



Presentation on advances in production technology in cassava

Presented by :

B.Sai Phanendra

220805200003

M. Sc. (Hort.) Vegetable
Science

Presented to :

Dr. Subrajyothi Chatterjee

Assistant professor

cassava

- **Botanical name :** *Manihot esculenta Crantz.*
- **Chromosome number :**
 $2n=2x=36$
- **Common name :** tapioca, manioc, mandioca, and yuca.



Introduction

- Cassava is a native of Brazil.
- It has been grown in India more than a century.
- It was introduced by the Portuguese sailors back in 17th century.
- But the initial spread after introduction was attributed to a famous ruler of Travancore state, Sri Visakam Thirunal.
- He encouraged the cultivation of cassava to overcome food shortage especially among low income groups.

Area and production in India

- Cultivation of cassava was restricted to southern peninsular regions and limited to few states.
- Its an important agricultural crop in some states like Kerala, Andhra Pradesh, Tamilnadu which accounts 98% of production in India.



Importance

- People use the root as a food and to make medicine.
- Cassava is used for tiredness, dehydration in people with diarrhoea, sepsis, and to induce labor.
- Cassava root is particularly high in vitamin C, an important vitamin that acts as an antioxidant, supports collagen production, and enhances immunity.
- Used for making gluten free breads.
- Cassava is a source of resistant starch, which helps to nurture beneficial gut bacteria.

Botany

- Cassava is perennial shrub with enlarged tuberous roots
- It is monoecious with 5-7 palmate type leaves.
- Stem is glabrous and maybe sparsely pubescent.
- Main stem /branches always terminate into inflorescence.
- Female flowers are few and present at base of inflorescence where male flowers are more and present above female flowers.
- Flowering may commence as early as 6th week after sowing.



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- The mature tuber can be easily differentiated into :
 1. Periderm
 2. Followed by cortex known as “rind”
 3. Massive flesh
- Rind maybe pink or cream in colour
- Yellow colour of flesh is due to presence of carotene.



varieties	
H 97	Cross between local variety and Brazilian selection. Yield is 25-30t/ha, harvesting@10 MAP , released in 1971
H 165	Hybrid between two local varieties. Yield is 33-38t/ha, harvesting@9 MAP, starch content 23-25%
H 226	Preferred variety by starch industry and dominant variety in Tamilnadu but nowadays it is found susceptible to CMD.
Sree vishakam	High carotene content 466ui/100mg, starch content 25-27%, Yield is 35-38t/ha, harvesting@ 10 MAP
Sree sahya	Yield is 35-40t/ha, starch content 29-30%, harvest@11MAP
Sree prakash	Starch content 29-30%, tolerant to cercospora leaf spot, Yield is 35-40t/ha, harvesting@ 7-8 MAP
Sree vijaya	Short duration i.e. 6 months, yield is 25-27t/ha, starch content 27-30%
KMC 1	Developed by clonal selection from Ramanthala(traditional cultivated one). Yield is 30t/ha Suitable for intercrop in coconut plantation
Some other varieties	Sree harsha, Sree jaya, CO 1, CO 2, CO 3



Sree raksha

Resistant to cassava mosaic disease

Sree pavitra

Suitable for growing in low P soils and low in bitterness

High yielding variety 45-48t/ha

Soil and climate

- It can be grown in wide range of soils, but preferred is well drained loamy soils.
- pH range is 6.5-8

Climate :

- Grown in high altitudes but performs well in low altitudes.
- Grown in both humid(1500mm rainfall) and semi arid(500-700mm rainfall) .
- Optimum temperature for growth i.e. 25°c - 30°c .
- Drought tolerant but cannot withstand frost.
- Growth ceases below 10°c- 12°c.

Land preparation

- Loosening of soil up to depth of 20-25 cm is recommended for good root growth.

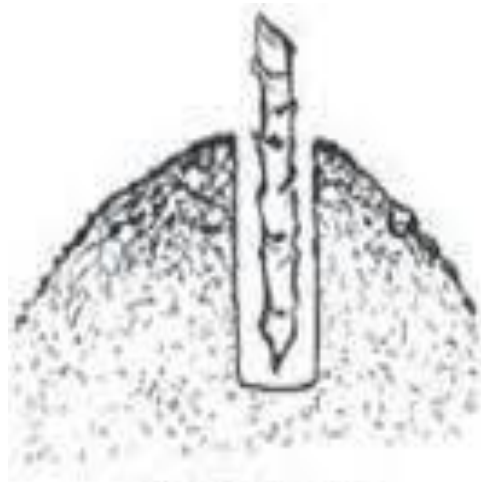
Different methods :

- Light soils- flat bed method of land preparation
- Heavy soils- mound method
- Irrigated- ridge and furrow

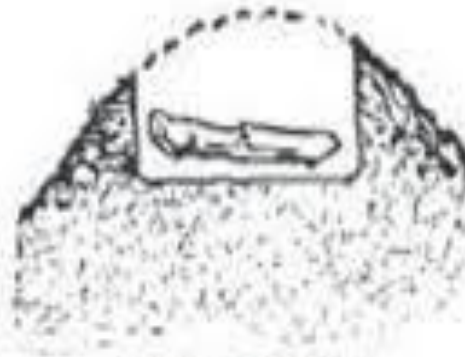


Preparation of setts

- Disease and pest free planting material of 8-10 months maturity having a thickness of 2-3cm is selected.
- Stakes should be obtained from bottom and middle portion of stem after discarding $1/3^{\text{rd}}$ from total length for better root yield and establishment.
- Stake length of 25-30cm found to give higher yield.
- Shallow planted and when it deeply planted it shows reduction of yield.
- Different method of planting like vertical, 90 to ground, slanted(45° angle).



Vertical Position



Horizontal Position



Slanting Position

*vertical method of planting found to increase more uniform callus tissue around cut surface.

*while preparing stakes, smooth cut ensure uniform callus formation and root initiation than irregular cut.

Sowing time and spacing

Sowing time :

- Rainfed crop : planting in April- may.
- Also done during in the months of august- September with the onset of north-west monsoons.
- Irrigated crop : throughout the year

Spacing :

- Three branching behaviour
 1. Branching and semi-branched : 90 × 90 cm
 2. Non-branching : 75 × 75 cm
- One stake/hill is planted normally.

Nutrient management

- For high yielding varieties :
 - 12t/ha of FYM
 - N:P:K @kg/ha – 100 : 50 : 100
 - 50kg N and 50kg P and 50kg K should be applied at time of land preparation.
 - Top dressing of Remaining 50 kg N and 50kg K at first intercultural operation i.e. 45-60 days after planting.
- For short duration varieties :
 - N : P : K @ kg/ha- 75 : 50 : 75

Intercultural operations

- Removal of excess sprouts by retaining only two/plant at opposite sides.
- Interculture operations at early stage of crop is good for control of weeds.
- Once the crop grows, it covers the entire field with its canopy so weeds will not be a problem.
- First interculture operation at 45-60 days after planting.
- Earthing up- 1 month after first interculture.

Irrigation and harvesting

Irrigation :

- Mostly rainfed
- Irrigation at 25% moisture depletion level throughout growing season doubles the yield.



Harvesting :

- 10-11 months after planting.
- Short-duration: 6-7 MAP
- Delayed harvest deteriorates the cooking quality.



Storage and post-harvest products

Storage:

- Curing is carried out for 4 to 7 days at temperatures of 32° to 40°C and a relative humidity of 85% to 95% (FAO, 1989).
- It slows down the deterioration process.

Post -harvest products:

- Many value added products like cassava chips, starch, sago liquid glucose, rava, dextrin, macroni, alcohol, high fructose syrup etc.



Post-harvest handling



- Major disadvantage of cassava is poor post-harvest life.
- Biochemical and physiological processes are triggered in tuber due to mechanical injury during harvesting.
- It's perishability decreases and make it unfit for consumption.
- The primary change observed in the tuber is the appearance of blue line called as vascular streaking or vascular blue lining.

Pest

scale insect: Anoidomytellus
obesus.

- Attack the stem in the field and also during the storage.
- It sucks and desaps the stem.
- Control @dimethoate spray at time of storing



Termites : Odontotermes
obesus

- Attack the planted cuttings and seedlings.
- Serious problem in prolonged dry spells.
- Control @ soil insecticides is preferred



Foliage feeding pests

Spider mites :

- Two groups
 1. Feeding on lower surface (*Tetranychus cinnabarinus* *bosid.*)
 2. Feeding on the upper surface (*Eutetranychus orientalis* *klein.*)
- Most serious pest i.e. bronzing and curling at margins.
- Control @spray methyl demeton @0.05%.



Thrips : *Retithrips syriacus*
mayet

- Serious during dry spell.
- Infested leaves lose chlorophyll and turn pale with dark-brownish deposits.
- Control @ spray of [dimethoate@0.05%](#) is recommended.



Disease

Cassava mosaic disease :

- Infected plant's younger and emerging leaf has chlorotic area which appears as specs in leaf lamina.
- Severely affected plant shows deformed leaves and stunted growth.
- Whitefly acts as vector for this disease.
- Control is growing resistant varieties.



Cercospora leaf spot :

1. Caused by Cercospora carbonaceae and c.dioscoreaceae
2. Curvularia leaf spot caused by Curvularia eragostidis.
 - Severe only in warm humid conditions.
 - Symptoms is brownish spots on the leaves.
 - Control @ spray dithane M 45(0.25%) at 15 days interval during maturity of crops.



REFERENCES

- Textbook of vegetables, tuber crops and spices by S Thamburaj and Narendra singh.
- From the website of central tuber crop research institute(CTCRI).
- Handling and storage methods for Fresh Roots and Tubers(chapter 4) published by FAO.



THANK YOU

you're the best