

# NACRRI

National Crops Resources  
Research Institute

**Sweetpotato research  
activities at the National  
Crops Resources Research  
Institute (NACRRI)**



Sweetpotato (SP), with an estimated annual production of 2.6 million metric tons, is the third most important food crop after bananas and cassava in Uganda. It is however constrained by a number of problems that the SP program at NaCRRRI addresses through research. Research has aimed at developing:

- 1) Weevil resistance
- 2) Virus resistance
- 3) Improved nutritional quality (beta-carotene and dry matter) and
- 4) improved agronomic traits-including traits to improve SP as animal feed.

## 🕒 The following are the major achievements and research areas:

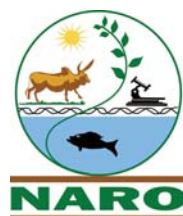
### 1) Variety Development.

a) The SP program has released 19 SP varieties. New Kawogo, Tanzania and NASPOT 1 have gained importance in local Ugandan markets and in export trade to Europe, especially the UK and the Netherlands. The orange-fleshed SP (OFSP) varieties, Ejumula, SPK004 (Kakamega), NASPOT 90 and NASPOT 100 are gaining importance as a result of promotions by different stakeholders to combat vitamin A deficiency in the

country. Some of the released OFSP varieties combine high dry matter (about 30%), high resistance to sweetpotato virus disease (SPVD) and Alternaria blight resistances. Other released varieties are of importance in specific agro-ecologies.

The global HarvestPlus Program has deployed the released OFSP varieties as a food-based approach in an effectiveness case study in three districts, Bukedea, Mukono, and Kamuli in Uganda to promote OFSP to alleviate vitamin A deficiency at community level. These OFSP varieties are also under deployment in four districts of northern Uganda, under the “Dissemination of New Agricultural Technologies in Africa” (DONATA) Project.

b) Participatory Breeding (PPB): NaCRRRI engages farmers in SP variety development and evaluation with the objective of producing varieties preferred by farmers and consumers/market: for improved food security, nutrition and income. Through this approach, a breeding line, NKA1081L was selected and is



The Sweetpotato for Profit and Health Initiative (SPHI) is a ten-year initiative designed to improve the food security and livelihoods of poor families in Sub-Saharan Africa by exploiting the untapped potential of sweetpotato. It seeks to reposition sweetpotato in food economies of Sub-Saharan African countries to alleviate poverty and under-nutrition in 10 million African families in 10 years.

about to be officially released. This will be the first PPB SP variety to be released.

2) **Most of the released SP varieties have high field resistance to sweetpotato virus disease (SPVD)**, the most devastating disease on SP globally. Breeding varieties resistant to the disease is a major activity of the Ugandan program. Uganda supplies SP breeding populations (true seed) to collaborating countries in Sub-Saharan Africa and to a few countries outside the continent for selections.

3) The NaCRRI, North Carolina State University, CIP, and Austrian Research Center, Seibersdorf, in Austria research team has produced **the first most comprehensive genetic AFLP linkage maps for sweetpotato** published in the March 2008 issue of Molecular Breeding. This is one of the major steps in marker assisted selection (MAS). The current challenge is to saturate the map with other molecular markers and validate the utility of the markers in different mapping populations before practical MAS is achieved.

#### 4) **Weevil resistance:**

a) SP weevils are the single most important pest constraint in SP production; they render the crop unsuitable for human consumption. Production losses due to weevil feeding may reach 60%-100%. The NRI/NaCRRI research team reported (2008) for the first time lab bioassays that replicate field resistance in New Kawogo and other varieties indicating that resistance in the field is not simply escape but is active, quantifiable and manageable for

breeding purposes. The compounds (octadecyl and hexadecyl) responsible for this are root latex phenolic esters. Efforts are under way to incorporate these compounds into popular susceptible varieties.

b) The NaCRRI/Auburn University research team developed the artificial diet for the African weevils currently used in bioassays for Bt and SP storage root extracts (SPSRE). The artificial diet allows investigations of effect of dosage of Bt and SPSRE on SP weevil to be carried out. Two Bt proteins have been confirmed to be highly toxic to SP weevils in the laboratory at NaCRRI. The next step will be to incorporate the genes of these proteins into SP to produce SP resistant to weevils.

#### 5) **Sweetpotato online data base.**

The SP project has developed a database for the SP germplasm collection in Uganda referred to as the 'Uganda Sweetpotato Germplasm Database' (USGDB). To date, the USGDB is the most comprehensive description of collected sweetpotato germplasm in the region. This database is online at this address:

[http://www.viazivitamu.org/ugasp\\_db/index.php](http://www.viazivitamu.org/ugasp_db/index.php).

#### 6) **Production of quality planting material:**

Once varieties are released, there is need to produce quality planting materials. NaCRRI trains CBOs, NGOs, and Farmer/Groups on how to rapidly produce quality planting materials of SP.

#### 7) **NaCRRI and its partners also**

**work** with the private sector for SP value addition. Recipes for products like cakes have been developed and promoted by stakeholders.



On-farm taste evaluation of sweetpotato (SP)



Preparing SP seed for pre-germination in the laboratory

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