

BREADFRUIT PRODUCTION

College of Agriculture, Science and Education, P.O. Box 170, Port Antonio, Portland
Faculty of Agriculture

INTRODUCTION

It is important for Jamaica to identify and develop the potential of its natural resource base in order to improve the economy and remain competitive in the global market place. It is believed that greater crop diversification coupled with saleable value added products within the country's agricultural enterprise would be a good strategy to stimulate and improve the Jamaican economy. Breadfruit qualifies under the new portfolio of economically promising varieties based on its export market potential. Breadfruit commercialization is also, an initiative to positively impact food security in Jamaica by increasing the food supply seasonally as well as year round under conditions which are sustainable.

BACKGROUND

The breadfruit (*Artocarpus altilis*) is said to be a native of Polynesia. The acquisition and subsequent introduction of breadfruit to Jamaica between 1782 and 1793 by captain William Bligh was intended to serve as a staple crop for slaves. It is said that the breadfruit germplasm from Bligh's second voyage was kept and cultivated in the Bath Botanical Gardens in eastern St. Thomas from which propagules were distributed to other parishes.

Breadfruit flourishes on a wide range of soils types with pH from 5.5 to 8.5 and at altitude ranging from sea level to 3500 feet. The plant performs best within a temperature range of 60°F to 100°F, a relative humidity of 70% to 80% and a nominally distributed rainfall of 80" to 100" per year.

The more widely used cultivars of breadfruit in Jamaica are commonly known as the 'yellow heart' and 'white heart'. The major breadfruit growing regions include Portland, St Mary, St. Thomas and St. James.

The initiative to grow breadfruit in an established orchard setting was first done by CASE at Passley Gardens, Portland. In 1993 the College established its first 1-acre block of breadfruit and have since expanded to approximately 12 acres.

The College is still the major producer in the propagation and production of high quality breadfruit seedlings in Jamaica.

With regards to breadfruit production in Jamaica CASE's continues to disseminate information to target audiences on the best management practices, and to impact positively on food security in Jamaica.

PROPAGATION

Breadfruit can be propagated vegetatively by stem and, root cutting, volunteer suckers and to a lesser extent by air layering, and grafting. Tissue culture is currently being explored. Root cuttings is the method widely used where large numbers of plants are required. Root cuttings are normally selected from parent trees with high vigor, profuse bearing characteristics and produces fruits of good edible quality. Roots should be collected in the cooler parts of the day in early spring and late autumn for best advantage.



Fig. 1. Root cuttings 4 to 6 inches in length

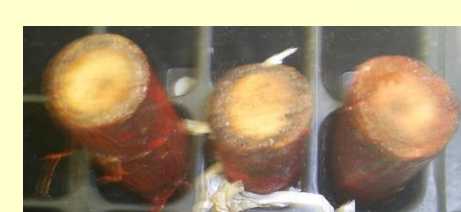


Fig. 2. Suitable root diameter for propagation

Root cuttings are normally propagated in beds constructed on the ground or raised. The propagation medium is a mixture of sand and undecomposed organic content such as coir dust or saw dust in a 2:1 ratio, sand to organic matter. The medium must be kept moist once the root cuttings are inserted until plantlets are ready to be transplanted. A light mulch can be used to aid moisture retention especially in the absence of a mist irrigation system.

Cuttings are made from health roots collected in the field. These roots are usually found running laterally along the orchard floor and exposed slightly above the soil surface. They are collected at varying length and of a diameter ranging from 1/2 inch to 1 1/2 inches (Fig. 2). Roots are cut into small pieces of about 4 to 6 inches long (Fig. 1).



The sets are laid horizontally in small drills across the beds keeping 1/4 inch between sets and about 2 inches between rows. Each piece of root cuttings should be buried in the drills such that the top is slightly exposed. Care must be taken so as not to damage the bud primordia on the root cuttings. Once the necessary preparation have been done and environmental conditions are adequate, there should be vegetative emergence within 6 to 8 weeks. Note however, that the regenerative period for vegetative growth initiation is varied and of such sprouting will occur over several months. A 60% to 70% success rate is commendable when propagating breadfruit by root cuttings. Once the plantlets start to emerge a weekly application of 20:20:20 soluble fertilizer to stimulate more profuse vegetative development. This practice will shorten the time taken to reach the transplanting stage.

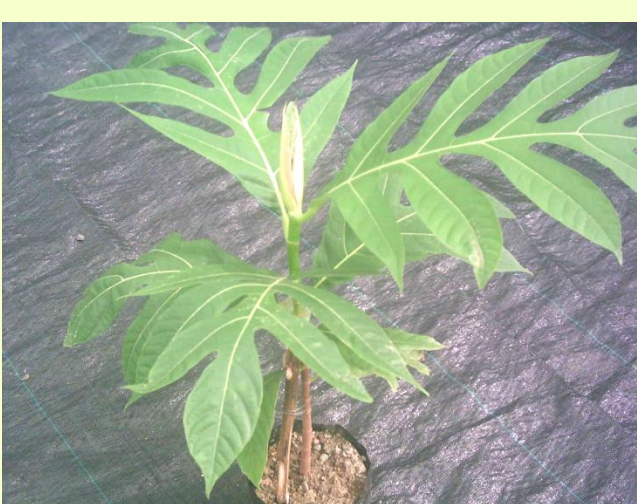
NURSERY

Commercial shade houses are generally constructed at heights of 10 ft to 12 ft, and are usually covered with shade cloth specified by 73% to 86% shade. A synthetic ground matting can be used to prevent weed growth between pots.

The shoots while still attached to the piece of root cutting are placed into potting bags filled with a composite mixture of topsoil, sand and organic matter in a ratio of 2:1:1.

Once emerging plantlets have reached a height of 2 inches or greater, they are ready for transplanting. At this stage plantlets would have developed two true leaves.

When transplanting care should be emphasized to prevent damages to the tender roots and shoots. Unlike exposing of the cutting when they are being inserted into the propagation beds, the bits of roots are covered entirely when transplanting to bags. Watering should be done immediately after transplanting is complete.

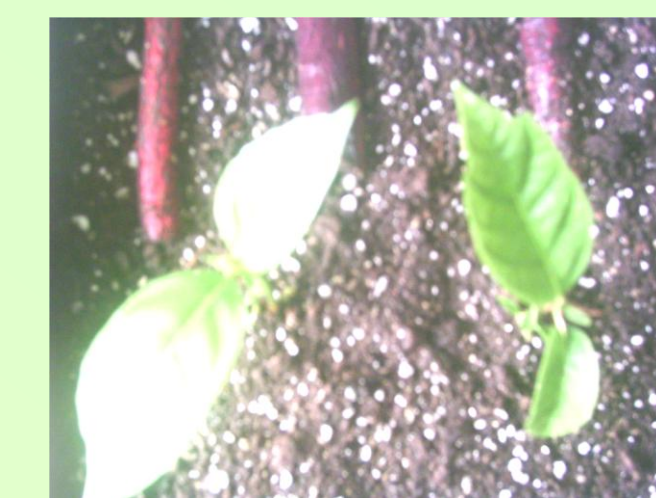


Plantlets laid out in nursery should receive fertilizer high in phosphorus to encourage rapid root development. Fertilizer blends such as 11:22:22 or 14:28:14 give good results. The addition of urea or sulfate of ammonia is also necessary to promote foliar development. Foliar application of 20:20:20 fertilizer containing micro nutrients should be carried out biweekly to further stimulate vegetative growth.

Watering must be done on a regular basis to ensure adequate moist levels in the pots. A lack of moisture will result in poor performance of the nursery stock.

Pest control in breadfruit nursery is minimal. The most frequent pest attack would be from slugs and mealy bugs for which periodic application of slug bait and selective insecticide should be done. In the rainy season precautionary doses of a copper base fungicide should be applied. All other pest damages are minor and the plants would generally outgrow the injury.

When breadfruit plantlets are about 18 inches in height, with stems about a 1/2 inch in diameter and having three to four well defined leaves at which time they will be suitable for planting out in the field. It is imperative however, that they are taken through a hardening off process before actual field establishment so as to reduce the environmental shock on the plantlets.



FIELD ESTABLISHMENT AND CARE

Commercial orchard setting, is concerned with specific planting distances, uniformity, tree size and production efficiency.

Breadfruit may be planted on slopes as well as on flat lands. Land preparation includes land clearing which can be either chemical or manual. Ploughing should be as minimal as possible unless intercropping will be practiced. In low lying areas where ponding is a likely problem, it is recommended that drains should be constructed.

Planting distance to some extent is influenced by topography, pure stand establishment and agro forestry systems. The recommended planting distance for pure stand and agro forestry are 30' x 30' and 40' x 40' respectively. Holes should be dug about 2 ft in diameter and 2 ft in depth. This will provide enough tilt area for the root room for initial root establishment. The topsoil and addition of organic matter are first placed back into the holes. After which the plantlets are centered in the hole and the remaining soil filled in and firmed around the base of the plant. Where irrigation is not possible, transplanting should be planned to coincide with the end of the dry season or just at the beginning of the rainy season.

The root zone should for the most part be kept free of weeds, and circle spraying holes prior to planting and subsequent manual circle weeding in the first year should follow as necessary. Weed control may be done by slashing, mechanical mowing or chemical applications.

Intercropping may be practiced in the first 3 years of establishment.

Fertilizer requirements are usually determined by soil test. In the first 6 months of establishment a nitrogen fertilizer should be applied. Thereafter, a suggested NPK blend of 11:22:22 may be used, at a rate of 450 grams per tree. This should be done in 3 to 4 split applications per year. Circle banding is the recommended method of application.



Another very important management practice is pruning. This is necessary to maintain tree height and shape of trees. Height management will mitigate against undue damage to trees and facilitate ease of harvesting.



With all the proper inputs, trees should start showing their bearing potential in year two after planting and the first economic crop should be realized in year three and with successive improvement thereafter.

CONCLUSION

Commercialization of breadfruit production in Jamaica is on the increase based on the demand for the commodity for both local and export market. To maintain sustainability, emphasis must be placed on improving propagation technique, cultivar selection, harvesting and post harvesting technology and processing.