

Supplementary Data

Epistasis effects and inheritance of harvest index, drought and heat-resistance related traits in groundnut (*Arachis hypogaea* L.)

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Supplementary Table 1. Genotypes used in the study

Sl. No.	Genotype	Botanical type	Pedigree	Characteristics
1	TAG 24	Spanish	TGS 2×TGE 1	A semi-dwarf commercial cultivar ; possesses moderate heat stress tolerance, low SLA, high $\Delta^{13}C$, high yield and very high HI
2	TMV 2 NLM	Virginia	Mutant of TMV 2	TMV 2 NLM is an induced narrow leaf mutant of an Indian Spanish cultivar, TMV 2; possesses heat stress tolerance, high SCMR, medium SLA and very low HI
3	GG 2	Spanish	J 11 ×EC 16659	Drought tolerant commercial variety; possesses heat stress tolerance, moderate SCMR and SLA, high $\Delta^{13}C$ and moderate HI
4	PBS 24030	Virginia	M13 ×R 33-1	An advanced breeding line developed at DGR and released as ‘Girnar 2’ for commercial cultivation; possesses moderately high water-use efficiency, moderate levels of heat stress tolerance, moderate SCMR and SLA, and low $\Delta^{13}C$ and HI
5	JL 24	Spanish	Selection from EC 94943	A commercial variety with high heat stress tolerance, low SCMR and HI, high SLA and $\Delta^{13}C$
6	PBS 12160	Spanish	Girnar 1 × ICGS 11	An advanced breeding line developed at DGR and released for commercial cultivation as ‘Girnar 3’; possesses moderate end-of-season drought tolerance, low SLA and high SCMR, sensitive to heat stress
7	NRCG 1022	Virginia	Germplasm line ICG 6764 collected from USA	A germplasm line moderately tolerant to heat stress; possesses moderate SCMR and SLA, high $\Delta^{13}C$ and low HI
8	NRCG 11535	Spanish	Germplasm line ICG 11907 collected from Mali	A germplasm line moderately tolerant to heat stress; possesses moderate SCMR and SLA, low $\Delta^{13}C$ and low HI
9	PBS 11049	Spanish	Advanced breeding line developed at DGR, Junagadh, India	Highly sensitive to heat stress; possesses moderate SCMR and SLA, high $\Delta^{13}C$ and low HI
10	ICGV 98383	Virginia	Advanced breeding line collected from ICRISAT, Hyderabad	Sensitive to heat stress; possesses moderate SCMR and SLA; low $\Delta^{13}C$ and HI
11	Chico	Spanish	A germplasm line developed by line selection from PI 268661	An early-maturing germplasm line with high sensitivity to heat stress; low SCMR, high SLA, low $\Delta^{13}C$ and high HI

DGR _ Directorate of Groundnut Research; ICRISAT _ International Crops Research Institute for the Semi-Arid Tropics; SCMR_Soil and plant analytical device chlorophyll meter reading; SLA_specific leaf area; $\Delta^{13}C$ _carbon isotope discrimination; HI_harvest index

Supplementary Table 2. Description of Triple Test Cross (TTC) mating design used

Sl. No.	Designation		Progeny
	Inbred	Tester	
1	GG 2 (I ₁)	TAG 24 (L ₁)	I ₁ × L ₁ (Single cross)
2	PBS 24030 (I ₂)		I ₂ × L ₁ (Single cross)
3	JL 24 (I ₃)		I ₃ × L ₁ (Single cross)
4	PBS 12160 (I ₄)		I ₄ × L ₁ (Single cross)
5	NRCG 1022 (I ₅)		I ₅ × L ₁ (Single cross)
6	NRCG 11535 (I ₆)		I ₆ × L ₁ (Single cross)
7	PBS 11049 (I ₇)		I ₇ × L ₁ (Single cross)
8	ICGV 98383 (I ₈)		I ₈ × L ₁ (Single cross)
9	Chico (I ₉)		I ₉ × L ₁ (Single cross)
10	GG 2 (I ₁)	TMV 2NLM (L ₂)	I ₁ × L ₂ (Single cross)
11	PBS 24030 (I ₂)		I ₂ × L ₂ (Single cross)
12	JL 24 (I ₃)		I ₃ × L ₂ (Single cross)
13	PBS 12160 (I ₄)		I ₄ × L ₂ (Single cross)
14	NRCG 1022 (I ₅)		I ₅ × L ₂ (Single cross)
15	NRCG 11535 (I ₆)		I ₆ × L ₂ (Single cross)
16	PBS 11049 (I ₇)		I ₇ × L ₂ (Single cross)
17	ICGV 98383 (I ₈)		I ₈ × L ₂ (Single cross)
18	Chico (I ₉)		I ₉ × L ₂ (Single cross)
19	GG 2 (I ₁)	TAG 24 × TMV 2NLM (Single cross, L ₃)	I ₁ × L ₃ (Three-way cross)
20	PBS 24030 (I ₂)		I ₂ × L ₃ (Three-way cross)
21	JL 24 (I ₃)		I ₃ × L ₃ (Three-way cross)
22	PBS 12160 (I ₄)		I ₄ × L ₃ (Three-way cross)
23	NRCG 1022 (I ₅)		I ₅ × L ₃ (Three-way cross)
24	NRCG 11535 (I ₆)		I ₆ × L ₃ (Three-way cross)
25	PBS 11049 (I ₇)		I ₇ × L ₃ (Three-way cross)
26	ICGV 98383 (I ₈)		I ₈ × L ₃ (Three-way cross)
27	Chico (I ₉)		I ₉ × L ₃ (Three-way cross)

Supplementary Table 3. Split of experimental material

Category	Material	Sub-Total
Inbred lines (parents)	L ₁ + L ₂ + 9 lines	11
Single crosses	(L ₃) + 9 single crosses (Sl.No.1-9) + 9 single crosses (Sl.No.10-18)	19
Three-way crosses	9 three-way crosses (Sl.No.19-27)	9
	Total	39