

Induction Of Somatic Mutations In Chrysanthemum By Gamma Irradiation

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ABSTRACT

Rooted cuttings of chrysanthemum (*Dendranthema grandiflora* Tzvelev) cv. 'Gulmohar' exposed to 1.0 kR, 1.5 kR, 2.0 kR, 2.5 kR and 3.0 kR of ⁶⁰Co gamma rays resulted in reduction in plant survival, plant height, plant spread, branch number, leaf and flower number and flower size after irradiation. The bud formation and flowering was delayed with the exposure to gamma rays and there was increase in leaf and floral abnormalities. Five mutations were induced in flower colour, plant size (dwarfness) and days taken to full bloom (earliness or lateness) and VM₂ generation was raised to study the stability of induced characters. The mutations which showed stability in VM₂ generation were isolated and established in pure and stable forms. The comparative analysis of original cultivar and mutants was done to find out the significant differences in various vegetative and flowering parameters.

Key words : Chrysanthemum, *Dendranthema grandiflora*, mutation, gamma rays

INTRODUCTION

Chrysanthemum (*Dendranthema grandiflora* Tzvelev) belongs to family Asteraceae and is a popular commercial flower grown for cut flower as well as pot plant in different parts of the world. The modern day cultivars are result of various breeding techniques like selection, crossing and mutagenesis including some biotechnological tools. The florist's chrysanthemum is a highly heterozygous, self-incompatible and polyploid in nature. It can easily be propagated through vegetative means hence most suitable for mutagenesis. Mutation breeding has now been widely recognized as a useful complimentary tool for the improvement of modern day chrysanthemum cultivars. The induction of mutations in florist's chrysanthemum has attracted considerable attention due to the fact that any mutation in the dominant genes is easily expressed in the first generation and thus the selection of mutations of directly perceptible characters like flower colour, shape and size etc. is generally very easy and can directly be put in to commercial use. Keeping in view the potentialities of mutagenesis, the present investigations were carried out to find out the best dose of gamma rays for inducing variability in chrysanthemum and to screen out the variants for ornamental traits.

MATERIALS AND METHODS

The present investigations were carried out at the

experimental farm of the Department of Floriculture and Landscaping, Dr. Y.S. Parmar University of Horticulture and Forestry, Nauni, Solan (H.P.) during 1999 and 2000. The rooted cuttings of chrysanthemum cultivar 'Gulmohar' were treated with different doses of gamma rays (Cobalt ⁶⁰ radiation source) i.e. 1.0 kR, 1.5 kR, 2.0 kR, 2.5 kR and 3.0 kR, at the Department of Radiation Therapy, Post Graduate Medical Education and Research Institute (PGI), Chandigarh using gamma rays machine Theratron-780, Atomic Energy of Canada Ltd. The distance from the source to the target was 80 cm and the gamma rays treatments were given with an output of 58 rads per minute. These gamma rays treated rooted cuttings along with control (untreated) were planted in the experimental plot in a Randomized Block Design (RBD) with four replications. 100 rooted cuttings were used per replication. All the standard cultural operations were followed except the pinching and disbudding. The plants which showed significant variation in flower colour, plant size (dwarfness) and number of days taken for full bloom stage (i.e. early and lateness) were isolated in pure form and planted separately in the observational rows along with the other treated plants to study the stability of induced characters. The observations recorded on various vegetative and floral characters in VM₁ generation, were also recorded in VM₂ generation.

RESULTS AND DISCUSSION

The plant survival percentage of rooted cuttings of

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