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Short Communication

RADIATION INDUCED VARIABILITY IN GLADIOLI

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Sexual breeding in gladiolus requires considerable time for evolving a good variety because seed takes about three seasons to come into blooming, and further many years for multiplying the stock, therefore, the present study for inducing variability and evolving a variety through mutation breeding which offers a comparatively shorter duration was taken up in 1990. Mutation breeding may also provide unusual strains of curiosity [1] which is normally difficult through conventional breeding methods.

The corms measuring about 4.5 cm in diameter of four gladiolus vars, viz., Green Finch, Mayur, Rose Memento and Wind Song were subjected to 0.0, 15.0, 30.0, 45.0 and 60.0 Gy doses of ^{60}Co gamma rays and planted in randomized block design with three replications, putting 10 corms in each replication. The data were recorded in vM_1 on different parameters, and upto vM_8 all those plants showing abnormality were grown in observational rows to see if the changes occurring in vM_1 persist or some new ones appear.

vM_1 GENERATION

Number of shoots produced per plant, number of petals per floret, number of corms produced per plant and weight of cormels produced per plant were found to be non- significant. However, for number of shoots, minimum value was obtained in 30.0 Gy of Mayur (1.11) and maximum under 30.0 Gy of Rose Memento (2.50) but for number of petals per floret, only 30.0 Gy of Green Finch and 15.0 Gy of Mayur (6.1 petals per floret in each case) showed variation. Number of corms produced per plant also ranged from 1.00 to 2.33 under different treatments and different varieties. The dose of 60.0 Gy gamma rays in Rose Memento and Green Finch and 45.0 Gy in Green Finch did not produce cormels.

Sprouting was found enhanced in Rose Memento while delayed in Mayur and Wind Song due to gamma treatment though Green Finch showed erratic behaviour. With the increase in doses, survival percentage decreased in almost all the varieties

though Mayur was found to be less sensitive. In certain cases the shoots afterwards ceased to grow which affected corm formation adversely though Green Finch (15.0 Gy, followed by 30.0 Gy) produced largest corms, probably due to catalytic effect of radiation on auxin favouring apical dominance. However, produced more number of corms, may be, due to late splitting of corms. Increase of gamma radiation dose reduced the cormel formation drastically. The radiation dose of 60.0 Gy was found highly detrimental for almost all the characters in almost all the varieties. Such deleterious effects due to toxicity of dosages occur because of disturbed photosynthesis and respiration which consequently cause retardation of cell division, ill- effects on auxin and hampered root system [2] while accelerating effects under lower dosages which play an important role in plant metabolism [3, 4].

Apparently there was no abnormality in Wind Song upto 45.0 Gy while 60.0 Gy proved highly detrimental where flowering was also not observed. This shows that this variety is, at lower dosages, quite insensitive but higher dose of 60.0 Gy proves lethal. Green Finch and Rose Memento did not flower under 60.0 Gy radiation. The number of florets was badly affected in Green Finch due to treatments as compared to other varieties. Upto 30 Gy dosages changed the colour of the petals partially (from purple mauve to white) in Wind Song, formed twin-buds in a few cases (30.0 Gy) and floral-blasting under 60.0 Gy. From usual trifid to uni- to hexafid stigmas, petal-notching, fasciation, proliferation/dissolution of floral-parts, floral sheath abnormality (number, shape, size and colour changes), twin-bud formation and fusion, throat colour disturbances and changed aestivation of the florets, petal colour changing, flattening of spike and seldom with pedicellate florets were the most common changes occurring, more pronounced being with higher dose levels as has been reported by Marek [5]. In Green Finch, the petal colour change from pinkish-cream to white, yellow or smoky-pink; in Mayur from deep mauve to smoky or yellow; and in Rose Memento and Wind Song from orange to white in former variety and from purple to white in latter variety, were observed from 15.0 to 45.0 Gy doses, more pronounced being upto 30.0 Gy. Since most of these changes did not reappear in further vegetative generations, hence may be attributed to physiological disturbances. Gupta and Samata [6] defined occurrence of such abnormalities due to action of the tissues at different phases of development, Sparrow *et al.* [7] defined it due to chromosomal breakage or damage, Gordon [8] due to auxins, and Hagen and Gunckel [9] due to change in the biochemical products of the plants. Broertjes and Alkema [10] in case of colour change stated that cell mutates which on survival from *diplontic selection* and when these participate in tissue formation, give rise to sectorial or periclinal chimeras where due to reshuffling of histogen layers colour change occurs. The number of florets in no case was found increased under gamma treatment except 30.0 Gy of Wind Song.

vM_2 to vM_8 GENERATIONS

The treated plants were studied in further vegetative generations by putting these in observational rows from vM_2 to vM_8. Most of the variations appearing in vM_1 disappeared in further generations and the plant growth became normal afterwards. However, in vM_3 under 15.0 Gy a very attractive mutant of lighter colour was produced in var. Mayur, where patches, blotches, spots and streaks of yellow, mauve-yellow, cream and white are found throughout the florets of original shape and size although at bud stage it is pinkish-pale. This mutant has stabilized when grown vegetatively and is still persisting.

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