



- (a) Reduced internodal length: Plants showed a 27% to 39% reduction in the internodal length as compared to control.
- (b) Fasciated stem: Fasciation in the lower part of the stem led to a change in the orientation of cotyledonary leaves.
- (c) Delayed flowering: Formation of flowers delayed for 12 to 15 days compared with control. Other characters liked normal plants.
- (d) High yield: Increased number of flowers (38.8%), pods (25%), and seeds (50%) over the original variety. The mutant also showed more vegetative growth.
- (e) High nodulating: Increased number of nodules and lateral roots. Dry biomass 2.7 g compared with 2.0 g of normal plants.

All the mutants described bred true in M_3 . Sodium azide in alkaline medium (pH 7.4) was found to be quite effective in inducing mutations in cowpea.

Table 2: Frequency of mutations in M_2 population of Vigna unguiculata L.

| Concentration (molar) | Reduced internodal length | Fasciated stem | Delayed flowering | High yield | High nodulating | Chlorophyll change |
|-----------------------|---------------------------|----------------|-------------------|------------|-----------------|--------------------|
| Control | - | - | - | - | - | - |
| 10^{-6} | 2.88 | - | - | - | - | 5.76 |
| 10^{-5} | 2.59 | 1.29 | - | 1.29 | 1.29 | 2.59 |
| 10^{-4} | 1.05 | - | 1.05 | - | - | 2.10 |
| 10^{-3} | - | 2.17 | - | - | - | 4.34 |

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Gamma-ray-induced bold seeded early maturing groundnut selections

"Chico" is an early maturing (85-90 days) erect groundnut (Arachis hypogaea L.) genotype utilised in groundnut improvement to incorporate earliness in high yielding varieties. Though it has high shelling out-turn, its yield potential is low since it has small seeds [1-3]. Mutation breeding was started with the objective of improving the seed size.

In a preliminary experiment, dry seeds were treated with 20, 30, 40 or 50 kR of gamma rays. The M_1 generation was grown during the post



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rainy season of 1988-1989. The M₂ generation was planted as individual plant progeny rows during the rainy season of 1989. 105 progeny rows were studied, the total number of M₂ plants being 1,730. All the M₂ plants were harvested 90 days after sowing.

Seven mutants with bold seed size were obtained. The mutants had 100 kernel weight ranging from 22.2 to 40.4 g compared to 21.1 g of control. The study is in progress.

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Application of mutagenesis for the improvement of an indigenous black seeded soybean variety of India

The large scale cultivation of soybean in India (nearly 2 million ha at present) with yellow seeded varieties) is a comparatively recent development. In early times, black seeded soybean was grown on a limited area, under local names like "Bhat", "Bhatmash", "Kalitur" or "Kala Hulga". These indigenous varieties are characterised by small black seeds, the ability to thrive well under suboptimal conditions, good seed germinability and organoleptic suitability for certain indigenous food preparations. However, they show low yield, long duration, high pod-shattering, vulnerability to insect-pests and diseases.

Dry seeds of the variety "Bhat" were treated with gamma rays (15, 20 and 25 k) with and without additional exposure to UV (2 hours at 260 nm). In M₂, the frequency of viable mutations ranged from 0.42 to 5.64%. Both macro- and micro-mutations were identified in the M₂ and M₃ generations. Agronomically useful mutants were evaluated in replicated trials for three consecutive years. A mutant "T₁₅₄", resulting from 20kR + UV, surpassed the parent and local checks in yield. Besides, the mutant has other improved desirable attributes viz., yellow seed coat, early maturity (110 days) and tolerance to yellow mosaic and bacterial pustules. The mutant has retained the good seed viability and tolerance to stress conditions as observed in the parent. It is semi-determinate in nature and possesses white flowers in contrast to purple flowers found in the parent variety "Bhat".

This mutant, later named "NRC-1", was entered in the multi-locational varietal trials under the All-India Co-ordinated Research Project on Soybean in 1988. It has fared well in three zones to enmerit its promotion for large scale evaluation in the northern plain zone, the central zone and the southern zone. It has yielded up to 3.64 t/ha at Parbhani in the Central Zone.

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