Block 1 Poster 7

Rooted Potato Cuttings to Transform Seed Systems in East Africa

RESEARCH PROGRAM ON Roots, Tubers and Bananas

TECHNOLOGY DESCRIPTION

Integrating rooted potato cuttings into seed systems reduces time to which high quality seed potato is available to farmers while increasing efficiency of seed production compared to current practices. Rooted cuttings are produced from tissue culture plantlets in the screenhouse rather than minitubers, and after rooting, are planted in the field (Fig. 1).

Figure 1. From left to right: i) individual rooted cutting, ii) screenhouse production, iii) transplanted into field

Productivity of rooted cuttings surpasses that of minitubers produced by sand hydroponics and aeroponics by greater than 15 and 4 fold, respectively (Table 1). High productivity is a result of producing several rounds of mother plants from the initial tissue culture plantlet prior to producing rooted cuttings.

Table 1. Projected production of seed potato tubers starting from a single tissue culture plantlet

	Screenhouse production (G1)		Pre-basic Seed (G2)[b]		Basic Seed (G3)		Certified 1 Seed (G4)	
		Time (mo)	# seed tubers	# seed tubers[e]	Time (mo)[f]	# seed tubers	Time (mo)[f]
Cuttings	120 rooted cuttings	5	1,080[c]	10,800	17	108,000	23
Aeroponics	35 minitubers	8[a]	245[d]	2,450	20	24,500	26
Sand hydroponics	10 minitubers	8[a]	70[d]	700	20	7,000	26

[a] Inclusive of tuber dormancy. [b] G = generation. [c] Assuming 9 tubers/rooted cutting. [d] Assuming 7 tubers/minituber. [e] Each field generation after pre-basic assumes 1:10 production ratio from each tuber. [f] Total time to seed class inclusive of dormancy, each field generation is assumed 3.5 months production and 2.5 months dormancy.

END USERS AND BENEFITS

The immediate user of rooted cuttings are seed multipliers who produce seed tubers over two, or three, field generations. Particularly, progressive farmers transformed into seed multipliers who produce seed from cuttings in local farming areas. Currently, seed multipliers are involved in testing the technology for suitability under their farming conditions (Fig. 2).

Farmers ultimately benefit from cuttings through improved access to basic-quality seed and associated yield benefits. When farmers purchase seed multiplied over two or three generations, they can be save seed on farm for a further few seasons, provided good agricultural practices are followed, making seed systems based on rooted cuttings compatible with seed-saving smallholder farming systems.

Rapid rates of multiplication will significantly contribute to alleviating shortages in seed potato systems, benefitting entire potato value chains.

SCALING STRATEGY

- Provide technical backstopping for private sector to produce cuttings – small to large scale enterprises
- Train seed multipliers to produce seed tubers from cuttings
- Develop investment funds for youth to engage in production of cuttings and seed from cuttings
- Engage phytosanitary bodies responsible for seed certification to recognise cuttings in certification schemes

LEVEL OF ADOPTION OR USE

The rapid pace of adoption by public and private sector attest the potential impact of this technology. Within one year from planting the initial trial to test rooted cuttings in Kenya:

- two private sector enterprises invested in cuttings,
- the national program has adopted the technology in basic seed production,
- 40 seed multipliers are multiplying seed from cuttings produced by the two private sector enterprises.

By 2020, a projected 200,000+ potato farmers would use seed originating from cuttings

CRITICAL GAPS AND NEXT STEPS

- Distribution: currently in standard flower boxes (Fig. 3), but other methods necessary
- Train wider base of seed multipliers to produce seed from cuttings
- Engage phytosanitary bodies and hold stakeholder workshops to raise awareness of this technology
- Wide-scale promotion to encourage farmers to use cuttings to increase business opportunities to produce cuttings

Figure 2. Decentralised seed multipliers in Kenya producing seed tubers from cuttings

Figure 3. Transporting rooted cuttings in flower boxed

KEY PARTNERS FOR SCALING

Private sector - produce rooted cuttings

Farm Input Promotions Africa and NGOs – develop networks of Seed multipliers to produce seed from cuttings in local farming areas, and promote amongst farmers

National partners /extension – institutionalise rooted cuttings as key component in seed systems

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