

Research Paper :

Residual effect of potassium and zinc on growth, yield and nutrient uptake by groundnut in medium black calcareous soils

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ABSTRACT

A field experiment was carried out on medium black calcareous soil for four years (2001-2004) on fixed plots at Vegetable Research Station, JAU, Junagadh with two levels of Zn (0 and 25 kg ZnSO₄ ha⁻¹), three levels of K (0, 50 and 75 kg K₂O ha⁻¹ as muriate of potash) and their combinations (T₁ to T₆) and T₇ as FYM 20 t ha⁻¹ in RBD with four replications. The pod and haulm yields of groundnut were significantly affected by the residual effect of Zn, K and FYM applied in individual years as well as in pooled, except haulm yield during 2002,2003 and in pooled. The average highest pod (2874 kg ha⁻¹) yield was recorded with treatment combinations of Zn₂₅K₇₅(T₆), which was 27 per cent higher pod yield over control (T₁). The significantly higher shelling percentage, test weight and oil content were recorded with treatment T₃, T₆ and T₇, respectively. Uptake of Zn and K by pod and haulm were significantly affected by the different treatments and were recorded highest with treatment T₆. Soil available K and Zn progressively increased with increasing levels of respective elements and found highest with treatment T₆.

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Garlic is widely cultivated in *winter season* in Saurashtra region of Gujarat. It is most important spices crop cultivated as cash crop about 1.44 lakh hectare with production 6059 lakh tones in India. In Gujarat state it stands first in area(20%), production(27%) and productivity of 7041 kg ha⁻¹ (Anon., 2007). Wide spread deficiencies of zinc and potassium were observed in medium black calcareous soils of Saurashtra region. Since last decade, its yield is either sustained or showed a decreasing trend, probably due to calcareous soil resulting in problems of Zn and K absorption. Therefore, there is a need to study the effect of these nutrients either alone or combinations on *rabi* Garlic- *kharif* groundnut grown in sequence. The direct effect of these nutrient on garlic yield was observed (Sakarvadia *et al.*, 2009), but very little work is available on its residual effect on groundnut crop. Keeping this in view, a field experiment was undertaken for studying the residual effect of Zn, K and FYM application on yield and nutrient uptake by groundnut.

MATERIALS AND METHODS

A field experiment was conducted on calcareous medium black soils (*Typic Ustrocrept*) for four years (2001-2004) at Vegetable Research Station, Junagadh Agricultural University, Junagadh (M.S.). The experimental soil was clay loam in texture, highly calcareous in nature (354 g CaCO₃ kg⁻¹) alkaline in reaction (pH 7.8) and free from salinity (EC_{2.5} 0.38 dS

m⁻¹). It was also low in available N (171 kg ha⁻¹), medium in available P₂O₅ (41.0 kg ha⁻¹), K₂O (280 kg ha⁻¹) and Zn (0.51 mg kg⁻¹). The treatments composed of two levels of Zn (0 and 25 kg ZnSO₄ ha⁻¹), three levels of K (0, 50 and 75 kg K₂O ha⁻¹ as muriate of potash) and their combinations (T₁ to T₆) and T₇ as FYM 20 t ha⁻¹. All the fertilizer treatments were applied as basal in *rabi* garlic crop only and their residual effect was tested in *kharif* groundnut cv. GG-20. The experiment was laid out in RBD with four replications in fixed plots. The recommended agronomical practices (seed rate, fertilizers dose and spacing etc.) for groundnut crop were followed. At maturity the crop was harvested and plot wise pod and haulm yields were recorded. Simultaneously, the pod and haulm samples of groundnut as well as soil sample were collected for chemical analysis by use of standard methods.

RESULTS AND DISCUSSION

The results obtained from the present investigation are summarized below :

Groundnut yields :

The pod and haulm yields of groundnut were significantly affected by the residual effect of Zn, K and FYM applied in individual years as well as in pooled, except haulm yield during 2002, 2003 and pooled (Table 1). The highest pod (3171, 2912, 3043, 2371 and 2874 kg