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Effect of Different Fertilizers on Yield of Groundnut

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ABSTRACT

The experiment was laid out at the Krishi Vigyan Kendra, Kapurthala farm with five treatments in randomized complete block design with three replications. The treatments include: T1: application of SSP@ 125kg/ha, T2: application of gypsum@ 125kg/ha, T3: application of SSP@ 125 kg/ha + gypsum@ 125kg/ha, T4: application of DAP@ 45kg/ha + gypsum@ 125kg/ha and T5: Farmer's practice (DAP application@ 45kg/ha). The yield data of groundnut revealed that maximum pod yield was obtained with application of SSP@ 125 kg/ha and gypsum@ 125kg/ha followed by SSP@ 125kg/ha alone or DAP@ 45kg/ha + gypsum@ 125kg/ha, which were statistically at par with each other. Similar results were observed with number of pods/ plant. It could be inferred that application of both SSP and gypsum was must to get optimum yield of groundnut.

Keywords: Di-mmonium phosphate, Groundnut, Gypsum, Single super phosphate.

INTRODUCTION

India is second largest producer of groundnut and its oil after china. Groundnut is major oilseed in India, it accounts for 25 per cent of total oilseed production in country. In India, groundnut was grown both during rabi (25%) and kharif (75%) seasons. Annual production of groundnut in India was 9,690 thousand tonnes (Anonymous, 2016). As it is grown in rainfed regions of the country, so, its production is highly vulnerable to rainfall deviations and display huge fluctuations during different years. Being an oilseed crop, it is most vulnerable to phosphorus deficiency, which in turn result in nitrogen as well as potassium deficiency; so fertilizer requirement of groundnut includes SSP and gypsum mainly.

The total amount of phosphorus taken by the groundnut plant is relatively small as only 0.4-0.5 kg of available phosphorus is required to produce one quintal of pods. Though the amount of phosphorus required is small but a large quantity of fertilizer had to be applied, as the efficiency of uptake of phosphorus from fertilizer is low. It has been postulated that the response of groundnut is higher to single superphosphate (SSP) application than to diammonium phosphate (DAP) because of presence of Ca, S and trace elements in SSP. The single super phosphate fertilizer contains 12.5 per cent sulphur, 16 per cent P2O5 and 19 per cent calcium and need be used as a basal-dressing only by placement method. It is not suitable for foliar spray as it contains some amount of gypsum and diphosphate which are not easily soluble in water. Mishra *et al* (1999) also reported positive response of sulphur application on groundnut yield.

Gypsum application, on the other hand, is generally recommended because it contains 18.6 per cent sulphur and 23 per cent calcium; it has impurities that also provide magnesium. Since there is little residual effect of gypsum and therefore, it is necessary to repeat application every season. Groundnut had the unique characteristic of uptake of calcium and sulphur by the developing pegs and pods. As calcium was relatively immobile in plant tissues and is not translocated in sufficient quantities from the roots to developing pods, calcium and sulphur have to be made available in adequate quantities in pod zone. Application of gypsum @

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200 kg/ha as basal (at the time of sowing) was recommended to obtain higher yield in groundnut. So, the present study was undertaken to see the effect of different fertilizers application on yield of groundnut.

MATERIALS AND METHODS

The experiment was laid out at Krishi Vigyan Kendra, Kapurthala farm with five treatments in randomized completer block design (RBD) and three replications. The groundnut crop was sown in rows of 30cm apart with plant to plant distance maintained at 10cm by dibbling method. The crop was sown on 7th June, 2017 and all the fertilizer treatments were done as basal application, near the root zone with the help of manual plough. Urea was applied to all the treatments @ 33kg/ha. The treatments include: T1: application of SSP@ 125kg/ha, T2: application of gypsum@ 125kg/ha, T3: application of SSP@ 125 kg/ha + gypsum@ 125kg/ha, T4: application of DAP@ 45kg/ha + gypsum@ 125kg/ha and T5: Farmer's practice (DAP application@ 45kg/ha). The crop was harvested on 10th October, 2017 and the data on number of pods/plant and pod yield was taken after proper drying of pods and analyzed using OPSTAT (Sheoran *et al* 1998).

RESULTS AND DISCUSSION

The data presented in table 1 revealed that significantly highest number of pods/plant (29.0) were obtained with application of SSP@ 125 kg/ha and gypsum@ 125kg/ha followed by use of SSP@ 125kg/ha (25.4), DAP@ 45kg/ha + gypsum@ 125kg/ha (24.8) and Gypsum@ 125kg/ha (22.3), which were statistically at par with each other. Sisodiya *et al* (2017) revealed that application of sulphur had significant effect on uptake of micronutrient (Fe, Mn, Zn, and Cu). This increase in uptake of nutrients by the crop was attributed to improved physical and chemical properties of the rhizosphere of the crop, due to application of sulphur. Pancholi *et al* (2017) reported that supply of sulphur in adequate amount helps in the development of floral primordial i.e. reproductive parts, which results in the development of pods and kernels in plants.

The yield data revealed that significantly higher pod yield was obtained with application of SSP@ 125 kg/ha and gypsum@ 125kg/ha (19.81 q/ha) followed by use of SSP@ 125kg/ha (18.62 q/ha) and DAP@ 45kg/ha + gypsum@ 125kg/ha (17.94 q/ha), which were statistically at par with each other. Nabi *et al* (1999) also reported that the SSP application produced highest seed yield. Greater partitioning of assimilation as well as adequate supply and translocation of metabolites and nutrients towards reproductive structures matching to their demand for growth and development might be the possible reason of improvement in yield of groundnut. The improved growth due to S fertilization coupled with increased photosynthesis on one hand and greater mobilization of photosynthates towards reproductive structures, on the other, might have been responsible for significant increase in yield of groundnut. On contrary to the findings, Yadav *et al* (2017) reported significantly higher yield with

Table 1: Effect of different fertilizers on pods/plant and yield of groundnut

Sr. No.	Treatment	Number of pods/plant	Pod yield (q/ha)
1	SSP@ 125kg/ha	25.4	18.62
2	Gypsum@ 125kg/ha	22.3	17.35
3	SSP@ 125kg/ha + gypsum@ 125kg/ha	29.0	19.81
4	DAP@ 45kg/ha + gypsum@ 125kg/ha	24.8	17.94
5	DAP@ 45kg/ha	20.8	16.33
CD (P=0.05)		**3.8**	**1.07**

application of gypsum followed by SSP.

CONCLUSION

It can be concluded that farmers need to apply SSP and gypsum simultaneously, without mixing for getting more number of pods/plant and optimum yield of groundnut.

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