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ASSESSING THE PERFORMANCE OF FRENCH BEAN (*PHASEOLUS VULGARIS* L.) GENOTYPES UNDER RED RIVER REGION OF ASSAM STATE, INDIA

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ABSTRACT:

French bean is one of the most important leguminous vegetable crop in Assam. Being a highest vegetable grown district of Assam an investigation was carried out in Darrang and Nagaon districts of Assam by both the Krishi Vigyan Kendras from 2014 to 2017 to evaluate the performance of three different French bean (*Phaseolus vulgaris* L.) genotypes for growth and yield attributing characters. The genotypes, studied under this experiment were *viz. Arka Anoop*, *Arka Suvidha*, *Arka Komal* and farmer's local variety. From the study, it has been revealed that genotype with relatively bigger seeds with more numbers of seeds per pod and higher bearing capacity per plant generally gives higher seed yield. Among the three genotypes, *Arka Suvidha* was the best one as it produced the highest yield (210.0 q/ha) and relatively good plant vigour (plant height 30.5 cm and no. of branches per plant 3.42) which were significantly higher as compared to Arka Anoop (124.0 q/ha) and Arka Komal(122.5q/ha). However, the lowest values of these attributes were associated with local cultivar. The average net return per hectare was found to be Rs. 1, 90,000.00 from the genotypes *Arka Suvidha* with a benefit cost ratio 4.8 . Hence, it may be concluded that Arka *Suvidha* may be adopted for commercial cultivation for achieving higher productivity and profitability under these vegetable growing zones of Assam.

Index Terms: French bean, Genotypes, Pod yield, Productivity

INTRODUCTION:

French bean (*Phaseolus vulgaris* L.) is an important vegetable crop under the family Fabaceae grown worldwide for its edible green beans or dry beans. Like other beans, the common bean is rich in starch, protein and dietary fibre and is a good source of iron, potassium, molybdenum and vitamins. Genotype environment interaction is a major challenging issue for plant breeders in dealing with instability and uncertainty of yield and in the development of improved cultivars for wide range of cultivation (Raffi *et al*., 2004). Therefore, until and unless a good genotype with high potential is used; other technologies will not work. These genotypes are greatly varied in their performance in different agro-climatic conditions. Moreover, one of the major constraints of traditional French bean farming in both of these zones of Assam is low productivity of local varieties. Therefore, selection of particular variety is very important in case of yield potential for farmers. In order to introduce a high yielding variety, the present experiment was conducted with an objective to study the performance of french bean genotypes for growth and yield attributing characters under red river region of Assam.

MATERIALS AND METHODS:

The experiment was conducted under Krishi Vigyan Kendra, Darrang and Nagaon, Assam during *rabi* season of 2014-15, 2015-16 and 2016-17 consecutively for three years with three varieties including one local variety as check. The seeds were sown in the first fortnight of October every year following the recommended spacing of 45 cm between rows and 30 cm between plants. The recommended FYM at the rate of 20 t/ha and fertilizer at the rate of 30 kg N, 40 kg P_2O_5 and 20 kg K_2O per ha were applied to the crop. The observations were recorded on five randomly selected plants per replication for each variety for most desirable character like plant height, no. of branches per plant, pod length (cm), pods /plant, seeds/ pod and yield (q/ha) in Table 1. The data on selected parameters of demonstration plots as well as control plots were collected on regular basis and continued till harvesting of crops. The data outputs were also collected from FLD plots as well as control plots and finally the gross return, net return along with the benefits-cost ratio were worked out (Table 2) as per the formula adopted by (Samui *et al*, 2000).

$$\text{Benefit: cost} = \frac{\text{Gross return}}{\text{Gross cost}}$$

RESULTS AND DISCUSSION:

All genotypes recorded significant response to all growth and yield contributing characters. Genotype *Arka Suvidha* was found significantly superior over rest of the genotypes (*Arka Anoop*, *Arka Komal* and local) with respect to branches per plant(3.42) , pods per plant (18.86), pod length (16.08 cm), , seeds per pod (5.63) (Table 1). However, the local cultivar was recorded highest plant height (30.8 cm) but other characters have shown significantly lower values. Difference in growth characters may be due to genetic variability within genotype itself or due to the environmental effects. These results were in close conformity with the findings of Muthuramu *et al*. 2015, Kumar *et al.*,2016, Arunkumar *et al.* 2018 and Patu *et al.* 2019 . In case of green pod yield, highest yield was recorded in Arka suvidha (210.0 q/ha) which was followed by Arka Anoop (124.0 q/ha), Arka Komal (122.5 q/ha) and local cultivar (100.6 q/ha). This might be due to yield attributes associated with the respective cultivars, which revealed that genotype with relatively bigger seeds with more numbers of seeds per pod and higher bearing capacity per plant generally gives higher seed yield(Kumar*etal.*2016).

Economic attributes like gross return, net return and benefit: cost ratio were markedly influenced with french bean cultivars among themselves (Table 2). Higher gross return (Rs. 2, 40,000 /ha), net profits (Rs. 1, 90,000/ha) and benefit: cost ratio (4.8) was recorded during the study period in Arka Suvidha compared to Arka Anoop and Arka Komal. However, these attributes were recorded lowest with the local cultivar. This might be due to higher yield associated with the respective cultivars (Kumar *et al.*2014).

Table 1: Performance of French bean genotypes on yield and yield traits & benefit cost ratio (pooled data for 3 years):

Genotype	Plant height(cm)	Branches/ plant	Pods /plant	Pod length(cm)	Seeds/ pod	Yield (q/ha)
Arka Anoop	28.8	3.1	10.56	13.55	5.09	124.0
Arka Suvidha	30.5	3.42	18.86	16.08	5.63	210.0
Arka Komal	27.8	3.1	10.28	13.11	5.09	122.5
Local	30.8	2.98	9.42	10.8	4.08	100.6
CD (0.05)	2.3	3.0	0.9	1.6	0.6	-

Table 2: Economics of French bean genotypes (pooled data for 3 years) :

Genotype	Gross return (Rs/ha)	Net return (Rs/ha)	B:C
Arka Anoop	2,10,500/-	1,60,380/-	4.2
Arka Suvidha	2,40,000/-	1,90,000/-	4.8
Arka Komal	2,05,670/-	1,55,507/-	4.1
Local	125580	86,336/-	3.2

CONCLUSION:

From overall point of view the results and discussion it can be concluded that the genotype with relatively bigger seeds with numbers of seeds per pod and higher bearing capacity per plant generally gives higher seed yield. Among the three genotypes, *Arka Suvidha* was the best one as it produced the highest yield and relatively good plant vigour with no pest and disease problem. This may be due to fact that the agro-climatic condition of the experimental site during the crop season best suited this genotype. Moreover, no pest and disease infestation was observed during the cropping period whereas the local variety though showed good yield but very prone to pest and disease problem. So, the participating farmers considered *Arka Suvidha* as the most promising variety due to high yield potential. Higher net return and benefit cost ratio will significantly boost the income of the farmers.

REFERENCES:

Arunkumar P, Smitha G B, Hanumanthaswamy B C, Rekha M V and Nagaraja R (2018). Impact of Frontline Demonstration on French Bean Variety Arka Sharath. Int. J. Pure App. Biosci., **6 (4**): 324-327

Kumar R, Deka B C, Kumawat N, and Ngachan S V (2014). Effect of integrated nutrition, biofertilizers and zinc application on production potential and profitability of garden pea (*Pisum sativum* L.) Eastern Himalaya India *Legume Research*,**37(6)**:614-620,

Kumar R, Hansing N, Deka B C, and Kumar M (2016). Evaluation of different sesame lines (*Sesamum indicum* L.) for enhancing cropping intensity and productivity under foot hill condition of Nagaland. *Indian Journal of Hill Farming*, **29(1):** 29-35

Muthuramu S , Paulpandi V K, Sakthivel S, Ramakrishnan K and R Karthik (2015). Assessing the Performance of French Bean (*Phaseolus vulgaris* L) in District Virudhunagar of Tamilnadu. *J. Krishi Vigyan,* **3(2)** : 5-7.

Patu K Zeliang, Manoj Kumar, Rakesh Kumar, K.L. Meena, D.J. Rajkowa (2019). Varietal Evaluation of French bean for Higher Productivity and Nutritional Security under the Foot Hill Ecosystem of Nagaland. *Indian Journal of Hill Farming* , Special Issue, Page 14-18.

Raffi, S.A., Nawaz, M.A. and Khan N. (2004). Stability analysis for pod and seed production in dry bean (*Phaseolus vulgaris* L.). *Asian J. Plant Sciences*, **3(2)**: 239-242.

Samui S K, Maitra S, Roy D K, Mandal A K and Saha D (2000). Evaluation of front line demonstration on groundnut. . *J Indian Soc. Coastal Agri Res*, **18(2):**180-183.