



P-ISSN: 2349-8528

E-ISSN: 2321-4902

IJCS 2019; 7(5): 916-918

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Received: 07-07-2019

Accepted: 09-08-2019

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Studies on nutrients contents and yield attributing characters in freshly harvested green French bean pods of different varieties

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Abstract

An experiment entitled “Studies on Nutrients contents and yield attributing characters in freshly harvested green French bean Pods of Different Varieties” was conducted during *Rabi* season of 2016-17 at the field site of AICRP on Vegetable Crops of O.U.A.T. The experiment was laid out in Randomized Block Design with three replications taking fifteen genotypes of French bean, to study the Nutrients contents and yield attributing characters in freshly harvested green French bean Pods of Different Varieties. The mineral contents of fresh pods ranged from N: 0.34 to 0.54%, P: 0.06 to 0.22%, K: 0.14 to 0.37%, Ca: 0.13 to 0.53%, Mg: 0.14 to 0.31%, S: 0.02 to 0.04%. Fe, Mn, Cu and Zn showed the following ranges: 56.67-166.67 mg/Kg, 2.49-6.64 mg/Kg, 0.68-1.35 mg/Kg and 2.21-3.92 mg/Kg respectively.

Keywords: French bean, NPK content, Ca, Mg, S, Fe, Mn, Cu, Zn, and yield

Introduction

Beans are a large group of leguminous vegetables which form an important source of proteins in human diet. French bean is also known as ‘meat of the poor’ (Singh, 1999) ^[8], ‘grain of hope’ (Sofi *et al.*, 2011) ^[9] and ‘super food’ (Saleh *et al.*, 2012) ^[6] in virtue of the nutritional properties it possesses. It is a good source of protein, carbohydrates and minerals. French bean is one of the most important legumes worldwide for human consumption. It has one of the longest histories in cultivated plants and is widely cultivated in the temperate and subtropical regions and in many parts of the tropics. (Singh, 1999) ^[8]. French beans are a rich source of proteins, minerals like phosphorus, calcium, iron, crude fibre apart from containing a decent source of carbohydrates. (Sardana *et al.*, 2000) ^[7]. They also contain good amount of vitamin A, thiamine, riboflavin, vitamin C and nicotinic acid. They also possess some medicinal properties which are useful in controlling diabetes and certain cardio vascular problems and provide a good natural cure for bladder burn, dysentery, eczema, hiccups, rheumatism, sciatica and tenesmus. It has carminative and depurative properties against constipation and diarrhea (Yadav, 2015) ^[10]. Area and production of french beans for India was 230.17 '000 hectares and 2278.47 '000 MT respectively in the year 2016-17. The area and production of French beans in Odisha stood at 10.58 '000 hectares and 48.70 '000 MT respectively in the year 2016-17. (Annual Report, 2017, Horticulture Statistics Division, Dept. of Agriculture, Cooperation and Farmers' welfare, GoI).

French beans are of three types: bush type with short internodes, semi-poletype with long internodes and the pole-type having longer internodes. Over 50 species of Phaseolus have been reported from America, of which only five namely, Common bean (*P. vulgaris* L.), Year bean (*P. polyanthus*), Scarlet or Runner bean (*P. coccineus* L.), Tepary bean (*P. acutifolius* A. Gray) and Lima bean (*P. lunatus* L.) have so far been domesticated. *P. coccineus* is generally cross pollinated with rest others being self pollinated. (Panchbhaiya *et al.*, 2017) ^[3]. The present investigation has been planned to study the “Studies on Nutrients contents and yield attributing characters in freshly harvested green French bean Pods of Different Varieties”

Materials and Methods

An experiment was conducted at the field site of All India Coordinated Research Project on Vegetable Crops of Orissa University of Agriculture & Technology, Odisha, India during *Rabi* season of 2017-18. The soil of experimental site was uniform in texture and was leveled. The

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field was ploughed three times after incorporation of FYM @ 15 tons/ha during final land preparation and levelled properly. Then the individual plots were laid out of scheduled size as per the plan of layout with required irrigation channel. The investigation was laid out in Randomized Block Design with fifteen genotype and three replications with a plot size of 3.0 X 2.7 m². The details of genotype are given below:

List of entries

V1	2016/ FBB VAR1	V9	Sigma
V2	2016/ FBB VAR2	V10	Vaishnavi 264
V3	2016/ FBB VAR3	V11	NS 9700
V4	2016/ FBB VAR4	V12	Falguni
V5	2016/ FBB VAR5	V13	Rani
V6	2016/ FBB VAR6	V14	Poorva
V7	2016/ FBB VAR7	V15	Harsha
V8	Anu		

The genotypes were distributed into plots of each block of the prepared layout of the experiment. The fifteen genotypes of the experiment were assigned at random into plots of each replication.

The seeds of french bean genotypes V1 to V7 were obtained from AICRP AVT I. The seeds of genotypes V8, V9, V10, V11, V12, V13, V14 and V15 were collected from local market tagged with company labels Amazon, Amazon, East-West International, Namdhari Seeds, Annapurna Seeds, Bioseeds, Kalash and Shriram seeds respectively after proper scrutiny of the labels for date of expiry and other seeds quality standards. Healthy and bold seeds were selected and the sowing of seeds was done on 28th November, 2017. The seeds were sown in straight lines maintaining a spacing of 50 cm row to row and 20 cm plant to plant. A fertilizer dose of 50 kg N, 75 kg P₂O₅ and 50 kg K₂O per ha was applied. Irrigation, thinning, gap filling, weeding, earthing and plant protection measures were followed timely. The observations were recorded on post-harvest quality like N, P, K, Ca, Mg, S, Fe, Mn, Cu, Zn content in Pods. The observations related to yield were recorded as yield per plot and per hectare. For the determination of percent of N, P, K, Ca, Mg, S, Fe, Mn, Cu, Zn Pods, firstly the Pods were kept for sun drying then kept in hot air oven at 600C. The fully dried Pods were grinded through the grinder and by applying the following methods, the percent of N, P and K, Ca, Mg, S, Fe, Mn, Cu, Zn was calculated.

Table 1: Methods of estimation of minerals in plant samples

Sl. No	Element	Method of estimation
1.	Nitrogen	Digestion with digestion mixture followed by Kjeldahl Method
2.	Phosphorus	Digestion with di-acid followed by Spectrophotometer reading
3.	Potassium	Digestion with di-acid followed by Flame Photometer reading
4.	Calcium	Digestion with di-acid followed by EDTA titration
5.	Magnesium	Digestion with di-acid followed by EDTA titration
6.	Sulphur	Digestion with di-acid followed by Spectrophotometer reading
7.	Iron, Manganese, Copper, Zinc	Digestion with di-acid followed by Atomic Absorption Spectrophotometer (AAS) reading

Results and Discussion

Table 2: Nutrient contents in freshly harvested green french bean pods

V. No.	Genotypes	Nitrogen	Phosphorus	Potassium	Calcium	Magnesium	Sulphur	Iron	Manganese	Copper	Zinc
% mg/kg											
1.	2016 FBB VAR 1	0.47	0.06	0.22	0.16	0.15	0.03	160	4.19	1.35	3.14
2	2016 FBB VAR 2	0.41	0.07	0.22	0.44	0.27	0.03	160	2.52	0.68	3.01
3	2016 FBB VAR 3	0.41	0.08	0.31	0.51	0.22	0.04	76.67	4.23	1.17	3.92
4	2016 FBB VAR 4	0.35	0.09	0.27	0.37	0.15	0.04	143.33	6.64	1.04	2.61
5.	2016 FBB VAR 5	0.42	0.11	0.37	0.42	0.26	0.02	116.67	5.03	1.35	3.60
6.	2016 FBB VAR 6	0.45	0.08	0.23	0.34	0.15	0.02	166.67	2.49	0.94	3.78
7.	2016 FBB VAR 7	0.34	0.11	0.22	0.39	0.28	0.03	143.33	4.79	0.87	3.51
8	Anu	0.51	0.07	0.27	0.53	0.31	0.02	160.00	2.56	0.99	2.22
9	Sigma	0.54	0.08	0.29	0.28	0.28	0.02	136.67	3.75	0.97	3.15
10	Vaishnavi 0.47	0.47	0.08	0.25	0.32	0.14	0.03	140.00	5.14	0.83	2.55
11	NS 9700	0.53	0.06	0.14	0.49	0.24	0.02	126.67	3.13 1.	1.24	2.72
12	Falguni	0.45	0.09	0.29	0.36	0.25	0.02	160.00	4.49	0.71	2.46
13	Rani	0.54	0.11	0.31	0.13	0.14	0.02	116.67	3.51	0.68	3.00
14	Poorva	0.44	0.17	0.36	0.18	0.17	0.02	56.67	2.64	0.74	2.42
15	Harsha	0.38	0.22	0.29	0.28	0.24	0.02	136.67	4.54	0.78	2.21
	SE(m)	0.04	0.01	0.03	0.03	0.02	0.00	11.49	0.36	0.10	0.20
	CD (0.05)	0.11	0.02	0.08	0.09	0.05	0.01	33.31	1.04	0.29	0.57
	CV (%)	15.20	13.62	18.69	16.29	13.72	17.05	14.93	15.64	18.11	11.54

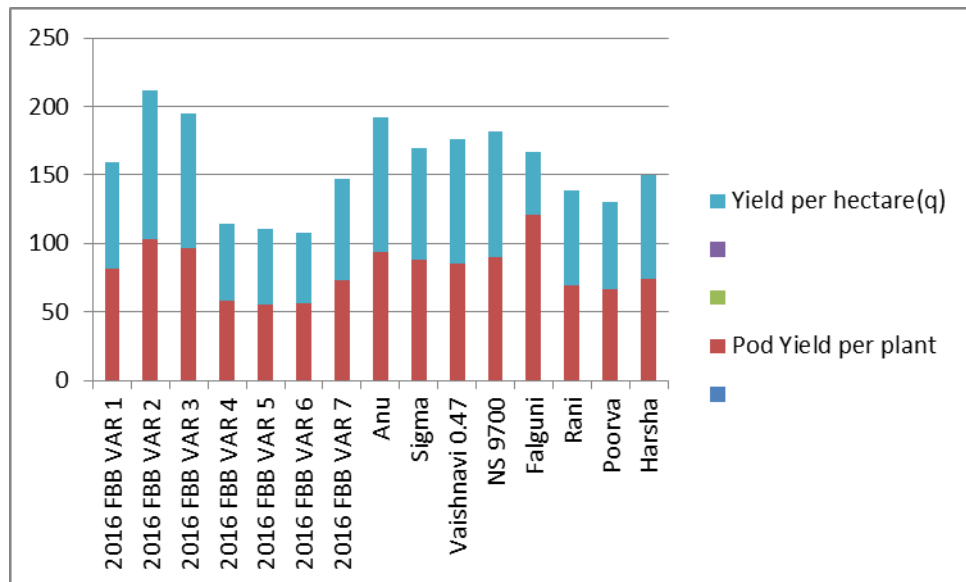


Fig 1: A significant variation was observed for this character presented

Nutrients contents in fresh French bean pods

The highest nitrogen content was found in V9 and V13 (0.54%). Genotypes V1 and V10 (0.47%), V8 (0.51%), V11 (0.53%), V6 and V12 (0.45%) and V14 (0.44%) were statistically at par with V9 and V13. The highest phosphorus content was found in V15 (0.22%) followed by V14 (0.17%). The mean value was shown by and V12 (0.09%). V5 showed the highest potassium content (0.37%) which is statistically at par with V3 (0.31%), V9 (0.29%), V12 (0.29%), V13 (0.31%), V14 (0.36%) and V15 (0.29%). V8 showed highest calcium content (0.53%), statistically at par with V2 (0.44%), V3 (0.51%) and V11 (0.49%). V8 also showed highest Magnesium content (0.31%) which was statistically at par with V2 (0.27%), V5 (0.26%), V7 (0.28%) and V9 (0.28%). V3 and V4 showed highest Sulphur content (0.04%), statistically at par with V1 (0.03%), V2 (0.03%), V7 (0.03%) and V10 (0.03%). V6 exhibited highest Iron content (166.67mg/kg), statistically at par with V1 (160mg/kg), V2 (160mg/kg), V4 (143.3mg/kg), V7 (143.3mg/kg), V8 (160mg/kg), V9 (136.67mg/kg), V10 (140mg/kg), V12 (160mg/kg) and V15 (136.67mg/kg). Highest Manganese content was found in V4 (6.64mg/kg), followed by V10 (5.14mg/kg) with the mean value at 3.98. V1 and V5 exhibited highest values for copper content (1.35mg/kg), statistically at par with V3 (1.17mg/kg) and V11 (1.24mg/kg). V3 (3.92mg/kg) showed highest Zinc content, statistically at par with V5 (3.60mg/kg), V6 (3.78mg/kg) and V7 (3.51mg/kg). In the present investigation, the highest nitrogen content was found in V9 and V13 (0.54%). The highest phosphorus content was found in V15 (0.22%) followed by V14 (0.17%). V5 showed highest potassium content (0.37%). V8 showed highest calcium (0.53%) and magnesium content (0.31%). V3 and V4 showed highest sulphur content (0.04%). V6 exhibited highest iron content (166.67mg/kg). Highest manganese content was found in V4 (6.64mg/kg), followed by V10 (5.14mg/kg). V1 and V5 exhibited highest values for copper content (1.35mg/kg). V3 (3.92mg/kg) showed highest zinc content.

Pod Yield per plant

A significant variation was observed for this character as presented in Figure-1, ranging from 55.27g to 120.96g among 15 genotypes. The maximum value was recorded in V12

(120.96g) which was followed by V2 (103.12g) and V3 (96.64g) while the lowest was recorded from V5 (55.27g).

References

1. Ali M, Kushwaha BL. Cultivation of Rabi Rajmash in Plains, Indian Farming. 1987; 31(2):20-23.
2. Annual Report. Horticulture Statistics Division, Dept. of Agriculture, Cooperation and Farmers' Welfare, GoI, 2017.
3. Panchbhैया A, Singh DK. Genetic diversity and path coefficient analysis for yield and yield related traits in French bean, Vegetable Science. 2015; 42(2):56-64.
4. Rangaswamy R. Analysis of Variance, A Textbook of Agricultural Statistics. New Age international Publishers, New Delhi, 2010, 243-248p.
5. Swarup V. French bean, Vegetable Science and technology in India, Kalyani Publishers, New Delhi, 2014, 479-480p.
6. Saleh SM, Shleel SMA, Hadid AFA. Prediction and adaptation of Dry bean yield under climate change conditions, Research Journal of Agriculture and Biological Sciences. 2012; 8(2):147-153.
7. Sardana V, Dhingra KK, Gill MS, Singh IJ. Production technology of French bean (*Phaseolus vulgaris* L.) cultivation: A review, Agricultural Reviews. 2000; 21(3):141-154.
8. Singh SP. Common bean Improvement in the Twenty-First Century, Springer Publications. Kluwer, Dordrecht, 1999, 225-274p.
9. Sofi PA, Zargar MY, Debouck D, Graner A. Evaluation of Common bean (*Phaseolus vulgaris* L) germplasm under temperate conditions of Kashmir valley, Journal of Phytology. 2011; 3(8):47-52.
10. Yadav BVS. Performance of vegetable french bean (*Phaseolus vulgaris* L.) as influenced by varieties and sowing dates under southern zone of Andhra Pradesh, M.Sc. (Hort.) Thesis. HCRI, Anantharajupet, 2015.