CHAPTER 6

SUMMARY
SUMMARY

The present thesis comprises six chapters. In chapter 1, the importance of the problem "Effect of calcium and application of pyridoxine on the performance of summer moong, mustard and wheat" has been described briefly.

In chapter 2, relevant available literature pertaining to mineral nutrition and pyridoxine treatment of crops has been reviewed.

Chapter 3 consists of the details of the materials and methods employed for the six field experiments and the relevant meteorological and edaphic conditions have also been included.

Chapter 4 includes the detailed data regarding crop response (growth, yield and quality characteristics, biochemical and chemical characteristics). These were mostly found significant on statistical analysis at \( P > 0.05 \). The salient data are summarised below:

**Experiment 1** (1992) conducted on summer moong var. T-44 during "Zaid" (summer) season to study the effect of basally calcium and pre-sowing seed treatment with pyridoxine, alone and added in combination in the presence of uniformly applied 10 kg N, 30 kg P and 35 kg K/ha on (i) growth, (2) yield and quality, and (3) biochemical and
The doses of calcium were 10 (Ca$_{10}$), 20 (Ca$_{20}$) and 30 (Ca$_{30}$) kg Ca/ha, with a no Ca control (Ca$_0$) while there were two controls, viz. unsoaked (US) and water soaked (WS) for the pre-sowing seed treatment with 0.3% aqueous pyridoxine (PY) solution. Growth parameters were studied at 15, 30 and 45 DAS and NAR, CGR, RGR were computed at 15–30 DAS and 30–45 DAS. NRA and status of N, P, K and Ca were also studied at different growth stages. Yield and quality parameters were studied at harvest (67 DAS).

Ca$_{10}$ and PY proved optimum for most of the parameters studied with US and WS proving at par. The increase in seed yield of Ca$_{10}$ over Ca$_0$ was 17.03% and that in PY over WS$_1$ 20.03%. Interaction effect was significant only on N status at 15 and 30 DAS, P status at 30 DAS, K status at 30 and 45 DAS, and Ca status at 15 and 30 DAS.

Experiment 2 (1992–93) was conducted on mustard var. Varuna during rabi (winter) season. The aim of this field trial was to study the effect of four basal doses of calcium and of pre-sowing seed treatment with pyridoxine, alone and in combination. The crop was grown with 90 kg N, 30 kg P and 30 kg K/ha, applied uniformly at the time of sowing. (1) Growth (2) yield and quality, (3) biochemical and chemical parameters were studied at various stages of growth. The doses of calcium were 0 (Ca$_0$), 20 (Ca$_{20}$), 40 (Ca$_{40}$) and 60 (Ca$_{60}$) kg Ca/ha for pre-sowing seed treatments two concentrations, viz. 0.01% (PY$_1$) and 0.02% (PY$_2$) of aqueous
pyridoxine solution were taken, together with the two controls (US and WS) as in Experiment 1, which again proved at par.

Ca\textsubscript{40} proved optimum for most of the parameters studied except weight per plant and LAI at 70 DAS. PY\textsubscript{2} proved optimum for almost all parameters. Except for fresh weight and dry weight at 70 DAS, the interaction effect on other parameters was non-significant.

Experiment 3 (1992-93) was conducted on wheat var. HD-2204 during "rabi" (winter) season to study the effect of four basal calcium levels, i.e. 0 (Ca\textsubscript{0}), 20 (Ca\textsubscript{20}), 40 (Ca\textsubscript{40}) and 60 (Ca\textsubscript{60}) kg Ca/ha and of pre-sowing seed enrichment with two aqueous pyridoxine solution, i.e. 0.01% (PY\textsubscript{1}) and 0.02% (PY\textsubscript{2}), alone as well as in combination, on growth (2) yield and quality and (3) biochemical and chemical parameters at various stages of growth.

Ca\textsubscript{20} proved optimum for most of the parameters studied except height per plant at 70 and 90 DAS, leaf number at 50 DAS tiller number at 70 DAS and Ears/plant at harvest, for which Ca\textsubscript{40} proved optimum PY\textsubscript{2} proved best for almost all parameters. It may be noted that Ca\textsubscript{20} gave 34.4% higher grain yield than Ca\textsubscript{0} and PY\textsubscript{2}, out-yielded WS by 17.27% for this parameter. The interaction effect on the parameters was non-significant.
Experiments 4, 5 and 6: These field trials on summer moong var. T-44 (1993), mustard var. Varuna (1993-94) and wheat var. HD-2204 (1993-94) were designed on the basis of the findings of Experiments 1, 2 and 3 respectively. As the two controls for pyridoxine treatment in Experiments 1, 2 and 3 had proved at par, only one control (WS) was taken in Experiments 4, 5 and 6. Also, the source of applied calcium being gypsum (CaSO₄·2H₂O), that contains sulphur also, the observed beneficial effect could not be assigned un-equivocally to calcium alone. To remove this lacuna, it was decided to reschedule the basal doses of calcium. Experiments 4, 5 and 6 as under:

Experiment 4 (Summer moong): (1) control (Ca₀S₀) 8 kg S/ha as K₂SO₄ (Ca₀S₈) and (3) 10 kg Ca + 8 kg S/ha as gypsum (Ca₁₀S₈).

Experiment 5 (Mustard): (1) control (Ca₀S₀); (2) 32 kg S/ha (Ca₀S₃₂) and (3) 40 kg S/ha (Ca₀S₄₈), both as ammonium sulphate; (4) 40 kg Ca/ha + 32 kg S/ha (Ca₄₀S₃₂) and (5) 60 kg Ca/ha + 40 kg S/ha (Ca₆₀S₄₈), both applied as gypsum.

Experiment 6 (Wheat): (1) control (Ca₀S₀); (2) 16 kg S/ha (Ca₀S₁₆); (3) 32 kg S/ha (Ca₀S₃₂), both as ammonium sulphate; (4) 20 kg Ca/ha + 16 kg S/ha (Ca₂₀S₁₆) and (5) 40 kg Ca/ha + 32 kg S/ha (Ca₄₀S₃₂), both applied as gypsum. The design of the all the three experiments was factorial randomised and the basal doses and sources of N, P and K
were retained. All the agricultural practices and sampling techniques employed in Experiments 4, 5 and 6 as well as the parameter studied were similar to those in Experiments 1, 2 and 3 respectively.

Data of Experiment 4 on summer moong revealed that basal application of Ca as well as S had a significant positive effect on almost all parameters studied. However, the combined effect of the two as gypsum was best and the contribution of S was far less than that of Ca. Among pre-sowing seed treatments, PY proved much superior to WS for all characteristics.

In Experiment 5 on mustard, similar observations were made. However 40 kg Ca/ha proved superior to 60 kg Ca/ha.

In results of Experiment 6 on wheat also showed a similar trend. Among the basal doses, 20 kg Ca/ha proved optimum.

In chapter 5, the main results have been discussed in the light of the findings of earlier researches in our laboratory and elsewhere.

The present chapter is followed by an up-to-date bibliography of the references cited in the text.