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SHORT COMMUNICATION

EVALUATION OF FABA BEAN GENOTYPES FOR SEED YIELD UNDER HARYANA CONDITIONS

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SUMMARY

Faba bean (*Vicia faba* L.) is an important herbaceous often cross pollinated crop plant, it belongs to family Fabaceae. It is cultivated for food, feed and fodder purposes. The field experiment was conducted in RBD by using 22 newly developed genotypes of Faba bean including checks during r**abi** 2017-18 at Research Farm of MAP Section, Department of Genetics and Plant Breeding, CCS Haryana Agricultural University, Hisar. In the present study, wide genetic variability was observed for plant height (cm), days to maturity, number of branches/plant, pod length (cm), seeds/pod, clusters/plant and seed yield (kg/ha)., except number of seeds/pod. Out of 22 genotypes, the genotype HB-14-20 recorded the highest seed yield (36.52q/ha) followed by HB-14-6 (35.42q/ha), HB-14-4(34.73q/ha), HB-14-32 (35.83 q/ha) and HFB-1(c) 34.44 q/ha) against Vikrant (33.02q/ha). These genotypes have good potential for commercial cultivation, but to be tested over time and space before recommendation for commercial cultivation.

Keywords : Seed yield, contributing characters, faba bean (*Vicia faba* L.), elite genotypes

Faba bean (*Vicia faba* L.) is a partially allogamous crop. The per cent mean cross pollination in this crop has been reported to range from 32 and 40 per cent, however, it belongs to family Fabaceae. The rate of outcrossing depends on the genotype, environmental factors, row space and the number of pollinating insects (Bishnoi *et al*., 2012). It is mainly used as animal feed in advanced countries and food for human consumption in developing countries. Its value as a feed and food crop is due to its high lysine-rich protein, vitamins, minerals, and carbohydrates (Crepon *et al*., 2010), which make it one of the best solutions to the malnutrition, mainly in developing countries of the world. The crop is one of the most efficient atmospheric nitrogen fixers, contributing to soil nitrogen content improvement thus, it is an important component of crop rotations, which is almost neglected in modern cropping system, at a time when there is an urgent need to minimize the impact of chemical fertilizers on the environment, reduce emissions of undesirable grasses and to economize of the following crops.

It is a winter season crop that grows well under cool and moist conditions, whereas, hot and dry weather is unfavorable and could lead to decrease in the seed yield and quality (Flores *et al*., 2012). This crop is considered to be the least drought-resistant legume crop, however, most of the breeding programs are directed toward improving the drought resistance of this crop and accordingly cultivars with high water use efficiency have recently been developed at ICARDA (Subash and Priya, 2012). Despite the huge importance of faba bean as a protein source for humans and animals in ensuring food and nutritional security in context of global population increase and global climate change, its full potential through hybrid breeding remains unexploited largely due to its unique pollination biology and yield instability (Bishnoi *et al.*, 2015). Owing to its different uses, potential of high seed production, balanced and high nutritional quality and ability to grow over a broad range of climatic and soil conditions, faba bean is appropriate for sustainable agriculture in many marginal areas, and the crop has gained greater global attention in recent years. Keeping the above discussion in view, the evaluation of newly developed faba bean elite genotypes was carried out.

To conduct the field experiment, 22 genotypes of faba bean (*V. faba* L.) were grown in RBD during rabi 2017-18 at Research Farm of MAP Section, Department of Genetics and Plant Breeding, CCS Haryana Agricultural University, Hisar located 29°10′ N latitude and 75°46′ E longitude with an elevation of 215.2m above the mean sea level. The plot size was kept 4.0 x 1.2 m^2 with spacing 30 x 10 cm^2. The soil

of experimental site was sandy loam in texture, medium in organic carbon (0.46 %), available nitrogen (141.0 kg/ha), available phosphorus (14.0 kg/ha) and available potassium (240.0 kg/ha). Weekly weather parameters data recorded from research area during 2017-18 given in Fig. 1. Each genotype was planted in six rows of four meter length spacing 30cm apart to each other. All the recommended package of practices were carried out to raise a good crop. Data were recorded on five randomly selected plants for plant height (cm), days to maturity, number of branches/ plant, pod length (cm), seeds/pod, clusters/plant and seed yield (kg/ha). The data were subjected was subjected statistical analysis as per standard procedure.

The analysis of variance revealed the significant differences among the genotypes for the all characters studied, except number of seed/pod, which reflects the presence of genetic variability for these characters. In the present investigation, it was revealed from table 1 that the genotype HB-14-32 was earliest in maturity (136.67days), it was followed by HB-14-43 (138.33days) and HB-14-7 (140.00 days). But, the genotype HB-14-40 was late in maturity, its days to maturity was recorded (146.00days) followed by HB-14-15 (144.00 days) and HB-14-25 (143.67 days). It is evident from the data on plant height (cm) that it ranges from 117.33to 145.00cm. The genotype HB-14-7 was recorded shortest in plant height (117.33 cm) followed by HFB-1(c) (121.67), HB-14-9 (121.89cm) and HB-14-4. Opposite to this, the genotype HB-14-38 was recorded tallest, measured 145.00cm long, followed by HB-14-14 (139.22cm), HB-14-22 (135.33cm) and HB-14-40 (134.67cm). For number of branches/plant, it was observed that the genotype HB-14-32 recorded the maximum mean value (4.56) followed by HB-14-22 (4.44) and HB-14-22 (4.33). However, the genotype HB-14-42 and HFB-1 (Check) recorded minimum value (3.33) followed by HB-14-15 (3.44), HB-14-25(3.44) and HB-14-31, (3.44).

While comparing the pod length of different genotypes of faba bean, it was noticed that HB-14-38 attained the maximum pod length (6.67cm) followed by HB-14-6 (6.56 cm), HB-14-31 (6.44 cm), HB-14-32 (6.44 cm) and HB-14-42 (6.44). On other hand, HB-14-7 achieved the minimum pod length 5.33cm followed by HB-14-22 (5.67cm). In case of number of seeds/pod, it is self evident from Table 1 that low genetic variability was found available in faba bean for this character. It ranges from 3.00 to 4.22. The results on number of pods/plant exhibited wide variability; it ranged from 32.11 to 51.00. The maximum value for this character was recorded for HB-14-17(51.00) followed by HB-14-38(49.33), HB-14-40 (46.89) and HB-14-18 (46.78). Opposite to this, minimum number of pods/plant was recorded in HB-14-25 (32.11) followed by HFB-1 (C) (32.89).

In the present study, wide genetic variability

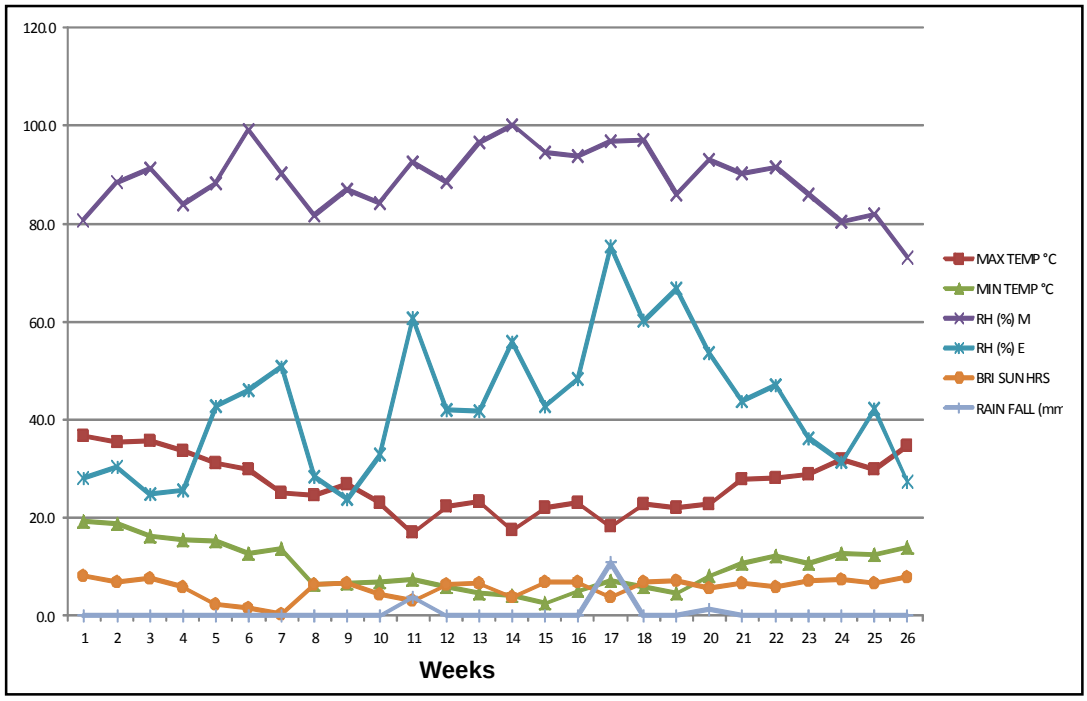

Fig. 1. Weekly weather parameters data recorded from research area during 2017-18.

TABLE 1
Performance of Faba bean genotypes during **Rabi** 2017-18

S. No.	Genotypes	Plant height (cm)	Branches/ plant	Pod length (cm)	Seeds/ pod	Pods/ plant	Clusters/ plant	Days to maturity	Seed yield (q/ha)
1.	HB-14-4	122.56	3.67	6.00	3.22	38.09	16.79	141.00	**34.73**
2.	HB-14-5	127.67	3.39	5.50	3.44	**45.89**	**22.83**	142.00	27.77
3.	HB-14-6	128.22	3.67	**6.56**	3.56	40.78	19.00	141.67	35.42
4.	HB-14-7	117.33	3.56	5.33	3.33	41.22	18.00	**140.00**	28.48
5.	HB-14-9	121.89	3.56	6.11	3.44	37.56	**21.56**	140.67	30.56
6.	HB-14-14	**139.22**	3.72	6.00	**3.67**	43.56	17.44	140.33	34.17
7.	HB-14-15	128.44	3.44	5.89	**3.67**	40.56	18.67	144.00	31.25
8.	HB-14-16	123.11	3.78	6.00	3.33	35.67	18.33	143.67	30.90
9.	HB-14-17	129.00	3.78	5.78	3.00	**51.00**	**35.67**	143.00	26.04
10.	HB-14-18	125.67	**4.33**	6.22	**3.67**	**46.78**	19.89	143.00	34.37
11.	HB-14-20	131.89	3.78	6.22	3.33	44.44	**26.33**	141.67	**36.52**
12.	HB-14-21	131.89	**4.44**	6.00	3.33	43.44	18.67	141.33	30.90
13.	HB-14-22	**135.83**	3.50	5.67	3.50	39.22	19.67	**140.67**	31.94
14.	HB-14-25	128.89	3.44	5.78	3.44	32.11	16.33	143.67	34.37
15.	HB-14-31	**134.44**	3.44	**6.44**	3.56	38.33	18.22	143.33	32.29
16.	HB-14-32	130.22	**4.56**	**6.44**	3.56	43.44	**23.33**	**136.67**	**35.83**
17.	HB-14-38	**145.00**	**4.00**	**6.67**	**3.67**	**49.33**	**20.33**	142.67	30.90
18.	HB-14-40	**134.67**	**4.00**	6.22	3.56	**46.89**	**34.33**	146.00	32.29
19.	HB-14-42	133.56	3.33	**6.44**	3.33	43.89	18.89	143.00	29.85
20.	HB-14-43	127.11	**4.11**	6.00	**3.78**	38.67	19.28	**138.33**	29.52
21.	Vikrant (c)	123.33	3.89	6.00	3.44	36.44	17.33	141.00	33.02
22.	HFB-1(c)	121.67	3.33	6.11	**4.22**	32.89	17.22	142.67	**34.44**
	Mean	129.16	3.76	6.06	3.50	41.37	20.87	141.83	32.12
	Range	117.33-145.00	3.33-4.56	5.33-6.67	3.00-4.22	32.11-51.00	16.33-35.67	136.67-146.00	26.04-36.52

Note : Top five genotypes indicated as bold.

was observed for seed yield (kg/ha), it ranged from 117.33 to 145. Out of 22 genotypes, highest seed yield/ plot was recorded for the genotype HB-14-20 recorded the highest seed yield (36.52q/ha) followed by HB-14-6 (35.42q/ha), HB-14-4(34.73 q/ha), HB-14-32 (35.83 q/ha) and HFB-1(c) (34.44 q/ha) against Vikrant (33.02q/ha). But the genotype HB-14-17 produced lowest seed yield/plot (26.04kg/ha) followed by HB-14-5 (27.77 kg/ha) and HB-14-7 (28.48 kg/ha). Each genotype was different from the others for seed yield and its contributing characters. The seed yield of crop genotypes is the combined reflection of contributing traits, which depends on plant phenology along with environmental conditions. Above finding were supported by Bishnoi *et al*. (2012 & 2015).

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