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Research Paper :

Effect of potassium and sulphur on yield of cotton

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ABSTRACT

A lysimeter experiment was conducted in *kharif* 2006-07 and 2007-08 on medium black calcareous soils with four levels each of K (0, 90, 120 and 150 kg K_2O ha^{-1}) and S (0, 10, 20, 40 kg S ha^{-1}) in factorial CRD having three replications. The results revealed that the application of potassium and sulphur at varying levels significantly influenced on the seed cotton and stalk yield of cotton in both years as well as in pooled results and yield attributes. The significantly higher seed cotton (159g $plant^{-1}$), stalk (267.5 g $plant^{-1}$), number of bolls per plant (53.6), oil content (19.86 %) and ginning percentage (36.75) were recorded with highest level of $K_{150.}$ Whereas, the higher seed cotton and stalk yield of cotton were recorded with S_{20} and S_{40} treatment, respectively. Simultaneously, the application of K and S increased their respective concentration and uptake by seed cotton and stalk of cotton and their soil availability.

Key words : Castor**,** Potassium, Sulphur, Yield and Nutrient uptake

Cotton is an important crop next to groundnut in Saurashtra region of Gujarat state. Cotton is a very good source of natural fiber and to some extent supplementary source of edible oil. The introduction of new high yielding variety, change the concept of nutrient requirement of cotton. Application of potassium to cotton crop boost up seed cotton yield by 25 per cent and 1 per cent oil content. Similarly, sulphur also improve yield and quality parameters of seed cotton (Mamatha *et al*., 2009). Keeping this in view, study was taken to know the effect of potassium and sulphur on yield and quality of cotton.

MATERIALS AND METHODS

A lysimeter experiment was conducted in *kharif* 2006-07 and 2007-08 on medium black calcareous soils with four levels each of K (0, 90, 120 and 150 kg K_2O ha^{-1}) and S (0, 10, 20, 40 kg S ha^{-1}) in factorial CRD having three replications. The experimental soil was silty clay loam in texture, having pH 8.1, EC 0.38 dSm^{-1}, $CaCO_3$ 240 g kg^{-1}, O.C. 7.2 g kg^{-1}, available N 225.8 kg ha^{-1}, P_2O_5 36.54 kg ha^{-1}, K_2O 221.0 kg ha^{-1} and heat soluble S 7.95 mg kg^{-1}. Nitrogen @160kgha^{-1} was applied in form of urea in splits *i.e.* 50 % basal and 25 % at 30 DAS and 25% at 60 DAS, while potash and sulphur were applied in form of murate of potash and element sulphur, respectively as basal. Five seeds of cotton (cv. G.Cot. Hyb.-10) were sown, thinned to five plants after germination and harvested at maturity. The seed cotton and stalk yield of cotton were recorded and representative samples were analyzed for nutrient content as per standard analytical methods. At the time of harvest, the soil sample was also collected from each plot and analyzed for NH_4O Ac-K (Jackson, 1973) and Heat soluble-S (Williams and Stenbergs, 1959).

RESULTS AND DISCUSSION

The results obtained from the present investigation are summarized below :

Effect of potassium :

On yield and yield attributes:

The data (Table 1) indicated that the application of potassium at varying levels significantly influenced on the seed cotton and stalk yield of cotton in both years as well as in pooled results. The higher seed cotton yield were recorded in terms of 169.2, 148.8 and 159.0 g $plant^{-1}$ in year 2006, 2007 and pooled result, respectively under K_{150} over remaining potassium levels but it remained at par with treatment of K_{120} in year 2006. Similarly, the stalk yield of cotton also recorded higher with K_{150} in year 2007 and pooled with respective values of 289.2 and 267.5 g plant.

In respect of yield attributes, number of bolls per plant, oil content and ginning percentage were significantly influenced by potassium application. The higher number of bolls per plant (53.6), oil content (19.86 %) and ginning percentage(36.75) were recorded with K_{150} (Table 1). The positive effect of K on yield and yield attributes might be due to pronounced role of potassium in translocation of photosynthates, photosynthesis and cell elongation. Similar results were also reported by earlier worker (Singh *et al*.,1991; Parmar, 2006)