Journal of Animal Feed Science and Technology 5 (2017) 31-32
DOI: http://dx.doi.org/10.21088/jafst.2321.1628.5117.5

Viable mutants in blackgram

A. Thanga Hemavathy*, R. Vinoth, Ayiswarya Tahore*****

*Assistant Professor (PB & G), Department of Pulses, Tamil Nadu Agricultural University, Coimbatore- 641003. **Casing Assistant, Gemini Institute of Engineering Technology, Chennai- 600001. ***Department of Rice, Tamil Nadu Agricultural University, Coimbatore- 641003

Keywords:

Mutagen
Gamma Ray
Viable Mutants

Abstract

Pulses are an important role in human dietary. Pulse protein provides good supplements to cereal diets and enhances the biological value of protein when consumed. Pulses are often attributed as "Poor man's diet". Crop improvement programme that the natural variability is an essential pre-requisite, however in blackgram due to their autogamous nature it lack genetic variability. Hence the present mutation breeding programme was taken up gammy ray irradiation to identify mutants with high yield potential, early maturity, and disease resistance and bold seeded type.

Pulses is an important role in human dietary. Pulse protein provides good supplements to cereal diets and enhances the biological value of protein when consumed. Pulses are often attributed as "Poor man's diet". Among the pulse blackgram (Vigna *mungo*) is an important kharif pulse in India grown on about 2.4 lack heatures. The annual production of blackgram is 10.32 lakh tonnes from an area of 27.56 lakh hectares in Tamilnadu and the productivity is 480 Kg ha^{-1}.

Any breeding programme that the natural variability is an essential pre-requisite, but in blackgram due to their autogamous nature it lack genetic variability. Mutation breeding is suitable choice of creating variability in self pollinated crops like blackgram. Therefore, the present mutation breeding programme was taken up to identify mutants with high yield potential, early maturity, and disease resistance and bold seeded type.

Seeds of ADT 3, ADT 5 and APK 1 varieties were subjected to 10 to 100 KR with an interval of 10 KR of gamma ray irradiation at IGARC, Kalpakkam during July, 2001. For each dose of physical mutagen a random sample of 370 seeds were treated in each variety. A total of 270 seeds in each treatment were sown in the field under Randomized black design in three replications with a spacing of 30 cm between rows and 15 cm between plants.

The individual M_1 plants were harvested separately and the seeds were sown as plant to row progenies to raise M_2 generation. Visual observations were made to isolate different morphological mutants.

The viable mutants were scored in M_2 generation based on their phenotypic changes or expression and changes in qualitative characters. They are categorized into several groups as stature, duration, leaf, pod seeds and sterile mutants. The characteristics of the mutants isolated in the present study are as follows.

Tall Mutant

Tall mutants were observed at 60, 80 KR in ADT 3, 50 and 70 KR in ADT 5 and 40, 70 KR in APK 1. Tall plants did not show any variation in the number of internodes, but they possessed longer internodes and they were erect habit. Similar type of m mutant has been reported by Sinha *et al*. (1969) in mungbean.

Corresponding Author: A. Thanga Hemavathy, Assistant Professor (PB&G), Department of Pulses, Tamil Nadu Agricultural University, Coimbatore- 641003, Tamil Nadu.
E-mail: hemavathytnau@gmail.com
Received on 18.01.2017, **Accepted on** 30.01.2017

Dwarf Mutant

These mutants noticed were very short height with 12 to 15cm in height at the time of maturity in ADT 3. The height of dwarf mutants in ADT 5, APK 1 is 13 cm and 12-13.5 cm respectively. In ADT 3 dwarf mutant were stunted in growth and gave poor yield. It was reported by Ignacimuthu (1988) in M_1 and M_2 generations of *Vigna mungo*, Mahna *et al*. (1990 a), Gautam and Mittal (1998) in blackgram, Singh and Yadav (1991) in greengram.

Spreading Type

Spreading type mutants were different from the normal type with creeping habit and longer internodes. These mutants have more in the number as well as length of the branches resulting in more spread than the control.

Open and Compact Type

The open type mutants are branched at an angle of 80^0. They had a less number of primary branches. The open type was recorded in all the three varieties. The compact type mutants are bushy habit with more number of leaves, and had condensed internodes.

Early and Late Mutants

Early mutants matured 10 to 15 days earlier than the respective control. Late mutants had the delayed flowering and matured late by 12 to 18 days when compared to control. The lateness may be due to the mitotic arrest in the flower primordia. These duration mutants have been reported by Charumathi *et al*. (1992), Vanniarajan *et al.* (1993b) and Prema Manapure and Santhi Patil (1997) in blackgram.

Table 1: Frequency of viable mutants isolated in M_2 generation:

Mutants	Frequency (%)		
	ADT 3	ADT 5	APK 1
Tall mutant	5.00	3.44	3.03
Dwarf	5.00	5.17	6.06
Spreading	3.33	5.17	4.54
Early mutant	3.33	5.17	3.03
Late mutant	3.33	3.44	4.54
Open	3.33	5.17	4.54
Compact	5.00	3.44	6.06

The useful mutants like tall mutants and early flowering mutants are suggested to be utilized in future hybridization programme.

Conclusion

In M_2 generation a total of 184 viable mutants were observed in all the three varieties. Among these APK 1 had more number of mutants and the variety ADT 5 had less number of mutants. But with respect to doses 80kR had less number of mutants.

Among the viable mutants, more number of stature mutants were recorded in APK1. While comparing different doses of gamma ray more numbers of stature mutants were found at 70kR. Regarding the leaf mutants high proportion was observed at 50 kR level and the all varieties had equal proportion. The seed mutants were high in 60 kR level.

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