CHAPTER - 6

SUMMARY
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The importance of the problem "Mineral nutritional studies on yield and quality of mustard" has been briefly considered. In view of the lacunae in our understanding of the problem, justification has been put forward for undertaking the present work (Chapter 1).

The literature pertaining to the history of mineral nutrition, nomenclature of the members of mustard group of oilseeds, their uses and fertiliser requirements and the effect of basal and foliar application of N, P, K and S on this crop has been reviewed with special reference to the work done in India (Chapter 2).

The details of the material and methods employed for the six field experiments have been given together with the relevant meteorological and edaphic data (Chapter 3).

The data were subjected to statistical analysis according to the design of each experiment and were found mostly significant (Chapter 4).

The main results have been discussed in the light of the findings of earlier researches undertaken in our own laboratory and elsewhere (Chapter 5) and are summarised below:
Experiment 1 (1980-81) was a varietal trial on 10 varieties (Appressed Mutant, Pusa Kisan, Pusa Kranti, R.75-2, RIK-3, RL-16, RS-3, T-11, T-16 and Varuna) grown uniformly with N\textsuperscript{60}P\textsubscript{40}K\textsubscript{40}. Yielding ability was assessed by pod number per plant, seed number per pod, hecto-litre weight, oil percentage and seed and oil yield and oil quality, by acid, iodine and saponification values.

Varuna proved best for all yield characteristics, except oil percentage which was maximum in RL-18. RIK-3 gave the lowest seed and oil yield. Pusa Kisan proved superior (and Varuna, moderate) for acid and saponification values and RS-3, for iodine value.

Experiment 2 (1980-81) was performed on Varuna to select the best dose of N out of 4 levels of foliar N with and without P and S supplied to supplement 2 basal doses of N and P and a uniform dose of K.

The basal treatment N\textsubscript{60}P\textsubscript{40} proved better for all the yield and quality characteristics (except saponification value).

Spray of N\textsubscript{20}P\textsubscript{2}S\textsubscript{2} gave maximum pods per plant, seeds per pod, seed yield and oil yield, while hecto-litre weight and oil percentage were maximum in N\textsubscript{5}P\textsubscript{2}S\textsubscript{2}. For quality, N\textsubscript{20}P\textsubscript{2}S\textsubscript{2} proved best for iodine value only.
In general each spray proved better for all characters at \( N_{60}P_{40} \) than at \( N_{40}P_{20} \). At both basal levels, \( N_{20}P_{2}S_{2} \) proved best for most yield parameters and for iodine value.

Experiment 3 (1980-81) was also conducted on Varuna to select the optimum combination of P and S sprayed to supplement 2 basal regimes of N and P with a uniform dose of K.

Basal \( N_{60}P_{40} \) again proved best for most of the parameters, including seed and oil yield.

Spray of \( P_{8}S_{2} \) was found best for pod production, hecto-litre weight, seed and oil yield as well as acid value and was moderately good for iodine and saponification values.

Spray treatments gave better results with basal \( N_{60}P_{40} \) than \( N_{40}P_{20} \). Spray of \( P_{8}S_{2} \) gave the maximum seed yield at both basal levels and the highest number of pods per plant, seeds per pod and oil yield at \( N_{60}P_{40} \). Best acid value and moderate iodine and saponification values were noted in spray treatment \( P_{8}S_{2} \) at both the basal levels.

The aim of Experiment 4 (1981-82) was to compare the efficacy of supplemental foliar application with top-dressing and to select their optimum combination with basal N for Varuna grown with a uniform dose of P and K.

In general, spray treatments proved better than other treatments. Of these, \( N_{60} \) (basal) + \( N_{20}P_{8}S_{2} \) (spray) proved
best for pods per plant, seeds per pod, seed yield, oil percentage and oil yield and moderate for quality characteristics. Even the combination $N_{45}$ (basal) + $N_{20}P_{8}S_{2}$ (spray) proved economical for seed yield and gave quite desirable acid, iodine and saponification values.

Experiment 5 (1982-83) was laid out on the basis of the data of Experiment 4. The response of 10 varieties to the optimum spray dose $N_{20}P_{8}S_{2}$ applied with basal $N_{60}P_{40}K_{40}$ in relation to the yield and quality parameters was studied.

Maximum seed yield was noted in R.75-2 which was at par with Varuna. However, maximum oil percentage and yield was noted in Varuna, RS-3, RL-18 and R.75-2. Pusa Kisan and T-11 gave lowest acid values. Whereas, Pusa Kranti, RS-3, Varuna and RL-18, being at par, gave lowest iodine value. Variety Pusa Kranti gave maximum saponification value.

It is noteworthy that varieties R.75-2, RL-18 and RS-3 which proved comparatively poor yielders in Experiment 1 (basal $N_{60}P_{40}K_{40}$ only) responded better to the supplemental spray of $N_{20}P_{8}S_{2}$ in this experiment and occupied the top positions in seed yield. On the other hand, Appressed Mutant, which gave very high seed yield earlier, could not maintain its superiority in this trial.

Experiment 6 (1982-83) was conducted to study the comparative response of six varieties, selected on the basis of
Experiment 1, to the spray of $N_{20}P_{8}S_{2}$ at 2 basal doses of $N$ and $P$ applied with a uniform $K$ dose in relation to yield and quality characteristics.

The higher dose ($N_{60}P_{40}$) proved better for all characters, except oil percentage and saponification value.

Variety Varuna produced maximum seeds followed by T-16 and R.75-2. Maximum oil yield was noted in Varuna, R.75-2, T-16 and T-11, which were at par. The oil content was maximum in RL-18 and T-11.

Variety Varuna proved best for acid and iodine values, R.75-2 and RL-18 being at par, gave maximum saponification value.

The interaction effect of each variety was better at $N_{60}P_{40}$ than $N_{40}P_{20}$ for most of the characters. It was interesting to note that oil yield given by Appressed Mutant at both the basal doses was at par, proving $N_{60}P_{40}$ to be supra-optimal. At lower basal dose ($N_{40}P_{20}$), T-11 and T-16 and at the $N_{60}P_{40}$, R.75-2 and RL-18 performed better for many characters, including seed and oil yield. It is interesting to add here that Varuna gave better response not only for seed and oil yield but also for some other parameters at both basal levels.

Considering the entire data of the six field experiments, the following generalisation may be made.
Foliar application of nutrients gave better yields and proved more economical than top-dressing. Increasing the doses of foliar-applied nutrients (N, P or S), significantly increased seed and oil yield, $N_{20}P_{8}S_{2}$ proving optimum in the presence of the basal dose $N_{60}P_{40}K_{40}$.

Among the varieties, R.75-2, RL-18, RS-3 and Varuna showed greater adaptability to local conditions and can be exploited to give better results by applying the optimum combination of basal and foliar nutrients noted above. However, if spray equipment is not easily available, Varuna may still be grown profitably.