



“CHARACTERIZATION AND EVALUATION OF MOTH BEAN [*VIGNA ACONITIFOLIA* (JACQ.) MARECHAL] GERMPLASM”

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ABSTRACT

An experiment was carried out to evaluate Forty-Four Moth Bean [*Vigna aconitifolia* (Jacq.) Marechal] Germplasm” genotypes for analysis of quantitative characters. Among the genotypes DHMB-31, DHMB 24, DHMB-30 and DHMB-29 were the top ranking, in terms of yields per plant. The early genotypes were DHMB-16, DHMB-8, DHMB-19, DHMB-10 and DHMB-21 which had observed its average 50% flowering on 43.67,46,46.67,47.33 and 47.33 days respectively, whereas the DHMB-24 , DHMB-29 and DHMB-31 was late in 50% flowering.

Key word: - Characterization, Evaluation, Genotypes, Moth bean

INTRODUCTION

Moth bean [*Vigna aconitifolia* (Jacq.) Marechal] belongs to family: Leguminosae /Fabaceae, sub family: Papilionaceae. It is a self-pollinated diploid ($2n = 2$) crop. Popularly, it is also known as „Mat“, „Matki“ and „Moth bean“ in different regions. Plant is an annual with spreading prostrate habit forming a mat like cover on soil, hence its name as a mat or moth bean. Canopy of moth bean covers surface area which conserves moisture and protects the soil from erosion. Moth bean is mainly used as “Dal” and some other preparations. Green pods are used as vegetables. It can also be used as green fodder for animals.

It is an important crop of dry and semi-arid areas of India and some countries of Asia. Among Kharif pulses, it has maximum capacity to resist drought condition. It is an excellent source of high-quality protein (23.6%) in the diet of low-income group in developing countries. Moth bean is cultivated for food as well as forage. In extremely low rainfall areas, it is grown alone as pure crop, while, in areas receiving adequate rains it may be grown as intercrop with pearl millet, sorghum, cotton, green gram or some other fodder grasses.

India has major area under moth bean cultivated in world. It is also grown in Pakistan, Shrilanka, China, and United States of America (USA). In India moth bean is mainly grown in Rajasthan which contribute about 75% of total area and production of the country. Other important states for cultivation of moth bean are Maharashtra, Gujarat, Jammu & Kashmir and Punjab.

Keeping in view the importance of such crop and its phenotype as well as genetic diversity, the available germplasm was evaluated for economically important traits, phenotypic elaboration and their further utilization in the breeding programmes. Through evaluation of genotypes is needed to know the performance in terms of yield and other yield attributing characters. Based on this, promising genotypes can be evaluated and identified. The genotypes performing well can be put to further use in the breeding programmes as a breeding line. Hence, an experiment was carried out to evaluate twenty-two horse gram genotypes for various phenotypic characters.

MATERIALS AND METHODS

Forty-Four Moth Bean [*Vigna aconitifolia* (Jacq.) *Marechal*] genotypes were evaluated for various characters. The experiment was carried out in Randomized block Design (RBD) with three replications during kharif 2016. Quantitative traits comprised of days to 50% flowering, days to maturity, length of main axis, number of primary branches, number of clusters per plant, number of pods per cluster, pods per plants, pod length, seeds per pod, 100seed weight yield per plant. The averages were analyzed by simple statistical value(s) and data was subjected to analysis of S.D. and variance for each character was calculated (Panse and Sukhatme 1989).

RESULTS AND DISCUSSION

The average performance of all forty-four moth bean genotypes with regard to different agronomic characters was given in Table-1. Among the genotypes, late genotypes, in descending order were DHMB-24 (106), DHMB-29 (106.33days) and DHMB-31 (105.67days). These late genotypes also show the higher yield per plant and it was recorded as 20.15g, 13.82g, 20.64g per plant respectively. This indicates that late flowering genotypes could be used in breeding programme over early maturity genotypes

The genotype MBS-0803 (153.13 cm) was found tall followed by MBS-0828 (152.03 cm), DHMB-7 (151.03 cm) and DHMB-4 (150.27 cm). The genotypes DHMB-16 (11.63 cm) was very dwarf followed by DHMB-6 (14.47 cm), DHMB-13 (14.48 cm) and DHMB-10 (14.67 cm). The population mean for this attribute was 107.44 cm and ranged from 11.63 to 153.13 cm. Among all genotypes twelve (27.27%) were found dwarf than the population mean

The genotypes DHMB-31 (8.78), DHMB-5 (8.10), DHMB-29 (7.85) and DHMB-24 (7.75)

produced maximum number of branches per plant. Out of 44 genotypes tested, only sixteen genotypes (36.37%) produced more number of branches than the populations mean. There was significant co-relation between higher yield and primary braches per plant in the present investigation.

MBS-0835 (58.88), DHMB-5 (57.52), and DHMB-31(56.73) (and DHMB-33 (56.11) produced maximum number of clusters per plant. Only eleven genotypes (25.00 %) produced more number of cluster per plant than population mean. There was significant co-relation between higher yield and primary braches per plant in the present investigation.

The general mean for number of pods per cluster was 1.79 and the variation ranged from 1.21 to 2.62. Only fifteen genotypes (34.10%) exhibited a greater number of pods per cluster.

Among the 44 genotypes, DHMB-30 (145.23) recorded maximum number of pods per plant followed by DHMB-31 (143.53), DHMB-26 (110.68). The variation for this trait ranged between 20.75 to 145.23. Sixteen genotypes recorded significantly higher (36.36%) number of pods per plant over the populations mean.

The variation for pod length character was ranged between 2.99 to 3.83 cm. Maximum pod length was recorded in DHMB-5, DHMB-23 (3.75 cm), DHMB-19 (3.66 cm), and DHMB-1 (3.64 cm).

The genotype DHMB-18 (2.95 g) recorded maximum 100 seed weight. The variation for this character was observed between 1.55 to 2.95 g. Out of all 44 genotypes 12 genotypes (27.27%) recorded significantly high 100 seed weight than population mean of 2.32 g

Seed yield per plant ranged between 1.83 to 20.64 g. Among all 44 genotypes tested, only ten (22.72%) genotypes recorded significantly superior performance than the population mean (6.94g)

Among 44 genotypes studied, the genotype DHMB-31 (number of primary branches and seed yield per plant), DHMB -30 (days to maturity, pods per cluster and number of pods per cluster), DHMB-5 (pod length and number of seeds per plant), DHMB-18 (100 seed weight), MBS-0835 (number of cluster per plant), MBS-0803 (length of main axis), DHMB-24 (days to 50 per cent flowering) showed high performance for the respective characters.

The character viz. days to 50% flowering, plant height (cm), no. of pods /cluster, no. of pods/plants, pod length, 100 seed wt. and yield per plant (g) were exhibited high variance which indicated importance of the accession.

The estimates of Variance were magnitudinally high for seed yield per plant, number of pods per plant, length of main axis, number of primary branches, number of cluster per plant and number of pods per cluster indicating the good scope for their improvement through selection. These results, confirm the findings of Tikka *et al.* (1973); Jindal and Vir (1983) for yield per plant and number of pods per plant; Natrajan *et al.* (1988) for number of pods and Garg *et al.* (2003) for number of pods per plant and seed yield per plant; Bhavsar and Birari (1989) for seed yield per plant and number of branches per plant.

Kumar (1996) observed moderate variation for number of pods per plant, 100 seed weight and days to 50 per cent flowering. Yogeesh *et al.* (2016) reported high variation for plant height, primary branches per plant, secondary branches per plant, 100 seed weight, and pods per plant and seed yield per plant. Viraswamy *et al.* (1973) who observed low magnitude of variation for pod length.

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Table 1. Mean performance of moth bean genotype

Sr. No	Genotypes	Days to 50% flowering	Days to maturity	Length of main axis (cm)	No. of primary branches	No of clusters /plant	No. of pods / cluster	No of pods/ plant	Pod length (cm)	No of seeds / pod	100 seed weight (g)	Seed yield /plant (g)
1	MBS-0835	99.33	148.67	130.78	6.73	58.88	1.62	95.39	3.58	6.67	2.25	10.06
2	MBS-0845	93.33	143.00	148.71	4.37	41.35	1.53	63.73	3.24	6.08	2.04	6.04
3	MBS-0803	91.67	141.67	153.13	3.89	29.70	1.65	49.61	3.26	5.95	2.40	4.76
4	MBS-0847	99.66	149.33	146.27	4.71	25.42	2.41	61.67	3.23	6.21	2.43	6.55
5	MBS-0828	95.33	143.67	152.03	3.97	37.68	1.38	52.53	3.19	6.03	2.15	4.89
6	MBS-0855	94.33	146.67	143.47	5.32	36.96	1.84	68.31	3.18	6.05	2.14	6.35
7	MBS-0853-2	93.00	145.00	145.56	4.77	34.40	1.69	59.97	3.49	6.72	2.14	6.15
8	MBS-0853-1	93.00	143.00	149.15	5.01	38.85	1.75	68.12	2.99	6.13	2.07	6.02
9	MBS-0814	93.67	143.33	149.75	4.37	36.24	1.49	54.21	3.14	6.56	2.29	5.85
10	MBS-0605	98.67	146.67	141.15	5.63	37.32	2.17	81.53	3.56	6.53	2.35	8.39
11	MBS-0851	99.33	144.33	143.06	6.00	38.90	2.23	85.60	3.33	6.29	2.20	8.44
12	MBS-27(C)	98.67	148.67	140.93	5.68	38.23	2.03	76.53	3.25	6.08	2.03	6.80
13	DHMB-1	50.67	104.67	16.15	2.99	15.71	1.32	20.75	3.64	4.67	1.58	1.88
14	DHMB-2	92.33	143.67	144.97	5.81	31.46	1.78	56.73	3.21	5.88	2.13	5.21
15	DHMB-3	98.67	145.33	136.45	5.95	41.13	1.94	78.15	3.44	6.31	2.84	8.71
16	DHMB-4	95.33	148.67	150.27	4.32	31.03	1.57	47.12	3.43	6.59	2.21	4.79
17	DHMB-5	104.67	154.00	137.29	8.10	57.52	1.88	108.17	3.83	6.90	2.56	12.98
18	DHMB-6	50.33	102.67	14.47	2.5	17.65	1.21	21.36	3.38	3.19	2.44	1.83

Table 1 Continued.....

19	DHMB-7	95.67	145.67	151.03	4.6	35.97	1.39	50.97	3.08	6.20	2.13	4.18
20	DHMB-8	46.00	103.67	16.18	3.39	18.68	1.43	26.72	3.51	3.70	1.55	2.12
21	DHMB-9	97.33	147.33	145.12	5.57	39.72	1.95	77.59	3.00	5.84	2.35	7.05
22	DHMB-10	47.33	105.33	14.67	2.87	20.37	1.25	24.47	3.36	3.31	2.03	1.94
23	DHMB-11	54.33	102.00	16.54	2.56	14.78	1.53	22.62	3.45	4.70	2.66	2.17
24	DHMB-12	97.67	148.00	138.66	5.07	33.78	2.25	76.56	3.11	6.19	2.14	7.32
25	DHMB-13	59.67	110.33	14.48	2.71	16.10	1.62	26.38	3.55	4.68	2.52	2.38
26	DHMB-14	96.33	143.67	136.94	5.00	34.59	1.78	65.14	3.24	6.36	2.37	6.86
27	DHMB-15	90.33	139.33	149.80	4.53	33.57	1.43	49.73	3.18	6.45	2.13	4.82
28	DHMB-16	43.67	90.33	11.63	2.49	16.59	1.33	22.06	3.51	4.45	1.98	2.25
29	DHMB-17	98.67	146.33	143.25	5.75	35.89	1.87	67.12	3.30	6.21	2.85	7.63
30	DHMB-18	95.33	144.00	147.03	4.83	25.23	2.14	54.67	3.38	6.09	2.95	5.53
31	DHMB-19	46.67	100.67	14.64	4.50	28.21	1.34	38.87	3.66	4.20	2.29	2.60
32	DHMB-20	97.33	141.67	146.05	5.12	34.00	2.10	67.87	3.38	6.09	2.08	6.63
33	DHMB-21	47.33	103.33	15.09	2.31	24.61	1.23	30.28	3.39	4.24	2.58	6.45
34	DHMB-22	98.00	142.67	143.97	6.05	41.89	1.84	77.58	3.26	5.60	2.23	7.84
35	DHMB-23	51.33	109.33	16.46	4.57	31.30	1.36	42.61	3.75	4.66	2.24	3.04
36	DHMB-24	106.67	155.67	129.56	7.75	54.16	2.59	140.29	3.41	6.63	2.65	20.15
37	DHMB-25	100.67	152.33	137.69	6.37	49.15	2.15	98.31	3.58	6.46	2.34	10.77
38	DHMB-26	102.67	149.33	139.33	6.69	47.41	2.33	110.68	3.28	5.55	2.15	10.95
39	DHMB-27	51.67	103.33	15.16	3.68	23.94	1.36	32.57	3.51	4.31	2.27	3.13
40	DHMB-28	50.67	97.33	15.36	3.09	30.17	1.39	41.85	3.44	4.21	2.19	3.11

Table 1 Continued.....

41	DHMB-29	106.33	153.67	135.37	7.85	45.16	2.39	108.27	3.48	6.37	2.79	13.82
42	DHMB-30	104.67	158.67	122.67	6.50	56.11	2.62	145.23	3.21	6.19	2.76	18.08
43	DHMB-31	105.67	156.33	124.26	8.78	56.73	2.53	143.53	3.51	6.61	2.71	20.64
44	DHMB-32	103.33	150.66	143.21	6.67	47.75	2.42	113.24	3.25	5.38	2.84	12.51
	G. Mean	84.93	135.09	107.44	5.01	35.08	1.79	66.05	3.37	5.67	2.32	6.94
	S.E. ±	0.97	1.49	3.43	0.53	1.94	0.086	3.91	0.10	0.22	0.058	0.565
	C.D. at 5 %	2.72	4.19	9.67	0.57	5.46	0.24	11.01	0.29	0.61	0.16	1.59
	C.V. (%)	1.98	1.91	5.55	7.01	9.27	8.28	10.27	5.29	6.59	4.34	14.08

Table 2. Showing the Best accession performance for different genetic parameters of Moth bean

Genetic Parameter	Range	Accession
Days to 50% flowering	43.67-106.67	DHMB-24 , DHMB-29,and DHMB-31
Days to maturity	90.33-158.67	DHMB-30 , DHMB-29,and DHMB-31
Length of main axis (cm)	11.63-153.13	MBS-0803, MBS-0828, DHMB-7, DHMB4
No. of primary branches	2.31-8.78	DHMB-31, DHMB-5, DHMB-29, DHMB-31
No. of cluster per plant	14.78-58.88	MBS-0803, DHMB-5, DHMB-31
No. of pods per cluster	2.21-2.62	DHMB-30, DHMB-24, DHMB-31
No. of pods per plant	20.75-145.23	DHMB-30, DHMB-31, DHMB-26
Pod length (cm)	2.99-3.83	DHMB-5, DHMB-23, DHMB-19, DHMB-1
No. of seeds per pod	3.19-6.9	DHMB-5,MBS-0853-2, MBS-0835
100 seed weight (g)	1.55-2.95	DHMB-18, DHMB-17, DHMB-32, DHMB-29
Grain yield per plant (g)	1.88-20.64	DHMB-31, DHMB-24, DHMB-30, DHMB-29