



Purple Gold



Kenya Mpya



Sherekea

Kenya Agricultural Research Institute stunning success in Potato Breeding

If there was versatility award, Irish potato (*Solanum tuberosum* L.) would win. Recently there has been a lot of interest on potato due to realization that the crop can transform people's lives both socially and commercially. Many have grasped its potential as a source of revenue besides improving livelihood and feeding the hunger stricken.

The tuber is remarkable for its adaptability and nutritional value. It is easily grown, providing more nutritious food faster on less land than any other food crop and in almost any habitat. It is a good source of carbohydrates, vitamin C, potassium and an excellent source of fiber. Throughout the world and across all civilizations, people eat potatoes as one of their regular and most favorite food. They are eaten in many forms like fried, boiled, baked and mashed.

In Kenya, potato ranks second after maize with approximately 25 000 to 30 000 hectares being grown annually, granting employment to more than 2.5 million people across the entire production and marketing chain.

The challenge of potato production lies in farmers getting quality seeds of superior varieties. This is hampered by low quantity of certified seed tubers produced and available for sale. Many private breeders/seed producers shy away from seed potato tuber reproduction, opting to breed seeds such as maize.

Kenya Agricultural Research Institute (KARI)-Tigoni is superb in addressing the issue. Recently they released three new potato varieties (Sherekea, Purple Gold and Kenya Mpya) that are high yielding, tolerant to viruses and resistant to late blight; the most serious potato disease.

According to Mr. John Onditi, a Potato breeder at KARI Tigoni, consumers and farmers should go for variety Sherekea, since it is the highest yielding and the

best so far. "It is red skin in colour and produces many medium sized tubers yielding 40-50 tonnes per hectare, highly tolerant to late blight and viruses and it is good for crisps, chips and mashing. While other varieties can be sprayed up to 6 times against late blight, Sherekea can be sprayed twice and get best crop" Onditi told Hortfresh Journal crews.

Purple Gold was released to the market because of its excellent crisping quality. In the past, there was only one variety (Dutch Robijn) for crisping but Purple Gold has come to bridge the gap. It is predominantly grown in Narok but can do well in other areas. The variety yields 25-35 tonnes per hectare but can yield higher in cooler highlands. Because of its purple colour, it is resistant to greening and has good storability.

Many farmers want **Kenya Mpya** to replace Cangi (a popular farmer's variety of dubious origin). It is oval in shape, white skinned in colour with pink eyes. It produces big sized tubers than Sherekea. Yields are 35-45 tonnes per hectare and is good for chips and mashing. It has very high tolerance to late blight. Due

to its short dormancy, farmers can replant it soon after harvesting thereby farming potatoes throughout the year. It has an early maturity (early tuberiser) 3 months variety and farmers can start harvesting even when leaves are green for early market.

Previous releases in 2002 included Kenya Sifa, Kenya Karibu, Kenya Faulu and Kenya Mavuno which have average yields of 35-45 tonnes per hectare. Other popular varieties comprise of Tigoni and Asante that were released back in 1998. Over 60 different potato varieties are maintained by KARI-Tigoni some of which includes; Nyayo, Meru, Arka, Cangi, Maritta, Desiree, Kerr's Pink, Dutch Robijn, Anett, Romano, Roslin Tana, B53, Kihoro, Kenya Furaha and Kenya Baraka.

However, the three latest varieties are all suitable for crisp making, and the Purple Gold most ideal. This has been partly because KARI has been working with processing Deepa Industries among others to understand the kind of potatoes the industry requires. "They give us their standards," said Onditi.



With certified seeds of improved varieties and proper crop management higher yields are guaranteed. "But due to scarcity of certified seeds, about 99% of the potatoes farmers plant are disease infected. The result is lower yields averaging around 7 tonnes per hectare, instead of over 40 tonnes per hectare obtained by progressive farmers" said Onditi. To bridge the gap KARI has accelerated the rate of seed production.



From the cross breeding work being conducted at their center there are over 2500 seedling selections that are being screened, and a few are taken up for further trials. They collect the materials from farmers while some are imported, and research on them, to get new varieties. They have a new farming technology for breeding multiple disease free potato tubers in a bid to achieve a widespread take-off in productivity of potatoes by farmers.

In close collaboration with the International Potato Center (CIP), KARI is using a soil less techniques known as aeroponics to produce a higher number of pre-basic potato seeds. The technology involves growing the tubers literally on 'air' or 'hanging potatoes' without the use of soil.

Aeroponics consists of meshed box that has holes through which the tuber plantlets grow up while the root system goes down, producing an extensive root network with maturing tubers. The meshed box has timed sprayers that release water solution in form of a mist. The solution contains all classes of nutrients required by the potato plant for optimal growth and tuberization. Excess of the mixture goes down back to the tank where it is re-pumped; recycled until all nutrients are depleted.



The box with tubers is wrapped in black plastics to create darkness but is aerated to ensure the tubers efficiently absorb oxygen and carbon dioxide they need. The aeration results in more tuber production.

"With this technology you can get 50-80 tubers per plant in one season instead of 5-10 tubers per plant when potato is grown in the soil" Onditi commented. The tubers are harvested for a period of 3-6 months. The enclosure of the aeroponics technology prevents diseases and pest attack as it is in the case with tubers grown in the soil.

The research institute is encouraging

private companies to adopt aeroponics technology and is offering training and technical advice. Other breeders that have implemented the technology are; Agricultural Development Corporation(ADC) - Molo, Kisima Farm in Timau and Mr. Mbugua a farmer in Rironi, near Limuru who is very appreciative of the venture.

Potato experts say due to low multiplication rates, it takes several seasons of seed production before the farmer can access the seed. Through aeroponics KARI hopes more quality; disease free-tubers will be produced to increase the country's potato harvest.