Preliminary results of the heterosis trial in Mozambique with clones derived from Ugandan inter- and intra- gene pool crosses

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SWEETPOTATO ACTION FOR SECURITY AND HEALTH IN AFRICA

Objective

- To demonstrate family means for inter genepool crosses 8A x 8B (64 families) and intra-genepool crosses 8A x 8A (n * n-1) / 2 = 24 families) as well as intra-genepool crosses 8B x 8B (n * n-1) / 2 = 24 families) under drought stress conditions – with other word heterosis increments under drought stress conditions

- **Note:** this is material in early breeding stage in which **no** selection has been carried out before

Materials

A diversity study with 18 microsatellites (SSR markers) identified two gene pools in Ugandan parental material (polycross of Robert).

- Population A

- Population B

8 parents were chosen from each population to constitute the crosses.

a) INTER_GENE POOL CROSSES: 8 X 8 factorial design

b) INTRA_GENE A CROSSES: 8 X 8 DIALLEL without self- and considering reciprocals

c) INTRA_GENE B CROSSES: 8 X 8 DIALLEL without self- and considering reciprocals

Parents selected

Population A			Population B		
Name	**Code**	**SPVD resistance**	**Name**	**Code**	**SPVD resistance**
Ejumula	A1	Susceptible	Resisto	B1	Susceptible
NASPOT1	A2	Moderate	Magabali	B2	Susceptible
Dimbuka-Buku	A3	Susceptible	NASPOT5	B3	Moderate
NASPOT5/58	A4	Susceptible	Wagabolige	B4	Moderate
NASPOT7	A5	Moderate	Mugande	B5	Moderate
SPK004	A6	Moderate	NASPOT11	B6	Moderate
NASPOT100	A7	Moderate	New Kawogo	B7	Moderate
NK259L	A8	Moderate	Huarmeyano	B8	HR SPFMV

Number of clones per family obtained in Mozambique from seed from Uganda

	A1	A2	A3	A4	A5	A6	A7	A8	B1	B2	B3	B4	B5	B6	B7	B8
A1	X	45	47	42	49	49	41	42								
A2		X	0	38	44	44R	45R	16R								
A3			X	47	12R	0	16R	47								
A4				X	48	47	0	38								
A5					X	14R	35	44								
A6						X	42	33								
A7							X	42								
A8								X								
B1	50	44	45	24	46	48R	47	49	X	50	46	45	40	50	47	45
B2	49	42	46	47	46	49	50	48		X	47	48	44	42	44	47R
B3	49	43	48	0	48	49	49	49			X	49R	46	0	41R	49
B4	47	46	45	47	47	38	21	47R				X	48	49	43	49
B5	48	47	41	49R	48	48	46	49					X	50	49	46
B6	42	46	47	30	50	47	48	49						X	29	42
B7	35	48	49R	0	47	47	0	50							X	49
B8	48	47	47	43R	45	44	48	46								X
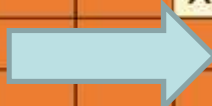
INTRA_A CLONES

INTRA_B CLONES

INTER_AxB CLONES

Experimental material

Population	A	B	AxB	Checks
Number of clones planted	898	1124	2287	Delvia Gaba-Gaba Irene Namanga Resisto

- A check was planted after every 50 clones
- 1 m row plots, 2 plot replications, 2 treatments (irri and no irri)
- RCBD with checks

Irrigation regimes

Irrigated treatment

Dates of planting:8 – 22 September

- 40 mm water applied per each irrigation cycle
- Trials were irrigated 7 times

Not irrigated treatment

Dates of planting: 21 August – 5 September 2014

- Trials were irrigated 5 times from planting to a month after planting.
- The trial was not irrigated from a month after planting.

Results
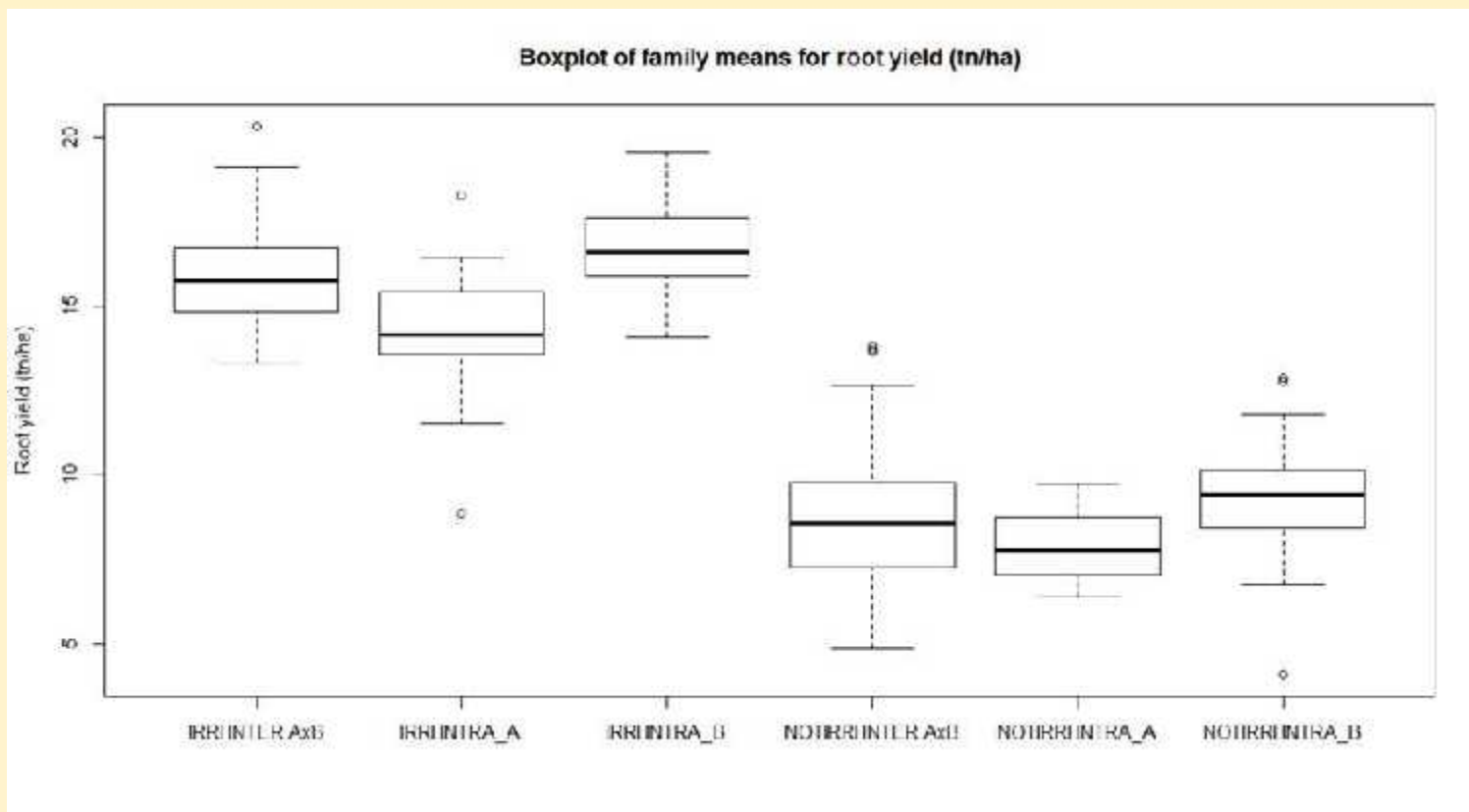
Drought Intensity Index (Fischer and Maurer 1978)

DII = 1- (Mean [NOIRRI]/Mean [IRRI])

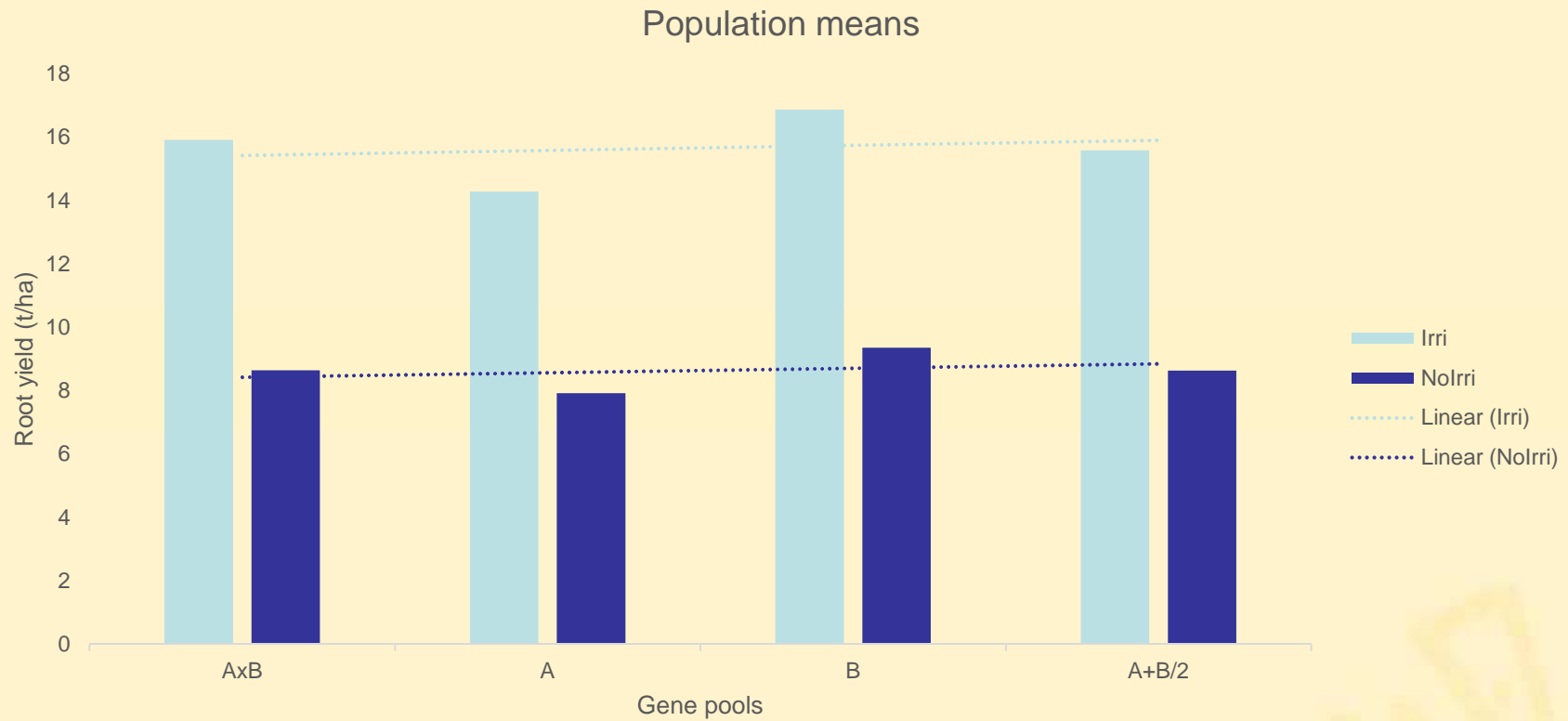|	INTER_AxB	INTRA_A	INTRA_B
DII	0,46	0,45	0,45

NB: All clones from the 3 populations were randomised and planted together

Family means for root yield (tn/há)

Comparison of population means among gene-pools and (A+B)/2

Conclusions and perspectives

- In our case, we didnt plant parents for mid-parent mid-offsprings heterosis
- The populations can be mantained as reference population for one further evaluation
- We are not sure on whether the parents were randomly selected for the study (question for Robert ?)
- We found heterosis increment on average for the AxB population and more "good" families in AxB than in A and B population
- The AxB population appeared to be more stable than the A and B population – especially under drought " good " famiies were observed

What we do next?

- Further data checking
- For sure we will select a larger number of clones for preliminary yield trials from families which were performing well under drought stress

- We need more information on parents
- We still have all the clones in the greenhouses and can utilize the 2015 winter season for example for an efficiency study for the accelerated breeding scheme

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