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A study on suitable dose of FYM and vermicompost on soil fertility in green gram [*Phaseolus radiata* L.]

Alka Pandey, C Tiwari and SK Singh

Abstract
The experiment was conducted at the Rajaula Agricultural Research farm of the Faculty of Agricultural Sciences, Mahatma Gandhi Chitrakoot Gramodaya Vishwavidyalaya, Chitrakoot – Satna (Madhya Pradesh) during kharif, 2018. The objective was to find out the best treatment comprising of FYM and vermicompost on soil fertility of green gram growth and yield characters. In this investigation nine treatments were tested in randomized block design with three replications. Randomly five plants were selected to record the observations on different eight characters. Significantly maximum seed yield (7.21 q/ha) was recorded under T_8: (FYM_2V_2) - (10 ton/ha^{-1} Farm yard manure + 10 ton/ha^{-1} Vermicompost) followed by 6.43 q/ha T_7 (FYM_2V_1) - (10 ton/ha^{-1} Farm yard manure + 5 ton/ha^{-1} Vermicompost) and over control.

Keywords: Green gram, suitable dose of FYM, suitable dose of Vermicompost, seed yield, yield attributes

Introduction
Mungbean [*Vigna radiata* L.] belong to the family leguminoceae and sub family papilionaceae is being grown as one of the principal crops since centuries in our state as well as in the India country Production area in 2020-21 is about 4.5million hectare with the total production of 2.64 million tonnes the data collection source of government of India 3rd advance estimates, it primarily producer one of the major kharif pulse crops. The requirement of pulses is expected to rise farther mainly due to increasing population and preference for pulses as the cheapest source of dietary protein. It contains 24.5% protein and carbohydrate it also contains 75 mg calcium 8.5mg iron and 49 mg R- carotene per 100 g of pulses. Productivity of crop is below the average owing to several inert soils related constrains such as low organic matter and poor soil fertility hence it required since efforts to enhance productivity.

One of the agro technical events permitted in biological production is the use of products obtained as a result of composting of organic waste with the help of various types of earthworms (Clive. 2006, Gutiérrez-Miceli. 2007, Singh. 2008) [3, 5, 14]. The bio product obtained as a result of the vital activity of these worms improves soil fertility (Karbauskiene 2000) [8] and has a very strong stimulating impact on the growth and development of plants (Atiyeh. 2000, Makulec 2002, Arancon. 2004) [1, 9, 2]. Some studies showed that N fertilization increases the total quantity of flour proteins, resulting in an increase in both gliadins and glutenins (Dupont and Altenbach 2003; Johansson *et al*. 2001; Johansson *et al*. 2004; Martre *et al*. 2003; Triboi *et al*. 2000) [3, 6, 7, 10, 13].

Materials and Methods
The field experiment was conducted at the Rajaula Agricultural Research farm of the Faculty of Agricultural Sciences, Mahatma Gandhi Chitrakoot Gramodaya Vishwavidyalaya, Chitrakoot – Satna (Madhya Pradesh) during kharif, 2018-19 which is situated between 25° 10' North latitude and 80° 52' East longitude and at an altitude of 200 m above mean Sea Level. The objective was to find out the best treatment comprising of FYM and vermicompost on soil fertility of green gram growth and yield characters, for this region. In this investigation nine treatments *viz*. T_0 (FYM_0V_0), T_1 (FYM_0V_1), T_2 (FYM_0V_2), T_3 (FYM_1V_0), T_4 (FYM_1V_1), T_5 (FYM_1V_2), T_6 (FYM_2V_0), T_7 (FYM_2V_1), T_8 (FYM_2V_2).

Table 1: Treatment details

Levels of FYM		Levels of vermicompost	
FYM0	0 ton /ha^{-1}	V0	0 ton /ha^{-1}
FYM1	7.5 ton /ha^{-1}	V1	5 ton/ ha^{-1}
FYM2	10 ton/ha^{-1}	V2	10 ton / ha^{-1}

were tested in randomized block design with three replications. Randomly five plants were selected to record the observations on different characters *viz*., plant height, branches, root length, root nodule, seed/plant(gm), 1000 seeds weight, selected plant pod weight, yield q/ha. Soil samples were collected separately from each plot of the experimental field to a depth of 0-15 cm prior to sowing of green gram crop. The soil of experimental site was sandy loam in texture, low in organic carbon, nitrogen and phosphorus and medium in available potassium.

Table 2: Physico-Chemical properties of the experimental soil.

Year	Soil texture	pH	EC	Organic Carbon	N	P	K	S
2018	Sandy Loam	8.02	0.22	0.03	138.32	32.12	26.22	15.88

Result and Discussion

The result presented in table revealed that significantly higher plant height (53.10 cm and 60.47 cm) was recorded in T_8(FYM_2V_2)- (10 ton/ha^{-1} Farm yard manure + 10 ton/ha^{-1} Vermicompost) at 40 DAS and 60 DAS respectively. Significantly maximum number of tertiary branch/plant (4.2 nos) was also recorded in the same treatment (T_8) (FYM_2V_2)-(10 ton/ha^{-1} Farm yard manure + 10 ton/ha^{-1} Vermicompost). Data further revealed that significantly highest 1000 seed weight (40.00 gram) and highest yield (7.21 q/ha) was also recorded in the same treatment i.e. (T_8) (FYM_2V_2)-(10 ton/ha^{-1} Farm yard manure + 10 ton/ha^{-1} Vermicompost).

Table 3: Effect of different treatments on all parameters during study

S.NO.	Treatment	plant hight (cm)			Branches/plant							Yield	
		20 DAS	40 DAS	60 DAS	secondry branch	Tertiary branch	root length	Root nodule	Seed selected plant (gm)	Seed slected per plot (gm) 1000 seeds wieght	Selected plant pod weight	Grain Yield	Yield q\ha
1	T0	17.50	48.00	52.27	4.63	3.73	12.57	23.00	11.63	27.33	28.53	625.00	3.70
2	T1	18.77	46.20	58.73	6.33	3.77	13.83	25.00	12.67	31.33	32.40	543.33	3.73
3	T2	21.60	48.73	59.33	6.27	2.83	13.43	25.00	11.50	28.33	31.23	560.00	4.63
4	T3	19.17	45.40	57.53	4.50	2.90	12.37	25.67	12.93	33.67	31.40	806.67	5.33
5	T4	25.47	46.73	59.10	7.43	3.47	11.97	26.67	13.03	29.67	34.23	1166.67	6.07
6	T5	19.67	45.43	57.53	5.97	3.40	14.60	26.67	12.77	34.67	30.17	626.67	4.40
7	T6	22.00	48.53	58.67	6.53	3.07	14.73	27.67	12.03	33.00	33.13	716.67	5.40
8	T7	21.67	49.40	60.13	6.60	3.67	13.30	25.00	11.97	36.00	31.93	626.67	6.43
9	T8	25.13	53.10	60.47	6.70	4.20	14.13	25.67	11.80	40.00	32.43	563.33	7.21
Maximum		**25.47**	**53.10**	**60.47**	**7.43**	**4.20**	**14.73**	**27.67**	**13.03**	**40.00**	**34.23**	**1166.67**	**7.21**
Minimum		**17.50**	**45.40**	**52.27**	**4.50**	**2.83**	**11.97**	**23.00**	**11.50**	**27.33**	**28.53**	**543.33**	**3.70**
Average		**21.22**	**47.95**	**58.20**	**6.11**	**3.4**	**13.44**	**25.59**	**12.26**	**32.67**	**31.72**	**692.78**	**5.21**
SEm ±		1.59	1.36	1.36	0.54	0.28	0.59	0.83	0.34	1.92	0.72	59.73	0.62
$CD_{5\%}$		4.65	3.96	3.97	1.58	0.81	1.73	2.42	0.99	5.61	2.11	174.34	1.81
CV		13.00	4.90	4.04	15.31	13.89	7.64	5.61	4.80	10.18	3.96	14.93	20.64

Results revealed that all the growth parameters expect number of branches per plant were significantly increased by vermicompost and FYM levels. plant height (recorded at two stages of crop growth) was maximum at V_2 F_2 level. Maximum numbers of tertiary branches were recorded at V_2 F_2 level. The same level gave the 1000 seeds weight whereas yield (q/ha) was recorded at V_2 F_2, the data were significant in case of all the above parameters. The result of this study, the role of humic substances as soil fertilizer to improve soil structure and micro-organisms that are (Ozdamar Unlu 2011) [11].

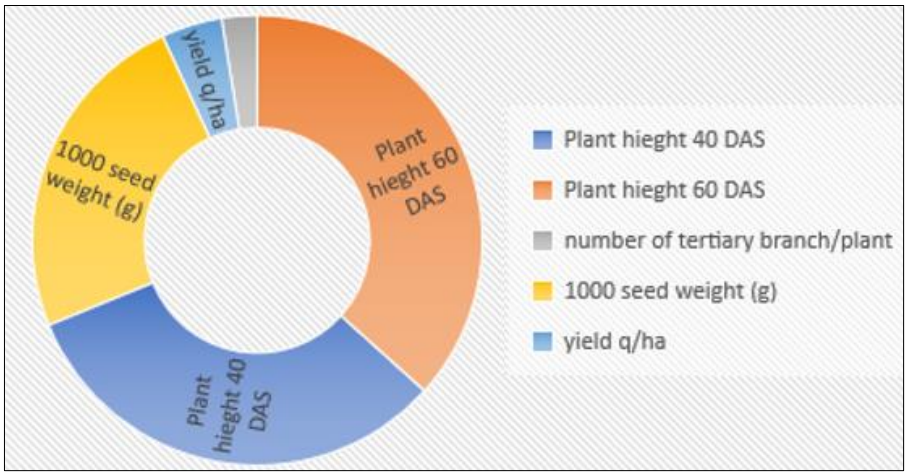

Fig 1: T8-(FYM2V2)-(10 ton/ha-1 Farm yard manure + 10 ton/ha-1 Vermicompost)

Integrated Organic Nutrient Management refers to the maintenance of soil fertility and plant nutrient supply at an optimum level for sustaining the desired productivity through optimization of the benefits from all possible sources of organic and biological components except inorganic in an integrated manner Shaon Kumar das (2018) [12].

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