Original Research Article

Effect of organic nutrients management on growth & yield performance of green gram (Vigna radiata L.,) under semi-arid region

Abstract: A field experiment was carried out throughout the kharif season of the year 2021-2022 at Agriculture research farm, Institute of Agricultural Sciences, Bundelkhand University, Jhansi, Uttar Pradesh. With an assessment to study on the "Effect of nutrient management through organic sources on growth and yield of green gram (*Vigna radiata* L.,). The experiment laid out randomized block design with nine treatments and three replications. The results revealed that growth parameters and yield parameters significantly influence by the nutrient management through organic sources. The value of different attribute related with 1/3 farm yard manure, 1/3 poultry manure, 1/3 vermicompost treated with rhizobium and PSB. As compared with control, the improvement in growth parameters viz., plant height, biomass production, number of nodules and yield attribute viz., pod length (cm), number of grains/pods, test weight, and seed yield (q/ha) by the best treatments. Thus, the combined use of different organic sources played a significant role in increased seed yield of green gram.

Key word: Farm yard manure, poultry manure, vermicompost, growth and yield attribute.

Introduction: Green gram (*Vigna radiata* L.,) is a member of the Leguminosae/Fabaceae family and has -chromosome number 2n=22. Pollination of the green gram crop happens naturally, but there is also a very little amount of cross pollination. Green gram plays a special function in diversifying Indian agriculture and reducing malnutrition among the nation's vegetarian population. After chickpea and pigeon pea, green gram is the third most important pulse crop in India. It covers 3.09 million hectares and produces 2.01 million tons during the kharif season, 2020 (Anonymous). Major producing state of green gram Rajasthan, Maharashtra, Andhra Pradesh, Odisha, Tamil Nadu, Madhya Pradesh, Uttar Pradesh. Rajasthan is largest producing state of green gram in term of area and production. In Rajasthan, Green gram is cultivated in an area of 17.19LH, (42.23%) with a production of 7.42 LT (39%), while in Uttar Pradesh Green gram is cultivated in an area of 0.48 lakh ha with a production of 0.14 lakh tons. (DES, Ministry of Agri. &FW (DAC&FW), Govt. of India; 2017-18*- IIIrd Adv. Est.).

It is a valuable crop that is high in protein. Mung bean seeds, flour are all excellent sources of protein. When compared to other varieties, mung bean is far more appealing, easily digestive, and delicious.

Comment [Ap1]: Not be analyzed

Comment [Ap2]: How much is the exact value in gr/ kg?

Ascorbic acid (vitamin C), riboflavin, and thiamine are abundant in the sprouted seeds of the Mung bean Choudhary et al. [1] Its, seed is used to make soup, together with seasoned rice. It can also be grown as a green manure crop in the summer. Being a legume crop, it has the capacity to fix atmospheric nitrogen. After the ripe pods are removed, its green plants are used as fodder Kumawat et al. [2] Application of nutrient elements, organic manures, and biofertilizers has a significant impact on the yield and nutritional quality of pulses Kumawat et al. [3] The combination of Rhizobium and pulse plants enhances soil fertility and is an economical way to fertilizer legumes with nitrogen Meena et al. [4] The Rhizobium strain, the type of plant, and the climate all affect how much nitrogen is fixed. Legumes are self-sufficient in terms of their N needs due to nitrogen fixation, and they also contribute significantly to maintaining the soil's nitrogen balance. They also enhance the soil's biological qualities as well as its physical ones, including bulk density and soil aggregate stability Bahadur and Tiwari [5] Due to the dual benefits of N fixation and P solubilization in green gram, combined inoculation of Rhizobium and PSB not only significantly improved the growth characteristics and yield attributes, but also resulted in significantly higher yield as compared to Rhizobium and PSB inoculation alone Singh et al. [6] Numerous crops use organic sources of nourishment like vermicompost, farmyard manure, and chicken manure. The development of advantageous organisms in the soil can be encouraged by using these organic additions. To improve crop growth, production, and quality, several workers employed organic chemicals Meena et al. Mujahid and Gupta [7, 8] Biofertilizer effectiveness is also increased by organic amendments. In recent years, the use of such bio-fertilizers, which are less expensive, environmentally beneficial, and based on renewable energy sources, has increased to complement chemical fertilizer's Meena et al. [9] According to Choudhary et al. [1] mung bean sprouted seeds are a good source of ascorbic acid (vitamin C), riboflavin, and thiamine.

Agriculture has used organic manures such vermicompost, FYM, poultry, bio fertilizer's, etc. as a substantial source of organic manure. These manures assist in maximizing crop output and desired quality while also ensuring balanced nutrient proportions, closing the current large gap between nutrient removal and supply, and improving response efficiency. Suggestion by Panse and Sukhatme. [10]

Method a nd material: A field experiment was conduct during the kharif season 2021-22 at the Agriculture Research Farm of the Institute of Agricultural Sciences, Bundelkhand University, Jhansi, Uttar Pradesh. Which is situated at 25^0.27" N latitude and 78^0.35" E longitude at an altitude of 271 meters above mean sea level in a semi-arid region of central India. The soil had a sandy loam texture, a pH of 7.4 that was neutral, low levels of available phosphorus (14.10 kg P2O5/ha), medium levels of potassium (229.0 kg K2O/ha), low levels of available nitrogen (186.0 kg/ha), and low levels of organic carbon (0.48%). The experiment laid out in randomized block design included three replications in nine treatments combination: T_0, (control); T_1, 100% nutrients though farm yard manure (FYM) + rhizobium; T_2, 100% nutrients through vermicompost (VM) + rhizobium; T_3, 100% nutrients through poultry manure (PM) + rhizobium; T_4, 50% nutrients through farm yard manure + 50% nutrients through vermicompost + rhizobium; T_5, 50% nutrients through farm yard manure + 50% nutrients through poultry manure +

Comment [Ap3]: How much?

rhizobium; T_6, 50% nutrients through poultry manure + 50% nutrients through vermicompost + rhizobium; T_7, 1/3 nutrients through farm yard manure + 1/3 nutrients through poultry manure + 1/3 nutrients through vermicompost + rhizobium; T_8, 1/3 nutrients through farm yard manure + 1/3 nutrients through poultry manure + 1/3 nutrients through vermicompost + rhizobium + PSB (Phosphate solubilizing bacteria).

Comment [Ap4]: Be consistent 100%, 50%, 33.3%

Comment [Ap5]: the reader will not know exactly how much FYM, VM, PM used

The field was plough once using a cultivator on 12th July, 2021, and then let too dry in the sun for three days. One pre-sowing irrigation was administered on 15th July, 2021. The soil was levelled and farmed using a cultivator after two days of watering. The green gram cultivated variety 'Shikha (410-3) was sown on 18th July 2021 by manual, using seed rate 15 kg/ha. The experimental plot was of size 2x3 m^2 with a row spacing of 30 cm and 10 cm plant to plant and seed treated with thiram at a rate of 2.5 g/kg seed, rhizobium 10g/kg seed and with PSB @ 20g/ kg seeds as per treatments. The treated seeds were kept in shade approximately for 2 hours for drying. FYM Vermicompost and poultry manure were incorporated 12 days before to sowing of green gram. Thinning operation done after having complete germination in the plot at 12 to 15 days after sowing. Weeding was done as per the treatment requirement by khurpi, two weeding's were done manually at 25 and 40 days after sowing to keep weed free plots and There was least infestation/infection of insect-pest and disease so plant protection measures not needed, but one spray of neem oil. The crop was finally harvested after the 78 days sowing. Observation to be occupied on vegetative parameters of growth; plant height, primary branch, secondary branch, fresh and dry weight of plant, root length, root nodules and total biomass production and the yield parameters; pod length, number of pods per plant, number of grains per pod, weight of pod per plant, seed yield per plant, thousand seed weight and protein content in grains through micro Kjeldahl digestion and distillation method. As part of the root nodule recording process, uprooted plants were put in a basin of water and the roots washed. After thorough root cleaning, nodules were counted separately for each plant's root. OPSTAT software was used to analysis the data.

Result: The analysis of the experiment's data revealed a range of responses from the crop's application of plant nutrients from organic sources, showing that the management of nutrient levels in green gram significantly improved yield attributes such as plant height, number of branches, dry and fresh weight of plant, root nodule, and number of pod plants^{-1}, number of grains pod^{-1}, pod length (cm), weight of pod plant^{-1}, test weight of grains straw yield and seed yield.

Comment [Ap6]: Significantly analysis was not carried out so that it could not state a significant difference

A. Effect on growth attribute:

Plant height: The examination of the data showed in (Table 2) that plant height at 30 DAS exhibited a consistent pattern across all organic nutrient management treatments and was not statistically significant. At 45 and 60 days after sowing maximum plant height (31.64 and 36.44 cm) was recorded with the treatment $T_{8;}$ (1/3 nutrient through farm yard manure + 1/3 nutrient through poultry manure + 1/3 nutrient through vermicompost + rhizobium + PSB). Might be due to organic manure like farm yard manure, poultry and vermicompost manure or organic fertilizers increases the production of new cells, fosters plant

Comment [Ap7]: not be analyzed

vigour and speeds up leaf growth, all of which contribute to better plant height. Similarly results finding by the Sangeetha et al. [11]

Number of branches: The results of the statistical study related to the number of branches plant^{-1} are provided in (Table 2). The maximum number of branches per plant^{-1} recorded for each treatment was found to be significant, with treatment T_8 recording a significantly higher average number of branches plant^{-1} (12.21) at 60 DAS (1/3 nutrient through FYM + 1/3 nutrient through poultry manure + 1/3 nutrient through vermicompost + rhizobium + PSB). Similarly finding result of Kamble et al. [12]

Number of leaves: The information in (Table 3) showed that at 30 DAS, treatment T_1 (100% nutrients through farm yard manure (FYM) + rhizobium) produced the maximum branches (14.33), and at 45 and 60 DAS, treatment T_8; (1/3 nutrient through FYM + 1/3 nutrient through poultry manure + 1/3 nutrient through vermicompost + rhizobium + PSB), produced the most leaves statistically significant (21.68 and 34.77). Similarly finding result of A.S. Channaveerswami et al. [13]

Fresh shoot weight: According to the data analysis, all of the organic nutrition management treatments for fresh shot weight showed (Table 3) a similar trend at 30 DAS and were deemed to be statistically irrelevant. The treatment T_8; (1/3 nutrient through FYM + 1/3 nutrient through poultry manure + 1/3 nutrient through vermicompost + rhizobium + PSB), was associated with the highest fresh shot weights (20.22 and 29.44 g) at 45 and 60 DAS, whereas the treatment T_0; (control) was associated with the lowest fresh shot weight (15.11 g). The findings from this study support those from Verma et al. [14]

Dry shoot weight: The data analysis revealed a same trend (Table 4) for dry shot weight for all organic nutrition management treatments at 30 DAS, and these results were judged statistically non-significant. The treatments T_0 and T_5 had the lowest dry shot weights, but the treatments T_8; (1/3 nutrient through FYM + 1/3 nutrient through poultry manure + 1/3 nutrient through vermicompost + rhizobium + PSB). were linked to the highest dry shot weights (4.50 and 8.81g) at 45 or 60 DAS. These findings agree with those from Verma et al. [14]

Fresh root weight: The treatment $T_{8;}$ (1/3 nutrient through FYM + 1/3 nutrient through poultry manure + 1/3 nutrient through vermicompost + rhizobium + PSB). had the highest fresh root weight showed (Table 4) at 45 and 60 DAS (0.90 and 2.28 g), but the treatment T_4 and T_0 had the lowest (0.53 and 1.30 g). The T8 recorded much more fresh root weight than the other treatments, according to the data for this character. The findings are only partially consistent with the study, according to Divyavani et al.; Kalal et al.; and Kamble et al., [15, 16, 12].

Dry root weight: The information showed (Table 5) on effective dry root weight plant^{-1} at different growth phases. The treatment T_8; (1/3 nutrient through FYM + 1/3 nutrient through poultry manure + 1/3 nutrient through vermicompost + rhizobium + PSB) produced the highest dry root weight at 30. 45 and 60

DAS (0.17, 0.29, and.71 g), whereas the T_6, T_0, and T_5 treatments produced the lowest dry root weight. Similarly, results were found by Khan et al. [17]

Number of root nodules plant^{-1}: At 30 DAS, the treatment T_5 with the application of (50%through FYM + 50%through poultry manure + rhizobium) (45.88) recorded the highest number of nodules; show in (Table 5) at 45 and 60 DAS, the treatment T_8 with the application of (1/3 nutrient through FYM + 1/3 nutrient through poultry manure + 1/3 nutrient through vermicompost + rhizobium + PSB), (70.14 and 112.98) recorded the highest number of nodules. Application of biofertilizers like rhizobium and PSB helped in increased nitrogen fixation and phosphorous solubilization, respectively, which assisted in increased root development and nodule formation. Additionally, application of farmyard manure, vermicompost and poultry manure aided in increased nutrient availability, which aided in increased nodule formation. The outcomes matched Kumawat et al. and Singh et al. findings [2, 18].

Effect on yield attribute:

Number of pod plant^{-1}: Over all the treatments, the treatment that applied T_8; (1/3 nutrient through FYM + 1/3 nutrient through poultry manure + 1/3 nutrient through vermicompost + rhizobium + PSB), had the highest number of pods per plant (17.78). However, the treatments (100% nutrients through Vermicompost (VC) + Rhizobium) (14.66) and (100% nutrients through Poultry manure (PM) + Rhizobium), (14.22) were shown to be statistically equivalent. Similar findings were found by Patel et al. [19] A significant rise in the number of pods/plants is caused by an increase in the availability of nitrogen and phosphorus through bio fertilizer inoculation (rhizobium and PSB). (Table 6).

Number of seed pods^{-1}: Data presented in table 6 shows that treatment T_8; (1/3 nutrient through FYM + 1/3 nutrient through poultry manure + 1/3 nutrient through vermicompost + rhizobium + PSB), reported a considerably greater number of seed pods (10.84). In terms of statistics, it was comparable to treatments T_4 and T_6, nevertheless. There may have been an increase in metabolite production as a result of seed treatment with biofertilizers like rhizobium or PSB and the application of organic manure, and their translocation to various sinks, particularly the productive structures (pods and seeds), may have helped to increase the number of seeds per pod in addition to promoting overall growth. Similar results were found. Rajkhowa, et al. [20].

Pod length (cm): the maximum length of pod was registered (6.65 cm) with the treatment T_8; (1/3 nutrient through FYM + 1/3 nutrient through poultry manure + 1/3 nutrient through vermicompost + rhizobium + PSB). But it remained statistically at par with treatments T_6 and T_2, indication in (Table 6).

Weight of pod plant^{-1}: The treatment T_8; (1/3 nutrient through FYM + 1/3 nutrient through poultry manure + 1/3 nutrient through vermicompost + rhizobium + PSB) registered the highest weight of pod per plant (6.75 g). The treatment T_0 (control) had the lowest weight of pod per plant (3.97 g), in contrast.

According to the values for this character, the T_8 greatly outperformed the other treatments in terms of pod weight per plant. This result presented (Table 6) outcomes support the findings by Nadeem et al. [21].

Test weight: With the combination of treatments in T_8; (1/3 nutrient through FYM + 1/3 nutrient through poultry manure + 1/3 nutrient through vermicompost + rhizobium + PSB), a considerable increase in seed weight (36.72 g) was noted. However, statistically speaking, it stayed on par with treatments T_7 and T_3. It is also possible that the favorable response of FYM, poultry manure, and vermicompost to yield attributes is due to the availability of sufficient amounts of readily usable plant nutrients throughout the growth period, particularly at crucial growth periods of the crop, which leads to better uptake, plant vigour, and superior yield attributes. The results were found to be similar with Yadav et al. [22] noted a similar tendency in green gram show in (Table 6).

Seed yield (q/ha): Under the T_0; (control) treatment, the green gram minimal seed production (7.36q/ha) was obtained. The seed production was significantly higher (10.50q/ha) with the combination of treatments in T_8; (1/3 nutrient through FYM + 1/3 nutrient through poultry manure + 1/3 nutrient through vermicompost + rhizobium + PSB). T_8, had a significantly higher seed output (q/ha) than the other treatments, although it was comparable to T_1 and T_7 (9.75 and 9.95, respectively). The release of macro- and micronutrients over the course of microbial decomposition is thought to be the cause of the higher increase in yield. The energy provided by organic matter also fuels the microflora of the soil, which converts additional nutrients added to the soil or treated in other ways into forms that are easily absorbed by growing plants and encourage seed development. The outcomes were consistent with Sharma and Abraham's. [23] findings. based on the results for this character presented (Table 7).

Comment [Ap8]: there is no significantly analysis

Table 1. Meteorological data recorded at Krishi Vigyan Kendra, Bharari, Jhansi during kharif season 2021.

Month	Metrological week	Average temp. (℃)		Relative humidity (%)			Total rainfall (mm)	Sun shine hrs./day
		Max.	Min.	Morning	Evening	Average		
July	27	31.5	27.2	89.0	70.4	79.7	05.00	3.9
	28	32.4	27.8	88.5	68.4	74.6	06.20	5.5
	29	32.7	26.9	85.6	67.5	71.5	24.50	4.3
	30	33.5	27.1	90.2	71.2	77.8	54.25	3.7
August	31	34.6	27.0	84.7	65.7	75.2	01.20	5.1
	32	36.8	27.3	80.4	58.8	69.6	00.00	5.1

	33	32.2	25.7	91.8	78.1	84.9	168.50	2.8
	34	31.5	27.2	89.0	70.4	79.7	05.00	3.9
September	35	31.3	24.9	90.5	81.8	86.1	114.8	0.0
	36	31.5	26.0	90.2	78.2	84.2	27.60	2.8
	37	32.2	25.8	89.0	70.1	79.5	62.60	2.8
	38	32.7	25.9	86.5	78.8	82.6	21.80	2.5
October	39	32.2	25.9	92.1	78.8	85.4	17.80	2.5
	40	32.8	26.3	87.4	70.5	78.9	03.20	4.8
	41	34.9	26.9	87.1	69.4	78.2	15.00	5.9
	42	34.4	26.5	87.2	64.0	75.6	02.20	7.5

Straw yield (g/plant): The treatment T_8; (1/3 nutrient through FYM + 1/3 nutrient through poultry manure + 1/3 nutrient through vermicompost + rhizobium + PSB) produced the highest straw yield per plant of green gram (5.50g). While the treatment T_2-(100% nutrients by Vermicompost (VC) + rhizobium) yielded the lowest amount of straw per plant (g) of green gramme (3.49g). The, values for this characteristic presented (Table 7), as compared to the other treatments, the T_8, recorded a substantially greater Straw yield per plant. These findings closely matched those published by Sharma and Guled. [24]

Conclusion: That green gram reacted best to combined treatments of farm yard manure, poultry manure, vermicompost, rhizobium, and PSB may thus be inferred from the previous explanation. The semi-arid region of Bundelkhand treated them differently. As a result, it can be concluded that the application of FYM, PM, VM, rhizobium, and PSB in combination may be a grateful source for the improved growth and yield of green gram in central India.

Comment [Ap9]: please state what is the best treatment

Table 2. Effect of managing nutrients from organic sources on plant height and branch count.

Treatments	Plant height			Number of branches		
	30DAS	45DAS	60DAS	30DAS	45DAS	60DAS
Control	16.03	27.33	32.68	4.33	10.11	9.44
100% nutrient through FYM	21.21	27.66	37.80	4.88	9.00	10.64
100% nutrient through vermicompost	16.22	26.66	34.33	4.77	10.89	11.44
100% nutrient through poultry manure	18.10	27.67	32.80	4.88	9.66	10.33
50% nutrient through FYM + 50% nutrient through VC+ rhizobium	20.66	26.44	35.00	4.22	9.78	10.66
50% nutrient through FYM + 50% nutrient through PM+ rhizobium	18.44	29.78	34.44	4.66	9.44	10.16
50% nutrient through PM + 50% nutrient through VC+ rhizobium	17.21	23.66	31.33	4.11	8.92	10.25
1/3 through FYM + 1/3 through PM + 1/3 + 50% through VC + rhizobium	20.66	28.66	37.66	4.22	10.55	12.10
1/3 through FYM + 1/3 through PM + 1/3 + 50% through VC + rhizobium + PSB	21.22	31.44	38.44	5.00	11.89	12.21
SE. m±.	1.38	0.83	1.22	0.11	0.44	0.41
C. D. (P = 0.05)	N/A	2.52	3.71	0.33	1.35	1.25

Table 3. Effect of managing nutrients from organic sources on number of leaves and fresh shoot

Treatments	Number of leaves			Fresh shoot weight		
	30DAS	45DAS	60DAS	30DAS	45DAS	60DAS
Control	13.00	21.00	29.110	5.12	11.55	23.66
100% nutrient through FYM	14.68	21.00	31.000	5.42	15.98	26.55
100% nutrient through vermicompost	14.33	21.00	27.553	6.18	18.10	27.78
100% nutrient through poultry manure	14.68	20.00	34.550	5.82	15.11	28.89
50% nutrient through FYM + 50% nutrient through VC+ rhizobium	12.68	20.00	29.330	5.57	11.51	23.76
50% nutrient through FYM + 50% nutrient through PM+ rhizobium	14.00	21.00	25.440	5.86	20.22	18.88
50% nutrient through PM + 50% nutrient through VC+ rhizobium	12.33	18.00	26.997	5.44	14.33	19.55
1/3 through FYM + 1/3 through PM + 1/3 + 50% through VC + rhizobium	13.33	19.68	26.777	6.40	15.66	29.21
1/3 through FYM + 1/3 through PM + 1/3 + 50% through VC + rhizobium + PSB	14.33	21.68	34.777	6.84	18.66	29.44
SE. m±.	0.50	0.576	1.142	0.46	0.64	0.73
C. D. (P = 0.05)	1.50	1.74	3.45	N/A	1.95	2.23

weight.

Table 4: Effect of managing nutrients from organic sources on dry shoot weight plant^{-1} and fresh root weight plant^{-1}

Treatments	Dry shoot weight plant^{-1}			Fresh root weight plant^{-1}		
	30DAS	45DAS	60DAS	30DAS	45DAS	60DAS
Control	1.06	2.03	5.69	0.38	0.54	1.32
100% nutrient through FYM	1.24	2.54	7.56	0.36	0.81	1.78
100% nutrient through vermicompost	1.04	4.39	8.81	0.40	0.81	2.00
100% nutrient through poultry manure	1.18	2.92	8.11	0.41	0.68	1.65
50% nutrient through FYM + 50% nutrient through VC+ rhizobium	1.16	3.31	6.17	0.40	0.53	1.66
50% nutrient through FYM + 50% nutrient through PM+ rhizobium	1.30	3.20	4.30	0.37	0.71	1.32
50% nutrient through PM + 50% nutrient through VC+ rhizobium	1.27	2.17	5.92	0.37	0.56	1.42
1/3 through FYM + 1/3 through PM + 1/3 + 50% through VC + rhizobium	1.26	3.75	5.61	0.45	0.68	1.97
1/3 through FYM + 1/3 through PM + 1/3 + 50% through VC + rhizobium + PSB	1.4	4.50	7.56	0.50	0.90	2.28
SE. m±.	0.15	0.26	0.37	0.039	0.043	0.18
C. D. (P = 0.05)	N/A	0.80	1.37	N/A	0.13	0.54

Treatments	Dry root weight (g)			Number of nodules plant^{-1}		
	30DAS	45DAS	60DAS	30DAS	45DAS	60DAS
Control	0.16	0.23	0.53	21.32	42.37	72.30
100% nutrient through FYM	0.17	0.23	0.70	38.44	58.48	87.67
100% nutrient through vermicompost	0.14	0.28	0.70	35.55	62.98	92.22
100% nutrient through poultry manure	0.10	0.26	0.65	37.33	55.60	96.00
50% nutrient through FYM + 50% nutrient through VC+ rhizobium	0.15	0.23	0.50	34.67	56.66	99.55
50% nutrient through FYM + 50% nutrient through PM+ rhizobium	0.14	0.26	0.46	45.88	53.81	98.96
50% nutrient through PM + 50% nutrient through VC+ rhizobium	0.12	0.24	0.51	38.55	60.44	110.55

1/3 through FYM + 1/3 through PM + 1/3 + 50% through VC + rhizobium	0.16	0.28	0.63	33.22	55.81	104.97
1/3 through FYM + 1/3 through PM + 1/3 + 50% through VC + rhizobium + PSB	0.17	0.29	0.71	43.78	70.14	112.98
SE. m±.	0.008	0.010	0.036	1.03	1.15	3.06
C. D. (P = 0.05)	0.023	0.030	0.108	3.12	3.50	9.25

Table 5. Effect of managing nutrients from organic sources on dry root weight plant^{-1} and number of nodules plant^{-1}.

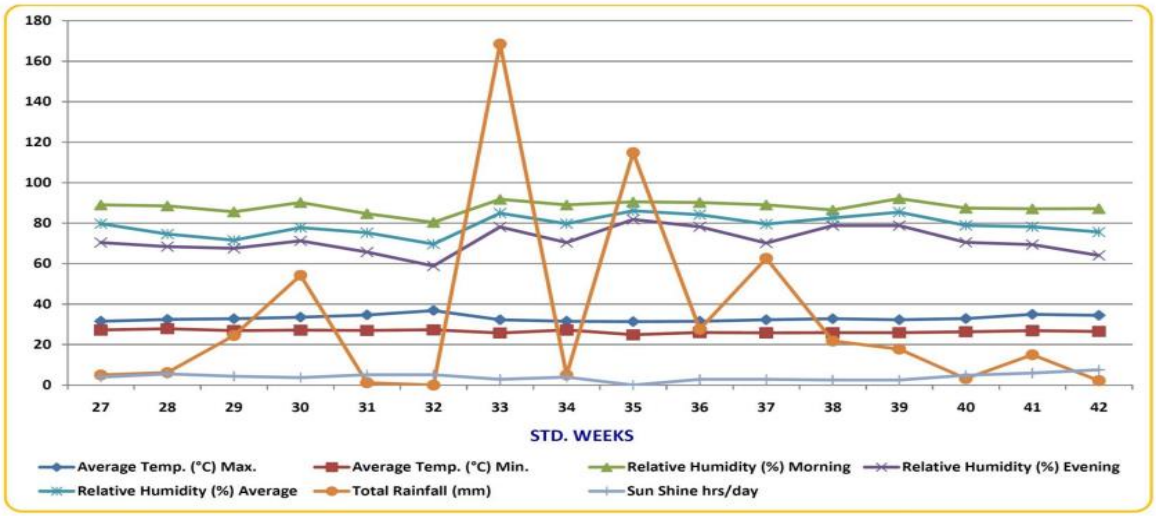
Table 6. Effect of managing nutrients from organic sources on various yield attribute

Treatments	Number of pods /plants	Number of grains/pods	Pod length (cm)	Weight of pods/plants(g)	Test weight (g)
Control	9.88	9.98	5.47	3.97	32.15
100% nutrient through FYM	14.11	10.07	5.79	5.25	33.78
100% nutrient through vermicompost	14.66	9.91	6.02	5.43	34.24
100% nutrient through poultry manure	14.22	9.97	6.0	5.24	36.15
50% nutrient through FYM + 50% nutrient through VC+ rhizobium	13.33	10.58	5.49	4.54	33.44
50% nutrient through FYM + 50% nutrient through PM+ rhizobium	12.99	10.08	5.80	5.09	34.77
50% nutrient through PM + 50% nutrient through VC+ rhizobium	10.99	10.16	6.52	4.55	34.02
1/3 through FYM + 1/3 through PM + 1/3 + 50% through VC + rhizobium	13.88	10.23	5.75	5.61	36.40
1/3 through FYM + 1/3 through PM + 1/3 + 50% through VC + rhizobium + PSB	17.78	10.84	6.65	6.75	36.72
SE. m±.	0.71	0.17	0.18	0.29	0.671
C. D. (P = 0.05)	02.15	0.51	0.55	0.88	2.025

Table 7. Effect of managing nutrients from organic sources on yield (q/ha) and straw yield (g/ha) attribute

Treatments	Yield (q/ha)	Straw yield (g/ha)
Control	7.36	4.18
100% nutrient through FYM	9.95	5.05
100% nutrient through vermicompost	8.20	3.49
100% nutrient through poultry manure	7.68	4.49
50% nutrient through FYM + 50% nutrient through VC+ rhizobium	7.36	4.08
50% nutrient through FYM + 50% nutrient through PM+ rhizobium	8.76	3.98

50% nutrient through PM + 50% nutrient through VC+ rhizobium	7.48	3.78
1/3 through FYM + 1/3 through PM + 1/3 + 50% through VC + rhizobium	9.75	4.70
1/3 through FYM + 1/3 through PM + 1/3 + 50% through VC + rhizobium + PSB	10.50	5.50
SE. m±.	0.34	0.19
C. D. (P = 0.05)	1.05	0.59



Fig, 1. Metrological dada.

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