

# Rooted apical cuttings for seed potato production

## Management of mother plants in the screenhouse

**Tissue culture  
plantlets**



**Original mother  
plants, 6 months**



**Sub-mother plants,  
5 months**

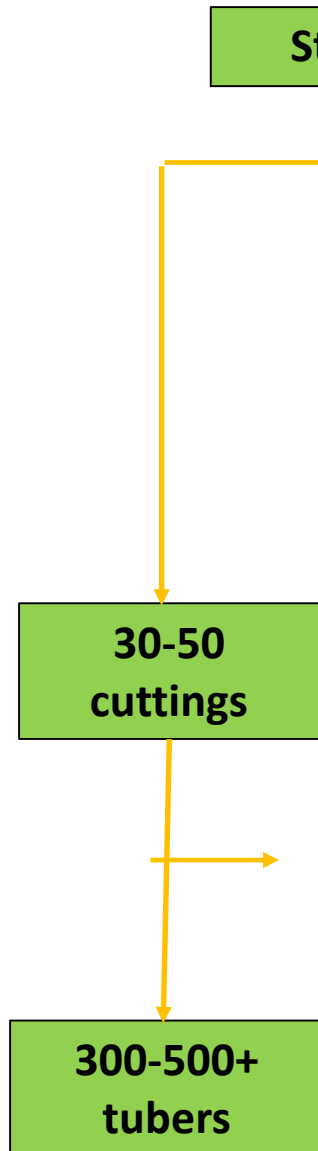


**Model rooted  
apical cutting**

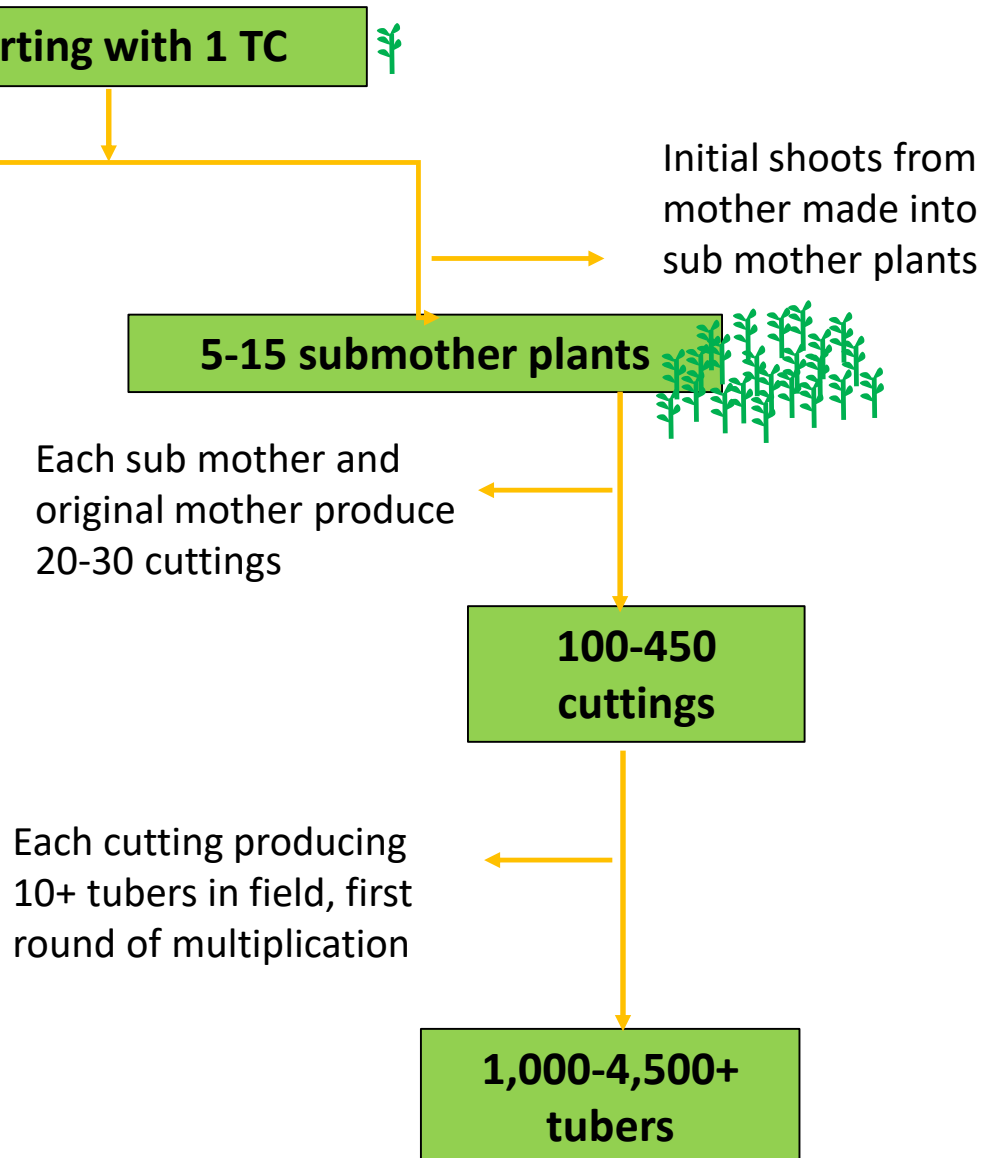


# Sub mothering-allows rapid multiplication

## Without sub mothering



## With sub mothering



# Transplanting tissue culture plants

Fill crate with media (sand, washed cocopeat, etc) & plant TC shoots directly into crate at 5 X 5 cm spacing



The tissue culture plants for transplanting should have well developed shoots

# Washing cocopeat

Cocopeat must be washed in calcium nitrate prior to use

Cuttings 22 days



**Cocopeat not  
washed before use**

**Cuttings in washed  
cocopeat**

# Tissue culture plant ready for first cut

**Original TC plants  
soon after  
transplanting**



**Shoots on  
original TC plants  
ready for first cut**



**Cut shoot here –  
plant in crate if  
making sub-mothers.  
Plant in plug if going  
to cutting**



## Tissue culture plant ready for first cut



**New TC  
transplants  
too young  
to cut**

**If this happens with the TC  
plants, cut them back to  
promote new growth**



**Shoots too long, needed  
to be cut sooner**

**Keep cutting shoots of the mother/sub mother plants**

**Subsequent shoots  
after first cut**



**An overgrown (sub) mother  
should have been cut earlier**

**Shoots on (sub)  
mother ready to cut**

## Mother and sub mother plants in juvenile state



**Original mothers  
from TC at 6 months**



**Sub mothers at 5  
months**



**Sub-sub mothers at  
5 months**

**Always keep cutting shoots on mother plants to maintain juvenile state. Mother plants will mature quickly if delay cutting shoots.**

**Keep the mother and sub mother plants healthy**

**Mothers/sub mothers  
well fed with nitrogen;  
juvenile and vigorous**



**Ensure shoots green before cutting –  
shoots should be healthy as unhealthy  
shoot gives unhealthy cuttings**

**Yellowing is an indication  
of nitrogen deficiency**



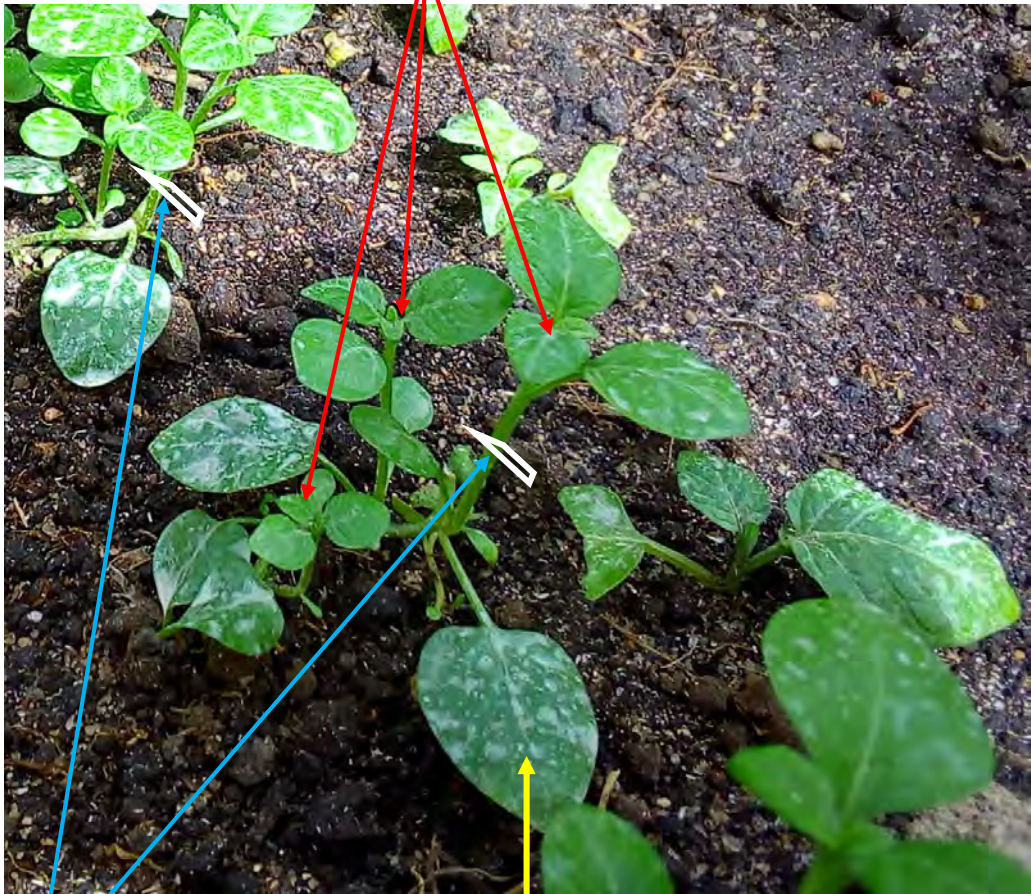
**Maintaining the juvenility of the mother cuttings**

**3 shoots that will become cuttings**

**Ensure timely cutting->  
better to cut  
and discard  
than delay  
when to cut**

**Cut at this point  
leaving behind 2-3  
young leaves on  
mother plant**

**NB:** Mother plant  
leaves must be  
simple and young  
(juvenile)



# How far to cut back shoots whether for sub mothers or cuttings

**Check carefully to see the buds at base of stem, cut just above buds**



**Cut back all shoots to just above new buds**

**Mother plants which are well cut and new buds developing**

Note these are mothers in individual plugs which we discouraged, but the cutting of the mother plant is good.



**Best to plant mothers and submothers in crates at 5 x 5 cm spacing seems to be more favourable than planting in individual plugs.**

Mother plants in individual plugs



Original mother plants

Newly planted sub mother shoots in crates



**Compound leaves-***an indication that the mother plant is losing her juvenility (exhausted mothers) or conditions of low temperatures and low light accelerated maturity*



**This shoot is  
example of  
simple leaves  
and juvenile  
mother plant**

**Compound  
leaves starting to  
form on mothers**

# How to rescue mothers and sub mothers if start to mature



**Sub mothers that have started to mature with compounding leaves soon after planting the shoot. Cut all shoots back to rescue the sub mother plants**

**Recovered sub mother plants – the shoots started to have compound leaves, shoots were cut back and new growth is all juvenile. Then keep cutting shoots to maintain juvenile state**

# Warm and bright conditions result in quicker shoot growth

- The conditions outside will determine shoot and root development:
  - warm conditions promote quick growth thus have to cut shoots more frequently
- Bright days promote rapid growth
  - especially warm and sunny conditions shoots will develop fast
  - have to cut shoots more frequently



Nice mother plants, overdue for cutting shoots

Shoots for sub  
mothers and cuttings



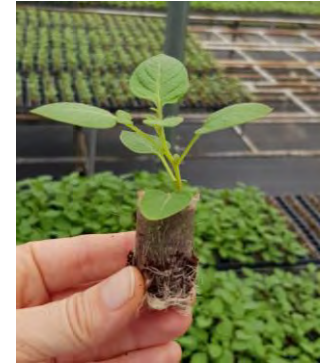
# When to plant shoots in crates or plugs

**TC and original mother plants are planted directly in crates at 5 x 5 cm spacing, do not need plugs**

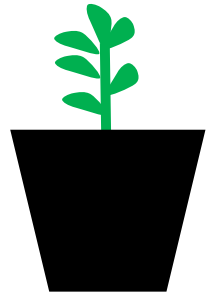
**All initial shoots for sub mothers also planted in crates at 5 x 5 cm spacing**



**Shoots for commercial cuttings are planted in plugs**



**When no mesh to support media, then use conical plug-this will enhance dense rooting that will hold the media in place**



# Rooting hormone or not

Not necessary when plug with mesh  
as mesh will hold media in place  
when cuttings are removed from tray



When no mesh to support media,  
then use conical plug and rooting  
hormone because the roots will hold  
the media in place



# Making minitubers from exhausted mother plants

Allow exhausted mothers and sub mothers to mature in crates and make minitubers



# Hilling mothers and sub mothers in crates

When mother plants have exhausted let them grow in the crate. Fill the crate with more media as the plant grows to mimic hilling.

Fill crate as plants mature – 'hilling in a box'

Use a tall crate to allow for hilling





Or transplant exhausted mothers/sub-mothers to larger bucket, tall crate or outside to produce minitubers

The crate must be tall enough: can't hill on this short crate



# Controlling insects in screenhouse

**Insect traps help in identifying insect pests affecting production in the tunnels**

**Yellow attracts wide range of insects eg. aphids, whiteflies, leafhoppers, moths**



**Blue attracts mainly the thrips**

# Selling cuttings at right stage

Be sure at right stage:  
not too small and not too long



Good size for  
transplanting



# Transporting cuttings

Crates = buyer deposit

Depending on plug diameter, 500-1000 cuttings can fit



# Transporting cuttings: stacked in boxes



Box of 80 cm x 30 cm x 18 cm (L\*W\*H) can contain 1,000 cuttings; 4 stacks each 250 cuttings

Each stack is separated by a carton plate



## Satellite nursery: Pictorial









**USAID**  
FROM THE AMERICAN PEOPLE



# THANK YOU

- Partners: private and public
- CGIAR Research Program on Roots, Tubers and Bananas
- USAID
- GIZ
- Syngenta Foundation for Sustainable Agriculture
- CIP Potato Team
- You for your keen ears



WORLD POTATO  
CONGRESS



CIP thanks all donors and organizations that globally support its work through their contributions to the CGIAR Trust Fund: [www.cgiar.org/funders](http://www.cgiar.org/funders)

© 2019. International Potato Center. All rights reserved.



This publication is copyrighted by the International Potato Center (CIP). It is licensed for use under the Creative Commons Attribution 4.0 International License



**The International Potato Center** (known by its Spanish acronym CIP) is a research-for-development organization with a focus on potato, sweetpotato, and Andean roots and tubers. CIP is dedicated to delivering sustainable science-based solutions to the pressing world issues of hunger, poverty, gender equity, climate change and the preservation of our Earth's fragile biodiversity and natural resources.

[www.cipotato.org](http://www.cipotato.org)



### **CIP is a member of CGIAR**

CGIAR is a global agriculture research partnership for a food secure future. Its science is carried out by the 15 research centers who are members of the CGIAR Consortium in collaboration with hundreds of partner organizations.

[www.cgiar.org](http://www.cgiar.org)