INTRODUCTION

Pulses belong to one of the largest family Fabaceae. These are unique crops in having an in-built capacity for fixing atmospheric nitrogen. Thus these crops meet their own nitrogen requirement to a great extent. They also leave nitrogen in the soil that enrich the soil and become available to the succeeding crop. Pulses are also main source of protein in the Indian vegetarian diet. Besides, by opening up of the soil by their deep root system and the huge leaf drop, the pulses also enrich the soil humus. Further, due to their plant type and varying maturity durations, the pulses ideally fit in the inter-cropping, relay cropping and multiple cropping systems of our agriculture.

India is a major pulse growing country in the world and ranks first in production of pulses among the Asian countries. India shares nearly 35 to 36 per cent of total area and 27 to 28 per cent of production of pulses in the world (Lal, 1987). During 1985-86, pulses accounted for an area and production of 23.82 million hectares and 12.96 million tonnes, respectively (Lal, 1987). However, in comparison to the average yield of major cereal crops like wheat (1.90 t/ha) and rice (1.60 t/ha), the average yield of pulses (0.54 t/ha) is very low. The low productivity of pulses may be attributed to (i) low genetic yield potential, (ii) susceptibility to
diseases, (iii) asynchronous maturity, (iv) non-availability of adequate quality seeds, and (v) to the general lack of understanding of their production technology.

Blackgram (*Vigna mungo* (L.) Hepper) popularly known as urdbean, urid, udid or mash is an important pulse crop. It is extensively grown under varying climatic conditions and soil types in India. It is also cultivated in many tropical and subtropical countries of Asia, Africa and Central America. Although, India, Pakistan, Bangladesh, Burma and Sri Lanka are the principal countries contributing to the world production. The blackgram in India is mainly grown in the states of Madhya Pradesh, Uttar Pradesh, Bihar, Punjab, Maharashtra, West Bengal and Tamil Nadu. Blackgram is mostly grown as a rained crop during summers in Northern India and in winters in Peninsular and Southern India. With increase in irrigation potential, the area under blackgram cultivation has registered an increase in recent years. During 1985-86, blackgram accounted for an area of 30.07 million hectares with production of 1.20 million tonnes with an average yield of 0.39 t/ha. However, during 1984-85, it registered an increase of 66.8 per cent in area, 117.60 per cent in production and 30.43 per cent in productivity (Lal, 1987). This increase in the production of blackgram is, however, only marginal in comparison to the phenomenal increase in the average production of wheat and rice during the same period.
selection from the local land races. Hybridization has contributed to the development of only about one fourth of the cultivars grown (Singh, 1982).

The feasibility of artificial induction of mutations was although demonstrated as early as in 1927 by Muller and in 1929 by Stadler. However, subsequent to the early work there was a rapid loss of interest on the part of plant breeders, as most of the induced mutations were lethal or deleterious in their effects on phenotype. Nevertheless, following significant achievements in mutation breeding in different crop plants (Micke et al., 1985; Chopra and Sharma, 1985), there has been a revival of interest with greater optimism for further use of induced mutation technique.

Most of the induced mutations are of deleterious type and the frequency of desirable mutants is considerably low. The occurrence of useful mutants by the process of spontaneous gene changes may take 100 or more years and hence even the low frequency of induced useful mutations represents a significant advance over the naturally occurring genetic changes. The potentiality of induced mutations in understanding the nature of gene (Benzer, 1961) and its utilization in plant breeding is now well established (Gottschalk, 1972; Swaminathan, 1972). However, mutation breeding should not be considered as a substitute to the conventional plant breeding methodology, but as an additional tool for the plant breeders.
Further, all plant breeding techniques are complementary to each other and mutation breeding like other breeding schemes will always include selection and will also frequently involve hybridization. Sigurbjornsson (1972) suggested that the utilization of effective mutation breeding is necessary as the existing germplasm is restricted and the incorporation of disease resistance and other desirable attributes offer a formidable task through conventional breeding procedures. Induced mutations contribute primarily towards generating more genetic variability and thus providing a broad base for further selection and improvement.

A large number of improved cultivars using induced mutations have been developed in a variety of crop and ornamental plants (Micke et al., 1985). In India, more than 40 such cultivars have been developed using induced mutations. However, a majority of these are in cereals (Chopra and Sharma, 1985).

In view of the above, the present study on induced mutations in blackgram (V. mungo (L.) Hepper) was conducted with the following objectives:

1. Isolation of different chlorophyll mutant types and a study of their frequency and segregation pattern in M_2 and M_3 generations.
(2) Isolation of morphological mutants (viable) and a study of their frequency and segregation pattern in $M_2$ and $M_4$ generations.

(3) Production and study of induced variability for various quantitative characters.

(4) Selection of high yielding mutants.

(5) Evaluation of the relative efficiency of the three methods i.e. plant to progeny method, single seed bulk method and modified single seed bulk method of harvesting the $M_1$ and handling of $M_2$ generations in terms of the frequency and spectrum of chlorophyll mutations.