

Nutrient uptake pattern of pigeonpea (*Cajanus cajan*) as influenced by integrated nutrient management

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ABSTRACT

Field experiment was conducted during *kharif* 2001-02 to study the effect of integrated nutrient management on pigeonpea crop with the treatments comprised of biofertilizers, farmyard manure, recommended dose of fertilizers and their all possible combinations. The results revealed that the pigeonpea seeds inoculated with *Rhizobium* plus *P.striata* significantly increased the content as well as uptake of nitrogen, phosphorus and potassium by grain as well stalk over uninoculated control. Similar trend was also observed with application of FYM 5 t ha⁻¹ over control (No manure). Pigeon crop fertilized with 75 and 100 % RDF ha⁻¹ were found equally effective and significantly superior over 50 % RDF ha⁻¹ and control with respect to content and uptake of nitrogen, phosphorus and potassium by grain as well as stalk. However the highest values of these parameters were recorded with 100 % RDF ha⁻¹.

Key words: Pigeonpea, INM, Nitrogen, Phosphorus, Potassium, Content, Uptake.

INTRODUCTION

Legumes are considered as soil recuperative crops and are generally grown without fertilization under rainfed conditions. Data collected on nutrient uptake however, reveals that sufficient amount of nutrients are removed by pulse crops. Pigeonpea occupies a prominent position as rainy season (*kharif*) pulse crop. Pigeonpea requires about 63.3 kg N, 15.8 kg P₂O₅ and 49.8 kg K₂O per hectare to produce 1 tonne of pigeonpea grains (Tamboli *et al.*, 1995). In the schedule of fertilization, it is important to know the accumulation of nutrients in the crop, as most of the applied nutrients are lost through leaching, volatilization, denitrification and chemical fixation in soil. Practically very limited information is available on the concentration and uptake of nutrients by pigeonpea crop grown with variable levels of recommended dose of fertilizers, farmyard manure and biofertilizers. So it has been considered worthwhile to study the concentration and uptake of nutrients in pigeonpea as affected by integrated nutrient management.

MATERIALS AND METHODS

An investigation was carried out on clayey soil during rainy season of 2001-02 at Gujarat Agricultural University, Junagadh. Initially the soil of experimental plot had the following characteristics: pH 7.7, organic carbon 0.72%, total nitrogen 0.62% available phosphorus 37.80 kg ha⁻¹ and available potassium 293.60 kg ha⁻¹. There were 16 treatment combinations consisting of two levels of Biofertilizers (with and without seed inoculation of *Rhizobium* plus *Pseudomonas striata*), two levels of

FYM (with and without 5 ton FYM_{ha}⁻¹) and four levels of Recommended dose of fertilizers (0, 50, 75 and 100 % RDF_{ha}⁻¹). The experiment was laid out with factorial concept in randomized block design with four replication. Pigeonpea Cv. GT-1 was sown at 90cm x 20cm spacing with 15 kg seed/ha in first week of July. The recommended dose of fertilizers @ 25:50:0 kg N: P: K ha⁻¹ was considered as 100% RDF. The crop was fertilized as per treatments with application of urea and diammonium phosphate at the time of sowing, while well decomposed FYM containing 0.5 % N, 0.2% P₂O₅ and 0.5 % K₂O was applied 10 days prior to sowing as per treatments. Seed was inoculated with a culture of *Rhizobium* plus *Pseudomonas striata* as per treatments before sowing. Other cultural operations were done as per recommendation and crop requirements. During crop growth period about 547.6mm rainfall was received in 41 rainy days. N content of grain and stalk was estimated adopting micro-kjeldahl method. Diacid (HNO₃ + HClO₄ in 10:4) digested grain and stalk samples were analyzed for P by vanadomolybdo-phosphoric acid method and K by flame photometry. Nutrient uptake was calculated using the grain and stalk yields.

RESULTS AND DISCUSSION

Effect on Nutrients Content :

The N, P and K content of grain as well as stalk were significantly increased by seed inoculation with *Rhizobium* plus *P. striata* over uninoculated control. Significantly the highest N (3.515 %), P (0.502%) and K (0.797%) content in grain as well as the highest N (1.128

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