(AEM 6/20 and AEM 32/20) isolated from the treated population of a local cultivar '6601' with 200 Gy gamma-ray treatment gave very encouraging performance in station as well as zonal trials [1]. On the basis of these results they were promoted in the National Trials, where they remained under evaluation for four years during spring as well as summer seasons. The pool data of four consecutive years of both seasons (Table 1) indicated that mutant lines AEM 32/20 and AEM 6/20 produced 1298 and 1246 kg/ha grain yield respectively as compared to the check variety 'NM 121-25' (1055 kg/ha) evolved at NIAB, Faisalabad through induced mutations. The seed yield increase over the check variety ranged from 18-23%. These two mungbean mutants have short stature combined with short duration and synchrony in maturity. Keeping in view the outstanding performance of these mutant lines, variety release proposals are being submitted to the Technical Sub-Committee for approval of varieties and techniques.

Table 1. Performance of mungbean mutant lines in Sindh province in national uniform yield trials

Genotypes	Mean of 4 years (Kharif 1990-93)	Mean of 4 years (Spring 1991-94)	Overall mean of two seasons	Increase over check (%)
AEM 6/20	1235	1257	1246	18.10
AEM 32/20	1269	1327	1298	23.03
NM 121-25 (Check)	1071	1039	1055	-

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GAMMA RAY INDUCED MALE STERILE MUTANT IN LENTIL

Male sterility refers to the failure of pollen grains to bring about effective fertilization, either due to structural default or physiological disfunctioning and has special significance in hybridization programmes. Male steriles have been produced in a number of crop plants like red gram [1], pigeon pea [3], mung bean [4], khesari [2] and lentil [5].

A completely male sterile mutant was isolated in *Lens culinaris* Medik, after seed treatment with 100 Gy dose of gamma rays. The male sterile mutant showed 100% pollen sterility but was morphologically more vigorous than the parent plants. It showed more branches and its leaves were bigger, more oblong and dark green. The number of flowers borne by the mutant was significantly higher than any other plant of the treatment. The size of the flowers was also increased but the anthers were smaller in size. Pollen grains were few in number, round in shape but empty and did not take up any stain, indicating that normal microsporogenesis had not taken place.

This male sterile mutant was used as the female parent and pollinated with pollen of a parent. Four pods with one seed in each were formed indicating that the mutant was female fertile. The seeds were smaller than those of the parent variety and also dark coloured. The mutant showed increased vigour and flower number as compared to parental plants. Lentil is an important pulse crop and induction of variability in its germplasm is necessary for its improvement. Male steriles can be used conveniently in lentil hybridization programmes.

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EFFECTS OF GAMMA RADIATION ON MORPHOLOGICAL TRAITS AND SEED STORAGE PROTEINS OF BEAN

The use of mutagenic agents to induce variability has been a practical tool, especially where natural variability is not available [2]. In this investigation gamma radiation (^{60}Co) was used to induce mutations to generate variability in morphological traits and electrophoretic profile of seed storage proteins in a nearly-white seed coat color bean (*Phaseolus vulgaris* L.) cultivar 'EMGOPA-Ouro'. The following characters were observed: percent germination, plant height, final stand, plant yield and yield components, the number of chlorotic and albino mutants, growth habit, earliness, alterations in seed coat color, seed coat brightness, halo color, seed size and form. Foundation seeds were submitted to 8 levels of radiation: 0, 100, 150, 200, 250, 300, 350, and 400 Gy and were planted in randomized complete-block design with four replications sowed with 100 seeds each. For biochemical analyses, 40 seeds of M_2 generation, collected randomly, were submitted to an acid saline solution, according to the method described by Romero *et al.* [1], modified by reducing the time of incubation at the extraction buffer to 1 hour. The effect of radiation dose on the protein electrophoretic profile was evaluated in 12% SDS-PAGE. Results indicated that the treatments with 200 and 250 Gy generated the highest variability. Some contrasting characters were observed on seed morphology (opaque and bright, large and small, squared and rounded, light and greenish coat color), growth habits (types I and II), and pod shape (straight and arched). Other traits such as variable leaf shape, yield components and chlorotic plants were also observed. In general, the 200 Gy treatment showed the highest variability, presenting the highest number of chlorotic plants. However, the 250 Gy treatment was the most efficient for modifying traits of agronomic interest, such as seed size, halo color and plant architecture. The main alterations in color and format of the seeds were observed in the 300 and 350 Gy treatments. The biochemical analysis demonstrated that three bands with molecular mass estimated between 40-50 **KDa**, corresponding to the globulins, are highly conserved. The mutation had a random effect related to electrophoretic profile, showing no association between the intensity of radiation and protein profile alterations.