RTB Project reporting – a global reporting on sweetpotato progress [Theme 2.5 (2 = breeding; 5 = sweetpotato), 2015)

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Theme 2 sweetpotato will become in the future the cluster “**User preferred sweetpotato varieties and seed technologies (SW2.6)**”

Overview of RTB (Root Tubers & Bananas) reporting / CRP 3.4

PRODUCT PORTFOLIO REPORTING 2014 - Themes 1-7 (SITUATION 03.April 2015)

Blue colored milestones are UNFUNDED (as mentioned in the PP updating for 2014 - and obvisously were unfunded throughout 2014 as not reported)

Theme/ Commodity	RED	YELLOW	GREEN	BLUE	Total
1.1	2	5	5	0	12
1.2	5	28	8	0	41
1.3	7	12	3	3	25
1.4	0	6	2	5	13
1.5	1	3	0	6	10
1.6	7	12	2	2	23
1.7	1	0	0	9	10
2.1	4	18	0	7	29
2.2	9	27	5	5	46
2.3	14	70	9	7	100
2.4	7	37	4	0	48
2.5	0	37	2	0	39
2.6	3	16	8	1	28
2.7	2	6	2	0	10
	62	277	50	45	434

Theme/ Commodity	RED	YELLOW	GREEN	BLUE	Total
3.1	0	10	1	5	16
3.2	12	24	23	0	59
3.3	2	20	5	2	29
3.4	3	14	14	0	31
3.5	0	6	0	5	11
3.6	2	2	0	4	8
3.7	0	0	0	0	0
4.1	0	3	0	5	8
4.2	2	2	6	3	13
4.3	8	10	5	4	27
4.4	1	10	0	6	17
4.5	5	0	0	0	5
4.6	13	0	0	2	15
7.1	47	38	4	0	89
	95	139	58	36	328

Theme/ Commodity	RED	YELLOW	GREEN	BLUE
5.1	3	14	0	4
5.2	0	31	4	1
5.3	13	22	5	1
5.4	4	0	0	12
5.5	2	0	0	8
5.6	2	7	0	1
5.7	4	0	0	0
6.1	19	12	1	2
6.2	17	3	0	1
6.3	16	3	4	3
6.4	15	1	0	0
6.5	13	2	0	0
6.6	13	1	0	1
6.7	6	0	0	0
	127	96	14	34

Commodity	RED	Total products	%
1: Crosscutting	75	209	36%
2: Banana	45	216	21%
3: Cassava	60	248	24%
4: Potato	30	141	21%
5: Sweetpotato	21	90	23%
6: Yam	40	99	40%
7: Other RTB	13	30	43%
	284	1033	27%

Commodity	Yellow	Total products	%
1: Crosscutting	100	209	48%
2: Banana	115	216	53%
3: Cassava	137	248	55%
4: Potato	68	141	48%
5: Sweetpotato	48	90	53%
6: Yam	35	99	35%
7: Other RTB	6	30	20%
	512	1033	50%

Commodity	Green	Total products	%
1: Crosscutting	11	209	5%
2: Banana	46	216	21%
3: Cassava	31	248	13%
4: Potato	20	141	14%
5: Sweetpotato	2	90	2%
6: Yam	10	99	10%
7: Other RTB	2	30	7%
	122	1033	12%

Commodity	BLUE	Total products	%
1: Crosscutting	23	209	11%
2: Banana	10	216	5%
3: Cassava	20	248	8%
4: Potato	23	141	16%
5: Sweetpotato	19	90	21%
6: Yam	11	99	11%
7: Other RTB	9	30	30%
	115	1033	11%

red = nothing reported at all

yellow = reported but information incomplete or misleading,

green = completely reported, no comments,

blue = unfunded throughout 2014

Commodities:

x.1 cross cutting across all RTB crops

x.2 Bananas

x.3 Cassava

x.4 Potato

x.5 Sweetpotato

x.6 Yam

x.7 Others

What are Themes?

Theme 1: **Genebank & Germplasm** (Conserving and accessing genetic resources)
Theme 2: **Breeding** (Accelerating the development and selection of varieties with higher, more stable yield and added value)
Theme 3: **Disease & Pest Management** (Managing Priority Pest and Diseases)
Theme 4: **Seed Systems** (Making available low-cost, high-quality planting Material for Farmers)
Theme 5: **Food Security & Health** (Developing Tools for More Productive, Ecologically Robust Cropping Systems)
Theme 6: **Post-Harvest** (Promoting Postharvest Technologies, Value Chains, and Market Opportunities)
Theme 7: **Impact** (Enhancing Impact through Partnerships)

Here we will talk today only about sweetpotato and breeding Theme 2 commodity sweetpotato = 2.5.

Breeding sweetpotato is devided in RTB into 5 product lines:

Product line 2.5.1. Breeding tools, strategies, and approaches: sweetpotato
Product line 2.5.2. Trait capture and gene discovery: sweetpotato
Product line 2.5.3: Population development and pre-breeding sweetpotato
Product line 2.5.4: Variety development sweetpotato
Product line 2.5.5: Aligning research with farmers' and end-users' priorities: sweetpotato

Each product line has products which must be ready in 201x or 201x and each products has milestones annually or biannually – against these milestones someone has to report to – a set of parameters from: achieved in percentage, summary (120 words), report with code and author, ... (5 or 6 yes or no parameters) such as "strategic value chain", and finally funding source.

Example: 2.5.3. Product 2: OFSP pre-breeding populations with high expression of sweetpotato virus disease (SPVD) tested (to be delivered in 2017) and for 2014 there was the milestone "b" to be reached and this was: "Working paper on SPVD resistant clones and families and field evaluations in East Africa of true seed families provided by CIP-Lima edited (to be reached in 2014).

Here we will talk today only about sweetpotato and breeding Theme 2 commodity sweetpotato = 2.5.

Breeding sweetpotato is devided in RTB into 5 product lines:

Product line 2.5.1. Breeding tools, strategies, and approaches: sweetpotato
this product line has currently 12 products with product or milestone reports

I give two products per product line one from the region SSA and one outside the region SSA**.**

2.5.1. product 4: Magnitude of heterosis exploitation in sweetpotato breeding based on grouping breeding populations into two genepools available for two breeding programs (2018) **milestone e:**. Working paper completed for heterosis estimates in population hybrids derived from population A and B in East Africa by CIP-Uganda (2015, CIP). **Summary** (<120 words): The objective of this study was to estimate yield gains in early generation sweetpotato clones derived from inter and intra population crosses of two East African genepools (Population Uganda A and Population Uganda B by 8x8 crosses) hypothesized to be mutually heterotic. Twenty clones were planted per family together with 2x8 parents, at 2 locations and two plot replications comprising 3 plants per plot. The overall heterosis increment for AxB population was estimated to be 7.6 % for storage root yield. However, it turned out that 2 parents used in the 8x8 crossing scheme were not members of genepool A and B, respectively. The striking result of the study was that 50% of cross combination and families, respectively, exhibited heterosis increments of >0% and 22% of cross combination and families, respectively, exhibited heterosis increments of >100%. These results were considered as a go decision to test the offspring from population A and B on larger scale in order to eliminate "bad" parents in pool A and B with respect to yield and SPVD performance. .

2.5.1. product 12: Molecular tools to characterize mutually heterotic genepools documented across different regions of the world (2015, CIP) . **Abstract** (<120 words) Three studies have been undertaken to characterize mutually heterotic genepools by molecular marker (SSR markers). The first study in Peru (at the global breeding platform) was using parental material of the populations PJ and PZ. The 2nd study in Uganda (at the EA breeding platform) was using parental material of the two crossing blocks in use at Namulonge. The 3rd study was using germplasm clones from the West Pacific (China, Korea Japan). Two genepools have been found in applied parental material at CIP HQ, two further genepools have been found in applied parental material at the EA breeding platform in Uganda, and four genepools in germplasma accessions form the West Pacific (China, Japan, Korea). **This product report is in total 3 pages.**

Here we will talk today only about sweetpotato and breeding Theme 2 commodity sweetpotato = 2.5.

Breeding sweetpotato is devided in RTB into 5 product lines:

Product line 2.5.2. Trait capture and gene discovery: sweetpotato Breeding tools, strategies, and approaches: sweetpotato - this product line has currently 4 products

I give two products for this product line one from the global program and one from global + regional programs.

2.5.2. product 3: Genotypes and gene(s) for early bulking (the <100 day sweetpotato) identified (2016); **Milestone b:** Documentation about early bulking genotypes in SA available (2015, CIP)

2.5.2. product 3: Genotypes and gene(s) for early bulking (the <100 day sweetpotato) identified (2016); **Milestone c:** Documentation about early bulking genotypes in SEA available (2015, CIP)

2.5.2. product 3: Genotypes and gene(s) for early bulking (the <100 day sweetpotato) identified (2016); **Milestone d:** Documentation about early bulking genotypes in EA available (2015, CIP)

All 3 milestone reports through the paper "Advances in sweetpotato breeding"

2.5.2.03b Gruneberg 2015 Advance ... App 1 & 2 Early bulking SA

2.5.2.03c Gruneberg 2015 Advance ... App 1 & 2 Early bulking SEA

2.5.2.03d Gruneberg 2015 Advance ... App 1 & 2 Early bulking EA

Here we will talk today only about sweetpotato and breeding Theme 2 commodity sweetpotato = 2.5.

Breeding sweetpotato is devided in RTB into 5 product lines:

Product line 2.5.3. Population development and pre-breeding sweetpotato - this product line has currently 7 products

I give two products for this product line one from the region and one from global programs.

2.5.3. product 1: Recurrent sweetpotato hybrid selection pool for OFSP with wide adaptation, earliness & processing use - 1st reciprocal recurrent selection cycle completed (2017); **Milestone d:**; True seed dissemination to NARS, ARIs, universities establsiehd for ESEAPwith improved hybrid OFSP populations (mid to long term target: 100day sweetpotato in ESEAP (2014, CIP). **Summary:** Breeding populations from HEBS have high vigor and develop rapidly. In total 603 families (21427 seed) were sent to Indonesia – OFSP hybrid population with the attribute wide adaptation and earliness. The material arrived well and was divided in two batches – about 10000 seed was taken over by ILETRI and about 10000 seed remained with CIP-Indonesia. Germination and multiplication from true seed derived plants have started.

2.5.3. product 6: Non-sweet, high dry matter populations for West Africa identified (2016) **Milestone a**. Field evaluations of intra-genepool cross combinations tested (2014, CIP). **Milestone b**. H0 population for West-Africa developed in Ghana with high DM and low sugar on basis of two selection pools including seed disemination to the sub-region from these populations documented (2015, CIP) **Summary:** The advanced Ghanaian breeding population at the Sweetpotato Support Platform for West Africa at CSIR-Crops Research Institute, has a high frequency of genotypes with high dry matter, and low sugar. Initial efforts to create a complementary, genetically distinct high dry matter, low sugar population were unsuccessful because the materials introduced from CIP-HQ proved susceptible to SPVD in the high virus pressure environment at Kumasi. So far the West African breeding platform is still operating with one breeding population. During 2015, further efforts were made to develop two genetically distinct high dry matter, low sugar populations for West Africa – one in Kumasi and one in northern Ghana. Therefore we look within the existing advanced Ghana breeding population, using progeny testing and molecular SSR markers.

Here we will talk today only about sweetpotato and breeding Theme 2 commodity sweetpotato = 2.5.

Breeding sweetpotato is devided in RTB into 5 product lines:

Product line 2.5.4. Variety development sweetpotato - this product line has currently 4 products

I give two products for this product line one from the region and one from global programs.

2.5.4. product 2: Accelerated breeding scheme (ABS) in NARS breeding programs in linkage to farmer participatory selection realized (2019**) ; Milestone b:** ABS published in a book chapter by CABI on advances in SP breeding (2015). **Summary:** The accelerated breeding scheme (ABS) targets the early stages of breeding clonally propagated crops. The conventional approach in breeding programs have followed for decades starting with population development (crossings) followed by selecting clones step by step over a period of 7 to 8 years until varieties are released. In sweetpotato ABS takes on average 3 to 4 years until variety release. The scheme was presented first at ISTRC

2.5.4. product 2: Accelerated breeding scheme (ABS) in NARS breeding programs in linkage to farmer participatory selection realized (2019**) ; Milestone c:** Implementation of ABS - Release of 2 to 3 purple-fleshed (PFSP) varieties for dry land tropics by ABS (2015); **Summary**: The objectives in the short term were to develop at least 2 superior purple-fleshed cultivars to serve both producer and consumer needs. CIP used a bi-parental crossing block at Gurué and Umbeluzi Research Stations (Mozambique) in 2011 to get seeds of a sweetpotato breeding population. A series of trials were conducted over two years and 25 clones selected based On-farm trials were concurrently established nearby these sites. Data were analyzed within and across locations. The storage root yield of three clones was high across mega-environments and showed high anthocyanin and suitable sensory quality equal or even better than that of the cultivar checks. The purple-fleshed cultivars may lead to changes on sweetpotato consumption patterns in Mozambique and neighboring Southern African countries.

Here we will talk today only about sweetpotato and breeding Theme 2 commodity sweetpotato = 2.5.

Breeding sweetpotato is devided in RTB into 5 product lines:

Product line 2.5.5. Aligning research with farmers' and end-users' priorities: sweetpotato – this product line has currently 5 products

I give two products for this product line both from regions.

2.5.5. Product 2: Annual training program for plant breeding statistics and methods realized (2012 to 2016); **Milestone c:** At least 8 sweetpotato breeders from ESEAP trained at a breeding platform in ESEAP (2015, CIP). **Summary:** The sweetpotato breeders meeting in Indonesia 2015 had to be canceled because of the long sick leave of W Gruneberg (2 1/2 months) due to a knee surgery. However, 4 sweetpotato breeders from the Asian regions were meeting at the SO1 launch meeting in Bangladesh from 8 - 10 June 2015. During this meeting breeding issues and challenges were discussed and partially solved. Moreover, it was organized that 3 Asian sweetpotato meet at the World Congress on tropical tuber crops in China January 2016. The intension is to conduct to breeders meetings in Asia in 2016 (one in Indonesia and one in India).

2.5.5. Product 5: Next generation African sweetpotato breeders using genomics tools trained (2018); **Milestone a:** A genomics scientists placed at BecA (2015, CIP); **Summary**: Following an international call for filling the position of genomics scientist, a post-doc from Kenya, Merci Kitavi, was appointed as a molecular breeder and based at the CIP regional office in Nairobi Kenya. Her contract started on the beginning of April 2015 and is for a duration of three years.

2.5.5. Product 5: Next generation African sweetpotato breeders using genomics tools trained (2018); **Milestone b:** Workshop organised for African sweetpotato breeders **(2015, CIP);** The first SASHA-GT4SP sweetpotato breeder's meeting was held in Mukono Uganda, June 1-5, 2015. GT4SP project attendees included: Craig Yencho, Ann Tomko, Benard Yada, Robert Mwanga, Lukas Muller, Zangjun Fei, Awais Khan, Wolfgang Gruneberg, Reinhard Simon, Raul Eyzaguirre, Luka Wanjohi, Ted Carey, Mercy Kitavi, Marc Ghislain, and Dorcas Gemenet. … This meeting was to first provide the SSA sweetpotato breeding community an overview of the goals and expected outcomes of the GT4SP project.

I'm the gain

Thank-you for your Attention