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# NMU-MUTAGENESIS IN POLYGENIC TRAITS OF EGGPLANT

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Significant reduction in percentage of seed germination was observed at 0.04% NMU. Increase in mean values was observed in lower concentrations in all most all the quantitative characters. Mutagenic treatment, specially higher doses (0.03% and 0.04%) increased, considerably, the phenotypic variability for all the characters and this increase in phenotypic variability was also dose dependent. On the basis of phenotypic variability it is expected that further improvement of Green Long is possible through mutagenic treatment and provide the scope to breeder to make selection.

**Key Words** : Mutation, Eggplant, Phenotypic variability, Mutagen.

Eggplant. *(S. melongena)* is an important vegetable crop in India. Mutation studies are very common in vegetable crops. Use of chemical mutagens are now very extensive for improving plants genetically (Kaul & Matta, 1985).

Chemical mutagens mostly carbonyl compound proved to be highly powerful and potent in its applications (Khan, 1980, 1983; Kaul & Matta, 1985; Siddiqui *et al.*, 1988; Siddiqui, 1989).

New genetic variability can be created either by hybridization or by mutagenic treatment and this crops, is a breeder's treasury for improvement through selection.

The present report deals with the effect of NMU on polygenic variability in eggplant var. Green Long.

## MATERIALS AND METHODS

Mature seeds of uniform size from genetically pure stock of *S. melongena* L. var. Green Long with above 90% germination were used as experimental material.

The seeds were treated with 4-different concentrations of NMU (0.01% to 0.04%) at room temperature (27 ± 1°C) for 6h. The control was maintained by treating the seeds for 6h with glass distilled water. After the treatment the seeds water washed with tap water for 30 minutes. The seeds were sown in the month of June, 1989 in earthen pots of 30 cms diameter.

As soon as the 5th leaf emerged out, the seedlings were space transplanted in the field at a distance of 90 cm apart in complete randomized block design to raise $M_1$ generation. Ripe fruits were harvested from normal looking $M_1$ plants and seeds were sown to raise $M_2$ generation to observe the quantitative parameters. These were statistically analysed for mean values and coefficient of variability (CV%).

## OBSERVATIONS

The data recorded on 8- polygenic traits such as plant height, number of branches, number of inflorences, number of barries and their length, diameter, weight, and weight of 1000 seeds in $M_2$ generations are given in Table 1.

N-nitroso-N-methyl urea (NMU) 0.04% inhibited seed germination. It was 32% as compared to control (78%).

After 2 weeks of transplantation, rate of survival was 90-100% in control and treated material. Stunted growth has been noted as a common feature of highest concentration.

In NMU treated populations, the mean values increased significantly over control with regards to majority of characters, such as total number of inflorescences per plant (64.4 ± 1.81), number of fruits (29.4 ± 0.61) and 1,000 seeds weight (83 ± 1.90) in lower concentration i.e. 0.02% NMU. While on the other hand in higher concentrations (0.04%, NMU) recorded lower mean values than control (See Table).

Mutagenic treatments increased the variability for all the eight traits studied was an increasing trend in variability in all the traits as the concentrations increased.

Coefficient of variability for plant height showed marginal variation in 0.02% NMU and its value was

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Table 1: Estimates of mean values $\bar{(x)}$ and coefficient of variation (CV) in $M_2$ generation of the variety GL treated with NMU.

| Character | Control | 0.0.1 | 0.02 | 0.03 | 0.04 |
|---|---|---|---|---|---|
| Height (cm) Mean ± S.E. | 59.52±0.86 | 62.±0.96 | 55.6±0.60 | 53.6±0.96 | 52.2±0.81 |
| CV (%) | 2.67 | 3.45 | 4.85 | 4.94 | 5.67 |
| Total No. of branches per plant Mean ± S.E. | 12.0±0.22 | 14.±0.44 | 13.68±11.4±0.42 | 10.0±0.31 | |
| CV (%) | 5.83 | 10.00 | 12.75 | 13.22 | 14.64 |
| Total No. of infl : p/1 mean ± S.E | 28.4±0.41 | 64.4±1.81 | 63.8±1.36 | 62.4±1.10 | 53.8±1.47 |
| CV (%) | 4.01 | 5.60 | 6.77 | 8.64 | 8.88 |
| No. of fruits /pl Mean ± S.E. | 18.0±0.61 | 28.2±0.78 | 21.4±0.42 | 17.0±0.50 | |
| CV (%) | 5.15 | 6.26 | 6.59 | 8.79 | 9.29 |
| Length (cm) Mean ± S.E. | 21.89±0.69 | 30.53±0.69 | 29.4±0.12 | 24.76±0.15 | |
| CV (%) | 0.65 | 1.98 | 1.75 | 1.35 | 0.99 |
| Diameter (cm) Mean ± S.E. | 3.60±0.07 | 4.04±0.03 | 3.88±0.02 | 3.42±0.05 | 3.18±0.03 |
| CV (%) | 0.85 | 1.22 | 1.00 | 0.69 | 0.88 |
| Weight (gm) Mean ± S.E. | 121.±5.90 | 247.8±1.73 | 217.?±1.25 | 155.0±2.46 | 148.8±1.24 |
| CV (%) | 4.12 | 5.49 | 3.96 | 3.10 | 3.55 |
| 1000 seed wt (mg) Mean ± S.E. | 655±3.53 | 837.8±1.90 | 812.0±2.40 | 754.8±3.65 | 680.8±3.96 |
| CV (%) | 0.52 | 1.84 | 1.53 | 0.71 | 0.93 |

markedly higher in several plant characters like total number of inflorescences, total number of barries and length, diameter and weight and 1000 seed weight per fruit.

The phenotypic coefficient of variability showed a dose dependent trend; it was increasing with increasing concentration of mutation.

## DISCUSSION

Mutations induced in polygenic characters can be detected by the estimation of mean, phenotypic variability and coefficient of variation.

The present investigation showed a slow and reduced growth of plant. The mean plant height was recorded minimum in 0.04% concentration (52.2±0.81). But the mean values of treated population increased significantly for several characters (See Table). Such increase in mean values are due to favourable mutations in treated population. On the other hand, mean plant height and total number of branches decreased. Bhatia & Swaminathan (1962) attreibuted such decrease to the incidence of determental mutations in higher frequencies. Similar results have been reported by Shekhar *et al.* (1981) and Kaul & Matta (1985).

Siddiqui (1991) induced variability by chemical mutagens in eggplant. The phenotypic variability was highest in treated population. The highest variation was recorded for number of branches followed by fruit per plant.

The higher values of coefficient of variability in quantitative traits indicates that these characters can be transmitted to future generation. Similar findings have been reported by earlier workers (Krishnaswamy *et al.*, 1977; Chaudhary *et al.*, 1975). Gaul (1964) and Kaul & Matta (1985) state that irradiation as well as chemical induced variability could be determined as early as in $M_2$ generation. Increase in variability could be explained to be due to mutations of polygenes governing the quantitative characters and their segregation.

In the present study high level of polygenic variability was generated by NMU. Thus the variability created, offers a opportunity for selection and recovery of micromutations.

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