Root Crops

Potato

Solanum tuberosum

Warm season

Lifecycle: annual

Herbaceous perennial grown as an annual in areas that receive frost. Late spring frosts can damage foliage, but growth will usually rebound quickly from underground parts.

Ease-of-care: easy

Growing is easy if you have the right site and soil. Pests aren't usually as bad in garden settings as in commercial fields. Fun to grow with kids, especially if you use the deep mulching method.

Height: 1.5 to 3 feet

Potato

Spread: 1.5 to 3 feet

Flower color: violet

Foliage color: medium green

Foliage texture: medium

Shape: cushion, mound or clump

Flowers relatively inconspicuous.

Shape in flower: same as above

Potato

Sunlight: full sun

Requires at least 6 hours of sun each day.

Soil conditions: requires acid soil

requires well-drained soil

Prefers well-drained, light, deep, loose soil, high in organic matter.

Unlike most vegetables, potatoes perform best in acid soil with pH 4.8 - 5.5. (Scab is less of a problem at low pH. If pH is more than 6.0, use scab-resistant varieties.)

Needs plentiful, consistent moisture.

Potato

Special locations: outdoor containers - Sometimes grown in barrels or stacks of old tires filled with compost.

Special characteristics: not native to North America - Native to the Andes Mountains in South America.

Potato

How to plant:

Propagate by division or separation - Grown from seed potatoes -- tubers grown the previous season. Germination temperature: 40 F - Do not plant seed potatoes until soil reaches 40 F.

Days to emergence: 14 to 28 - Sprouts from seed potatoes should emerge in 2 to 4 weeks depending on soil temperature.

Potato

Potatoes perform best in areas where summers are cool (65 F to 70 F), but are widely adapted.

Potatoes require well-drained soil. (They will rot under prolonged cold, wet conditions.)

If your soil is poorly drained or a heavy clay, consider using raised beds. Adding organic matter (compost, cover crops, well-rotted manure or leaves) is a good way to improve soil before growing potatoes.

Go easy on organic matter sources high in nitrogen (such as manure) and nitrogen fertilizer as too much nitrogen can encourage lush foliage at the expense of tuber production.

Potato

Unlike most vegetables, potatoes perform best in acid soil with pH 4.8 - 5.5. Use scab-resistant varieties with pH above 6.0.

Because most other garden vegetables perform best at near-neutral pH, it's usually not feasible to grow potatoes in their preferred pH range, unless you dedicate one section of your garden to growing just potatoes in rotation with cover crops.

Buy certified disease-free seed potatoes from garden centers or through online or mail-order catalogs for best results. If you save your own seed potatoes, discard any that show any signs of disease.

Avoid planting potatoes from the supermarket because they may have been treated with sprout inhibitors. They may also be less vigorous and more prone to disease.

Potato

Cut seed potatoes that are larger than a chicken egg into pieces about 1 inch across or slightly larger.

Each piece should have at least one “eye” (the bud where the stem will grow from) -- preferably two eyes. Egg-sized and smaller tubers can be planted whole.

Traditionally, cut seed potato pieces are allowed to cure for a few days to a few weeks before planting. This is because the cut potatoes need high humidity, plenty of oxygen and temperatures between 50 F and 65 F to heal quickly.

If you have excellent, well-drained soil that meets those conditions, you can plant the seed pieces without curing. But if conditions are not right, the seed potatoes will rot in the ground.

Potato

A less risky practice is to put about 5 pounds of cut potatoes into a large grocery bag and fold the top closed. Keep the bag at room temperature for 2 or 3 days, then shake the bag to unstick pieces that may have stuck together. Let sit for another 2 to 3 days and then plant.

If you want fast emergence, keep the bag of cut potatoes at room temperature until sprouts appear. Some varieties are slow to break dormancy and benefit from a 2- to 4-week “pre-warming” before planting. Others sprout in just a few days.

Potato

Plant about 2 to 4 weeks before your last frost date. The soil temperature should be at least 40 F. Do not plant where you've grown potatoes, tomatoes, peppers or eggplant in the past 2 years. One common way to plant potatoes is to dig a shallow trench about 4 inches deep with a hoe. Place the seed potato pieces with their eyes up (cut sides down) about 8 to 12 inches apart in the trench, and replace soil. Space trenches about 2 to 3 feet apart. Stems and foliage should emerge in about 2 to 4 weeks, depending on soil temperature.

Potato

When the plants are about 6 to 8 inches tall, “hill” the potatoes by hoeing soil loosely around the base of the plants to within about an inch of the lower leaves from both sides of the row.

Repeat in about 2 to 3 weeks. You may want to make additional hillings, gradually building a 6- to 8-inch ridge down the row.

Hilling keeps the developing potatoes from being exposed to sun, which turns them green and bitter.

Potato

Green potatoes contain a chemical, solanine, which is toxic in large amounts.

Alternatively, snuggle seed pieces shallowly into the soil and cover with a thick layer of clean straw or other weed-free mulch. Add more mulch as needed to keep light from reaching potatoes. (A foot or more of mulch may be required.) Tubers grown this way can be easily harvested by pulling back the mulch after the plants die.

Potato

Potatoes need at least 1 inch of water per week from either rainfall or deep watering. Mulching helps retain moisture. Keeping the soil from drying out also helps reduce scab.

Use row covers to protect from insects if they are a problem.

Potato

Pests: Aphids - A hard stream of water can be used to remove aphids from plants. Wash off with water occasionally as needed early in the day.

Check for evidence of natural enemies such as gray-brown or bloated parasitized aphids and the presence of alligator-like larvae of lady beetles and lacewings.

Flea beetles - Use row covers to help protect plants from early damage. Put in place at planting and remove before temperatures get too hot. Control weeds.

Leaf hoppers - Wash small nymphs off with a hard stream of water.

Potato

Diseases: Use certified seed. Avoid wetting plant foliage if possible. Water early in the day so above ground plant parts will dry as quickly as possible.

Avoid crowding plants. Space apart to allow air circulation. Eliminate weeds around plants and garden area to improve air circulation. In autumn, rake and dispose of all fallen or diseased leaves and tubers. Locate new plants in a part of the garden different from previous year's location.

Potato

The fungus that causes late blight has recently become a major threat to home gardens and commercial growers because of the migration of new strains (genotypes) into the United States. The disease can readily spread from home gardens to commercial fields.

Verification of a late blight diagnosis and implementation of prompt control measures are highly recommended. The newly arrived strains are more aggressive than previous strains. Cultural control measures such as those listed above may not adequately control these new strains.

Scab - Use certified seed. Locate new plants in a part of the garden different from previous year's location. Lower soil pH to 5.2 with sulfur. Plant resistant varieties: Chieftan, Norland, Russet Burbank, Russet Rural and Superior. Viral diseases - Use certified seed. Control aphids.

Potato

Varieties of potatoes for Alaska*

Russets: Best for baking and boiling because of their high starch content, but good for frying and roasting as well.

Allagash	Russet Norkotah
Hilat Russet Ranger Russet	Ranger Russet
Hilite Russet	(Poor production results with Russet Burbank in Alaska)

White Flesh: Generally these can be prepared in any way with good results.

Alasclear	Caribe	Knik
Alaska 114	Caribe (white skin)	MaineStay
Alaska Frostless	Denali	Shepody
Alaska Red Eye	Green Mountain	Snowchip
Atlantic	Jemseg	Superior
Bake-King	Kennebec	Tundra
CalWhite		

Red-skinned Varieties: These are best for salads, roasting, boiling and steaming.

Cherry Red	Iditared	Robinta
Chieftain	NorDonna	Rote Eerstling
Dark Red Norland	Redsen	Sangre 11

Yellow Flesh: Best for baking, boiling, roasting and steaming.

Bintje	Keuka Gold	Yellow Finn
French Fingerling (red skin)	Mrs. Moehrle's Yellow Flesh	Yukon Gold
German Butterball	Peanut or Banana	

Blue and Purple: Best prepared by microwaving (which preserves color), steaming and baking.

All Blue	Magic Molly (delicious, almost black flesh)
Huckleberry (red flesh)	

Beets

Beta vulgaris subsp. vulgaris

Cool Season

Easy-to-grow beets do double-duty in the kitchen, producing tasty roots for baking, boiling or sautéing and fresh greens to boil or steam. Plant them early for top quality and best flavor.

(Fluctuating weather can reduce quality and create white zone rings in the roots.)

Some varieties have red stems and venation in the leaves, making them a natural for edible landscaping.

Beets

Sunlight: full sun or part shade

Soil conditions: tolerates low fertility

Prefers well-drained sandy loam to silt loam soil, high in organic matter, with pH between 6.5 and 7 and free of large stones.

Good soil structure is important because growth is improved by good soil aeration. Beets grow poorly in acid soil. They tolerate low fertility but require consistent moisture. Do not plant in soils with pH less than 6.0.

Beets use boron inefficiently. Boron is less available in soils with high pH and high organic matter. Corky black areas in the roots indicate boron deficiency.

Beets

Lifecycle: annual

Biennial grown as an annual.

Ease-of-care: easy

Foliage color: medium green variegated

Some varieties have red stems and leaf venation.

Foliage texture: medium

Shape: cushion, mound or clump

Beets

Tolerates: frost

Special characteristics: not native to North America - Native to Europe and Asia

Special uses: edible landscaping

Beets

How to plant: Propagate by seed

Germination temperature: 50 F to 85 F - Will still germinate at temperatures as low as 40 F and as high as 90 F.

Days to emergence: 5 to 8 - May take two to three weeks in colder soils.

Seed can be saved 4 years.

Maintenance and care: Plant in early spring, as soon as you can work the soil, ¾ inch deep and 1 inch apart in rows 12 to 18 inches apart. For continuous harvest, make successive plantings every three weeks until midsummer. For winter storage, sow crop about 10 weeks before heavy freeze.

Beets

The wrinkled “seedball” usually contains two to four viable seeds, making it necessary to thin to 3- to 4-inch spacings if you plan to harvest young, small or cylindrical-shaped roots, or 6-inch spacings for larger roots for winter storage.

Begin thinning when seedlings are about 4 to 5 inches tall, and eat the thinnings. Cut rather than pull plants when thinning to avoid disturbing roots of other plants.

Some “monogerm” varieties have only one seed per fruit. Some seed companies remove seeds from the seedball.

Unlike most root crops, beets can be started inside or in cold frames and transplanted into the garden.

Beets

Use floating row covers to discourage insects early in the season.

Keep well-weeded.

Competition and uneven watering can make beets stringy and tough.

Beets are closely related to Swiss chard and spinach.

Avoid following these crops in rotation.

Beets tolerate average to low fertility. Too much nitrogen will encourage top growth at the expense of root development.

Beets

Best color and flavor develop under cool conditions and bright sun. When beets mature in warm weather, they are lighter colored, have less sugar and have more pronounced color zoning in the roots. Fluctuating weather conditions produce white zone rings in roots.

Beets are biennials. Normally, they produce an enlarged root during their first season. Then after overwintering they produce a flower stalk. If they experience two to three weeks of temperatures below 45 F after they have formed several true leaves during their first season, a flower stalk may grow prematurely. Many newer varieties are less sensitive to this problem.

Beets

Pests: Leafminer - Cover plants with fine netting or cheesecloth or floating row cover to protect them from adult flies. Handpick and destroy infested (mined) leaves. Control weeds.

Diseases: Cercospora leaf spot - Avoid wetting foliage if possible. Water early in the day so aboveground plant parts will dry as quickly as possible. Avoid crowding plants. Thin plants to allow air circulation.

Beets

Eliminate weeds around plants and garden area to improve air circulation. In autumn, rake and dispose of all fallen or diseased leaves and fruit.

Scab - Avoid wetting foliage if possible. Water early in the day so aboveground plant parts dry as quickly as possible. Avoid crowding plants Thin to allow air circulation.

Other diseases:

Root rots

Radish

Raphanus sativus

Cool Season

Brassicaceae Family

Easy to grow and ready to harvest in just 3 to 6 weeks.

Make plantings of cool-season spring radishes every week or two for a continuous harvest until hot weather hits.

Don’t forget winter varieties that produce large, fall-harvested roots.

Radish

Sunlight: full sun or part shade

Yields best in full sun.

Soil conditions: requires well-drained soil

Prefers well-drained, loose soil, high in organic matter, free from stones, with pH 5.8 to 6.8.

Needs plentiful, consistent moisture.

Radish

Lifecycle: annual

A few winter radish varieties are biennials.

Ease-of-care: easy

Height: 0.5 to 1.5 feet

Spread: 0.5 to 0.75 feet

Foliage color: medium green

Foliage texture: medium

Shape: cushion, mound or clump

Radish

Tolerates: frost

Special characteristics: not native to North America - Mediterranean origin

Radish

How to plant: Propagate by seed

Germination temperature: 55 F to 85 F

Days to emergence: 3 to 4

Seed can be saved 4 years.

Maintenance and care: Grows best in cool (50 F to 65 F), moist weather. Hot weather reduces quality and increases pungency. Late plantings may bolt before edible root forms.

About 3 to 6 weeks before average last frost, direct seed ½ inch deep, 1 inch apart, in rows 12 inches apart. Thin to about 2-inch spacings.

Crowded plants may not produce high-quality roots. Use thinings in salads.

Radish

For continuous harvest, make additional plantings every 1 to 2 weeks until temperatures average in the mid 60s F, or plant varieties with different maturity dates in a single planting. Resume planting when weather cools in fall.

Plant most winter varieties so that they mature around the first fall frost date. (Frost improves flavor and texture of most winter varieties.)

Larger winter varieties need more space than spring varieties, so thin to about 6-inch spacings, depending on variety. Keep soil moist for uninterrupted growth and best quality. Adding nitrogen fertilizer or nitrogen rich manure close to planting may produce lush tops and small roots.

Radish

Can be sown in the same row with carrots, parsley, parsnips and other slow germinating crops. The radishes help to break soil crust for the weaker and later-germinating crops.

Because they mature quickly, radishes make a good intercrop along with slower growing crops, such as other cabbage family crops, or tomato- or squash family crops. Or follow radish harvest with summer succession crops such as beans, or fall-harvested crops.

To help reduce disease, do not plant radishes or other cole crops in the same location more than once every three or four years.

Radish

Pests: Cabbage root maggots - Use row covers made of nonwoven fabrics. Hoops can be used to make a tent area over rows or as floating row covers. For fresh radish, weekly plantings can be made. Some will avoid maggot attack.

Diseases: Clubroot - Locate new plants in part of garden different from previous year's location. If soil is infested, add lime to raise soil pH to 7.2.

Rutabaga

Brassica napus var. napobrassica

Synonym: Brassica napus var. rapifera

Cool Season

Brassicaceae Family

Easy-to-grow softball-sized root crop is a favorite for fall and winter soups and dishes, and can also be used raw in salads. Rutabagas are often confused with turnips, but are sweeter flavored.

Rutabaga

Sunlight: full sun or part shade

Soil conditions: requires well-drained soil

tolerates low fertility

Performs well on wide range of soils. Unlike most brassicas, does not require rich soils.

High organic matter and/or nitrogen levels may cause poorly shaped roots. Loosen soil deeply or grow in raised beds to encourage good root development.

Sensitive to boron deficiency.

Rutabaga

Lifecycle: annual

Biennial grown as an annual.

Ease-of-care: easy

Foliage color: medium green

Often a waxy blue-green

Foliage texture: medium

Shape: cushion, mound or clump

Rutabaga

Tolerates:

frost

Special characteristics:

not native to North America - May have developed from cross between Old World cultivated *B. oleracea* and wild *B. napa*

Rutabaga

How to plant: Propagate by seed

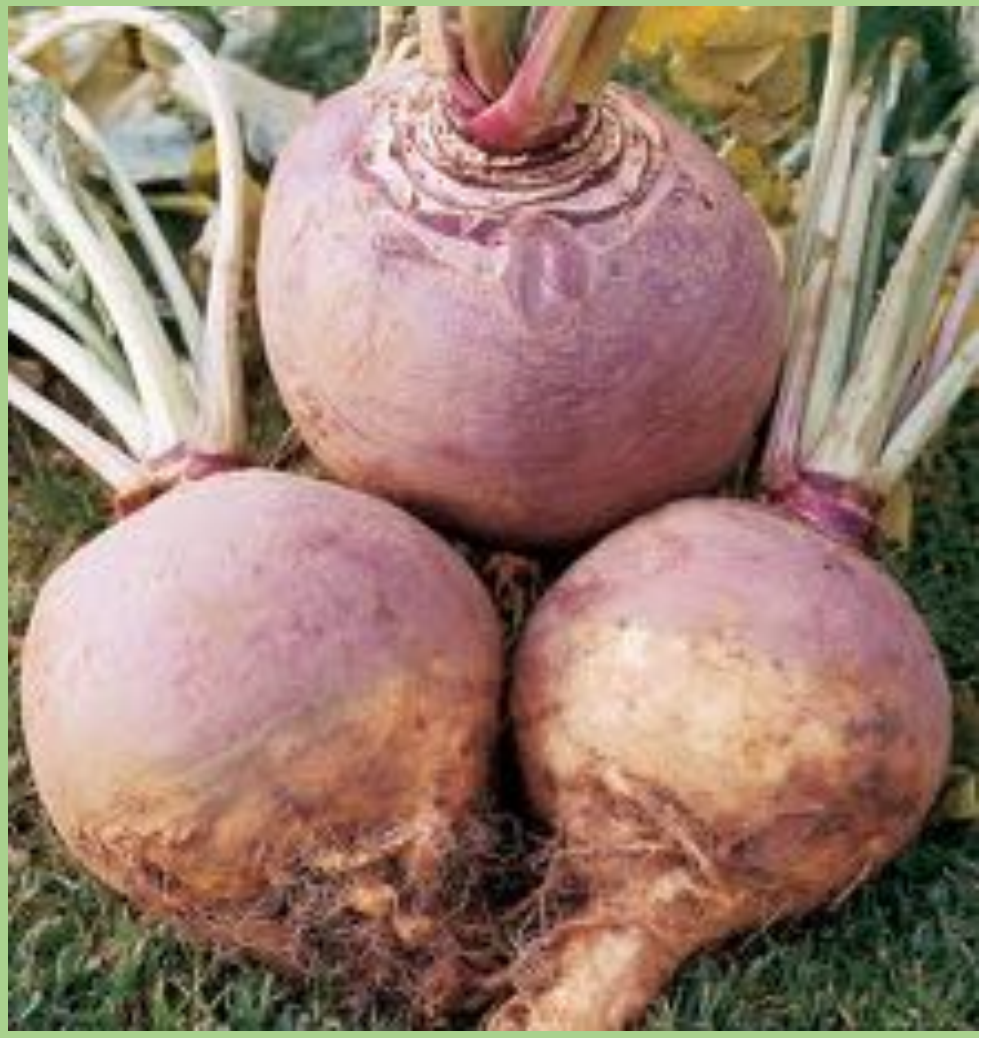
Germination temperature: 45 F to 85 F - Will germinate at soil temperatures as low as 40 F. 60 F is optimum.

Days to emergence: 4 to 7

Maintenance and care: Plant seed 2 inches apart and ½ inch deep in rows 18 to 24 inches apart in early to mid-summer, about 3 months before expected harvest for most varieties. Thin to 6-inch spacings.

Frost improves quality and flavor.

For early crops, sow seed as soon as you can work the soil in spring. Do not wait until fall to harvest as roots will become woody and fibrous.

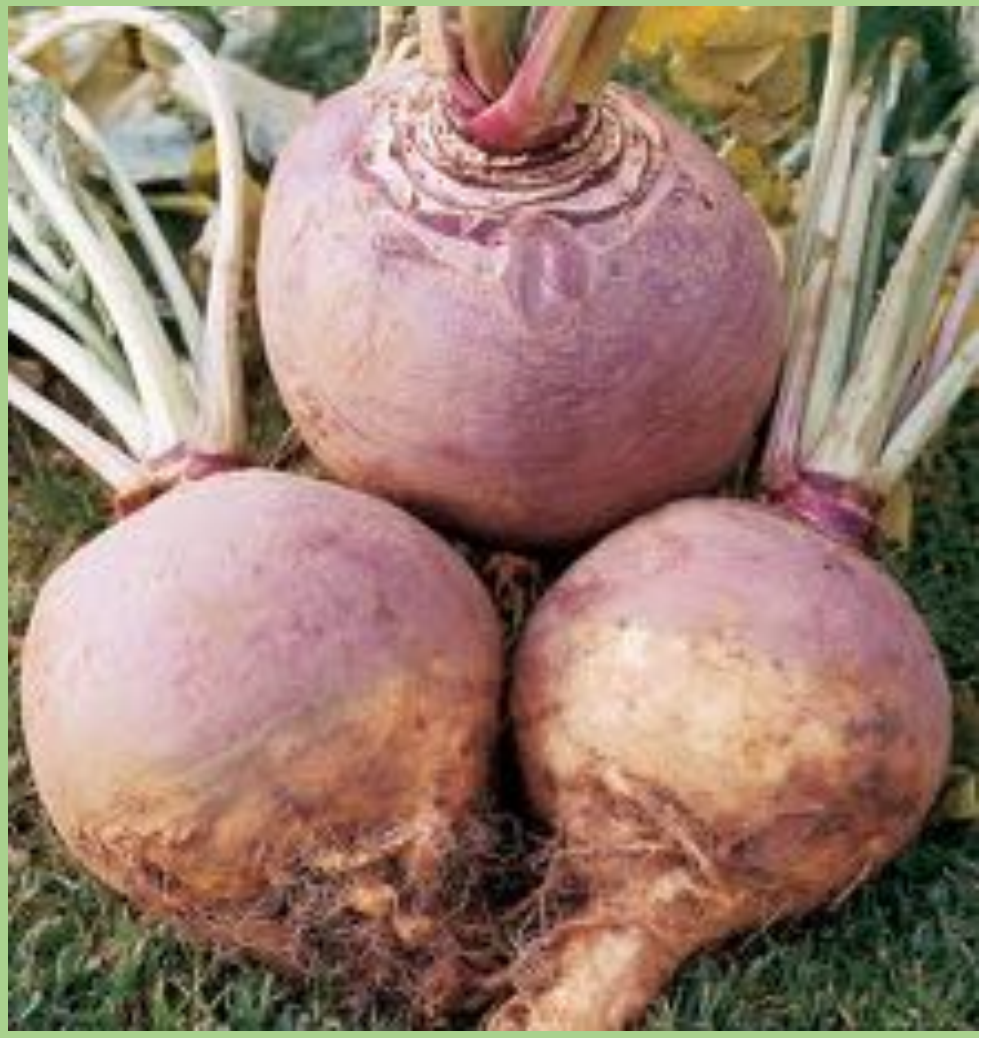


Rutabaga

Larger seeds germinate faster and may be ready for harvest as much as 5 to 6 weeks sooner than smaller seed.

To help reduce disease, do not plant rutabagas or other cole crops in the same location more than once every three or four years.

Use floating row covers to protect crop from early pests. Sustained mean temperatures above 80 F can cause excessively fast growth and root cracking.



Rutabaga

Pests: Flea beetles - Use row covers to help protect plants from early damage. Put in place at planting and remove before temperatures get too hot (midsummer). Control weeds.

Cabbage root maggots - Use row covers.

Diseases:

Black leg

Black rot

Turnip mosaic virus

Turnip

Cool Season

Brassica rapa var. rapa

Brassicaceae Family

Fast-growing spring turnip crops are best harvested while the weather is still cool. The flavor of fall crops is improved by light frost. Don’t forget the greens which are delightful raw or cooked.

Turnip

Sunlight: full sun or part shade

Soil conditions: requires well-drained soil

Prefers well-drained, fertile soil high in organic matter, pH 6.0 to 7.5. Can tolerate slightly alkaline soil.

Needs plentiful, consistent moisture. Loosen soil deeply or grow in raised beds to encourage good root development.

Will tolerate less-than-ideal conditions, but poor soil will slow growth and hurt quality and flavor.

Turnip

Lifecycle: annual

Biennial grown as an annual.

Ease-of-care: easy

Foliage color: medium green

Foliage texture: medium

Deeply lobed or cut leaves on most varieties.

Shape: cushion, mound or clump

Turnip

Tolerates: frost - Light frost improves flavor, but hard freezes will kill plant and damage roots.

Special characteristics: not native to North America - Not known in the wild. Probably developed in cooler parts of Europe.

Turnip

How to plant: Propagate by seed

Germination temperature: 45 F to 85 F - Will germinate at soil temperatures as low as 40 F.

Days to emergence: 4 to 7

Seed can be saved 4 years.

Maintenance and care: From early spring to late summer, sow seeds ¼ to ½ inch deep, 1 inch apart in rows 12 to 18 inches apart. Thin plants to 4- to 6-inch spacings.

Plant every 2 weeks for continuous harvest. Quality and flavor are best if harvested when whether is cool.

Turnip

Use floating row cover to protect crop from early pests.

To help reduce disease, do not plant turnips or other cole crops in the same location more than once every three or four years.

Turnip

Pests: Flea beetles - Use row covers to help protect plants from early damage. Put in place at planting and remove before temperatures get too hot in midsummer. Control weeds.

Cutworms - Control weeds. Cardboard collars around each plant give good protection.

Other pests: Root maggots

Cabbage loopers

Cabbageworms

Cabbage aphids

Slugs and snails

Nematodes

Turnip

Diseases:

Black leg

Black rot

Turnip mosaic virus

While susceptible to the diseases that plague other cole crops, turnip diseases usually aren't a problem if grown in well-drained soil and harvested young.

Carrots

Cool Season

Daucus carota var. sativus

Umbelliferae Family

Careful attention to the soil makes these Vitamin A-rich roots a snap to grow. Plant in deep, stone-free soil (a raised bed is great) with a fine surface. Thin and weed carefully, and mulch to keep soil cool.

Carrots

Sunlight:

full sun

Will tolerate very light shade.

Soil conditions:

requires well-drained soil

Good quality roots require plentiful moisture and soil that is deep, loose, free of stones, and high in organic matter. Roots can become twisted and forked in heavy, stony soil. Prefers pH of 6.0 to 6.8 but can tolerate 5.5 to 7.5. Requires only moderate nitrogen. Too much can cause root branching.

Carrots

Lifecycle: Biennial grown as an annual.

Ease-of-care: easy

Great crop for kids if planted in deep soil and site gets full sun.

Foliage color: medium green

Foliage texture: fine

Shape: cushion, mound or clump

Carrots

Tolerates:

frost - Tolerates light frost.

Special characteristics:

not native to North America - Mediterranean origin. First orange carrots probably developed in The Netherlands about 1600.

Special uses:

edible landscaping

Carrots

How to plant:

Propagate by seed

Germination temperature: 50 F to 85 F - Will germinate at temperatures as low a 40 F. Will germinate in about a week at 75 F, with adequate moisture.

Days to emergence: 7 to 21

Seed can be saved 3 years.

Carrots

Maintenance and care:

Plant in spring, 2 to 3 weeks before last frost, ½ inch deep, ½ inch apart, in rows 12 to 24 inches apart. Deeply worked soil with fine, weed-free seedbed will greatly improve chances of successful crop.

Carrots are slow to germinate (1 to 3 weeks), and often germinate unevenly over a period of several weeks. To speed germination, water lightly daily if soil is dry.

Carrots

Thinning is critical to reduce competition from neighboring plants. Thin to 1- to 4-inch spacings (depending on size of root desired) before plants are 2 inches tall. Cutting rather than pulling reduces disturbance of the remaining plants.

To improve germination in dry weather: Make a small furrow, about 2 inches deep. Plant seed and cover with about ½ inch of soil. Cover furrow with a board to retain soil moisture until seeds germinate.

Tip: Sow radishes in the same row. They germinate quickly, break the soil crust, and mark the row. Thin and/or harvest radishes before they compete with carrots.

Carrots

Use seed tape or pelleted seed for more even spacings and less thinning. Or mix seed in roughly equal proportions with sand, fine vermiculite, or dried coffee grounds.

Mulch to keep soil cool, conserve moisture and to keep exposed "shoulders" from turning green and bitter. Another option is to hill soil over the shoulders.

Make additional plantings every three weeks through midsummer for continuous supply and fall harvest. Sowing in very early spring is possible, but some varieties will bolt if temperatures are too cold. Plant crops for fall harvest about 10 to 12 weeks before first frost.

Carrots

Root quality is best when soil temperatures are 60 F to 70 F. The shape of the root is determined within the first few weeks after germination when the new plant extends its taproot deep into the soil. If it encounters obstacles (such as rocks or high water table) or is damaged, shape and quality of the root will suffer.

To prevent diseases, don't plant carrots in the same spot more than once every 3 years.

Carrots

Pests:

Avoid planting on ground that was in sod the previous season. Use fabric covers to exclude insects.

Leafhopper - Leafhoppers spread disease causing carrots to be woody, hairy and bitter. No cultural control is available.

Other pests:

Slugs

Wire worms