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REVIEW PAPER

Estimate Effect of Integrated Nutrient Management on Seed Yield and Quality Charaters in Greengram (*Vigna radiate (L.)*

S.S. VITNOR. G.S. PAGIRE., SURENDRA SINGH., AND NEERAJ NATH PARIHAR

Sam Higginbottom Institute of Agriculture, Technology and Sciences, Allahabad, Uttar Pradesh
Mahatma Phule Agricultural University, Rahuri, Maharashtra
Department of Agricultural Botany,
email : sushilvitnor2013@gmail.com

ABSTRACT

The attempt was made on estimate effect of integrated nutrient management on seed yield and quality charaters in greengram (vigna radiate (l.)" experiment consists of pot experiment comprise of 9 treatment combinations treated with Green-gram variety Samrat and sown in randomised block design with factorial concept having three replications. The observation is based on 9 morpho physiological and biochemical characters. 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).

Key words *Green gram, Pot experiment, Treatment combination.*

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 nutrient requirement 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 chemical fertilizers and in turn increase in the usage of organics which needed to check the yield and quality 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 aforesaid consequences have paved way to grow greengram using organic and inorganic manures along with biofertilizers.

MATERIALS AND METHODS

This attempt consists of pot experiment comprise of 9 treatment combinations treated with Green-gram variety Samrat and sown in 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). The experiment was carried out during Kharif season 2014-2015, Department of Biological Sciences, SHIATS, Allahabad (U.P.).

RESULTS AND DISCUSSION

Result obtained from this attempt shows significant treatments for following character taken under study .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. 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 2 that, significantly higher seed yield was recorded with combined

Table 1. Effect of integrated nutrient management on average plant height (cm), seedyield/plant(g), seed yield (kg/ha), 1000 seed weight (g), number of pods/plant, of greengram (*vigna radiate (l.)*.

Treatments	Plant height (cm)		Seedyield/plant(g)	Seed yield (kg/ha)	1000 seed weight (g)	Number of pods/plant
	25DAS	50DAS				
T1	23.14	37.40	11.76	1028.33	38.72	21.17
T2	20.70	32.68	9.11	847.69	37.74	17.04
T3	27.35	42.40	14.49	1043.90	41.91	23.50
T4	24.60	39.34	13.24	1028.35	40.26	21.97
T5	22.20	36.74	10.28	917.24	40.42	17.97
T6	20.96	32.97	9.59	889.46	39.01	17.14
T7	28.62	44.17	14.80	1139.46	42.52	24.77
T8	25.82	40.64	13.46	1056.13	41.39	22.04
T9	22.80	37.40	10.43	972.79	40.50	19.57
Mean	S	S	S	S	S	S
S.Em±	1.145	1.567	0.497	2.203	0.721	0.656
CD @ 0.05	2.364	3.235	1.027	4.546	1.487	1.355

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.

Crude protein (%) Significantly variation on protein content of seed was noticed due to the application of organic manures, inorganic fertilizers and biofertilizer are presented. Seed protein content was markedly higher in (T7) with the treatment 100% RDF + vermicompost @1.25 t ha-1 + Azatobactor @ 375 g ha- (24.12 %) and it was on par with (T3) 100% RDF + FYM @ 2 t ha-1 + Azatobactor @ 375 g ha-1(23.41%) and (T1) RDF (25:50:0 Kg NPK per ha) + Azatobactor @ 375 g ha-1(23.22 %) however lowest (21.50 %) was noticed in (T2) FYM @ 2 t ha-1 + Azatobactor @ 375 g ha-1. Aruna and Narsareddy (1999) reported that the application of vermicompost @ 15 t per ha to soybean recorded significantly higher protein content (41.80%) and oil content (24.30%) over the application of FYM 5 t per ha + 50 kg N per ha (38.70% and 23.00%, respectively).

Moisture content (%) Significantly higher moisture content (11.14 %) was recorded with the treatment 100% RDF + vermicompost @1.25 t ha-1 + Azatobactor @ 375 g ha-1(T7) followed by (T6) Vermicompost 1.25 t per ha + Azatobactor(375 g/ha), (T8) 75% RDF + VC @ 1.25 t per ha + Azatobactor(375 g/ha)(10.32%), (T9) 50% RDF + VC @ 1.25 t per ha + Azatobactor(375 g/ha) (9.72) and the minimum moisture content was recorded in (T3) 100% RDF + FYM @ 2 t per ha + Azatobactor(37 g/ha) (9.09).

Electrical conductivity (dSm -1) The electrical conductivity of seed leachate varied non-significant to different treatments. However, the lower electrical conductivity of seed leachate produced by seed treated with (T7) 100% RDF + vermicompost @1.25 t ha-1 + Azatobactor @ 375 g ha-1 (0.807 dSm-1) fallowed by 100% RDF + FYM @ 2 t ha-1 + Azatobactor @ 375 g ha-1(0.811 dSm-1), FYM @ 2 t ha-1 + Azatobactor @ 375 g ha-1 (0.815 dSm-1), 50% RDF + VC @ 1.25 t per ha + Azatobactor @ 375 g ha-1 (0.818 dSm-1), 75% RDF + VC @ 1.25 t per ha + Azatobactor @ 375 g ha-1(0.819 dSm-1) compared to control (T1 : 0.857 dSm-1). Channaveerswami (2005) reported that combined application of vermicompost @ 2.5 t per ha + RDF (25:50:50 kg NPK per ha) + copper ore tailing recorded higher plant height (43.94 cm), number of branches (6.92), and less number of days to 50% flowering (35.15), number of matured pods (17.06), pod yield (3337 kg/ha) and kernel yield (2362 kg/ha) 100 seed weight (35.26 g). This seed obtained with this treatment also recorded higher seed quality parameters like, germination (94.31%), seedling length (23.85cm), seedling dry weight (4.60 g), seedling vigour index (2249) and lower electrical conductivity (0.186 dSm-1) in groundnut.

**Table 2. Effect of integrated nutrient management on average of plant of germination(%), crude protein content (%),moisture content, electrical conductivity(ds m^{-1})greengram (*vigna radiate (l.)*

Treatments	Germination (%)	Crude protein content (%)	Moisture content	Electrical Conductivity (dS m^{-1})
T1	96.27	23.22	9.47	0.857
T2	95.24	21.50	9.17	0.815
T3	97.57	23.41	9.09	0.811
T4	95.57	21.74	9.38	0.821
T5	95.32	22.34	9.47	0.819
T6	94.90	21.70	10.72	0.820
T7	99.90	24.12	11.14	0.807
T8	96.24	21.59	10.32	0.819
T9	95.57	21.94	9.72	0.818
Mean	S	S	S	NS
S.Em±	1.120	0.717	0.504	0.176
CD @ 0.05	2.312	1.480	1.039	0.363

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.

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