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Induced morphological mutants in tomato (*Lycopersicon esculentum Mill*) cv. PUSA RUBY

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SUMMARY

The seeds of *Lycopersicon esculentum* Mill cv Pusa ruby were treated with various doses/concentrations of physical (gammarays) and chemical (HZ, EMS) mutagens and their combinations (30KR + EMS, 30KR + HZ). Various morphological mutations were characterized on the basis of the part of the plant body affected in M2 generation. Based on this, 22 different types of morphological mutants including sterile were isolated. Among them the important mutations from the point of view of breeding are, male sterile, dwarf and bushy mutants.

Key words: PusaRuby, EMS, HZ, Gammarays, Morphological Mutations.

Mutations are the ultimate source of all variability in organisms. Mutations can be used for plant breeding in many different ways. The direct use of mutations is a very valuable supplementary approach to plant breading, particularly when it is desired to improve 1 or 2 easily identifiable characters. Induced mutation is thus the ultimate source of all the genetic variability in crop plants that may be difficult to bring through breading experiments (Girhe and Choudhary, 2002).

During the last several years., different mutagens have been used by various workers to induce genetic variability in crop plants (Gaul, 1965; Daskaloft, 1973; 1974; Gustafsson, 1975; Skripnikova, 1976; Choudhary, 1978). In the present investigation mutations were induced in the cv Pusa Ruby of *Lycopersicon esculentum* by treating the seeds with different deses/concentrations of gammarays, HZ., EMS., and their combinations i.e., 30KR +EMS, 30KR + HZ.

The plants of the M_2 generation were screened for morphological mutations. Most of these were found to be bred true in the M_3 generation. The present report deals with the characteriirisation of the different morphological mutations isolated in the M_2 generation of tomato cv Pusa Ruby.

MATERIALS AND METHODS

The seeds of tomato cv Pusa Ruby were used in the present investigation. Two hundred dry and healthy seeds were subjected to 30KR, 40KR, 50KR, 60KR and 70KR doses of gammarays at the Central Instrumentation Centre, Kakatiya University, Warangal (Model Gamma Chamber 900 BARC make) and the source of irradiation was 60 Co., Gamma unit Installed at IARI, New Delhi and two chemical mutagens (HZ, EMS) and combined treatments with gammarays and chemicals (30KR +EMS, 30KR + HZ) were also used to induce the mutations. In this case seeds were soaked in distilled water for 74 hrs at 25^{0}c and then treated with 0.1% EMS and HZ for 6 hrs., 12 hrs., 18hrs and 24 hrs. respectively and after these were washed thoroughly with running tap water for 1 hr. Corresponding controls were also maintained in distilled water for EMS and HZ.

The seeds of the M1 plants were collected plant wise and again sown in the field to raise the M2 generation and similarly those of the M2 generation seeds were used to raise M3 generation. The M2 populations were screened for the presence of morphological mutations. Most of the M2 mutants were found to be bred true in the M3 generation.

The morphological mutations were characterized on the basis of growth, development and reproductive performance.

RESULTS AND DISCUSSION

Among the mutagenic agents used gammarays and EMS singly and 30KR +HZ combinations were found to be more effective in inducing various mutants. But the efficient mutagens were found to be gamma rays and EMS in inducing highest frequency of mutations in the present investigations, compared to other treatments studied.

A total of 22 different morphological mutants were isolated in the M2 and M3 generations and they were called, as tall mutant, dwarf mutant, curly leaf mutant, needle like leaf mutant, leathery leaf mutant, simple leaf mutant anthocyanin pigmentations in leaf, dark green and thick leaf mutants, ovate leaf mutant, deformed leaf mutants, small leaf mutant, dichotomous branching, bushy mutant, primary branching, climbing habit, clipped stem mutant, branchless mutant and male sterile muntants, long inter node mutant, single longest branched mutant, semi sterile mutants and sterile mutants (See Table-1). These mutants were characterized on the basis of the following features.

I. MUTATIONS AFFECTING HEIGHT

1. Tall mutants

The average height of these tall mutants was found to be 100-200cms in comparison to controls (70-75cm)

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