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Extension Folder No.: 61 (2013)

Improved Production Technology for Elephant Foot Yam

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Elephant foot yam (*Amorphophallus paeonaiifolius*) an underground stem tuber, is one of the most popular tuber crops, extensively used as a favourite vegetable by millions of people in India. It has both nutritional and medicinal value and is usually consumed as cooked vegetable. It has high dry matter production capability per unit area than most of the other vegetables. Elephant foot yam is a remunerative and profitable stem tuber crop. The crop is gaining popularity due to its shade tolerance, easiness in cultivation, high productivity, less incidence of pests and diseases, steady demand and reasonably good price. Tubers are mainly used as vegetable after thorough cooking. Chips are made of starch-rich tubers. Tender stem and leaves are also used for vegetable purpose. Tubers contain 18.0% starch,1-5% protein and up to 2 % fat. Leaves contain 2-3 % protein, 3 % carbohydrates and 4-7 % crude fibre. Tubers and leaves are quite acrid due to high content of oxalates. Acridity is usually removed by boiling fairly for a long time. Cultivation of elephant foot yam is limited to India, Philippines, Sri Lanka and South East Asia.

Unlike other tubers, Amorphophallus roots has many medicinal uses and is widely prescribed by Ayurvedic physicians. *Amorphophallus* corm is a good sources of phyto-aestrogens and are effective alternate or complementary to conventional hormone replacement therapy for symptoms associated with menopause and chronic degenerative diseases in women.

Climate and soil:

Elephant foot yam grows well in warm humid climate. In fertile loamy soils, it gives good tuber yield as pure crop as well as intercrop. Generally it is raised as rainfed crop but are grown as irrigated crop also. It grows well on a variety of soils but a well drained sandy loam or sandy clay loam soil with neutral soil reaction is ideally suited for the crop.

Varieties

SreePadma–DevelopedatCTCRI,Thiruvananthapuram; yield 42 t/ha

Gagendra – Developed at APAU, Hyderabad.

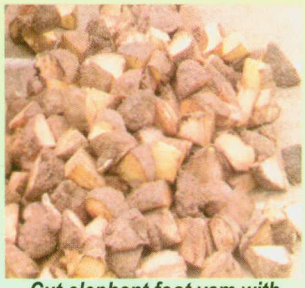
Planting material:

Elephant foot yam setts of 750-1000g are the recommended size of planting material. Multiplication ratio is extremely poor in this crop and hence in order to enhance the multiplication ratio, minisetts of 100g size was found to be optimum. By this technique the multiplication ration was enhanced to 1:15 from the traditional 1:3. While making minisetts enough care should be taken to see that a portion comprising of buds from the central ring of Amorphophallus is retained in each minisetts. On an average, about 15 minisetts could be made from a corm weighing 1.5kg, which may be treated with *Trichoderma* mixed in cowdung slurry. They are then spread under shade cover for one day, prior to planting in the main field. This treatment would protect the crop against attack from *Schlerotium rolsfi*, a soil borne fungus which causes collar rot. Such minisetts could be planted in a closer spacing of 45 x 30cm. Minisetts may be planted straight in to the main field, after ensuring sufficient moisture presence in the soil. A small layer of soil is packed over the minisetts which are further covered with sufficient quantity of dry or green mulch.

Sprouted yam seed for planting

Propagation

Amorphophallus is propagated through corm. Corms harvested during November are stored in well ventilated rooms. Before planting during February, the corm is cut into setts of 750-1000 g, each bearing a portion of central bud. Cut corms are smeared with cow dung slurry or wood ash and allowed to dry in partial shade. Rapid seed corm production technique suggests use of cormels and mini sett transplants of 100 g size for planting at a closer spacing of 45 x 30 cm.



Cut elephant foot yam with central bud for planting

Cultivation practices

After one or two ploughings, pits of size 60 x 60 x 45 cm are made at a spacing of 90 x 90 cm during February. For harvesting small to medium sized tubers, distance between pits is reduced to 60 x 60 cm. Pits are half filled with top soil and well dried farmyard manure @ 2.0-2.5 kg/pit and wood ash. Planting material is placed vertically in the pit. After compacting the planted tubers, pits are covered with organic mulches like green leaves or paddy straw. Apply fertilizer @ 40 kg N, 60 kg P_2O_5 and 50 kg K_2O/ha 45 days after planting along with mulching and application of cow dung or compost after receipt of rains. This is followed by digging interspaces and light earthing up. Top dressing is done with 40 kg N, 50 kg K_2O again one month after, along with shallow intercultural operations like weeding, light digging and earthing up.

Elephant foot yam in field

Amorphophallus is mainly grown as a rainfed crop. During periods of late receipt of monsoon, a light irrigation is given during early stages of crop. Crop is susceptible to water stagnation.

Mulching immediately after planting is the most important operation in *Amorphophallus*. It not only conserves soil moisture and regulates soil temperature, but also suppresses weed growth.

A plant usually produces a single "stem" In case of more numbers, it is advisable to remove it retaining only one healthy one.

Elephant foot yam intercropped in coconut

Elephant foot yam intercropped in banana

Elephant foot yam intercropped in papaya

Pests and diseases

Amorphophallus is free from major pests and diseases except collar rot caused by *Sclerotium rolfsii*. Water logging, poor drainage and mechanical injury at the collar region favour disease incidence. Disease can be managed by use of disease-free planting material, removal of infected plants, improving drainage, application of neem cake in soil, use of bio-control agents like Trichoderma and drenching soil with captan 0.2 %.

Amorphophallus Mosaic Disease

Primary spread is through planting material. Secondary spread of the disease is through insect vectors, *Myzus persicae* Sulz., *Aphis gossypii* Glover, *A. craccivora* Koch. and *Pentalonia nigronervosa* coq.

Mosaic symptom in elephant foot yam

Disease symptoms include mosaic mottling of leaves and distortion of leaf lamina. Corms produced by the mottled plants are much smaller than those without mottled leaves.

Management: Use of virus free planting material, spraying of systemic insecticides to prevent secondary spread.

Collar rot:

Collar rot is caused by *Sclerotium rolfsii* and *Rhizoctonia solani* is commonly found in two to three months old plants. The collar region is attacked. Soil drenching with 0.2% captan or 0.1% Brassicol twice at monthly interval will prevent the disease spread.

Rotting of stem at collar region in elephant foot yam

Leaf blight:

Blight symptom and drying of leaves in elephant foot yam

Management of *Amorphophallus* Diseases

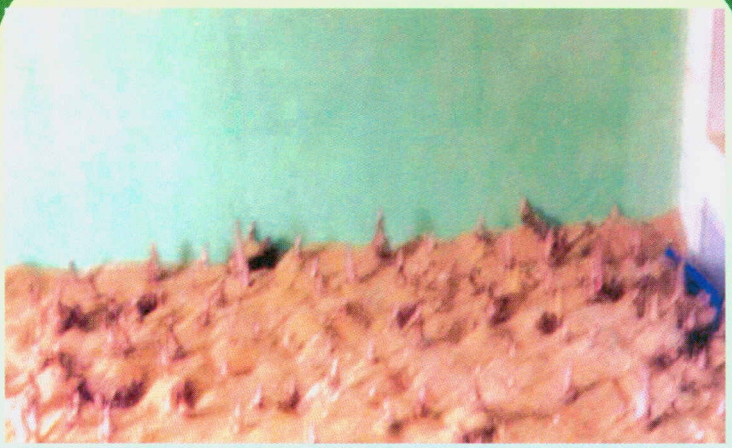
- Use of healthy planting material without any apparent rotting symptoms
- Treatment of the whole/cut tubers with cowdung slurry mixed with Trichoderma before planting
- Application of Trichoderma enriched compost in pits/field
- Application of neem-cake @ 250g/pit
- One foliar spray with Mancozeb (0.2%) and a broad spectrum systemic insecticide (0.05%) at 60 and 90 DAP

Harvest and yield

Underground corms are harvested with pick axe or by digging when the top is completely withered and fallen. Crop will be ready for harvest in 8-9 months after planting. However on better market price, tubers can be harvested six months onwards. Average yield is 30-40 t/ha.

Field view of elephant foot yam

Storage of elephant foot yam seed corms



Storage of elephant foot yam seed corm in sand

Elephant foot yam under organic cultivation

Elephant foot yam responds well under organic production system. There is 20% higher yield in organic method of tuber production, generating additional income of around Rs.45,000/ha over conventional method (57tonnes/ha).

The improved varieties (Gajendra, Sree Padma and Sree Athira) and local varieties respond equally well to organic and conventional systems. Tuber quality is improved with significantly higher dry matter and starch contents and lower oxalate content. There is lesser incidence of collar rot under organic practice. The physic-chemical and biological properties of soil are also improved (Source, CTCRI, Kerala)

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Published by

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Financial grant from Tribal Sub Plan (TSP),
Govt. of India is duly acknowledged.