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Research Paper :

Effect of potassium and zinc on yields and nutritients uptake by castor

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ABSTRACT

A field experiment was conducted in *kharif* during 2005 to 2007 with castor (Var.GCH 6) on medium black calcareous clayey (*Typic Ustrocrepts*) soils at Oilseed Research Station, Junagadh Agricultural University, Junagadh with three levels, each of Zn (0,25 and 50kg $ZnSO_4$ ha^{-1}), and K (0,50 and 75 kg K_2O ha^{-1}) in factorial RBD having four replications reveled that the highest (2763 kg ha^{-1}) seed yields of castor was recorded with combined application of Zn_{50} x K_{75} , which was 48.5 per cent higher over (Zn_0 x K_0).Individual application of each levels of Zn and K had significant effect on seed and stalk yield of castor in individual year and as well as in pooled results. Simultaneously, individual application of Zn and K increased their respective concentration and uptake by seed and stalk of wheat and soil nutrient availability.

Key words : Castor yields, Zn and K nutrition

Castor is one of the most important oilseed crops of Gujarat with an area 3.04 lakh ha. and productivity of 1526 kg ha^{-1}. The nutrient requirement specifically depends on variety besides the types of soil and nutrients availability (Parmar *et al.*, 2009). The advance hybrid varieties responded well to higher package of fertilizers in comparison to old varieties. The potassium and zinc one of the most important element and seemed to be more effective for castor due to oilseed crop. Now a days zinc and potassium deficiency are observed in Saurashtra region of Gujarat. Keeping this in a view, a field experiment was conducted to study the effect of potassium and Zn on yield and nutrient uptake by castor.

MATERIALS AND METHODS

A field experiment was conducted in *kharif* during 2005 to 2007 with castor (Var.GCH 6) on medium black calcareous clayey (*Typic Ustrocrepts*) soils at Oilseed Research Station, Junagadh Agricultural University, Junagadh with three levels, each of Zn (Zn_0 - 0, Zn_{25}-25 and Zn_{50} -50 kg $ZnSO_4$ kg ha^{-1}), and K (K_0 - 0, K_{50} -50 and K_{75} -75 kg K_2O ha^{-1}) in factorial RBD having four replications. The experimental soil had clayey in texture, highly calcareous in nature (350 $CaCO_3$g kg^{-1}) slightly alkaline in reaction (pH 7.8) and free from salinity (EC 0.24 dSm^{-1}). It was also low in available nitrogen (225 kg ha^{-1}), medium in available phosphorus (45 kg ha^{-1}), Potash (278 kg ha^{-1}) and zinc (0.70 mg kg^{-1}). The recommended agronomical practices (seed rate, fertilizers dose and spacing etc.) were followed. At maturity, the crop was harvested and plot wise yields were recorded. Simultaneously the soil as well as plants samples were also collected for analysis of K, and Zn. Available potassium was determined by flame photometric method and available Zn by AAS methods as described by Jackson (1973) and Lindsay and Norvell (1978), respectively.

RESULTS AND DISCUSSION

The results obtained from the present investigation are summarized below :

Effect of potassium:

On yields and yield attributes :

The data (Table 1) indicated that the seed and stalk yield of castor was significantly influenced by various levels of potassium in individual year as well as in pooled. The significantly the higher castor seed yield of 2401, 2512 and 2367 kg ha^{-1} were recorded with K_{50} during year 2006, 2007 and in pooled, respectively. It was at par with the treatment K_{75} in 2006, 2007 and in pooled. While in case of year 2005, it was found highest (2253 kg ha^{-1}) with K_{75} and which was at par with treatment K_{50}. In case of castor stalk yield, significantly the highest castor stalk yield of 3841, 4281 and 4154 kg ha^{-1} were recorded with K_{75} during 2005, 2006 as well as in pooled. It was at par with treatment K_{50}. While during the year 2007, significantly highest castor stalk yield of 4371 kg ha^{-1} noted with K_{50}, it was at par with treatment K_{75}. Almost similar results were also observed by Hadwani (2006) for castor crop in medium black calcareous soils.

The average data (Table 2) indicated that the effect of potassium was found significant for number of internodes per plant, branches per plant, number of spike per plant, number of capsule per main spike, oil content