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Effect of Different Organic Manure on Primary Branches and Straw Yield Attributes of Green Gram [*Phaseolus radiata* (L.)] under Rainfed Condition in Chitrakoot Region, India

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A B S T R A C T

The field experiment was conducted during kharif season 2014-2015 at rajaula instructional farm M.G.C.G.V.V. Chitrakoot to evaluate the appropriate dose of suitable organic matters used on green gram under rainfed condition. Nine different organic matter treatments (Farm Yard Manure, Vermi Compost, Goat Manure, Poultry Draige) along with one control were tested in RBD with three replications. The Results revealed that application of poultry manure (T_6) primary branches and (T_8) Straw Yield to the summer green gram crop significantly increased the organic matter content in Number of Primary Branches and straw yield. After analysis of data shifted in various table results revealed that poultry manure (T_6) 28.67 showed, best performance in initial plant Number of primary branches at 60 DAS, Highest (T_8) R_2 Straw Yield formation at 710.00 gram over control respectively.

Introduction

Pulses are the cheapest and main source of quality protein which contains 20-25 percent. India is a major pulse growing country in the world, currently producing 18.5 million tonnes with an import of 3-5.4 million tones and a consumption of about 22 million tones. The major pulse growing states are Madhya Pradesh, Rajasthan, Maharashtra, Uttar Pradesh and Andhra Pradesh with together account for about 82 percent of the production from an area of about 74 percent. Green gram (*Vigna radiata* L. Wilczek) is a self-pollinated

leguminous crop which is grown during zaid as well as kharif seasons in arid and semi-arid regions of India

Gadi *et al.,* (2017) reported that the experiment was laid out in Randomized Block Design with thirteen treatments in three replications. Among all the treatments, application of 10-40-20 NPK kg/ha + 10 kg/ha N through poultry manure + GA3 75+75 ppm was recorded maximum plant height, root length, more numbers of branches per plant, highest number of leaves per plant, maximum numbers of nodules, maximum dry weight per plant and maximum grain yield at 30, 45, 60 and 75 days after sowing. Poultry manure with organic form of nitrogen enabled a faster and better growth of crop. The application of organic manures, inorganic fertilizers and growth regulators could be ascribed to their direct influence on dry matter production at successive stages by virtue of increased photosynthetic efficiency.

Mung bean is one of the most important pulse crops for protein supplement in subtropical zones of the world. Mainly grown in India, Burma, Ceylon, Pakistan, china, Fiji, ~ 3 ~ Africa. It is widely grown in Indian subcontinent as a short duration cash crop between two principle crops. Mung bean contains 51 percent carbohydrate, 24-26 percent protein, 4 percent mineral, and 3 percent vitamins. Besides providing protein in the diet, Green gram has the remarkable quality of helping the symbiotic root rhizobia to fix atmospheric nitrogen and hence to enrich soil fertility.

It has been reported that the crop produces equivalent to 22.10 kg of N ha^{-1}, which has been estimated to supplement 59 thousand tons of urea annually. In India, green gram occupies 3.44 million hectares and contributes to 1.40 million tons in pulse production (Anonymous, 2012).

Mohbe *et al.,* (2015) results revealed that poultry manure (T_8) showed, best performance in initial plant height at 15 DAS, pod formation 8.0 and 17.53 at 45 and 60 DAS respectively, Highest nodule formation at 60 DAS 27.27, maximum yield per plant 9.31 gram and maximum seed yield per plot 1368 gram.

Dharwe *et al.,* (2017) Observed that the interaction effect of PXS on seed and straw production of summer green gram was found also significant and yield was improved by the application of both of these two 90kg P_2O_5/ha and 40kg S/ha nutrients as compared to control and but statistically at par with 40 kg sulphur ha^{-1}. The percent enhancement were 6.74, 15.92 and 19.48 in seed and 31.60, 54.50 and 69.71 in straw of green gram due to 10, 20 and 40kg S/ha^{-1} over control respectively.

Khinchi *et al.,* (2017) Reported that the results showed that maximum green fodder (196.61 and 184.21 q ha^{-1}) and dry matter (33.36 and 29.33 q ha^{-1}) yield of fodder pearlmillet at first and second cut, respectively; and economics viz. net return (Rs. 57,117 ha^{-1}) and B:C ratio (4.02) were recorded with 120 kg N ha^{-1}. Further, Significant increase in green fodder (347.21 q ha^{-1}) and dry matter (55.46 q ha^{-1}) yields; and economics viz. net return (Rs. 50,700 ha^{-1}) and B:C ratio (3.69) were obtained when the crop was fertilized with 30 kg $ZnSO_4$ ha^{-1} compared with control and 15 $ZnSO_4$ kg ha^{-1}.

Reported that the increased available P content of soil might be due to release of CO_2 and organic acids during decomposition, which helps in solubilizing the native soil P. During decomposition of organic manures, various phenolic and aliphatic acids are produced which solubilize phosphatase and other phosphate bearing minerals and thereby lowers the phosphate fixation and increase its availability (Dotaniya *et al.,* 2014). Thus,

incorporation of organic materials improves soil health and crop yield (Dotaniya, 2012). Addition of organic residue increased food for microorganisms which helps in faster decomposition. Sugar content in organic residues accelerates the rate of decomposition and enhances the release of low molecular organic acids in soil (Dotaniya, 2012; Dotaniya *et al.,* 2013).

Dotaniya *et al.,* (2016) Application of sugar industries by-products, such as press mud and bagasse, to soil improves the soil chemical, physical, and biological properties and enhanced the crop quality and yield. A huge possibility of sugarcane industries by-products can be used in agriculture to cut down the chemical fertilizer requirement. If all the press mud is recycled through agriculture about 32,464, 28,077, 14,038, 3434, 393, 1030, and 240 tonnes (t) of N, P, K, Fe, Zn, Mn, and Cu, respectively, can be available and that helps in saving of costly chemical fertilizers.

Green gram [*Phaseolus radiata* (L.)] is third important pulse crop in India. It is used as vegetable, pulse, fodder and green manure crop (Saravanan *et al.,* 2013). Green gram is agriculturally important warm season and tropical legumes, sub genus sigmoido tropis links with this crop which enabled so for to study the genome for better improvement (Tomooka *et al.,* 2005). It is an excellent source of protein and minerals for most of the people Green gram has been considered as a "poor men's protein" (Main 1976).

It contains 60% Carbohydrate, 23.9% Protein, 4% minerals, 3% vitamins and 10% moister (Khan 1981). It is miserable that average yield of green gram is very low (763.50 kg/ha.) as compared to its potential yield of 2 to 4 ton/ha (Ramakrishna *et al.,* 2000). Numbers of factors have been responsible for low yield of green gram in our country, Poor quality seed and disease infestation have been witnessed to be most important factors for such set beak, judicious use of fertilizer and manures have proved good response in yield of green gram.

Materials and Methods

The field experiment was conducted at Rajaula instructional farm at Mahatma Gandhi Chitrakoot Gramodaya Vishwavidyalaya, Chitrakoot, Satna M.P. during 2014 in kharif season under semi-arid climatic zone situated at $21^{o}06'$ to $26^{o}30'$ north latitude and $82^{o}48'$ longitude. The attitude of place is nearly 190-210 meter above mean sea level. Data regarding weather condition during the period of experimental was maintained in. The experiment was laid out in Randomized Block Design (RBD) compressing of nine treatment combination with control, each replicating three times. These treatments combination were T_1 - Farm Yard Manure @ 10 ton/ha. T_2 – Farm Yard Manure @ 15 ton/ha. T_3 – Vermi Compost @ 5 ton/ha. T_4 – Vermi Compost @ 8 ton/ha. T_5 – Goat Manure @ 3 ton/ha. T_6 – Goat Manure @ 5 ton/ha. T_7 – Poultry Draige @ 2 ton/ha. T_8 – Poultry Draige @ 3 ton/ha and T_9 – Control. Time to time weeding and plant protection operation were done for better standing of crops. Number of Primary branches per plant the total number of primary braches per plant on five randomly selected plants from each treatment were counted and averaged out at the time of maturity.

Soil properties mechanical analysis

Sand %- 56.50, Silt %- 27.55, Clay % - 19.95, Textural class- Sandy loam

Results and Discussion

The Data were statistically analyzed and shifted in table 1 and 2. After perusal of analyzed data following results were observed in various parameters.

Table.1 Meteorology of experimental period

Months	Temperature (^{0}C)		Rainfall (mm)	R.H. (%)
	Min.	Max.		
July, 14	23.30	40.40	296	**68.82**
August, 14	23.82	35.70	111.84	**74.19**
September,14	19.83	35	21.25	**74.21**
October, 15	**15.43**	**34.29**	**86.75**	**68.82**

Table.2 Number of primary branches of green gram affected by organic manure

S. No.	Treatment	Number of primary branches/plants			
		15 DAS	30 DAS	45 DAS	60 DAS
1	T_1	2.67	12.13	25.27	26.80
2	T_2	2.80	12.60	25.87	27.53
3	T_3	2.67	11.73	25.53	27.33
4	T_4	2.73	12.93	26.73	28.33
5	T_5	2.73	11.60	24.27	25.80
6	T_6	2.73	12.73	26.40	28.67
7	T_7	2.80	11.93	24.93	27.60
8	T_8	2.93	12.33	26.33	28.47
9	T_9	2.60	11.20	21.13	23.07
Maximum		**2.93**	**12.93**	**26.73**	**28.67**
Minimum		**2.60**	**11.20**	**21.13**	**23.07**
Average		**2.75**	**12.12**	**24.94**	**26.85**
SEm+- =		0.13	0.55	0.47	0.43
CD 5% =		0.40	1.66	1.42	1.28
CV =		8.34	7.90	3.25	2.74

Table.3 Straw yield per plot (kg/ha) of green gram affected by organic manure

S. No.	Treatment	Replication			Mean
		R1	R2	R3	
1	T_1	480.00	520.00	580.00	526.66
2	T_2	570.00	550.00	590.00	570.00
3	T_3	530.00	520.00	540.00	530.00
4	T_4	620.00	610.00	470.00	566.66
5	T_5	570.00	540.00	580.00	563.33
6	T_6	670.00	590.00	500.00	586.66
7	T_7	660.00	530.00	550.00	580.00
8	T_8	640.00	710.00	590.00	646.66
9	T_9	460.00	560.00	470.00	496.66
Maximum		**670.00**	**710.00**	**590.00**	**656.66**
Minimum		**460.00**	**520.00**	**470.00**	**483.33**
Average		**565.00**	**615.00**	**530.00**	**569.99**
SEm±		-	-	-	**0.14**
CD 5%		-	-	-	**3.01**
CV		-	-	-	**2.06**

Fig.1 Number of primary branches of green gram affected by organic manure at 15, 30, 45 and 60 DAS

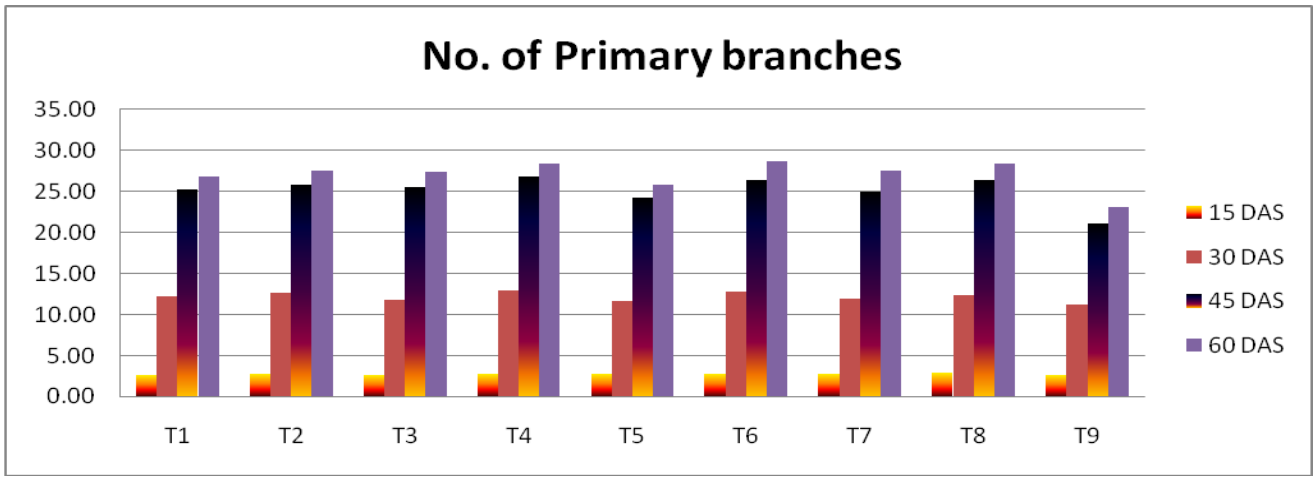
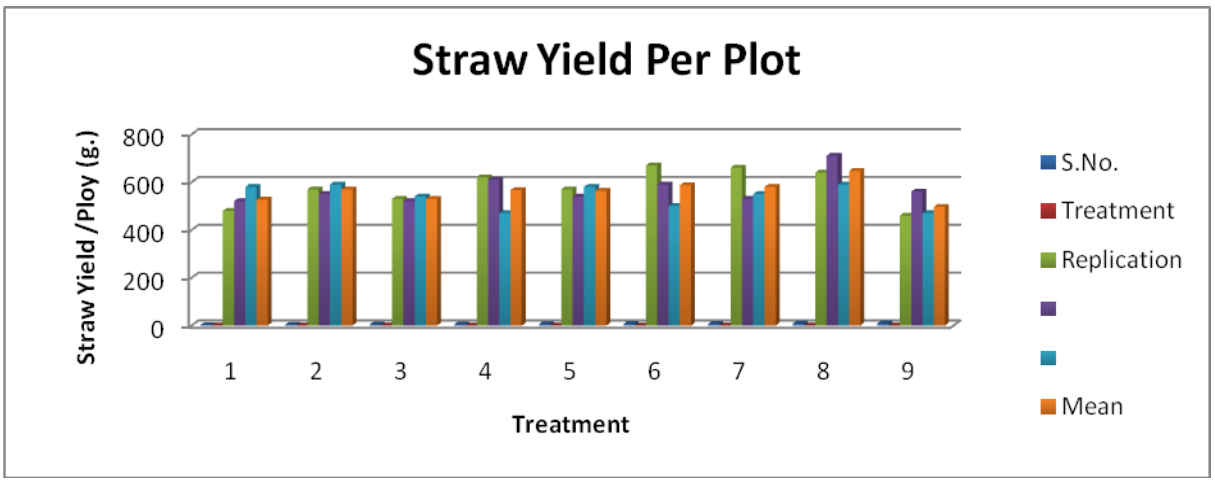


Fig.2 Straw yield per plot (kg/ha) of Green gram affected by organic manure doses



Number of primary branches

The data of No. of primary branches showed in table 2 @ four levels *i.e.* 15 DAS, 30 DAS, 45 DAS and 60 DAS, using FYM, Vermicompost, Goat manure and poultry draige combination. The maximum No. of primary branches observed in T_2 (2.93) and minimum T_9 (2.60) with a general mean 2.75 at 15 DAS while, 30 DAS maximum No. of primary branches observed T_4 (12.93) and minimum T_9 (11.20) with a general mean 12.12. At 45 DAS, highest No. of primary branches observed 26.73 (T_4) and minimum 21.13 (T_9) with a general mean 24.94 and 60 DAS maximum No. of primary branches observed 28.67 (T_6) and minimum 23.07 (T9) with a general mean 26.85. Similar results were reported by Prasad and Sanoria (1984), Pal (1986), Dotaniya (2012), Dotaniya *et al.*, (2013), Saad and Sharma (2003) and Menaria *et al.*, (2003) on green gram (Fig. 1).

Straw yield per plot (kg/ha)

The straw yield per plot of Green gram with using organic manure (FYM, Vermi Compost, Goat Manure and Poultry draige) combination

is a primary concern in its cultivation showed in table 3, data recorded at the time of harvesting and Figure 2 the maximum straw yield per plant (g/ha) were observed 646.66 (T_8) followed by 586.66 (T_6), 580.00 (T_7), 570.00(T_2), 566.66 (T_4), 563.33 (T_5), 530.00 (T_3) 526.66 (T_1), and minimum 496.66 (T_9) with a general mean 569.9. The above findings are in agreement with Prasad and Sanoria (1984), Pal (1986), Saad and Sharma (2003) and Manoria *et al.,* (2003) and Dotaniya *et al.,* (2017).

The maximum No. of primary branches observed in T_2 (2.93) and minimum T9 (2.60) with a general mean 2.75 at 15 DAS while, 30 DAS maximum No. of primary branches observed T4 (12.93) and minimum T_9 (11.20) with a general mean 12.12. At 45 DAS, highest No. of primary branches observed 26.73 (T_4) and minimum 21.13 (T_9) with a general mean 24.94 and 60 DAS maximum No. of primary branches observed 28.67 (T_6) and minimum 23.07 (T_9) with a general mean 26.85. Forgoing results and inferences revealed that presence of wide spectrum of exploitable variability in the material studied with respect the treatment combination T_8 showed maximum Straw yield per plot 710.00 (g) using FYM, Vermicompost, Goat manure and poultry draige combination. Number of primary branches per plant and plant height has high values for different genetic parameters projecting there by, immense scope for genetic upgradation in Green gram.

References

Ali, A., Ali, Z., Iqbal, J., Nadeem, M.A., Akhtar, N., Akram, H.M. and Sattar, A. (2010). Impact of nitrogen and Phosphorus on seed yield of green gram, *J. Agric. Res.*, 48 (3): 335-343.

Daddu Singh Dharwe, H. C. Dixit, Veena Malvi, C.K. Dotaniya and R.K. Dautaniya 2017. Effect of phosphorus and sulphur on the yield of green gram (*Vigna radiate* l.), *International Conference on Advances in Agricultural and Biodiversity Conservation for Sustainable Development* (Abcd - 2017) Abstract Page-4

Dotaniya, C.K., Manju Lata, Narpat Singh, 2017. Integrated Nutrient Management in Fenugreek. Research Book, *Lap Lambert Academic Publisher, Germany, www.amazon.com/Integrated-Nutrient-Management-Fenugreek-Dotaniya/dp/ 3330080582*.

Dotaniya, M.L. 2012. Crop residue management in rice-wheat cropping system. First Edition, *Lap Lambert Academic Publisher, Germany*. pp. 116. ISBN 978-3-659-29388-7.

Dotaniya, M.L., Datta, S.C., Biswas, D.R. and Meena, B.P.2013 Effect of solution phosphorus concentration on the exudation of oxalate ions by wheat (*Triticum aestivum* L.). *Proceedings of the National Academy of Sciences, India, Section B: Biological Sciences* 83,305-309.

Dotaniya, M.L., Datta, S.C., Biswas, D.R., Meena, H.M., Kumar, K. 2014a. Production of oxalic acid as influenced by the application of organic residue and its effect on phosphorus uptake by wheat (*Triticum aestivum* L.) in an Inceptisol of north India. *Na. Acad. Sci. Lett.* 37(5):401-405.

Dotaniya, M.L., S. C. Datta, D. R. Biswas, C. K. Dotaniya, B. L. Meena, S. Rajendiran, K. L. Regar, Manju Lata 2016. Use of sugarcane industrial by-products for improving sugarcane productivity and soil health. *Int J Recycl Org Waste Agricult* 5:185–194

Dotaniya, M.L., S.C. Datta, D.R. Biswas and Kuldeep Kumar, 2014. Effect of Organic Sources on Phosphorus Fractions and Available Phosphorus in Typic Haplustept, *Journal of the Indian Society of Soil Science*, 62(1) 80-83.

Gawai, P.P. and Pawar, V.S. 2006. Integrated Nutrient Management in Sorghum (Sorghum bicolor)–green gram (*Phaseolus radiate* L.) Cropping Sequence under Irrigated Conditions, *Indian Journal of Agronomy*. 51(1).

Hamed, M.F. 2003. Fababean as affected by Zinc, phosphorus fertilizer and phosphorein. *Annals of Agric. Sci., Moshtohor* 41

(3):1047-1056.

Khan S. and Khalil S.K. (2014).Integrated use of organic and inorganic fertilizers in wheat and their residual effect on subsequent mung bean, *International Journal of Farming and Allied Sciences* 3 (8): 835-844.

Kumpawat, B.S.; R.P. Singh and S.S. Rathore 1990. Response of chickpea varieties to phosphorus. *Indian J. of Agron*., 35(4):416-417.

Menaria, B. L., Singh, P., Nagar, R. K. and Singh P.D. 2003. Effect of nutrients and microbial inoculants on growth and yield of benjal gram. *J. Soil and Crops*. 13(1):14-17.

Pal, A.K. (1986). Interaction of Rhizobium inoculation with phosphate and molybdenum application on green gram (*Vigna radiata* L.) at rained condition. *Environment and Ecology* 4 (4):642-647.

Parvathi Gadi, Joy Dawson and Shankar M. 2017, Effect of Different Organic Manures, Inorganic Fertilizers and Growth Regulators on Growth and Yield of Greengram (*Vigna radiata* L.), *Bull. Env. Pharmacol. Life Sci*., 6(1) 2017: 67-75

Patil S.V.; Halikatti S.I., Hiremath S.M., Babalad H.B., Sreenivasa M.N., Hebsur N.S. and Somanagouda G. 2011. Effect of organic manures and rock phosphate on growth and yield of green gram (*Phaseolus radiata* L.) in vertisols, *Karnataka J. Agric. Sci*., 24 (5): (636-638).

Prasad, J. and Sanoria, C.L. 1984. Associative effect of Rhizobium and Azotobacter at different levels of phosphorus on yield and nutrient content of Bengal gram (*Cicer arietinum* L.) *Legume Res*. 7(1): 13-16.

Robinson, J.S. and Sharpley, A.N. 1995. Release of nitrogen and phosphorus from poultry litter. *Journal of Environmental Quality*, 24: 62–67.

Saad, A. A. and H. M. Sharma. 2003. Efficacy of phosphatic fertilizers on the yield of green gram. *Indian J. Pulses Res*. 16(1):63-64.

Sainju, U.M., Senwo, Z.N., Nyakatawa, E.Z., Tazisong, I.A. and Reddy. K.C. 2010. Poultry litter application increases nitrogen cycling compared with inorganic nitrogen fertilization. *Agronomy Journal*, 102(3):917-925.

Sandeep mohbe, Dr. U.S. Mishra, R.C. Pandey 2015. A study on organic manure on green gram [*Phaseolus radiata* (L.)] under rainfed condition of Chitrakoot area, *Trends in Biosciences* Year: *2015*, 8, (23). 6551-6554.

Singh, G.; Sekhon, H.S., Ram, H. and Sharma, P. 2010. Effect of Farmyard Manure, Phosphorus and Phosphate Solubilizing Bacteria on Nodulation, Growth and Yield of Kabuli Chickpea, *Journal of Food Legumes*. 23 (3&4).

Vimal Khinchi, S. M. Kumawat, C. K. Dotaniya and Shri Rakesh 2017. Effect of Nitrogen and Zinc Levels on Yield and Economics of Fodder Pearl Millet (*Pennisetum americanum* L.), *Int. J. Pure App. Biosci*. 5 (3): 426-430.

Zeiton, O.A.A. 1992. Response of green gram to planting denisty and levels of N and P fertilization in newly reclaimed lands. *Zagazig J. Agric. Res*. 19 (4):1547- 1558.

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