

Table 2. Number of BB resistance lines and their segregation in M<sub>2</sub> generation

Varieties	Treatments	Gene action			Total
		Segregating 3:1	Non- segregating	Not clear segregation	
PR 106	EMS 0.25 %	5	0	0	5
	EMS 0.50 %	11	0	0	11
	Gamma rays 1Gy	2	0	0	2
	Gamma rays 2Gy	3	0	3	6
Pusa Basmati 1	EMS 0.25 %	2	0	0	2
	EMS 0.50 %	0	1	1	2
	Gamma rays 1Gy	1	0	0	1
	Gamma rays 2Gy	10	1	0	11
Total		34	2	4	40

Induced mutants have been used to develop new BB resistant gene(s) viz. *xa-nm(t)* by Nakai *et al.* [2] and *xa-19* by Taura *et al.* [4]. The productive BB resistant lines developed here were grown in plant-progeny methods by screening in every generation. Advanced lines are under field trial and would be used to study the genetics of the BB resistance or released as commercial cultivars for the farming community of this region.

#### REFERENCES

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#### AN EXTRA EARLY MUTANT OF PIGEONPEA

The redgram (*Cajanus cajan* (L.) Huth) variety 'Prabhat DT' was gamma irradiated with 100, 200, 300 and 400 Gy doses. Several mutants have been identified viz., extra early mutants, monostem mutants, obcordifoliate mutants and bi-stigmatic mutants. The extra early mutant was obtained when treated with 100 Gy dose. The mutant was selfed and forwarded from M<sub>2</sub> to M<sub>4</sub> generation. In the M<sub>4</sub> generation the mutant line was raised along with the parental variety. Normal cultural practices were followed and the biometrical observations were recorded (Table 1). It was observed that for the characters viz., total number of branches per plant, number of pods per plants, seeds per pod, 100 seed weight and seed yield per plant there was no difference between the mutant and parent variety. Whereas, regarding the days to



flowering and maturity the mutants were earlier than the parents. The observation was recorded from two hundred plants each. The mutant gives the same yield in 90 days as that of the parent variety in 107 days, which make it an economic mutant.

Table 1. Comparative morphological data on mutant and parent variety Prabhat DT

Characters	Mutant		Parent	
	Range	Mean	Range	Mean
Plant height (cm)	66-71	68.60	69-75	72.50
Number of branches	4-7	5.70	4-7	6.20
Days to flowering	46-49	47.20	58-60	58.60
Days to maturity	86-90	88.20	106-112	107.60
Number of pods per plant	75-90	78.00	72-84	78.60
Seeds per pod	2-5	3.10	2-5	3.20
Hundred seed weight (g)	7.2-7.8	7.32	7.1-7.6	7.33
Seed yield per plant	9.5-13.2	10.70	9.3-13.2	10.57
*Estimated yield in kg/ha	---	2379.99	---	2388.89

\*Estimated yield was calculated by keeping the same plant population per hectare.

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#### GAMMA RAYS INDUCED BOLD SEEDED HIGH YIELDING MUTANT IN CHICKPEA

In pulses especially in chickpea (*Cicer arietinum* L.), genetic variability has been exhausted due to natural selection and hence conventional breeding methods are not very fruitful. Mutation techniques are the best methods to enlarge the genetically conditioned variability of a species within a short time and have played a significant role in the development of many crop varieties [2]. Investigations on the effects of ionizing radiations and chemical mutagens in induction of macro-mutations have received much attention owing to their utmost importance in plant breeding. The present study reports a bold seeded mutant in chickpea, the most dominating pulse crop on the Indian subcontinent.

Fresh seeds of chickpea variety 'Pusa-212' were procured from IARI, New Delhi and treated with different doses/concentrations of gamma rays ( $^{60}\text{Co}$  source at NBRI, Lucknow) and ethyl methanesulphonate (EMS), individually as well as in combination, to raise the  $M_1$  generation. Seeds of  $M_1$  plants were sown to raise  $M_2$  plant progenies. A bold seeded mutant was isolated from 400 Gy gamma ray treatments. The mutant was confirmed as true bred, all the mutant seeds gave rise to morphologically similar plants in  $M_3$ , which were quite distinct from the control.

The bold seeded mutant showed "gigas" characteristics and vigorous growth. The plant remained initially straight but later on attained a trailing habit due to heavy secondary branching. The leaves, petioles, flowers, pods and seeds were almost double that of the parent variety, in size. The flowering occurred 10 days later than the parent and maturity was also delayed accordingly. Observations were recorded on various quantitative traits (Table 1). Plant height and number of primary branches showed a significant improvement over the parent. It is interesting to note that the number of pods and number of seeds per pod significantly decreased. However, the hundred seed weight ( $31.73 \pm 0.59\text{g}$ ) in the mutant plants was more than double in the parent variety ( $12.64 \pm 0.14\text{g}$ ). This ultimately resulted in an increase in the