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EFFECT OF IRON AND MOLYBDENUM ON THE EFFICIENCY OF *Rhizobium* STRAINS, YIELD AND NUTRIENT UPTAKE BY GROUNDNUT IN INCEPTISOL

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ABSTRACT

A pot culture experiment was conducted to study the effect of iron and molybdenum on the efficiency of *Rhizobium* strains and nutrient availability for groundnut (cv. Phule Pragati) in inceptisol at Division of Soil Science and Agricultural Chemistry, College of Agriculture, Pune (M.S.) during 2004. The results clearly indicated that groundnut crop responded significantly to the interaction effect of iron and molybdenum along with *Rhizobium* strains. The data revealed that the application of iron @20 kg ha^{-1} and molybdenum @ 0.5 kg ha^{-1} along with recommended dose of fertilizers (25:50:00) and *Rhizobium* strain (NC 92) recorded significantly highest dry matter (24.27 g $plant^{-1}$) and seed yield (19.36 g $plant^{-1}$) at harvest, iron uptake by groundnut creeper at flowering and at harvest (9.330 and 11.185 mg $plant^{-1}$, respectively), molybdenum uptake by groundnut creeper at flowering (2.216 µg $plant^{-1}$) and molybdenum uptake by groundnut seeds at harvest (3.018 µg $plant^{-1}$).

Key words : Iron, Molybdenum, *Rhizobium*, Groundnut

Although India is a leader in groundnut cultivation, its productivity is very low (756 kg ha^{-1}) as compared to USA (3393 kg ha^{-1}) and China (3143 kg ha^{-1}) (Anonymous, 1999). Amongst the micronutrients required by crop plants, iron and molybdenum play an important role in nodulation in oilseed crops.

Although yield improvement by biofertilizers and micronutrients application is well known, information on yield and nutrient uptake by groundnut is very meagre. The cultivation of groundnut as a cash crop in India is very popular. Therefore, an attempt has been made to study the effect of Fe and Mo along with *Rhizobium* strains on yield and nutrient uptake by groundnut crop.

MATERIALS AND METHODS

A pot culture experiment was conducted at Division of Soil Science and Agricultural Chemistry, College of Agriculture, Pune during 2004. The soil collected from a cultivated field was used for this experiment. The soil used was clay loam in texture with moderately alkaline in reaction (pH 8.1). The fertility status of the soil was low in available nitrogen (156.7 kg ha^{-1}), moderate in available phosphorus (14.3 kg ha^{-1}), high in available potassium (281.3 kg ha^{-1}), high in available iron (3.81 mg ha^{-1}) and low in available molybdenum (0.129 mg ha^{-1}). Soil was moderate in organic carbon content (0.56%). Total of twenty five treatments were tested in Factorial completely randomized design with three replications. Treatments were as follows : (A) Fertilizer treatment : T_1 – Control, T_2 –R.D. (25:50:00), T_3 – R. D. + $(NH_4)_2MoO_4$ @ 0.5 kg ha^{-1}, T_4 - R.D. + $FeSO_4$ @ 20 kg ha^{-1}, T_5 - R. D. + $(NH_4)_2MoO_4$ @ 0.5 kg ha^{-1} + $FeSO_4$ @ 20 kg ha^{-1} and (B) *Rhizobium* strain treatment : S_1 – SGNR 12, S_2 – PGNR 11, S_3 – CVGNR 1, S_4 – NC 92 and S_5 – AGNR 11. The cement pots of (40 x 40 cm) were selected and cleaned. 15 kg soil (<2 mm) was filled up in pots by keeping pieces of earthen pot at the bottom hole. Fertilizer treatments were applied through ferrous sulphate ($FeSO_4$) and ammonium molybdate [$(NH_4)_2MoO_4$]. At optimum moisture level, the soil of each pot was pulverized and good quality seeds of groundnut cultivar JL – 24 were treated with respective strains of *Rhizobium* @ 2.5 g kg^{-1} and six seeds were dibbled per pot in circular manner at equal distance on 11/06/2004. Irrigation schedule was followed as per recommendation. The plant samples were collected at flowering and at harvest stages for analysis. Based on the content of nutrients and dry matter yield the uptake of nutrients was computed. Statistical analysis was done as per the Snedecor and Cochran (1989).

RESULTS AND DISCUSSION

Yield :

Dry matter production at flowering (45 DAS):

Rhizobium strain treatment - Highest increase in dry matter weight of plant at flowering was observed