Sweet Potato Tuber Production Agronomy

presented by
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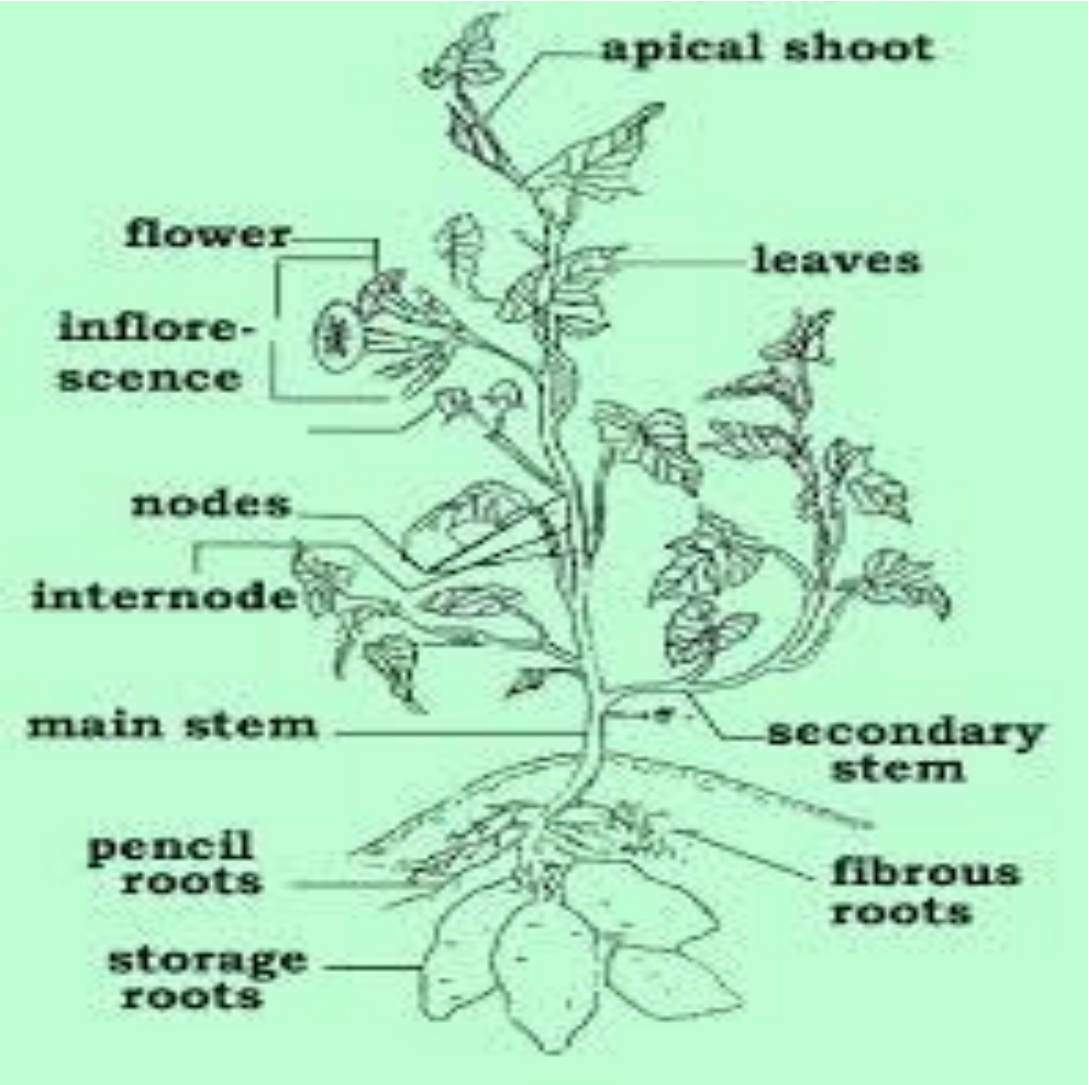
PRESENTATION OUTLINE

- **BOTANY**
- **CLIMATIC REQUIREMENTS**
- **SOIL REQUIREMENTS**
- **LAND PREPARATION**
- **PLANTING**
- **SPACING**
- **FERTILIZER MANAGEMENT**
- **IRRIGATION**
- **WEED CONTROL**
- **PEST CONTROL**
- **DISEASE CONTROL**
- **HARVESTING**
- **POST-HAREST HANDLING**

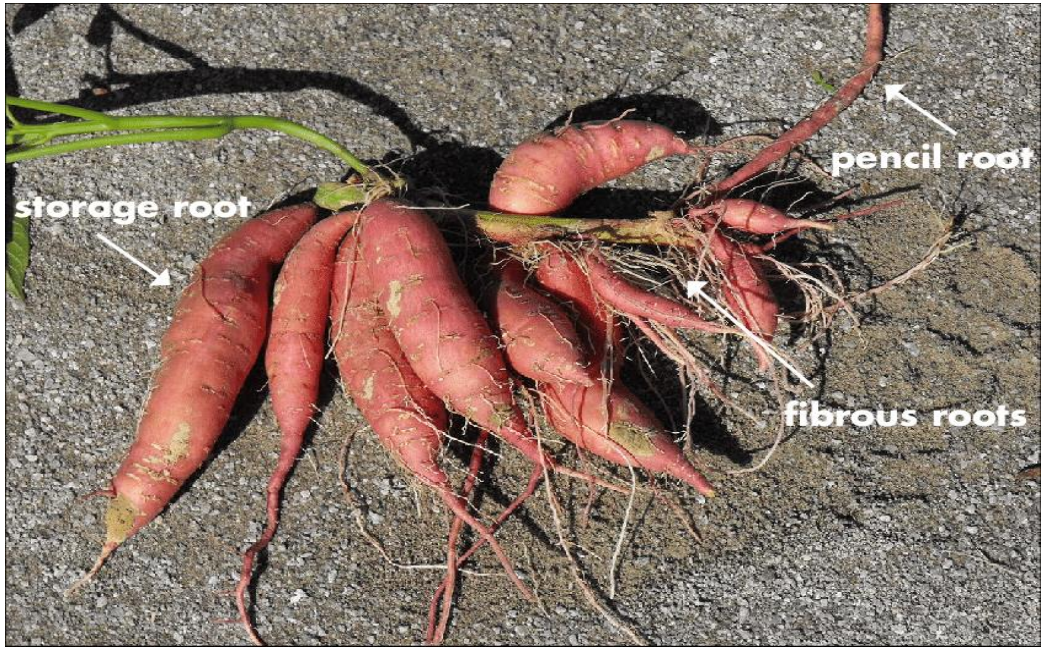
BOTANY



- The sweet potato crop is a perennial, although grown as an annual.
- It belongs to the morning glory family or Convolvulaceae.

BOTANY

- ***Roots***- The tubers are variable in shape, size and colour. Some are long and cylindrical, others short, thick and rounded at the ends.



- ***Stem***- Growth habit trails or twins stems up to 4 m long

BOTANY

- ***Flowers***- The flowers have purplish throats and white margins, resembling those of the morning glory.

- ***Leaves-*** The general form of the leaf is heart-shaped or halberd-shaped.

CLIMATIC REQUIREMENTS

Temperature

- Because sweet potatoes are of tropical origin, they adapt well to warm climates and grow best during summer.

- Sweet potatoes are cold sensitive and should not be planted until all danger of frost is past.

- The optimum temperature to achieve the best growth of sweet potatoes is between 21 - 29 ℃

SOIL REQUIREMENTS

- Sweet potatoes are cultivated in a wide range of soils
- A well-drained sandy loam is preferred and heavy clay soils should be avoided as they can retard root development, resulting in growth cracks and poor root shape.
- Sweet potato prefers lightly acid or neutral soils, with an optimum pH of between 5.5 and 6.5. Soils which are excessively acid or alkaline often encourage bacterial infections and negatively influence yields
- A yearly soil test may be recommended to assess soil properties, pH and nutrient levels before ground preparation.

LAND PREPARATION

- Sweet potatoes are grown either on ridges, flat ground and mounds.
- **Ridges:** 30cm above the ground and the top part should accommodate one row.
- **Mounds**: soil rich in humus is heaped to form a conical shape, commonly practiced on backyard farming
- **Flat ground**: ideal method for vine production

PLANTING

Time of planting:

- In areas with heavy frost, mid-November to the beginning of December is the best time to plant, and usually the crops gets ready for harvest from April to May
- It is common to plant from January to March in frost-free areas so that the growing season extends through winter

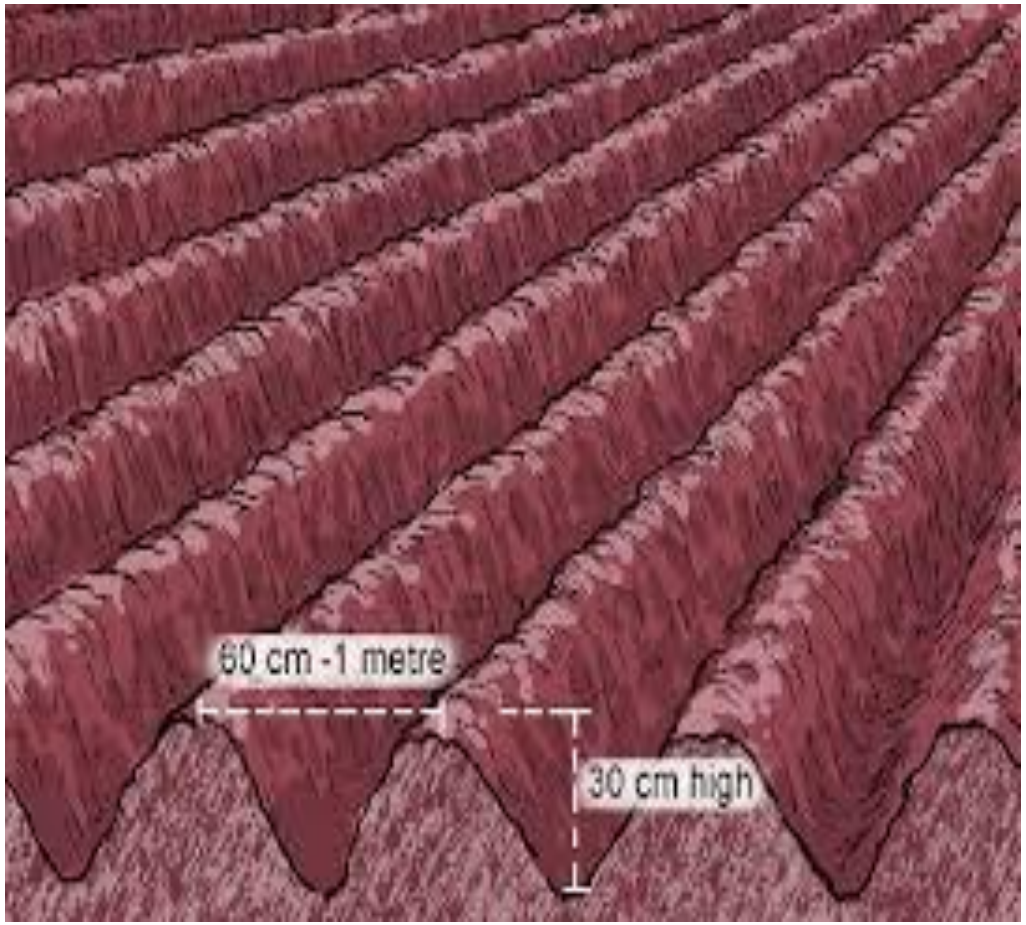
PLANTING

Planting techniques:

- **Vertical method**- the cutting is planted at 90 degrees with the ground level.
- **Horizontal method**: the cutting is laid horizontal with the ground
- **Ring method**: a 30cm vine length is ringed at the bottom so that when planting the ringed portion is buried in the ground
- **Vertical ring method**: an improved method to accommodate the vine length underneath when the whole is shallow whereby the vine is bent in the whole
- **Depth of planting**: 2/3 buried in the ground with a 1/3 extending out.

SPACING

- Optimum plant density depends on cultivar
- usually around 40 000 plants per hectare.
- Rows may vary from 0,60 to 1,25 m apart
- in-row spacing it is usually 25 to 30 cm.



FERTILIZER MANAGEMENT

- Compound C is applied at a rate of 200-250kg/ha at planting when the soil is moist
- Apply after one month when the soil is semi dry.
- Top dressing can be done using calcium nitrate or potassium nitrate at 100 kg/ha and 150 kg/ha respectively after four weeks of planting

IRRIGATION

- Prior to planting the soil should be at field capacity
- After planting a post irrigation is done to promote establishment.
- A 3hr irrigation schedule twice per week during the first 4 weeks
- Thereafter can withstand a dry spell which means a 3hr irrigation once per 12 day period.
- During the last phase of growth irrigation frequency and amount should be increased so as promote tuber formation and development.

WEED CONTROL

- Weeds may be a problem early in crop growth before vigorous vine growth covers the beds as plants become established.
- After bed formation, irrigating should be applied to germinate any weed seed. Spraying with a herbicide **(glyphosate)** before planting has been an effective method.
- **Herbicides**;- post emergence naptalam, alachlor/ lasso , sencor, agil 100 EC
- **Hand weeding**; at 4 and 8 weeks after planting
- **Mechanica**l; by ridging with ridger or plough to control weeds in the furrow and sides of ridge

PEST CONTROL

Sweet potato weevil

- Adults are ant-like and lay eggs on stems and roots. The larvae burrow into the roots, making them unmarketable.
- plant uninfected healthy material, rotation, regular carbaryl or chloropyrifos sprays at crop establishment and during root development/ at cracking soil, close cracks by irrigating and re-ridging
- Destroying all crop residues after harvest

PEST CONTROL

Giant termite

- Termites can be a major problem, especially on newly cleared ground where the activity of established colonies has not been identified
- Avoiding known termite-infested areas may be successful in the short term.

PEST CONTROL

Other pests

- Leaf-feeding caterpillars may cause problems if infestation is severe enough to cause significant leaf reduction- carbaryl +5% molasses
- Giant sweet potato bugs
- Rats are also a problem
- Nematodes; - nematicides, plant resistant varieties

DISEASE CONTROL

Mycoplasma (little leaf disease)

- Infected plants have small, pale-yellow, stunted leaves and stems.
- The infection is spread by leafhoppers.
- Control is by regular monitoring for symptoms and the removal and destruction of infected plants

DISEASE CONTROL

Fungal disease

- Soil-borne fungal diseases **Fusarium root and stem rot**
- Usually are not a large problem on well-drained, sandy soils.
- Any organic matter added to the soil should be well decomposed before planting.

DISEASE CONTROL

Viruses

- **Feathery mottle virus**
- The virus is spread by insect vectors and by infected planting material.
- Virus-free material should be obtained and planted

DISEASE CONTROL

- Sweet-potato mosaic virus
- burn all affected plants
- Plant virus free material

DISEASE CONTROL

- **Other diseases**
- **Scurf;** -treat the seed with fungicides benomyl or thiabendazole, ferbam, plant disease-free material
- **Charcoal rot**; -disease free material, resistant varieties, rotation, sanitation

HARVESTING

- Harvesting sweet potato can be very labour intensive, and requires suitable equipment for commercial production
- Before harvesting, most of the top growth needs to be removed or it will become entwined in the digging machine.
- Roots are lifted from the soil using a plough, ripper or potato harvester however, causes damage. Hence, forks and spades are more advantageous
- For small scale production the use of a digging stick to lever the tubers out of the ground.
- The dug roots are then manually collected into bulk bins/bags and transported to the shed.
- The harvested crop must be kept away from lengthy exposure to the sun

POST-HARVEST HANDLING

SORTING AND GRADING

- Harvested roots should be washed, graded and cooled soon after being dug and not left in the field for an extended period.
- Marketable root weight is between 0,25 kg and 1,0 kg with 2 grades of 0,25 to 0,6 kg and 0,6 to 1,0 kg.
- Top- quality roots should be free of soil with smooth, undamaged skins.
- They should have good even shape with no cracking or insect damage.

POST-HARVEST HANDLING

PACKAGING

- The graded product is then hand-placed in fibreboard cartons for marketing.
- Sweet potatoes are sensitive to ethylene and should not be shipped or stored with ripening fruit and melons that produce ethylene

POST-HARVEST HANDLING

STORAGE

- Storage temperature is between 12 and 15 °C.
- Relative humidity should be maintained between 75 to 80% to prevent excessive water loss from the roots. Some ventilation should be provided to prevent carbon dioxide
- Post-harvest storage rots such as Rhizopus fungi can infect damaged areas on roots and can spread to other roots on contact. The best control is preventive by avoiding skin damage and not packing damaged roots. Roots should be dry before packing.

POST-HARVEST HANDLING

MARKET PREPARATION

- Fresh market sweet potatoes are usually washed and graded before marketing.
- Poorly shaped, diseased and damaged roots should be graded out to make an attractive pack.
- Buyer requirements for grade and size must be met for repeat sales.
- Fresh market sweet potatoes are usually packed in 5 to 20 kg per container or bag.

THANK YOU!!!!!!!!!!!!!