

Positive selection: a simple technique for improving seed potato quality and potato productivity among smallholder farmers

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Abstract

Seed potato accounts for 40-50% of the total cost in potato production in highlands of SSA. However, this is often the most quality-compromised input due its unavailability and high cost among smallholder farmers who resort to repeated planting of home-saved seed to solve the problem with consequent in low yields, low enterprise profitability, food and income insecurity as well. To mitigate this, participatory trials were conducted with farmer groups in Uganda and Kenya to test and adapt positive selection (PS) as a technique for improving home-saved seed between 2009 and 2011. Positive selection involves identification, marking and monitoring healthy-looking potato plants during growth until they are harvested and tubers kept use as seed. Positive selected seed (PSS) was compared with basic seed (BS), certified seed (CS), quality declared seed (QDS) and farmer selected seed (FSS) for bacterial wilt (BW) incidence, latent BW infection in seed and total tuber yield. NCM-ELISA showed that 12.6% of tuber samples obtained from PSS had latent BW infection compared to 44.7% from FSS. All samples from PSS were free from *Potato leaf-roll virus*, PVY and had lower infection incidence with PVS and PVX than FSS. In Uganda, the incidence of BW symptomatic potato plants in progeny crops did not exceed 3% in PSS compared with 6.7% in FSS and incidence did not significantly ($P \leq 0.05$) differ from BS. Bacterial wilt incidence in PSS and FSS in Kenya was 12.6 and 40.8%, respectively. Positive selected seed had significantly ($P \leq 0.05$) higher yield than FSS and did not significantly ($P \leq 0.05$) differ in yield from BS in Uganda but in Kenya. Positive selection in both Uganda and Kenya increased potato productivity between 19 and 52% over FSS. Overall, PSS was superior to FSS and was comparable in quality and performance to BS or CS which are produced under highly controlled conditions. The only variable costs between PSS and FSS are stakes and selection time in order to realise such large benefits in seed quality and progeny crop productivity thus rendering the technology amenable to smallholder farmer adoption.