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Effect of micro-nutrients application on pod yield of peanut and incidence of POD borer

Abstract

The experiment was undertaken two consecutive years during rainy season at Regional Research Station, Mainpuri, C.S. Azad University of Agriculture and Technology, Kanpur (U.P.). The experimental soil was sandy loam, having poor status of fertility. The six treatments i.e. ammonium molybdate @ 10 kg/ ha, iron sulphate @ 10 kg/ha zinc sulphate @ 10 kg/ha, cupper sulphate @ 10 kg/ha, gypsum @ 300 kg/ha and control were tested in RBD with 4 replications. Application of gypsum @ 300 kg/ha with RDF registered significantly higher pod yield of peanut by 15.41 q/ha. The other micro-nutrients in combination recommended doses of NPK produced almost statistically at par pod yield of peanut. The order of performance was gypsum @ 300 kg/ha (15.41 q/ha)> ammonium moly. @ 10 kg/ha (13.98 q/ha) > iron sulphate @ 10 kg/ha (13.70 q/ha) > zinc sulphate 10 kg/ha (13.70 q/ha) > cupper sulphate 10 kg/ha (13.34 q/ha) > control (12.00 q/ha). The higher net profit Rs 24345/ha and BCR 1:1.54 were computed with the application gypsum @ 300 kg/ha, while lowest net profit (Rs 9000/ha) and BCR (1:1.20) obtained at control. The highest pod damage due to incidence of pod borer was recorded with application of iron sulphate @ 10 kg/ha (9.8%) and cupper sulphate @ 10 kg/ha (7.05%).

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Keywords

Deficiency, Gypsum, Incidence, Micro-nutrient, Pod borer

Introduction

Plants like animals and human beings requires food for growth and development. This food is composed of certain chemical elements often referred to as plant nutrients of plant-food elements. Since human beings and farm animals consume plant parts in various forms, and thus depend on plants as a source of their growth and development, it would be interesting to know whether the elements essential for plants are also essential for animals and human beings. Therefore, for proper maintenance of balanced nutrition, better health and proper growth of human beings and farm animals, it is most essential that plants be properly fed with these essential mineral elements.

In the early 19th century, two prominent scientists, the Swiss Physicist Nicholas Theodore de Saussure and French Chemist and Agriculturist Jeen Baptiste Boussingault first discovered that plants need mineral nutrients for growth and development. They also showed correctly the source of nitrogen used by plants to be from the soil. The deficiency of the element makes it impossible for the plants to complete the vegetative or reproductive stage of its life cycle. The deficiency is specific to element in question and such can be prevented or corrected only by supplying that particular nutrient element to the plant.

The sulphur, iron, zinc, copper, calcium, molybdenum are used by field crops in small quantities, however, it is most essential to plant growth as well as final product. The deficiency of these nutrients cause serious losses in final plant products.

The micro-nutrients deficiency was observed in the peanut growing tract of South-Western-Zone of Uttar Pradesh. Therefore, for obtaining the better pod yield of peanut the present study was undertaken on continuous raising area of peanut under situation base study.

Materials and Methods

The study was laid out during rainy season of 1995 and 1996 at Regional Research Station, Mainpuri, C.S. Azad University of Agriculture & Technology, Kanpur. The experimental soil was sandy loam having pH 8.5, organic carbon 0.45% total nitrogen 0.04%, available phosphorus 10 kg/ha and available potassium 278 kg/ha, thus, the nutrients of experimental soil were analysed low in organic carbon, total nitrogen, available phosphorus and high in available potassium. The pH was determined by Electrometric glass electrode method (Piper, 1950), while organic carbon was determined by Colorimetric method (Datta, *et al.,* 1962). Total nitrogen was analysed by Kjeldahl's method as discussed by Piper (1950). The available phosphorus and potassium were determined

Table-1: Effect of different treatments on pod yield, net return, BCR and damage by pod borer (pooled data of two years).

Treatment	Yield (q/ha)	Net return (Rs/ha)	BCR	Damage by pod borer (%)
RDF + Ammo. Moly. @ 10 kg/ha	13.98	17910	1:1.40	6.12
RDF + Iron sulphate @ 10 kg/ha	13.81	17145	1:1.38	9.82
RDF + Zinc sulphate @ 10 kg/ha	13.70	16650	1:1.37	6.94
RDF + Cupper sulphate @ 10 kg/ha	13.34	15030	1:1.33	7.05
RDF + Gypsum @ 300 kg/ha	15.41	24345	1:1.54	6.45
Control	12.00	9000	1:1.20	6.38
S.E ($m^{\pm}$)	0.42	-	-	-
C.D. 5%	0.90	-	-	-

by Olsen's method (Olsen *et al.,* 1954) and Flame photometric method (Singh, 1971), respectively.

The ammonium molybdate @ 10 kg/ha, iron sulphate @ 10 kg/ha, zinc sulphate @ 10 kg/ha, cupper sulphate @ 10 kg/ha, gypsum @ 300 kg/ha (for supply of sulphur and calcium) and control were tested. The peanut cultivar Kaushal was planted in second fortnight of July and harvested in the end of October after 105 days of seeding during both the experimental seasons as suggested by Singh (1999), Singh (2000) and Singh (2001). The uniform dose of N @ 15 kg/ha, P_2O_5 @ 30 kg/ha and K_2O @ 45 kg/ha was conjucted with different micro-nutrients. The recommended agronomical practices were followed as suggested by Singh (1999), Singh (2000) and Singh (2001). The experiment was laidout in RBD with four replications. The experimental data of two years were statistically analysed as suggested by Gomez and Gomez (1984).

Results and Discussion

The yield data obtained were statistically analysed and reported in Table-1 and discussed here under appropriate heads.

Pod yield of peanut under different micro-nutrients: Application of gypsum @ 300 kg/ha, which contain the sulphur and calcium registered significantly higher pod yield of peanut (15.41 q/ha) during rainy season over other micro-nutrients treatments. The other nutrients combination with recommended doses of NP & K produced pod yield of rainy season peanut almost at par with each other. Therefore, the order of performance was gypsum @ 300 kg/ha (15.41 q/ha) > ammo. moly. @ 10 kg/ha (13.98 q/ha) > iron sulphate @ 10 kg/ha (13.81 q/ha) > zinc sulphate @ 10 kg/ha (13.70 q/ha) > cupper sulphate @ 10 kg/ha (13.34 q/ha) > control (12.00 q/ha). The higher yield of peanut with the application of gypsum was due to proper supply of sulphur and calcium and more pegging, therefore, higher pods obtained under this treatment. These results are in agreement with those reported by Singh (2007).

Profitability from different nutrients application: Results given in Table -1 clearly displayed that application of gypsum @ 300 kg/ha for supply of sulphur and calcium gave highest net return (Rs 24345.00) and BCR 1:1.54. Similarly, use of ammo. moly. @ 10 kg/ha, iron sulphate @ 10 kg/ha, zinc sulphate @ 10 kg/ha and cupper sulphate @ 10 kg/ha gave net return by Rs 17910/ha & 1:1.40, Rs 17145/ha & 1:1.38, Rs 16650 & 1:1.37 and Rs 15030/ha & 1:1.33, respectively. The control treatment gave net return and BCR by Rs 9000/ha & 1:1.20, respectively, which was lowest in comparison to other tested treatments.

Damage of pod borer: The application of iron sulphate @ 10 kg/ha and cupper sulphate @ 10 kg/ha promoted to the incidence of pod borer by 9.82% and 7.05%, respectively, which was higher over the other treatment. It is observed that the higher incidence of pod borer in the application of $FeSO_4$ and $CuSO_4$ was due to soft shell of pods in comparison to other applied micro-nutrients and control.

Since, the higher pod yield of peanut was reaped with the application of gypsum, which maintained the calcium and potassium ratio in soil, easy pegging and hord pods shell, therefore, farm families residing in the peanut growing tract may be advocated for application of gypsum alongwith NPK.

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