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Yield enhancement of Rajmah through Integrated Nutrient Management (INM) in Cachar district of Assam

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Abstract

Disproportionate application of fertilizer not only increases the cost of production but also decrease overall soil fertility leads to environmental pollutions. Therefore, a field experiment was carried out by Krishi Vigyan Kendra, Cachar to evaluate the yield performance of Rajmah by use of organic manure with optimum rate of fertilizer under intensive farming system. Three trials were conducted in three different locations of Cachar district during rabi seasons of 2017-18 and 2018-19. Critical inputs like seed (HUR-301), recommended dose of fertilizer, lime and boron were distributed among the farmers. Farmers were encouraged to provide recommended dose of FYM in their field. The results revealed that the crop takes same period i.e. 101 days for maturity in both trial and farmers practice plots; However, plant height of 52.87 cm and 51.75 cm, respectively recorded under trial and farmers practice plots; pod per plant were recorded as 18.2 and 16.1 under trial and farmers practice; seed per pod were 4.25 and 4.19 numbers under trial and farmers practice; physiologically mature seed weight were recorded as 17.49 and 14.96 q/ha under trial and farmers practice and benefit cost ratio were recorded as 1.64 under trial as compare to 1.42 in farmers practice. Yield increases of 16.96 percent were observed in the trial as compare to farmers practice in the farmer's field.

Keywords: Rajmah, INM, farmers practice, yield

Introduction

Pulses are an important commodity group of crops that provide high quality protein complementing cereal proteins for pre-dominantly substantial vegetarian population of the country. French bean (*Phaseolus vulgaris* L.) belongs to Leguminosae (Fabaceae) family, it is a very nutritious vegetable highly rich with protein, calcium and iron content and grown only for its tender green pods and seeds. It can be grown in all types of soils ranging from sandy loam to clay soils but it is unable to withstand water log condition. It is also known as snap bean, dwarf bean, kidney bean, haricot bean, wax bean, field bean, garden bean, string bean, pole bean or runner bean and especially the common bean. Unlike other pulses, French bean is inefficient in symbiotic nitrogen fixation as it lacks nodulation due to the absence of "NOD" gene regulator (Kushwaha, 1994; Ali, *et. al.* 2017) [8, 1] even with native kind of Rhizobia and commercially produced cultures. As a protein rich vegetable rajmah is traditionally grown in temperate region, its introduction to north eastern plains of India as a winter crop has generated lot of interest amongst farming community due to its higher productivity, responsiveness to agricultural inputs and higher demand. The main cultivated districts of Assam are Dhubri, Barpeta, Darrang, Kokrajhar and Barak Valley including Cachar. In general, rajmah is grown for fresh bean for vegetable purpose in the Brahmaputra valley of Assam whereas it is mainly grown for pulse purpose in Cachar and other districts of Barak Valley. Farmers use to harvest physiological mature seeds and sale directly for getting higher price as compared to dried beans. In general, farmers do not prefer drying bean except preservation for future consumption and seed purpose. Rajmah have been cultivated in the Cachar district during *rabi* season as mono crop or intercropping with potato and other vegetable in the riverside areas of Barak River which is about 4665 ha during 2017-18 (Ali *et al.*, 2017) [1]. As rajmah does not nodulate with the help of native *rhizobia*, it responds to heavy doses of nitrogen and produce higher yield under balanced fertilizer and lime application (Sardana *et. al.*, 2000) [9]. Indiscriminate and injudicious use of fertilizer in the farmers' field not only increase the cost of production but also decrease overall soil fertility causing

pollutions to soil-air-water. So, an On Farm Test (OFT) was conducted by Krishi Vigyan Kendra, Cachar to evaluate the yield performance of rajmah by use of organic manure with optimum rate of fertilizer under intensive farming system.

Materials and Methods

On Farm Tests were conducted in Krishnapur part II (N24°48.850' and E92°39.951') and Bhairabnagar villages (N24°41.154' and E92°51.055') of Salchakra block during *rabi* season of 2017-18 and 2018-19 financial year, respectively. Tests were conducted at three numbers of farmers' field. Beneficiaries and locations were selected

purposely and randomly on the basis of characters like risk bearing capacity of the farmers, existing cropping sequence and potential area for increasing rajmah production. Two technological options were imposed for this on farm test and critical inputs like seed (HUR-301), fertilizers, phosphate solubilizing bacteria, pesticides were distributed to the farmers. The observations or parameters viz., plant height (cm), aphid population, whitefly population, coccinellids population, days to maturity (days), numbers of seed per pod, numbers of pod per plant, yield (q/ha) and benefit to cost ratio (BCR) were recorded from both treated/testing and farmers practice plots.

Table 1: Technological Options

Technology Option	Variety	Source of technology
T1	Variety: HUR-301 Fertilizer: as per requirement and Imbalance	Farmers' practice
T2	Variety: HUR-301 Fertilizer: FYM- 10 t/ha Urea: SSP: MOP:: 132:281:68 kg/ha PSB: 50 g/kg seed	AAU-ZRS, Shillongani, Nagaon

Table 2: Performance of Rajmah at testing plot and farmer's practice plot (Average of three trials) during 2017-18 and 2018-19

Parameters	Testing plot result	Farmer's practice plot result
Days to maturity (days)	101	101
Plant height(cm)	51.75	52.87
Aphid population (based on No. of aphids/10cm twig)	3.67	5.77
Whitefly incidence (Per trifoliolate leaf)	5.67	9.33
Coccinellids population (based on No. of aphids/10cm twig)	1.33	0.67
No.s of pods per plant	18.2	16.1
No.s of seed per pod	4.25	4.19
yield (q/ha)	17.49	14.96
B: C ratio	1.64	1.42

Table 3: Soil data at farmers practice plot (average of three trials) during 2017-18 and 2018-19

Sample No.	pH	EC	OC	CEC	Sand	Silt	Clay	Soil	Available nutrients (kg/ha)		
		(dS m ⁻¹)	%	[cmol (p+) kg ⁻¹]	%	%	%	Texture	N	P ₂ O ₅	K ₂ O
1	5.14	0.03	0.95	5.5	44.16	33	22.84	l	432.8	57.96	189.9
2	5.78	0.02	0.71	6.2	64.88	15	20.12	sc	407.4	29.23	153.7
3	5.72	0.01	0.68	5.8	64.56	18	17.44	sl	376.2	25.39	177.5

Result and Discussion

Among the pulses Rajmah has the potential to produce highest productivity if managed properly. The average data of different parameters from the influence of integrated nutrient management on three trials and farmers' practice are presented in table (2). Perusal of data revealed that significant yield advantage was achieved under integrated nutrient managed trials which are 17.49 q/ha as compare to 14.96 q/ha under farmer's practice. This may be attributed through increase in number of pods per plant *i.e.* 18, seeds per pod *i.e.* 4.25 and plant height were 52.87 cm in the trial plot as compare to farmers' practice which was 16 numbers, 4.19 numbers and 51.75 cm, seeds no./pods, pods/plant and plant height, respectively. The variety takes 101 days to mature in both trial and farmer's practice. These findings are in line with those reported by Sardana *et al.* (2000)^[9] and Barcchiya J. (2014)^[2]. Yield increases of 16.96 percent were observed in the trial as compare to farmers practice in the farmer's field. Benefit cost ratio were recorded as 1.64 under trial as compare to 1.42 in farmer's practice. The pest and disease incident were also observed to be minimal as the efficient intercultural and pest management practice were follower in the trials as compare to farmer's practice. However, the population of aphid and whitefly are less in testing plot (3.67 and 5.77) than farmers practice plot (5.67 and 9.33). FYM and plant-based chemical can control insect pests as compared to

synthetic chemical (Kashyap *et al.*, 2020; Borkakati *et al.*, 2023)^[7, 6]. Moreover, the presence of predatory coccinellids also more in testing plot (1.33) as compared to farmers practice plot (0.67). This finding also in the line of Borkakati *et al.*, 2018^[4]; Borkakati and Saikia, 2020^[5]. Virendra *et al.*, 2020^[10] reported that under prevailing climatic conditions of Kanpur region, the treatment comprised 75% NPK through inorganic + 25% N through vermicompost is the best for obtaining higher green pod yield.

Conclusion

From the present investigation, it may be concluded that Integrated Nutrient Management (INM) has vital role on obtaining higher yield of rajmah which is mainly attributed by higher pods/plant, higher seeds/pods, higher plant height, insect pest population as well as on natural enemies' population in the trial plots, eventually higher production lead to higher benefit cost ratio. Further there may be recommendation of high yielding variety along with FYM and balanced dose of fertilizer for obtaining higher yield in the prevailing conditions. Barman *et al.*, 2022^[3] also emphasize on this type of approach for higher yield and income generation by farming community.

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References

1. Ali M, Mishra JP, Ghosh PK, Naimuddin. Rabi (Winter) Pulses (Chickpea, lentil, fieldpea, lathyrus and frenchbean). Textbook of Field Crop Production-Foodgrain Crops. Vol.-I. Prasad R. (eds.), Directorate of Knowledge management in agriculture, ICAR, Krishi Anusandhan Bhavan I, Pusa, New Delhi-110012; c2017
2. Barcchiya J. Effect of Integrated Nutrient Management on Growth, Yield and Quality of Seed in French Bean (*Phaseolus vulgaris* L.), Thesis submitted to the Department of Vegetable Science, Rajmata Vijayaraje Scindia Krishi Vishwa Vidyalaya, Gwalior, College of Horticulture, Mandsaur (M.P.)-458001; c2014.
3. Barman S, Deka A, Borkakati RN, Deka N, Pathak PK. Evaluation of ICAR Schemes / Approaches- Progressive Farmers Perception on KVKs Activities. Journal of Experimental Agriculture International. 2022;44(10):100-104.
4. Borkakati RN, Saikia DK, Buragohain P. Natural enemy fauna of agri-horti ecosystem of Assam. Indian Journal of Entomology. 2018;80(3):658-661.
5. Borkakati RN, Saikia DK. Effect of Weather Parameters on Population Buildup of Predatory Coccinellids and Spiders Present in Brinjal Crop Ecosystem of Assam. International Journal of Current Microbiology and Applied Sciences. 2020;9(9):114-117.
6. Borkakati RN, Barman S, Saikia DK, Gogoi R. Indigenous Technical Knowledge of Assam for Pests Management – Exploit Potential in Organic Agriculture. Indian J Tradit Knowle. 2023;22(1):40-49.
7. Kashyap G, Borkakati RN, Dutta BC, Saikia DK. Efficacy of different botanicals against subterranean insect pests of potato. Journal of entomology and zoology studies. 2020;8(1):875-878.
8. Kushwaha BL. Response of French bean (*Phaseolus vulgaris* L.) to nitrogen application in north Indian plains. Indian journal of Agronomy. 1994;39:34-37.
9. Sardana V, Dhingrae KK, Gille MS, Singh IJ. Production technology of French bean (*Phaseolus Vulgaris* L.) cultivation: A review. Agricultural Review. 2000;21(3):141-154.
10. Virendra Kumar, Rajiv, Manoj Kumar, Durgesh Kumar, Anoop Kumar Rawat, Lalit Yadav, *et al.* To Studies effect of integrated nutrient management (INM) on growth parameters and yield attributing characters of French bean cv. Azad Rajmah-1. Int. J Chem. Stud. 2020;8(2):681-684.