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variety 'C 727'. This was once a widely grown and popular variety, which lost its resistance to Ascochyta and was replaced. The selection of mutants was performed in the M_2 generation grown in the Ascochyta blight nursery and sixteen mutants were selected [2]. In the subsequent generations CM 88 proved resistant to both Ascochyta blight and Fusarium wilt, and exhibited superiority in agronomic characteristics. CM 88 was also tested for many years in the various yield trials on research stations and farmers fields throughout the country. In these trials it out yielded both the parent and standard varieties [3]. The mutant CM 88 has been approved by the Punjab Seed Council on 27 October 1994 for general cultivation in the Punjab Province, especially the Thal area which accounts for more than 70% of the area under chickpea cultivation.

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A HIGH YIELDING, BETTER QUALITY CHICKPEA MUTANT VARIETY 'NIFA-95'

Chickpea or gram (*Cicer arietinum* L.) is an important legume crop of Pakistan, grown on over one million hectares annually. The national average yield of the crop is very low (0.5 t/ha) and thus the country had to spent about 2 billion rupees ($ 50 million) on import of pulses. The main causes of low yield are non-availability of genetic sources for resistance to various diseases especially gram blight *Ascochyta rabiei* (Pass.) Lab., insect pest (Pod borer) and non-adoption of proper production technology by the farmers. This calls for earnest efforts of breeders to evolve high yielding and disease resistant varieties of chickpea for provision of quality seeds to the farming community to increase production of this important crop.

Seeds of a highly blight susceptible variety '6153' were irradiated at 200 Gy dose of gamma radiation in 1985 and the promising mutant line CMN-446-4 was selected in M_3 generation on the basis of disease resistance, greater number of pods and better plant type. After confirmation of its resistance to blight in M_4 and M_5, the mutant line was evaluated in various trials at different locations. In the advanced and zonal yield trials during 1993-95, the line CMN-446-4 produced the highest grain yield of 2,600 kg/ha as compared to the rest of the mutants and varieties. The line was also evaluated in the chickpea national uniform yield trial, conducted on over 11 locations in the country during 1993-94. In this trial, the mutant line ranked 3rd by producing an average yield of 1,528 kg/ha as compared to the two check varieties 'Punjab-91' (1,316 kg/ha) and 'Paidar-91' (1,391 kg/ha). The mutant line CMN-446-4 is moderately resistant to gram blight, highly resistant to stored pest (pulse beetle), contains 25.3% more protein as compared to the parental variety 6153 and is also better in nitrogen fixing capacity.

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The proposal for release of the mutant line CMN-446-4 as a new variety under the name 'NIFA-95' for general cultivation in the rainfed area of North West Frontier Province was approved by the Provincial Seed Council on 8 December 1996. The characteristics of the mutant variety NIFA-95 are presented in Table 1.

Table 1. Agronomic characters of mutant variety NIFA-95 and its parent

Characteristics	Mutant variety NIFA-95	Parent variety 6153
Growth habit	Semi spreading	Semi spreading
Plant height	86 cm	84 cm
Flower colour	Pink	Pink
Days to flowering	136	130
Days to maturity	205	190
Seed coat colour	Light brown	Dark brown
Seed surface	Rough	Smooth
1000 grain wt (g)	186	220
Blight resistance	MR	H.S
Protein content (%)	25.2	20.1
Av. yield (kg/ha)	2600	400

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IMPACT OF MUTANT VARIETIES OF BLACKGRAM IN REALISING IMPROVED PRODUCTIVITY

Blackgram (*Vigna mungo* L. Hepper) is an important pulse crop extensively grown in India. It is the cheapest source of protein for millions of Indians. The seeds contain about 22% protein. The area under cultivation in India is about 3.25 million hectares with an annual production of 1.45 million tons. About 70% of the total area is in the Central and Southern part of the country, which contributes about 77% of the total production. In the past there have been attempts to increase the production and productivity of this crop using conventional breeding approaches at different Agricultural Research Centres. However, the yield remains around 500 kg/ha. We have used induced mutation techniques to break the yield barrier. The induced mutations were used in cross breeding to synthesise an ideal plant type with high yield potential suitable for different agroclimatic conditions.

Induced mutation experiments were initiated at Nuclear Agriculture and Biotechnology Division of Bhabha Atomic Research Centre, Mumbai during 1973-74 using 'No. 55', a variety popular in Maharashtra state and later during 1986 with 'EC168200' an exotic collection obtained from AVRDC, Taiwan. The seeds were exposed to gamma rays (15 to 750 Gy). Fast neutron irradiation (20 to 60 Gy) was carried out at the 'APSARA' reactor at Trombay, BARC in a specially designed Standard Neutron Irradiation Facility (SNIF) to obtain fast neutrons free from slow neutrons and gamma rays.

In all, forty-nine true breeding mutants with distinct morphological characters were established and classified on the basis of most conspicuous and easily discernible morphological and agronomic traits like chlorophyll, growth, leaf, pod, seed characters flowering and/or maturity. Though no mutant superior in yield per se compared to the parent variety No. 55 or EC 168200 was obtained, several mutants superior in one or more yield components were isolated like early flowering, dwarf, altered branching pattern, large seed,