ISSN 2349-7823

International Journal of Recent Research in Life Sciences (IJRRLS)
Vol. 2, Issue 2, pp: (42-45), Month: April 2015 - June 2015, Available at: www.paperpublications.org

Studies on Integrated Nutrient Management on Seed Yield and Quality of Green gram (*Vigna Radiate L.)*

[1]Sushil Vitnor, [2]E.P.Lal, [3]K.P.Rao

[1,2,3,]Department of Biological Sciences, Sam Higginbottom Institute of Agriculture, Technology and Sciences, Allahabad, Uttar Pradesh, india

Abstract: **A field experiment will be conducted to "studies on integrated nutrient management on seed yield and quality of greengram (*Vigna radiate (L.)*" The experiment was carried out during *Kharif* season 2014-15, Department of Biological Sciences, SHIATS, Allahabad (U.P.) which is located at 25° 24' 42" N latitude, 81° 50' 56" E longitude and 98 m altitude above the mean sea level. This area is situated on the right side of the river Yamuna by the side of Allahabad Rewa Road about 5 km away from Allahabad city. The pot experiment consisted of nine treatments with different organic and inorganic manures and laid out in randomized block design with three replications. results indicated that the application of 100% RDF + vermicompost @ 1.25 t/ha + *Azatobactor* @ 375 g/ha recorded significantly plant height (cm) 25 days (28.62) and 50 days (44.17),number of leaves 25 days (13.37) and 50 days (22.10),number of branches 25 days (3.34) and50 days (5.44),days of 50% flowering (41.24), number of pods per plant (24.77), number of seeds per pod (14.77),number of seeds per plant (342.74), seed yield per plant (14.80 g), seed yield per ha (1139.46 kg), thousand seed weight (42.52 g), Number of pods/plant (24.77) germination (99.90%), to others treatments.**

Keywords: **Integrated nutrient management, growth, Farmyard manure, Vermicompost, Azatobactor, Recommended dose of fertilizer.**

1. INTRODUCTION

Greengram (*Vigna radiata*L. Wilczek) is one of the most ancient and extensively grown leguminous crops of India. According to Vavilov (1926) it is a native of India and Central Asia. It is a short duration crop and rich in protein and vitamin B. In India it is cultivated in Maharashtra, Andhra Pradesh, Rajasthan, Orissa and Karnataka. It can be grown under wide range of soil types. It is grown usually as rainfed crop and can also be grown as pre-monsoon and late monsoon crop. In India it occupies 3.0 million ha area with a production of 1.24 million tonnes with the average yield 425 kg per ha (Anon., 2009a).

All though, chemical fertilizers are playing a crucial role to meet the nutrientrequirement of the crop. Persistent nutrient depletion is posing a greater threat to thesustainable agriculture. Therefore, there is an urgent need to reduce the usage of chemicalfertilizers and in turn increase in the usage of organics which needed to check the yield andquality levels. Use of organics alone does not result in spectacular increase in crop yields,due to their low nutrient status (SubbaRao and Tilak, 1977). Therefore, the aforesaidconsequences have paved way to grow greengram using organic and inorganic manuresalong with biofertilizers.

2. MATERIALS AND METHODS

The experiment was carried out during *Kharif*season 2014-2015, **Department of Biological Sciences, SHIATS, Allahabad (U.P.)** which is located at 25° 24' 42" N latitude, 81° 50' 56" E longitude and 98 m altitude above the mean sea

level. This area is situated on the right side of the river Yamuna by the side of Allahabad Rewa Road about 5 km away from Allahabad city. The pot experiment comprise of 9 treatment combinations involving three Green-gram varieties and the design followed is randomised block design with factorial concept having three replications. The plot size adopted for one variety is as follows. T_1 RDF* (60:30:30 Kg N, P2O5 and K20 per ha) +Azatobactor(375 g/ha) – Control, T_2 FYM @ 2 t per ha + Azatobactor(375 g/ha), $T_3$100% RDF + FYM @ 2 t per ha + Azatobactor(375 g/ha), $T_4$50% RDF + FYM @ 2 t per ha + Azatobactor(375 g/ha), $T_5$75% RDF + FYM @ 2 t per ha +Azatobactor(375 g/ha), T_6 Vermicompost 1.25 t per ha +Azatobactor(375 g/ha), $T_7$100% RDF + Vermicompost 1.25 t per ha + Azatobactor(375 g/ha), $T_8$75% RDF + Vermicompost 1.25 t per ha +Azatobactor(375 g/ha), $T_9$50% RDF + Vermicompost 1.25 t per ha + Azatobactor(375 g/ha).

3. RESULTS AND DISCUSSION

Plant height (cm):

The data on plant height of greengram at different growth stages as influenced by organic and inorganic fertilizers along with biofertilizers are presented in The plant height at 25 days after sowing (DAS) differed significantly due to different treatments. Significantly higher plant height (28.62 cm) was recorded in T7 (100% RDF + vermicompost @1.25 t ha-1 + *Azatobactor*@ 375 g ha-1) and it was on par with the application of 100% RDF + FYM @ 2 t ha-1 + *Azatobactor*@ 375 g ha-1 (T3 : 27.35 cm) compared to FYM @ 2 t ha-1 +*Azatobactor*@ 375 g ha-1 (T2 : 20.70 cm).

The plant height at 50 DAS differed significantly due to different treatments. Significantly higher plant height (44.17 cm) was recorded in T7 with application of 100% RDF + vermicompost @1.25 t ha-1 + *Azatobactor*@ 375 g ha-1 and it was on par with T3 *i.e*. 100% RDF + FYM @ 2 t ha-1 + *Azatobactor*@ 375 g ha-1 (42.40 cm). While, FYM @ 2 t ha-1 + *Azatobactor*@ 375 g ha-1 treatment recorded lowest plant height (32.68 cm). **Govindan and Thirumurugan (2005)** observed that the application of vermicompost (75%) had significantly recorded higher plant height (84.70 cm), leaf area index (3.40) over press mud (100%N) (78.20 cm and 2.70, respectively) in soybean.

Number of leaves:

The data on number of leaves at 25 and 50 DAS as influenced by various treatments are presented in Table 3. At 25 DAS, the number of leaves differed significantly due to different treatments. But numerically more number of leaves per plant was observed in (T7) treatment 100% RDF + vermicompost @1.25 t ha-1 + *Azatobactor*@ 375 g ha-1 (13.37) it was on par (T3) *i.e*. with the application of 100% RDF + FYM @ 2 t ha-1 + *Azatobactor*@ 375 g ha-1 (13.04), At 50 DAS, the number of leaves differed significantly due to different treatments. But numerically more number of leaves per plant was observed in treatment 100% RDF + vermicompost @1.25 t ha-1 + *Azatobactor* @ 375 g ha-1 (22.10) and it was at par with the. Significantly lower number of leaves obtained with the application of FYM @ 2 t ha-1 + *Azatobactor* @ 375 g ha-1(16.64). **Chinnamuthu and Venkatakrishnan (2001)** reported that the application of vermicompost @ 2 t per ha recorded significantly higher plant height (147.80 cm) and 100 seed weight (4.14 g) compared to application of FYM @ 5 t per ha (140.80 cm and 4.06 g, respectively) to sunflower.

Number of branches:

The data clearly indicated that there was significant difference in number of branches per plant at 25 DAS. However, it was maximum (3.34) with the treatment (T7) 100% RDF + vermicompost @1.25 t ha-1 + Azatobactor@ 375 g ha-1 and minimum (2.52) with the treatment(T2) FYM @ 2 t ha-1 + Azatobactor@ 375 g ha-1. There was significant difference in number of branches per plant due to different treatments at 50 DAS. Application of 100% RDF + vermicompost @1.25 t ha-1 + Azatobactor @ 375 g ha-1 recorded higher number of branches (T7 : 5.44) and, it was on par with 100% RDF + FYM @ 2 t ha-1 + *Rhizobium* @ 375 g ha-1 (T3 : 4.97). Significantly lower number of branches obtained with the application of FYM @ 2 t ha-1 + Azatobactor@ 375 g ha-1(4.32)

Days to 50% flowering:

Days to 50% flowering did not differ significantly due to different treatments. The lesser number of days (41.24) taken for 50% flowering was recorded with the treatment 100% RDF + vermicompost @1.25 t ha-1 + Azatobactor @ 375 g ha-1 (T7). While, more number of days (43.57) recorded in case of FYM @ 2 t ha-1 + Azatobactor @ 375 g ha-1 (T2)

ISSN 2349-7823

International Journal of Recent Research in Life Sciences (IJRRLS)
Vol. 2, Issue 2, pp: (42-45), Month: April 2015 - June 2015, Available at: www.paperpublications.org

Number of seeds per pod:

Number of seeds per pod varied significant due to different treatments are presented in Table 5. The plants received with 100% RDF + vermicompost @1.25 t ha-1 + Azatobactor @ 375 g ha-1 recorded maximum number of seeds per pod (14.77), respectively), whereas lower number of seeds per pod was observed in FYM @ 2 t ha-1 + Azatobactor@ 375 g ha-1 (12.50). This is supported by **Aruna and Narsa Reddy (1999)** in soybean.

Number of seeds per plant:

The treatment with application of 100% RDF + vermicompost @1.25 t ha-1 + Azatobactor@ 375 g ha-1 treatment produced significantly higher number of seeds per plant while, treatment FYM @ 2 t ha-1 + Azatobactor@ 375 g ha-1produced lower number of seeds per plant (196.76). This is supported by **Rajkhowa*et al.* (2002)** in in greengram.

Seed yield per plant (g):

Application of 100% RDF + vermicompost @1.25 t ha-1 + Azatobactor @ 375 g ha-1 recorded maximum seed yield per plant (14.80 g). This is supported by **Malligawad *et al.* (2000)** in groundnut.

Seed yield per ha (kg):

It is evident from the Table 7 that, significantly higher seed yield was recorded with combined application of organic, inorganic fertilizers and biofertilizer as compared to organic or inorganic fertilizer alone. Among all treatments, (T7) the plant received 100% RDF + vermicompost @1.25 t ha-1 + Azatobactor @ 375 g ha-1 recorded significantly higher seed yield per ha (1139.46 kg per ha). **Arunachalam *et al.* (1995)** reported that the application of 75 kg N per ha + 50 kg P2O5 + 0 kg K2o + 6 t FYM per ha recorded significantly higher seed yield (477 kg/ha) compared to control (392 kg/ha) in sorghum.

Thousand seed weight (g):

The thousand seed weight was significantly influenced by the integrated nutrient management. Significantly higher (42.52 g) thousand seed weight was recorded in (T7) with application of 100% RDF + vermicompost @1.25 t ha-1 + Azatobactor @ 375 g ha-1.This is supported by **Roy and Singh (2006)** in malt barley.

Number of pods per plant:

was at par. Significantly lower (g) thousand seed weight was recorded in (T2) with application of FYM @ 2 t ha-1 + Azatobactor @ 375 g ha-1 (37.74 g). **Kale *et al.* (1994)** observed that the application of vermicompost @ 5 t per ha + 50% RDF recorded significantly higher value of growth yield components and yield of sunflower compared to FYM @ 5 t per ha + RDF.

Germination percentage Significantly higher germination (99.90 %) was recorded with the treatment 100% RDF + vermicompost @1.25 t ha-1 + Azatobactor @ 375 g ha-1(T7) and it was on par. This is supported by **Neelamegam*et al.* (2011)** in greengram.

Table 1: Studies on integrated nutrient management on average of Germination(%),Plant height (cm), Number of leaves, Number of branches , Days to 50% flowering, plant of Greengram (*Vigna radiate (l.)*)

Treatments	Germination(%)	Plant height (cm)		Number of leaves		Number of branches		Days to 50% flowering
		25DAS	50DAS	25DAS	50DAS	25DAS	50DAS	
T1	96.27	23.14	37.40	2.52	42.57	11.97	19.97	42.57
T2	95.24	20.70	32.68	2.62	43.57	10.37	16.64	43.57
T3	97.57	27.35	42.40	2.92	41.57	13.04	20.30	41.57
T4	95.57	24.60	39.34	2.87	41.90	12.37	19.44	41.90
T5	95.32	22.20	36.74	2.74	43.24	10.57	17.50	43.24
T6	94.90	20.96	32.97	2.70	43.24	10.57	17.20	43.24
T7	99.90	28.62	44.17	3.34	41.24	13.37	22.10	41.24
T8	96.24	25.82	40.64	2.84	41.57	12.57	19.70	41.57
T9	95.57	22.80	37.40	2.72	42.70	10.90	17.77	42.70
Mean	S	S	S	S	S	S	S	S
S.Em±	1.120	1.145	1.567	0.199	0.735	0.816	1.089	0.735
CD @ 0.05	2.312	2.364	3.235	0.411	1.516	11.97	19.97	1.516

ISSN 2349-7823

International Journal of Recent Research in Life Sciences (IJRRLS)
Vol. 2, Issue 2, pp: (42-45), Month: April 2015 - June 2015, Available at: www.paperpublications.org

Table 2 : Studies on integrated nutrient management on average Number of seeds/ pod, Number of seeds/plant, Seedyield/plant(g), Seed yield (kg/ha), 1000 seed weight (g), Number of pods/plant, of Greengram (*Vigna radiate (l.)*.

Treatments	Number of seeds/ pod	Number of seeds/plant	Seedyield/plant(g)	Seed yield (kg/ha)	1000 seed weight (g)	Number of pods/plant
T1	13.60	269.85	11.76	1028.33	38.72	21.17
T2	12.50	196.73	9.11	847.69	37.74	17.04
T3	14.04	310.01	14.49	1043.90	41.91	23.50
T4	13.90	286.92	13.24	1028.35	40.26	21.97
T5	12.97	216.44	10.28	917.24	40.42	17.97
T6	12.57	201.74	9.59	889.46	39.01	17.14
T7	14.77	342.74	14.80	1139.46	42.52	24.77
T8	13.94	287.79	13.46	1056.13	41.39	22.04
T9	12.90	234.22	10.43	972.79	40.50	19.57
Mean	S	S	S	S	S	S
S.Em±	0.115	1.986	0.497	2.203	0.721	0.656
CD @ 0.05	0.238	4.098	1.027	4.546	1.487	1.355

4. CONCLUSION

It is concluded from the present investigation that treatment T_7- 100% RDF + VC @ 1.25 t per ha + Azatobactor(375 g/ha) exhibited higher mean value for seed yield per plant and high mean performance for number of primary branches, number of clusters per plant, number of pods per plant, pod length, number of seeds per pod, plant height, seed yield per plant etc. T_2- FYM @ 2 t per ha + *Azatobactor*(375 g/ha)showed high mean performance in 50% days to maturity (43.57.00) and T_3- 100% RDF + FYM @ 2 t per ha + Azatobactor(37 g/ha)T_1- RDF (60:30:30 N, P_2O_5, K_2O kg/ha) + Azatobactor(375 g/ha)and T-7 (50% RDN + Azatobactor + Azospirillum 20 g/ kg)showed less days to 50% T_7 (50% RDN + Azatobactor + Azospirillum 20 g/ kg). Further experimentation is suggested to confirm the consistency of results.

REFERENCES

[1] Anonymous, 2009a, Moong Directorate of Pulse Development, Bhopal. p.1. Anonymous, 2009b, Final estimates of area, production and yield of important agricultural crops in Karnataka. Directorate of Economics and Statistics, Govt, of India. pp.12.

[2] Aruna, P. and Narsa Reddy, S., 1999, Response of soybean (Glycine max) to conjunctive use of organic and inorganic sources of nitrogen. Indian J. Agric. Sci., 69(5) : 382 – 383.

[3] Arunachalam, C., Ramanathan, S. P., Mathan, K. K. and Palaniappan, S. P., 1995, Integrated nutrient management in irrigated gram. Madras Agric. J. 82 : 582 – 583.

[4] Govindan, K. and Thirumurugan, V., 2005, Synergistic association of Rhizobium with phosphate solubilizing bacteria under different sources of nutrient supply on productivity and soil fertility in soybean (Glycine max). Indian J. Agron., 50(3) : 214 – 217.

[5] Channaveerswami, A. S., 2005, Studies on integrated nutrient management and planting methods on seed yield and quality of groundnut. Ph.D. Thesis, Univ. Agric. Sci., Dharwad, Karnataka (India).

[6] Kale, R. D., Banok, V., Sunitha, N. and Gangadhar, H. J., 1994, Adloc scheme on promotion of vermicomposting for production of organic fertilizers. ICAR, New Delhi. Tech. Rep., 1994, Univ. Agric. Sci., Bangalore, Karnataka.

[7] Malligawad, L. H., Patil, R. K., Vidyadhar, K. and Giriraj, K., 2000, Effect of fertility management practices in groundnut. Karnataka J. Agric. Sci., 13(2) : 299-305. manure and time of gypsum application on growth and yield of soybean (Glycine max). J. Oilseed Res., 16(2) : 348 – 349.

[8] Rajkhowa, D. J., Saikia, M. and Rajkhowa, K.M., 2003, Effect of vermicompost and levels of fertilizer on greengram. Legume Res., 26(1) : 63-65.

[9] Roy, D. K. and Singh, 2006, Effect of level and time of nitrogen application with and without vermicompost on yield, yield attributes and quality of malt barley (Hordeum vulgare). Indian J. Agron., 51(1) : 40 – 42.