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Research Paper :

Interaction effect of sulphur and potassium on yield and nutrients uptake by sesame (*Sesamum Indicum* L.)

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ABSTRACT

A field experiment was conducted on medium black calcareous soils during *Kharif*, 2003 at Junagadh Agricultural university, Junagadh with four levels each of Sulphur (0,20,40 and 60.0 kgha^{-1} as elemental sulphur) and potassium (0,20,40,and 60 as KCl) in Factorial Randomized Bloch Design (FRBD) with four replications. The results revealed that the combined application of S_{40} and K_{40} resulted 60.0 and 114.0 per cent higher in grain and stover yield of sesame, respectively. Simultaneously, individual as well as combined application of S and K also significantly increased nutrients uptake by seed and stover.

Key words : Interaction effect, Yields, Sulphur and potassium uptake, Calcareous soils

Sesame (*Sesamum indicum* L.) "Queen of Oilseed" is the third important oilseed crop in the world and extensively grown in tropical and sub tropical regions for high edible oil. India is the highest producer of sesame in the world which occupies an area of 17.6 lakh ha with a production of 7.85 lakh tones and productivity of 446 kgha^{-1} (Anonymous,2009) Among the different state of India, Gujarat ranks first in production. The cultivated area of sesame in Gujarat is about 3.00lakh ha and production 1.41 lakh tones with average productivity of 470 kgha^{-1} (Anonymous, 2008), Sesame cultivation area has been increased in Gujarat state in general and particular in Saurashtra region, because of its short duration nature, suitable in rain fed condition and intercropping system as well as high demand in the foreign market and comparatively high price. The medium black calcareous soils of saurashtra region of Gujarat are tended to decline in available K and S due to intensive cropping. Sulphur and potassium both the elements play a vital role in the nutrition of plants. No work has been done on the interaction effect of sulphur and potassium on yield and nutrients uptake by sesame crop in this region. Keeping this in view, the investigation was carried to study the interaction effect of sulphur and potassium on nutrients uptake as well as yield of sesame crop.

MATERIALS AND METHODS

A field experiment was conducted on medium black calcareous soil (Typic Ustocrepts) at Agronomy Research farm, Junagadh Agricultural University, Junagadh in a Factorial Randomized Block Design with four replications using sesame cv.G.TIL-2. There were 16 treatments consisting four levels of S (S_1=0, S_2=20, S_3=40, and S_4=60 kg S ha^{-1} applied as elemental sulphur-Sulphex, 80%) and four levels of potassium (K_1=0, K_2=20, K_3=40, and K_4= 60 kg K_2O ha^{-1}applied as muriate of potash). The experimental soil was silty clay in texture, having $pH_{2.5}$ 7.9, $EC_{2.5}$-0.32 dSm^{-1},$CaCO_3$ 145 gkg^{-1} and O.C.6.3gkg^{-1}. It contained 220, 38.5 and 234 kgha^{-1} available N, P_2O_5 and K_2O, respectively and available sulphur 9.5 mgkg^{-1}. The half of the recommended nitrogen (6.5 kgha$^{-1)}$ and full dose P_2O_5 (25 kgha^{-1}) were added though urea and DAP as basal application in each plot. The remaining half dose of nitrogen (6.5kgha^{-1}) was applied at 45 days after sowing. The treatment wise sulphur and potassium were applied though elemental sulphur (20 days prior to sowing of crop) and muriate of potash as basal. The crop was raised with standard package of practices. Representative samples of seed and stover were taken at maturity from each net plot for the estimation of nutrient content in seed and stover. The samples were oven dried at 60^{0}C temperature up to constant weight and then powdered by mechanical grinder. The N,P,K and S content in seed and stover was determined with following standard methods(Jackson, 1973 and Chaudhry and Cornfield, 1966).

RESULTS AND DISCUSSION

The results obtained from the present investigation as well as relevant discussion have been presented under following heads :

Crop yields:

The data presented in Table 1 showed that the seed