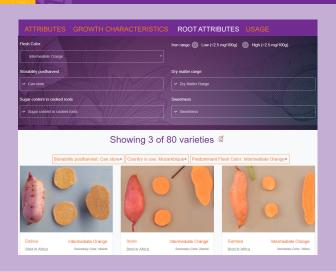# 2019 Sweetpotato Digital Catalogue Now Available

- The Sweetpotato Digital Catalogue (Fig. 1) presents a collection of the best performing sweetpotato varieties or "best bets" in Africa.

- Standardized information of 80 varieties in use in15 Sub-Saharan Africa (SSA) countries can be found at www.sweetpotatoknowledge.org on the web

- Information on a particular variety can be down-loaded for printing, as can the entire catalogue

- Contact details are provided so that users can obtain disease-free, pre-basic cuttings or tissue culture plantlets of these varieties.

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Fig. 1 Home page of the 2019 Digital Sweetpotato Catalogue Showing Multiple Search Criteria

What was the problem?

Every African sweetpotato breeding program has its own collection of released varieties and dominant landraces still in use. Selected varieties have gone through trials in different agro-ecologies and been proven successful in certain environments. This information, well known by the local breeders, needs to be standardized using well-defined descriptors across countries.   In the past, catalogues have been printed (2010 and 2014 being the most recent), but this is expensive due to the need for color plates.   In addition, both breeders and practitioners need to have faster access to disease-free starter material of good performers with desired traits.

What objectives did we set?

There were several objectives in establishing the Sweetpotato Digital Catalogue. First, the emphasis was to be on the best performing sweetpotato germplasm in Africa, regardless of flesh color. Breeders across 15 sub-Saharan African (SSA) countries were to nominate existing varieties and local landraces to be included and provide copies to CIP-KEPHIS. Second, standardized data were to be obtained on the agronomic attributes, growth characteristics, root attributes and usage; complemented with the release document. Third, each root would be scanned using the Near-Infrared Spectrometer (NIRS), to have a profile of macronutrients, sugars, and key vitamins and minerals linked to the description of the variety. Fourth, we also wanted to capture genetic diversity among the varieties by fingerprinting their DNA.   Fifth, standard quality pictures would be taken of the plant, roots and leaves and a protocol developed for how to take quality photographs for the catalogue. The catalogue was to be designed so that anyone could upload information about new variety into the catalogue. Sixth, after virus removal or "clean-up", the cuttings would be multiplied in a screenhouse under "double protection", that is in a cage

with horticultural netting, to truly minimize chances of insect-mediated virus transfer.

Where did we work?

The best bets have been characterized in Kenya, where the International Potato Center (CIP) collaborates closely with the Kenya Plant Quarantine Inspection Service (KEPHIS) and the Kenya Agriculture and Livestock Research Organization (KALRO). Samples of varieties and information about each one was collected from the breeders across 15 countries in SSA. Work began in 2017 with a total of 111 cultivars submitted. Some did not establish well, but 98 genotypes were set up in a characterization trial at the KALRO station in Kiboko, Kenya. Morphological data and pictures were taken at 90 days and root samples were taken at 120 days for quality analysis using NIRS method at Namulonge, Uganda.

The back-end database for the catalogue was adapted from an existing potato catalogue application developed by the Research and Informatics Unit (RIU) at CIP headquarters in Peru. Development of the front-end application was implemented by a Nairobi-based consultant under the supervision of the SASHA data manager. National program breeders were consulted at several stages to confirm the characterization information.

Varietal clean-up and the establishment of a dedicated screen house for the "best-bet" collection, with each variety under double protection (Fig. 2) was undertaken by the CIP regional germplasm program at KEPHIS-Muguga.

What did we achieve during SASHA Phase 2?

The Sweetpotato Digital Catalogue was set up on Sweetpotato Knowledge Portal (www.sweetpotatoknowledge.org) and the corporate website of CIP (www.cipotato.org) in May 2019. A set of 80 varieties was identified for its morphological characteristics, root

Fig. 2 Pathogen-tested cuttings of each variety are kept in cages within the screenhouse as a double-protection strategy (Credit: J. Low)

Although a professional photographer was engaged, a major drawback of digital colors is that the orange root color is distorted to be more intense or less intense than the actual shade. Therefore, pictures need to be adjusted against a standard color.

What's next?

The digital catalogue is ready to be used, but the fingerprinting work is being finalized and will be available as part of the catalogue by December 2019. Usage data are missing for many varieties and need to be determined using standardized procedures. We need to align the catalogue with improved breeding data management tools to support standardized data collection and storage. We need to ensure continuous submission from the different countries as new releases become part of the best bet collection to keep the catalogue up-to-date. By September 2019, the catalogue will be available as a standalone android app, downloadable from the Google Play Store for free.
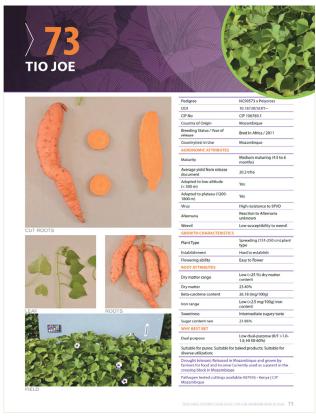
attributes, and consumer and processing qualities. All varieties on the digital catalogue have been issued with a unique accession number, and a Digital Object Identifier (DOI) by the International Treaty on Plant Genetic Resources for Food and Agriculture. The search engine allows filtering varieties by country or key traits.

A print ready version of the catalogue is available for download or each variety can be downloaded as a single A4 page with additional morphological and NIRS quality data separately (Fig. 3). A form for submitting new varieties for publishing on the digital catalogue is available on the website. Web analytics on the digital catalogue are being collected to inform on usage and future improvements.

The catalogue is backstopped by the regional germplasm collection effort maintained by the CIP at KEPHIS in Muguga. Disease-free tissue culture plantlets and at least 20 virus-indexed pre-basic cuttings under double protection in the screenhouse (Fig. 2) are available.

Where there any key challenges or lessons learned?

The major challenge encountered was loss of some cultivars due to stress encountered during shipping, and some mix-up in cultivars during the characterization trial. However, one of the benefits of the current digital version is that it will be easy to add additional varieties, once all information is verified.

Fig. 3 Detailed variety information for the variety Tio Joe

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