

Table (2): Mean performances for *in vivo* and *in vitro* traits of maize inbred lines and their 10 F₁ hybrids evaluated in 2008 growing season.

Genotypes	Plant height	Ear height	Ear length	Ear diameter	Number of rows per ear	Number of kernels per row	1000 kernel weight	Grain yield per plant
L71	181.46	82.16	13.78	3.87	11.34	26.74	183.72	81.94
L85	179.58	78.87	13.97	3.64	14.16	28.4	183.19	68.51
L101	192.51	96.33	14.03	3.57	12.91	27.39	187.41	70.20
L120	161.90	57.40	15.65	3.36	10.48	29.52	172.95	67.21
L173	140.94	40.75	12.88	3.99	12.63	25.91	198.28	74.98
L71× L85	209.03	112.21	20.62	5.14	15.97	43.79	252.34	191.43
L71 ×L101	283.88	122.61	17.41	4.63	14.24	42.46	360.24	157.43
L71×L120	254.22	117.35	18.77	4.63	14.62	42.75	230.32	171.10
L71×L173	219.10	97.13	19.95	5.30	16.20	44.78	272.12	198.02
L85×L101	250.58	105.83	21.61	4.57	14.92	42.21	311.84	215.90
L85×L120	278.08	132.49	18.21	4.63	13.90	42.49	287.86	197.77
L85×L173	245.63	108.77	18.87	5.07	14.61	43.05	273.70	194.80
L101×L120	252.40	129.24	18.70	4.37	13.49	44.16	231.78	186.26
L101×L73	219.10	109.06	19.15	4.83	15.73	43.84	249.32	190.57
L120×L173	224.04	107.41	19.53	4.48	14.56	46.63	268.29	191.50
L.S.D. at 0.05	17.80	15.36	1.04	0.33	1.44	2.34	7.78	10.74
L.S.D. at 0.01	23.96	20.68	1.40	0.44	1.94	3.14	10.48	14.46

Table (2) Cont.

Genotypes	Callus fresh weight I	Callus fresh weight II	Callus fresh weight III	Callus formation percentag	Callus growth rate I	Callus growth rate II	Callus growth rate III
L71	170	324	448	52	11.30	10.24	8.24
L85	176	308	464	48	11.72	10.64	8.48
L101	154	302	398	44	10.24	9.98	6.32
L120	158	312	422	52	10.50	10.24	7.28
L173	144	294	414	44	9.58	9.98	7.98
L71× L85	210	414	540	60	13.90	13.52	8.38
L71 ×L101	206	426	534	60	13.64	14.64	7.18
L71×L120	198	404	514	64	13.12	13.32	6.92
L71×L173	192	398	506	52	12.64	13.60	7.04
L85×L101	228	440	554	60	15.18	14.10	7.46
L85×L120	218	456	564	60	14.44	15.82	7.04
L85×L173	224	400	570	56	14.90	11.70	11.30
L101×L120	220	448	568	64	14.58	15.12	8.00
L101×L73	226	462	574	60	15.04	15.70	7.44
L120×L173	198	402	518	68	13.24	13.04	7.98
L.S.D. at 0.05	7.57	25.64	30.58	19.46	1.06	1.6	1.88
L.S.D. at 0.01	10.19	34.5	41.18	26.2	1.42	2.14	2.52

Table (3): Mean square estimates of ordinary and combining ability analysis for *in vivo* and *in vitro* traits of the diallel cross evaluated in 2008 growing season.

S.O.V.	d.f	Plant height	Ear height	Ear length	Ear diameter	Number of rows per ear	Number of kernels per row	1000 kernel weight	Grain yield per plant
Replicates	2	299.35	172.19	0.15	0.06	0.42	6.78	18.76	31.34
Genotypes	14	5336.26**	1978.14**	23.14**	1.07**	7.83**	188.63**	5686.60**	10276.29*
Parents	4	1224.01**	1445.90**	3.02**	0.19**	6.12**	6.00*	249.23**	108.30
Crosses	9	1944.19**	369.61**	4.40**	0.29**	2.39**	5.49*	1858.02**	750.77**
Parent. vs Crosses	1	52313.88**	18583.86**	272.28**	11.67**	63.62**	2567.37**	61893.36**	136677.92**
GCA	4	2432.89**	1418.72**	1.13*	0.64**	6.58**	4.49*	1205.63**	290.45**
SCA	10	6497.61**	2201.91**	31.94**	1.24**	8.33**	262.28**	7478.99**	14270.63**
Error	28	112.97	84.20	0.39	0.04	0.73	1.93	21.62	41.15
GCA/SCA		0.37	0.64	0.04	0.52	0.79	0.02	0.16	0.02

*and ** significant at the $P < 0.05$ and the $P < 0.01$ levels of probability, respectively.

Table (3). Cont

S.O.V.	d.f	Callus fresh weight I	Callus fresh weight II	Callus fresh weight III	Callus formation percentage	Callus growth rate I	Callus growth rate II	Callus growth rate III
Replicates	4	141.33	550	801.33	245.33	0.47	0.30	0.71
Genotypes	14	3948.00**	18451.43**	18818.48**	268.19	17.34**	22.98**	6.56**
Parents	4	814.00**	630.00	3526.00**	80.00	3.63**	0.37	3.81
Crosses	9	848.89**	3072.22**	3215.33**	96.89	3.95**	8.28**	8.42**
Parent. vs Crosses	1	44376.00**	228150.00**	220416.67**	2562.67**	192.67**	245.76**	0.76
GCA	4	1232.29**	1705.71**	3392.29**	NS	5.56**	3.17	8.92**
SCA	10	5034.29**	25149.71**	24988.95**	NS	22.05**	30.91**	5.62**
Error	56	136.33	390.71	556.33		0.66	1.51	2.07
GCA/SCA		0.24	0.07	0.14	0.42	0.25	0.10	1.59

*and ** significant at the $P < 0.05$ and the $P < 0.01$ levels of probability, respectively.

Table (4): Percentage of heterosis over better-parents for *in vivo* and *in vitro* studied characters in diallel cross

Genotypes	Plant height	Ear height	Ear length	Ear diameter	Number of rows per ear	Number of kernels per row	1000 kernel weight	Grain yield per plant
L71×L85	16.40	36.58**	47.59**	32.98**	12.83**	54.17**	37.35**	133.62**
L71 ×L101	56.44**	27.28**	24.04**	19.76**	10.33**	144.16**	38.86**	92.12**
L71×L120	57.02**	42.83**	19.89**	19.59**	28.86**	44.81**	25.37**	108.82**
L71×L173	55.46**	18.22*	44.78**	32.74**	28.27**	67.45**	37.24**	141.66**
L85×L101	39.54**	9.87	53.99**	25.79**	5.42**	48.61**	66.40**	207.56**
L85×L120	71.76**	67.99**	16.31**	27.22**	-1.84**	43.91**	57.14**	188.67**
L85×L173	74.28**	37.91**	35.04**	26.93**	3.23**	51.56**	38.04**	159.81**
L101×L120	55.90**	63.87**	19.46**	22.52**	4.52**	49.59**	23.67**	165.34**
L101×L73	55.46**	13.22	36.46**	20.86**	21.84**	60.06**	25.74**	154.17**
L120×L173	58.97**	87.13**	24.77**	12.16**	15.34**	57.94**	35.31**	155.42**
L.S.D. at 0.05	17.80	15.36	1.04	0.33	1.44	2.34	7.78	10.74
L.S.D. at 0.01	23.96	20.68	1.40	0.44	1.94	3.14	10.48	14.46

*and ** significant at the $P < 0.05$ and the $P < 0.01$ levels of probability, respectively.

Table(4). Cont.

Genotypes	Callus fresh weight 1	Callus fresh weight 2	Callus fresh weight 3	Callus growth rate I	Callus growth rate II	Callus growth rate III
L71×L85	19.32*	27.78*	16.38	18.60**	27.07**	-1.18*
L71 ×L101	21.18**	31.48*	19.20	20.71**	42.97**	-12.86**
L71×L120	16.47*	24.69	14.73	16.11**	30.08**	-16.02**
L71×L173	12.94	22.84	12.95	11.86**	32.81**	-14.56**
L85×L101	29.55**	42.86**	19.40	29.52**	32.52**	-12.03**
L85×L120	23.86**	46.15**	21.55	23.21**	48.68**	-16.98**
L85×L173	27.27**	29.87*	22.84	27.13**	9.96**	33.25**
L101×L120	39.24**	43.59**	34.60*	38.86**	47.66**	9.89**
L101×L73	46.75**	52.98**	38.65*	46.88**	57.31**	-6.77**
L120×L173	25.32**	28.85*	22.75	26.10**	27.34**	0.00
L.S.D. at 0.05	15.14	25.64	30.58	0.53	1.6	0.94
L.S.D. at 0.01	20.38	34.5	41.18	0.71	2.14	1.26

*and**

Significant at the $P < 0.05$ and the $P < 0.01$ levels of probability, respectively.

Table (5): Estimates of general combining ability effects for the parental Genotypes for *in vivo* and *in vitro* traits in diallel cross evaluated in 2008 growing season.

Genotypes	Plant height	Ear height	Ear length	Ear diameter	Number of rows per ear	Number of kernels per row	1000 kernel weight	Grain yield per plant
L71	5.21	6.24*	-0.41	0.43**	-0.08	-1.02**	-18.38**	-9.08**
L85	10.93**	7.71*	0.86**	0.11	1.64**	-0.56*	28.62**	14.52**
L101	31.72**	25.87**	-0.14	-0.38**	0.13	-0.94*	1.14	-5.36*
L120	6.67	0.96	0.54*	-0.69**	-2.74**	2.33**	-26.23**	-9.42**
L173	-54.53**	-40.79**	-0.86**	0.53**	1.05**	0.20	14.85**	9.34**
L.S.D. at 0.05	7.14	6.16	0.42	0.13	0.58	0.94	3.12	4.32
L.S.D. at 0.01	9.60	8.30	0.56	0.18	0.78	1.26	4.2	5.8

*and ** significant at the $P < 0.05$ and the $P < 0.01$ levels of probability, respectively.

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Table (5) Cont.

Genotypes	Callus fresh weight I	Callus fresh weight II	Callus fresh weight III	Callus growth rate I	Callus growth rate II	Callus growth rate III
L71	-16.29**	-18.57**	-32.29**	-1.22**	-0.78**	-0.58*
L85	45.14**	7.14*	86.29**	3.04**	-0.17	3.09**
L101	13.71**	45.71**	-6.57	0.94**	2.05**	-2.93**
L120	-13.43**	12.86**	-19.43**	-0.88**	0.80**	-1.65**
L173	-29.14**	-47.14**	-28.00**	-1.88**	-1.90**	2.07**
L.S.D. at 0.05	3.92	6.63	7.92	0.28	0.41	0.49
L.S.D. at 0.01	5.28	8.93	10.66	0.37	0.56	0.65

*and ** significant at the $P < 0.05$ and the $P < 0.01$ levels of probability, respectively.

Table (6): Estimates of specific combining ability (SCA) effects for the hybrids for *in vivo* and *in vitro* traits.

Genotypes	Plant height	Ear height	Ear length	Ear diameter	Number of rows per ear	Number of kernels per row	1000 kernel weight	Grain yield per plant
L71×L85	-47.5**	23.16**	5.02**	1.67**	4.41**	18.13**	34.11**	117.32**
L71 ×L101	156.2**	36.19**	1.90**	0.63**	0.73	14.52**	85.29**	35.20**
L71×L120	92.3**	45.31**	2.76**	0.92**	4.71**	12.13**	22.91**	80.29**
L71×L173	48.1**	26.41**	5.19**	1.73**	5.67**	20.33**	107.23**	142.27**
L85×L101	50.6**	-15.61*	2.34**	0.78**	1.05	13.31**	193.09**	187.01**
L85×L120	158.1**	89.28**	3.73**	1.24**	0.84	10.87**	148.53**	136.69**
L85×L173	122.0**	59.86**	4.06**	1.35**	-0.80	14.68**	64.96**	109.02**
L101×L120	60.3**	61.37**	2.90**	0.97**	1.13	16.28**	7.75	122.03**
L101×L73	21.6*	42.58**	3.36**	1.12**	4.06**	17.44**	19.31**	116.20**
L120×L173	61.5**	62.54**	1.15*	0.38*	3.42**	22.54**	103.57**	123.07**
L.S.D. at 0.05	19.56	16.88	1.08	0.36	1.58	2.56	8.56	11.8
L.S.D. at 0.01	26.34	22.74	1.46	0.48	2.12	3.44	11.52	15.9

*and ** Significant at the $P < 0.05$ and the $P < 0.01$ levels of probability, respectively.

Table (6) Cont.

Genotypes	Callus fresh weight I	Callus fresh weight II	Callus fresh weight III	Callus growth rate I	Callus growth rate II	Callus growth rate III
L71×L85	47.14**	151.43**	116.67**	3.01**	4.67**	0.38
L71 ×L101	58.57**	172.86**	179.52**	3.81**	8.06**	0.40
L71×L120	45.71**	95.71**	92.38**	3.02**	2.70**	-2.18**
L71×L173	31.43**	125.71**	60.95**	1.62**	6.80**	-5.30**
L85×L101	107.14**	217.14**	160.95**	7.25**	4.74**	-1.88**
L85×L120	84.29**	330.00**	223.81**	5.37**	14.59**	-5.25**
L85×L173	130.00**	110.00**	262.38**	8.67**	-3.31**	12.32**
L101×L120	125.71**	251.43**	336.67**	8.17**	8.87**	5.57**
L101×L73	171.43**	381.43**	375.24**	11.47**	14.47**	-0.96
L120×L173	58.57**	114.29**	108.10**	4.28**	2.41**	0.47
L.S.D. at 0.05	10.74	18.19	21.70	0.75	1.13	1.33
L.S.D. at 0.01	14.46	24.49	29.22	1.01	1.52	1.79

*and ** Significant at the $P < 0.05$ and the $P < 0.01$ levels of probability, respectively.

Table (7): Phenotypic correlation for *in vivo* and *in vitro* studied traits

Traits	Callus fresh weight I	Callus fresh weight II	Callus fresh weight III	Callus growth rate I	Callus growth rate II	Callus growth rate III
Plant height	0.82**	0.85**	0.81**	0.81**	0.81**	-0.03
Ear high	0.82**	0.85**	0.81**	0.82**	0.81**	-0.04
Ear length	0.85**	0.85**	0.83**	0.85**	0.76**	0.07
Ear diameter	0.75**	0.76**	0.79**	0.74**	0.69**	0.24*
Number of rows per ear	0.67**	0.65**	0.67**	0.66**	0.63**	-0.05
Number of kernel per row	0.87**	0.91**	0.89**	0.86**	0.85**	-0.01
1000 kernel weight	0.72**	0.76**	0.72**	0.72**	0.73**	0.02
Grain yield per plant	0.91**	0.93**	0.91**	0.90**	0.84**	0.13

*and ** Significant at the $P < 0.05$ and the $P < 0.01$ levels of probability, respectively.