



Asparagus spears harvested by snapping.

for 2 weeks the third year the plants are in the garden; 4 weeks the fourth year, and 8 weeks the fifth and following years. In the cool central valleys of California, a 4-8-12 week sequence is best.

When the harvest season is approximately half completed, 5 to 6 inches of soil may be carefully ridged over the row. This lowers the temperature around the crown and increases spear size. The ridge should be raked level right after the last harvest.

White asparagus, which has a distinctive flavor, can be produced by ridging 10 to 12 inches of soil over the row in the spring when the first spears emerge. When the tip of the spear breaks through the ridge of soil, carefully remove some soil from around the spear, and use a long knife or asparagus knife to cut the spear about 8 inches below the tip.

If the harvest from one day is not enough for a meal or if the asparagus is to be consumed later, wash the spears, place the cut ends in a shallow pan of water and immediately put them in the refrigerator. Good quality can be maintained for several days if the spears are kept at 35° to 40° F. A 40-foot long row of asparagus will yield approximately 10 to 25 pounds of spears during the average season.

RHUBARB

by Daniel Tompkins

Rhubarb, also known as pieplant, is a hardy perennial vegetable grown in many home gardens for its thick leaf stalks or petioles. It produces its crop early in spring, largely from food that has been stored in the large fleshy crowns and roots of the plant during the preceding year. It likes cool weather and grows best in the Northern States where the average summer temperatures are not much above 75° F. Rhubarb does not grow well in areas where the summers are quite warm.

Stalks can't be fully harvested until the third year of the planting.

A member of the buckwheat family, rhubarb is native to Central Asia. It was introduced into Great Britain, where it is grown extensively, in the 16th century and was probably brought to the United States from Italy late in the 18th century. It has long been grown in the Old World as a vegetable, an ornamental foliage plant, and for medicinal properties of the dried root which provides a strong purgative. Here in this country rhubarb is grown for its acid stalks which are stewed for pies and sauces, made into preserves, and sometimes used for making wine. It is also excellent baked.

Rhubarb leaves should never be eaten, since they contain levels of soluble oxalic acid that can make one quite ill or even cause death. The stalks are harmless since the oxalic acid is present in smaller amounts and mostly in an insoluble form.

Rhubarb contains vitamin C and calcium (largely insoluble). It also contains some vitamin A, iron, phosphorus, potassium and only about 60 calories per pound of stalks. It has been reported that rhubarb can pro-

Daniel Tompkins is a Horticulturist with the Cooperative State Research Service.

tect the teeth against acid erosion such as may be caused by excessive use of lemon juice or cola beverages. Rhubarb is one of the most acid of all vegetables; the juice has a pH of 3.1 to 3.2. The tender stalks are about 94 percent water.

For home use, rhubarb varieties or cultivars may be divided into two classes, those with red stalks and those with mainly green stalks when grown outdoors. The somewhat larger and more vigorous green stalk cultivars are Victoria, German Wine and Suttons' Seedless. These cultivars are commonly used by commercial growers for forcing where they produce stalks with a delicate pink-red color. The cultivars that produce red stalks when grown outdoors are Ruby, McDonald, Valentine, Canada Red, and Crimson Wine.

Rhubarb grows easily from seed but this is not recommended since many plants will not be like their parents.

Dividing Crowns

You usually propagate rhubarb by dividing the crowns in early spring. Dig the crowns and then split them into pieces with one large bud to each section of crown and root. Trim the pieces by removing all broken roots and shortening the long thin roots.

Crowns vary in size and number of buds produced due to cultivar, age, and growing conditions. Vigorous crowns will normally provide 5 to 10 pieces suitable for planting. Very old crowns may have only an outer fringe of buds suitable for dividing.

Protect the root pieces from excessive drying before planting.

Space the plants $2\frac{1}{2}$ to 3 feet apart in rows $3\frac{1}{2}$ to $4\frac{1}{2}$ feet wide. Usually you plant in a furrow, placing the crown pieces at a depth so that the buds will not be more than two inches below the surface. Fill in soil around the pieces and firm well, but

leave loose surface soil above and around the bud. The soil should be well fertilized and worked deeply and thoroughly before planting. Plant rhubarb as early in spring as the soil can be worked. For each person, about 3 to 4 plants should produce an ample supply. If well cared for, the new planting should last 5 to 7 years depending on cultivar and location.

A deep, rich, well-drained sandy loam soil is most desirable for production. However, rhubarb will grow well on any type soil from sand or peat to clay, provided it is well drained and has a good supply of moisture to encourage vigorous growth during hot summer months. Light sandy soils that warm up quickly provide earlier spring growth than the colder, heavier soils.

Rhubarb requires large amounts of plant food and abundant moisture during the growing season. If available, a heavy application of manure should be worked into the soil before planting to provide organic matter and nutrients for the growing plants. This should be followed by a manure mulch each fall.

Before planting, broadcast a complete fertilizer like 10-10-10 at the rate of 2 to 3 pounds per 100 square feet and thoroughly work it into the soil. In the following years a fertilizer like 10-10-10 should be broadcast or banded at the rate of $1\frac{1}{2}$ pounds (sandy soil) to 2 pounds (clay soil) per 100 square feet before the new leaves begin to grow each spring. This fertilizer should be mixed 2 to 3 inches deep in the soil but not any closer than 10 inches from the plant.

After harvesting is completed, a sidedressing of ammonium nitrate (33.5 percent nitrogen) at the rate of 6 ounces per 100 square feet will stimulate summer growth and food storage in the roots.

If manure is not available, the rhubarb patch can be mulched with 1 to

3 inches of lawn clippings each year during late spring or early summer.

To promote good growth during the summer, water the plants whenever the soil begins to dry.

If the plants go dormant (leaves die) after harvest, little food is stored in the roots for the next year's crop.

Rhubarb is tolerant to soil acidity, and liming is seldom needed. It will grow well in soil as acid as pH 5.2, provided the essential nutrients of calcium, phosphorus, and magnesium are well supplied.

Weed control by hoeing and cultivation should be shallow and frequent enough to control emerging weeds. The most serious weed problems will usually occur early in spring before the newly planted root pieces start growing well.

When to Pick

Don't pick stalks during the first season or the year of planting. Food from the leaves is needed to enlarge the roots for the coming years' growth. During the second year stalks should be picked for only a short period (two weeks). Beginning with the third year the harvest period may extend as long as six weeks or until the stalks become small, indicating that food supplies in the roots are becoming depleted. Don't remove more than two-thirds of the developed stalks from the plant at any one time. Pull only the large stalks, leaving the young ones to grow.

Pick the stalks by pulling and not by cutting. Grasp the stalk near its base and pull it slightly to one side in the direction it grows. The stalks separate readily from the plant and are easily pulled. After the stalk is pulled, trim it by removing the leaf or leafblade.

If flower stalks appear, remove them at once so the plant's food will go into the roots for the next year's crop of stalks. Continued development of flower stalks will reduce

rhubarb production during the following year.

Rhubarb is relatively free of insect and disease problems. But one insect that can cause problems is the rhubarb curculio. This snout beetle, common in the eastern half of the country, can puncture the stems—leaving black spots. The beetles average about a half-inch in length and are black. But they usually are so densely covered with a rusty powder that they appear reddish. Since the curculio as a rule feeds on curly dock weed, one control measure is to destroy these weeds growing near the rhubarb.

Phytophthora crown rot or foot rot is a disease that can affect rhubarb in the eastern half of the country. At the base of the stalk lesions develop rapidly to cause collapse of the whole stalk. In warm moist weather the stalks may continue to collapse until the plant is killed. There is no effective control at present.

Other diseases that may affect rhubarb are bacterial crown rot, pythium crown rot, rhizoctonia crown rot, gray mold or *Botrytis* (the most serious disease of commercial forcing operations), and *ascochyta* leaf spot. There also are a number of viruses that can reduce plant vigor and yields.

If you plan to propagate your own plants, identify the most vigorous 2- to 3-year-old plants with stakes during June. Leave the stakes by the plants (crown) until the following spring when the marked crowns are dug and split for planting stock. Replace plants when they start to produce fewer—and small size—stalks. Remove the old crowns and associated fleshy roots by digging, and make a new planting elsewhere in the garden.

Commercially, much of the rhubarb crop is produced by forcing during the winter months. This is a unique horticultural practice of producing an edible crop inside darkened, heated

buildings. Rhubarb plants are grown in the field for 2 to 3 years during which the food materials produced in the leaves are stored in the thick fleshy roots. During winter months when the plant leaves are dead, the crown (roots) are brought from the field to the forcing structures. The large amount of food stored in fleshy roots of the crown enables it to produce many well-colored rhubarb stalks under the proper forcing conditions of darkness, water, and low even heat (50° to 55° F). After the crowns are forced they are discarded.

A crown can produce 4 to 12 pounds of stalks, depending on cultivar and crown size and vigor.

While it is a messy and time-consuming job, crowns may be forced in the home basement or cellar. About 6 to 10 good crowns should produce enough for the average family after you learn how to force rhubarb.

For Further Reading:

U. S. Department of Agriculture. *Rhubarb Production*, Leaflet 555, for sale by Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20202. 25¢.