if the soil needs fertilizer in the coming season, take a soil sample in the fall. (See ST 11, *Soil Sample Information Sheet*, for more information.) Apply and incorporate the recommended type and amount of fertilizer into the top 6 to 8 inches of soil in spring before planting.

In spring, do not spade or till the garden when the soil is wet. If worked when too moist, heavy soils become hard, compacted, and will limit growth for the entire season. If a handful of soil can be pressed into a ball, delay tilling or spading until it is drier.

Selecting seeds

Buy seeds early in the year so you will be sure to find the varieties or cultivars you want. Select them based on intended use, time of maturity, disease resistance,

size, shape, and color. For help in selecting the best cultivars, see PM 607, *Suggested Vegetable Varieties for the Home Garden*. Seeds can be purchased from garden centers, mail order catalogs, or on the Internet. For best germination, purchase new seeds each year. Depending on the vegetable crop, leftover seeds can be difficult to store and often germinate poorly. Saving seeds from previous harvests can be risky, too. One problem with saving seeds from last year's crop is the possibility of getting plants that are not true to type. Off-type plants are produced because many vegetables are hybrids or easily cross-pollinate in the garden. While off-type plants may be interesting, sometimes they produce poor quality crops. In addition, diseases can be transmitted through seeds. Seed companies harvest seeds from only healthy, disease-free plants.

Many seed companies treat their seeds before offering them for sale. This chemical treatment kills disease organisms in or on the seeds. It also prevents seed rot and “damping off,” a disease that causes rotting in young seedlings. Seeds that have been treated will be labeled as such and often are brilliantly colored. Be sure to wash your hands after handling treated seeds.

Planting dates

A vegetable garden cannot be planted in one day. Some vegetables grow best in cool weather, while others require warm soil and air temperatures. (See planting guidelines in PM 534, *Planting and Harvesting Times for Garden Vegetables*.) Factors, such as a late or wet spring, may require you to modify your planting schedule.

Cool-season vegetables, such as leaf lettuce, spinach, and radish, can be planted in spring and late summer. Some vegetables can be sown multiple times for an extended harvest period. See page 4 for suggested planting dates.

Using vertical space

Many vegetables, including peas, pole beans, squash, cucumbers, gourds, and melons will naturally climb a support and grow up rather than out, leaving more ground space for other crops. Support structures include trellises, twine, tepees made from poles, chicken wire, or a chain-link fence. Tomatoes also can be trained to grow upright in wire cages or tied to stakes.

Sowing seeds

When planting, sow seeds generously to allow for seeds that fail to sprout and for seedlings that die. When sowing, you can scatter the seeds or plant them in furrows or hills.

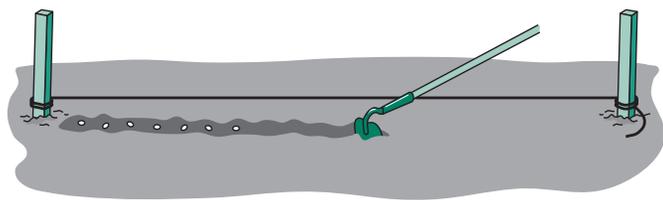
As a general rule, plant a seed to a depth of not more than three to four times its thickness. If planted too deeply, the seeds may germinate but die before reaching the surface. If planted too shallowly, wind or rain may blow or wash the seeds away before they sprout. In sandy or lighter soils, plant a little deeper.

Sow seeds slightly deeper when planting in summer for a fall crop. The soil dries out quickly in summer. Planting slightly deeper in summer should improve germination rates. A light mulch over the newly planted row helps conserve moisture.

For a large garden, you may want to consider using a “hand push” seeder that spaces the seeds at the correct distance.

Straight-row furrows—Planting in straight rows has some advantages over other planting methods. It makes cultivation, insect control, and harvesting easier. However, straight-row furrows are not the most efficient use of limited garden space.

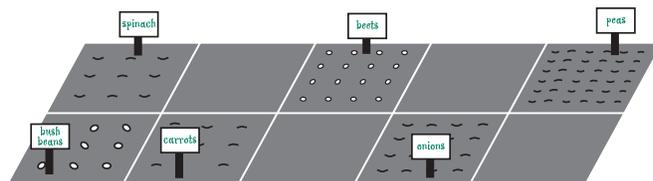
To plant a straight-row furrow, first stretch a taut cord between stakes at each end of the row. A 1½- to 2-inch-deep furrow can be made with a hoe blade for large seeds, such as beans and corn. The handle of the hoe can be used to make a ¼- to ½-inch shallow furrow for lettuce, carrots, beets, onions, and other small-seeded crops.



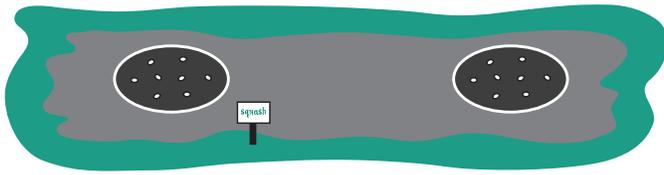
Wide-row planting—Scattering seeds across a wide row produces greater yields of small vegetables from a given space. More efficient use of sunlight, space, and soil nutrients is achieved. Seeds of carrot, beet, radish, leaf lettuce, snap beans, and onion plants are planted in a 4- to 24-inch-wide band, rather than in single rows. Scatter sowing usually requires less thinning. However, more time will be necessary to hand weed wide-row plantings.



Square-foot gardening—Like wide-row planting, this method requires extra hand weeding, but it is a very efficient use of garden space. Instead of planting in rows, the garden is divided into squares that are 1 foot by 1 foot. The number of plants placed in each square depends on the vegetable crop, how big the plant gets, and how far apart they should be planted in order to develop properly. For example, bush beans require about 4 inches between plants, thus 9 plants will fill one square foot. Sixteen onions, spaced 3 inches apart, can be planted in one square foot. If you have a family-sized garden, it may be easier to plant four or more squares as a “block” of a particular crop.



Hill planting—This is a commonly used planting method for vine crops, such as squash, melons, and cucumbers. Hills let the roots range out from the central growing point, thus obtaining more soil nutrients and water. Plant 4 to 5 seeds in a 6- to 8-inch circle. Later, thin the hill to 3 plants. Leave space between hills as recommended on the packet. Raised mound plantings are not recommended because the soil dries out much more quickly than level plantings. As a result, seeds may germinate poorly in raised mounds.



Thinning the seedlings

“Thick and thin” is the way to sow seeds. Plant seeds twice as close as the desired plant spacing, referring to page 4. After germination, pull out the extras to provide growing space for the remaining plants. Remove the surplus seedlings while they are small and before they compete with the others for light, air, and water.

Thin root crops before their taproots become fleshy. When vegetables grow too close together, plants are stunted, root crops become distorted, and vine crops grow poorly due to self-shading.



Transplants

—buy or grow them yourself

Many vegetables, such as tomatoes, eggplant, peppers, and cabbage, are set out as transplants rather than direct seeded into the garden.

Some individuals choose to grow their own transplants. This allows the gardener to select specific cultivars. In addition, many gardeners get personal satisfaction from germinating and growing their own transplants. For more information on starting transplants, see PM 874, *Starting Garden Transplants at Home*.

Other gardeners prefer to purchase plants from garden centers and greenhouses. Be selective when buying transplants. Dark green, stocky plants are superior to yellow, spindly ones.

“Hardening” transplants—Plants started indoors or purchased at a greenhouse should be “hardened” or acclimated to the outdoors before being transplanted

to the garden. About 7 to 10 days before planting, set the transplants in a shady, protected outdoor location. Gradually expose the plants to longer periods of sun over several days. Also, allow the plants to dry slightly between waterings during the hardening period.

Hardening young seedlings increases their food reserves, reduces the severity of transplant shock, and increases the chance of survival in the garden.

Setting transplants into the garden—The main goal in transplanting is to avoid root disturbance as much as possible. Little damage occurs with biodegradable pots like peat pots, but such containers must be planted below the soil surface. Any portion of the peat pot remaining above the soil surface should be removed because it acts as a wick and draws moisture from the soil around the transplant on windy days.

Carefully remove plants from plastic cell packs by gently squeezing the bottom of each compartment. Remove plants in plastic pots by tipping them on their sides and tapping the bottom of the pots. With flats of young seedlings, use a sharp knife to cut the soil into blocks around the plants 1 or 2 days before you plan to transplant. Water the blocks thoroughly after cutting. This will stimulate the plants to produce tiny root hairs, thus lessening transplant shock.

If possible, set plants into the garden in the late afternoon/evening or on a cloudy day. Early plantings may need protection, such as plastic covers or cloches, to avoid damage from frost. When coverings are used, be sure to provide some ventilation so young plants are not damaged by very high temperatures.

Fertilizing transplants—For best growth, give each plant 1 to 2 cups of a starter fertilizer solution immediately after setting it in the ground. A starter fertilizer solution can be prepared by following directions on a water-soluble fertilizer or by dissolving 2 tablespoons of an all-purpose garden fertilizer (such as 12-12-12) in one gallon of water. This is one time when “more” is not better. Fertilizer burn damage can result if too much fertilizer is used.

Vegetable planting guide

Plant and row spacing

Vegetables	Seed or plants for each 10 ft. of row	When to plant*	Inches between plants	Inches between rows	Days until edible	Yield per 10 ft. of row
Asparagus	7 crowns	1, 2, 3	12–18	36–48	2 years	3–4 lb.
Beans, bush	1½ oz.	4, 5	2–3	24	50–60	6 lb.
Beans, lima	1½ oz.	4	4–6	24	65–90	2 lb.
Beans, pole	1 oz.	4	4–6	24	60–70	3–4 lb.
Beets	½ packet	1, 2, 3, 4	2–3	12–18	55–65	10 lb.
Broccoli	5–7 plants	1, 2, 5	18–24	24–36	60–80	10 lb.
Cabbage	7–10 plants	1, 2, 3, 5	18–24	24–36	60–100	10 heads
Carrots	½ packet	1, 2, 3, 4, 5	2–3	12–18	60–80	10 lb.
Cauliflower	5–10 plants	1, 2, 5	18–24	24–36	60–80	10 lb.
Celery	20 plants	2, 5	6–8	24–30	120–150	8–13 lb.
Chinese cabbage	7–10 plants	6	12–18	24–30	80–100	10 heads
Corn, sweet	1 packet	3, 4, 5	8–12	30–36	65–110	11–13 ears
Cucumbers	½ packet	4, 5	15–18	48–60	50–70	10 lb.
Eggplant	6–8 plants	4	18–24	24–36	75–85	20 fruits
Endive	1 packet	1	8–12	12–18	65–85	6 lb.
Kale	1 packet	1, 6	8–12	18–24	60–70	2–5 lb.
Kohlrabi	½ packet	1, 2, 3	4–6	15–18	50–60	8 lb.
Lettuce (leaf)	1 packet	1, 2, 3, 6	2–3	12–15	40–60	5 lb.
Muskmelon	1 packet	4	24–36	60–72	75–90	10 melons
Mustard	1 packet	1, 2, 3, 6	6–8	12–18	40–60	4–8 lb.
Okra	¼ oz.	4	18–24	30–36	60–70	5 lb.
Onion seed	1 packet	1, 2, 3	2–3	12–18	100–120	10 lb.
Onion sets	60 sets	1, 2, 3	2–3	12–18	90–100	10 lb.
Parsley	1 packet	1, 2, 3	4–6	12–18	75–90	½–1 lb.
Parsnips	1 packet	1, 2	3–4	18–24	120–140	10–12 lb.
Peas	1½ oz.	1, 2	2–3	18–24	50–75	3 lb.
Peppers	5–7 plants	4	18–24	24–36	70–75	80 fruit
Potatoes (Irish)	10 pieces	1, 2, 3	12	24–36	100–140	30 lb.
Potatoes (sweet)	10 sprouts	4	12–18	36–48	120–140	12 lb.
Pumpkins (winter squash)	1–2 hills	4	24–36	72–84	90–120	40 lb.
Radishes	1 packet	1, 2, 3, 6	1–2	12	25–50	10 bunches
Rhubarb	3 crowns	1, 2, 3	24–36	48–60	2 year	12 lb.
Spinach	1 packet	1, 2, 3, 6	3	12–18	50–60	5 lb.
Squash (summer)	½ packet	4, 5	18–24	36–48	55–60	60 fruit
Swiss chard	8 plants	1, 2, 3	6–8	15–18	60–75	12 lb.
Tomatoes	2–5 plants	4	24–36	36–48	70–90	60 lb.
Turnips	½ packet	5, 6	2–3	15–18	60–90	10 lb.
Watermelons	¼ packet	4	24–36	72–84	90–110	4–10 melons

*Planting-date code numbers

1. As soon as the ground can be worked without becoming cloddy (late March or early April in central Iowa).
2. Ten days later than no. 1, or the first or second week of April.
3. Twenty days later than no. 1, or about the third week of April.
4. After the danger of frost is past, or about May 10 in central Iowa. Average date of last 32°F temperature is April 25 to May 1 in central Iowa.
5. Late June plantings of longer season vegetables for fall crops.
6. July plantings of shorter season vegetables for fall crops.

For more information

Check these websites for more information:

ISU Extension Distribution Center

<https://store.extension.iastate.edu/>

ISU Horticulture—

www.yardandgarden.extension.iastate.edu

Questions also may be directed to ISU Extension Hortline by calling 515-294-3108 during business hours (10 a.m.–12 noon, 1 p.m.–4:30 p.m. Monday–Friday), or by contacting your local ISU Extension office.

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