Correlation Studies in M$_2$ Generation in Brinjal Varieties

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A B S T R A C T

Field trials were conducted to study the effect of physical and chemical mutagens (Gamma rays, Ethyl Methane Sulphonate (EMS) and Diethyl sulphate (DES)) on biometric characters viz., days to 50% flowering, plant height, number of branches, fruits per plant, fruit length, fruit girth, fruit weight and fruit yield per plant and their correlations in five brinjal cultivars viz., Angoor, Annamalai, Hissar pragath, PLR 1 and Putheri. The results revealed that there had been strong association between number of fruits per plant and fruit weight with fruit yield per plant in M$_2$ generation.

Key words: Brinjal, Mutation, M$_2$, Correlation.

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Introduction

Brinjal or egg plant (Solarium melongena, 2n = 2x = 24) belonging to the family solanaceae is one of the important vegetable crops grown in India and other parts of the world. India is the primary center of origin (Bhaduri and Kallo, 1989) being confirmed through isozyme and morphological variations. It is also extensively grown in Bangladesh, Pakistan, Japan, Germany, U.S.A. and Italy besides South East Asian countries.

It is a very nutritive vegetable having high percentage of carbohydrates, proteins and other essential nutrients and also has some medicinal properties. Brinjal fruits are rich source of minerals like calcium, magnesium, potassium, iron, zinc and copper. The present investigation was attempted to study the association between various biometric characters in five brinjal varieties viz., Angoor, Annamalai, Hissar pragath, PLR 1 and Putheri in M$_2$ generation.

Materials and Methods

Five varieties of brinjal viz., Angoor, Annamalai, PLR 1, Putheri and Hissar Pragath were taken to study the effect of physical and chemical mutagens on the biometric characters and their association in M$_2$ and M$_3$ generations. Physical mutagen namely Gamma rays and chemical mutagens namely Ethyl Methane Sulphonate (EMS) and DiEthyl Sulphate (DES) were used for inducing mutation. Well filled 600 seeds per treatment were packed in polythene bags in respect of each genotype and treated in the gamma chamber ($^{60}$Co) at 10 krad dosage. Similarly, 600 seeds per treatment pre-soaked
for 12 hours in distilled water were treated with 0.04 per cent DES and 0.6 per cent EMS for four hours at room temperature (26±2°C) with intermittent shaking during this period. The treated seeds were washed thoroughly in running water and were used for germination test or for sowing immediately in seed bed. The same procedure was followed for the control, where 600 well filled seeds per genotype were soaked in distilled water for 12 hours at room temperature (26±2°C) with intermittent shaking during this period.

Genotype wise and treatment wise the seeds from M₁ were mixed, bulked and used for raising the M₂ generation. Genotype wise and treatment wise seeds from M₂ were mixed, bulked and used for raising M₃ generation with three replications in Randomized Block Design. The number of plants per treatment was fifty and were transplanted to 3m x 4.5m treatment plot. Ten randomly selected plants were labelled for taking observations of quantitative characters except for days to 50% flowering. Number of days taken from sowing to 50 per cent flowering of treatment population was recorded for each treatment and expressed as number of days to 50% flowering. The height of the main stem of ten plants was measured from the ground level to the apical leaflet and the mean was expressed in cm and the number of branches borne on the main axis of 10 plants was counted at the time of harvest and the mean was expressed in numbers. The total number of fruits was counted for each of the randomly selected individual plants at the time of harvest and expressed in numbers. Fruit yield of ten random plants was recorded and the mean was expressed as fruit yield per plant in grams (g).

**Statistical analysis**

The data for each character in all the treatments were analysed separately by an appropriate analysis of variance. The statistics like mean, variance, standard error, coefficient of variation, heritability and genetic advance as per cent of mean were computed for population in all traits studied adopting the standard statistical method. The estimates of inter component correlation were calculated for M₂ and M₃ generation as per the methods suggested by (Goulden, 1952).

\[
R_{1,2} = \frac{\text{Sum of Products of 1 and 2}}{(\text{Sum of squares of 1 x Sum of squares of 2})^{1/2}}
\]

Where, \( R \) = Correlation co-efficient and 1 and 2 are characters 1 and 2 respectively.

**Results and Discussion**

For designing an efficient plant breeding program, adequate knowledge about the magnitude and direction of association between yield and its component traits is essential. The genotypic and phenotypic correlation coefficients were estimated to measure the degree of association between yield and its contributing characters.

The correlation studies in Angoor between different characters indicated that number of fruits per plant was positive and highly significantly associated with fruit yield per plant and fruit weight in respect of all treatments. Similarly plant height was also found to be significant and positively associated with number of branches per plant in respect of all the treatments. The maximum positively significant association was noted between number of fruits per plant and fruit yield per plant for the mutagenic treatment 10 krad gamma rays (0.64) followed by 0.04 per cent DES (0.51) (Table 1). For the genotype Annamalai, the mutagenic treatment 10 krad gamma rays and 0.6 per cent EMS revealed positive and highly significant correlation values for most of the characters with fruit yield per plant.
Table 1 Phenotypic correlation for biometric traits of Angoor in M2 generation

| Parameters                | Treatments                          | Plant height | Number of branches per plant | Number of fruits per plant | Fruit length | Fruit girth | Fruit weight | Fruit yield per plant |
|---------------------------|-------------------------------------|--------------|-------------------------------|----------------------------|--------------|-------------|--------------|------------------------|
|                           | Control                             | 0.19*        | 0.34**                        | -0.28*                    | -0.53        | -0.31**     | 0.25**       | 0.19*                  |
| Days to 50 per cent flowering | 10 krad Gamma rays                  | 0.09         | 0.03                          | -0.12                     | 0.16         | -0.03       | 0.03         | 0.09                   |
|                           | 0.04 per cent DES                   | 0.12         | 0.12                          | -0.16                     | 0.34**       | 0.36**      | 0.37**       | 0.12                   |
|                           | 0.6 per cent EMS                    | 0.31**       | -0.22**                       | 0.03                      | 0.06         | -0.09       | -0.41**      | 0.31**                 |
|                           | Control                             | 0.47**       | -0.13                         | 0.03                      | 0.01         | -0.11       | 0.05         |                        |
| Plant height              | 10 krad Gamma rays                  | 0.43**       | -0.08                         | -0.04                     | 0.05         | 0.02        | 0.08         |                        |
|                           | 0.04 per cent DES                   | 0.52**       | 0.06                          | 0.08                      | 0.01         | 0.08        | -0.07        |                        |
|                           | 0.6 per cent EMS                    | 0.55**       | -0.04                         | -0.02                     | -0.03        | 0.12        | 0.05         |                        |
|                           | Control                             | -0.16        | -0.03                         | 0.02                      | -0.11        | 0.08        |              |                        |
| Number of branches per plant | 10 krad Gamma rays                  | 0.08         | -0.02                         | -0.03                     | -0.03        | 0.02        | 0.02         |                        |
|                           | 0.04 per cent DES                   | 0.05         | 0.05                          | 0.05                      | 0.02         | 0.02        |              |                        |
|                           | 0.6 per cent EMS                    | 0.05         | -0.03                         | -0.03                     | 0.06         | -0.05       |              |                        |
|                           | Control                             | -0.08        | 0.02                          | 0.29**                    |              | 0.34**      |              |                        |
| Number of fruits per plant | 10 krad Gamma rays                  | 0.03         | -0.06                         | 0.36**                    |              | 0.64**      |              |                        |
|                           | 0.04 per cent DES                   | -0.08        | 0.02                          | 0.39**                    |              | 0.51**      |              |                        |
|                           | 0.6 per cent EMS                    | -0.02        | 0.06                          | 0.41**                    |              | 0.33**      |              |                        |
|                           | Control                             | 0.03         | -0.09                         | 0.08                      |              |              |              |                        |
| Fruit length              | 10 krad Gamma rays                  | -0.03        | 0.06                          | 0.06                      |              |              |              |                        |
|                           | 0.04 per cent DES                   | -0.02        | 0.03                          | 0.06                      |              |              |              |                        |
|                           | 0.6 per cent EMS                    | -0.02        | -0.17*                        | 0.17                      |              |              |              |                        |
|                           | Control                             | 0.12         | -0.02                         | 0.08                      |              |              |              |                        |
| Fruit girth               | 10 krad Gamma rays                  | 0.08         | 0.08                          | 0.08                      |              |              |              |                        |
|                           | 0.04 per cent DES                   | 0.03         | 0.05                          | 0.05                      |              |              |              |                        |
|                           | 0.6 per cent EMS                    | 0.12         | 0.05                          | 0.05                      |              |              |              |                        |
|                           | Control                             | 0.03         |                              |                          |              |              |              |                        |
| Fruit weight              | 10 krad Gamma rays                  | -0.12        |                              |                          |              |              |              |                        |
|                           | 0.04 per cent DES                   | -0.17*       |                              |                          |              |              |              |                        |
|                           | 0.6 per cent EMS                    | -0.06        |                              |                          |              |              |              |                        |
Table 2: Phenotypic correlation for biometric traits of Annamalai in M<sub>2</sub> generation

| Parameters                      | Treatments         | Plant height | Number of branches per plant | Number of fruits per plant | Fruit length | Fruit girth | Fruit weight | Fruit yield per plant |
|---------------------------------|--------------------|--------------|-------------------------------|---------------------------|--------------|-------------|--------------|------------------------|
| Days to 50 per cent flowering   | Control            | 0.02         | 0.16                          | -0.33                     | -0.16        | 0.01        | 0.19*        | 0.24**                 |
|                                 | 10 krad Gamma rays | 0.11         | 0.04                          | -0.09                     | 0.25         | -0.06       | -0.01        | 0.11                   |
|                                 | 0.04 per cent DES  | 0.15         | 0.00                          | -0.03                     | 0.18*        | 0.56**      | 0.21**       | 0.06                   |
|                                 | 0.6 per cent EMS   | 0.20*        | -0.17*                        | -0.16*                    | 0.40**       | 0.23**      | 0.20         | 0.42**                 |
|                                 | Control            | 0.17*        | 0.03                          | 0.14*                     | 0.02         | 0.77**      | -0.11        |                        |
|                                 | 10 krad Gamma rays | 0.38**       | -0.19*                        | 0.15*                     | 0.00         | 0.24**      | 0.29**       |                        |
|                                 | 0.04 per cent DES  | 0.39**       | 0.12                          | 0.32**                    | 0.19*        | 0.22**      | 0.22**       |                        |
|                                 | 0.6 per cent EMS   | 0.11         | 0.01                          | 0.07                      | 0.05         | 0.20*       | 0.25**       |                        |
|                                  | Control            | -0.08        | 0.08                          | 0.09                      | 0.25**       | 0.09        |              |                        |
| Number of branches per plant    | 10 krad Gamma rays | 0.17         | 0.33**                        | 0.20*                     | 0.35**       | 0.19*       |              |                        |
|                                 | 0.04 per cent DES  | 0.00         | 0.31**                        | 0.16                      | 0.27**       | 0.02        |              |                        |
|                                 | 0.6 per cent EMS   | -0.13        | 0.22*                         | 0.06                      | 1.03**       | 0.36**      |              |                        |
|                                  | Control            | 0.24**       | 0.12                          | 0.42**                    | 0.41**       |              |              |                        |
| Number of fruits per plant      | 10 krad Gamma rays | 0.13         | 0.08                          | 0.23**                    | 0.59**       |              |              |                        |
|                                 | 0.04 per cent DES  | 0.27**       | 0.12                          | 0.26**                    | 0.40**       |              |              |                        |
|                                 | 0.6 per cent EMS   | 0.49**       | 0.20*                         | 0.36**                    | 0.34**       |              |              |                        |
|                                  | Control            | 0.14         | 0.14*                         | 0.32**                    |              |              |              |                        |
| Fruit length                    | 10 krad Gamma rays | 0.16         | 0.16                          | 0.38**                    | 0.22**       |              |              |                        |
|                                 | 0.04 per cent DES  | -0.01        | 0.27**                        | 0.10                      |              |              |              |                        |
|                                 | 0.6 per cent EMS   | 0.04         | 0.51**                        | 0.37**                    |              |              |              |                        |
|                                  | Control            | 0.14         | 0.18*                         |                            |              |              |              |                        |
| Fruit girth                     | 10 krad Gamma rays | 0.22**       | 0.33**                        |                            |              |              |              |                        |
|                                 | 0.04 per cent DES  | 0.18         | 0.06                          |                            |              |              |              |                        |
|                                 | 0.6 per cent EMS   | 0.25**       | 0.54**                        |                            |              |              |              |                        |
|                                  | Control            |              |                               |                            |              |              |              |                        |
| Fruit weight                    | 10 krad Gamma rays |              |                               |                            |              |              |              |                        |
|                                 | 0.04 per cent DES  |              |                               |                            |              |              |              |                        |
|                                 | 0.6 per cent EMS   |              |                               |                            |              |              |              |                        |

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**Table 3** Phenotypic correlation for biometric traits of Hissar Pragath in M$_2$ generation

| Parameters                | Treatments                  | Plant height | Number of branches per plant | Number of fruits per plant | Fruit length | Fruit girth | Fruit weight | Fruit yield per plant |
|---------------------------|------------------------------|--------------|------------------------------|---------------------------|--------------|-------------|--------------|------------------------|
|                           | Control                      | 0.10         | 0.07                         | -0.30                     | -0.18*       | 0.13        | 0.08         | 0.03                   |
| Days to 50 per cent flowering | 10 krad Gamma rays          | 0.03         | 0.20*                        | -0.06                     | 0.03         | -0.13       | -0.18        | -0.07                  |
|                           | 0.04 per cent DES            | 0.13         | 0.10                         | 0.03                      | -0.16        | -0.03       | 0.02         | -0.11                  |
|                           | 0.6 per cent EMS             | 0.16         | -0.12                        | -0.21*                    | 0.20*        | 0.36**      | 0.29**       | 0.55**                 |
|                           | Control                      | -0.18*       | 0.15                         | -0.10                     | 0.07         | 0.03        | -0.18        |                        |
|                           | 10 krad Gamma rays           | 0.12         | -0.18*                       | 0.08                      | -0.10        | 0.07        | 0.03         |                        |
|                           | 0.04 per cent DES            | 0.06         | 0.10                         | 0.33**                    | 0.26**       | 0.20*       | 0.20*        |                        |
|                           | 0.6 per cent EMS             | -0.33**      | 0.03                         | -0.03                     | 0.03         | 0.10        | 0.10         |                        |
|                           | Control                      | 0.13         | -0.18*                       | 0.13                      | 0.42**       | -0.10       |              |                        |
| Number of branches per plant | 10 krad Gamma rays           | 0.16         | 0.36**                       | 0.29**                    | 0.55**       | 0.33**      |              |                        |
|                           | 0.04 per cent DES            | 0.53**       | 0.03                         | 0.13                      | 0.16         | -0.03       |              |                        |
|                           | 0.6 per cent EMS             | -0.18*       | 0.13                         | 0.16                      | 0.36**       | 0.03        |              |                        |
|                           | Control                      | 0.26**       | 0.20                         | 0.20*                     | 0.56**       |              |              |                        |
| Number of fruits per plant | 10 krad Gamma rays           | 0.03         | 0.10                         | 0.10                      | 0.03         |              |              |                        |
|                           | 0.04 per cent DES            | 0.39**       | 0.13                         | 0.13                      | 0.13         |              |              |                        |
|                           | 0.6 per cent EMS             | 0.42**       | 0.33**                       | 0.33**                    | 0.23**       |              |              |                        |
|                           | Control                      | 0.13         | 0.16                         | 0.16                      | 0.55**       |              |              |                        |
| Fruit length              | 10 krad Gamma rays           | 0.16         | 0.36**                       | 0.33**                    |              |              |              |                        |
|                           | 0.04 per cent DES            | 0.03         | 0.07                         | 0.26**                    |              |              |              |                        |
|                           | 0.6 per cent EMS             | 0.06         | 0.23**                       | 0.20*                     |              |              |              |                        |
|                           | Control                      | 0.12         | 0.20*                        |                           |              |              |              |                        |
| Fruit girth               | 10 krad Gamma rays           |              |                              |                            | 0.36**       | 0.66**      |              |                        |
|                           | 0.04 per cent DES            |              |                              |                            | 0.20**       | 0.56**      |              |                        |
|                           | 0.6 per cent EMS             |              |                              |                            | 0.26**       | 0.63**      |              |                        |
|                           | Control                      |              |                              |                            | 0.24**       |              |              |                        |
| Fruit weight              | 10 krad Gamma rays           |              |                              |                            |              | 0.33**      |              |                        |
|                           | 0.04 per cent DES            |              |                              |                            |              | 0.39**      |              |                        |
|                           | 0.6 per cent EMS             |              |                              |                            |              | 0.42**      |              |                        |
### Table 4: Phenotypic correlation for biometric traits of PLR 1 in M<sub>2</sub> generation

| Parameters                  | Treatments          | Plant height | Number of branches per plant | Number of fruits per plant | Fruit length | Fruit girth | Fruit weight | Fruit yield per plant |
|-----------------------------|---------------------|--------------|------------------------------|----------------------------|--------------|-------------|--------------|------------------------|
| Days to 50 per cent flowering | Control             | -0.33**      | 0.06                         | -0.30                      | 0.06         | 0.18        | 0.14         | 0.41**                 |
|                             | 10 krad Gamma rays  | 0.24*        | -0.24*                       | -0.06                      | 0.07         | 0.06        | 0.06         | 0.42**                 |
|                             | 0.04 per cent DES   | 0.15         | -0.33**                      | 0.03                       | 0.05         | 0.24*       | 0.13         | 0.36**                 |
|                             | 0.6 per cent EMS    | 0.06         | -0.12                        | -0.21*                     | 0.03         | 0.30**      | 0.07         | 0.22*                 |
| Plant height                | Control             | -0.33**      | 0.15                         | 0.11                       | -0.06        | 0.03        | 0.18         |                        |
|                             | 10 krad Gamma rays  | 0.12         | -0.18                        | 0.19*                      | 0.06         | 0.23*       | 0.19         |                        |
|                             | 0.04 per cent DES   | 0.06         | 0.12                         | 0.16                       | 0.18         | 0.24*       | 0.11         |                        |
|                             | 0.6 per cent EMS    | -0.33**      | 0.06                         | 0.16                       | 0.18         | 0.24*       | 0.21*        |                        |
| Number of branches per plant| Control             | -0.33**      | 0.07                         | 0.06                       | 0.24*        | 0.42**      |              |                        |
|                             | 10 krad Gamma rays  | 0.24**       | 0.05                         | 0.24*                      | 0.30**       | 0.06        |              |                        |
|                             | 0.04 per cent DES   | 0.79**       | 0.03                         | 0.30**                     | 0.37**       | 0.12        |              |                        |
|                             | 0.6 per cent EMS    | -0.18*       | 0.01                         | -0.06                      | 0.33**       | -0.18       |              |                        |
| Number of fruits per plant  | Control             | -0.33**      | 0.07                         | 0.06                       | 0.24*        | 0.42**      |              |                        |
|                             | 10 krad Gamma rays  | 0.36**       | 0.18                         | 0.24**                     | 0.61**       |              |              |                        |
|                             | 0.04 per cent DES   | 0.36**       | 0.18                         | 0.24*                      | 0.31**       |              |              |                        |
|                             | 0.6 per cent EMS    | 0.24*        | 0.06                         | 0.24*                      |              |              |              |                        |
| Fruit length                | Control             | 0.24*        | 0.30**                       | 0.06                       | 0.06         |              |              |                        |
|                             | 10 krad Gamma rays  | 0.30**       | 0.06                         | 0.67**                     | 0.12         |              |              |                        |
|                             | 0.04 per cent DES   | 0.24*        | 0.06                         | 0.63**                     | -0.18        |              |              |                        |
|                             | 0.6 per cent EMS    | 0.06         | 0.73**                       | 0.79**                     |              |              |              |                        |
| Fruit girth                 | Control             | 0.24*        | 0.30**                       | 0.06                       |              |              |              |                        |
|                             | 10 krad Gamma rays  | 0.76**       | 0.06                         | 0.70**                     | 0.06         |              |              |                        |
|                             | 0.04 per cent DES   | 0.76**       | 0.06                         | 0.67**                     | 0.12         |              |              |                        |
|                             | 0.6 per cent EMS    | 0.76**       | 0.06                         | 0.67**                     |              |              |              |                        |
| Fruit weight                | Control             | 0.24*        | 0.42**                       | 0.15                       |              |              |              |                        |
|                             | 10 krad Gamma rays  | 0.42**       | 0.15                         | 0.30**                     |              |              |              |                        |
|                             | 0.04 per cent DES   | 0.42**       | 0.15                         | 0.30**                     |              |              |              |                        |
|                             | 0.6 per cent EMS    |              | 0.30**                       | 0.30**                     |              |              |              |                        |
Table 5: Phenotypic correlation for biometric traits of Putheri in M2 generation

| Parameters                       | Treatments                      | Plant height | Number of branches per plant | Number of fruits per plant | Fruit length | Fruit girth | Fruit weight | Fruit yield per plant |
|----------------------------------|---------------------------------|--------------|------------------------------|---------------------------|--------------|-------------|--------------|-----------------------|
|                                  | Control                         | 0.20         | 0.36**                       | 0.29**                    | 0.55**       | 0.03        | 0.26**       | 0.20*                 |
| Days to 50 per cent flowering    | 10 krad Gamma rays              | 0.10         | 0.03                         | 0.13                      | 0.16         | -0.03       | 0.03         | 0.10                  |
|                                  | 0.04 per cent DES               | 0.13         | 0.13                         | 0.16                      | 0.36         | 0.13        | 0.39**       | 0.13                  |
|                                  | 0.6 per cent EMS                | 0.33**       | 0.23**                       | 0.03                      | 0.07         | -0.10       | 0.42**       | 0.33**                |
|                                  | Control                         | 0.01         | 0.28**                       | 0.07                      | 0.02         | 0.23*       | 0.10         |                       |
| Plant height                     | 10 krad Gamma rays              | 0.13         | 0.16                         | 0.08                      | 0.11         | 0.03        | 0.18*        |                       |
|                                  | 0.04 per cent DES               | 0.11         | 0.13                         | 0.18                      | 0.02         | 0.16        | 0.15         |                       |
|                                  | 0.6 per cent EMS                | 0.17         | -0.08                        | -0.05                     | -0.07        | 0.26        | 0.11         |                       |
|                                  | Control                         | -0.16        | -0.03                        | 0.02                      | -0.11        | 0.08        |              |                       |
| Number of branches per plant     | 10 krad Gamma rays              | 0.08         | 0.02                         | 0.03                      | -0.03        | 0.02        |              |                       |
|                                  | 0.04 per cent DES               | 0.05         | 0.05                         | 0.05                      | 0.02         | 0.02        |              |                       |
|                                  | 0.6 per cent EMS                | 0.05         | 0.03                         | -0.03                     | 0.07         | -0.05       |              |                       |
|                                  | Control                         | 0.16         | 0.02                         | 0.41**                    | 0.36**       |              |              |                       |
| Number of fruits per plant       | 10 krad Gamma rays              | 0.03         | -0.07                        | 0.37**                    | 0.67**       |              |              |                       |
|                                  | 0.04 per cent DES               | 0.08         | 0.02                         | 0.41**                    | 0.34**       |              |              |                       |
|                                  | 0.6 per cent EMS                | 0.02         | 0.07                         | 0.42**                    | 0.54**       |              |              |                       |
|                                  | Control                         | 0.03         | -0.10                        | 0.08                      |              |              |              |                       |
| Fruit length                     | 10 krad Gamma rays              |              |                              | -0.03                     | 0.07         | 0.07        |              |                       |
|                                  | 0.04 per cent DES               |              |                              | -0.02                     | 0.03         | 0.07        |              |                       |
|                                  | 0.6 per cent EMS                |              |                              | -0.02                     | -0.18*       | 0.18        |              |                       |
|                                  | Control                         |              |                              |                          | 0.13         | -0.02       |              |                       |
| Fruit girth                      | 10 krad Gamma rays              |              |                              | 0.08                      | 0.08         |              |              |                       |
|                                  | 0.04 per cent DES               |              |                              | 0.03                      | 0.05         |              |              |                       |
|                                  | 0.6 per cent EMS                |              |                              | 0.13                      | 0.05         |              |              |                       |
|                                  | Control                         |              |                              |                            | 0.03         |              |              |                       |
| Fruit weight                     | 10 krad Gamma rays              |              |                              |                            |              | -0.13       |              |                       |
|                                  | 0.04 per cent DES               |              |                              |                            |              | -0.18       |              |                       |
|                                  | 0.6 per cent EMS                |              |                              |                            |              | -0.07       |              |                       |
Interestingly fruit yield has revealed positive and highly significant association with plant height, number of branches per plant, number of fruits per plant irrespective of treatments. Maximum positive and significant correlation value of 0.59 was noted between the fruit yield per plant and number of fruits per plant in the mutagenic treatment in 10 kr/krad gamma rays (Table 2).

Correlation studies in Hissar Pragath showed that the fruit yield per plant was positive and highly significantly correlated with the traits fruit length, fruit girth and fruit weight. Fruit weight was positively and highly associated with fruit girth for all the mutagenic treatments. The maximum positive and highly significant association was observed between fruit yield per plant and fruit girth in the mutagenic treatment 10 kr/krad gamma rays (0.66) followed by 0.6 per cent EMS (0.63)(Table 3). In case of PLR 1, it was observed that the fruit yield per plant was positive and highly significantly correlated with days to 50 percent flowering and number of fruits per plant. Interestingly fruit weight was positively and significantly associated with plant height, number of branches per plant, number of fruits per plant, fruit length and fruit girth in respect of all mutagenic treatments (Table 4).

The association analysis between different traits in Putheri showed that fruit yield per plant as well as fruit weight were associated positive and highly significantly with number of fruits per plant. Maximum positive correlation was observed between the traits fruit yield per plant and number of fruits per plant in 10 kr/krad gamma rays (0.67) followed by 0.6 per cent EMS (0.54) (Table 5). Highly significant and positive correlation was observed between fruit yield per plant and fruit girth per plant (0.68) for the mutagenic treatment 0.6 per cent EMS followed by 10 kr/krad gamma rays (0.66) in the M₂ generation in Hissar Pragath. The traits fruit length, fruit girth and fruit weight expressed higher significant positive correlations. Similar kind of results was reported by earlier workers (Mohanthy, 1999; Atul kumar et al., 2002). This information suggests that yield could be improved through selections based on either of fruit diameter or number of fruits per plant and correlates with earlier observations (Mohanthy, 1999; Soorianatha et al., 1994). These results are also in consonance with (Eldin et al., 1968; Singh and Singh, 1990; Ingale, 1993; Patel and Sarnaik, 2004) in brinjal.

Number of fruits per plant (0.46), fruit diameter (0.38) and number of pickings (0.38) had significant positive correlation with yield per plant at genotypic level (Sunita Kushwah and Bandhyopadhya, 2005). Positive association between number of fruits per plant and fruit yield per has been reported by many workers (Mohanthy, 1999; Atul kumar et al., 2002) in brinjal; (Singh and Singh, 1990; Indunair and Thamburaj, 1995; Mohanty, 2003), in tomato and other crops. Similarly, in brinjal, (Nainar et al., 1990; Kumar et al., 1990; Nalini et al., 2009) reported strong association between number of fruits per plant and fruit yield. The entries having maximum number of fruits per plant and heavier fruits were generally observed to yield higher.

To conclude, it has been observed that there was strong relationship between fruit yield with number of fruits and fruit weight per plant.

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