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Optimum Dose of Molybdenum in Groundnut

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A B S T R A C T

A field experiment was conducted during *kharif* season of 2015 at Agronomy Farm, S.K.N. College of Agriculture, Jobner, Jaipur (Rajasthan) with groundnut variety RG-382 (Durga) on loamy sand alkaline soil under irrigated condition. The treatments consisted 20 combination of 5 organic manures viz. control, FYM @ 10 t/ha, poultry manure @ 5 t/ha, vermicompost @ 4 t/ha and RDF) and four levels of molybdenum viz. control, 0.5, 1.0 and 1.5 kg Mo/ha through sodium molybdate which were tested in factorial RBD replicated thrice. The results revealed that Response of pod yield to varying levels of molybdenum was worked out and found to be the quadratic. The perusal of data showed that the economic optimum level of molybdenum was found to be 0.85 kg/ha with its corresponding pod yield of 2388.60 kg/ha.

Introduction

Groundnut is an important oilseed crop of India while occupies the first place, both in regard to the area and the production in the word. In India, In India, groundnut was cultivated on an area of 5.53 m ha with production of 9.67 m t and productivity of 1750 kg/ha during 2013-14 (AICRPG, 2015). The important groundnut producing states in the country are Gujarat, Andhra Pradesh, Tamil Nadu, Karnataka, Rajasthan and Maharashtra accounting for nearly 90 % of the area and 89.3% total production of groundnut in the country. Organic manure are found to increase the groundnut productivity with maintaining soil health. Among those, Vermicompost is a prime source of macro and micro nutrients in chelated form and fulfills the balanced nutrient requirement of crops for longer period. Poultry manure is another important source of nutrients which plays direct role in plant growth.

Importance of FYM in crop production and soil fertility management is well known. Among micronutrient molybdenum is an important micronutrient reported deficient in Indian soils.

Molybdenum plays a significant role in various enzymatic and physiological activities of plants with obvious role in nitrogen fixation through root nodules in leguminous

crops. Keeping in to consideration the above points, the present study was undertaken.

Materials and Methods

The present experiment was conducted on Agronomy farm, S.K.N. College of Agriculture, Jobner, Jaipur (Rajasthan) during *kharif* season of 2015 with groundnut variety RG-382 (Durga) which is semi-spreading, bold seeded and 128-133 days duration. The experimental soil was loamy sand in texture and alkaline in reaction with 8.3 pH. Having 0.17 % organic carbon, 132 kg/ha available N, 18 kg/ha P_2O_5, 144 kg/ha available K_2O and 0.4 ppm available molybdenum. Crop was raised under irrigated condition by tubewell flowing slightly saline water. The treatment consisted 20 combinations of 5 organics/ fertilizers viz. Control, FYM @ 10 t/ha, poultry manure @ 5 t/ha, Vermicompost @ 4 t/ha and RDF (25 kg N + 60 kg P_2O_5) and four levels of molybdenum viz. 0, 0.5, 1.0 and 1.5 kg/ha. All 20 treatment combinations were tested in randomized block design replicated thrice. Organic manure before application were analysed for N, P, K contents. FYM, poultry manure and vermicompost contained 0.55: 0.25: 0.50, 1.20: 1.15: 0.75 and 1.40: 0.72: 1.07 percent N: P: K, respectively. Molybdenum was applied through sodium molybdate containing 39 % molybdenum. Required quantity of organic manures and molybdenum as per treatment plots were drilled in deep furrows 45 cm apart and this process was just followed by seed showing @ 80 kg/ha in same furrows through kera method and finely the planking was done on same day of 27th June, 2015. Besides pre-sowing irrigation, the crop was irrigated thrice at all critical stages. Other than treatments, the crop was raised as per recommended package of practices for the area. At maturity, crop was harvested on 28.10.2015. Besides irrigations, crop also received 406 mm rains during to life cycle. To evaluate the treatments effect the observations were recorded at the stage of crop harvested on plant stand, growth characters, yield attributes and yield. Nutrient contents, uptake, quality traits and economics were also worked out. Data recorded on different crop characters were analyzed statistically as per the procedure given by Panse and Sukhatme (1985).

Results and Discussion

Response of pod yield to varying levels of molybdenum was worked out and found to be the quadratic given in table 1.

The data given in table 1 revealed that partial regression coefficients b_1 was found significant at 1% level of significance and b_2 was found significant at 5% level of significance, but b_0 was not significant.

Table.1 Pod yield (Y) as a function of molybdenum fertilization ($Y = b_0 + b_1.X + b_2.X^2$)

Study parameters	Values
1. Partial regression coefficients	
b_0	1922.7
b_1	73.24**
b_2	-2.2*
2. Coefficients of	
I. Determinations (R^2)	0.997856**
II. Multiple correlation (R)	0.998928**
3. Optimum level (kg/ha)	0.85
4. Yield at optimum level (kg/ha)	2388.60
5. Response of optimum level (kg/ha)	2810.11

Note: The yield, Mo levels, responses and intercepts are given in kg/ha

* Significant at 5% level of significance; ** Significant at 1% level of significance

Coefficients of determinations (R^2) and multiple correlation (R) were found significant. Optimum level was recorded 0.85 kg/ha. Yield at optimum level was recorded 2388.60 kg/ha and response of optimum level was recorded 2810.11 kg/ha.

The perusal of data showed that the economic optimum level of molybdenum was found to be 0.85 kg/ha with its corresponding pod yield of 2388.60 kg/ha.

This may be due to the fact that optimum level of molybdenum that we were using in the experimental study is reflecting significant effect on the yield of groundnut and after 0.85 kg/ha level of molybdenum, the yield was radiantly decreases in comparison to the prior level of molybdenum.

However it was also increasing, but saliently less than the optimum level of molybdenum. Further increase in level of Mo to 1.5 kg/ha could not prove beneficial due to low return to investment. The findings of the study found similar to the results reported by Caires and Rosolam (2000) in groundnut, Sharma (2003) in cowpea and Khan *et al.,* (2014) in chickpea.

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