Seventh framework programme
Food, Agriculture and Fisheries, and Biotechnology

Specific International Co-operation Actions
Small or medium scale focused research project

Sweet Fuel

Sweet Sorghum
an alternative energy Crop

Grant Agreement n° 227422

Deliverable 3.25:

Five to ten sweet sorghum hybrids with a high PIU recommended for ethanol production

Composition of the consortium

CIRAD
ICRISAT
EMBRAPA
KWS
IFEU
UniBO
UCSC
ARC-GCI
UANL
WIP

Over the past five years we have been involved in “fast track” development of sweet sorghum male sterile and maintainer lines (A and B Lines) in A1 cytoplasm as summarized in the following table:

Year	B - Line	A - Line	Activity
2008/2009	F1; F2; RC1		B x R crosses & advance generation
2010	F2:3		Phenotype selection
2011	F3:4	P1	Select, advance & cross to A1 cytoplasm
2011	F4:5	F1	Select, advance & backcross to A1 cytoplasm
2012	F5:6	BC1	Select, advance & backcross to A1 cytoplasm
2012	F6:7	BC2	Select, advance & backcross to A1 cytoplasm
2013	F7:8	BC3	Select, advance & backcross to A1 cytoplasm
2013	F8:9	BC4	Advance, backcross to A1 cytoplasm and develop Experimental Hybrids
2014	F9:10	BC5	Increase seed of selected lines and experimental hybrid evaluation

Twelve Experimental Sweet Sorghum hybrids, 10 varieties, and three commercial hybrid checks were evaluated in an official 25 hybrid trial in three locations with three replications. The results are summarized in the two following tables.

Experimental Hybrid	Biomass Yield	BRIX	Height	Total Extracted Brix	Total Extracted Sugars
	(t ha^{-1})	(% Juice)	(m)	(t ha-1)	(t ha-1)
201337B011*	72,26	15,21	2,71	5,69	4,55
201337B005*	61,39	18,01	2,81	5,62	4,50
201337B012*	59,62	16,68	2,62	5,20	4,16
201337B003	58,78	15,56	2,72	4,84	3,87
201337B007	59,75	15,11	2,68	4,80	3,84
201337B009	53,02	17,07	2,67	4,58	3,66
201337B010	62,23	13,20	2,63	4,49	3,59
201337B008	57,63	14,62	2,67	4,48	3,58
201337B004	52,17	17,10	2,78	4,42	3,54
201337B002	52,28	15,06	2,68	4,13	3,31
201337B006	52,79	14,42	2,41	4,03	3,23
201337B001	51,03	12,71	2,72	3,14	2,51
Hybrid Mean	57,75	15,40	2,67	4,62	3,69

The first three experimental (*) hybrids are pre-candidates for registration and release. The Brix content of several experimental hybrids was superior to the sweet sorghum male parent, demonstrating that these hybrids have potential for official registration and release. Note that all the experimental hybrids and varieties had a Brix value superior to the Brix threshold of 14.5.

Experimental Sweet Sorghum Hybrid Trial 2013/2014 Average of Three Locations					
Average	Biomass Yield	BRIX*	Height	Total Extracted Brix	Total Extracted Sugars
	(t ha^{-1})	(% Juice)	(m)	(t ha-1)	(t ha-1)
12 Experimental Hybrids (EH)	57,75	15,40	2,67	4,62	3,69
Best EH	72,26	15,21	2,71	5,69	4,55
Best three EH	64,42	16,63	2,71	5,51	4,40
Best nine EH	59,65	15,84	2,70	4,90	3,92
New Varieties	60,32	16,54	2,70	4,99	3,99
Released Varieties	57,25	17,25	2,64	4,82	3,86
Commercial Check	67,97	12,88	2,65	4,70	3,76