

## Effect of Nitrogen, Phosphorus and Zinc Fertilization on Soil Nutrients Status and Yield of Ber (*Zizyphus mauritiana* Lamk) cv Gola in Arid and Semi-Arid Regions

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### Abstract

An investigation was carried out to study the effect of three levels each of nitrogen (250, 500 and 750 g/plant per year), phosphorus (200, 350 and 500 g/plant per year) and zinc sulfate (0.4%, 0.6% and 0.8% plant per year) on soil composition and yield of ber fruits. The nitrogen content was significantly influenced with the application of nitrogen in orchard soil. Phosphorus, potassium and zinc content also increased but the results were not significant. The soil phosphorus was significantly influenced by the application of phosphorus, but it had no significant effect on nitrogen, potassium and zinc. The foliar application of zinc sulfate did not significantly influenced the nitrogen, phosphorus, potassium and zinc content of soil. The yield of ber fruit increased significantly with the application of nitrogen, phosphorus, and zinc sulfate.

**Key words :** Nitrogen, Phosphorus, Zinc, Fruit yield, Soil.

In the arid and semi-arid nutrient deficient soils nutrition is one of the most important factor which greatly affect the yield of ber fruits and increase the soil fertility. The effect of N, P and Zn are considered to be closely related and these have well marked effects on the fruit production. Experimental evidences have shown that nitrogen and phosphorus as soil application to fruit plant benefit crops, increase the fruit yield with improvement in soil fertility (1). The beneficial effect of nitrogen in increasing the tree growth might be due to the reason that absorbed nitrogen combined with the carbohydrates synthesis, lead to the formation of nitrogenous compounds to build new tissues (2). Phosphorus is another essential nutrient which is required for many metabolic activities in plants. It plays key role in the energy metabolism. Nitrogen and phosphorus are also known to improve the fruit quality and impart resistance to plant diseases (3). Zinc availability is necessary for plant growth. It has been reported to promote synthesis of indole acetic acid through tryptophane which serves a precursor for auxin synthesis directly affecting the growth parameters. The more availability of auxins and increased availability of photosynthates, increase the leaf area which is directly respon-

sible for metabolites required for plant growth and development (2). In view of these considerations, in the present experiment was conducted on the effects of fertilizer application in ber orchard in arid and semi-arid zone on fruit yield, and also the improvement of soil fertility status.

### Methods

A field experiment was conducted at CAZRI, Krishi Vigyan Kendra Farm at Pali during 2004-05 and 2005-06. Well established ber orchard of cv Gola was selected for the present study. The plants were maintained as recommended for healthy orchard management practices. The treatment composed of three levels of nitrogen viz. 250 (N<sub>1</sub>), 500 (N<sub>2</sub>) and 750g (N<sub>3</sub>)/plant per year, three levels of phosphorus viz. 200 (P<sub>1</sub>), 350 (P<sub>2</sub>) and 500 g (P<sub>3</sub>)/plant per year applied through urea and single super phosphate and three levels of zinc sulfate 0.4 (Z<sub>1</sub>), 0.6 (Z<sub>2</sub>) and 0.8% (Z<sub>3</sub>)/plant per year. In all, there were 28 treatment combinations including unfertilized (control). Half dose of nitrogen and full dose of phosphorus were applied to pit soil in July and the remaining dose of nitrogen, was applied in November. The zinc sulfate was