

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 preparing 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 plowed in the fall without danger of soil erosion. The freezing and thawing action in the spring will break up the clods. Fall-plowed soils need only be leveled before planting in the spring. To find out if the soil will need fertilizer in the coming season, take a soil sample in the fall. (See ST 11, *Soil Sample Information Sheet*, for more information.)

When breaking ground in the spring, do not spade or plow 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 the soil can be pressed into a ball, delay plowing 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, and disease tolerance. For help in selecting the best cultivars, ask your county extension office for PM 607, *Suggested Varieties for the Home Garden*. Many seeds can be purchased from garden centers, mail order catalogs, or on the Internet. For best germination purchase new seed every year. Depending on the vegetable crop, leftover seed can be difficult to store and often germinates poorly. Saving seed from previous harvests can be risky, too. It is safer to buy fresh seed from a reliable company. One problem with saving seed 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 these off-type plants may be interesting, sometimes they produce poor quality crops. In addition, diseases can be transmitted through the seed. Seed companies select disease-free plants for their seed.

Many seed producers also treat their seeds before offering them for sale. This chemical treatment kills disease organisms in or on the seed. It also prevents seed rot and "damping off," a disease that causes rotting in young seedlings. Seed that has been treated will be labeled as such and is often 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 temperatures, while others require warm soil and air. A guide to planting dates for many vegetables, PM 534, *Planting and Harvesting Times for Garden Vegetables*, is available at your county extension office. Many factors, such as a late or wet spring, may cause you to modify your planting schedule.

Some vegetables can be sown or planted for fall harvest. These crops are more tolerant of cool temperatures. Some vegetables can be sown multiple times for an extended harvest period. Check the planting guide on page 4 for the suggested dates when these vegetables should be planted.

Using vertical space

Many vegetables, including peas, pole beans, cucumbers, squash, 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, strings, tepees made from poles, chicken wire, or a chain-link fence. Tomatoes also can be trained to grow upright in cages or tied to stakes.

Sowing the seed

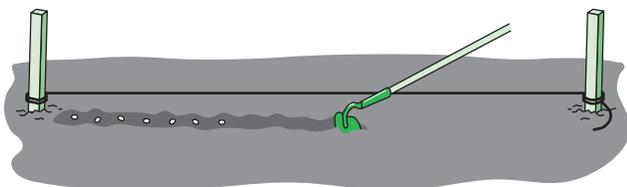
Whether in the garden or in flats, sow seed generously to allow for seeds that fail to sprout and for seedlings that die. When sowing, you can scatter the seeds or plant them in furrows or hills.

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

Sow seed deeper when you put in a fall garden. You will be planting in the summer heat, when soil dries out quickly, so a slightly deeper planting is necessary. A light mulch over the newly planted row will help conserve moisture.

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

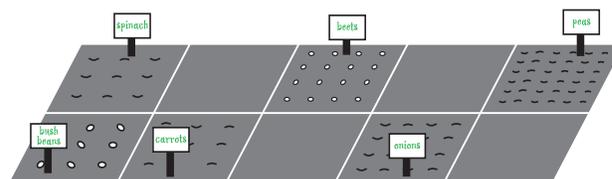


To plant a straight-row furrow, first stretch a taut cord between stakes at each end of the row. A 1½- to 2-inch furrow can be made with a hoe blade for large seeds such as beans and corn. The handle of the hoe will make a ¼- to ½-inch shallow furrow for lettuce, carrots, beets, onions, and other small-seeded 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 plants of onions are planted in a 4- to 24-inch wide **band**, rather than in single **rows**. The bands reduce the chance of tangled malformed roots. Although scatter sowing means less thinning, some thinning is necessary to ensure quality vegetables. Also, more time and care will be necessary when hand weeding to avoid damaging small seedlings.

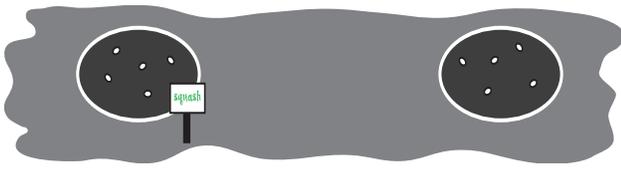


Square-foot gardening—Like wide-row planting, this method requires extra hand weeding, but it is a very efficient use of garden space. Instead of planting in rows, the garden is divided into squares that are 1 foot by 1 foot. The number of plants placed in each square depends on the particular variety, 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 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 12-inch circle. Later, thin the hill to 3 plants. Leave space between hills as recommended

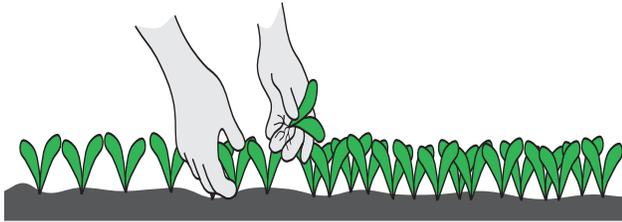
on the package or in the planting guide on page 4. Raised mound plantings are not recommended because the soil dries out much more quickly than if it were level. Poor germination and seedling death can result.



Thinning the seedlings

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

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



Transplants—buy or grow them yourself

Many crops, such as tomatoes, eggplant, peppers, and cabbage, need to be started early indoors or in cold frames and later transplanted into the garden. This head start permits the long-season crops to grow and mature before frost in the fall.

Some people choose to grow their own transplants. This allows the gardener to select specific cultivars and control seedling growth. 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 find it easier to purchase plants from garden centers and greenhouses. Be selective when buying your transplants. Dark green, stocky plants are superior to yellow, spindly ones.

“Hardening” transplants—Whether plants are purchased or grown at home, seedlings should be “hardened” or acclimated to the outdoors before being transplanted to the garden. About 7 to 10 days before setting them in the ground, take the plants out in the daytime for a few hours and bring them in again at night. Gradually expose them to more sunlight each day. 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 or paper pots, but such containers must be planted below the soil surface. Any peat or paper remaining above the soil surface should be removed because it will act as a wick and draw moisture from the soil around the transplant on windy days.

With flats of young seedlings, use a sharp knife to cut the soil into blocks around the plants the day before you plan to transplant. Water the blocks thoroughly after cutting. This will stimulate the plant to produce tiny root hairs, thus lessening transplant shock.

Try to transplant late in the afternoon or during a cloudy day. Protect newly set plants with a light shade (like boards set at an angle over the plants) during bright, sunny weather for the first 3 to 5 days. 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 cooked by the heat.

Fertilizing transplants—For best growth, give each plant 1 or 2 cups of liquid starter fertilizer immediately after setting it in the ground. Prepare a liquid starter fertilizer by adding 2 tablespoons of a complete fertilizer (such as 12-12-12) to each 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	18–24	36–48	3 years	3–4 lb.
Beans, bush	1½ oz.	3, 4, 5	2–3	24	50–70	6 lb.
Beans, lima	1½ oz.	4	4–6	24	65–90	2 lb.
Beans, pole	1 oz.	4	4–6	24	45–65	3–4 lb.
Beets	½ packet	1, 2, 3, 4	2–3	12–18	60–110	10 lb.
Broccoli	5–7 plants	1, 5	18–24	24–30	60–80	10 lb.
Cabbage	7–10 plants	1, 2, 5	18–24	20–28	60–100	10 heads
Carrots	½ packet	1, 2, 4, 5	2–3	12–18	60–100	10 lb.
Cauliflower	5–10 plants	1, 5	18–24	24–30	60–80	10 lb.
Celery	20 plants	2, 5	6	20–24	120–150	8–13 lb.
Chinese cabbage	7–10 plants	6	12–18	20–24	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	50–80	10 lb.
Eggplant	6–8 plants	4	18	24–30	75–85	20 fruits
Endive	1 packet	1	6	12	65–85	6 lb.
Kale	1 packet	1, 6	4	12–18	60–70	2–5 lb.
Kohlrabi	½ packet	1, 2, 3	4–6	15–24	50–60	8 lb.
Lettuce (leaf)	1 packet	1, 2, 3, 6	—	6–15	40–60	5 lb.
Muskmelon	1 packet	4	18–24	48–60	90–120	10 melons
Mustard	1 packet	1, 2, 3, 6	4	12–18	40–60	4–8 lb.
Okra	¼ oz.	3	18	24–36	70–90	5 lb.
Onion seed	1 packet	1, 2, 3	2–3	12–15	100–140	10 lb.
Onion sets	60 sets	1, 2	2–3	12–15	90–100	10 lb.
Parsley	1 packet	1, 2, 3	4	12–18	80–100	½–1 lb.
Parsnips	1 packet	1, 2	3	18–24	140–160	10–12 lb.
Peas	1½ oz.	1, 2	1–2	6–12	45–90	3 lb.
Peppers	5–7 plants	4	18	24–30	70–75	80 fruit
Potatoes (Irish)	10 pieces	1, 2, 3	12	24–36	140–150	30 lb.
Potatoes (sweet)	10 sprouts	4	18	36–48	140–150	12 lb.
Pumpkins (winter squash)	1–2 hills	4	4	60–72	90–120	40 lb.
Radishes	1 packet	1, 2, 6	1–1½	6–12	30–60	10 bunches
Rhubarb	3 crowns	1	36–72	36–60	1 year	12 lb.
Spinach	1 packet	1, 2, 6	3	12–18	50–70	5 lb.
Squash (summer)	½ packet	4	4	24–30	60–75	60 fruit
Swiss chard	8 plants	1, 2	6–8	15–18	60–75	12 lb.
Tomatoes	2–5 plants	4	24–36	24–48	70–100	60 lb.
Turnips	½ packet	5, 6	18–24	18–24	60–90	10 lb.
Watermelons	¼ packet	4	60–84	60–84	90–130	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 killing frost is May 1 to 5.
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 Web sites for more information:

ISU Extension publications—

<http://www.extension.iastate.edu/pubs>

ISU Horticulture—

<http://www.hort.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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