

Impact Factor 6.261

ISSN- 2348-7143

INTERNATIONAL RESEARCH FELLOW ASSOCIATION'S

RESEARCH JOURNEY

UGC Approved Multidisciplinary international E-research journal

PEER REFREED & INDEXED JOURNAL

14th February 2019

Contribution of Biological Research for Sustainable Development

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Effect of Gamma rays on Early flowering in Cluster bean (*Cyamopsis tetragonoloba* (L.)Taub.)

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Abstract

The experiment was carried out to study the effect of different doses of gamma rays as mutagen on flowering. Dry seeds of *Cyamopsis tetragonoloba* (L.)Taub.var. Golden Early-36 and Harit Rani were exposed to 5kR, 10kR and 15kR of gamma rays produced from Co³⁶ source. Three hundred fifty seeds from each treatment were grown at the experimental farm of Botanical garden of Dr.Babasaheb Ambedkar Marathwada University, Aurangabad. Plant wise and treatment wise capsules were harvested. Gamma ray showed the values for this parameter increased as the dose increased in the two varieties of cluster bean. The values for commencement of flowering in control were 12 and 13 days in the two varieties. The negative shift in mean values could be observed in Gamma rays (5kR and 10kR) treatments have shown significant negative shift in mean values in M2 and M3 generations in variety GE-36.

Key words: *Cyamopsis tetragonoloba* (L.)Taub., gamma rays, Co³⁶.

Introduction

Cluster bean is also called as guar. The word “GUAR” represents a derivation from the Sanskrit word “GAUAAHAR” which means cow fodder or fodder of live stock. Basically cluster bean is a drought hardy, deep rooted annual legume. The crop is mainly grown in the dry habitats of Rajasthan, Haryana, Gujarat and Punjab. In addition to its major cultivation in India, the crop is also grown as a cash crop, although to limited extent in other parts of the world like Australia, Brazil and South Africa. The crop is known for its exceptionally high adaptation towards poor and erratic rains, multiuse in cropping system, in industrial use in many ways besides other social and dietary uses. These qualities have made it most the favored crop of marginal farmers in arid areas.

Vegetables act as a good source of nutrients. To enhance variability in such crops the tool of mutation breeding is accepted by various plant breeders. To increase the productivity of vegetables various mutation breeding programs are carried out in brinjal (Datar and Ahstaputre 1984), chilli (Gupta and Yadav 1984), pea (Cemalettin et al., 2004), rye (Savaskan and Toker, 1991) and capsicum (Alcantara et al., 1996). Different vegetables contribute towards the fibre and protein production besides getting the induced genetic variability for disease /pest/insect resistance.

Material and methods:

The seed material of two varieties of cluster bean (*Cyamopsis tetragonoloba* (L.) Taub.) namely, Golden Early 36 and Harit Rani obtained from Golden Seeds Pvt. Ltd, Bangalore, Karnataka and Navalakha Seeds Pvt. Ltd, Pune have been used in the present study. Seeds were treated with physical mutagen, Gamma rays in the present investigation.

Gamma rays:

Electromagnetic ionizing radiations were applied from a Co⁶⁰ 1000 curie source of gamma irradiation unit installed at the Department of Biophysics, Government Institute of Science, Aurangabad.

Commencement of flowering in M1 , M2 and M3 generations:-

Commencement of flowering was counted as the number of days to first flower in from the date of sowing. Early flowering was screened for three consecutive generations.

Result:

Commencement of flowering :- (Tables- 1-4)

It is an important character which plays a significant role in altering the life cycle of any plant. In the present studies all the three mutagens have succeeded in inducing variability in commencement of flowering in cluster bean. The values for this parameter increased as the concentration/dose increased in the two varieties of cluster bean. The values for commencement of flowering in control were 12 and 13 days in the two varieties. The negative shift in mean values could be observed in majority of the treatments.

Gamma rays (5kR and 10kR) treatments have shown significant negative shift in mean values in M2 and M3 generations in variety GE-36. In variety HR gamma ray have shown negative shift in mean values both the M2 and M3 generations.