Ministry of Food Production
Extension Training and Information Services Division
Home Gardening Series
TT:Ag Ext: 15:21

by: Frankie Solomon Jr., Agricultural Officer I

How to Grow Breadfruit

INTRODUCTION

The breadfruit *Artocarpus altilis* (Parkinson) Fosberg is a good source of carbohydrate (84.2 g/100 g), fibre and vitamins. In Trinidad and Tobago it is mainly prepared by a famous one-pot dish known as 'Oil-Down'. Other preparations include roasting, boiling, frying and baking. Breadfruit has the potential to be used as a substitute for rice, wheat and white potatoes, which are not grown locally.

Did you know?

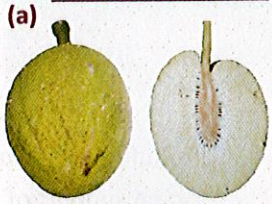
Breadfruit has a low to intermediate glycaemic index, that is, it does not release glucose into the blood stream quickly. Therefore, consuming it can assist in controlling blood glucose.

VARIETIES

There are two forms of breadfruit, those that contain seeds (seeded) and those that do not (seedless). The seeded type is not very common and mainly found in the Pacific region. Locally, there are two seedless cultivars that we enjoy, namely, the 'Local Yellow' and 'Local White'. There is also a seeded type known as 'Ma'afala' that is becoming popular. ***Figure 1a - c*** gives some information on these varieties.

'Local Yellow'

(a)



Fruit Description

Type: seedless
Flesh colour: pale yellow
Latex production: high
Fruit weight: 1.6 - 2 kg (3.5 - 4.4 lbs.)

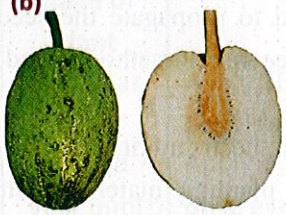
Skin colour: green when immature and yellowish green at maturity.

Tree Description

Yield: 200 – 300 kg (440 – 660 lbs.) per tree
Harvest season: February - September
Time to bearing: 2 - 3 years
Harvest period: 6 - 7 months
Canopy width: 6 - 9 m (20 - 30 ft.)
Mature height: 12 - 18 m (40 - 60 ft.)

'Local White'

(b)



Fruit Description

Type: seedless
Flesh colour: creamy white
Latex production: low
Fruit weight: 1.5 - 1.6 kg (3.3 - 3.5 lbs.)

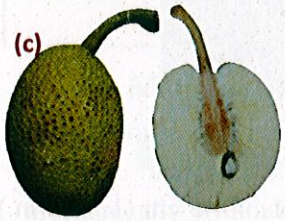
Skin colour: green when immature and light green at maturity.
Time to bearing: 2½ - 3 years

Tree Description

Yield: 200 - 300 kg (440 - 660 lbs.) per tree
Harvest season: February - September
Time to bearing: 2½ - 3 years
Harvest period: 6 - 7 months
Canopy width: 6 - 9 m (20 - 30 ft.)
Mature height: 12 - 18 m (40 - 60 ft.)

'Ma'afala'

(c)



Fruit Description

Type: seeded
Flesh colour: pale yellow
Latex production: medium
Fruit weight: 0.9 - 1 kg (2 - 2.2 lbs.)

Skin colour: green when immature and light yellowish green at maturity.

Tree Description

Yield: 80 - 100 kg (176 - 221 lbs.)
Harvest season: August - December
Time to bearing: 2 - 2½ years.
Harvest period: 4 - 5 months
Canopy width: 5 - 6 m (16 - 20 ft.)
Mature height: 10 - 14 m (33 - 46 ft.)

Figure 1 a - c: Characteristics of three local breadfruit cultivars

SITE SELECTION

It is important to note that the breadfruit tree would occupy the ground for over fifteen years. Therefore, careful consideration for site selection, placement and access is important. Breadfruit can tolerate various types of soil.

However, the growth is more vigorous in deep, fertile and high humus soil. Generally, it prefers light to medium soils with good drainage and pH between 6 - 6.5. Fruit drop and poor growth and development may occur with soils that have a high water holding capacity. Plant breadfruit at least 5 - 6 meters (16 - 20 feet) away from any structure, for example, house, fence, other fruit trees, overhead power lines and underground pipelines.

BREADFRUIT PROPAGATION

Propagation in breadfruit is primarily done using vegetative methods, while seeds can be used to propagate the seeded types. The following are the three main methods used to propagate the breadfruit.

(1) **'Root Suckers':** These have been traditionally used to provide small amounts of planting materials. Short sections of tree roots that grow 3 - 6 cm (1.2 - 2.4 in.) above the ground and remain exposed, produce shoots (adventitious shoot) either naturally or in response to injury, for example cutting a root accidentally **(figure 2).** These shoots are removed along with 15 - 20 cm (6 - 8 in.) of parent root and propagated as an independent plant.

Figure 2: Root Suckers

(2) **'Root Cuttings':** Surface roots, 4 - 5 cm (1.5 - 2 in.) in diameter, and between 0.9 - 1.5 (3 - 5 ft.) in length, are harvested and sub-divided into 0.3 m (1 ft.) lengths. Six small notches/ incisions are placed evenly on either side of each of the 0.3 m (1 ft.) sections. Each root section is placed in sharp-sand at 1 cm. (0.4 in.) in depth. **DO NOT ALLOW** the sharp sand to dry out. At each notch, a shoot with its independent root system would develop in 3 - 4 weeks **(figure 3a).** At this stage each shoot with its roots, is removed along with piece of the parent root. It is then placed into potting bags as an independent plant.

(3) **'Stem Cuttings from Nursery Plants':** This is one of main methods that is used to commercially produce plants. It is a modification of the root cutting method as described above.

The shoots that were developed on the 0.3 m (1 ft.) section can be used as a source from which stem cuttings can be collected for propagation. See **figures 3a to 3d** .

Figure 3a: Shoot (adventitious) would begin to develop within 3 - 4 weeks.

Figure 3b: Shoots allowed to grow into nursery source plants. Newly formed shoot stems would be harvested above a node at the brown to green area of the stems when they reach pencil thickness and 15 - 20 cm (6 - 8 in) in length.

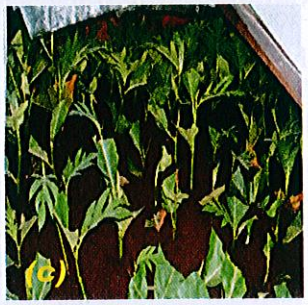


Figure 3c: Treat the cut end of the harvested shoot with rooting hormone and place at 45° angle 6 - 8 cm (2½ - 3 in.) in depth into a rooting medium .

Figure 3d: Shoot would develop roots within 3 - 4 weeks. At this stage transplant to a potting bag containing 2:1 soil/manure mix. Place in a cool and shaded environment

Figure 3 a - d: Producing stem cutting from nursery plants

SELECTION OF PLANTING MATERIAL

Obtain plants from a trustworthy supplier to ensure that you get the desired cultivar.

The selected plant should:

- Be between 6 – 8 months after propagation. This would ensure that there are no overgrown protruding roots, which may lead to poor root growth and anchorage support of the mature plant.
- Have an intact growing tip showing signs of new growth. Plants with a decaying tip may be an early indication of a disease and should not be selected.
- Be pest free.

NB: The plant should have an overall healthy appearance as seen in ***figure 4.***

Figure 4: Young healthy breadfruit plant

PREPARING THE PLANTING HOLE

Breadfruit cannot withstand water logging conditions. Make drains, if needed, to remove excess water. Ensure that planting is done at the beginning of the rainy season to prevent heat and water stress.

Prepare the planting hole for breadfruit by making a hole at least 1½ times the depth and width of the plant's root ball.

Prepare a mixture of manure and soil that was removed in a ratio 1:2 (**figure 5a inset**). Use this mixture to refill the planting hole.

In the absence of a soil test, mix 100 g - 200 g (¼ - ½ lb.) of limestone and 30 - 40 g (1 - 1.5 oz.) of 12:24:12 into the soil and manure mixture.

PLANTING

Remove potting bag (**figure 5a**). Place soil mixture to fill at least ⅓ the depth of the hole and place the plant's root ball in the hole (**figure 5b**). Hold plant upright and fill the hole with soil mixture (**figure 5c**). Lightly pack soil around the plant and water immediately (**figure 5d**).

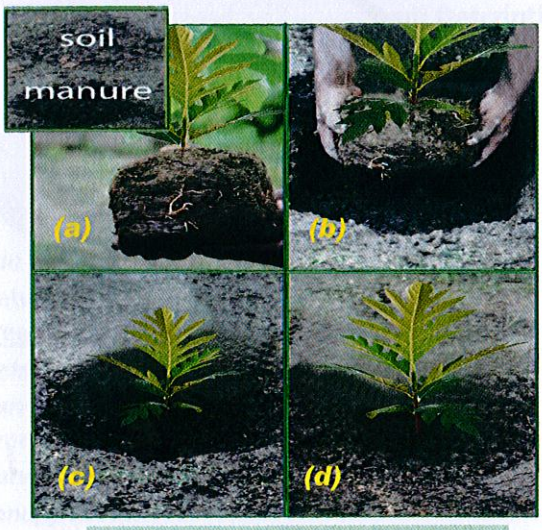


Figure 5 a - d: Planting breadfruit

FERTILISING

The breadfruit plant requires nutrients for healthy growth and production. These are usually provided by the growing medium. Apply complete fertiliser around the drip circle to provide additional nutrients if needed (**Table 1**).

Table 1: Suggested application of major nutrients at different growth stages for breadfruit.

Growth Stage of Plant	Recommended NPK and Application Rates
First year	Apply 100 - 150 g (4 - 5 oz.) of 12:24:12 per tree, once every 4 months.
Second year until flowering starts	Apply 300 g (11 oz.) of 20:10:10 per tree, once every 4 months.
Bearing trees and onward	Apply a total of 1000 g (35 oz.)/tree/yr. of 12:12:17:2 [750 g (27 oz.) at flowering and 250 g (9 oz.) after harvesting is completed].
Through-out the plant's life	Apply a micro-nutrient foliar fertiliser at least three times per year. The first application should be made four months after planting. Follow manufacturer's recommendations.

WEED MANAGEMENT

Weeds compete with the breadfruit plant for sunlight, nutrients and water. Remove weeds manually or mechanically without damaging the main stem of the plant.

IRRIGATION

Water breadfruit plants during dry periods, since they cannot withstand prolonged dry conditions. Lack of water may cause the plant to become stressed, resulting in fruit fall, leaf fall and a general unhealthy appearance.

PEST AND DISEASE MANAGEMENT

Pest:

There are no major pests that affects the breadfruit plant or fruit. There are minor pests, which include, mealy bugs, beetles, bachacs, nematodes, soft-scales, ants and termites that infest dead branches. Apply a class IV insecticide following manufacturer's guidelines to control pests.

Disease:

The major disease affecting breadfruit in Trinidad and Tobago is one referred to as Tree Decline or "die back". The disease is caused by a combination of both environmental and biological factors, for example, drought, water logging conditions and pathogens such as *Rosellinia* sp., *Phytopthora* sp. and nematodes.

Symptoms of die back in breadfruit include heavy leaf fall, fruit fall, dieback of branches, which begins from the tip of the plant and moves downwards, sparse, scanty and overall unhealthy appearance and premature death, which can occur within one year (***Figure 6a - b***).

Figure 6: Early (a) and late (b) dieback symptoms in breadfruit

Once symptoms are detected early a cutback/pruning of the tree should be done, which would promote new growth and delay symptoms. Limestone can also be applied at a rate of 1 kg (2.2 lbs.) evenly on top of the soil within the root region to delay symptoms.

There is also a fruit rot caused by *Phytophthora sp.*, *Colletotrichum sp. (anthracnose)*, and *Rhizopus sp.* It is identified by small round dark brown spots that develop on the skin and gradually expand to form larger legion that is hard to the touch.

Remove affected fruits from the tree and do not allow fruits to ripen on the tree or rot on the ground. Apply a copper base fungicide when fruits are immature to prevent fruit rot.

HARVESTING

Select fruits that are generally between 12 - 18 weeks from flowering. Fruits harvested between 12 - 16 weeks are considered green/immature and have a longer shelf life (1 - 2 weeks), but are not preferred because of rubbery texture and low flavour. The characteristics of a mature fruit are:

- between 16 – 18 weeks old
- latex emerging from the fruit
- smooth texture and full breadfruit flavour

Avoid physical damage to fruit. The recommendation is that fruits should be harvested using a picking tool that would cut or break the fruit stem and then catch the fruit as seen in ***figure 7***.

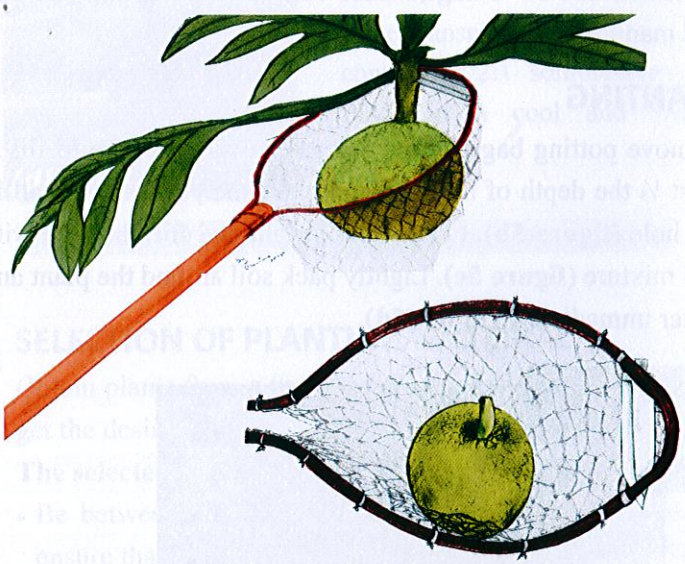


Figure 7: Recommended fruit picker

Published and Printed by
Ministry of Food Production
The Extension Training and Information Services Division
Trinidad and Tobago
July 2015