



Scientists on a field trial site for the Vitamin A-rich banana variety. Photos Credit: Lominda Afedraru

Ugandan breakthrough in breeding Vitamin A-rich banana

By Lominda Afedraru

IT is early morning and a team of science journalists are heading to Western Uganda on a fact-finding visit about a banana variety rich in Vitamin A and iron bred by a team of agricultural scientists at the National Agricultural Research Laboratories (NaRL).

Upon arrival at Mbarara Zonal Agricultural Research and Development Institute there is field trial site that with banana performing well.

The same applies to the trial site at Bulindi Zonal Agricultural Research and Development Institute (Bulindi ZARD) though there is slight difference due to the infertile land difference.

Like any other farmer, those who grow bananas are faced with the challenge of pests and diseases as well growing crops lacking in food nutrients.

Several crops such as beans, groundnuts, sorghum, millet, maize, cassava, rice, sweet potatoes and green vegetables have the challenge of pest and disease infection as well as the effects of climate change.

Banana, identified by the Ministry of Agriculture as a priority crop, is infested with diseases such as banana bacterial wilt and black sigatoka and pests such as nematodes and lack of Vitamin A nutrients.

As such scientists at NaRL in 2010 began breeding banana rich in Vitamin A and iron to address challenges of food nutrient.

Their goal is to help rural families suffering from a deficiency of the nutrient, which is essential for proper growth, maintenance of the immune system and good vision.

To date the research effort has shown promising results, with the transgenic banana variety expressing 100 percent Vitamin A content. The fortified variety is more golden-coloured than ordinary bananas.

The scientists are conducting multi locational trials in Mbarara, Bulindi, NaRL and Bugiyanya Zonal Agricultural Research and Development Institute.

The trial site manager, Isaac Magumba, notes that the breeding programme began when scientists determined that a good number of rural communities, particularly in Western Uganda, are deficient in vitamin A and iron.

Some 28 percent of Uganda's preschool age children and 23 percent of pregnant women are deficient in vitamin A and iron, according to World Bank statistics.

Scientists at NaRL felt it was better to incorporate Vitamin A in food, which can be grown by the affected communities and consumed directly, than to encourage pregnant women and mothers to buy Vitamin A and iron tablets, especially since they often do not have the resources to buy supplements.

He explained that there is hidden hunger in western Uganda in districts such as Sheema, Mitoma, Lubirizi, Buhweji and Bushenyi.

Since banana is a dietary staple for many Ugandans, it was a likely candidate for fortification.

The team accessed genes with beta carotene from non-edible banana obtained from Papua New Guinea, Southeast Asia.

These were isolated and introduced through genetic engineering to two local cultivars, Nakitembe and M9 commonly known as Kiwangazi used for processing juice.

There were initially 800 lines at NARL confined field trials. The team selected two lines with traits similar to those of the conventional variety but also with enhanced vitamin A properties.

The team checked the vitamin content using molecular methods in Laboratory that confirmed Vitamin A content in the new banana varieties.

The flesh of the fortified banana is orange in color. There is also an orange color expression deep in the leaves

The existing Vitamin A content in local banana varieties is 3-6 micro grams but the current selected varieties contain 35 micro grams suitable for human health.



A scientist on a field trial site. Photo Credit: Lominda Afedraru

The team has also ensured that the banana plant grows true to the traditional type with the initial traits remaining intact apart from introduction of vitamin A gene.

"When conducting the research, we consider the yield rate and we are harvesting bunches that weigh 50kg. We also consider pest and disease challenge, stability of the plant. We planted in January 2020 and we keep harvesting after every seven months of Nakitembe and Kiwangazi in five months," he noted.

The trial manager at Bulindi, Julius Kaheru, explained similar details but the yield at his site is not like that in Mbarara due to the soil not being as fertile.

People in Bunyoro and Hoima region do not consume a lot of cooking it is the reason the research work is done there for farmers to get acquainted and grow the crop as food security crop and income earning initiative.

These banana varieties are ready for release to farmers but the challenge is scientists are still reworking on the law to enable aspects of health

to be incorporated. Once the law is in place the selected varieties will be sent to the variety release committee at the Ministry of Agriculture for onward certification.

Johnson Agondeze Ntairaho, a resident of Bulindi Kigungu, says he appreciates the work the scientists are doing.

This is because in his banana plantation the yields are not uniform. In the first planting season he is able to harvest a 5kg of banana but in the fourth year the yield deteriorates.

In a week he harvests 20-30 bunches in the first year but in the fourth year it reduces to five.

Kenneth Kagezi, another farmer from the same village who is growing banana on one acre land, says he wants to venture into commercial banana farming but not using local variety suckers.

He says since he has seen the yield rate of the banana under research, he would wish the scientists to release it soonest.