

Table S1: Sorghum parental genotypes pollen fertility percentage and *in-vitro* pollen germination percentage in 2018.

Parents	Pollen fertility percentage	<i>in-vitro</i> pollen germination percentage
AKMS 30B	81.8	55.1
AKRMS 45B	80.3	54.3
AKRMS 66-2B	78.5	33.3
RS 585	81.4	65.0
AKR-354	83.9	71.5
AKRB-335-3	92.5	74.5
SLR-24	86.2	66.6
AKRB-428	88.2	72.5
RB-324	80.4	70.5
Rb-413-1	83.3	71.5
AKRB-429	84.3	72.5
AKRB- 430	81.9	66.6
AKRB-431	92.6	75.5

Table S2: Sorghum parental genotypes pollen fertility percentage and *in-vitro* pollen germination percentage in 2019

Parents	Pollen fertility percentage	<i>in-vitro</i> pollen germination percentage
AKMS 30B	83.2	57.3
AKRMS 45B	81.2	56.1
AKRMS 66-2B	77.6	34.1
RS 585	82.7	68.1
AKR-354	85.2	72.7
AKRB-335-3	94.9	75.8
SLR-24	88.4	68.3
AKRB-428	89.9	74.4
RB-324	82.5	71.9
Rb-413-1	85.6	72.6
AKRB-429	87.2	74.2
AKRB- 430	85.4	68.3
AKRB-431	95.1	78.2

Table S3. Pooled data of Sorghum parental genotypes pollen fertility percentage and *in-vitro* pollen germination percentage.

Parents	Pollen fertility percentage	<i>in-vitro</i> pollen germination percentage
AKMS 30B	82.5	56.2
AKRMS 45B	80.75	55.2
AKRMS 66-2B	78.05	33.715
RS 585	82.05	66.55
AKR-354	84.545	72.1
AKRB-335-3	93.685	75.15
SLR-24	87.3	67.45
AKRB-428	89.05	73.45
RB-324	81.445	71.2
Rb-413-1	84.465	72.05
AKRB-429	85.75	73.35
AKRB- 430	83.65	67.45
AKRB-431	93.865	76.85

Table S4. Sorghum F₁ hybrids pollen fertility percentage and *in-vitro* pollen germination percentage in 2018.

Genotypes	Pollen fertility percentage	<i>in-vitro</i> pollen germination percentage
AKMS 30A × RS 585	79.1	53.5
AKMS 30A × AKR 354	51.1	45.6
AKMS 30A × AKRB-335-3	93.1	78.2
AKMS 30A × SLR-24	51.3	25.0
AKMS 30A × AKRB-428	86.0	66.6
AKMS 30A × RB-324	0.0	0.0
AKMS 30A × Rb-413-1	81.3	56.5
AKMS 30A × AKRB-429	83.9	65.5
AKMS 30A × AKRB-430	83.0	61.2
AKMS 30A × AKRB-431	93.6	81.5
AKRMS 45A × RS 585	52.1	33.3
AKRMS 45A × AKR 354	62.9	40.6
AKRMS 45A × AKRB-335-3	80.6	59.5
AKRMS 45A × SLR-24	52.8	42.8
AKRMS 45A × AKRB-428	81.4	59.5
AKRMS 45A × RB-324	0.0	0.0
AKRMS 45A × Rb-413-1	80.2	58.5
AKRMS 45A × AKRB-429	74.2	50.0
AKRMS 45A × AKRB-430	77.3	52.5
AKRMS 45A × AKRB-431	56.4	42.8
AKRMS 66-2A × RS 585	73.4	48.5
AKRMS 66-2A × AKR 354	75.0	50.0
AKRMS 66-2A × AKRB-335-3	72.9	51.2
AKRMS 66-2A × SLR-24	50.7	46.2
AKRMS 66-2A × AKRB-428	79.5	54.6
AKRMS 66-2A × RB-324	0.0	0.0
AKRMS 66-2A × Rb-413-1	73.5	33.3
AKRMS 66-2A × AKRB-429	74.3	52.5
AKRMS 66-2A × AKRB-430	73.7	42.8
AKRMS 66-2A × AKRB-431	52.9	33.3
CSH 15R (Checks)	82.3	58.5
CSH 19R (Checks)	82.0	62.2

Table S5. Sorghum F₁ hybrids pollen fertility percentage and *in-vitro* pollen germination percentage in 2019.

Genotypes	Pollen fertility percentage	<i>in-vitro</i> pollen germination percentage
AKMS 30A × RS 585	76.3	51.6
AKMS 30A × AKR 354	53.2	47.1
AKMS 30A × AKRB-335-3	94.3	77.3
AKMS 30A × SLR-24	53.2	29.0
AKMS 30A × AKRB-428	88.6	67.5
AKMS 30A × RB-324	0.0	0.0
AKMS 30A × Rb-413-1	82.4	57.2
AKMS 30A × AKRB-429	84.3	97.6
AKMS 30A × AKRB-430	85.1	62.3
AKMS 30A × AKRB-431	94.1	82.1
AKRMS 45A × RS 585	53.2	34.1
AKRMS 45A × AKR 354	63.5	41.2
AKRMS 45A × AKRB-335-3	81.2	61.3
AKRMS 45A × SLR-24	54.5	43.7
AKRMS 45A × AKRB-428	81.8	61.2
AKRMS 45A × RB-324	0.0	0.0
AKRMS 45A × Rb-413-1	82.1	59.3
AKRMS 45A × AKRB-429	75.9	51.3
AKRMS 45A × AKRB-430	78.6	54.1
AKRMS 45A × AKRB-431	58.1	44.3
AKRMS 66-2A × RS 585	75.1	49.4
AKRMS 66-2A × AKR 354	76.3	51.1
AKRMS 66-2A × AKRB-335-3	73.4	52.4
AKRMS 66-2A × SLR-24	51.3	47.3
AKRMS 66-2A × AKRB-428	80.3	55.7
AKRMS 66-2A × RB-324	0.0	0.0
AKRMS 66-2A × Rb-413-1	75.3	35.2
AKRMS 66-2A × AKRB-429	75.6	53.1
AKRMS 66-2A × AKRB-430	71.3	41.4
AKRMS 66-2A × AKRB-431	51.3	32.6
CSH 15R (Checks)	83.1	59.1
CSH 19R (Checks)	83.4	63.5

Table S6. Pooled data of Sorghum F₁ hybrids pollen fertility percentage and *in-vitro* pollen germination percentage.

Genotypes	Pollen fertility percentage	<i>in-vitro</i> pollen germination percentage
AKMS 30A × RS 585	77.7	52.6
AKMS 30A × AKR 354	52.1	46.4
AKMS 30A × AKRB-335-3	93.7	77.8
AKMS 30A × SLR-24	52.3	27.0
AKMS 30A × AKRB-428	87.3	67.1
AKMS 30A × RB-324	0.0	0.0
AKMS 30A × Rb-413-1	81.8	56.9
AKMS 30A × AKRB-429	84.1	81.6
AKMS 30A × AKRB-430	84.1	61.8
AKMS 30A × AKRB-431	93.9	81.8
AKRMS 45A × RS 585	52.6	33.7
AKRMS 45A × AKR 354	63.2	40.9
AKRMS 45A × AKRB-335-3	80.9	60.4
AKRMS 45A × SLR-24	53.7	43.3
AKRMS 45A × AKRB-428	81.6	60.4
AKRMS 45A × RB-324	0.0	0.0
AKRMS 45A × Rb-413-1	81.2	58.9
AKRMS 45A × AKRB-429	75.1	50.7
AKRMS 45A × AKRB-430	77.9	53.3
AKRMS 45A × AKRB-431	57.3	43.6
AKRMS 66-2A × RS 585	74.2	49.0
AKRMS 66-2A × AKR 354	75.7	50.6
AKRMS 66-2A × AKRB-335-3	73.1	51.8
AKRMS 66-2A × SLR-24	51.0	46.8
AKRMS 66-2A × AKRB-428	79.9	55.2
AKRMS 66-2A × RB-324	0.0	0.0
AKRMS 66-2A × Rb-413-1	74.4	34.3
AKRMS 66-2A × AKRB-429	74.9	52.8
AKRMS 66-2A × AKRB-430	72.5	42.1
AKRMS 66-2A × AKRB-431	52.1	33.0
CSH 15R (Checks)	82.7	58.8
CSH 19R (Checks)	82.7	62.9

Table S7: Morphological data of Sorghum parental lines

Genotypes	Plant Height (cm)			Panicle Length (cm)			Panicle Width (cm)			Anther Extrusion (no)			Anther Morphology	
	2018	2019	Pooled Data	2018	2019	Pooled Data	2018	2019	Pooled Data	2018	2019	Pooled Data	2018	2019
AKMS 30B	126	134	130	18.4	17.3	17.85	3.6	3.9	3.75	1.3	1.7	1.5	Pale yellow coloured with ample amount of pollen load	Pale yellow coloured with ample amount of pollen load
AKRMS 45B	131	142	136.5	16.8	18.6	17.7	4.1	3.4	3.75	1.4	1.6	1.5	Pale yellow coloured with ample amount of pollen load	Pale yellow coloured with ample amount of pollen load
AKRMS 66-2B	117	126	121.5	17.3	19.1	18.2	3.2	4	3.6	1.2	1.4	1.3	Pale yellow coloured with ample amount of pollen load	Pale yellow coloured with ample amount of pollen load
RS 585	190	196	193	20.1	21.3	20.7	4.2	4.8	4.5	3.1	2.8	2.95	Yellow coloured with large amount of pollen load	Yellow coloured with large amount of pollen load
AKR-354	175	181	178	21.4	20.7	21.05	4.3	4	4.15	3	2.6	2.8	Yellow coloured with large amount of pollen load	Yellow coloured with large amount of pollen load
AKRB-335-3	181	188	184.5	19.4	18.1	18.75	5.1	4.5	4.8	3.3	3	3.15	Yellow coloured with large amount of pollen load	Yellow coloured with large amount of pollen load
SLR-24	195	197	196	18.3	17.4	17.85	3.9	4.4	4.15	2.3	2.6	2.45	Yellow coloured with large amount of pollen load	Yellow coloured with large amount of pollen load
AKRB-428	201	192	196.5	19.6	18.7	19.15	4.8	4.2	4.5	2.9	2.8	2.85	Yellow coloured with large amount of pollen load	Yellow coloured with large amount of pollen load
RB-324	196	183	189.5	16.4	17.7	17.05	5	3.9	4.45	2.6	2.4	2.5	Yellow coloured with large amount of pollen load	Yellow coloured with large amount of pollen load
Rb-413-1	188	191	189.5	15.9	16.8	16.35	4.4	4.1	4.25	2.4	2.2	2.3	Yellow coloured with large amount of pollen load	Yellow coloured with large amount of pollen load
AKRB-429	205	197	201	21.1	22.3	21.7	3.7	4	3.85	2.3	2.9	2.6	Yellow coloured with large amount of pollen load	Yellow coloured with large amount of pollen load
AKRB-430	178	185	181.5	20.9	19.6	20.25	4.9	5.3	5.1	2.6	2.9	2.75	Yellow coloured with large amount of pollen load	Yellow coloured with large amount of pollen load
AKRB-431	169	165	167	17.8	18.9	18.35	5	5.4	5.2	3	3.1	3.05	Yellow coloured with large amount of pollen load	Yellow coloured with large amount of pollen load

Table S8: Morphological data of Sorghum hybrids and checks.

	Plant Height (cm)			Panicle Length (cm)			Panicle Width (cm)			Anther Extrusion (no)			Anther Morphology	
Hybrids	20 18	20 19	Pooled Data	20 18	20 19	Pooled Data	20 18	20 19	Pooled Data	20 18	20 19	Pooled Data	2018	2019
AKMS 30A × RS 585	20 2	19 6	199	23 .6	24 .7	24.15	5. 6	4. 8	5.2	3. 4	2. 8	3.1	Yellow coloured with large amount of pollen load	Yellow coloured with large amount of pollen load
AKMS 30A × AKR 354	18 6	19 5	190.5	22 .1	21 .4	21.75	4. 1	5. 3	4.7	2. 9	3. 3	3.1	Pale yellow coloured with small amount of pollen load	Pale yellow coloured with small amount of pollen load
AKMS 30A × AKRB-335-3	19 9	20 7	203	23 .9	25 .8	24.85	5. 8	6. 4	6.1	3. 9	4. 8	4.35	Yellow coloured with large amount of pollen load	Yellow coloured with large amount of pollen load
AKMS 30A × SLR-24	21 1	22 5	218	26 .3	24 .9	25.6	4. 8	4. 2	4.5	3. 1	2. 9	3	Pale yellow coloured with small amount of pollen load	Pale yellow coloured with small amount of pollen load
AKMS 30A × AKRB-428	23 1	21 2	221.5	27 .8	28 .6	28.2	5. 5	5. 7	5.6	3. 8	4. 2	4	Yellow coloured with large amount of pollen load	Yellow coloured with large amount of pollen load
AKMS 30A × RB-324	21 3	20 4	208.5	25 .5	26 .8	26.15	3. 1	3. 3	3.2	1. 6	1. 9	1.75	White /Pale colored and flattened	White/Pale colored and flattened
AKMS 30A × Rb-413-1	21 7	20 1	209	23 .1	20 .8	21.95	5. 5	6. 1	5.8	4. 1	4. 5	4.3	Yellow coloured with large amount of pollen load	Yellow coloured with large amount of pollen load
AKMS 30A × AKRB-429	23 0	24 0	235	24 .7	22 .1	23.4	5. 3	5. 5	5.4	3. 8	3. 3	3.55	Yellow coloured with large amount of pollen load	Yellow coloured with large amount of pollen load
AKMS 30A × AKRB-430	18 6	19 9	192.5	20 .3	21 .2	20.75	5. 8	4. 9	5.35	4. 2	3. 4	3.8	Yellow coloured with large amount of pollen load	Yellow coloured with large amount of pollen load
AKMS 30A × AKRB-431	18 1	19 5	188	19 .8	21 .6	20.7	6. 2	5. 6	5.9	4. 4	3. 1	3.75	Yellow coloured with large amount of pollen load	Yellow coloured with large amount of pollen load
AKRMS 45A × RS 585	20 9	21 7	213	24 .9	26 .6	25.75	4. 3	4. 8	4.55	3	3. 2	3.1	Pale yellow coloured with small amount of pollen load	Pale yellow coloured with small amount of pollen load
AKRMS 45A × AKR 354	20 4	19 8	201	25 .3	27 .1	26.2	4. 2	3. 9	4.05	3. 1	3. 5	3.3	Yellow coloured with large amount of pollen load	Yellow coloured with large amount of pollen load
AKRMS 45A × AKRB-335-3	22 7	23 5	231	23 .8	25 .2	24.5	5. 3	4. 1	4.7	3. 4	3. 8	3.6	Yellow coloured with large amount of pollen load	Yellow coloured with large amount of pollen load
AKRMS 45A × SLR-24	23 3	23 8	235.5	24 .3	25 .6	24.95	3. 6	4. 1	3.85	2. 8	2. 6	2.7	Pale yellow coloured with small amount of pollen load	Pale yellow coloured with small amount of pollen load
AKRMS 45A × AKRB-428	22 3	21 4	218.5	23 .7	22 .5	23.1	4. 4	4. 9	4.65	3. 3	3. 6	3.45		
AKRMS 45A × RB-324	21 7	22 1	219	21 .9	20 .6	21.25	3. 3	3. 7	3.5	1. 9	2. 2	2.05	White /Pale colored and flattened	White/Pale colored and flattened

AKRMS 45A × Rb-413-1	23 0	21 5	222.5	25 .7	27 .8	26.75	4. 1	4. 5	4.3	2. 9	3. 7	3.3	Yellow coloured with large amount of pollen load	Yellow coloured with large amount of pollen load
AKRMS 45A × AKRB-429	25 0	26 3	256.5	24 .1	26 .4	25.25	4. 3	3. 8	4.05	2. 6	2. 9	2.75	Yellow coloured with large amount of pollen load	Yellow coloured with large amount of pollen load
AKRMS 45A × AKRB-430	20 6	22 2	214	22 .8	24 .9	23.85	5. 5	5. 9	5.7	4. 2	4. 6	4.4	Yellow coloured with large amount of pollen load	Yellow coloured with large amount of pollen load
AKRMS 45A × AKRB-431	19 0	18 6	188	25 .4	23 .8	24.6	5. 3	6. 1	5.7	3. 5	4. 2	3.85	Pale yellow coloured with small amount of pollen load	Pale yellow coloured with small amount of pollen load
AKRMS 66-2A × RS 585	19 9	20 7	203	24 .6	21 .9	23.25	5. 2	4. 3	4.75	3. 1	3. 6	3.35	Yellow coloured with large amount of pollen load	Yellow coloured with large amount of pollen load
AKRMS 66-2A × AKR 354	18 7	19 3	190	20 .7	22 .6	21.65	4. 7	4. 1	4.4	2. 4	2. 1	2.25	Yellow coloured with large amount of pollen load	Yellow coloured with large amount of pollen load
AKRMS 66-2A × AKRB-335-3	20 3	19 5	199	19 .8	22 .3	21.05	5. 8	6. 5	6.15	3. 8	4. 2	4	Yellow coloured with large amount of pollen load	Yellow coloured with large amount of pollen load
AKRMS 66-2A × SLR-24	21 8	21 0	214	21 .6	20 .9	21.25	5. 4	4. 3	4.85	3. 2	3. 5	3.35	Pale yellow coloured with small amount of pollen load	Pale yellow coloured with small amount of pollen load
AKRMS 66-2A × AKRB-428	23 0	23 4	232	24 .5	25 .2	24.85	4. 2	4. 9	4.55	2. 9	3. 1	3	Pale yellow coloured with small amount of pollen load	Pale yellow coloured with small amount of pollen load
AKRMS 66-2A × RB-324	24 1	24 9	245	22 .9	22 .5	22.7	2. 8	3. 1	2.95	1. 5	1. 2	1.35	White /Pale colored and flattened	White/Pale colored and flattened
AKRMS 66-2A × Rb-413-1	20 3	21 1	207	23 .8	24 .5	24.15	4	4. 9	4.45	2. 3	2. 7	2.5	Yellow coloured with large amount of pollen load	Yellow coloured with large amount of pollen load
AKRMS 66-2A × AKRB-429	22 3	21 8	220.5	24 .4	21 .6	23	5. 2	3. 9	4.55	3. 4	3. 1	3.25	Yellow coloured with large amount of pollen load	Yellow coloured with large amount of pollen load
AKRMS 66-2A × AKRB-430	19 0	19 3	191.5	22 .3	21 .1	21.7	5. 7	4. 3	5	3. 6	2. 9	3.25	Yellow coloured with large amount of pollen load	Yellow coloured with large amount of pollen load
AKRMS 66-2A × AKRB-431	18 5	18 1	183	25 .6	27 .9	26.75	3. 9	4. 9	4.4	2. 8	3. 1	2.95	Pale yellow coloured with small amount of pollen load	Pale yellow coloured with small amount of pollen load
CSH 15R (Checks)	16 4	17 2	168	23 .1	24 .8	23.95	5. 2	5	5.1	3. 4	2. 9	3.15	Yellow coloured with large amount of pollen load	Yellow coloured with large amount of pollen load
CSH 19R (Checks)	18 0	17 5	177.5	24 .3	24 .5	24.4	4. 8	5. 3	5.05	3. 1	3. 6	3.35	Yellow coloured with large amount of pollen load	Yellow coloured with large amount of pollen load