SUMMARY

Six field trials were conducted with five levels of Phosphorus (0, 30, 60, 90 and 120 Kg P₂O₅/ha) with six varieties namely, Tender Crop Stringless, Stringless Cluster, Canadian Wonder, Meghalaya Local (Pole), Meghalaya Local (Dwarf) and Manipuri. The periods of sowing were April, June and September during 1990 and 1991. The data were subjected to analysis and the summary of results are presented hereunder.

1. The varieties responded differently to Phosphorus. The variety TCS required higher Phosphorus level for high yield while Canadian Wonder required less Phosphorus. The yield of french bean was low when grown during June and September. The best time for sowing beans was April. The best dose of P₂O₅ for the six varieties viz., TCS, Stringless Cluster, Canadian Wonder, Meghalaya Pole, Meghalaya Dwarf and Manipuri were 60 Kg/ha, 0 Kg/ha, 30 Kg/ha, 30 Kg/ha, 90 Kg/ha and 120 Kg/ha respectively. Even though, the variety Stringless Cluster gave good yield in absence of Phosphorus the yield of Canadian Wonder was higher in control than Stringless Cluster. Out of all the characters studied significant genotype environment
interaction as well as significant effect of Phosphorus was observed for Plant height and yield. Pod number was another important trait which showed response to phosphorus in all seasons except April sowing in 1990.

2. Effect of soil application of Phosphorus was negligible on soil pH and organic carbon while phosphorus had marked influence on available P and K contents of soils. Maximum available phosphorus build up was noticed in Meghalaya Pole, Manipuri and Stringless Cluster.

3. The asymptotic pattern of response was absent in case of Canadian Wonder and Meghalaya Pole while it was linear in case of TCS and Meghalaya Dwarf. But, in general the response was of quadratic regression type. The optimum level of P₂O₅ for the varieties were, TCS - 99.7 Kg/ha, Stringless Cluster - 68.44 Kg/ha, Canadian Wonder - 4.4 Kg/ha, Meghalaya Pole - 32.6 Kg/ha, Meghalaya Dwarf - 35.55 Kg/ha and Manipuri - 48 Kg/ha while the mean optimum requirement was 15.44 Kg/ha.

4. As indicated above significant genotype x environment interaction was observed for Plant height and yield in all seasons while Pod number
showed interaction in all seasons except April 1990, as well as in pooled analysis. Canadian Wonder and Stringless Cluster were stable performer over seasons and ideal for low Phosphorus soils. None of the varieties can be considered stable for plant height.

5. The number of factors constituting Principal Components contributing to the total variance were seven for all the seasons. The pooled analysis revealed the number of factors responsible for total variance were 5.

6. The treatment of Phosphorus which gave high loadings for each variety varied with season. Stringless Cluster and Canadian Wonder, the two low phosphorus requiring varieties, showed high loadings with no phosphorus level in two seasons.

7. In all seasons it was generally observed that yield and pod number were showing high loadings in Factor 1 while branch number and pod length were important in orthogonal axis.

8. For bush types, plant height and pod thickness were important due to high loadings in Factor 1 while pole types showed high loadings in Factor 2.
and 3 and the characters important were pod number and pod breadth.

9. High phosphorus levels showed loadings in Factor 1 and Factor 2.

10. As indicated in point no. 7 above, branch number and pod number were important traits for improving the yield of beans and could serve as selection index based on the results of Sequential Yield Component Analysis (SYCA). The major effect of phosphorus on yield improvement was through improving vegetative and reproductive growth.