Bruchid Resistance Breeding Pipeline: 2009-2017

Farmer managed seed production and dissemination

A contingent of the 121 farmers in the FRN will be recruited to produce seeds on QDS arrangement.

*Mwampashe Joseph BR Beans QDS Seeds Farmer*

“ I have been an active member in the SUA FRN for about 4 seasons, I am excited about Bruchid resistant beans, they are tasty, have comparatively better yield, mature early and demonstrate a degree of resilience to poor rainfall. After experiencing the better yield I have decided to promote these varieties, I am producing Quality Declared Seeds (QDS) for distribution to needy farmers. In 2016/2017 I produced and sold 800kgs of the seed. From my visits to Chunya District I learnt that the District has a serious shortage of beans as it relies on deliveries from Mbesa. I approached a village government at Mapogoro Village that offered a piece of land for multiplication of the improved seeds. I am promoting the new varieties alongside the use of Utupa (T. Vogelli) through the church as it is the only institution in the village with large number of followers to accelerate the uptake.”

Social innovation

Modern breeding tools:

Molecular biology lab established at Sokoine University. Lab has served as a node for several breeding research projects and for marker assisted breeding. Increased inventory of Bruchid resistant material.

Multi-functional varieties:

A total of 60 multi-lines of Kablaniketi and Soya were generated that contain PA/Arcelin2 (Bruchid resistance) with phaseolin null and resistance to CBMV.

Achieve detectable, heritable variation for traits of interest among progeny generated:

PCR based arcelin-like DNA markers and SDS seed storage proteins gel analysis revealed the presence of target storage proteins (APA) in F1s indicating that the APA locus is transferable by breeding. Regularly these markers have been used and validated for continuous selection of breeding lines.

The diagnosis:

Bruchid damage was apparent in beans in all surveyed areas where measures were not taken to protect beans during storage.

Promote seed policies that encourage cultivars for specific niches

SUA has made preparations for certification of Bruchid introgessed beans with Tanzania Official Seed Certification Institute (TOSCI) starting in 2017 and expected completion in 2021.

Stakeholder participation in variety setting:

Participatory selection was carried out in 3rd season of on-farm trials in the 3 locations and 1 on-station trials at SUA. 4 bruchid resistant lines have been selected by farmers based on adaptation to local production conditions with high yield, early maturity and tolerance to foliar diseases under natural field infestation. These included ML3 and ML10 resistant to both bruchids species and ML8 and ML11 resistant to only Z. subfuscatus. ML9 was also selected by farmers for its yield, good seed size and colour for culinary purpose.

Understanding local preferences and knowledge:

A baseline survey (n=178) in six major bean-producing areas of Tanzania led to the choice of six farmer preferred lines (FPVs). Selection criteria used by farmers were market demand, maturity, productivity (yield/ha), resistance to biotic and abiotic stress (drought tolerance, water logging and disease resistance), cookability & palatability.