



**Seventh framework programme
Food, Agriculture and Fisheries, and Biotechnology**

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



Sweet Sorghum an alternative energy Crop

Grant Agreement n° 227422

Deliverable 3.23:

*Five to ten sweet sorghum varieties
(A and B-lines) with appropriate
photoperiod sensitivity*

Composition of the consortium

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



The following chronogram was followed in developing new female sweet sorghum lines.

Year	B - Line	A - Line	Activity
2008/2009	F1; F2; RC1		Develop B x R crosses and advance generation
2010	F2:3		Phenotype selection
2011	F3:4	P1; F1	Advance and cross to A1 male sterile cytoplasm
2011	F4:5	BC1	Advance and backcross to A1 male sterile cytoplasm
2012	F5:6	BC2	Advance and backcross to A1 male sterile cytoplasm
2012	F6:7	BC3	Advance and backcross to A1 male sterile cytoplasm
2013	F7:8	BC4	Advance and backcross to A1 male sterile cytoplasm and develop experimental hybrids
2013	F8:9	BC5	Advance and backcross to A1 male sterile cytoplasm and develop experimental hybrids
2014	F9:10	BC6	Increase the seed of A and B lines and evaluate experimental hybrids.

Actually we have more than 200 sweet sorghum lines in various stages of development. The potential of eight male-sterile A and B lines developed in our “fast track” program are summarized in the two tables below. The lines were evaluated for Brix of the extracted juice, with several lines exceeding the minimum goal of 15 ° Brix. The Brix level of the second table was slightly lower due to “off season” winter nursery. These male sterile female lines were used to make experimental sweet sorghum hybrids in 2013 that were evaluated in 2013/2014.

Brix content of juice extracted with hydraulic press of new sweet sorghum A and B lines

Entry	Cytoplasm	Generation	Plant Height (cm)	Brix 30/ago/13	Brix 06/set/13	Brix 13/set/13
2013001	A1	BC4	1,20	12,50	12,90	15,60
2013002	B	F8:9	1,20	14,80	13,20	14,40
2013003	A1	BC4	1,60	13,50	13,50	16,90
2013004	B	F8:9	1,60	14,70	14,80	11,40
2013005	A1	BC4	1,65	13,00	14,60	16,10
2013006	B	F8:9	1,65	15,00	15,70	14,40
2013007	A1	BC4	1,55	15,60	12,80	16,30
2013008	B	F8:9	1,55	16,20	15,70	14,80
2013009	A1	BC4	1,50	11,30	13,10	16,70
2013010	B	F8:9	1,50	14,80	15,60	16,10
2013011	A1	BC4	1,75	12,80	14,00	19,70
2013012	B	F8:9	1,75	15,00	15,80	13,30
2013013	A1	BC4	1,20	9,70	11,40	13,80
2013014	B	F8:9	1,20	9,70	9,20	13,70
2013015	A1	BC4	1,70	13,60	14,70	13,10
2013016	B	F8:9	1,70	16,00	16,60	17,60

Several of these male sterile female lines were evaluated in hybrid combinations in 2013/2014 at Embrapa. Several combinations had Brix and sugar values superior than either parent. This strongly supports that the genes influencing sugar cont in sweet sorghum are additive. The best female lines will be used in crosses to make additional experimental sweet sorghum hybrids for 2014/2015.

Entry	Pedigree	Ciclo	Flower (days)	Height (cm)	Brix 15/08	Brix 30/08	Brix 06/09
201314(B) - 001	(CMSXS157A*{CMSXS157B x BR505}-31-1-1-2-1-1)	RC4	92	0,90	14,90	10,00	10,60
201314(B) - 002	{CMSXS157B x BR505}-31-1-1-2-1-1	F8:9	90	1,00	11,50	10,90	13,90
201314(B) - 003	(CMSXS157A*{CMSXS157B x BR505}-31-1-1-2-2-1)	RC4	106	1,20	11,70	12,50	12,90
201314(B) - 004	{CMSXS157B x BR505}-31-1-1-2-2-1	F8:9	90	1,20	10,40	14,80	13,20
201314(B) - 011	(CMSXS157A*{CMSXS157B x BR505}-43-2-1-1-1-1)	RC4	102	1,56	11,10	13,50	13,50
201314(B) - 012	{CMSXS157B x BR505}-43-2-1-1-1-1	F8:9	102	1,83	10,90	14,70	14,80
201314(B) - 013	(CMSXS157A*{CMSXS157B x BR505}-43-2-1-1-2-1)	RC4	102	1,65	10,60	13,00	14,60
201314(B) - 014	{CMSXS157B x BR505}-43-2-1-1-2-1	F8:9	102	1,63	11,20	15,00	15,70
201314(B) - 015	(CMSXS157A*{CMSXS157B x BR505}-43-2-1-2-1-1)	RC4	104	1,55	11,70	15,60	12,80
201314(B) - 016	{CMSXS157B x BR505}-43-2-1-2-1-1	F8:9	104	1,65	13,50	15,20	15,70
201314(B) - 017	(CMSXS157A*{CMSXS157B x BR505}-43-2-1-3-1-2)	RC4	102	1,52	10,50	7,30	13,10
201314(B) - 018	{CMSXS157B x BR505}-43-2-1-3-1-2	F8:9	104	1,57	12,60	14,80	15,60
201314(B) - 019	(CMSXS157A*{CMSXS157B x BR505}-43-2-1-3-2-1)	RC4	104	1,63		12,80	14,00
201314(B) - 020	{CMSXS157B x BR505}-43-2-1-3-2-1	F8:9	104	0,75		15,00	15,80
201314(B) - 043	(CMSXS157A*{CMSXS157B x BR505}-71-2-1-1-1-1)	RC4	92	1,30	13,70	12,70	11,90
201314(B) - 044	{CMSXS157B x BR505}-71-2-1-1-1-1	F8:9	90	1,21	13,60	12,00	14,00
201314(B) - 045	(CMSXS157A*{CMSXS157B x BR505}-72-1-1-2-1-1)	RC4	106	1,03	10,50	13,80	13,90
201314(B) - 046	{CMSXS157B x BR505}-72-1-1-2-1-1	F8:9	106	1,07	8,70	12,50	13,60
201314(B) - 065	(CMSXS157A*{CMSXS157B x BR505}-119-3-1-3-1-1)	RC4	95	1,70	12,90	13,60	14,70
201314(B) - 066	{CMSXS157B x BR505}119-3-1-3-1-1	F8:9	95	1,75	11,20	16,00	16,60