

()

*

(// : // :)

%

SCA

GCA

SCA

GCA

%

SCA

GCA

()

B

()

PEG

:

:

*

%

(SF)

(RWC)

.()

()

(SF)

.()

.()

.()

×

F₁

)

*

.()

.(

(F₁)

F₁

.()

.()

%

()

.()

.()

B

%

... :

GCA
)
 SCA ,(×) × .(
 * %
 .() SCA (*) EXCEL
 ()
 GCA MINITAB
 % SCA
 () SCA GCA MSTAT-C D₂ DIAL98

%
 GCA
 SCA * .()
 %
 SCA
 .() GCA
 .()
 (SCA) (GCA)

| | | | | | | | |
|------|------|------|------|------|------|------|---------|
| / ns | / ns | / ns | / ** | / ** | / ** | / ns | GCA |
| / ** | / ** | / ** | / ** | / * | / ns | / * | SCA |
| / | / | / | / | / | / | / | ī |
| / ns | / ns | / ns | / ns | / ** | / ** | / ns | GCA/SCA |

(SCA) (GCA)

| | | | | | |
|------|------|------|------|------|---------|
| % | | | | | |
| / * | / * | / * | / ** | / ** | GCA |
| / ** | / ** | / ** | / ns | / ns | SCA |
| / | / | / | / | / | ī |
| / ns | / ns | / ns | / ** | / ** | GCA/SCA |

** * ns

(SCA) (GCA)

| | | | | | | | | | |
|------|------|------|------|------|------|------|------|------|---------|
| / * | / * | / * | / * | / * | / * | / * | / ** | / ns | GCA |
| / ** | / * | / ** | / ** | / ** | / ** | / ** | / * | / ** | SCA |
| / | / | / | / | / | / | / | / | / | ī |
| / ns | / ns | / ns | ns | / ns | * | / ns | / ** | / ns | GCA/SCA |

** * ns

ī

%

| | | | | | | | | | | | |
|------|------|------|------|------|------|------|------|------|------|------|------|
| / ×× | / ns | / ns | / ns | / ns | / * | / * | / ** | / * | / ns | / ns | / ns |
| / ns | / ** | / ns | / * | / * | / * | * | / ns | / ns | / * | / ns | / ns |
| / ns | / ns | / ns | / ** | / * | / ns | / ns | / ** | / ns | / ns | / ** | / ** |
| / ns | / ** | / * | / ns | / ns | / * | / * | / ** | / ns | / ns | / ns | / * |
| / ns | / ns | / * | / ns | / ns | / ns | / ns | / ** | / ns | / ns | / ns | / ns |
| / ns | / ns | / ns | / ns | / ns | / ns | / ns | / ** | / ns | / ns | / ns | / * |
| / ns | / ns | / ns | / ns | / ns | / ns | / ns | / ns | / ns | / ns | / ns | / * |
| / * | / ns | / ns | / ns | / * | / ns | / ** | / ** | / * | / ns | / ** | / * |
| / ns | / ns | / ns | / ns | / ns | / ns | / ns | / ** | / ns | / ns | / ** | / ns |
| / ns | / * | / ns | / ns | / ns | / ns | / ns | / ** | / ns | / ns | / ns | / ns |

S.E(gi)
C.D_{0.01}
C.D_{0.05}
** * ns

(GCA)

| | | | | | | | | | | |
|------|------|------|------|------|------|------|------|------|------|------|
| / ** | / * | / ns | / ns | / ns | / ns | / ns | / ns | / ns | ns | / |
| / ns | / * | / ns | / * | / ns | / ns | / ns | / * | / ns | / ns | / ns |
| / ns | / ns | / ns | / ns | / ns | / ns | / * | / * | / ns | / ** | / ** |
| / ns | / * | / * | / ns | / ns | / ns | / * | / * | / ns | / ns | / * |
| / ns | / ns | / ns | / ns | / ns | / ** | / ns | / ns | / ns | / ns | / ** |
| / ns | / ns | / ns | / ns | / ns | / ns | / ns | / ns | / ns | / ns | / ns |
| / * | / ns | / ns | / * | / ns | / ns | / ns | / ns | / ns | / ns | / ** |
| / ns | / ns | / ** | / ns | / * | / ns | / ns | / ns | / ns | / ns | / ** |
| / ns | / ns | / ns | / ns | / ** | / ns | / ns | / ns | / * | / ** | / ** |

آزادي
S.E(gi)
C.D_{0.01}
C.D_{0.05}
** * ns

...

:

| | | | | | | (F ₁) |
|------|------|------|------|------|------|---------------------|
| / ** | / * | / * | / ns | / ns | / ** | * |
| / ** | / ** | / ** | / ns | / ns | / ** | * |
| / ** | / ** | / ** | / * | / ns | / ns | * |
| / ns | / ns | / ns | / ns | / ns | / ** | * |
| / ns | / ns | / ns | / ns | / ns | / ns | * |
| / ns | / ns | / ns | / ns | / ns | / ** | * |
| / ns | / ns | / ns | / ns | ns | / * | * |
| / ns | / * | / ns | / ns | / ns | / ** | * |
| / ns | / ns | / ns | / ns | / ** | / ** | * |
| / ns | / ns | / ns | / ns | / ns | / ** | * |
| / ns | / ns | / ns | / * | / ** | / ** | * |
| / ns | / ns | / ns | / ns | / * | / ** | * |
| / ns | / ns | / ns | / ns | / ns | / ** | * |
| / * | / ** | / ns | / ns | ns | / ** | * |
| / ** | / ** | / ns | / ns | / ns | / ** | * |
| / ns | / * | / ns | / ns | ns | / ** | * |
| / ns | / * | / ns | / ns | / ns | / ** | * |
| / ** | / ** | / ** | / ns | / * | / ** | * |
| / ns | / ns | / ns | / ns | / ns | / ** | * |
| / * | / ns | / ns | / ns | / ns | / | * |
| / ns | / ** | / ns | / ns | / * | / ** | * |
| / * | / ns | / ns | / ns | / ns | / ns | * |
| / ns | / ns | / ns | / ns | / ns | / ** | * |
| / * | / ** | / ns | / ** | / ns | / ** | * |
| / ns | / ns | / ns | / ns | / ns | / ** | * |
| / ns | / * | / ns | / ns | / ns | / ** | * |
| / ns | / * | / ns | / ns | / ns | / ** | * |
| / * | / ** | / ns | / ns | / ** | / ** | * |
| / ns | / ns | / ns | / ns | / * | / ns | * |
| / ns | / ns | / ns | / ns | / ** | / ** | * |
| / ns | / ** | / ns | / ns | / ns | / ** | * |
| / ns | / * | / ns | / ns | / ns | / ** | * |
| / ns | / ** | / ns | / ns | / ns | / ** | * |
| / ns | / ** | / ns | / ns | / ns | / ns | * |
| / ns | / ** | / ns | / ns | / ns | / ** | * |
| / ns | / ** | / ns | / * | / ** | / ns | * |
| / ns | / ** | / ns | / ns | / ns | / ** | * |
| / * | / ** | / ns | / ns | / ns | / ns | * |
| / * | / ns | / ns | / ns | / * | / ** | * |
| / * | / ** | / ns | / ns | / ns | / ** | * |
| / ns | / ** | / ns | / ns | / ns | / ** | * |
| / | / | / | / | / | / | S.E(gi) |
| / | / | / | / | / | / | C.D _{0.01} |
| / | / | / | / | / | / | C.D _{0.05} |

| | | | | | | (F ₁) |
|------|------|------|------|------|------|-------------------|
| / ns | / ns | / ns | / ns | / ns | / ns | * |
| / ns | / ns | / ns | / ns | / ns | / ns | * |
| / ** | / * | / * | / ns | / ns | / ns | * |
| / ns | / ns | / * | / ns | / ns | / ns | * |
| / ns | / ns | / ns | / ns | / * | / ns | * |
| / ** | / ns | / ns | / * | / ns | / * | * |
| / ** | / ns | / ns | / ns | / ns | / ** | * |
| / ** | / ** | / ns | / ns | / ns | / ns | * |
| / ns | / ns | / ns | / ns | / ** | / ns | * |
| / ns | / ns | / ns | / * | / ** | / ns | * |
| / ** | / ns | / * | / ns | / ns | / * | * |
| / ns | / ** | / * | / * | / * | / ns | * |
| / ** | / ns | / ns | / ** | / * | / * | * |
| / ** | / ns | / ns | / ns | / ns | / ns | * |
| / ns | / ns | / ns | / * | / ns | / ns | * |
| / ns | / * | / ns | / ns | / ns | / ns | * |
| / ns | / ** | / ns | / ns | / ns | / * | * |
| / ns | / ns | / * | / ns | / * | / ns | * |
| / ** | / ns | / * | / ns | * / | / * | * |
| / ns | / ** | / ns | / ns | / ns | / ns | * |
| / ** | / ** | / ns | / ns | / ns | / ** | * |
| / ns | / ns | / ns | / ns | / ns | / ns | * |
| / ns | / ns | / ns | / ns | / ns | / ns | * |
| / ns | / ** | / ns | / ns | / ** | / ns | * |
| / ns | / ** | / ** | / ns | / ** | / ns | * |
| / ** | / ns | / * | / ns | / ns | / ns | * |
| / ** | / ns | / * | / ns | / ns | / ** | * |
| / ** | / * | / * | / ns | / ns | / ns | * |
| / ** | ** | / * | / ns | / ** | / ns | * |
| / ns | / ** | / * | / ns | / ns | / ns | * |
| / ns | / ns | / * | / ns | / ns | / * | * |
| / ns | / ns | / * | / ns | / ns | / * | * |
| / ** | / ns | / * | / ns | / * | / ns | * |
| / ** | / ns | / * | / ns | / ns | / * | * |
| / ns | / ns | / ns | / ** | / ns | / ns | * |
| / ** | / ns | / ns | / ns | / ns | / ** | * |
| / ns | / * | / ns | / ns | / ** | / ns | * |
| / ns | / ns | / ns | / ns | / ns | / ** | * |
| / ns | / ns | / ns | / ns | / ns | / | * |
| / ns | / ns | / ns | / ns | / ** | / ns | * |
| / ** | / ns | / ns | / ns | / ns | / ns | * |
| / ns | / ** | / ns | / ns | / ns | / ns | * |
| / ns | / * | / ns | / ns | / ** | / ns | * |
| / ns | / ns | / ns | / ns | / ** | / ns | * |
| / | / | / | / | / | / | S.E(gi) |
| / | / | / | / | / | / | C.D0.01 |
| / | / | / | / | / | / | C.D0.05 |

...

:

| | | | | | (F ₁) |
|------|------|------|------|------|---------------------|
| / ** | / ns | / * | / ** | / ** | * |
| / ns | / ns | / ns | / ns | / ** | * |
| / ** | / ns | / ns | / ns | / ** | * |
| / ** | / ** | / ns | / ns | / ns | * |
| / ns | / ns | / ns | / ns | / ** | * |
| / ** | / ns | / ns | / ns | / ** | * |
| / * | / ** | / * | / ns | / ** | * |
| / * | / ns | / ns | / ns | / ns | * |
| / * | / ns | / ns | / ** | / * | * |
| / * | / ns | / ns | / ns | / ** | * |
| / ** | / ns | / ns | / ns | / ns | * |
| / ns | / ns | / ns | / ns | / ** | * |
| / ns | / ns | / ns | / ns | / ** | * |
| / ** | / ns | / * | / ** | / ** | * |
| / ns | / ns | / * | / ns | / ** | * |
| / ns | / ns | / ns | / ns | / ** | * |
| / ns | / ns | / ** | / ns | / ** | * |
| / ns | / ns | / ns | / * | / ** | * |
| / ns | / ns | / ns | / ns | / ** | * |
| / ns | / ns | / ns | / ns | / ** | * |
| / ns | / ns | / ns | / ns | / ns | * |
| / * | / ns | / ns | / ns | / ** | * |
| / ns | / ns | / * | / ns | / ** | * |
| / ** | / ns | / ns | / ns | / ns | * |
| / ns | / ns | / ns | / ns | / ** | * |
| / ** | / ns | / ns | / * | / ** | * |
| / ** | / ns | / ns | / ns | / ** | * |
| / ns | / ns | / ns | / ns | / ns | * |
| / ** | / ns | / * | / ns | / ** | * |
| / ns | / ns | / ns | / ns | / ns | * |
| / ns | / ns | / ns | / ns | / ** | * |
| / ** | / ns | / ns | / ns | / ** | * |
| / ns | / ns | / ns | / ns | / ** | * |
| / ns | / ns | / * | / ns | / ** | * |
| / ** | / ns | / ns | / ns | / ** | * |
| / ** | / ns | / ns | / ns | / ** | * |
| / ns | / ns | / ns | / ns | / ** | * |
| / ns | / ns | / * | / ns | / * | * |
| / ** | / ** | / ns | / ns | / ns | * |
| / ns | / * | / ns | / ns | / ns | * |
| / ** | / ** | / * | / ns | / ** | * |
| / ns | / ns | / ns | / ns | / * | * |
| / ** | / ns | / ns | / ns | / ** | * |
| / ns | / ns | / ns | / ns | / ns | * |
| / | / | / | / | / | S.E(gt) |
| / | / | / | / | / | C.D _{0.01} |
| / | / | / | / | / | C.D _{0.05} |

...

:

SCA GCA GCA
 .() % SCA
 GCA
 *

SCA GCA

SCA GCA

.()

GCA

SCA

*
 .() %
 ()

%

GCA

SCA

GCA
 %

%

*

.()

SCA

*

.()

()

.()

SCA GCA

SCA GCA

GCA
 %

%

.()

GCA

GCA

SCA

*

.()

GCA

%

GCA

()

SCA

*

%

SCA

%

.()

... :

*
 % SCA % GCA
 . () SCA
 SCA GCA GCA= /
 SCA * ()
 GCA %
 SCA *
 SCA
 . GCA
 () % SCA %
) SCA GCA
 % SCA % GCA GCA ()
 GCA
 % GCA
 * SCA
 GCA
 SCA *
 SCA GCA
 % SCA * * ()
 SCA () GCA

REFERENCES

3. Babu, V. R. & S. S. Kumar. 1995. Combining ability analysis for wheat in normal and stress environments. Ann. Agricultural Research. 16:1, 23-24.
 4. Baker, R. J. 1978. Issues in diallels analysis. Crop sci. 18. 533-536.

5. Griffing, B. 1953. Concept of general and specific combining ability in relation to diallel. Crossing systems. *Austr. J. Biol. Sci.* 9 (16): 443-446.
6. Hayman. B. I. 1954. The theory of analysis of diallel crosses. *Genetics*- 39-78.
7. Islam, M.S. 1998. Genetic studies on drought tolerance in wheat. I. Relative leaf water content membranes stability and stomata frequency. *Ann. Agri. Res.* 19:4. 458 – 462.
8. Islam, M.S. & et al. 1999. Genetic studies on drought tolerance in wheat. II. Early seeding growth and vigour. *Ann. Agri. Res.* 20:2, 190 - 194.
9. Iqbal, S. & et al. 1980. Relative efficiency of diallel partial, partial diallel and trip cross designs for studying genetic architecture of some traits in wheat. *Indi. J. of Genetics and plant Breeding.* 46 (3):530-540.
10. Jinks, J. L. & Hayman. 1953. The analysis of diallel crosses. *Maize cent. Coop. News.* 1. 27, 48- 54.
11. Kheiralla K. A. 1994. Inheritance of earliness and its relation with yield and drought tolerance in spring wheat. *Assi. J. Agri. Sci.* 25:5, 129- 139.
12. Malik, A.J., A.R. Chowohory, M. M. Pajpur & K. A. Siddiqui. 1988. General and specific combining ability estimates in spring wheat diallel crosses. *Paki. Agri. Res.* 9 (1): 10-15.
13. Saraf, A. R. Ecoohard & C. Planchon. 1986. Estimation of genotype values in breeding programs by diallel analysis in durum wheats. *Whe. Bar. and Trit. Abs.* 4 (5): 3035.
14. Satha, D .R. & C.K. Aurna. 1985. Combining ability analysis in F3 and F4 derived generations in wheat. *J. Agri. Res.* 11 (2): 814.