CHAPTER -1

INTRODUCTION
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Lentils is one of the principal pulse crops cultivated in various regions of the world, particularly in Indian sub-continent and in the dry areas of the Middle-East. The crop is a dietary mainstay in those areas and mostly consumed by local populations. Of the countries that produce lentil, India has the largest area followed by Turkey, Canada and Syria. Ethiopia and Morocco are also major producers of lentil. Other countries of the Middle-East such as Egypt, Jordan, Iraq and Lebanon are major consumers of lentil but not major producers (Muehlbauer et al., 1995).

India accounts for almost 50 percent of the world lentil production. It is grown in 1.20 million hectare with an annual production of 0.83 million tonnes with an average productivity of 736 kg/ha (F.A.O., 2001).

The species Lens culinaris Medik. has been divided into two sub-species; macrosperma and microsperma on the basis of seed size and cotyledonary colour (Barulina, 1930). The seeds of macrosperma are bold in size with yellow cotyledon colour and seeds of microsperma are small in size with red cotyledon colour. Sub species macrosperma are mostly cultivated in the temperate regions of Europe, North and South America, while microsperma are cultivated in tropical countries of Asia and Africa. Lentil is one of the important pulse crops, but this has not received proper attention from geneticists and plant breeders for its improvements.
The effectiveness of selection for any character depends on the amount of genetic variability present in the population. High estimates of heritability increases selection efficiency. It assess the amount of genetic variance due to genetic effects which is likely to be transferred to the progeny.

Genetic advance helps in the improvement of the mean genotypic value for the selected families over the base populations. When dealing with segregating populations, heritability in narrow sense is more appropriate for estimating genetic advance.

Character association reveals the type, nature and magnitude of correlations between yield and yield components and among themselves. Correlations studies provided better understanding of yield components which helps the plant breeder during selection (Robinson et al., 1951; Johnson et al., 1955).

Mass selection has been used to improve seed yield in several crops through indirect selection for highly suitable characters which are associated with yield.

Path analysis identifies the yield components which directly and indirectly influence the yield and it also provides the basis for selection of superior genotypes from the diverse breeding population.

The D² technique for multivariate analysis had been successfully used in a variety of crosses to select divergent genotypes in order to exploit heterosis and for bring together higher frequency of desirable genes in a strain. Knowledge of genetic diversity in combination with
character association analysis for yield and its contributing characters allow the breeder to select suitable genotype with broad genetic background and to use them in initiating the breeding programme. Further genetic divergence and character association are also known to change with a change in environment (Singh, 1976).

Thus, the studies of variability, heritability, character association, path analysis and genetic divergence have great importance for designing successful breeding programme in any crop. This will help in selecting desirable strains for hybridization may give better segregants. Keeping in view, the present investigation was undertaken on the following objectives.

(i) To estimate the coefficients of variation for yield and its contributing characters.

(ii) To estimate the heritability and genetic advance with respect to yield and yield contributing characters.

(iii) To study the character association and path coefficient analysis.

(iv) To study the genetic diversgence among genotypes.

(v) To suggest a suitable breeding plan for improving the seed yield in lentil.