Performance of different Varieties of French bean (*Phaseolus Vulgaris* L.) under Prayagraj agro-climatic condition

ABSTRACT

The present investigation was carried out at the Department of Horticulture, Naini Agricultural Institute, Sam Higginbottom University of Agriculture, Technology & Sciences, Prayagraj (UP) during the rabi season 2022-23 with a view to check performance of different varieties of French Bean under Paryagraj agro-climate condition and to estimate economicsof French Bean using different varieties. The experiment comprised of total 7varieties**V1**(IET/2022/FBBVAR-1),**V3**(IET/2022/FBBVAR-3),**V4**(IET/2022/FBBVAR-4),**V5**(IET/2022/FBBVAR-5),**V6** (IET/2022/FBBVAR-6),**V7 (**Lakshmi), **V8 (**Ellora No.11) consisting 3 replication which were laid out in randomized block design.From the above experiment finding it is conclude that all the parameter varied significantly. Further, while studying the plant height, no. of leaves and pod length was found maximum in **(**Lakshmi).Day to germination days,first flowering, 50% flowering and first pod pickingwas found minimumin (IET/2022/FBBVAR-1).Number of branches, pod girth, pod per plant,average pod weight,ascorbic acid, yield per ha andbenefit-cost (B: C) ratiowas found maximum in (IET/2022/FBBVAR-3).Themaximum TSS, fiber and protein was found in(IET/2022/FBBVAR-1).

Keyword French bean; Variety; growth; quality and yield.

INTRODUCTION

French bean (Phaseolus vulgaris L.) belongs to thefamily Fabaceae and it is native of South America. It isdomesticated in Mexico, Peru and Colombia about 8000years ago. French bean has evolved from wild growingvine distributed in the high lands of Middle-America andAndes. These two domestications, led to two groups ofcultivars with contrasting agronomic characteristics.During this evolution, some marked changes has affectedthis plant from climbing to dwarf type, which has takenplace both in the middle American and domestication center as reported by **Schoonhoven andVosyest, (1991).**

It is widely cultivated in tropics, sub tropicsand temperate regions. In India and most of the tropical French bean commonly known as kidney bean orsnap been or fine bean is one of the important vegetablecrop among legumes. It is grown for tender green podsfor fresh consumption as well as for dry seeds which areused as pulse. The dried beans are rich in protein andclosely compare with meat. In India, it is mostly grownfor tender green pods, while in the USA it is grown forprocessing in large quantities. This vegetable not onlyplays a vital role in nourishment of human population, butalso improves soil fertility to a greater extent by virtue ofbeing highly nitrogen fixing crop. 100 g green pods contain1.7 g protein, 0.1 g fat, 4.5 g carbohydrate, 1.8 g fiber and are also rich in minerals and vitamins. It has some medicinal properties in control of diabetes, cardiac problems and natural cure for bladder burn. It has both carminative and reparative properties against constipation and diarrhea. They come in multiple colors and sizes. Green pods are rich in Ca, K, P and Fe Seeds are highly protein.Major growing states are Andhra.Pardesh, Maharashtra, Tamil Nadu, Gujarat and West BengalThe optimum temperature for its cultivation is 15-25°C. Dropping of flowers may occur if temperature falls below 10°C or goes above 35°C which resulted into reduction of yield **Duke (1981)and (Kumar, 2022).**

2. MATERIAL AND METHOD

The present investigation entitled "Performance of differentvarieties of French bean under Prayagraj Agro-climatic conditions" was carried out during the rabi season of year 2022-23 at Horticulture Research Farm, Department of Horticulture, Naini Agriculture Institute, Sam Higginbottom Institute of Agriculture, Technology and Sciences, Prayagraj (UP). The experiment was laid out in randomized block design with 7varieties and 3 replications on 28th October 2022. The sowing was done on open field condition, ridges with spacing of 60 X 15 cm adopting the recommended cultivation practices for raising a healthy cropduring the last ploughing FYM @ 20 t/ha was applied. The recommended dose of fertilizers was applied @ 50:65:50 kg/ha (N: P: K) in the form of Urea, Single Super Phosphate (SSP) and Muriate of Potash (MOP), respectively. The full dose of P and K along with half dose of N was applied before sowing of seeds as basal dose. After 30 days of sowing the remaining half dose of N was given as top dressing. Data was recorded on all the important characters pertaining to the present study. The cultural practices such as irrigation, weeding and plant protection measure were carried out uniformly as and when required. Observations were recorded at different stages of growth periods and studied for growth parameters like plant height, number of branches per plant, earliness parameters like days to first flowering, days to 50% flowering, yield parameters like number of fruits per plant, fruit length, fruit girth, fruit weight, fruit yield per plant, fruit yield per hectare and quality parameters total soluble solid,protein, fiberand ascorbic acid content. The data were statistically analyses by the method suggested by Fisher and Yates, 1963. The details of varieties used are given in Table 1. The total soluble solids of the fruit were determined with the help of Portable Hand refractometer. The observed value of T.S.S. was recorded from the scale of the instrument (0-32 range). Vitamin C content or Ascorbic acid content was estimated by using 2, 6 dichlorophenol indophenol dye as reported by **Ranganna (1986)**

CLIMATECONDITION IN EXPERIMENTAL AREA

The South-East region of Uttar Pradesh has a subtropical climate, with both the winter and summer experiencing temperature extremes. The research area is situated on the south of Prayagraj on the right bank of Yamuna at Rewaroad at a distance of about 6 km from Prayagraj city. It is situated at the 250.8^0 N Latitude and 810.50^0 E meters from sea level. Prayagraj has a sub-tropical climatic with uttermost in summer (in the month of May and June) with temperate reaching around 115^0 F with hot blazing winds and in winter (December and January the temperature falls down as low as 32^0 F. The average rainfall is around 1013.4 (mm) annually with maximum concentration during July to September with occasional showers in winter

Table 1. Detail of variety used

Notation	Name of variety	source
V1	IET/2022/FBBVAR-1	IIVR, Varanasi
V3	IET/2022/FBBVAR-3	IIVR, Varanasi
V4	IET/2022/FBBVAR-4	IIVR, Varanasi
V5	IET/2022/FBBVAR-5	IIVR, Varanasi
V6	IET/2022/FBBVAR-6	IIVR,Varanasi
V7	Lakshmi	YSPU,Solan
V8	ELLORA No.11	East-west seed private limited

3. RESULT AND DISCUSSION

3.1 Growth Parameter

3.1.1Plant height (cm)

Among the all different varieties, plant height showed the significant result. The maximumplant height recorded at 80 D.A.S in V7 LAKSHMI (204.33cm)superior over rest of the varieties,followed byV3IET/2022/FBBVAR-1 (64.00cm)where as minimum plant height recorded in V1 IET/2022/FBBVAR-1 (48.67cm)depicted inTable 2.Due to favorablePrayagraj agro-climatic conditions, environmental factors such as sunlight exposure, temperature, and soil fertility can also influence plant growth. Varieties that are well-suited to the specific environmental conditions of this region or have been selectively bred for longer plant height may demonstrate better performance in terms of plant heightthe findings were in accordance with earlier reports of**Zelaing *et al*., (2018)** and **Akter *et al*., (2021)**

3.1.2Number of Branches per plant

Among the all different varietiesno. of branches showed the significant result,The maximum number of branchesrecorded in V3 IET/2022/FBBVAR-3 (14.47)superior over rest of the varieties,followed byV5IET/2022/FBBVAR-5 (13.57) where as minimum no. of branches recorded in V1 IET/2022/FBBVAR-1 (10.00)depicted in Table 2. The variation in no. of branches might have been due to specific genetic makeup of different varieties, inherent properties, Prayagrajenvironmental factor, hormonal factor and vigour of the crop. The findings were in accordance with earlier reports of**Barcchiya and khshwah, (2017).**

3.1.3Number of leavesper plant

Among the different varieties maximum no. of Leaves showed the significant result The maximum leaves recorded in V7 LAKSHMI (247.50)superior over rest of the varieties, followed by V5IET/2022/FBBVAR-5(214.93)where as minimum no. of leaves recorded in V1 IET/2022/FBBVAR-1 (120.33)depicted in table 2. The superior performance of one variety over another in terms of vegetative growth no. of branches and no. of leaves can be attributed to a combination of genetic factors and environmental conditionsvarieties with genetic traits that promote no. of leaves, such as enhanced internodes elongation or increased branching, can exhibit greater plant growth.. Hybrids that are well-suited to the specific environmental conditions of a particular region or have been selectively bred for longer plant height may demonstrate better performance in terms of plant height. Similar findings were reported by **Hema and Rana D. K. (2020).**

3.2Earliness Parameter

3.2.1 Day to germination

Among the different varietiesthe day to germination showed the significant result varied. Theminimumday to germination recorded in V1 IET/2022/FBBVAR-1 (4.67DAS)superior over rest of the varieties, followed byV3IET/2022/FBBVAR-3 (64.00DAS)where as maximum day to germination recorded in V7 ELLORA N0.11 (8.33DAS) depicted inTable 2.Similar findings were reported by **kaluni *et al*.,(2020)**

3.2.2Days to First flowering

Among the different varietiesdays to emergence of first flowering showed the significant result .The minimum day to first flowering recorded in V1 IET/2022/FBBVAR-1 (36.00DAS) superior over rest of the varieties, followed by V6 IET/2022/FBBVAR-6 (46.67DAS), where as maximum day to first flowering recorded in V7 LAKSHMI (52.80DAS)depictedin Table 3.The variationin day to first flowering appears might have been due to specific genetic makeup of different varieties prevailing Prayagraj agro-climatic conditions. Similar findings were reported by **Bairagi *et al*.,[21]**

3.2.3Days to 50%Flowering

Among the different varieties Day of 50% flowering show the significant result. The minimum day to50%Flowering recorded in V1 IET/2022/FBBVAR-1 (45.50DAS) superior over rest of the varieties, followed by V3 IET/2022/FBBVAR-3 (45.57DAS)where as maximum recorded in V7 LAKSHMI (61.03DAS)depictedinTable3.The variationin day to 50% flowering appears might have been due to specific genetic makeup of different Genotypes prevailing Prayagraj agro-climatic conditions. Similar findings were reported by **Das *et al*., [2018]**

3.3 Yield parameter

3.3.1Days to First Fruit Harvest

Among the different varietiesday of 1st pickling showed the significant result. The minimum day to first harvest recorded in V1 IET/2022/FBBVAR-1 (46.00DAS)superior over rest of the varieties, followed by V6 Lakshmi(67.33DAS)where as maximum recorded in V7 LAKSHMI (75.70DAS)depictedin Table 3 The better performance of one variety over another in terms of earliness in flowering and maturing can be attributed to genetic factors and environmental conditions. Variety with genetic traits that promote early flowering, such as early maturation genes or shorter vegetative growth phases, can exhibit faster initiation of flowering. Additionally, environmental factors such as temperature, photoperiod, and nutrient availability can influence flowering and maturing time. Hybrids that are genetically predisposed to respond more favorably to the prevailing environmental conditions, or those that have been selectively bred for early flowering, may show superior performance in terms of early initiation of flowering and maturing. The findings were reported similarly earlier by Varietal Evaluation of French bean for Higher Productivity**Zeliang*et al*.,(2018) , P.K., Kumar and M., Kumar**,

3.3.2Number of Pods per Plant

Among the different varieties maximum Number of pods per plants showed the significant result. The maximum recorded in V3 IET/2022/FBBVAR-3 (21.67) superior over rest of the varieties, followed by V7 lAKSHMI(21.67)where as minimum pod per plant recorded in V5 IET/2022/FBBVAR-5 (14.87)depictedin Table 3.The variation in pods per plant might have been due to sex ratio, fruit set percentage, genetic nature and their response to varying Prayagraj agro-climatic conditions. This type of similar results have also been reported in **Panchbhaiya *et al*., (2017) and Whankate *et al*.,(2021)**

3.3.3Average pod Length (cm)

Among the different varieties maximum pod length Pod length (cm) showed the significant result. The maximum average pod Lengthrecorded in V1 IET/2022/FBBVAR-1 (19.53cm)superior over rest of the varieties, followed by V3 IET/2022/FBBVAR-3 (18.47cm) where as minimum pod length recorded in V1 IET/2022/FBBVAR-1(13.00cm)depicted in Table3. The variation in podlength, might have been due to genetic factor, environmental factor, hormonal factor and vigor of the crop Similar result for this trait were also found earlier**Das *et al*., [2018]**

3.3.4Average pod girth(cm)

Among the different varietiespod girth (cm) showed the significant result. The maximumaverage pod girth recorded in V3 IET/2022/FBBVAR-3 (3.37cm) superior over rest of the varieties, followed by V1 IET/2022/FBBVAR-1 (3.37cm), where as minimum pod girth recorded in V8 Ellora No. 11 (2.13cm)depicted in Table 3.The variation in podgirth, might have been due to genetic factor, environmental factor, hormonal factor and vigour of the crop Similar result for this trait were also found earlier**Kumar *et al*., (2017); Khan *et al*., (2015).**

3.3.5Averagepod Weight(g)

Among the different varieties Pod weight (g) showed the significant result. The maximumpod weight recorded inV3IET/2022/FBBVAR-3(7.37g) superior over rest of the varieties, followed byV1 IET/2022/FBBVAR-1 (7.13g), where as minimum fruit weight recorded inV5 IET/2022/FBBVAR-5 (4.17g)depicted in Table 3.The variation inpodweight may be due to itsvigour and adoptability to Allahabad agro-climatic conditions. For this trait, similar result was also reported by **Panchbhaiya *et al*., (2017) and Whankate *et al*.,(2021).**

3.3.6Average Pod Yield (t/ha)

Among the different varietiesthe podyield (t/ha) showed the significant result. The maximum yield per ha recorded in V3 IET/2022/FBBVAR-3 (18.16t/ha)superior over rest of the varieties, followed by V7 Lakshmi(15.29t/ha) where as minimum yield per ha recorded in V5 IET/2022/FBBVAR-5 (6.25t/ha)depicted in Table 3. The better performance of one Hybrid over another in terms of enhanced fruit yield can be attributed to genetic factors and environmental conditions. Hybrids with genetic traits that promote higher flower-to-fruit conversion rates, increased branching, or enhanced reproductive capacity can result in a greater yield of fruits. Additionally, environmental factors such as pollination efficiency, availability of nutrients and water, and optimal growing conditions can significantly influence fruit production. Varieties that are genetically predisposed or have been selectively bred for higher fruit yield can demonstrate superior performance in terms of overall fruit production per plant. The findings were in accordance with earlier reports of **Bharti *et al*., (2024) and Das K., (2017).**

3.4 Quality Parameter

3.4.1Total soluble solid.[°Brix]

Among the different varieties Total soluble salt (Brix) showed the significant result. The maximum total soluble salt (°Brix) was recorded in V1 IET/2022/FBBVAR-1 (6.40°Brix)superior over rest of the varieties, followed by V3 IET/2022/FBBVAR-3 (5.83°Brix)where as minimum TSS recorded in V5 IET/2022/FBBVAR-5 (5.03°Brix) depicted in Table 4.The variation may be due to the inherent character and genetic makeup of the varieties and environmental conditionsand the results are conformity with the finding of (**Chaurasiya *et al*., (2016), [16] and [27].**

3.4.2 Protein content (%)

Among the different varietiesProtein (%) showed the significant result .The maximum protein content recorded in V1 IET/2022/FBBVAR-1 (1.52%)superior over rest of the varieties, followed by V7 Lakshmi (1.49%)where as minimum protein content recorded in V5IET/2022/FBBVAR-5 (1.41%)depictedin Table 4. The variation in protein can be attributed to genetic factors and environmental conditions. Varieties with genetic traits that promote accumulation of amino acid and improvedfruit quality.

3.4.3 Fiber content (%)

Among the different varietiesFiber (%) content showed the significant result. The maximum fibercontent recorded in V1 IET/2022/FBBVAR-1 (3.89%) superior over rest of the varieties, followed by V3 IET/2022/FBBVAR-3 (3.86%)where as minimum fiber content recorded in V5 IET/2022/FBBVAR-5 (3.82%)depictedin Table 4.The variation in Fibercontent can be attributed to genetic factors and environmental conditions. Varieties with thesuperior genetic traits that improved the fruit quality

3.4.4Vitamin C Content (mg/100g)

Among the different varietiesVitamin-C (mg) show the significant result. Among the different varieties the maximum Vitamin-Ccontent recorded V3 IET/2022/FBBVAR-3 (11.77mg) superior over rest of the varieties,whereas minimum Vitamin recorded V5 IET/2022/FBBVAR-5 (11.55mg) depictedin Table 4. Vitamin C content can be attributed to genetic factors and environmental conditions. Varieties with genetic traits that promote higher sugar accumulation and improved fruit quality can result in increased vitamin C content. Additionally, environmental factors such as sunlight exposure, temperature, and nutrient availability can influence the synthesis and accumulation of sugars in fruits. The findings were in accordance with earlier reports. Evaluation of French Bean (Phaseolus vulgaris L.) Varieties for Growth, Pod Yield and Quality**Hema and Rana D. K. (2020)**

Table 2. Performance of different varieties of French bean in term of germination and growth parameter

Varieties	Day of germination	Plant height 80(DAS)	No. of branches 80(DAS)	No. of leaves 80(DAS)
IET/2022/FBBVAR-1	**4.67**	48.67	10.00	120.33
IET/2022/FBBVAR-3	7.00	64.00	**14.47**	183.00
IET/2022/FBBVAR-4	7.00	45.47	12.53	188.07
IET/2022/FBBVAR-5	7.37	38.73	13.57	214.93
IET/2022/FBBVAR-6	7.00	42.80	12.20	170.07
Lakshmi	7.00	**204.33**	13.57	**247.50**
ELLORA NO.11	8.33	53.13	12.57	153.73
F-Test	**S**	**S**	**S**	**S**
SEd (±)	0.17	0.77	0.17	3.69
CD (5)	0.36	1.66	0.36	7.91
CV%	3.35	2.15	1.84	2.83

Table 3. Performance of different varieties of French bean in term of flowering and yield

Name of Varieties	Day of 1st flowering (DAS)	Day of First picking (DAS)	Day of 50% Flowering (DAS)	Pod per Plant	Pod length (cm)	Pod Girth (cm)	1Pod weight (g)	Yield/hac (Tone)
IET/2022/FBBVAR-1	**36.00**	**46.00**	**45.00**	17.27	13.00	2.23	7.13	12.32
IET/2022/FBBVAR-3	36.57	55.00	45.57	**24.37**	18.47	**3.37**	**7.37**	**18.16**
IET/2022/FBBVAR-4	40.80	55.37	49.13	15.30	18.20	2.63	5.90	9.21
IET/2022/FBBVAR-5	42.33	64.00	51.00	14.87	15.50	2.63	4.17	6.25
IET/2022/FBBVAR-6	46.67	67.33	55.67	15.47	16.53	2.33	5.53	8.60
Lakshmi	52.80	75.70	61.03	21.67	**19.17**	3.17	7.10	15.29
ELLORA NO.11	45.43	65.87	54.10	17.73	15.63	2.13	5.20	9.31
F-Test	**S**	**S**	**S**	**S**	**S**	**S**	**S**	**S**
SEd (±)	**0.37**	**0.48**	**0.54**	**0.70**	**0.19**	**0.07**	**0.03**	**0.06**
CD (5)	**0.78**	**1.02**	**1.15**	**1.50**	**0.40**	**0.15**	**0.07**	**0.14**
CV%	**1.19**	**1.06**	**1.45**	**5.42**	**1.48**	**3.54**	**3.59**	**0.79**

Table 4. Mean performance of French bean on Quality parameter

Name of Varieties	TSS (°Brix)	Fiber (%)	Protein (%)	Vit C (mg)

IET/2022/FBBVAR-1	**6.40**	**3.89**	**1.52**	11.76
IET/2022/FBBVAR-3	5.83	3.86	1.48	**11.77**
IET/2022/FBBVAR-4	5.40	3.84	1.47	11.57
IET/2022/FBBVAR-5	5.03	3.86	1.41	11.55
IET/2022/FBBVAR-6	5.20	3.82	1.46	11.55
Lakshmi	5.53	3.85	1.49	11.60
ELLORA NO.11	5.30	3.88	1.48	11.56
F-Test	**S**	**S**	**S**	**S**
SEd (±)	**0.09**	**0.01**	**0.01**	**0.01**
CD (5)	**0.20**	**0.03**	**0.03**	**0.03**
CV%	**2.36**	**0.50**	**1.40**	**0.14**

Table 5. Benefit cost ratio (B: C)

Name of Varieties	Yield (t/ha)	Gross return (Rs/ha)	Cost of cultivation (Rs/ha)	Net return (Rs/ha)	Benefit cost ratio
IET/2022/FBBVAR-1	12.32	120000	544400	424400	3.5
IET/2022/FBBVAR-3	**18.16**	120000	831200	711200	**5.9**
IET/2022/FBBVAR-4	9.21	120000	416000	296000	2.4
IET/2022/FBBVAR-5	6.25	120000	278800	158800	1.3
IET/2022/FBBVAR-6	8.60	120000	393200	273200	2.2
Lakshmi	15.29	120000	611600	491600	4.0
ELLORA NO.11	9.31	120000	372400	252400	2.1

3.5 Economics of Different Varieties of French Bean

Maximum gross returns were recorded in Variety (IET/2022/FBBVAR-3) with Rs. 831200 and the minimum was recorded in Variety (IET/2022/FBBVAR-5) Rs.278800.Maximum net returns were recorded in Variety (IET/2022/FBBVAR-3) with Rs. 711200 and the minimum Rs 158800 was recorded in Variety (IET/2022/FBBVAR-5). Maximum BC ratio was recorded in Variety (IET/2022/FBBVAR-3) with 5.9 and the minimumBC ratio 1.3 was recorded in Variety IET/2022/FBBVAR-5 depicted in Table 5.

4. CONCLUSION

From the above experimental finding it is concluded that the variety IET/2022/FBBVAR-3 performed best in terms of growth parameters like pod length, earliness in flowering and maturity and yield parameters like fruit length, fruit diameter, and fruit yield per ha. It showed best performance for quality parameters also TSS, protein, fiber and Vitamin C content. Maximum BC ratio was obtained in variety IET/2022/FBBVAR-3 with value of 5.9.

REFRENCE

1. Akter, M., Mostarin, T., Khatun, K., Samad, M.A., Haq, M.E., Badrunnesa, A. and Shamim, A.S.A. (2021). Growth and yield comparison of french bean as influenced by three varieties and nutrients. Asian Journal of Research in Crop Science. 6(2): 8-19.

2. Kalauni, S. and Luitel, B.P. (2020). Evaluation of pole-type french bean (*Phaseolus vulgaris L.*) genotypes for agro-morphological variability and yield in the mid hills of Nepal. AgriRxiv.

3.Duke, J. A. (1981).Handbook of legumes of world economicimportance. New York, USA/ London, UK : Plenum Press,195-200

4. Barcchiya, J. and Kushwah, S.S. (2017). Influence of integrated nutrient management on growth, yield parameters and yield in french bean (Phaseolus vulgaris L.) Legume Researchan International Journal. 40(5): 920-923. doi: 10.18805/lr.v0i0.8398.

5. Choudhary, B.R. (2015). French bean. In: Vegetables. Kalyani Publishers New Delhi. P: 162.

6. Das, K., Datta, S. and Sikhdar, S. (2018). Performance of bush type french bean varieties (Phaseolus vulgaris L.) with or without rhizobium inoculation. Indian Journal of Agricultural Research. 52(3): 284-289. doi: 10.18805/IJARe.A-4981.

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

8.Panchbhaiya, A., Singh, D.K., Jatav, V., Sanganamoni, M. and Verma, P. (2017). Studies on variability, heritability and genetic advance for yield and yield contributing characters in french bean (Phaseolus vulgaris L.) germplasm under Tarai region of Uttarakhand. Journal of Applied and Natural Science. 9(4): 1926-1930

9. Kumar, A. (2022). Assessment of french bean (Phaseolus vulgaris L.) genotypes for yield traits. Journal of Krishi Vigyan. 11(1): 1-6. doi: 10.5958/2349-4433.2022.00093.9.

10.Whankate, R.A., Garande, V.K., Shinde, U.S., Dhumal, S.S., Sonawane, P.N., Sarvade, S.A. and Ambad, S.N. (2021). Growth and yield performance of french bean (Phaseolus vulgaris L.) germplasm under sub-montane zone of Maharashtra.Legume Research-An International Journal. 44(2): 138-144.

11. Bharti , D.Mal, E.Goutam, L.Kumar (2024). Performance of French bean (*Phaseolus vulgaris* L.) genotype under transgangetic plains region. Indian journal of agriculture research volume 58(1) :101-105.