

Table 3. Mean squares estimates for all studied wheat traits in a half 7x7 wheat diallel crosses under normal and late sowing dates as well as their combined data

S.O.V.	Env.	D.f	Days to heading	Flag leaf area	Plant height	Membrane stability index (MSI)	Electrolyte leakage (EL)	No. of spikes/plant	No. of kernels / spike	1000-kernel weight	Grain yield / plant
Sowing dates (D)	Comb.	1	242.881**	5776.56**	1134.12**	4391.23**	437.47**	81.62**	4054.29**	4006.2**	3353.13**
Rep/s	D1	2	1.08	17.95	0.60	68.70	9.64	1.74	15.14	0.03	4.0575
	D2	2	0.14	5.66	15.26	1.96	0.31	5.03	0.88	0.85	1.6037
	Comb.	4	0.61	10.57	7.68	35.33	4.98	3.39	8.01	0.44	2.83
Genotypes (G)	D1	27	17.53**	217.14**	150.60**	31.93**	10.93**	2.04	119.20**	148.96**	37.20**
	D2	27	8.63*	139.75**	184.59**	64.18**	17.69**	1.29	100.46**	67.06**	17.13**
	Comb.	27	13.209**	251.86**	309.66**	48.55**	19.32**	2.08	165.44**	149.02**	34.00**
G x D	Comb.	27	12.955**	67.99**	26.36**	47.56**	9.30**	1.25	54.23**	67.00**	20.32**
GCA	D1	6	11.22 **	5.17**	166.11**	14.26**	2.49*	1.09	67.79**	61.20**	10.21**
	D2	6	5.17**	26.68**	265.56**	18.16**	1.61	0.58	70.02**	36.49**	14.12**
	Comb.	6	12.35**	25.12**	422.22**	14.13**	1.66	1.25	105.54**	84.72**	17.93**
SCA	D1	21	4.31**	88.72**	17.09**	9.61**	3.97**	0.56	31.72**	46.36**	13.02**
	D2	21	2.22 **	52.27**	3.23**	22.31**	7.12**	0.39	23.03**	18.30**	3.30**
	Comb.	21	2.13**	113.27**	9.94**	16.77**	7.81**	0.54	40.74**	39.65**	9.44**
GCA x D	Comb.	6	4.04**	16.73**	9.45**	18.29**	2.44*	0.41	32.28**	12.97**	6.40**
SCA x D	Comb.	21	4.40 **	27.73**	10.38**	15.15**	3.29**	0.42	14.02**	25.01**	6.88**
GCA / SCA	D1		2.60	0.17	9.72	1.48	0.63	1.93	2.14	1.32	0.78
	D2		2.33	0.51	82.25	0.81	0.23	1.48	3.04	1.99	4.28
	Comb.		5.79	0.22	42.47	0.84	0.21	2.33	2.59	2.14	1.90
Error	D1	54	0.35	3.06	12.32	7.14	1.52	1.63	1.75	0.43	3.07
	D2	54	4.65	2.58	6.66	3.47	1.71	1.06	3.94	0.39	1.55
	Comb.	108	2.50	2.52	8.91	5.30	1.61	1.35	2.84	0.41	2.31

D1 and D2: recommended and late sowing dates, respectively. *, **: significant at 0.05 and 0.01 levels of probability, respectively. GCA and SCA denote general and specific combining ability, respectively.

Table 6. Estimates of general combining ability effects for the 7 bread wheat parental genotypes evaluated under normal (D1) and late (D2) sowing date

Parents	Days to 50% heading		Flag leaf area (cm ²)		Plant height (cm)		Membrane stability index (MSI)		Electrolyte Leakage (EL)		No. of spikes / plant		No. of kernels /spike		1000 – Kernel weight (g)		Grain yield /plant	
	D1	D2	D1	D2	D1	D2	D1	D2	D1	D2	D1	D2	D1	D2	D1	D2	D1	D2
Sakha 93 (P1)	-0.04	0.39	-1.00**	-2.24**	-6.69**	-8.13**	-0.14	0.85*	0	-0.38	0.14	0.06	-4.93**	-3.86**	-3.17**	-1.13**	-1.54**	-0.55*
Gemmeiza 11 (P2)	-2.04**	-1.42**	-0.19	1.24**	-0.08	1.21*	2.31**	1.02**	-0.38	0.03	-0.61**	-0.33	-0.78**	4.73**	2.58**	1.17**	-0.01	0.98**
Gemmeiza 10 (P3)	0.96**	0.54	2.18**	0.21	-5.10**	-6.80**	-1.93**	1.36**	0.83**	0.06	0.06	-0.2	-1.24**	-1.94**	-2.99**	-3.53**	-1.05**	-2.50**
Gemmeiza 7 (P4)	1.40**	-0.02	0.96**	1.54**	3.31**	4.86**	-0.52	-0.15	-0.14	0.38	0.14	-0.19	2.14**	-0.56	2.73**	1.44**	0.84**	0.12
Misr 2 (P5)	-0.12	-0.02	-0.51	1.84**	3.31**	4.79**	0.33	-2.63**	-0.82**	0.12	-0.22	0.05	-0.16	-1.02**	2.51**	1.26**	-0.06	0.84**
Sids 1 (P6)	-0.52**	0.91*	-1.75**	-0.27	4.10**	4.09**	-0.15	0.63	0.34	-0.71**	0.51*	0.24	1.55**	0.69	-0.92**	-1.24**	1.60**	0.04
Giza 168 (P7)	0.36*	-0.39	0.3	-2.31**	1.15	-0.03	0.11	-1.08**	0.16	0.50*	-0.02	0.37*	3.42**	1.95**	-0.73**	2.01**	0.24	1.08**
S.E(gi)	0.11	0.38	0.31	0.29	0.63	0.46	0.48	0.33	0.22	0.23	0.23	0.18	0.24	0.35	0.12	0.11	0.31	0.22
LSD(gi - gj) 0.05	0.32	1.17	0.95	0.87	1.91	1.4	1.45	1.01	0.67	0.71	0.69	0.56	0.72	1.08	0.36	0.34	0.95	0.68
0.01	0.43	1.56	1.27	1.16	2.54	1.87	1.93	1.35	0.89	0.95	0.92	0.75	0.96	1.44	0.47	0.45	1.27	0.9

*and** = denote significant differences at 0.05 and 0.01 probability levels, respectively.

Table 7. Estimates of specific combining ability effects for 21 wheat crosses evaluated under normal (D1) and late (D2) sowing date

Cross	Days to 50% heading		Flag leaf area (cm ²)		Plant height (cm)		Membrane stability index		Electrolyte leakage (EL)		No. of spikes / plant		No. of kernels /spike		1000 – Kernel weight (g)		Grain yield /plant	
	D1	D2	D1	D2	D1	D2	D1	D2	D1	D2	D1	D2	D1	D2	D1	D2	D1	D2
	P1 X P2	2.87**	-1.44	3.26**	0.26	-1.45	1.01	2.28	2.37*	-0.17	-0.47	-0.1	-0.42	-1.56*	-3.22**	3.31**	2.77**	1.46
P1 X P3	-0.13	-1.08	12.36**	2.36**	-1.79	-1.26	2.49	2.76**	0.69	-0.21	0.02	-0.91	7.93**	3.75**	-1.29**	6.47**	-2.34*	0.9
P1 X P4	-0.24	1.15	1.86*	7.45**	1.6	-0.02	0.48	7.71**	-2.51**	-3.50**	-1.16	0.41	1.82*	2.50*	3.06**	-1.83**	-2.06*	-2.83**
P1 X P5	2.94 **	-0.85	3.05**	-4.65**	3.16	-1.78	0.49	6.25**	0.91	1.39*	-0.13	-0.33	3.25**	3.33**	-6.29**	1.68**	-0.63	0.16
P1 X P6	1.35 **	-0.45	3.68**	7.06**	-0.06	1.72	-1.89	-0.18	-0.28	-0.08	-0.26	1.15*	-1.16	-7.75**	-3.19**	0.52	-0.89	2.04**
P1 X P7	-0.54	1.18	-0.85	-5.45**	-0.38	0.34	-1.72	-0.6	2.09**	2.28**	-0.06	0.76	-4.73**	1.39	6.29**	1.27**	-1.86*	0.72
P2 X P3	-0.13	-0.59	-4.25**	-16.75**	3.04	0.84	-1.33	-0.78	2.84**	1.91**	-0.29	0.81	-2.55**	-2.88**	-7.00**	-5.16**	1.2	-1.38**
P2 X P4	-1.58 **	2.63 *	9.94**	8.83**	-1.18	-1.62	0.28	-0.3	0.53	-1.38*	-1.47*	-0.17	-1.73*	3.71**	7.64**	0.2	-2.89**	-1.15
P2 X P5	-1.06 **	-1.03	-0.27	3.77**	0.89	0.29	3.51*	0.98	-1.88**	5.68**	-0.21	-0.24	0.97	-1.26	-2.04**	-0.28	0.31	0.28
P2 X P6	0.35	-1.96	-0.73	4.78**	-0.56	2.59	0.79	-1.25	-0.87	-0.09	-0.37	-0.4	-1.51*	-1.91	1.46**	2.22**	3.02**	-0.02
P2 X P7	0.46	2.34 *	8.05**	3.63**	0.98	-0.17	-4.77**	-0.04	0.74	-1.80*	0.55	0.72	1.05	4.13**	2.20**	-0.70*	-1.82*	2.31**
P3 X P4	-0.91**	0	-10.60**	-1.93*	2.25	0.89	-0.77	3.26**	-0.6	-3.22**	1.42*	-0.1	5.39**	3.48**	-6.65**	4.90**	6.38**	-0.25
P3 X P5	1.94 **	-0.67	7.10**	12.00**	0.68	1.39	-3.42 *	3.04**	0.81	2.04**	-0.03	0.1	-7.21**	-0.53	13.37**	5.08**	-2.98**	-1.43*
P3 X P6	1.69 **	1.08	12.00**	-0.02	5.33**	-1.28	-7.47**	-0.09	0.99	0.04	-0.45	0.44	1.78*	0.96	6.73**	6.58**	1.26	0.51
P3 X P7	-1.54 **	1.04	8.23**	8.05**	8.31**	-1.16	-0.53	2.96 **	1.50*	-0.44	0.94	0.44	7.58**	0.14	-3.23**	3.33**	1.45	-1.24
P4 X P5	3.50 **	0.22	3.42**	5.19**	-7.43**	1.27	0.14	-0.28	-1.59*	0.47	0.33	0.39	11.68**	2.60*	-11.02**	-3.22**	-0.41	1.25
P4 X P6	0.91 **	-0.04	0.03	-3.01**	1.58	-1.33	3.65*	5.52**	-3.18**	-1.68*	0.27	-0.94	-5.13**	-2.37*	-8.76**	0.95**	4.07**	-2.19**
P4 X P7	-2.98 **	-1.07	-12.06**	-8.06**	5.69**	2.35	-0.94	5.68**	-2.10**	-2.09**	-0.06	-0.19	4.67**	5.53**	1.55**	-0.64*	-5.37**	-0.7
P5 X P6	0.1	-1.71	15.06**	5.19**	-0.55	-3.50*	2.17	0.34	0.84	-0.58	0.2	0.56	2.54**	-7.92**	-8.87**	-1.87**	3.60**	0.83
P5 X P7	0.54	1.59	-1.97*	-2.02*	0.82	2.22	-2.09	-2.92**	-0.95	-3.73**	-0.35	-0.1	2.80**	3.12**	0.11	-1.29**	3.79**	2.69**
P6 X P7	-0.06	-0.34	-4.35**	-1.61	-2.46	-2.92*	1.99	-1.15	0.19	0.14	-1.07	-1.13*	-1.95**	0.97	4.70**	1.71**	4.93**	1.65*
DP(Sij)	0.31	1.12	0.91	0.83	1.82	1.34	1.38	0.97	0.64	0.68	0.66	0.53	0.69	1.03	0.34	0.32	0.91	0.65
LSD(Sij - Sik) 0.05	0.91	3.32	2.69	2.47	5.4	3.97	4.11	2.87	1.9	2.01	1.97	1.59	2.04	3.06	1.01	0.96	2.7	1.92
0.01	1.21	4.42	3.58	3.29	7.19	5.28	5.47	3.81	2.52	2.68	2.61	2.11	2.71	4.06	1.34	1.28	3.59	2.55
LSD(Sij - Skl) 0.05	0.85	3.11	2.52	2.31	5.05	3.72	3.85	2.68	1.78	1.88	1.84	1.48	1.91	2.86	0.94	0.9	2.52	1.79
0.01	1.13	4.13	3.35	3.08	6.72	4.94	5.12	3.57	2.36	2.5	2.45	1.97	2.53	3.8	1.26	1.2	3.36	2.38

*and** = denote significant differences at 0.05 and 0.01 probability levels, respectively. P1 (Sakha 93), P2 (Gemmeiza 11), P3 (Gemmeiza 10), P4 (Gemmeiza 7), P5 (Misr 2), P6 (Sids 1) and P7 (Giza 168)