

# Improving the Performance of Matooke and Mchare Breeding Pipeline in East Africa



## Research GAP

All the landrace cultivars of the East African highland cooking bananas are susceptible to **pests and diseases, threatening the livelihoods of over 30 million people in East Africa**. The key pest threats are weevils and nematodes, while the leading diseases are black Sigatoka, Fusarium wilt and Bacterial wilt. Developing **resistant cultivars provides a fundamental intervention** to addressing these pest and disease challenges. However, **classical breeding of bananas is fraught with obstacles** due to the low fertility, low seed germination, long evaluation and selection cycle period of banana, as well as the large amount of space required for field evaluation.



## What WE DID

**“Breeding is a game of numbers”!** To increase the breeding pipeline performance for *Matooke* and *Mchare* we **increased the progeny populations** from which to select better performing and more pest and disease resistant hybrids. We further **improved the progeny evaluation process**. This has been conducted using a broad range of interventions:

- Expanded pollination blocks from 4ha to 15ha;
- Characterized floral development stages at and after anthesis to identify the best time for pollination;
- Studied pollen viability during the day and over the calendar season;
- Studied the efficacy of various sugars for improving pollen germination;
- Intensified the number of crosses made on a daily basis;
- Targeted valuable crosses;
- Introduced, generated and characterized specific male parents for desired traits to be integrated in the breeding program;
- Improved tissue culture operations and nursery infrastructure;
- Optimized embryo germination media and protocols;
- Conducted chromosome doubling for *Mchare*;
- Increased progeny populations in trials segregating for desired traits;
- Developed product profiles for *Matooke* and *Mchare* cultivars;
- Reduced the progeny evaluation period;
- Conducted phenomics for genotypes at early stages of evaluation;
- Introduced BTracT tool to fast-track breeding activities.



## What **WE ACHIEVED**

By focusing our efforts as a team, sharing information, skills and training between partners we **were able to improve our success all along the breeding pipeline:**

- Generated 439 hybrids from 3x-2x;
- Generated 12054 hybrids from 4x-2x;
- Generated 7035 diploid hybrids from 2x-2x, 3x-2x and 4x-2x;
- Selected 231 hybrids for advancement to field yield trials;
- Selected 90 diploid hybrids from inter-ploidy crosses;
- Generated 1218 hybrids from Mchare-2x crosses;
- Planted 92 matooke hybrids in multi-location PYTs;
- Established biophysical and sensory platforms for banana post-harvest characterization.



## Why **THIS IS IMPORTANT**

Development and release of banana cultivars better tailored to market and consumer demands **will lead to rapid cultivar adoption** across a wider target area, with **beneficial impacts on food security, livelihoods and human nutrition**. Robooni Tumuhimbise <[rtumuhimbise@hotmail.com](mailto:rtumuhimbise@hotmail.com)>



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