Original Research Article

INFLUENCE OF COW BASED LIQUID MANURES AND SPRAYING FREQUENCY ON GROWTH AND YIELD OF GREEN GRAM (*Vigna radiata* L.) UNDER NATURAL FARMING

Abstract

A field experiment was conducted at Crop Research Farm, Department of Agronomy, SHUATS, Prayagraj (U.P) during kharif**,** *2022*. The soil of the experimental plot was sandy loam in texture, nearly neutral in soil reaction (pH 7.1), organic carbon (0.75%), available N (269.96 kg/ha), available P (33.10 kg/ha), and available K (336 kg/ha). The treatments applied were of Panchagavya (3%), Jeevamrutha (500 lit/ha), cow urine (2500 lit./ha), and spraying schedule on every 7, 10 & 14 different days. The experiment was laid out in Randomized Block Design with nine treatments each replicated thrice. Based on the objectives taken maximum plant height (88.07 cm), number of total branches (5.02), number of nodules (40.87), plant dry matter accumulation (20.66 g/plant), number of pods per plant (25.67), number of seeds per pods (11.60), seed yield (1.65 t/ha), stover yield (3.89 t/ha), biological yield (5.54 t/ha) were recorded significantly higher in treatment combination of Panchagavya spraying interval at 10 days interval. The maximum gross returns (₹ 97200.00/ha), net returns (₹ 61385.00/ha), and benefit: cost ratio (1.71) were recorded higher in treatment combination of Panchagavya spraying interval at 10 days interval.

Keywords*: *Panchagavya, Jeevamrutha, Cow urine, greengram, Growth, and Yield

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INTRODUCTION

"Poor man's meat" (Patel 2017). Green gram is one of the major pulse crops grown in India, cultivated in an arid and semi-arid 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. It is India's third most important pulse crop in area cultivated and production after chickpea and pigeon pea (Singh, 2017). In India, green gram is grown in a 3.38 m ha area with 474 kg/ha average productivity. In Uttar Pradesh, it is grown on

25.9 thousand ha with a productivity of 659 kg/ha (Anonymous 2014). For over half a century, the world has relied on increasing crop yields to supply an ever-increasing demand for food. World pulse production increased significantly during the last two decades. India is the largest producer and consumer of pulse globally, accounting for 25% of the global output and 15% consumption (**Saraswati,** 2004). India is producing of42.57 lakh hectares and production 20.09 lakh tons and yields 472 g/ha (Jharkhand accounts for the production of 637 kg per hectare green gram from an area of

16.1 (t/ha) with the productivity of 10.3 t/ha (**Rathour,** 2015) Total pulse production in India during 2011-2012 is estimated to be (5.6% less than the last year) 17.21 mt from the area of 24.78 m ha and with average productivity 694 kg/ha. (Directorate of Economics and Statistics and Ministry of Agriculture and Farmers Welfare) Pulses play an important role in Indian Agriculture as they restore soil fertility by fixing atmospheric nitrogen through biological nitrogen fixation (BNF) in association with root nodule bacteria. That is why pulses can also be referred to as mini fertilizer factories. Pulses are less water requiring crop and prevent soil erosion due to their deep root system and good ground coverage; because of these good characters, pulses are called "Marvel of Nature. In addition to being an essential source of human food, it also plays a vital role in sustaining soil fertility by improving soil physical properties and fixing atmospheric nitrogen. The pulses form an integral part of the cropping system of farmers all over the country because they fit well in crop rotation and crop mixture

MATERIALS AND METHODS

A field experiment was conducted at Crop Research Farm, Department of Agronomy, SHUATS Prayagraj (U.P) during *Kharif*, 2022. The soil of the experimental plot was sandy loam in texture, nearly neutral in soil reaction (pH 7.1), organic carbon (0.75%), available N (269.96 kg/ha), available P (33.10 kg/ha), and available K (336 kg/ha). First variable was cow based liquid organic manures O1-Panchagavya, O_2 - Jeevamrutha (500 lit/ha), O_3 - Cow urine (2500 lit/ha) second variable was S_1 Every 10 days, S_2 Every 15days, S_3 Every 20 days The experiment was laid out in Randomized Block Design with 12 treatments T1- Panchagavya (3%) +S_1 Every 10 days, T2- Panchagavya (3%) + S_2 Every 15 days, T3- P Panchagavya (3%) +S_3 Every 20 days, T4- Jeevamrutha +S_1 Every 10 days, T5- Jeevamrutha +S_2 Every 15 days, T6- Jeevamrutha + S_3 Every 20 days l, T7- Cow urine + S_1 Every 10 days , T8- Cow urine +S_2 Every 15 days , T9- Cow urine + S_3 Every 20 days l each replicated thrice. The observations were recorded on different growth and yield parameters were analyzed statistically to test their significance and the experiment findings have been summarized in the light of scientific reasoning and have been discussed below under the

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following heading

RESULTS AND DISCUSSION

A. Growth Attributes

At 60 DAS, significantly higher plant height (35.7cm) was recorded with application of Treatment -1(Panchagavya + S_1 Every10 days). However , Cow urine +S_1 Every10 days (35.21cm) and Jeevamrutha + S_1 Every 10 days (34.36 cm) were statistically at par with treatment-1 (Panchagavya + S_1 Every10 days). The IAA and GA present in panchagavya when applied as foliar spray could have created stimuli in the plant system and increased the production of growth regulators in cell system and the action of growth regulators in plant system ultimately stimulated the necessary growth and development. Similar findings were also reported by **Patel (2012).** At 60 DAS, significantly higher No of branch/plants (6.48cm) was recorded with treatment -1 (panchagvya +S1 Every 10 days) . however , Jeevamrutha + S_1 Every 10 days (6.13cm) and cow urine S_1+ Every 10days(6.05cm) were statistically at par with treatment-1 (Panchagavya + S_1 Every10 days) The auxin content in Panchagavya upon its application leads to the activation of cell division and cell elongation in the auxiliary buds which had a promoting effect in increased number of branches, leaves and leaf area. The application of panchagavya would have induced the endogenous synthesis of native auxins resulting in an early active growth **(Reshma *et al.*, 2018)** At 80 DAS, the maximum dry matter accumulation (6.48g/plant) was recorded with application treatment -1(panchagvya + S_1 Every10 days) however, Jeevamrutha + S_1 Every 10 days (5.85g/plant) and cow urine S_1 + Every 10days(5.77g/plant) were statistically at par with treatment-1 (Panchagavya + S_1 Every10 days).

B. Yield Attributes

At harvest , the significantly higher number of pods/ plant were observed in the treatment combination Of panchagavya + S_1 Every 10 days (28.40pod/plant) however , Jeevamrutha +S_1 Every 10 days (27.65pod/plant) were satistically at par with panchagavya + S_1 Every 10 days . The effect of panchagavya on vegetative growth (plant height, number of leaves and branches per plant) and reproductive growth (pods per plant, pod length, seeds per pod, test weight and seed yield per plant) were considered as the important yield attributes having a significant positive correlation with seed and haulm yield. These findings are in line with the findings of **Devakumar (2014)** At harvest, significantly maximum number of seeds/pod (10.85) was observed in the treatment combination of Panchagavya + S_1Every 10 days**.** At however cow urine + S_1 Every 10 days(9.32seed/pod) and jeevamrutha +S_1 Every 10days (9.22seed/pod) were satistically at par with

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panchagavya + S_1 Every 10 days. **.** It was observed that crop yield is the complex function of physiological processesand biochemical activities, which modify plant anatomy and morphology of the growing plants. Seed and stover yield of green gram were significantly influenced by different treatments of Panchgavya application**.**The significantly maximum seed yield of green gram (0.87 t/ha) was observed in the treatment combination of Panchagavya + S_1 Every 10 days. However, Jeevamutha + S_1 Every 10 days (0.85 t/ha), Cow urine +S_1 Every days (0.84 t/ha) were statistically at par Panchagavya S_1 Every + 10 days. The significantly maximum stover yield of green gram (2.55 t/ha) was observed in the treatment combination of Panchagavya+S_1 Every 10 days. However, Jeevamutha +S_1 Every10 days (2.51 t/ha), Cowurine +S_1 Every 10 days (2.44t/ha) were statistically at par Panchagavya (3%) + at an interval of 10 days Improvement in yield and yield attributes might be due to stimulation in root growth by inorganic nutrients as well better absorption of water and nutrients complementary effect of Jeevamrutha and Panchagavya after fermentation which favour the higher yield. These findings are in line with those reported by **Avudaithai *et al.* (2010) and Kumar *et al.* (2011)**

CONCLUSION

As per my research trial, the treatment combination of Panchagavya +S_1 Every 10 days was found to be more productive and also economically feasible. Although the findings are based on one season, further research is needed to confirmthe findings and their recommendation

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Table.1 Influence of Cow Based Liquid Manures and Spraying Frequency on Growth parameters of Green gram

Treatments	Plant height (cm)	Number of branches	Dry weight (g/plant)
1. Panchagavya + S_1 Every 10 days	35.7	6.48	6.48
2. Panchagavya + S_2 Every 15 days	30.30	5.02	5.31
3. Panchagavya + S_3 Every 20 days	27.31	5.35	5.35
4. Jeevamutha + S_1 Every 10 days	34.36	6.13	5.85
5. Jeevamutha + S_2 Evey 15 days	33.89	4.88	4.88
6. Jeevamutha + S_3 Every 20 days	29.57	4.95	4.95
7. Cow Urine + S_1 Every 10 days	35.21	6.05	5.77
8. Cow Urine + S_2 Every 15 days	28.85	4.89	5.42
9. Cow Urine + S_3 Every 20 days	29.92	5.27	5.27
F-test	S	S	S
SEm±	0.60	0.16	0.23
CD (P=0.05)	1.81	0.48	0.71

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Table.2 Influence of Cow Based Liquid Manures and Spraying Frequency on Growth parameters of Green gram

Treatments	Pods/plant	Seeds/pods	Seed Yield (t/ha)	Straw yield (t/ha)
1. .Panchagavya + S1 Every 10 days	28.40	10.85	0.87	2.55
2. Panchagavya + S2 Every 15 days	25.60	9.05	0.84	2.46
3. Panchagavya + S3 Every 20 days	24.65	8.12	0.83	2.45
4. Jeevamutha + S1 Every 10 days	27.65	9.22	0.85	2.51
5. Jeevamutha + S2 Evey 15 days	25.85	8.45	0.82	2.43
6. Jeevamutha + S3 Every 20 days	21.74	8.35	0.80	2.41
7. Cow Urine + S1 Every 10 days	23.70	9.32	0.84	2.44
8. Cow Urine + S2 Every 15 days	21.50	8.48	0.77	2.41
9. Cow Urine + S3 Every 20 days	20.65	7.89	0.74	2.37
F-test	S	S	S	S
SEm±	0.46	0.61	0.01	0.04
CD (P=0.05)	1.40	1.64	0.03	0.12

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