



## ACHIEVEMENTS IN EVALUATION AND RELEASE OF LATE BLIGHT TOLERANT POTATO VARIETIES IN KENYA

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### Abstract

Potato late blight caused by *Phytophthora infestans* is major cause of low crop yields in major potato growing areas in Kenya. Utilization of host resistances to the pathogen has been most preferred method used to sustainably manage this devastating disease. This review outlines the efforts that have so far been made in evaluation and release of improved late blight tolerant varieties in response to the needs of the local farmers and consumers. Late blight tolerance is one of the major traits used in selecting new improved varieties in the national potato breeding programme and also major variety adoption criteria among the small scale farmers. The breeders have therefore been developing and selecting newer varieties to replace the older less resistant varieties with more resistant ones. Different breeding strategies from different potato breeding programs around the world have led to release of several varieties in the country with diverse characters. The most recent breeding strategy has achieved higher levels of late blight resistance through breeding for horizontal resistance which has facilitated efficient selection and release of superior varieties with durable resistance. Utilization of such improved varieties has significantly reduced fungicide sprays, improved crop yield and profitability of potato farming. Future parents for cross breeding local varieties can be sourced from such improved clones and can generate genotypes with multiple important market demanded characters such as short dormancy, good storability, good chipping and crisping quality which attracts higher consumer acceptability.

**Key words:** potato, late blight, resistance, varieties, Kenya

### Importance of late blight to the Kenyan potato industry

Stakeholders in the potato industry recommend that major attention be given to breeding for higher yielding late blight tolerant varieties in addition to market demanded characters in the existing varieties as a long lasting, cheap and effective measure of controlling the disease (MoA, 2005). Newer varieties with higher yields and late blight tolerance together with other market demanded characters are gaining demand in the potato industry while older varieties continue to lose popularity (Lung'aho *et al.*, 2012).

### Earliest search for late blight resistant varieties in Kenya

In 1974, collection of released varieties and their levels of late blight resistance were summarized (Table 1). Variety Anett, Kenya Akiba were classified as the most resistant while Desiree,

Feldeslohn and Urgenta were the most susceptible to late blight.

**Table 2: Levels of late blight resistance in major Kenyan potato varieties in 2008**

**Table 1: Levels of late blight resistance in major Kenyan potato varieties in 1974**

Variety	Late blight resistance*	Yield**	Source
Anett	Very resistant	High	Germany
Desiree	Very susceptible	Medium	Netherlands
Feldeslohn	Very susceptible	High	Germany
Kenya Akiba	Very resistant	High	Scotland
Kenya Baraka	Resistant	High	Scotland
Kerr's Pink	Susceptible	Medium	Scotland
Maritta	Slightly resistant	High	Germany
Mirka	Susceptible	Medium High	Czechoslovakia
Patrones	Very susceptible	High	Netherlands
Pimpernel	Very susceptible	Medium	Netherlands
Dutch Robyjn	Very susceptible	High	Netherlands
Roslin Chaina	Susceptible	Medium High	Scotland
Roslin Eburu	Slightly resistant	Medium High	Scotland
Roslin Sasamua	Susceptible	Medium Low	Scotland
Urgenta	Very susceptible	Medium	Netherlands

\*Late blight resistance was classified as very resistant, resistant, slightly resistant, susceptible and very susceptible.

\*\*Yield was classified as high, medium high, medium, medium low and low.

Source: Potato Atlas of Kenya by Bellestrem and Holler (1974)

### Latest screening of different germplasm collections

Lung'aho *et al.*, (2008) collected different sources of potato germplasm in Kenya, screened and ranked 32 genotypes according to their levels of resistance to late blight (Table 2) and rated Kenya Karibu, Tana Kimande, Kenya Sifa, Kihoro, Zangi and Mungaruro as most resistant while other varieties like Kerr's Pink, Ngure, Pimpernel, Romano and Desiree as most susceptible. Kenya Karibu, Kenya Sifa were sourced from late blight tolerance breeding programme at the International Potato Centre (CIP) while Tana Kimande, Kihoro, Zangi and Mungaruro are popular farmer selections.

### Release of varieties with most advanced level of late blight resistance in Kenya

The latest breeding clones released in Kenya sourced from CIP carry most advanced source of horizontal resistance to late blight at CIP (Population B3) which has undergone three cycles of recombination to improve levels of field resistance to late blight while incorporating additional useful traits (Landeo *et al.*, 1989). Examples of Kenyan potato varieties from population B3 include varieties Sherekea (CIP 393385.39), Kenya Mpya (CIP 393371.58) and Purple Gold (CIP 391691.96) released in the year 2010. Among these, Sherekea is so far the highest yielding (40-50T/ha) and with the highest level of horizontal resistance to late blight than any other potato variety in Kenya. Variety Kenya Mpya is a vigorous crop in the field with high horizontal resistance to late blight. Both Kenya Mpya and Sherekea have high consumer acceptability have been popularized for their good chipping, crisping, boiling and mashing quality, longer duration of storability and high dry matter content. Purple Gold is highly demanded for its high crisping, chipping and mashing qualities. Though it is only moderately resistant to late blight (Onditi *et al.*, 2012), it is the only alternative to Dutch Robyjn which is the main crisping variety in the country (Ooko and Kabira, 2011).

Variety	Resistance to late blight*
Kenya Karibu	Resistant
Tana Kimande	Resistant
Kihoro	Resistant
Kenya Karibu (White flowers)	Resistant
Kenya Sifa	Resistant
Kenya Mavuno	Not clearly concluded
Zangi	Resistant
Mugaruro	Resistant
Dutch Robyjn	Moderately Resistant
Dutch Robyjn (White skin)	Moderately Resistant
Roslin Tana	Moderately Resistant
Asante	Moderately Resistant
Meru	Moderately Resistant
Bvumbwe	Moderately Resistant
Tigoni (oval)	Moderately Resistant
Tigoni	Moderately Resistant
Maritta	Not clearly concluded
Ndera Mwana	Not clearly concluded
Furaha	Moderately Resistant
Kenya Baraka	Moderately Resistant
Kenya Chaguo	Not clearly concluded
Komesha	Not clearly concluded
Kenya Dhamana	Intermediate
Roslin Eburu(B53)	Intermediate
Anett	Not clearly concluded
Nyayo	Moderately Susceptible
Arka	Moderately Susceptible
Romano	Susceptible
Pimpernel	Susceptible
Desiree	Susceptible
Ngure	Susceptible
Kerr's Pink	Susceptible

\*Resistance to late blight was classified as resistant, moderately resistant, intermediate, moderately susceptible and susceptible. Adapted from Lung'aho *et al.*, 2008

### Conclusion and future perspectives

Late blight resistance is a major variety selection criterion which can influence variety choice and adoption. Kenya among many other developing countries has made a significant step in introduction, selection and release of varieties with durable horizontal resistance to late blight. The most recently used horizontal resistance has proven as more durable than the previously used vertical resistance and most recent breeding efforts are aimed at combining desired consumer demanded characters with higher levels of late blight resistance. Future cross breeding work in Kenya should focus on using improved clones from the most

advanced breeding clones) with higher levels of durable resistance late blight.

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