

Gamma rays and ethyl methane sulphonate induced pollen sterility in sesame (*Sesamum indicum* L.)

M.B. BORANAYAKA, S.M. IBRAHIM, G. RAJESHA, T.V. SHADAKSHARI, K.R. ASHOKA AND K. RAGHAVENDRA

Received : January, 2011; Accepted : March, 2011

SUMMARY

Five dosages of gamma rays ranging from 10 ($V_1 T_1$) to 50 krad ($V_1 T_5$) with an interval of 10 krad and five concentrations of Ethyl methane sulphonate (EMS) ranging from 0.8 ($V_2 T_1$) to 1.6 per cent ($V_2 T_5$) with an interval of 0.2 per cent were employed to study pollen fertility in two sesame genotypes viz., SVPR 1 and Cardeboriga. Both the mutagens exhibited significant differences for pollen fertility. All the treatments in both the genotypes produced considerable pollen sterility indicating that the mutagens were capable of bringing about either large or cryptic structural differences. The pollen fertility of M_1 plants showed decreasing trend as the dosage of mutagen increased in both the genotypes.

Boranayaka, M.B., Ibrahim, S.M., Rajesha, G., Shadakshari, T.V., Ashoka, K.R. and Raghavendra, K. (2011). Gamma rays and ethyl methane sulphonate induced pollen sterility in sesame (*Sesamum indicum* L.). *Internat. J. Plant Sci.*, 6 (2): 240-242.

Key words : Sesame, Gamma rays, Ethyl methane sulphonate, Pollen sterility

The mutagen induced sterility is attributed by chromosome mutation, factor mutations, cytoplasmic mutations and physiological effects. Sterility was mainly due to detectable chromosomal aberrations and cryptic structural deficiencies. As a result, malformed pollen grains and wrinkled seeds were observed. It is reasonable to support that various physiological and chromosomal damages resulting from the chemicals are responsible for production of large quantities of non viable pollen and hence the pollen sterility. The present study was undertaken to assess the effect of gamma rays and EMS in inducing pollen sterility and thus provide information on

pattern of variation in mutagenic experiments using the mutagens on sesame plant.

MATERIALS AND METHODS

Two promising sesame genotypes namely, SVPR 1 (ruling popular white seeded type) and Cardeboriga (monostem African type) were treated with the two mutagens viz., gamma rays and EMS. Two hundred well filled dry seeds were sealed in butter paper covers and exposed to 10 to 50 krad doses of gamma rays from ^{60}Co source at Indira Gandhi Centre for Research, Kalpakkam, Tamil Nadu. Another two hundred seeds of each variety, for each treatment were presoaked in distilled water for four hours then treated with different concentrations of Ethyl methane sulphonate (EMS) ranging from 0.8 to 1.6 per cent for three hours. After the treatment, the seeds were thoroughly washed with tap water ten times and dried with blotting excess water. The treated seeds were sown in the field along with control in a Randomized Block Design with Four replications by adopting a spacing of 30 cm between rows and 30 cm between plants. Pollen grains were collected on clean glass slides by dusting anthers of single flower that were about to dehisce and stained with Iodine potassium iodide. Well filled and fully stained pollens were counted as fertile, while the unstained and shrunken ones as sterile and expressed in percentage.

Correspondence to:

M.B. BORANAYAKA, P.C. Unit (Small Millets), Zonal Agricultural Research Station, University of Agricultural Sciences, G.K.V.K., BENGALURU (KARNATAKA) INDIA
Email : mbboranayak@gmail.com

Authors' affiliations:

S.M. IBRAHIM, G. RAJESHA AND T.V. SHADAKSHARI, Department of Plant Breeding and Genetics, Agricultural College and Research Institute (T.N.A.U.), MADURAI (T.N.) INDIA

K.R. ASHOKA, Department of Soil Science and Agricultural Chemistry, College of Agriculture, University of Agricultural Sciences, G.K.V.K., BENGALURU (KARNATAKA) INDIA

K. RAGHAVENDRA, Department of Crop Physiology, College of Agriculture, University of Agricultural Sciences, G.K.V.K., BENGALURU (KARNATAKA) INDIA