

Ministry of Education
Curriculum Planning & Development Division

Level: Forms 4 & 5

CSEC Agricultural Science Syllabus

SECTION B: CROP PRODUCTION

1. Anatomy and Physiology

Specific objective(s):

- 1.4 Distinguish between sexual and asexual reproduction in plants;
Artificial (propagation techniques) – layering, root cuttings, stem cuttings,
budding, grafting, tissue culture.
- 1.5 Demonstrate the techniques used in plant propagation;

SBA Skill # 8: Demonstrate plant propagation techniques;

- 8 (a) Budding (done in a separate lesson)
- 8 (b) Grafting (done in a separate lesson)
- 8 (c) Layering
 - Simple Layering (done as a separate lesson)
 - Air Layering (done as a separate lesson)

8 (d) Cuttings

Artificial Plant Propagation Techniques

PRODUCING PLANTS BY
STEM CUTTINGS

Objectives

- 1) Define the term “stem cutting”
- 2) Describe a plant propagator
- 3) Identify the tools and materials used in propagating plants using stem cuttings
- 4) State the appropriate time of day to select cutting material
- 5) List the steps in propagating plants by stem cuttings

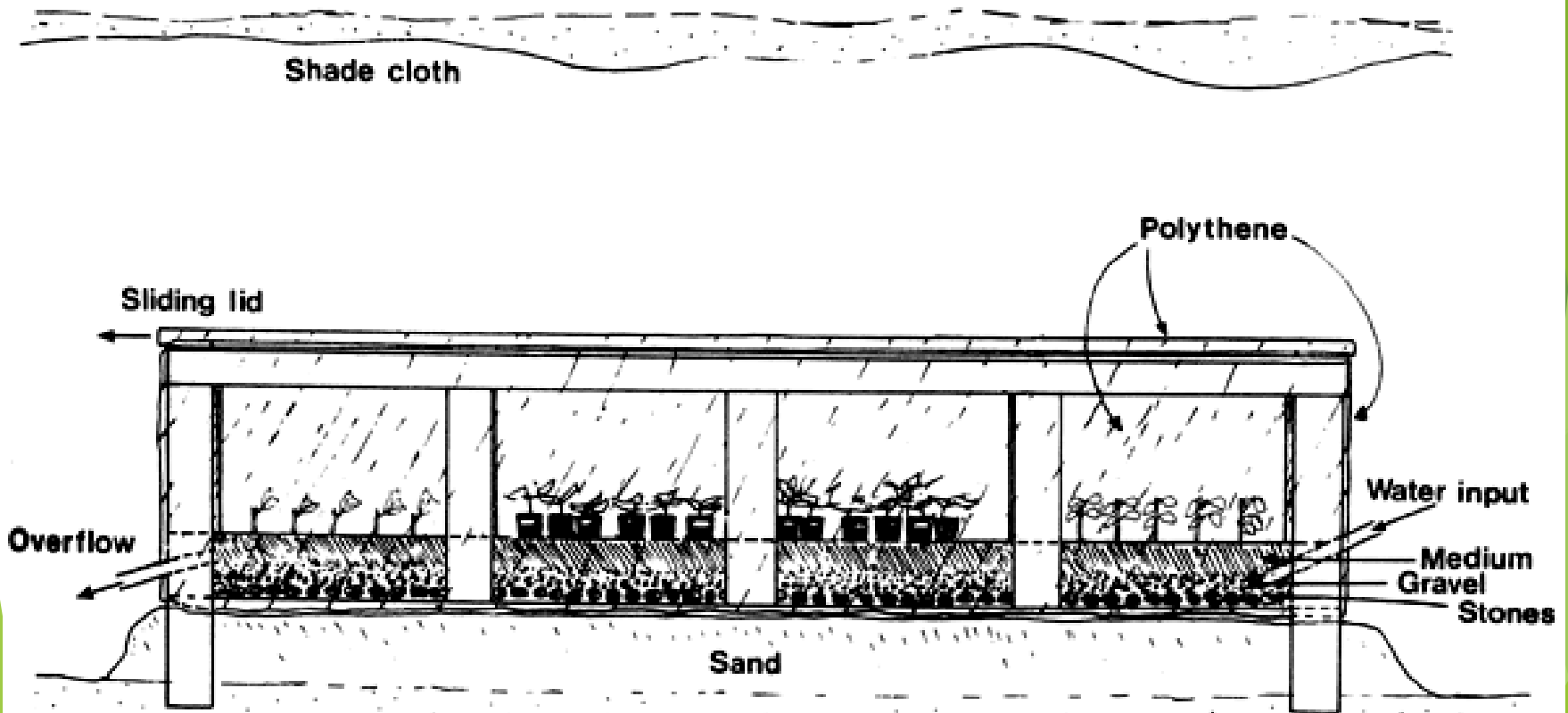
What are Stem Cuttings?

- ▶ Stem cuttings are pieces of the stem of a parent plant which have been cut, treated with a rooting hormone and placed in a propagating medium to form a new plant.



What is a propagator ?

- ▶ A propagator is a special bin, filled with a rooting medium such as sand used to root cuttings.



Can I make a propagating bin for use at home?

- ▶ Everyday objects e.g.
 - ▶ water bottle
 - ▶ Plastic bag secured over a flower pot
 - ▶ 5-gallon bucket can be used to make a propagator



<https://www.dreamstime.com/propagation-process-growing-new-plants-variety-sources-seeds-cuttings-other-plant-parts-plant-image161483449>



<https://www.dreamstime.com/how-start-rubber-tree-plant-propagation-step-take-plastic-bag-cover-plant-pot-tightly-closed-process-rubber-image175370529>



https://myesbackyardnursery.com/wp-content/uploads/2013/10/rsz_dsc_0090.jpg

Some plants that can be propagated from stem cuttings

Ficus	
Hibiscus	
Rose	

Some plants that can be propagated from stem cuttings

Croton



Ixora



Broad-leaf
thyme
(Spanish Thyme)



Tools and materials



Tools

- damp cloth
- dibber
- secateurs/budding knife
- watering can

Materials

- cuttings
- gloves
- potting bag
- potting medium
- propagating bin
- rooting hormone
- water

Safety precautions

- ▶ Ensure secateurs are handled properly and held in the correct manner to prevent injury to self and others.
- ▶ Ensure rooting hormone is NOT ingested by yourself or others or comes into contact with skin and it is properly secured after use.
- ▶ Wear protective wear at ALL times.
- ▶ Ensure all materials used are stored in a safe place after use.



Step 1

- Select and cut stems from a disease free parent plant, early in the morning

Cuttings are generally taken in the morning because at this point the cell sap in the cells is more concentrated



Step 2

- Immediately wrap stem cuttings in clean, damp cloth



Step 3

- Using secateurs, trim stem cuttings to 20 cm in length



Step 4

- Using a sharp knife or budding knife, remove lower leaves on the stem cuttings



Step 5

- ▶ Cut the base of the stem cutting at a 45° angle just below a node



Step 6

- ▶ Dip the base of the stem cuttings in rooting hormone
- ▶ Dust away the excess rooting hormone



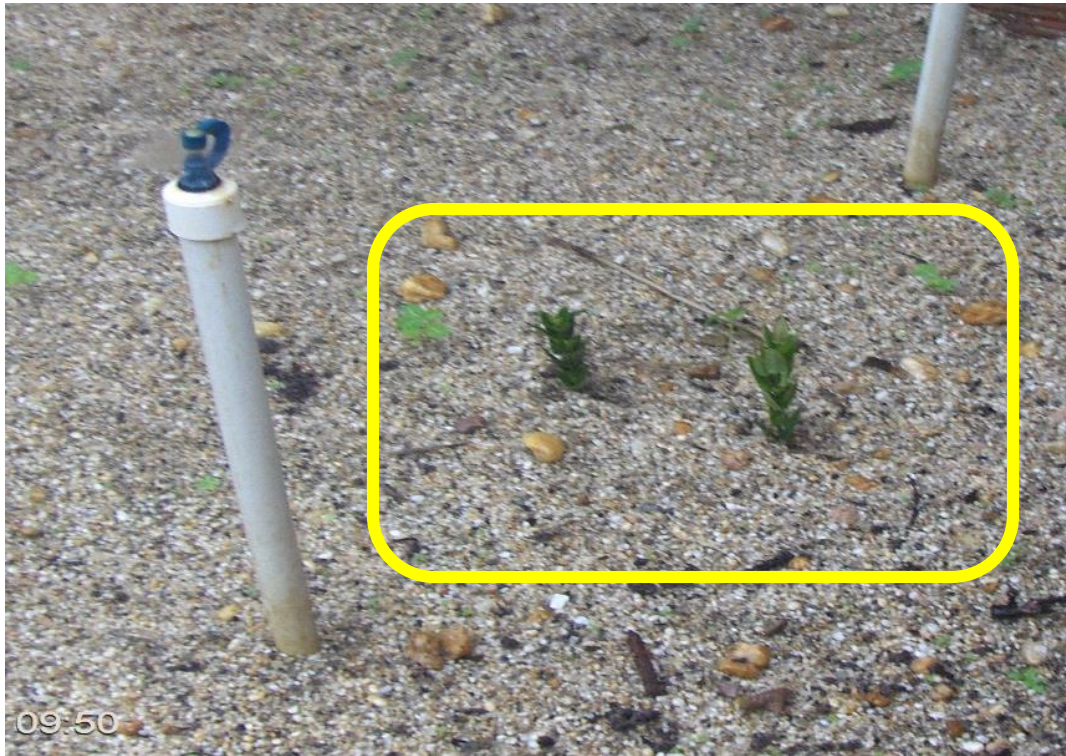
Step 7

- Using the dibber, make a planting hole in propagating bin



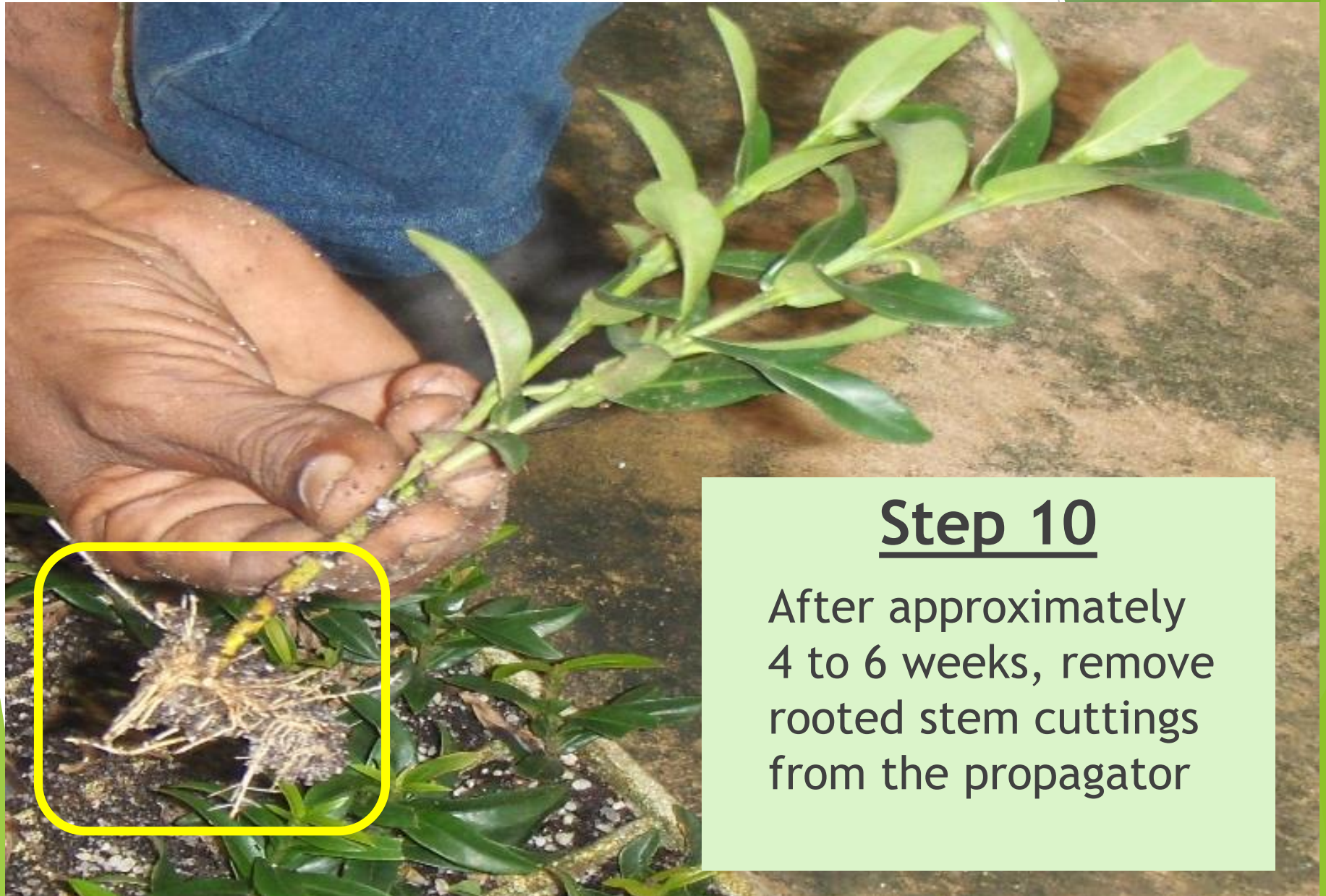
Step 8

- Place the base of the stem cutting into the hole and gently firm the soil around it



Step 9

- Water the area around the stem cuttings thoroughly



Step 10

After approximately 4 to 6 weeks, remove rooted stem cuttings from the propagator



Step 11

- Fill potting bag with potting mix



Step 12

- ▶ Transplant the rooted stem cuttings into the potting bag



Step 13

- Set transplanted plant in a cool area for 2 weeks



Step 14

- Gradually place the new plant in direct sunlight for 1 week
- This gradual introduction of a new plant to field conditions is referred to as ‘hardening off’ or ‘Acclimatization’



Step 15

- After the hardening period the new plants are now ready to be transplanted

EVALUATION

1. What are stem cuttings?
2. What is a propagator?
3. Explain the purpose of the following items used in preparing stem cuttings:
 - Budding knife
 - Rooting hormone
4. Identify and explain **TWO** safety precautions which must be adhered to when preparing stem cuttings
5. Outline the steps required to produce an ixora plant using stem cuttings

ANSWERS

1. What are stem cuttings?

Stem cuttings are pieces of the stem of a parent plant which have been cut, treated with a rooting hormone and placed in a propagating medium to form a new plant.

2. What is a propagator?

A propagator is a special bin, filled with a rooting medium such as sand used to root cuttings.

3. Explain the purpose of the following items used in preparing stem cuttings:

- Budding knife - Used to remove the stem cuttings from the parent plant as well as the lower leaves, cutting the base of the stem of the cuttings before setting into the propagating medium.
- Rooting hormone - is a hormone used to stimulate root formation

ANSWERS

4. Identify and explain **TWO** safety precautions which must be adhered to when preparing stem cuttings

Any **TWO** of the following responses:

- Ensure budding knife/ sharp knife is handled properly and held in the correct manner to prevent injury to self and others.
- Ensure rooting hormone is **NOT** ingested by yourself or others or comes into contact with skin and it is properly secured after use.
- Wear protective wear at **ALL** times.
- Ensure all materials used are stored in a safe place after use.

5. Outline the steps required to produce an ixora plant by stem cuttings.

1. Select and cut stems from a disease free parent plant, early in the morning. Cuttings are generally taken in the morning because at this point the cell sap in the cells is more concentrated.
2. Immediately wrap stem cuttings in damp cloth.
3. Using secateurs, trim stem cuttings to 20 cm long.
4. Using a sharp knife or budding knife, remove lower leaves on the stem cuttings.
5. Cut the base of the stem cutting at a 45° angle just below a node.
6. Dip the base of the stem cuttings in rooting hormone. Dust away the excess.
7. Using a dibber, make a planting hole in propagating bin. If a propagating bin is not available, use any recycled container with a sand based medium.
8. Place the base of the stem cutting into the hole and gently firm the soil around it.
9. Water the area around the stem cuttings thoroughly
10. After approximately 4 to 6 weeks, remove rooted stem cuttings from the propagator.
11. Fill potting bag with potting mix.
12. Transplant the rooted stem cuttings into the potting bag.
13. Set transplanting plant in a cool area for two weeks
14. Gradually place the new plant in direct sunlight for one week. The gradual introduction of a plant to field conditions is referred to as 'Hardening' or 'Acclimatization'
15. After the acclimatization period, the plants are now ready to be transplanted into garden.

Bibliography

Longman, K. A., & Wilson, R. H. (1993). *Rooting Cuttings of Tropical Trees*. Retrieved from Food & Agriculture Organization:

<http://www.fao.org/3/ad231e/AD231E04.htm>