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Influence of organic manure and sulphur on growth and yield attributes of groundnut

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Abstract

A field experiment was conducted during *Kharif* 2023 at Crop Research Farm, Department of Agriculture, Ideal college of Arts and Sciences, Vidyut Nagar, Kakinada, Andhra Pradesh. The experiment was laid out in Randomized Block Design with ten treatments which are replicated thrice on the basis of one year experimentation. The treatments consisted of 3 levels of farm yard manure (2 t/ha, 4 t/ha, 6 t/ha), and sulphur (20 kg/ha, 40 kg/ha, 60 kg/ha) and a control. Application of Farm yard manure (6 t/ha) + sulphur 60 kg/ha (Treatment 9) recorded maximum.

Keywords: Farm yard manure, groundnut, sulphur, yield

Introduction

Groundnut (*Arachis hypogaea* L.) is also known as “The king of oilseeds”. Groundnut is an important oilseed crop in India which occupies first position in terms of area and second position in terms of production after soyabean. China ranks first in groundnut production with 17.57 million tonnes followed by India 6.73 million tonnes. According to the all India kharif crop coverage report, Government of India, as on 17th September 2021, groundnut was sown in around 49.14 lakh hectares as compared to last year (50.97 lakh ha). Among the states, Gujarat stood first in area coverage with 19.09 lakh ha followed by Rajasthan (7.76 lakh ha), Andhra Pradesh (6.27 lakh ha), Karnataka (4.75 lakh ha) and Madhya Pradesh (3.82 lakh ha) (Groundnut Outlook - November 2021). The optimization of the mineral nutrition is the key to optimize the production of groundnut, as it has very high nutrient requirement and the recently released high yielding groundnut varieties remove still more nutrients from the soil. On contrary groundnut farmers, most part of the semi-arid region use very less nutrient fertilizer and sometime only one or two nutrients resulting in severe mineral nutrient deficiencies due to inadequate and imbalance use of nutrients is one of the major factors responsible for low yield in groundnut. India is the world’s largest producer of groundnut where nutritional disorders cause yield reduction from 30 to 70% depending upon the soil types. Thus it is high time to look into the mineral nutrition aspects of groundnut for achieving high yield and advocate the suitable package of practices for optimization of yield (Veeramani *et al.*, 2012) ^[12]. Many studies have shown that organic farming methods can produce even higher yields than conventional methods. Significant difference in soil health indicators such as nitrogen mineralization potential and microbial abundance and diversity, which were higher in the organic farms can also be seen. Keeping the points in view field experiment entitled “Effect of organic manures and sulphur on growth and yield of groundnut (*Arachis hypogaea* L.)”.

Materials and Methods

The experiments on the effect of farm yard manure and sulphur along with recommended dose of fertilizers (RDF) on the growth and yield enhancement of groundnut were conducted at *kharif* season of 2023 at Crop Research Farm, Department of Agriculture, Ideal college of Arts and Sciences, Vidyut Nagar, Kakinada, Andhra Pradesh. Before seed sowing operation, it was ensured that sufficient moisture for germination of seed is present in the soil. The seed was sown

at the rate of 8 kg/ha and seeds were treatment with liquid organic manure (Beejamrutham 10%). In the lines at spacing of 45 x 20cm. Immediately after sowing the lines were closed with soil and slightly pressed so as to have good contact of seed with soil to ensure good germination.

Results

Plant height: maximum plant height was reported in Farm yard manure (6 t/ha) + sulphur 60 kg/ha with (65.80 cm) and minimum was reported in control plot (60.00 cm), there was significant change in between the treatments and Farm yard manure (4 t/ha) + sulphur 60 kg/ha (65.00 cm) was statistically at par with T₉.

Plant Dry weight: maximum plant dry weight was reported in Farm yard manure (6 t/ha) + sulphur 60 kg/ha with (29.74 g) and minimum was reported in control plot (24.62 g), there was significant change in between the treatments and Farm yard manure (4 t/ha) + sulphur 60 kg/ha g) was statistically at par with T₉.

Number of nodules per plant: higher number of nodules were reported in Farm yard manure (6 t/ha) + sulphur 60 kg/ha with (58.50) and minimum was reported in control plot (52.70), there was significant change in between the treatments and Farm yard manure (4 t/ha) + sulphur 60 kg/ha (57.70) was statistically at par with T₉.

Number of pods and seeds per pod

higher number of pods and seeds per pod were reported in Farm yard manure (6 t/ha) + sulphur 60 kg/ha with (2.00 and 33.23) and minimum was reported in control plot (1.60 and 28.11), there was significant change in between the treatments and Farm

yard manure (4 t/ha) + sulphur 60 kg/ha (2.00 and 32.60) was statistically at par with T₉.

Discussion

The optimum growth of the plant due to favourable nutritional environment and higher uptake of nutrients might have favoured significant increase in number of pegs per plant and thus a greater number of pods per plant. However, Panwar and Singh (2003) [4], and Zalate and Padmani (2009) [10] reported same. The important growth and yield contributing characters viz., plant spread, number of branches, dry matter accumulation, number of pods and kernels and their weight and thousand kernel weight were significantly increased with the application of Psolubilizer treatments with poultry manure due to additional nitrogen and phosphorous uptake, resulting in increased dry pod yield. Increase in root nodules due to P-solubilizer and nitrifying bacteria also helped in increasing better root development and dry pod yield by fixing more nitrogen and consequently increasing its absorption. These results were found to be in conformity with Raychaudari *et al.* (2003) [6].

Sarkar and Banik (2002) [7] and Raja *et al.*, (2007) [5] in sesame. Sulphur in the form of sulphate is involved in various metabolic and enzymatic activities of plant. It is also a constituent of glutathione, a compound supposed to play part in plant respiration and synthesis of oils (Jordon and Reisenaur, 2003) [2]. Further, sulphur also plays a vital role in chlorophyll formation as it is constituent of succinyl Co-A which is involved in chlorophyll synthesis (Pirson, 2005) [3]. The higher content of sulphur in plants is known to have role in better development and thickening of xylem and collenchyma tissues. The improved nutritional environment at the cellular level and leaf chlorophyll content appears to have increased the photosynthetic rate.

Table 1: Effect of farm yard manure and sulphur on growth and yield attributes of Groundnut

S No	Treatments	Plant height	Plant dry weight	Number of pods per plant	Number of seeds per pod	Seed index (g)
1.	Farm yard manure (2 t/ha) + sulphur 20 kg/ha	61.00	25.43	53.70	1.00	28.92
2.	Farm yard manure (4 t/ha) + sulphur 20 kg/ha	62.30	26.77	55.00	1.60	30.26
3.	Farm yard manure (6 t/ha) + sulphur 20 kg/ha	63.00	27.36	55.70	1.70	30.85
4.	Farm yard manure (2 t/ha) + sulphur 40 kg/ha	61.80	26.00	54.50	2.00	29.49
5.	Farm yard manure (4 t/ha) + sulphur 40 kg/ha	63.70	28.02	56.40	1.80	31.51
6.	Farm yard manure (6 t/ha) + sulphur 40 kg/ha	64.10	28.45	56.80	1.90	31.94
7.	Farm yard manure (2 t/ha) + sulphur 60 kg/ha	62.00	26.22	54.70	2.00	29.71
8.	Farm yard manure (4 t/ha) + sulphur 60 kg/ha	65.00	29.11	57.70	2.00	32.60
9.	Farm yard manure (6 t/ha) + sulphur 60 kg/ha	65.80	29.74	58.50	2.00	33.23
10.	Control (RDF) 40:60:40 kg ha ⁻¹ (NPK)	60.00	24.62	52.70	1.60	28.11
	SEm±	0.89	0.24	0.74	0.03	0.44
	CD (p=0.05)	2.65	0.71	2.19	0.09	1.31

Conclusion

Organic manure management is an important aspect of sustainable agriculture, and it can play a vital role in improving the yield and quality of groundnut crops. The use of organic manure helps to improve soil fertility, enhance crop growth and yield, reduce soil erosion, and reduce the incidence of pests and diseases. Different types of organic manure can be used, including farmyard manure, compost, green manure, and vermicompost. Farmers should choose the appropriate type of organic manure based on their soil type, crop requirements, and availability of resources.

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