

Table S1 Pedigree details and target agro-climatic conditions of the genotypes used in study

G No	Genotype	Pedigree	Target Conditions
G 01	AKAW3717	HW2035/NI5439	Drought
G 02	AKW2862-1	VEE#6//DOVE"S"/BUC"S"CM92225-66Y-OM	Heat
G 03	C 306	RGN/CSK3//2*C591/3/C217/N14//C281	TSRF NWPZ, NEPZ
G 04	CNM 16-1	Mutus*2/HARIL#1	IR CZ, PZ
G 05	DBW 168	SUNSU/CHIBIA	TSIR PZ
G 06	DHTW 60	Indigenous collection IC356761A	Drought
G 07	DWAP 1607	Advanced Breeding Line	Late sown (Heat)
G 08	DWAP 1608	Advanced Breeding Line	Late sown (Heat)
G 09	DWAP 1610	Advanced Breeding Line	Late sown (Heat)
G 10	DWAP 1612	Advanced Breeding Line	Late sown (Heat)
G 11	DWAP 1613	Advanced Breeding Line	IR CZ, PZ
G 12	DWAP 1614	Advanced Breeding Line	IR CZ, PZ
G 13	HD 3043	PJN/BOW//OPATA*2/3/CROC_1Ae.squarrosa 224)//OPATA	RI NWPZ
G 14	HINDI 62	Land race from UP (IC296681)	Heat & Drought
G 15	HTW11	Indigenous collection IC35117	Heat
G 16	HTW 14	RAJ3765/P11632//4*PBW343/3/PBW698	Heat
G 17	HTW6	Indigenous collection IC29007A	Heat
G 18	HTW 64	HD2733/2*C306	Drought
G 19	HTW 65	K7903/P11632	Heat
G 20	HTW 66	SYN36/PBW396//2*PBW343	Heat
G 21	HTW 67	RAJ3765/P11632//3*PBW343	Heat
G 22	LBP 2016-5	NI5439/MACS2496	IR CZ, PZ
G 23	LBP 2016-9	NP846/HUW234	Late sown (Heat)
G 24	NIAW 1415	GW9506/PRL//PRL	RF/RI PZ
G 25	PBS 2	SYN44/DBW14*2//FLW01	Late sown (Heat)
G 26	QBP 1605	30 th SAWSN3009	IR CZ, PZ
G 27	QBP 1606	36 th IBWSN172/AHW-5//PBW343/27 th IBWSN 168	IR CZ, PZ
G 28	QBP 1608	39 th IBWSN1110/36 th IBWSN162//HI1539	Late sown (Heat)
G 29	RWP 2016-10	BAJ#1*2/KISKADEE#1	Late sown (Heat)
G 30	RWP 2016-15	Francolin#1*2//ND643/2*WBLL1	IR CZ, PZ
G 31	RWP 2016-16	Sr39/DPW621-50	IR CZ, PZ
G 32	RWP 2016-17	VEE/MJI//2*TUI/3/PASTOR/4/BERKUT/5/MUU	Late sown (Heat)
G 33	RWP 2016-18	BABAX/Lr42//BABAX*2/3/PAVON753+Lr47/4/ND643/2*WBLL2	IR CZ, PZ
G 34	SRIL 1	DPW621-50/Dharwar Dry	Drought
G 35	SRIL 116	DPW621-50/Dharwar Dry	Drought
G 36	ST 1A	SYN99/OP2425/FLW22//PBW502	Late sown (Heat)
G 37	UAS 304	SERI/CEP80120//KAUZ/PBW343	TSIR PZ
G 38	WB 2	<i>T. DICOCCON CI9309/AE.SQUARROSA (409)/3/ MILAN/ S87230// BAV92/4/ 2*MILAN/ S87320//BAV92</i>	TSIR NWPZ
G 39	WH 730	CPAN2092/IMPROVED LOK1	Heat
G 40	WS 2016-12	EC479379/K0711	IR CZ, PZ
G 41	WS 2016-4	PASTOR/3/Altar84/Ae. Sq (Tr.Ta)//OPATA M-85	IR CZ, PZ
G 42	WS 2016-8	AKAW4006/F81513/MILAN	IR CZ, PZ

Table S2 ANOVA for agronomical traits under TSIR NS, TSRF DR and LSIR HT

Source	DF	DH	DM	GFD	BM	GY	HI	TGW
Year (Y)	1	16156.63**	32093.59**	7792.33**	130017189.99**	18618692.58**	4840.48**	987.46**
Centre (C)	2	51374.40**	21649.53**	27437.34**	106599827.48**	9513145.10**	4736.29**	6490.97**
Genotype (G)	41	607.42**	142.87**	146.56**	272807.09	35803.79*	172.62**	176.51**
Sowing Condition (Cond)	3	9880.70**	28336.96**	17990.25**	52270927.57**	5498998.67**	1242.06**	3846.65**
Sowing time (S)	1	1745.75**	65293.51**	31679.28**	1863575.98**	27287.63	182.24*	10759.33**
Irrigation (IR)	1	14892.20**	11034.74**	356.73**	101418484.22**	11594018.15**	1007.23**	572.39**
G*Cond	123	40	28.83	30.99	71383.24	12367.64	41.79**	19.21
Y*G*Cond	164	9.44	27.96	27.75	70811.81	10151.5	42.23**	17.23
G*S	41	91.36**	36.05	66.09*	60964.71	11297.19	72.66**	31.38**
G*IR	41	15.62**	34.33	33.50	70040.49	13303.88	41.19	16.29
G*S*IR	41	14.25**	40.02	38.10	54935.27	7394.43	49.70	14.49
C*G*S*IR	126	125.57**	60.42**	59.29*	242574.15**	9366.65	90.27**	52.92**
TSIR-NS	41	309.50**	90.66**	90.34*	205217.31**	21732.96**	62.75**	83.66**
TSRF-DR	41	402.57**	94.53**	105.75**	91719.22**	13175.27**	82.18	56.44**
LSIR-HT	41	90.624**	52.84	67.35	119932.22**	22708.99**	121.03**	61.94**
LSRF-DHT	41	81.15**	60.25**	46.5	41014.53	6813.15*	76.36**	39.10**
Source	DF	PHT	PTL	SPKL	SPKLT	GN	GW	
Year (Y)	1	49233.03**	202526.91**	117.71**	391.69**	16483.52**	76.30**	
Centre (C)	2	76925.88**	20169.43**	102.98**	740.75**	7964.74**	25.84**	
Genotype (G)	41	2717.29**	2575.54**	19.19**	37.70**	875.83**	0.97**	
Sowing Condition (Cond)	3	23014.09**	83208.65**	98.44**	570.86**	5867.68**	16.262**	
Sowing time (S)	1	2303.58**	46996.17**	5.03	89.03**	73.45	22.42**	
Irrigation (IR)	1	48124.75**	130598.70**	222.67**	1264.12**	15480.48**	26.97**	
G*Cond	123	69.16**	314.72	3.2	4.61	66.17	0.16	
Y*G*Cond	164	49.63**	310.65	3.29	6.01	72.88	0.14	
G*S	41	89.84**	331.91	2.78	4.66	73.19	0.18**	
G*IR	41	69.84	333.35	2.77	5.59	99.94*	0.22**	
G*S*IR	41		243.09	3.22	4.20	48.44	0.07	
C*G*S*IR	126	42.22	326.89	4.27	5.02	69.37	0.13	
TSIR-NS	41	1014.49**	778.55**	6.69**	18.48**	402.98**	0.39**	
TSRF-DR	41	664.62**	999.90**	15.48*	17.31**	240.24**	0.37**	
LSIR-HT	41	964.59**	1212.79**	5.98**	14.39**	282.39**	0.25**	
LSRF-DHT	41	465.27**	532.53**	3.54**	5.50**	128.47**	0.19**	

**Significant at (P< 0.01) per cent LSD and * significant at (P<0.05) per cent LSD

Table S3 Mean performance of genotypes under different environments.

TSIR-NS				TSRF-DR		
Trait	Mean \pm SE	Range	CV%	Mean \pm SE	Range	CV%
DH	78.47 \pm 0.78	65.25 – 85.58	6.47	75.69 \pm 0.44	66.92 – 80.58	3.81
DM	128.31 \pm 0.42	117.00 – 131.92	2.14	111.56 \pm 0.28	104.83 – 114.17	1.62
GFD	45.27 \pm 0.42	37.67 – 52.58	6.06	35.38 \pm 0.24	28.08 – 39.58	5.18
PHT	95.85 \pm 1.42	78.83 – 124.53	9.59	91.59 \pm 1.39	76.94 – 113.39	9.86
PTL	88.07 \pm 1.24	70.29 – 104.00	9.15	80.80 \pm 1.68	65.04 – 118.75	13.44
BM	1539.84 \pm 20.18	1280.67 – 1812.17	8.49	1211.41 \pm 19.08	993.85 – 1459.58	10.20
GY	522.01 \pm 6.57	417.08 – 616.71	8.15	398.70 \pm 8.13	302.42 – 535.69	13.22
HI	35.56 \pm 0.35	29.28 – 43.59	6.43	32.40 \pm 0.43	26.53 – 41.17	8.64
SPKL	10.06 \pm 0.12	7.90 – 11.19	7.42	9.54 \pm 0.11	7.79 – 11.17	7.54
SPKLT	18.92 \pm 0.19	16.22 – 22.64	6.56	18.05 \pm 0.16	15.69 – 19.92	5.82
GN	53.58 \pm 0.89	40.77 – 62.57	10.82	49.25 \pm 0.89	34.58 – 63.05	11.77
GW	2.33 \pm 0.03	1.64 – 2.83	9.47	1.81 \pm 0.03	1.24 – 2.46	12.44
TGW	42.62 \pm 0.41	38.88 – 48.35	6.19	36.62 \pm 0.42	32.22 – 43.76	7.49

LSIR-HT				LSRF-DHT		
Trait	Mean \pm SE	Range	CV%	Mean \pm SE	Range	CV%
DH	72.06 \pm 0.42	65.50 – 76.58	3.81	68.01 \pm 0.90	54.25 – 79.50	8.53
DM	111.60 \pm 0.32	103.92 – 115.00	1.88	109.46 \pm 0.43	103.33 – 127.75	2.35
GFD	37.19 \pm 0.37	29.00 – 41.25	6.37	30.47 \pm 0.46	28.00 – 41.83	6.54
PHT	94.36 \pm 1.38	79.67 – 118.36	9.50	80.81 \pm 1.18	63.50 – 103.75	9.45
PTL	85.94 \pm 1.55	76.00 – 117.42	10.70	64.14 \pm 1.41	52.46 – 98.08	14.27
BM	1194.22 \pm 15.43	992.29 – 1396.46	8.37	748.75 \pm 13.85	560.79 – 1067.08	11.99
GY	434.29 \pm 6.71	335.08 – 526.08	10.02	268.37 \pm 5.28	202.48 – 344.23	12.76
HI	36.94 \pm 0.49	29.70 – 44.86	8.60	34.63 \pm 0.41	28.04 – 39.50	7.73
SPKL	9.63 \pm 0.11	7.42 – 11.02	7.34	8.98 \pm 0.18	6.69 – 14.68	12.75
SPKLT	18.96 \pm 0.17	16.47 – 21.03	5.78	16.67 \pm 0.19	13.06 – 18.81	7.31
GN	51.41 \pm 0.75	42.43 – 63.08	9.45	45.51 \pm 0.70	33.53 – 55.20	9.90
GW	1.97 \pm 0.03	1.64 – 2.42	8.38	1.54 \pm 0.03	1.41 – 2.31	10.56
TGW	36.99 \pm 0.35	33.00 – 41.96	6.12	31.22 \pm 0.34	37.38 – 46.12	5.29