Effect of Integrated Nutrient Management on Growth and Yield of *kharif Groundnut* (*Arachis hypogaea* L.)

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Abstract— *Application of 100 % RDF through inorganic fertilizers + 5 tonne FYM (T3) recorded significantly highest plant growth attributes in kharif groundnut maximum and more plant height, plant spread, dry matter, number of branches plant^{-1}, leaf area and number of nodules plant^{-1} as compared to absolute control (T1), 100 % RDN through FYM + remaining P2O5 through inorganic fertilizers (T4), 100 % RDN through cotton seed cake + remaining P2O5 through inorganic fertilizers (T8), and T8 + Gypsum (T9). The highest growth attribute in T3 may be due to sufficient nutrient available in soil from organic and inorganic source of fertilizer. In yield attribute, the Application of 100 % RDF through inorganic fertilizers + 5 tonne FYM (T3) recorded maximum number of pods plant^{-1}, weight of dry pods plant^{-1}, 100 kernel weight, shelling %, dry pod yield ha^{-1} and dry haulm yield ha^{-1} which was significantly more over absolute control (T1), 100 % RDN through FYM + remaining P2O5 through inorganic fertilizers (T4), 100 % RDN through cotton seed cake + remaining P2O5 through inorganic fertilizers (T8), and T8 + Gypsum (T9).*

Keywords— Groundnut, INM, FYM,RDF.

I. INTRODUCTION

Groundnut (*Arachis hypogaea* L.) is one of the most important oil seed and cash crop. It has been reported that South America was the place from where cultivation of groundnut originated and spread to Brazil, Southern. In India during 2011-2012 the area under this crop was 5.31 million hectares with the production of 6.93 million tonnes with productivity of 1305 kg ha-1. Groundnut is an oil and protein rich energy giving crop, but usually grown under low soil fertility and in rainfed areas. The productivity of groundnut in India is still low (approximately 1300 Kg ha-1) mainly due to low consumption of fertilizer in spite of prominent nutrient deficiencies (Nambiar and Abrol, 1989). Integrated nutrient management, involving the conjunctive use of chemical fertilizers and organic sources assumed great importance recently due to paucity of fertilizers and need to sustain productivity (Nambiar and Abrol, 1989). Groundnut is an exhaustive crop and removes large amount of macro and micro-nutrients from soil which cannot be met by single nutrient source. The supply of nutrients through, biofertilizer, organic and inorganic sources has been found to be the best option for increasing productivity and maintaining sustainability, and hence there is ample scope of increasing productivity through combined use of various nutrient sources. Keeping in view, all these facts, the field trail was conducted to study the effect of " Effect of Integrated Nutrient Management on growth and yield of *kharif* Groundnut (*Arachis hypogaea* L.)".

II. MATERIALS AND METHOD

The experiment was carried out at Agronomy farm, college of Agriculture, Dhule, Mahatma Phule Krishi Vidyapeeth, Rahuri in Maharashtra during the *Kharif* – 2013 in randomized block design with three replication. The treatments consisted of T1 = Absolute control, T2 = 100 % RDF through inorganic fertilizers, T3 = 100 % RDF through inorganic fertilizers + 5 tonne FYM, T4 = 100 % RDN through FYM + remaining P2O5 through inorganic fertilizers, T5 = T4 + Gypsum, T6 = 100 % RDN through Vermicompost + remaining P2O5 through inorganic fertilizers, T7 = T6 + Gypsum, T8 = 100 % RDN through cotton seed cake + remaining P2O5 through inorganic fertilizers and T9 = T8 + Gypsum. (*Rhizobium* and PSB inoculation was common to all treatments). The sowing was done by dibbling. The different treatment had significantly influenced the growth and yield of Groundnut.The soil of the experimental field was clay in texture with low in available nitrogen (130 kg ha^{-1}) and available phosphorus (9.11 kg ha^{-1}) and fairly rich in available potassium (481 kg ha^{-1}) and moderately alkaline in reaction (pH 8.2) and EC (0.34 dSm^{-1}). The allocation of treatments was made by

random method. The gross and net plot size were 4.00 x 3.60 m^2 and 3.60 x 3.00 m^2, respectively and crop was sown at a spacing of 45 cm row to row and 05 cm plant to plant spacing.

III. RESULTS AND DISCUSSION

Effect on growth attributes –

Results from this experimentations shows that the application of 100 % RDF through inorganic fertilizers + 5 tonne FYM (T3) recorded the maximum and significantly higher growth attributing characters *viz*., plant height,plant spread, number of branches, number of root nodules, leaf area $plant^{-1}$, dry matter $plant^{-1}$ Similar results were observed by Karunakaran *et al*.,(2010), Singh *et al*., (2011) and Vishwakarma *et al*., (2012).

Effect on Protien and oil Yield –

yield contributing characters *viz*., no. of pods plant-1,weight of dry pods plant-1, 100 kernel weight, shelling percentage than that of absolute control (T1), 100 % RDN through FYM + remaining P2O5 through inorganic fertilizers (T4), 100 % RDN through cotton seed cake + remaining P2O5 through inorganic fertilizers (T8), and T8 + Gypsum (T9), which ultimately resulted in increase in dry pod yield of groundnut (2320.98 kg ha-1) and haulm yield (4654.31 kg ha^{-1}). Similar results were reported by Dutta and Mondal (2006), Mohapatra and Dixit (2010) and Gunri and Nath(2012).

IV. CONCLUSION

For better early development of the crop growth and yield it is recommended to apply 5 tonne of FYM ha^{-1} along with recommended dose of fertilizer

Table.1: Growth attributes of Kharif Groundnut as influenced by different treatment.

Treatment Details	Plant height (cm)	Plant spread (cm)	Leaf area (dm2) plant-1	Dry matter (g) plant-1	No. of branches	No. of nodules
T1 : Absolute control	27.6	42.33	2.20	28.28	5.00	**27.66**
T2 : 100 % RDF through inorganic fertilizers.	33.56	50.43	2.74	34.20	6.13	**39.33**
T3 : 100 % RDF through inorganic fertilizers + 5 tone FYM	34.53	51.36	2.97	35.66	6.83	**40.00**
T4 : 100 % RDN through FYM + remaining P2O5 through inorganic fertilizers.	31.00	46.20	2.36	31.72	5.46	**32.66**
T5 : T4 + Gypsum	31.30	48.40	2.58	32.12	6.06	**35.66**
T6 : 100 % RDN through vermicompost + remaining P2O5 through inorganic fertilizers	31.50	49.13	2.64	32.74	6.06	**36.66**
T7 : T6 + Gypsum	31.63	49.70	2.69	33.11	6.10	**38.00**
T8 : 100 % RDN through cotton seed cake + remaining P2O5 through inorganic fertilizers.	30.46	44.66	2.20	30.08	5.40	**28.00**
T9 : T8 + Gypsum	30.86	45.46	2.32	30.72	5.43	**30.33**
S. E.(m) ±	1.14	1.62	0.13	.23	0.28	**2.09**
C. D. at 5 %	3.43	4.86	0.39	3.69	0.85	**6.29**
General mean	**31.32**	**47.52**	**2.52**	**32.07**	**5.83**	**34.25**

Table.2: Yield attributes of Kharif Groundnut as influenced by different treatment.

Treatment Details	No. of pods Plant-1	Wt. of dry pods plan-1 (g)	100 kernel wt. (g)	Shelling percentage	Dry pod yield (kg ha-1)	Dry haulm yield (kg ha-1)
T1 : Absolute control	19.13	15.21	45.46	66.21	1238.37	3544.30
T2 : 100 % RDF through inorganic fertilizers.	22.60	18.44	49.70	71.84	2207.40	4561.72
T3 : 100 % RDF through inorganic fertilizers + 5 tone FYM	24.33	19.69	50.90	72.36	2320.98	4654.31
T4 : 100 % RDN through FYM + remaining P2O5 through inorganic fertilizers.	20.73	16.06	48.06	68.57	1945.06	4191.35
T5 : T4 + Gypsum	21.70	17.55	48.50	70.78	2071.60	4330.13
T6 : 100 % RDN through vermicompost + remaining P2O5 through inorganic fertilizers	21.86	17.62	48.70	71.58	2170.36	4376.54
T7 : T6 + Gypsum	21.93	18.00	49.40	71.72	2188.88	4530.86
T8 : 100 % RDN through cotton seed cake + remaining P2O5 through inorganic fertilizers.	19.26	15.60	46.50	68.05	1867.89	4096.29
T9 : T8 + Gypsum	19.53	16.00	47.36	68.50	1908.02	4129.62
S. E.(m) ±	0.88	0.80	0.89	0.97	85.57	131.15
C. D. at 5 %	2.66	2.39	2.69	2.93	256.56	393.19
General mean	**21.23**	**17.13**	**48.28**	**69.96**	**1990.95**	**4268.34**

REFERENCES

[1] Dutta, D. and Mondal, S.S. 2006. Response of summer groundnut (*Arachis hypogaea* L.) to moisture stress, organic manure and fertilizer with and without gypsum under lateritic soil of West Bengal. *Indian J. Agron.* **51** (2): 145-148.

[2] Gunri, S.K. and Nath, R. 2012. Effect of organic manures,biofertilizers and biopesticides on productivity of summer groundnut (*Arachis hypogaea* L.) in red and laterite zone of West Bengal. *Legume Res*. **35**(2): 144 – 148.

[3] Karunakaran, V., Rammohan, J., Chellamuthu, V. and Poonghuzhalan, R. 2010. Effect of integrated nutrient management on the growth and yield of groundnut (*Arachis hypogaea*) in coastal region of Karaikal. *Indian J. Agron.* **55** (2): 128-132

[4] Mohapatra, A.K.B. and Dixit, L. 2010. Integrated nutrient management in rainy season groundnut (*Arachishypogaea*). *Indian J. Agron.* **55** (2): 123-127.

[5] Nambiar, K.K.M. and Abrol, I.P., 1989. Long-term fertilizer experiments in India-an overview. *Fert. News*. 34:11-20.

[6] Singh, G.P., Singh, P.L. and Panwar, A.S. 2011. Response of groundnut (*Arachis hypogaea L.*) to biofertilizer, organic and inorganic sources of nutrient in north east India. *Legume Res.* **34**(3): 196 – 201.

[7] Vishwakarma, A.K., Brajendra, Pathak, K.A. and Ramakrishna, Y. 2012. Effect of different sources of nutrient application on productivity, nutrient uptake and economics of groundnut (*Arachis hypogaea* L.) in Kolasib district of Mizoram *Indian J. of Soil Conservation*. **40** (2): 152-157.