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Effect of liquid organic manure on growth and yield of summer green gram (*Phaseolus aureus* Roxb.)

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Abstract

A field experiment was conducted during *Zaid* (summer) season of 2023 at Crop Research Farm Department of Agronomy. The treatments consisted of 3 levels of 5% panchgavya, 3% Jeevamrutha, 2% cow urine and (10%, 15% and 20%) neem oil. This experiment was laid out in a Randomized Block Design with 9 treatments and replication thrice. Application of 5% panchgavya + 20% neem oil (Treatment 3) recorded highest plant height (51.71 cm), highest number of branches per plant (12), highest number of nodules per plant (29.4), highest dry weight (11.96 g), pods per plant (22.73), seeds per pod (11.83), test weight (37.12 g), seed yield (937.57 kg/ha) and stover yield (2550.45 kg/ha). The aforesaid treatment also recorded maximum gross return (₹ 85656.53/ha), net return (₹ 53937.78/ha) and B:C ratio (1.70).

Keywords: Green gram, *panchagavya*, *jeevamaruth*, *cow urine*, economic and yield

Introduction

Green gram is one of the major pulse crops grown in India, cultivated in an arid and semiarid region, and it is also called moong bean. It is originated in the Indo-Burma region and the area of East Asia. Green gram is considered to be the hardiest of all pulse crops, belongs to the family Leguminosae. (Singh *et al.*, 2017) ^[17]. It is an important conventional pulse crop of India. The calorific value of green gram is 334 calories per 100 g. it is known for high nutritional content crude protein 24.0%, fat 1.3%, carbohydrate 56.6%, minerals 3.5%, lysine 0.43%, methionine 0.10% and tryptophan 0.04%. The Indian Council of Medical Research (ICMR) has recommended a minimum consumption of 40 gram/day. The major portion is utilized in making dal, soup, sweets and snacks (Patel *et al.*, 2020) ^[18]. Green gram popularly known as mung-bean. It was extensively cultivated under varying agro-climatic conditions. India is the major producer of green gram in the world and grown in almost all the states. In India during 2021-2022, green gram is grown in about 31.5 lakh/ ha with the total production of 2.64 million tons with a productivity of 783kg/ha and contributing 11% to the total pulse production. and Uttar Pradesh (0.30 lakh/ ha) are the major producers of green gram in India. Green gram has many local names, "mung bean, mash or golden gram". It is a short duration pulse crop containing 25 per cent protein of high digestibility and has an appreciable amount of 0.621 mg thiamine, 0.233 mg riboflavin (Lokhande *et al.*, 2018) ^[19]. It also helps in preventing soil erosion. It is also used as a green maturing crop. When grown in the summer s Still, the productivity of summer mung-bean is low due to significant constraints of nutrient availability.

Materials and Methods

During the *Zaid* season of 2023, a field experiment was conducted in alluvial soil at the Crop Research Farm of the Department of Agronomy, SHUATS, Prayagraj, U.P. The soil of experimental plot was sandy loam, having a nearly neutral soil reaction (pH 7.8), electrical conductivity 0.617 ds/m, medium in available nitrogen (249.8 kg/ha) and potassium (240.4 kg/ha), and low in available phosphorous (38.2 kg/ha). Green gram seeds (PDM-139 Samart) were sown on April 4, 2023 with a spacing of 30 cmx10 cm. The experiment was conducted in a

Randomized Block Design consisting of 9 treatment combinations and 3 replications. Basel application were applied as band placement, for which 4-5 cm deep furrows were made along the seed rows with a hand hoe. Manual weeding was done with the help of khurpi at 18 and 28 days after sowing to minimize the crop weed competition. The crop was harvested on 12 June 2023. Plant growth parameters viz., plant height (cm), dry weight (g/plant) were measured at a regular interval from germination till harvest and yield metrics viz. pods/plant, seeds/pod, test weight (g), seed yield (kg/ha), Stover yield (kg/ha) and harvest index (%) were measured at harvest. The observed data was statistically analyzed using analysis of variance (ANOVA) as applicable to randomized block design.

Results and Discussions Growth parameter

Plant height

60 DAS there were no significant influence recorded in plant height, however, treatment 3 5% panchagavya + 20% neem oil recorded maximum plant height which was significantly at par to all the other treatments.

Number of plant branch

At 60 DAS, the plant height number of branches per plant was significantly higher in treatment 3 (12.07) 5% Panchagavya + 20% neem oil. However, treatment 9 (11.77) and T₁ (11.17) were statically at par with treatment 3.

Number of nodules

At 30 DAS, significantly higher number of nodules per plant were observed in treatment 3 (32.33) was recorded with treatment 5% Panchagavya +20% Neem oil. However, treatment was found to be statically at per treatment 2% Cow urine + 15% Neem oil Every (29.73 cm).

Plant dry weight

At 60 DAS, significantly the higher plant dry weight (11.96) was recorded in 5% Panchagavya + 20% Neem oil, while treatment 7 (11.84) T₄ (10.96) T₂ (10.91) it was found to be statically significant at par with treatment 3.

Yield attributes

Number of pods/plants

The number of pods/plants was no significantly recorded (22.73) in treatment 5% Panchagavya + 20% Neem oil. which was statistically at par to the other treatments 3.

Number of grains/pods

The significantly higher number of grains/pod (11.83) was recorded in treatment 5% Panchagavya + 20% Neem oil. However, treatment 1 (11.56). T₂ (11.46) and T₈ (11.1) were found to be statistically at par with treatment 3.

Test weight (g)

Non-significantly higher test weight (37.12) was recorded in 5% Panchagavya + 20% Neem oil. which was statistically at par to the other treatments 3.

Seed yield (kg/ha)

Significantly higher seed yield (937.57 kg/ha) was observed in 5% Panchagavya + 20% neem oil. However, treatment 7(826.19 kg/ha) were found to be statistically at par with T₃.

Stover yield (kg/ha)

The significantly higher stover yield (2550.45 Kg/ha) was observed in treatment Panchagavya +20% neem oil. However, treatment 9(2213.9) were found to be statistically at par with treatment 3.

Harvest index (%)

Significant higher in Harvest Index (28.29%) was observed in application 2% cow urine + 20% neem oil. However, treatment 8, and T₆, was found to be statistically at par with T₉.

The data pertaining to yield-attributing characters are presented in Table 2. The maximum number of pods/plant (22.73) was recorded with the application of 5% Panchagavya + 20% Neem oil which was found to be statistically at par to all treatment. Significantly higher number of seeds/pod (12.83) and test weight (38.12 g) were recorded with application of 5% Panchagavya + 20% Neem oil were statistically at par with the highest.

Table 1: Influence of liquid organic manures on yield attributes of Summer green gram

S. No	Treatments	Plant height	Plant nodules	Plant branch	Plant Dry weight	No of pod/plant	No of seed/pod	Test weight	Seed yield (kg/ha)
1	5% panchagavya +10%neem oil	50.20	29.07	11.17	10.69	22.53	11.56	35.43	841.16
2	5% panchagavya +15%neem oil	50.52	30.20	10.27	10.91	22.40	11.46	36.46	853.32
3	5% panchagavya +20%neem oil	51.71	32.33	12.07	11.96	22.73	11.83	37.12	937.57
4	3%jeevamaruth +10% neem oil	50.34	29.73	10.53	10.96	20.80	11.13	36.20	840.06
5	3%jeevamaruth +10% neem oil	50.42	31.20	10.47	10.40	20.50	10.93	36.84	866.09
6	3%jeevamaruth +10% neem oil	51.30	31.47	10.87	10.11	21.06	10.87	36.86	874.84
7	2% cow urine +10% neem oil	46.95	29.73	10.27	11.84	20.04	10.33	35.76	826.19
8	2% cow urine +15% neem oil	49.12	30.47	10.60	10.57	20.06	11.1	35.83	869.26
9	2% cow urine +20% neem oil	48.97	30.67	11.77	9.26	20.86	11.07	36.14	874.18
	F-Test	NS	S	S	S	NS	S	NS	S
	SE m (±)	2.45	1.58	0.34	0.42	0.68	0.34	0.69	25.12
	CD (P = 0.05)	-	4.75	1.03	1.26	-	1.02	-	53.27

Conclusion

On the basis of one season experimentation, From the results, it can be concluded that application of (5% Panchagavya + 20% Neem oil) Treatment 3 in Green gram has recorded highest grain yield, gross return, net return and benefit cost ratio.

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