Australian Journal of Crop Science AJCS

AJCS 9(1):9-13 (2015) ISSN:1835-2707

Supplementary Data

Heterosis for yield and its components in sorghum (*Sorghum bicolor* L. Moench) hybrids in dry lands and sub-humid environments of East Africa

Justin Ringo *, Agustino Onkware, Mary Mgonja, Santosh Deshpande, Abhishek Rathore, Emmarold Mneney, Samuel Gudu

Supplementary Table 1. Average heterosis (H_{MP}) and heterobeltiosis (H_{BP}) for some sorghum hybrids across dry low land and sub-humid environments.

	Hybrids	Days to 50% flowering		Productive tillers		Plant height (cm)		Panicle exsertion (cm)		Panicle length (cm)		Panicle width (cm)		Grain yield/panicle (g)	
		H_{MP}	H_{BP}	H_{MP}	H_{BP}	H_{MP}	H_{BP}	H_{MP}	H_{BP}	H_{MP}	H_{BP}	H_{MP}	H_{BP}	H_{MP}	H_{BP}
1.	ATX623xICSV95022	-6.01**	-7.49**	15.87	12.5	19.01**	17.66*	47.33*	33.9	11.81**	6.06	16.1	-2.1	16.95	-0.48
2.	ATX623xIESV91104DL	-5.38**	-6.43*	35.48	31.25	32.61**	11.81*	60.58	36.1	6.13	-2.15	21.08*	8	76.08**	38.48*
3.	ATX623xIESV91131DL	-7.91**	-5.44*	20.83	-9.38	27.52**	21.49**	91.10**	65.85	10.42*	7.71	3.52	-4.13	34.66	16.6
4.	ATX623xKARI-MTAMA1	-7.25**	-5.65*	61.29	56.25	-37.22**	-23.17**	87.83*	46.83	14.92	12.99	10.93	0.21	80.54**	60.05**
5.	ATX623XMACIA	-7.80**	-6.10*	45.00*	33.75*	28.57**	23.80**	76.67**	64.34	17.59**	12.67*	23.66*	18.46	28.1	18.34*
6.	ATX623xMAKUENI LOCAL	-11.51**	-7.90**	95.12	60	21.53**	-4.41	90.88**	83.37*	17.99**	3.89	5.88	-11.09	16.86	7.15
7.	CK60AxIESV23010DL	-6.82**	-11.48**	-8.33	-8.33	45.37**	25.42**	54.56*	14.24	20.36**	15.88*	25.85*	5.01	57.76*	28.58
8.	CK60AxKARI-MTAMA1	-5.58**	-8.85**	23.08*	16.5	37.39**	14.04*	79.51**	20.84	15.09**	9.18	48.30**	20.99*	42.54	10.75
9.	CK60AxSP74278	-9.96**	-10.90**	20	16.67	24.96**	8.37	28.62**	22.01**	11.17*	1.81	16.05	0.24	31.45	9.53
10.	ICSA11xS35	-4.35*	-7.91**	50.00*	48.3	52.92**	34.76**	57.3.76**	54.27	15.23**	16.74*	31.55**	14.15	81.90**	77.18*
11.	ICSA11xSP74279	-9.16**	-13.29**	33.33	20	12.17	2.58	46.90**	33.03*	11.69*	11.48*	7.63	-5.28	19.02	2.83
12.	ICSA12xICSR93001	-6.57**	-5.23*	25	25	35.64**	27.44**	64.14*	55.81	7.21	-2.46	23.60*	20.23	31.4*	18.6
13.	ICSA12xIESV23019DL	-7.48**	-2.39	61.05	50.54	58.45**	38.54**	89.30**	65.08**	-3.95	-4.73	18.94*	6.68	38.81	37
14.	ICSA12xIESV91104DL	-5.26**	-2.14	70.37	43.33	44.21**	20.06**	68.62*	65.08*	-2.38	-16.54**	27.07**	16.4	30.1	8.72
15.	ICSA12xKARI-MTAMA1	-4.96**	-0.98	40.74	26.67	-48.11**	-31.13**	57.22*	44.75	-3.11	-15.49**	19.29*	10.7	30.81	17.52
16.	ICSA12xSIAYA46-2	-6.38**	-3.53	57.14**	125	50.22**	29.81**	76.07**	45.42	1.62	-14.93**	25.48*	17.79	24.45	18.52
17.	ICSA15xICSR160	-11.50**	-7.91**	41.18	-11.11	29.95**	12.11	58.09**	42.61*	20.60**	15.75**	26.32*	13.16	33.1	21.28
18.	ICSA15xIESV91104DL	-8.24**	-3.57	50	28	46.05**	16.16**	71.15*	63.58*	1.84	-10.30*	15.45	-0.6	56.26**	27.62

19.	ICSA15xTEGEMEO	-10.07**	-7.52**	41.67	33.18	74.37**	-53.61**	75.62**	71.01**	11.54*	-4.58	30.85**	15.47	68.16**	57.66*
20.	ICSA276xIESV91104DL	-4.93**	-3.57	93.33	89.36	-18.16**	-11.44*	34.77	-9.33	9.66*	-4.84	32.93**	31.20**	-5.34	-5.55
21.	ICSA293xICSR24009	-9.46**	-6.28*	13.33	15	8.97	8.74	67.95**	53.45*	11.13*	7.58	51.56**	40.84**	79.10**	54.48*
22.	ICS687xIESV23011DL	-7.58**	-7.93**	75.76**	56.52**	5.73	-7.82	14.25	-8.28	16.11**	4.26	46.69**	30.62**	39.17	17.86
23.	ICSA88001xICSR160	-10.14**	-4.13	-27.27	-48.15	-26.76**	23.27**	25.9	19.43	17.96**	16.15**	37.76**	29.61**	57.33*	35.15
24.	ICSA88001xICSR93034	-9.22**	-11.70**	29.00**	25.77*	36.08**	16.67**	77.09*	41.9	18.69**	13.36*	53.02**	36.94**	59.62**	23.65
25.	ICSA88001xKARI-MTAMA1	-8.07**	-9.40**	92.45	93.33	41.91**	34.21**	47.13**	43.72*	20.06**	10.57*	54.73**	41.36**	72.75**	51.37*
26.	ICSA88001xMACIA	-17.53**	-13.99**	56.41	47.39	29.17**	17.91*	43.91**	42.80*	16.77**	9.27	28.67**	24.77*	15.96	5.44
27.	ICSA88006xIESV91131DL	-6.86**	-3.26	48.77	26.67	32.53**	27.71**	11.64**	8.86	4.27	-2.46	0.87	-12.17	-8.09	-19.54
28.	ICSA88006xKARI-MTAMA1	-5.45**	-4.2	36.36	16.67	56.80**	30.74**	25.33	-15.95	12.58**	1.92	26.72**	7.82	77.23**	58.91*
29.	ICSA89003xIESV23011DL	-4.06*	-3.12	-45.83	-48	50.97**	23.98**	88.98**	67.51**	-0.08	-4.52	26.01**	1.81	43.05	7.92
30.	ICSA9xICSR56	-1.9	-1.74	-65.08	-67.65	40.65**	27.99**	39.90**	22.42**	15.44**	7.18	19.72	18.26	30.66	10.37

Note: * significant at 5%: H_{MP} = Heterosis over mid parent; H_{BP}= Heterosis over better parent

Supplementary Table 1. Continued.

	Hybrids	Days to 50% flowering		Productive tillers		Plant height (cm)		Panicle exsertion (cm)		Panicle length (cm)		Panicle width (cm)		Grain yield/panicle (g)	
		H_{MP}	**H_{BP}**	**H_{MP}**	**H_{BP}**	**H_{MP}**	**H_{BP}**	**H_{MP}**	**H_{BP}**	**H_{MP}**	**H_{BP}**	**H_{MP}**	**H_{BP}**	**H_{MP}**	**H_{BP}**
31.	ICSA90001xICSR43	-5.12**	-4.27	16.67	14.44	11.92	7.05	84.09	52.53	17.11**	17.08**	27.54**	15.14	33.04	28.59
32.	ICSA90001xICSR89001	-9.90**	-6.31**	90.16	5.45	6.12	3.21	53.97**	48.74*	12.85**	12.60*	23.11**	9.53	52.49*	38.35
33.	ICSA91002xICSR38	-8.96**	-9.24**	85.71	63.8	-17.02*	8.62	73.68**	45.60**	10.19*	9.02	22.60*	3.39	46.49	28.31
34.	IESA2xICSR24009	-13.90**	-7.21**	52.38	-20	8.12	-7.3	76.77	38.38	9.72*	6.95	20.85*	16.31	0.99	-10.18
35.	IESA2xICSR24010	-12.89**	-5.52*	33.33	20	29.38**	-2.32	69.82**	84.91*	9.41	0.88	41.14**	36.47**	47.64	44.89
36.	IESA2xSIAYA42	-11.64**	-4.96	16.67	5.22	23.12**	1.88	77.52	38.76	14.91*	-1.01	9.95	-2.79	12.68	6.86
37.	MA6xIESV23010DL	-3.59	-3.67	22.22	-8.33	55.26**	31.91**	40.35**	38.67*	12.11*	10.86	32.53**	7.84	37.87	7.37
38.	MA6xMAKUENI LOCAL	-7.75**	-10.05**	94.59	44	34.32**	-2.05	64.39**	56.99**	24.77**	18.95**	18.84	-10.92	17.18	-6.2
39.	MA6xS35	1.26	-7.35**	23.03	13.1	-55.67**	29.53**	74.50**	58.07**	8.12	6.2	23.23*	2.78	72.00*	46.85
40.	SDSA1xICSR24009	-4.05*	0	60	0	24.70**	14.58*	67.70**	65.47*	9.91*	1.89	6.28	-5.8	-4.4	-17.93
41.	SDSA1xICSR24010	-11.11**	-3.29	38.71	24	42.34**	13.70**	18.14*	13.43	7.42	-9.52*	15.62	-3.61	24.96	22.23
42.	SDSA1xICSR43	-5.80**	-6.07*	-85.71	-88.89	31.81**	23.62**	90.00**	86.86**	7.79	4.45	21.99*	8.12	12.26	1.65

43.	SDSA1xICSR93001	-9.34**	-3.05	76.47	25	50.50**	41.21**	20.47**	19.38**	6.06	-2.71	35.32**	18.86	78.05**	49.24*
44.	SDSA1xIESV91104DL	-11.58**	-5.40*	60	46.67	51.07**	25.62**	65.83*	50.18*	-4.78	-17.97**	6.12	-11.6	2.83	-19.59
45.	SDSA1xIESV91131DL	-7.75**	-4.23	30	25	39.24**	34.86**	65.70**	59.24**	3.16	-6.4	1.13	-12.83	12.87	-2.92
46.	SDSA1xBUSIA28-1	-7.07**	-2.81	33.33	-20	42.05**	16.10**	81.96	71.3	8.78	-25.76**	17.25	0.43	42.71	32.11
47.	SDSA4xICSR24009	-4.67**	0.23	-70.37	-80	37.64**	25.82**	31.76**	23.54*	14.42**	8.62	4.77	-5.8	-9.89	-20.6
48.	SDSA4xICSR43	-6.40**	-3.82	-62.5	-66.67	30.91**	22.13**	88.41**	64.74**	17.73**	16.97**	34.19**	20.65	28.75	19.88

Note: *, ** significant at 5% and 1% respectively: H_{MP} = Heterosis over mid parent; H_{BP}= Heterosis over better parent

Supplementary Table 2. Heterobeltiosis for days to 50% flowering, plant height, panicle length and yield for sorghum hybrids within locations

		Days to flowering			Mature plant height			Panicle length			Grain yield		
No	CROSS	KBK	MWL	UKIR	KBK	MWL	UKIR	KBK	MWL	UKIR	KBK	MWL	UKIR
1	A_2DN_{55}xAIHR91075	-3.05	-5.51**	-6.52	67.65**	59.90**	32.57**	24.41**	8.49	14.65	24.25**	79.27	16.05
2	ATX623xGADAM	-13.67**	-10.00**	-2.21	69.26**	41.45**	29.45**	17.41**	-4.72	-14.48**	81.94**	90.10*	45.69
3	ATX623xICSR23019	-5.04*	-0.77	-1.47	100.24**	57.20**	41.13**	27.41**	10.24	-3.09	77.82**	204.38**	34.65
4	ATX623xICSV95022	-7.64**	-4.55*	-10.14**	16.05*	10.94	8.71	17.07**	-2.76	4.55	41.87*	-27.01	-5.7
5	ATX623xIESV91104DL	-5.71**	-4.62*	-9.87**	29.71**	25.57**	-22.02**	2.22	-6.99	-0.97	57.07**	19.73	36.34
6	ATX623xIESV91131DL	-7.91**	-3.08	-5.19	42.56**	15.78	7.76	21.48**	5.85	-4.44	32.22*	6.32	22.51
7	ATX623xIESV91136DL	-7.91**	-3.08	0.74	40.13**	29.99**	6.73	25.19**	12.36	4.05	85.00**	63.07	-4.75
8	ATX623xKARI-MTAMA1	-7.91**	-6.92**	-4.93	-41.86**	-12.32	16.11*	4.81	-9.59	-3.28	47.15**	120.66**	0.69
9	ATX623xMACIA	-9.09**	-8.15**	-3.68	36.55**	25.54**	7.36	23.33**	6.18	9.27	10.42	1.97	27.56
10	ATX623xMAKUENI LOCAL	-11.51**	-9.23**	-2.94	10.02*	-10.51*	-11.48**	10.00*	1.79	0	-7.53	-3.92	31.99
11	CK60AxIESV23010DL	-6.82**	-8.80**	-18.52**	19.70**	29.69**	27.71**	12.57**	23.91**	9.24	15.3	57.33	25.02
12	CK60AxKARI-MTAMA1	-7.30**	-11.72**	-7.75*	12.05*	12.67	18.52**	18.14**	7.66	1.74	-5.57	36.02	-6.7
13	CK60AxSP74278	-12.23**	-2.4	-17.33**	9.81	11.31	2.86	6.55	9.91	-13.18*	-16.79	52.5	17.43
14	CK60AxR8602	-6.06**	-4.80*	-8.15*	52.66**	25.69*	19.36*	35.24**	23.32**	37.94**	76.03*	16.65	50.24
15	ICSA11xICSR172	-4.51*	-2.36	2.27	28.97**	24.79*	21.77**	6.47	-7.47	17.31*	102.21**	55.97	55.17
16	ICSA11xS35	-9.02**	-7.87**	-6.82*	38.79**	40.49**	-22.59**	9.71*	-1.62	15.14*	70.05**	85.36**	47.52*
17	ICSA11xSP74279	-11.43**	-5.51**	-22.82**	3.8	1.94	1.87	17.27**	14.45*	-12.13*	-17.64	21.4	59.96
18	ICSA12xICSR162	-9.66**	1.57	2.21	87.49**	70.67**	49.69**	-2.26	-9.78	-8.47	20.94	110.73**	115.91**
19	ICSA12xICSR172	-11.72**	-3.15	-0.74	23.38**	21.40*	21.43**	-4.37	-4.89	-18.47**	19.69	78.90*	64.89
20	ICSA12xICSR93001	-6.90**	-3.76*	-5.56	28.72**	31.78**	20.34**	0.45	-3.26	-4.75	23.57	-18.6	76.43*

21	ICSA12xIESV23019DL	-8.72**	-3.13	4.93	49.05**	40.60**	25.20**	-3.12	-16.85**	1.53	17.15	26.26	80.50*
22	ICSA12xIESV91104DL	-6.90**	-1.56	-1.32	34.78**	24.43**	0.05	-4.68	-29.76**	-13.39**	32.12*	-34.13	105.71**
23	ICSA12xIESV92156	-10.34**	3.15	-0.74	38.50**	35.72**	18.75*	2.56	-13.59*	-1.86	3.16	15.65	90.79*
24	ICSA12xIESV92158DL	-8.97**	0	3.68	36.19**	30.58**	19.11*	-1.06	-17.66**	-11.53*	5.85	-0.89	50.63
25	ICSA12xIESV92172DL	-10.34**	-4.72*	-0.74	33.66**	33.08**	24.55**	9.50**	-16.85**	-8.47	29.89	4.92	53.54
26	ICSA12xKARI-MTAMA1	-7.59**	-2.34	2.11	-50.59**	25.98**	14.71*	-14.33**	39.57**	-11.69*	14.29	34.49	-1.71
27	ICSA12xSIAYA46-2	-8.97**	-1.52	-5.13	47.24**	41.16**	-0.23	-7.69*	-17.39**	-20.00**	21.43	22.64	-18.75
28	ICSA15xICSR160	-14.19**	-7.75**	-3.5	16.44*	8.71	11.81	11.61**	16.43**	12.50*	16.16	35.71	-18.31
29	ICSA15xICSR162	-2.88	1.56	-3.5	106.59**	46.95**	85.87**	2.38	7.02	29.57**	46.91*	26.1	81.84*
30	ICSA15xICSR172	-9.35**	-7.03**	3.5	39.09**	77.52**	28.56**	-4.17	-7.72	7.45	23.84	22.05	4.52
31	ICSA15xIESV91104DL	-8.57**	-3.13	0.66	18.57**	31.74**	-3.81	-12.20**	-15.17**	-0.21	79.67	40.79*	4.7
32	ICSA15xTEGEMEO	-10.07**	-6.67**	-9.09*	61.15**	71.99**	24.00**	-8.48**	-8.15	6.38	122.11*	44.38	34.66
33	ICSA276xICSR162	-8.33**	-5.07**	12.12**	56.76**	37.54**	13.41*	-4.1	-5.47	-7.57	15.07	56.07	-53.80**
34	ICSA276xICSR24008	-5.56**	-2.9	6.06	13.46*	3.38	-11.3	-2.69	0.91	-0.18	9.12	-13.42	-42.13**
35	ICSA276xIESV91104DL	-6.25**	-4.35*	-9.21**	-20.03**	-22.51**	-9.83*	0.42	-1.22	-15.86**	18.97	-27.16	-55.00**
36	ICSA293xICSR24009	-11.26**	-4.96**	-6.25	23.42**	-13.88	18.78**	24.27**	-4.98	3.07	39.02**	82.70**	70.86*
37	ICSA366xKARI-MTAMA1	-6.57**	-7.81**	-1.41	29.69**	17.14*	16.62**	24.47**	6.02	0.65	14.75	-12.26	-31.84
38	ICSA366xMACIA	-13.99**	-11.11**	0	34.64**	38.19**	25.69**	27.24**	5.91	3.07	47.49**	-25.92	148.74**
39	ICSA371xMACIA	-12.59**	-10.37**	-4.17	59.06**	56.33**	15.49*	21.64**	5.73	2.63	40.85*	2.63	37.94
40	ICSA376xIESV23013DL	-3.82	-4.65*	-8.90*	46.84**	41.67**	29.27**	23.77**	2.86	-0.83	95.03**	28.51	-20.89
41	ICSA44xIESV91104DL	-5.71**	-3.91*	-5.26	24.22**	15.68*	1.07	2.78	1.43	23.02**	25.79	14.34	44.33
42	ICSA44xMAKUENI LOCAL	-13.67**	-1.57	2.27	17.57**	-10.18*	-5.57	36.16**	22.42**	32.13**	14.83	57.56	101.94*
43	ICSA479xSIAYA66-1	-3.52	3.03	5.8	9.06	6.34	1.43	19.95**	4.22	16.07	33.41	-30.82	25.00**
44	ICSA6xICSR93034	-4.83*	-4.72*	-2.72	9.96*	-21.18**	-16.68**	28.32**	13.51	13.09*	26.75*	-39.71*	1.33
45	ICSA6xIESV23011DL	-7.80**	-3.08	-4.83	25.25**	27.15**	-0.06	0.91	2.83	-17.96**	25.08	12.7	46.78
46	ICSA654xICSR153	-11.35**	-10.00**	-7.97*	16.26*	25.91**	-3.56	6.58	-0.81	-24.60**	10.74	30.95	3.59
47	ICS687xICSR162	-7.35**	-8.80**	-8.15*	31.26**	34.84**	14.20*	22.56**	26.83**	21.61**	57.67*	33.53	-8.69
48	ICS687xIESV23011DL	-9.22**	-6.92**	-7.59*	2.71	-13.48*	-12.07*	7.25*	19.33**	-13.59**	12.52	10.3	-6.62
49	ICSA77xICSR160	-11.49**	-9.15**	-6.43	18.36**	-0.64	-1.92	6.1	4.09	-9.52	10.07	-28.27	-26.98

Supplementary Table 2. Continued.

No	Hybrid	Days to 50% flowering			Mature plant height			Panicle length			Grain yield		
		KBK	MWL	UKIR	KBK	MWL	UKIR	KBK	MWL	UKIR	KBK	MWL	UKIR
50	ICSA88001xICSR108	-12.84**	-0.76	-7.69*	31.67**	19.11*	3.88	38.92**	-3.77	-9.86*	37.82*	54.47	-18.75
51	ICSA88001xICSR160	-10.14**	-6.34**	-2.56	22.69**	8.29	42.33**	20.00**	11.59*	-0.53	34.42*	60.07*	-9.21
52	ICSA88001xICSR93034	-10.14**	-8.33**	-16.03**	29.48**	17.00**	1.92	34.87**	-5.22	12.68*	58.90**	-29.22	59.99*
53	ICSA88001xKARI-MTAMA1	-11.49**	-1.52	-14.10**	47.98**	17.24*	42.24**	32.93**	-0.58	4.4	74.85**	29.58	66.33**
54	ICSA88001xMACIA	-18.92**	-4.44*	-19.23**	16.48*	28.75**	6.03	25.37**	1.74	-3.52	12.52	-15.23	11.72
55	ICSA88006xICSR162	-3.62	-3.70*	-5.77	96.95**	111.42**	67.15**	10.10**	-0.31	0.53	63.74**	9.53	-37.29
56	ICSA88006xIESV91131DL	-7.19**	-5.19**	1.28	34.33**	20.73*	28.57**	3.26	-3.74	-7.18	-13.13	-13.5	-30.36
57	ICSA88006xKARI-MTAMA1	-5.80**	-3.70*	-3.21	42.46**	23.57**	26.87**	-1.95	15.26*	-8.93	43.96**	74.95**	126.98**
58	ICSA89003xICSR89058	2.31	3.94*	1.41	62.39**	15.8	43.47**	26.99**	20.83**	8.66	150.06**	32.45	69.9
59	ICSA89003xICSR92003	2.31	4.72*	-4.23	59.74**	40.82**	51.23**	13.07**	7.4	7	123.00**	16.87	80.5
60	ICSA89003xIESV23011DL	-7.80**	-1.54	0	45.18**	21.49**	4.52	2.42	-3.67	-12.78**	5.85	-10.16	35.94
61	ICSA 89004xICSR89028	-15.03**	-8.51**	7.53*	4.89	-3.91	15.84*	-2.41	20.70**	11.52*	11.24	-14.6	-49.50**
62	ICSA9xICSR56	-2.27	-3.82*	-0.7	24.25**	18.27*	47.92**	5.38	-2.74	23.49**	50.75*	-18.17	8.79
63	ICSA9xICSR89058	-5.30*	-3.82*	13.64**	46.00**	32.19**	67.28**	18.99**	11.61	28.19**	90.60**	31.95	28.34
64	ICSA90001xICSR162	-6.21**	-3.62*	-7.89*	51.42**	50.25**	15.80*	13.56**	-17.90**	6.8	8.68	-7.13	38.15
65	ICSA90001xICSR172	0	-7.25**	-12.50**	19.66*	-4	-0.3	18.98**	-14.67**	10.8	54.66**	25.13	45.04
66	ICSA90001xICSR24008	-1.38	-2.9	-3.29	41.32**	24.21*	14.89*	23.39**	46.33**	29.80**	57.34**	22.54	86.00**
67	ICSA90001xICSR43	-6.08**	-5.76**	-1.27	5.2	9.7	6.05	22.13**	1.35	0.47	-1	46.02	13.53
68	ICSA90001xICSR89001	-10.81**	-2.16	-5.73	15.66*	5.26	-12.32	12.74**	-0.67	2.5	32.99*	109.44**	-13.5
69	ICSA90001xICSR89058	-6.21**	-3.62*	-6.58*	19.36*	8.56	2.42	21.36**	0.94	24.60**	1.63	-4.73	36.51
70	ICSA90001xICSR92003	-4.14*	-6.52**	1.97	30.22**	27.02**	25.25**	16.61**	-7.67	26.60**	28.18	37.94**	13.53
71	ICSA91002xICSR38	-11.19**	-8.76**	-7.75*	19.85**	11.81	-10.05	18.15**	8.53	-10.71	44.21*	25.02	-14.07
72	IESA2xICSR24007	-15.28**	-3.1	-4.86	23.35**	24.86*	14.57	8.46*	0.97	-5.24	25.68	14.88	-52.15**
73	IESA2xICSR24008	-6.94**	-6.98**	-5.56	24.73**	114.17**	29.09**	34.93**	1.61	26.67**	103.44**	37.58	-0.76
74	IESA2xICSR24009	-15.89**	-6.38**	-2.78	-3.48	-16.54*	1.37	15.50**	-8.24	17.81**	9.49	-29.4	-41.57*
75	IESA2xICSR24010	-13.19**	-12.59**	0	18.73**	-18.01**	-4.02	-2.94	-2.42	8.14	40.48	91.28*	-16.69
76	IESA2xSIAYA42	-12.84**	-10.22**	4.17	6.29	-0.33	-0.39	0.74	-12.42	13.57*	-0.3	-17.76	-10.75
77	MA6xIESV23010DL	-8.33**	-5.60**	-6.57	26.09**	41.53**	27.22**	13.14**	11.55	1.15	-4.3	10.08	26.61
78	MA6xMAKUENI LOCAL	-14.39**	-10.24**	-8.76*	11.94*	-6.64	-10.62*	11.24**	12.3	32.32**	-27.95	-6.57	27.08
79	MA6xS35	0.83	-8.80**	-13.87**	36.16**	33.73**	16.37**	7.81	7.41	-2.42	105.77**	21.52	47.25
80	SDSA1xICSR24009	-5.96**	-6.38**	11.43**	21.77**	-0.38	27.02**	4.04	1.56	0	-14.45	-21.6	6.87
81	SDSA1xICSR24010	-11.72**	-4.90**	5.71	24.45**	12.70*	3.34	-5.9	-10.64	-12.09**	29.87	1.76	23.21
82	SDSA1xICSR43	-6.76**	-7.80**	-5.06	16.96*	31.11**	22.33**	6.52	8.09	-6.62	-34.60*	68.06	-4.87
83	SDSA1xICSR93001	-9.66**	-5.67**	3.47	54.11**	32.20**	38.20**	3.11	1.28	-13.58**	49.08**	33.55	58.78*
84	SDSA1xIESV91104DL	-13.10**	-9.93**	-1.32	20.82**	34.66**	20.41**	-11.80**	-24.40**	-17.05**	12.61	-54.38**	23.82
85	SDSA1xIESV91131DL	-9.66**	-10.64**	-1.95	45.42**	36.08**	23.10**	0.93	-7.23	-13.25**	0.53	10.04	-0.23
86	SDSA1xBUSIA28-1	-9.21**	-7.80**	5	25.22**	12.72*	11.25*	-22.98**	-38.01**	-14.40**	37.40*	19.57	16.87
87	SDSA4xICSR24009	-5.30**	-2.84	9.42*	32.53**	11.21	38.67**	7.61*	0.15	21.30**	-1.65	-55.40*	-1.47
88	SDSA4xICSR43	-6.71**	-6.38**	-0.63	23.78**	26.41**	15.65*	5.07	24.35**	-3.31	1.37	92.51*	-6.2
89	SDSA4xICSR89059	-9.40**	-4.26*	15.91**	46.09**	39.41**	39.91**	9.30**	11.18	29.21**	32.64	36.62	16.41

Note: *, ** significant at 5% and 1% level respectively; KBK = Kiboko; MWL = Miwaleni; UKIR = Ukiriguru

Supplementary Table 3. List of sorghum lines used in this study.

S/no	A-lines	Origin	Status	S/no	A-lines	Origin	Status	S/no	R-lines	Origin	Status
1	A_2 DN_{55}	ICRISAT-India	Inbred line	28	ICSA 89003	ICRISAT-India	Inbred line	17	ICSR 108	ICRISAT -India	Inbred line
2	ATX 623	ICRISAT-India	Inbred line	29	ICSA 9	ICRISAT-India	Inbred line	18	ICSR 153	ICRISAT -India	Inbred line
3	CK 60A	ICRISAT-India	Inbred line	30	ICSA 90001	ICRISAT-India	Inbred line	19	ICSR 160	ICRISAT -India	Inbred line
4	ICSA 11	ICRISAT-India	Inbred line	31	ICSA 91002	ICRISAT-India	Inbred line	20	ICSR 162	ICRISAT -India	Inbred line
5	ICSA 12	ICRISAT-India	Inbred line	32	IESA 2	ICRISAT-India	Inbred line	21	ICSR 172	ICRISAT -India	Inbred line
6	ICSA 15	ICRISAT-India	Inbred line	33	MA 6	ICRISAT-India	Inbred line	22	ICSR 24007	ICRISAT -India	Inbred line
7	ICSA 276	ICRISAT-India	Inbred line	34	SDSA 1	ICRISAT-India	Inbred line	23	ICSR 24008	ICRISAT -India	Inbred line
8	ICSA 293	ICRISAT-India	Inbred line	35	SDSA 29	ICRISAT-India	Inbred line	24	ICSR 24009	ICRISAT -India	Inbred line
9	ICSA 324	ICRISAT-India	Inbred line	36	SDSA 4	ICRISAT-India	Inbred line	25	ICSR 24010	ICRISAT -India	Inbred line
10	ICSA 366	ICRISAT-India	Inbred line		**R-lines**	**Origin**	**Status**	26	ICSR 38	ICRISAT -India	Inbred line
11	ICSA 371	ICRISAT-India	Inbred line	1	Busia #28-1	ICRISAT-Nairobi	Landrace	27	ICSR 43	ICRISAT -India	Inbred line
12	ICSA 376	ICRISAT-India	Inbred line	2	SIAYA # 42	ICRISAT-Nairobi	Landrace	28	ICSR 56	ICRISAT -India	Inbred line
13	ICSA 44	ICRISAT-India	Inbred line	3	AIHR 91075	ICRISAT-Nairobi	Landrace	29	ICSR 89001	ICRISAT -India	Inbred line
14	ICSA 452	ICRISAT-India	Inbred line	4	GADAM	ICRISAT-Nairobi	Variety	30	ICSR 89028	ICRISAT -India	Inbred line
15	ICSA 469	ICRISAT-India	Inbred line	5	IESV 23011 DL	ICRISAT -India	Inbred line	31	ICSR 89058	ICRISAT -India	Inbred line
16	ICSA 479	ICRISAT-India	Inbred line	6	IESV23010DL	ICRISAT-India	Inbred line	32	R 8602	ICRISAT -India	Inbred line
17	ICSA 592	ICRISAT-India	Inbred line	7	TEGEMEO	ICRISAT-Nairobi	Variety	33	ICSR 92003	ICRISAT -India	Inbred line
18	ICSA 6	ICRISAT-India	Inbred line	8	SIAYA # 66-1	ICRISAT-Nairobi	Landrace	34	ICSR 93001	ICRISAT -India	Inbred line
19	ICSA 654	ICRISAT-India	Inbred line	9	SP 74278	ICRISAT-Nairobi	Landrace	35	ICSR 93034	ICRISAT -India	Inbred line
20	ICSA 43	ICRISAT-India	Inbred line	10	SP 74279	ICRISAT-Nairobi	Landrace	36	ICSV 95022	ICRISAT -India	Inbred line
21	ICSA 683	ICRISAT-India	Inbred line	11	MACIA	ICRISAT -India	Variety	37	MAKUENI LOCAL	ICRISAT-Nairobi	Landrace
22	ICSA 686	ICRISAT-India	Inbred line	12	IESV23019DL	ICRISAT -India	Inbred line	38	S 35	ICRISAT-Nairobi	Landrace
23	ICSA 687	ICRISAT-India	Inbred line	13	IESV 91136 DL	ICRISAT -India	Inbred line	39	SIAYA # 46-2	ICRISAT-Nairobi	Landrace
24	ICSA 73	ICRISAT-India	Inbred line	14	IESV 23019 DL	ICRISAT -India	Inbred line	40	IESV 92156	ICRISAT -India	Inbred line
25	ICSA 77	ICRISAT-India	Inbred line	15	IESV 91104 DL	ICRISAT -India	Inbred line	41	KARI MTAMA 1	ICRISAT -India	Inbred line
26	ICSA 88001	ICRISAT-India	Inbred line	16	IESV 91131 DL	ICRISAT -India	Inbred line	42	AIHR 91075	ICRISAT -India	Inbred line
27	ICSA 88006	ICRISAT-India	Inbred line								