Addressing the Challenges Faced Managing Sweetpotato Multiplication in Drought-Prone Areas

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Importance for seed systems

- Recognized potential impact on poverty
- Impact on yield/quality/income
  - Provision of clean planting material alone can yield rates of return of between 56-84%.
- Pathway for dissemination of new varieties
- Provision of **timely** (clean) planting material of appropriate varieties to extend availability of the crop and in times of crisis

The Sweetpotato Community of Practice survey questionnaire indicated that "**quality and availability of planting material**" is the most important limiting factor in developing the sweetpotato crop in all three sub-regions

Virus-free sweetpotato planting material in Shandong province, China

- CIP technology (virus testing and tissue culture) transferred to China (1988-1998)
- Technology adopted over 80% of area (17Mt; 12% global): 1994-1998. Average yield increase of 30%
- Annual productivity increases by 1998 valued at $145M p.a. (NPV $550M; IRR of 202%)
- Agricultural income of 7M smallholders improved by 3-4%.

Varieties vary in their ability to resist viruses over time

Viruses more of a problem in areas where sweetpotato is grown year-round and aphid and white fly pressure is high

Requirements for high quality foundation (pre-basic) planting usually maintained by national programs

- Critical enabling technologies.
  - In vitro conservation of germplasm
  - Virus clean up capacity (thermotherapy)
  - Virus diagnostic capacity (safe movement)
- In vitro multiplication capacity
- Screenhouse and field multiplication of clean vines

Identified Challenges

1. How to maintain vines during the dry season, particularly when access to lowlands is limited?

2. How to assure that adequate quanties of quality vines are available at the beginning of the rains?

- Results from some experiments to date start to answer these questions

Strategies to conserve vines through dry seasons and extend availability of crop: buried roots and sources of water

Protected Root Bed Research in Uganda Built upon A Traditional Practice

Tradition in dry areas: leave a few unharvested roots in the ground and when the rains re-start the next season, they sprout

Drawbacks:

- Small amounts of material that need to be further multiplied so miss the productivity gain that comes with planting during the initial rains
- Or have small plots
- Material may not be healthy

Selected small but healthy roots and harvest time and store in sand during the dry season (Namanda PhD research)

Sand prevents weevil attack, better quality root storage than ash

Plant roots 10 cm deep, slanted, 20 cm (between rows) X 10 cm in protected area 6-10 weeks prior to expected start of rains

Initial water applications to be fortnightly to keep the roots moist, and then gradually be increased to weekly as the demand from the foliage increases Two weeks prior to harvesting, reduce watering to harden off the foliage. Biggest problem: pests!

Which technology is best for helping smallholders maintain vines during the dry season?

Treadle pumps require 2-3 people to manage and hard to repair; hose easily damaged; higher output with manual irrigation. Small-scale drip irrigation (bucket +100 sq m) promising. Output 36% higher than manual irrigation in one trial. Farmers may diversify use.

What rapid multiplication techniques can be adopted by farmer multipliers?

Existing recommendation:

- Short 2-3 node cuttings
- 10 cm X 10 cm spacing
- Intensive management
  - Just not adopted over time
  - Used at stations with resources

Revised recommendation (Uganda):

- Apply farm yard manure/compost at a rate of 2.5 kg m^{-2} or NPK (25-5-5) at the rate of 100g per m^2 within 10-15cm depth (*fertilization doubles yields*)
- 20 cms cuttings, 2/3 below surface
- 20 X 10 cm spacing

Managing for dual purpose use: maximizing root and vine yields in Mozambique

Experimental design:

- Varied vine harvesting times: 60, 100, 150 days after planting (dap)
- Length of cutting: 15 vs 30 cm
- Planting density: 15 cm X100 cm vs 30 cm X 100 cm
- Two varieties: Resisto vs MgCL01
- No fertilization

35-50 Vines per root

Results from 1st year:

- Best combination (total roots + vines):
  - vine harvesting 100 dap
  - 15 cm length cuttings
  - 15 cm X 100 cm planting density
- Worst combination: 60 dap; 15 cm cuttings, 15 cm X 100 cm spacing
  - Early vine harvesting negatively affects root production

Obrigado!


SWEET POTATO
MULTIPLICATION
NYAKASANGA
PLANTING DATE 2/9/05