

Source of Variations	df	Sum of Squares	Mean Squares	F Ratio	Probability	η^2	ηp^2	ω^2
Replicates	2	5.90506	2.95253	8.402	0.00055 ***	0.033	0.198	0.028
Treatments	34	147.15044	4.32795	12.315	0.00000 ***	0.832	0.860	0.417
Parents	9	32.14992	3.57221	10.165	0.00000 ***	0.182	0.574	0.139
Parents (Line)	4	1.95824	0.48956	1.393	0.24565	0.011	0.076	0.003
Parents (Testers)	4	8.88906	2.22227	6.324	0.00022 ***	0.050	0.271	0.040
Parents (L vs T)	1	21.30261	21.30261	60.618	0.00000 ***	0.120	0.471	0.106
Parents vs Crosses	1	18.97191	18.97191	53.985	0.00000 ***	0.107	0.443	0.095
Crosses	24	96.02861	4.00119	11.386	0.00000 ***	0.543	0.801	0.321
Line Effect	4	69.54389	17.38597	14.631	0.00003 ***	0.393	0.785	0.263
Tester Effect	4	7.47209	1.86802	1.572	0.22972	0.042	0.282	0.015
Line * Tester Eff.	16	19.01263	1.18829	3.381	0.00023 ***	0.107	0.443	0.068
Error	68	23.89700	0.35143					
Total	104	176.95250	1.70147					

Line * Tester Analysis

ANOVA for Earhead Length cm

Source of Variations	df	Sum of Squares	Mean Squares	F Ratio	Probability	η^2	ηp^2	ω^2
Replicates	2	7.22355	3.61178	9.508	0.00033 ***	0.059	0.284	0.050
Crosses	24	96.02861	4.00119	10.533	0.00000 ***	0.790	0.840	0.400
Line Effect	4	69.54389	17.38597	14.631	0.00003 ***	0.572	0.785	0.339
Tester Effect	4	7.47209	1.86802	1.572	0.22972	0.062	0.282	0.021
Line * Tester Eff.	16	19.01263	1.18829	3.128	0.00117 **	0.156	0.510	0.092
Error	48	18.23451	0.37989					
Total	74	121.48668	1.64171					

 μ Mean

Parental Mean	10.95600
General Mean	10.28390
Cross Mean	10.01507
Average Heterosis %	-8.58829

GCA & SCA Effects Table for Earhead Length cm

Parent	COGG -2	ML -267	PUSA -105	RMG -275	PDM -89 -	GCA Test	Var. GCA	Var. SCA	GCA / SCA
LGG -460	0.612	0.348	-0.308	-0.314	-0.340	-0.583 ***	0.340	0.805	0.422
LGG -410	0.420	-0.258	0.313	-0.040	-0.436	0.143	0.020	0.532	0.038
COGG -22	-0.414	-0.284	-0.460	-0.090	1.248 ***	0.363 *	0.132	2.029	0.065
ML -26 - 7	-0.502	0.174	-0.615	0.616	0.326	0.078	0.006	1.146	0.005
PUSA -105 / A	-0.117	0.019	1.070 **	-0.173	-0.799 *	0.000	0.000	1.827	0.000
GCA Line	0.522 ***	0.340 **	0.876 ***	-1.862 ***	0.124				
Var. GCA	0.273	0.115	0.767	3.466	0.015				
Var. SCA	0.988	0.299	1.927	0.517	2.607				
GCA / SCA	0.276	0.385	0.398	6.704	0.006				

Means Table for Earhead Length cm

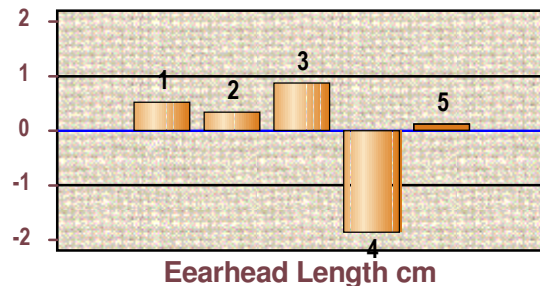
	LGG -460	LGG -410	COGG -22	ML -26	PUSA -105 / A	F1 Mean	Par. Mean
COGG -2	10.567	11.100	10.487	10.113	10.420	10.537	11.667
ML -267	10.120	10.240	10.433	10.607	10.373	10.355	11.780
PUSA -105	10.000	11.347	10.793	10.353	11.960	10.891	11.360
RMG -275	7.257	8.257	8.427	8.847	7.980	8.153	12.460
PDM -89 - 221	9.217	9.847	11.750	10.543	9.340	10.139	11.727
F1 Mean(Tester)	9.432	10.158	10.378	10.093	10.015	10.015	11.799
Par. Mean(Tester)	9.827	10.213	11.493	9.160	9.873	10.113	

Comparison	Std. Error	C.D.95 %	C.D.99 %
GCA(Line)	0.1591	0.3200	0.4268
GCA(Tester)	0.1591	0.3200	0.4268
SCA	0.3558	0.7155	0.9545
Gi - Gj(Line)	0.2251	0.4525	0.6037
Gi - Gj(Tester)	0.2251	0.4525	0.6037
Sij - Skl	0.5032	1.0118	1.3498
Sij - Sik	0.5513	1.1084	1.4786

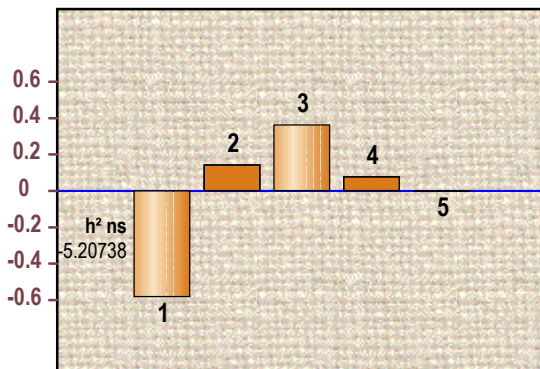
	Fixed Effect	Random Effect	Standard Error	Singh & Chaudhry
σ^2 Line HS	1.1337 ***	1.0798 ***	0.6697	1.0798
σ^2 Tester HS	0.0992	0.0453	0.0766	0.0453
σ^2 GCA (Average) HS.	0.6165 ***	0.5626 ***	0.3370	0.0703
σ^2 L * T (SCA)	0.2695 **	0.2695 **	0.1320 *	0.2695
σ^2 e	0.1266	0.1266		0.1266
σ^2 a(F = 1)	1.2329	1.1252		0.1406
σ^2 D(F = 1)	0.2695	0.2695		0.2695
σ^2 a / Var.D	4.5755	4.1755		0.5219
Degree of Dominance	0.4675	0.4894		1.3842
σ^2 a(F = 0)	2.4659	2.2503		0.2813
σ^2 D(F = 0)	1.0779	1.0779		1.0779
σ^2 a / Var.D	2.2877	2.0877		0.2610
Degree of Dominance	0.6611	0.6921		1.9575
σ^2 p	1.6290	1.5213		0.5367
h^2 (Narrow Sense) %	75.6854	73.9626		26.2035
Genetic Advance 5 %	1.9900	1.8792		0.3955
Covar F.S.				2.0510
Contribution of				
Line	72.4200 %			
Tester	7.7811 %			
Line * Tester	19.7989 %			

Parent	Regression Equation	T-Test	Probability	R ²
Line	Y = 40.73513 -2.60369 x	7.1753	0.0056	0.69121
Mid	Y = 16.62753 -0.60355 x	1.1168	0.3455	0.05143
Tester	Y = 7.93847 0.20533 x	0.6766	0.5472	0.01951

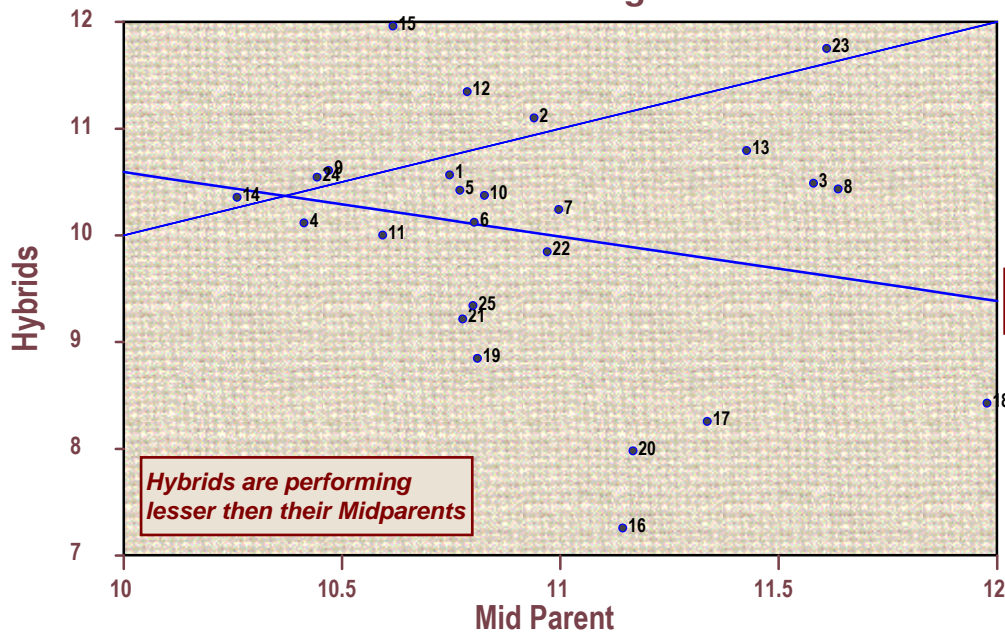
Line GCA effects



Earhead Length cm



Earhead Length cm



Line of 45 degree where midparent performance is equal to Hybrid performance

Regression Line of the Line * Tester experiment

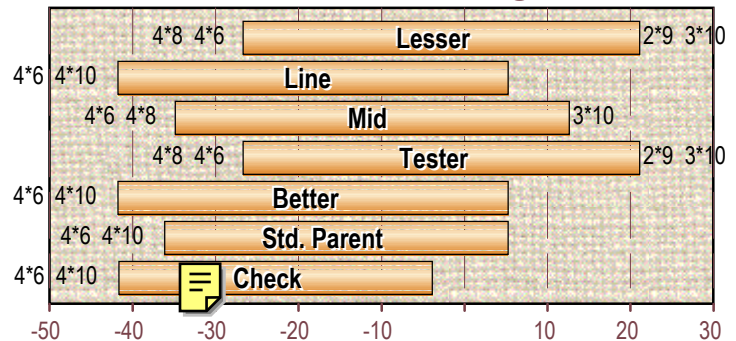
Hybrids are performing lesser then their Midparents

Heterosis Table (Earhead Length cm)

F1	Mean	Lesser	Line	Mid	Tester	Better	Std. Parent	Check
1*6 COGG -2*LGG -460	10.57	7.53	-9.43 *	-1.67	7.53	-9.43 *	-6.98	-15.06 **
1*7 COGG -2*LGG -410	11.10	8.68	-4.86	1.46	8.68	-4.86	-2.29	-10.77 *
1*8 COGG -2*COGG -22	10.49	-8.76	-10.11 *	-9.44 *	-8.76	-10.11 *	-7.69	-15.70 **
1*9 COGG -2*ML -26 - 7	10.11	10.41	-13.31 **	-2.88	10.41	-13.31 **	-10.97 *	-18.70 **
1*10 COGG -2*PUSA -105 / A	10.42	5.54	-10.69 *	-3.25	5.54	-10.69 *	-8.27	-16.24 **
2*6 ML -267*LGG -460	10.12	2.99	-14.09 **	-6.33	2.99	-14.09 **	-10.92 *	-18.65 **
2*7 ML -267*LGG -410	10.24	0.26	-13.07 **	-6.88	0.26	-13.07 **	-9.86 *	-17.68 **
2*8 ML -267*COGG -22	10.43	-9.22 *	-11.43 *	-10.34 **	-9.22 *	-11.43 *	-8.16	-16.13 **
2*9 ML -267*ML -26 - 7	10.61	15.79 **	-9.96 *	1.31	15.79 **	-9.96 *	-6.63	-14.74 **
2*10 ML -267*PUSA -105 / A	10.37	5.06	-11.94 **	-4.19	5.06	-11.94 **	-8.69	-16.61 **
3*6 PUSA -105*LGG -460	10.00	1.76	-11.97 **	-5.60	1.76	-11.97 **	-11.97 **	-19.61 **
3*7 PUSA -105*LGG -410	11.35	11.10 *	-0.12	5.19	11.10 *	-0.12	-0.12	-8.79 *
3*8 PUSA -105*COGG -22	10.79	-4.99	-4.99	-5.54	-6.09	-6.09	-4.99	-13.24 **
3*9 PUSA -105*ML -26 - 7	10.35	13.03 *	-8.86	0.91	13.03 *	-8.86	-8.86	-16.77 **
3*10 PUSA -105*PUSA -105 /	11.96	21.13 **	5.28	12.65 **	21.13 **	5.28	5.28	-3.86
4*6 RMG -275*LGG -460	7.26	-26.15 **	-41.76 **	-34.88 **	-26.15 **	-41.76 **	-36.12 **	-41.67 **
4*7 RMG -275*LGG -410	8.26	-19.16 **	-33.73 **	-27.17 **	-19.16 **	-33.73 **	-27.32 **	-33.63 **
4*8 RMG -275*COGG -22	8.43	-26.68 **	-32.37 **	-29.64 **	-26.68 **	-32.37 **	-25.82 **	-32.26 **
4*9 RMG -275*ML -26 - 7	8.85	-3.42	-29.00 **	-18.16 **	-3.42	-29.00 **	-22.12 **	-28.89 **
4*10 RMG -275*PUSA -105 / A	7.98	-19.18 **	-35.96 **	-28.54 **	-19.18 **	-35.96 **	-29.75 **	-35.85 **
5*6 PDM -89 - 221*LGG -460	9.22	-6.21	-21.40 **	-14.48 **	-6.21	-21.40 **	-18.87 **	-25.91 **
5*7 PDM -89 - 221*LGG -410	9.85	-3.59	-16.03 **	-10.24 *	-3.59	-16.03 **	-13.32 **	-20.85 **
5*8 PDM -89 - 221*COGG -22	11.75	2.23	0.20	1.21	2.23	0.20	3.43	-5.55
5*9 PDM -89 - 221*ML -26 -	10.54	15.10 **	-10.09 *	0.96	15.10 **	-10.09 *	-7.19	-15.25 **
5*10 PDM -89 - 221*PUSA -10	9.34	-5.40	-20.35 **	-13.52 **	-5.40	-20.35 **	-17.78 **	-24.92 **

Comparison of F1 with	S.E.Difference	CD 95 %	CD 99 %
Mid Parent	0.4358	0.8763	1.1690
Line / Tester / Selected Parent / Check	0.5032	1.0118	1.3498

Heterosis Ranges



Line x Tester Anova (Summary)



	DF	Plant Height cm	Peduncle Volume	Earhead Length cm	Total Biomass	Grain Yield/ Plant g
Replicates	2	42.726 *	0.062	3.612 ***	260.712	270.726 ***
Crosses	24	28.338 **	0.905 ***	4.001 ***	120.034	21.592
Line Effect	4	61.916	2.932 **	17.386 ***	96.966	6.266
Tester Effect	4	7.046	0.750	1.868	101.447	7.652
Line * Tester Eff.	16	25.267 *	0.437	1.188 **	130.448	28.909
Error	48	11.699	0.251	0.380	111.555	21.668
Total	74	17.934	0.458	1.642	118.336	28.375

General Combining Ability (Summary)

	Plant Height cm	Peduncle Volume	Earhead Length cm	Total Biomass	Grain Yield/ Plant g
COGG -2	-2.493 ***	0.442 ***	0.522 ***	-3.301 ***	-0.828 ***
ML -267	-1.482 ***	0.196 **	0.340 ***	1.218	0.607
PUSA -105	0.007	-0.166 ***	0.876 ***	2.073	0.391
RMG -275	2.318	-0.688 ***	-1.862 ***	-2.137 ***	-0.559 ***
PDM -89 - 221	1.651	0.216 ***	0.124 *	2.147	0.388
LGG -460	0.319	-0.184 ***	-0.583 ***	-2.053 ***	-0.413 ***
LGG -410	-0.165 ***	0.012	0.143 *	1.603	0.889
COGG -22	0.071	0.142 **	0.363 ***	-2.249 ***	-0.642 ***
ML -26 - 7	0.815	0.284 ***	0.078	-1.057 ***	-0.489 ***
PUSA -105 / A	-1.039 ***	-0.255 ***	0.000 ***	3.755	0.654
sl ² Line HS	3.348	0.179	1.134	-0.973	-1.027
sl ² Tester HS	-0.310	0.033	0.099	-0.674	-0.934
sl ² GCA (Average) HS.	1.519	0.106	0.616	-0.823	-0.981
sl ² L * T (SCA)	4.523	0.062	0.269	6.298	2.413
sl ² e	3.900	0.084	0.127	37.185	7.223
sl ² a(F = 1)	3.038	0.212	1.233	-1.646	-1.961
sl ² D(F = 1)	4.523	0.062	0.269	6.298	2.413
sl ² a / Var.D	0.672	3.408	4.575	-0.261	-0.813
IDegree of Dominance	1.220	0.542	0.467	1.956	1.109
sl ² a(F = 0)	6.075	0.424	2.466	-3.293	-3.923
sl ² D(F = 0)	18.090	0.249	1.078	25.191	9.653
sl ² a / Var.D	0.336	1.704	2.288	-0.131	-0.406
IDegree of Dominance	1.726	0.766	0.661	2.766	1.569
sl ² p	11.460	0.358	1.629	41.836	7.675
Ih ² (Narrow Sense) %	26.506	59.273	75.685	-3.936	-25.554
IGenetic Advance 5 %	1.848	0.730	1.990	-0.524	-1.458