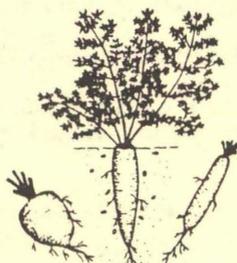


## Root Crops

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### Carrots

#### *Environmental Preferences*

**LIGHT:** sunny  
**SOIL:** well-drained, deep loam, free of rocks  
**pH:** 5.5 - 6.5  
**TEMPERATURE:** cool (60-65°F)  
**MOISTURE:** moist, but not water logged

#### *Culture*

**PLANTING:** sow seeds as soon as soil can be worked, 1/4-1/2" deep

**SPACING:** 1/2" x 12-18", single row or wide bed

**HARDINESS:** hardy biennial

**FERTILIZER NEEDS:** broadcast 2 pounds 10-10-10 per 100 sq. feet before planting. Sidedress with 1/2 lb/100 sq. ft 10-10-10 if needed

#### **CULTURAL PRACTICES:**

Carrot seeds are extremely small and difficult to space uniformly. Mixing the seed with fine soil and lightly scattering the mixture in the row or bed helps avoid overcrowding.

Carrot seedlings are weak and slow to grow when young. Therefore, it is important to control weeds. Cultivate shallowly until plants are 12" high.

Seedlings should be thinned at 1" high to no more than 3 plants per inch for finger carrots, 1-2 plants per inch for carrots that will be harvested young, and 1 plant per inch for larger varieties. Moisture is required to keep the plants growing quickly, but as carrots approach maturity, decrease water to prevent cracking. Carrots require a deep, friable soil for the largest, most shapely roots. A well-enriched, loam deeply dug is best suited for most varieties. For heavy soils select a finger or short type. Half-longs are the largest type which do well in most of Virginia's gardens.

#### *Common Problems*

**DISEASES:** Aster yellows

**INSECTS:** Cut worms, rootknot, nematodes

**CULTURAL:** Green crowns (sunburning, cover crowns with mulch or loose soil as crowns begin to swell). Forked, twisted roots (seeding too thickly, inadequate thinning).

#### *Harvesting and Storage*

**DAYS TO MATURITY:** 55-80 days

**HARVEST:** Carrot roots may be harvested whenever roots reach an acceptable size. Dig only the amount needed for immediate use and allow the remainder to increase in size. Carrots may be left in the ground in the winter and dug as needed. Roots are normally harvested when 1/2-3/4" in diameter.

Carrot Sizes:

Type	Length
Finger	3-4"
Short	2-4"
Half-long	5-6"
Cylindrical	6-7"
Standard	7-9"

**APPROXIMATE YIELDS:** (per 10 ft row) 7-10 pounds

**AMOUNT TO RAISE PER PERSON:** 11 pounds

**STORAGE:** in cool (32°F) moist (95% RH) conditions 2-4 weeks - immature carrots; 4-5 months - mature carrots

**PRESERVATION:** canning, freezing

### Beets

#### *Environmental Preferences*

**LIGHT:** sunny, but tolerates partial shade  
**SOIL:** well-drained, deep loam  
**pH:** 6.0 - 7.0  
**TEMPERATURE:** cool (60 - 65°F)  
**MOISTURE:** moist, but not waterlogged

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### Harvesting and Storage

DAYS TO MATURITY: 45-80

HARVEST: Greens may be harvested when of sufficient size. Excessive removal of the leaves for greens will inhibit enlarging of the root. Harvest greens lightly until beet is ready for harvest at 1-3" in diameter. Roots larger than 3" tend to be woody.

APPROXIMATE YIELDS: 8-10 lbs. per 10 foot row

AMOUNT TO RAISE PER PERSON: 5-10 lbs.

STORAGE: cold (32°F.), moist conditions (95% RH) for 3-5 months with greens removed, greens may be stored as well.

PRESERVATION: pickle, freeze, can, or dry

PLANTING: sow seed 1/2" deep as soon as soil can be worked

SPACING: 2-3" x 12-18" or equidistant 2-3" apart in wide bed

HARDINESS: hardy annual

FERTILIZER NEEDS: broadcast 2 lbs. 10-10-10 per 100 square feet into soil before planting. Sidedress with 1 lb. 10-10-10 4-6 weeks after sowing or when 4-6" tall

CULTURAL PRACTICES: Beets may be grown for both their greens and their roots. They are heavy yielders, and high in iron and vitamins. Beets come in several colors and shapes. In addition to the standard dark red, orange and white varieties are available. The lighter varieties do not bleed their color as readily, but are less attractive in canning jars and on the plate than the red ones. Round beets are most common, but flat and oblong types are grown as well. Flat and round beets tend to be early-maturing varieties, while the long cylindrical beets are usually late-maturing.

Beets are relatively tolerant to heat and cold, though very high temperatures tend to make the leaves bitter and roots woody with poor color development. Two to three weeks of daytime temperatures below 50° F. may cause seed stalks to form at the expense of root development. Spring and fall crops produce the best results in Virginia.

The beet seed is actually a fruit with 1-4 seeds enclosed. Thinning is usually necessary for this reason. Crushing them lightly with a rolling pin will allow individual seed to separate and reduce the amount of thinning required. Soaking the fruits may enhance germination. Plant at 3-week intervals for a continuous harvest. If you're interested in greens only, space the seeds closely for high leaf yields.

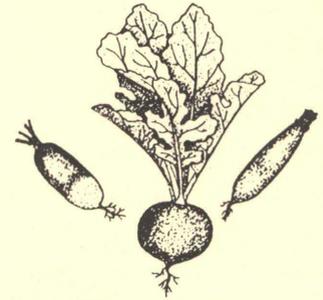
Keep the soil moist after planting. Sawdust or other light mulch placed over the seeded row will keep the soil from crusting. Beets often take a long time to germinate, so be patient. Control weeds, and water if necessary.

### Common Problems

DISEASES: Cercospora leaf spot (rotate crops)

INSECTS: leaf miners, aphids

CULTURAL: Woody textured roots (excessively high temperatures, lack of water, roots too large); poor root development (overcrowding, improper nutrition); internal black spots in roots, dead bottom leaves (boron deficiency - use 1 T. household borax to 12 gallons of water per 100 square feet, lime acidic soil according to soil test).



### Radish

#### Environmental Preferences

LIGHT: tolerates partial shade  
SOIL: well-drained, well-worked, deep and free of rocks  
pH: 6.0 - 8.0  
TEMPERATURE: cool (60-65°F)  
MOISTURE: moist, but not water-logged

#### Culture

PLANTING: sow seeds early to mid-spring for spring harvest and late to mid-summer for fall harvest. Winter radishes usually grown as fall crop from seed sown in mid-summer.

SPACING: Spring - 1 x 12", Winter - 4 x 12"

HARDINESS: hardy annual or biennial

FERTILIZER NEEDS: Broadcast 2 lbs. 10-10-10 per 100 sq. ft. 4-6" into the soil before planting.

#### CULTURAL PRACTICES:

Two types of radishes are grown by home gardeners, annual radishes and winter or storage radishes. The type seen in grocery stores is an annual that grows only in cool weather and matures in 25 to 35 days. Successive plants can be made every 10-14 days from the time soil can be worked in the spring until early summer, then again in late summer for fall harvest. During hot weather, plants produce seed stalks and roots develop a hot flavor.

Seeds are often started with carrots, parsnips, or beets to mark the rows of these slower-growing plants or between

slow-maturing vegetables such as cabbage, pepper and tomatoes. Overcrowding causes poor root development and slow development results in hot or woody roots. Therefore, good water and nutrient supply are needed to encourage quick growth for good quality. Over fertilization, however, can cause excessive top growth and poor root development.

Winter or storage radishes are biennials that are planted in mid-summer for fall or winter harvest. They are slow-growing, requiring 45-70 days to maturity. They are often planted in the space in which early corn or onions were planted. Varieties range from mild to very hot and produce roots up to 50 lbs.

### *Common Problems*

DISEASES: club root

INSECTS: cabbage root maggot, aphids, flea beetles

### *Harvesting and Storage*

DAYS TO MATURITY: Spring radishes - 25-35 days;  
Winter radishes - 45-70 days

HARVEST: Spring harvest as soon as radishes are edible size - about 1 -1 1/2" in diameter. Winter harvest depends on variety which may be up to 2 ft. long and 50 lbs. Winter radishes should be harvested and stored like other root crops.

APPROXIMATE YIELDS: (per 10 ft of row) - 1-4 lbs.

AMOUNT TO RAISE PER PERSON: 3 lbs.

STORAGE: Spring radishes - cool (32°F) moist (95% RH) conditions, 3-4 weeks; winter radishes - cool (32°F), moist (95% RH) conditions, 2-4 months.

PRESERVATION: pickle



## **Parsnips**

### *Environmental Preferences*

LIGHT: sunny

SOIL: deep, well-drained, well-worked, and free of rocks

pH: 6.0 - 7.5

TEMPERATURE: cool (60-65°F)

MOISTURE: average

## *Culture*

PLANTING: sow seeds early to mid-spring, 1-2 weeks before frost-free date

SPACING: 1/2" deep, 2-4" x 18-24"

HARDINESS: hardy biennial

FERTILIZER NEEDS: Broadcast 1 lb. 10-20-10 per 100 sq. ft. 4-6" before planting; sidedress in 4-5 weeks after planting with 1 lb. 10-10-10 per 100 sq. ft.

CULTURAL PRACTICES:

Parsnips are slow to germinate and require a long growing season. The seeds should be planted in the spring and allowed to grow through summer and fall. Thin to 3", as crowding causes small, tender roots. Parsnip seeds are not long-lasting and will lose viability after a year.

Parsnips should remain in the ground until their tops freeze in late fall. Then dig as needed or harvest for storage. If parsnips are left in the soil over the winter, put about an inch of soil mulch over the crowns after the first fall frost. However, parsnips will lose their flavor and become fibrous if not harvested before growth begins in the spring, or if growth continues too long in the fall.

### *Common Problems*

DISEASES: Very little problem

INSECTS: Cabbage root maggot, aphids, flea beetles

### *Harvesting and Storage*

DAYS TO MATURITY: 94-120 days from seed

HARVEST: Leave parsnips in the ground through the winter, cover crowns with mulch, and dig up entire crop in early winter and store as a root crop.

APPROXIMATE YIELDS: (per 10 ft row) 10-12 lbs.

AMOUNT TO RAISE PER PERSON: 10 lbs.

STORAGE: cool (32°F), moist (95% RH) conditions, 2-6 months

## **Turnip & Rutabaga**

### *Environmental Preferences*

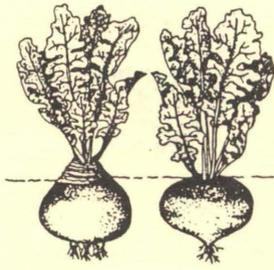
LIGHT: sunny

SOIL: well-drained, well-worked, and free of rocks

pH: 5.5 - 7.0

TEMPERATURE: cool (60-65° F)

MOISTURE: moist, but not water logged



### **Culture**

**PLANTING:** sow turnip seed in early spring for summer harvest, and mid- to late summer for fall harvest. Sow rutabaga seed in June for fall harvest.

**SPACING:** 3-5" x 8-24"

**HARDINESS:** hardy biennial

**FERTILIZER NEEDS:** Broadcast 2 lbs. 10-20-10 per 100 square feet, work 4-6" into the soil before planting, sidedress 1 lb. 10-10-10 per 100 sq. ft.

**CULTURAL PRACTICES:**

Hot, dry weather and low fertility levels cause turnips and rutabagas to be small, hot, and woody. Balanced soil fertility and water levels are important for quality crops. Turnip roots will split when a heavy rain follows a dry period.

Rutabagas require 4-6 weeks longer to mature than turnips, have a firmer flesh and will store longer. They do not become pithy if they over-mature as turnips do.

### **Common Problems**

**DISEASES:** club root

**INSECTS:** Cabbage root maggot

### **Harvesting and Storage**

**DAYS TO MATURITY:** Rutabaga 80-100 days;  
Turnip 30-60 days

**HARVEST:** The quality of turnips and rutabaga roots is best when they are medium size (turnips 2-3", rutabagas 3-5"). Roots can also be harvested when 1-2" in diameter. The roots will stand frost, but should be dug before ground freezes. A heavy straw mulch will extend harvest through early winter. For greens, turnips are pulled before storage roots develop. For broccoli raab, turnips are allowed to overwinter and flower stalks harvested the next spring.

**APPROXIMATE YIELDS:** (per 10 ft of row) - 8-12 lbs.

**AMOUNT TO RAISE PER PERSON:** 5-10 lbs.

**STORAGE:** cool (32° F), moist (95% RH) conditions, 2-4 months. Rutabagas can be dipped in wax to reduce shriveling.

**PRESERVATION:** freezing

## **Salsify**

### **Environmental Preferences**

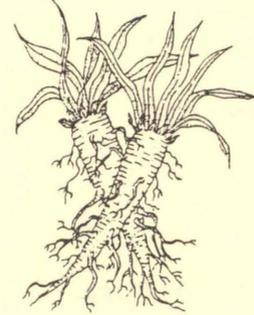
**LIGHT:** sunny

**SOIL:** light, crumbly, loose soil, 18" deep

**pH:** 6.0 - 6.8

**TEMPERATURE:** 55 -75°F

**MOISTURE:** average



### **Culture**

**PLANTING:** sow seed as soon as ground can be worked

**SPACING:** 1/2" deep, 2-3" x 16-18"

**HARDINESS:** hardy biennial

**FERTILIZER NEEDS:** Before planting, incorporate 2 lbs. of 10-20-10 per 100 square feet.

**CULTURAL PRACTICES:**

Salsify is also called oyster plant due to the oyster-like flavor of its roots. It requires a loose soil to produce long, straight roots with few side roots and will grow best in a raised bed filled with a mix of organic matter, fine sand and vermiculite. Manure should not be used as it will cause branched roots. Plants should be irrigated until established, then they will tolerate some dry conditions.

### **Common Problems**

No insect or disease problems of major consequence

### **Harvesting and Storage**

**DAYS TO MATURITY:** 120 - 150 days

**HARVEST:** Harvest should be delayed until after a frost for best flavor and texture. However, the roots may be harvested when they are 1 - 1 1/2" in diameter. Complete harvest before growth begins in spring.

**APPROXIMATE YIELDS:** (per 10 ft. row) 10 lbs.

**AMOUNT TO RAISE PER PERSON:** 5 lbs.

**STORAGE:** The roots may be stored in damp sand in a cellar or they may be left in the ground over the winter. A light mulch should be used to protect roots left in the ground.

**PRESERVATION:** freeze