CHAPTER 6

SUMMARY
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The present investigation entitled "A Study on variability, character association and genetic divergence in lentil (Lens culinaris Medik.)" was undertaken with following objectives-

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

(ii) To estimates 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.

The experiment comprising of 50 genotypes of lentil were grown in a Randomized Block design (RBD) with three replications at Research Farm, Department of Genetics & Plant Breeding, Post Graduate College, Ghazipur, during rabi season of 2002-2003 and 2003-2004, plant to plant and row to row distance was kept 10 cm and 45 cm, respectively. The data were recorded on days to 50% flowering, days to maturity, number of primary branches per plant, number of secondary branches per plant, plant height (cm), number of pods per plant, number of seeds per pod, biological yield per plant (g), seed yield
per plant(g), 100-seed weight(g) and harvest index(\%).

The salient findings from the present study are summarized as follows:

1. The analysis of variance shows that the mean squares due to treatments were highly significant at 1% level of significance for all the eleven quantitative characters of two years and pooled over years indicating the variation among the characters.

2. The estimate of GCV and PCV showed wide range. The GCV in I Year, II year and pooled over years respectively varied from 2.00 to 33.01 for days to maturity and 100 seed weight, 1.05 to 35.96 for days to maturity and number of pods per plant and 34.23 to 64.28 for days to maturity and seed yield per plant.

   In I, II year and pooled over years the estimates of GCV in order of their magnitude were high for seed yield per plant, biological yield per plant, harvest index, number of pods per plant and days to 50% flowering consequently GCV estimates were low for plant height, number of secondary branches per plant, number of primary branches per plant and number of seeds per pod.

3. The phenotypic coefficient of variation in I Year, II year and pooled over years respectively varied from 4.19 to 46.90, 8.80 to 66.58, 35.96 to 76.73 for days to maturity and seed yield per plant.

   The estimates of PCV in I, II year and pooled over years were also high for the characters like number of pods per plant, biological yield, 100-seed weight, harvest index and days to 50%
flowering, number of secondary branches per plant and plant height, low estimates of PCV were for number of primary branches per plant and number of seeds per pod.

4. In both years (I and II) high estimates of heritability in broad sense were observed for the characters like 100 seed weight, days to 50% flowering, harvest index and number of pods per plant. Similarly the low estimates of heritability were for biological yield per plant, seed yield per plant, plant height and number of seeds per pod. Whereas in pooled over years the estimates of heritability were high for all the characters.

5. The higher estimates of genetic advance in both the years were observed for days to 50% flowering, number of pods per plant, harvest index, plant height and biological yield per plant. Low genetic advance were for the characters like 100, seed weight, number of primary branches per plant, days to maturity and number of primary branches per plant. On the other hand the genetic advance in pooled over years showed higher estimates of genetic advance for all the characters except for harvest index 100-seed weight, number of seed per pod and number of primary branches per plant. Thus, the material under study appear to be promising.

6. The estimates of genotypic correlation coefficients in I year, II year and pooled over years were higher than the estimates of phenotypic correlation coefficients. The seed yield per plant had positive and significant correlation with number of secondary
branches per plant, number of pods per plant, harvest index, biological yield and 100-seed weight; these associations indicate that improvement in seed yield will be made by increasing the biological yield, harvest index, number of pods per plant and 100-seed weight.

7. The estimates of direct and indirect contribution of different characters towards seed yield were calculated following path analysis. In both years and pooled over years the positive and high direct effect on seed yield were observed for biological yield, number of pods per plant and harvest index and 100-seed weight at phenotypic level. The positive and low direct effect were observed for number of pods per plant, days to maturity and days to 50% flowering. Whereas, number of seeds per pod was showed negative and high direct effect on seed yield at phenotypic level as well as low negative and direct effect were observed on seed yield for secondary branches per plant, biological yield per plant at phenotypic level.

8. It is suggested that improvement in the characters like biological yield, number of pods per plant, harvest index, 100-seed weight, and plant height will help in improving the seed yield in lentil in the sense of direct selection.

9. \(D^2\) analysis (genetic divergence) was calculated from the I year, II year and pooled over years data by using Mahalanobis (1936) approach on the 50 genotypes of lentil.
10. In both years and pooled over years, the 50 genotypes were grouped into 7 clusters. In the first year, cluster II had the maximum number of genotypes (13) followed by cluster VII (11), cluster I and VI (8), cluster IV (7), cluster III (2), and cluster V (1). In the second year, the cluster VII had the maximum number of genotypes (12) followed by cluster I and V (8), cluster III (7), cluster II (7), cluster IV and VI (5). Whereas in pooled over years, the cluster II and VIII had the maximum number of genotypes (11) followed by cluster IV (10), cluster I and III (7), cluster VI (3), and cluster I (1).

11. In the first year, the maximum intra-cluster distance was observed in cluster VII and the minimum in cluster V. The maximum inter-cluster distance was observed between cluster V and VII. The cluster V and VI showed the maximum divergence, indicating that genotype L-532-02 (cluster V) and genotypes P-56, P-7, P-109, L-7484, L-63, L-62, P-11106 and P-16 (cluster V) are more divergent. These genotypes may be used to produce superior hybrids and transgressive segregants.

12. In the second year, the maximum intra-cluster distance was observed in cluster III and the minimum in cluster II. The maximum inter-cluster distance was observed between cluster IV and VII. The cluster IV and VII showed the maximum divergence, indicating that genotypes P-11106, L-4614, L-55, P-95, P-96 (cluster IV) and genotypes L-564, 3-22-97, 543-02, 545-02, L-7479, L-68-17-4-2, P-32212, 2-532-02, P-32210, L-620, P-52232 (cluster VII) and more divergent, these genotypes may be used to produce superior hybrids and transgressive segregants.
13. In pooled over years the maximum intra-cluster distance observed in cluster VI and minimum in cluster V. The maximum inter cluster distance observed between cluster I and V. The cluster I and VI had maximum divergence indicated that genotypes 537-02, L-68-17-4-2, P-32212, L-532-02, P-32210, L-620, P-52232 (cluster I) and genotypes L-5214, L-6178, P-10 (cluster VI) are more divergent, these genotypes may be used to produced superior hybrids and trangressive segregants.

14. The relationship between genetic and geographic diversity would not be worked out in the present investigations.

15. It is suggested that the success of hybridization depends on the genetic diversity among the parents. In present investigation the cluster V and VI in I year, cluster IV and VII in second year and cluster I and VI in pooled over years showed maximum divergence. It is expected that hybridization between the genotypes of these divergent clusters will leads to high heterotic effects with better segregants.

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