RESEARCH PAPER International Journal of Agricultural Sciences, Vol. 7 Issue 2 (June, 2011) : 340-342

Response of cowpea (*Vigna sinensis* L.) to different levels of potassium and zinc cv. GC-4

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ABSTRACT

A field experiment was conducted on medium black calcareous soil of the Instructional Farm, Junagadh Agricultural University, Junagadh (Gujarat) during the season of *Kharif*-2008. Significantly higher grain (1587 kg ha^{-1}) and straw (2047 kg ha^{-1}) yields were recorded with application of 60 kg K_2O ha^{-1}. Significantly highest grain (1553 kg ha^{-1}) and stover (2010 kg ha^{-1}) yields were recorded with 40 kg zinc ha^{-1}. It indicated that the potential production and profit from *Kharif* season cowpea (cultivar GC-4) can be secured by fertilizing the crop with 60 kg K_2O ha^{-1} along with 40 kg zinc ha^{-1}.

Chavan, A.S. and Khafi, H.R. (2011). Response of cowpea (*Vigna sinensis* L.) to different levels of potassium and zinc cv. GC-4. *Internat. J. agric. Sci.*, **7**(2): 340-342.

Key words : Cowpea, Potash, Zinc

INTRODUCTION

Cowpea [*Vigna unguiculata* (L.) Walp], synonym, *Vigna sinensis* (L.) savi ex Hassk is one of the important *Kharif* pulse and grown in the India for grain, forage and green manure purpose. Cowpea is the versatile *Kharif* as well as summer pulse, because of its smothering nature, drought tolerant character, soil restoring properties and multipurpose uses. It covers the ground and checks soil erosion and works as mulch to reduce the evaporation losses apart from being a leguminous crop. Cowpea can fix about 80 to 90 kg N ha^{-1} under ideal condition.

Amongst the nutrients N and P are given the prority and very little attention is paid towards the K and micronutrients which are of prime importance for the nutrition of cowpea from the nutrition point of view.

The Potassium is one of the major plant nutrient for the growth and development of plants. The major functions are associated with enzyme involved in photosynthesis, metabolism of carbohydrate and physiological processes, such as root growth, water uptake and utilization efficiency, synthesis of protein and amino acids, enzyme activation and yield determining process *viz.*, drought, pest and disease tolerance.

Zinc plays vital role in plant growth and development. Zinc also catalyses the biosynthesis of indole acetic acid (IAA), acting as metal activator of the enzyme, there by ultimately increasing crop yield. Moreover, it controls the equilibrium between CO_2, water and carbonic acid in plant metabolism and helps in synthesis of nucleic acids, proteins and stimulates seed formation. Its deficiency retards photosynthesis and nitrogen metabolism.

MATERIALS AND METHODS

A field experiment was conducted during the *Kharif* season2008 at Agronomy Farm, College of Agriculture, Junagadh Agricultural University, Junagadh (Gujarat). The experiment comprised of twelve treatment combinations consisting of four levels of potassium *viz.*, no potassium application (K_0), 20 kg K_2O ha^{-1} (K_1), 40 kg K_2O ha^{-1} (K_2), 60 kg K_2O ha^{-1} (K_3) and three levels of zinc *viz.*, no zinc application (Zn_0), 20 kg zinc ha^{-1} (Zn_1) and 40 kg zinc ha^{-1} (Zn_2) were framed in Factorial Randomized Block Design (FRBD) with four replications. The soil of experimental site was on medium black calcareous soil with pH of 7.9 which was free from any kind of salinity or sodicity hazards. The gross and net plot sizes were 5.00 m x 3.6 m and 4.00 m x 2.4 m, respectively. Potash in the form of murate of potash (60% K_2O) and zinc in the form of zinc sulphate (21% Zn) were applied at the time of sowing in furrows as per treatments.

RESULTS AND DISCUSSION

The results obtained from the present investigation have been duscussed below:

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