

# CASSAVA

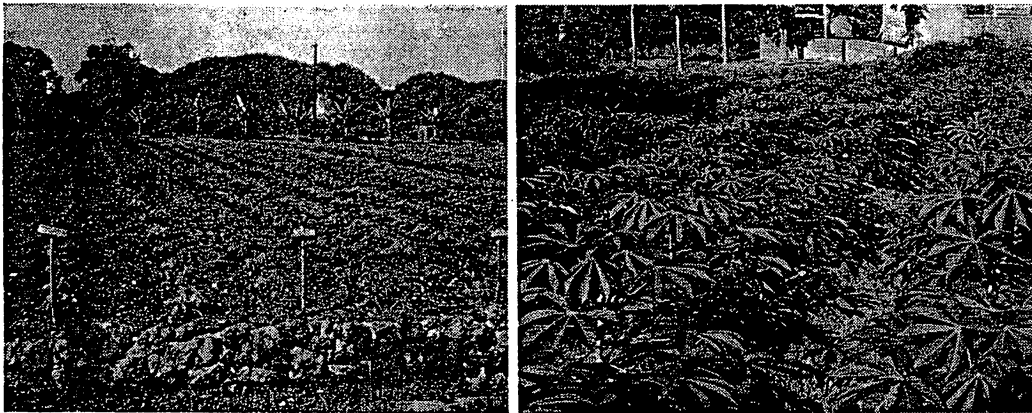
## INTRODUCTION

Cassava is the least important of the starchy foods used by Pacific islanders. It is most important in the Palau Islands of Micronesia, ranking second to taro, and is becoming more important in the Cook Islands and certain islands of French Polynesia. Two reasons for its increased planting are that it is easy to grow and produces high yields. Due to this high yield, however, cassava takes up a lot of plant food from the soil. If plantings are not carefully rotated, garden soils will become too poor to grow other vegetables. Repeated plantings on the same poor soils have ruined certain areas of the high islands in the Pacific, and caused the soil to become eroded and unproductive.

Of all the starches grown as a staple food, cassava is the most unbalanced, being very low in protein.

## VARIETIES

Cassava originated in South America where for centuries it has been grown by the Indians as a staple food. After the discovery of America, the Portuguese and Spanish explorers spread the cassava plant throughout the tropics. It probably reached Micronesia in the 17th century, and arrived in Polynesia in the first half of the 19th century. It is reported that a cer-



Left—A field of various varieties of cassava in Palau. Right—Several-months-old cassava plants at the Koror High School farm.

tain variety was brought into Palau from New Guinea in the latter part of the 19th century to take the place of taro that was dying of a corm rot disease.

Cassava is sometimes grouped into two species which are recognized as either 'bitter' or 'sweet'. *Manihot esculenta* is known as the 'bitter' cassava because it has a greater content of manihotoxin, a toxic and bitter material (*hydrocyanic acid*) found in both the central portion and the outer layers of the tuber. *Manihot dulcis* is known as 'sweet' cassava, with but a small amount of manihotoxin, usually only in the outer layers of the tuber. Some botanists feel that *M. dulcis* is a variety of *M. esculenta* resulting from years of selection of planting material that was low in the poisonous material.

There are over 200 known varieties of cassava, and they are grown in nearly every tropical country. In Micronesia, Palau has the most varieties, numbering between 30 and 40. The newest introduction was from San Salvador via Hawaii in 1958, and it is very high yielding compared with the varieties that are grown locally.

Cassava is a shrubby, perennial plant reaching 10 to 12 feet high. There are also dwarf varieties that grow to only 3 or 4 feet. Generally, the bitter varieties are recognized by dark leaves and stems, often tending to be reddish in color, whereas the sweet varieties have light-green leaves and stems. The bitter varieties are usually planted for the production of starch and other commercial products such as alcohol and acetone.

Cassava is known by such names as tapioca and manioc. The name, tapioca, should be reserved for the product that is prepared from the fine starch which settles out when the juice of the tuber is squeezed.

## **CLIMATE AND SOILS**

Cassava is well adapted to growing throughout the tropical area. Its yield, taste, amount of hydrocyanic acid, and growth are determined by climate and soil conditions. It will grow best in areas with less than 150 inches of rainfall annually. High humidity and rainfall make more top growth and less root growth. It can withstand very dry periods, but will then have lower yields.

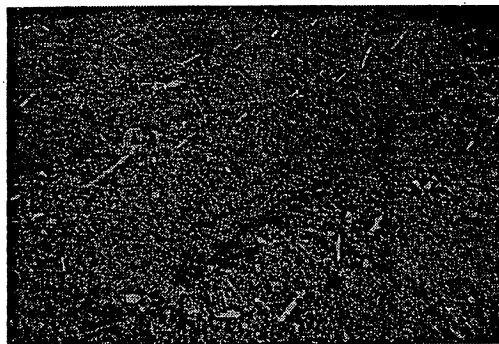
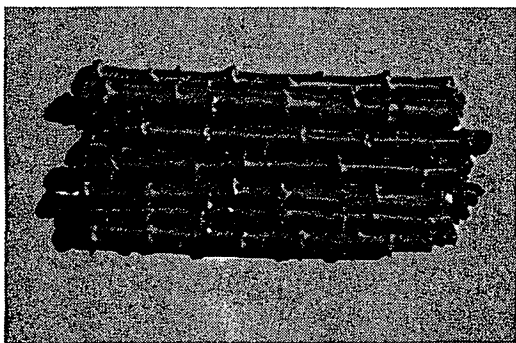
Cassava grows in a wide variety of soils, ranging from very poor to rich alluvial. The soil can be sandy to heavy clay; however, cassava will not

grow if water is standing on the land for long periods. Heavy compact soils must first be loosened by digging before planting time.

## **LAND PREPARATION AND PLANTING**

In order to plant cassava, the land has to be cleared of all grass, weeds, tree stumps, and rocks. Several weeks before planting, the whole area should be plowed to a depth of 6 to 8 inches. If an animal- or a tractor-drawn plow is not available, then the soil will have to be loosened with a spading fork or a three-pronged hoe. When cassava is planted for the first time in newly cleared land and all the work must be done by hand labor, mark off the field with stakes 3 or 4 feet apart each way. Then take a spading fork or a three-pronged hoe and loosen the ground around it in a circle 18 inches in diameter, and 6 to 8 inches deep. This loosened area will be the planting site for the cassava cuttings. If the soil is low in fertility, then a planting hole of about 10 inches deep by 15 inches wide should be dug; three-quarters of the hole should be filled with organic material, then the soil should be replaced and mounded-up to make the planting site.

Another planting method is to make planting ridges or beds that are about 12 to 14 inches high and 2 feet wide, with a flat top. Trenches are made and organic material used if the soil is poor, or, if the soil is rich, only the ridge is made, without the addition of any plant material.



**Left—Clean and mature stem cuttings of cassava ready for planting. Right—Cassava cuttings planted on a ridge.**



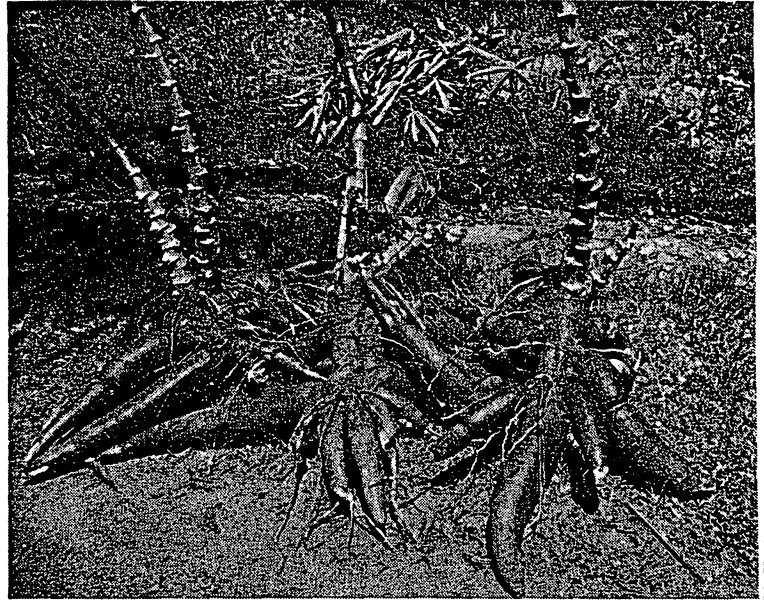
Mature cassava plants ready for harvesting.

Cassava planting material is obtained by making stem cuttings of about 8 inches long from the variety desired. In selecting planting material, choose only from disease-free and strong vigorous plants. The best cuttings are those taken from the base of the plant. These are planted in a slanting direction with one-third of the cutting remaining above ground. Two cuttings are usually planted at each site, and the sites spaced 3 to 4 feet apart each way. Each cutting will send up two to four shoots. After the shoots are about 18 inches high they should be pruned so that only one or two main shoots are left per cutting. The weeds and grasses must be kept out of the garden until the cassava plants shade the ground to prevent further weed growth.

## **FERTILIZING**

To produce high yields, cassava needs large quantities of nutrients. It especially needs large amounts of potash in order to ensure that the tubers grow so as to produce more starch, and also that the tubers themselves will have a good flavor. The most suitable fertilizer is one that has a ratio of

NPK of 12:12:18 applied at one-quarter pound per plant site, one-half of it applied at planting time, and the other half as a side dressing about two months later. If a 5:5:10 fertilizer is used, the amount applied should be doubled. If fertilizer is not used where cassava is grown, the soil will soon become very poor, and nothing but weeds will grow. The best practice is rotation of cassava plantings with corn, vegetables, and legume plants. Cassava should normally be planted for only two years on the same land.



Cassava tuber roots.

## **HARVESTING**

The length of time from planting to harvest time depends on the variety. The best time to harvest is when the plant reaches maturity, usually from ten to eighteen months. Only sufficient tuber roots should be harvested as can be consumed immediately. Cassava tubers are not usually stored after harvesting because they ferment and become unfit for food. The yield varies depending on variety, climate, fertility of the soils, and method of cultivation. The normal yield with little or no fertilization is about 3 to 6 tons per acre. The San Salvador variety produced 11 tons per acre at Ponape with good cultivation and proper amounts of applied fertilizer.

The young tender leaves of cassava can be used as boiled greens, which have fair amounts of vitamins and minerals. These are also good for stock feed.