SHORT COMMUNICATION

A Mutation Study on *Gerbera jamesonii*: An important Ornamental Plant

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Abstract

The demand for variations in ornamental plants is always on high for the development of different types of color and other morphological changes, etc. In this context, the mutation is a very much helpful and promising approach among the floriculturists and very well recognized for the development of novel varieties. Most of the researchers used the micropropagation techniques for large scale propagation of ornamental plants. Micropropagation not only enhances the rate of propagation but also produce true to type plants in a relatively short time and space. In this study, we use a combination of mutation and micropropagation strategies in *Gerbera jamesonii* plant.

Keywords: Gamma rays, *Gerbera jamesonii*, Mutation, Ornamental.

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Introduction

The development of novel varieties is a major requirement for the floriculture industry. Crop improvement is always a demand for any area of plant science, and in ornamentals plants development of new/different flower color or shape plays a very important role (Ibrahim *et al.,* 2018). In this regard, mutation breeding is an established and acceptable method for floriculturists. In the case of vegetatively propagated ornamentals, rooted cuttings are treated with gamma rays before planting. Still, chimeras development is a very usual phenomenon, and it is considered as a major obstacle in mutation breeding (Dutta *et al.,* 2008). In chimeric tissue, mutated cells are present along with the normal cells. During subsequent cell division, the mutated cells compete with the surrounding normal cells for survival (called diplontic selection). If these mutated cells survive in diplotic selection, they are expressed in plants. Since most of the ornamental crops are highly heterozygous, their seed progeny is not true-to-type (De, 2017). Conventionally, vegetative propagation is being used to produce genetically similar plants, but this could not fulfill the market demand due to a slower rate of propagation. Therefore, most of the modern floriculturists adopted for the micropropagation technique for large scale propagation of ornamentals. Micropropagation speed up the process of propagation develops the true-to-mother type of plants in a small-time period (Suman, 2017). A huge number of ornamental crops are commercially propagated via micropropagation. In the present study, gamma rays treatment was given to the plant to observe the effect of the mutation; obtained color variations are helpful in the development of new varieties.

Materials and Methods

The *G. jamesonii* cv. Sunway culture was obtained from laboratory stock and further subcultured for the generation of mutant plants. A mutagenesis study was performed by a two-step process; the first step was *in vivo* mutagen treatment and, secondly, *in vitro* regeneration of viable plants from mutated sectors.

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Result and Discussion

The laboratory stock was subcultured for the irradiation treatment and regeneration of plants (Fig. 1). Shoots from *in vitro* grown plants of *G. jamesonii* cv. Sunway was irradiated with a single dose of 1.0 Gy gamma rays, and irradiated plantlets were micro propagated. After rooting, the plantlets were cultivated in the greenhouse, and morphological variations were observed. We found that irradiation treatment affects the rate of propagation of approximately 25 percent. Further, out of total variant flowers found, more than 30% were chimeric. Among uniformly variant flowers, 13% showed color variations

Fig. 1: An *in vitro* establishment of *G. jamesonii*

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Fig. 2: Variation in flower color after mutation

(Fig. 2). Our study, also supported by another study on some different floral traits was also observed in *G. jamesonii* plant when seeds were irradiated with different doses of gamma rays (Singh *et al.*, 2011).

Conclusion

G. jamesonii is an important ornamental crop. In this study, we first time generate color variation plants of *G. jamesonii* cv. Sunway using gamma rays irradiation and subsequent micropropagation. In the current study, we present a quick and efficient method for the creation of new color variant mutants through *in vitro* mutagenesis.

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