



Effect of rate and time of nitrogen application on seed yield, quality and economics of cumin (*Cuminum cyminum* L.) under loamy sand soils

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Abstract : A field experiment was conducted at Agronomy Instructional Farm, Sardarkrushinagar Dantiwada Agricultural University, Sardarkrushinagar during *Rabi* season of 2008-09 wherein twenty treatment combinations comprising of four levels of nitrogen (20, 30, 40 and 50 kg ha⁻¹) and five times of nitrogen application *i.e.*, 50 per cent as basal + 50 per cent at 30 DAS, 25 per cent as basal + 25 per cent at 8-10 DAS + 50 per cent at 30 DAS, 33 $\frac{1}{3}$ per cent as basal + 33 $\frac{1}{3}$ per cent at 8-10 DAS + 33 $\frac{1}{3}$ per cent at 30 DAS, 50 per cent at 8-10 DAS + 50 per cent at 30 DAS and 33 per cent at 8-10 DAS + 33 per cent at 30 DAS + 33 $\frac{1}{3}$ per cent at 50 DAS were tested. Crop fertilized with 50 and 40 kg N ha⁻¹ recorded statistically at par seed yield but significantly higher than the lower levels of nitrogen. Increasing levels of nitrogen improved protein and oil content in the seed. Similar trend was observed in case of uptake of N and P by the crop as well as for buildup of N status of soil with increasing N levels. Application of nitrogen in three equal splits at 8-10, 30 and 50 DAS recorded maximum seed yield, but in case of quality parameters, nitrogen and phosphorus uptake by crop as well as available nitrogen content in soil it remained at par with application of nitrogen in two equal splits at 8-10 and 30 DAS. The package involving 50 kg N ha⁻¹ applied in three equal splits at 8-10, 30 and 50 DAS was found more remunerative.

Key Words : Cumin, Nitrogen level, Split, Yield, Nutrient uptake

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INTRODUCTION

Cumin is a tropical plant grown in sandy loam to medium black soil during *Rabi* season where atmospheric humidity is low during flowering and seed formation stages. It is mostly grown on light textured soils deficient in organic matter and nitrogen as well poor water holding capacity. Nitrogen effect being manifested quickly on plant growth and ultimately on crop yields. Nitrogen being a constituent of protoplasm and chlorophyll, it is intimately involved in the process of photosynthesis, respiration and protein synthesis. Availability of nitrogen is most important for growing plants as it is a major and indispensable constituent of proteins and nucleic acid molecules, nucleotides, enzymes, alkaloids, vitamins and

chlorophyll. The effect of rate and time of nitrogen application varies with soil plant environment. Hence, to standardise the dose and time of application of nitrogen to cumin for sandy loam soils of North Gujarat, the investigation was taken up.

MATERIALS AND METHODS

The field experiment was conducted on loamy sand soil during *Rabi* season of the year 2008-2009. The experimental plot was low in organic matter, available nitrogen and medium in available phosphorus and potash and free from excess salt. Twenty treatment combinations comprising of four levels of nitrogen (20, 30, 40 and 50 kg ha⁻¹) and five times of nitrogen application *i.e.*, 50 per cent as basal + 50 per cent at 30 DAS;

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