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Genetic Variability Study in Muskmelon *(Cucumis melo L.)*

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ABSTRACT: *Twenty two genotypes collected from the Patur and Balapur tehsil of Akola district and were obtained from Department of Horticulture, Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola evaluated in summer season. A wide range of genetic variability was observed for all the characters. GCV and PCV is highest for percentage of fruit set, length of vine at harvest, weight of fruit, rind thickness and yield per plant. High estimate of heritability in broad sense were recorded for length of vine at harvest, internodal length, length of fruit, diameter of fruit, weight of fruit, flesh thickness, TSS, 100 seed weight, yield per plant. Lowest value recorded for days required for appearance of first female flower, percentage of fruit set and number of seeds per fruit. High heritability values with high genetic advance were obtained for length of vine at harvest and weight of fruit.*

Keywords: *GCV, PCV, Genetic variability, Heritability, Genetic advance.*

INTRODUCTION

Muskmelon (*Cucumis melo* L.) is one of the most important cucurbitaceous crop. It is grown as a dessert crop which quench thirst and add to the nutrient content of man's diet whereas non-dessert are used as vegetables. It is a annual crop with climbing, creeping or trailing vines of length upto 3 m. Leaves are deeply or shallowly lobed, flowers solitary, lemon yellow to deep orange colour and fruits many seeded pepo, fleshy. Muskmelon is native of tropical Africa. The fruit is valued for its attractive shape, size, wonderful colour and markings on the rind, taste flavour, colour of flesh and sweetness. The fruit is sweet with musky flavour and hence relished by all peoples. It is supposed to be very wholesome and nutritive.

MATERIAL AND METHODS

Twenty two genotype of muskmelon collected from Patur and Balapur tehsil of Akola district and obtained from University Department of Horticulture, Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola. It was grown in randomized block design with three replication at Main Garden, Department of Horticulture, Dr. PDKV, Akola during summer season. Each genotype is sown in plot size 9 x 1.5 meter with a spacing 1.5 x 0.75 m. in furrow and basin system accommodated twenty four plants per treatment. The observations for twenty two traits were recorded on five randomly selected plants in each treatment and in each replication. The characters studied were length of vine, number of primary branches per vine, number of leaves per vine, leaf area, internodal length, node at which first female flower appears, days required for opening of first female flower, percentage of fruit set, days for first fruit harvest, number of fruits per vine, length of fruit, diameter of fruit, weight of fruit, rind thickness, flesh thickness, Total soluble solids, size of cavity, weight of seeds per fruit, number of seeds per fruit, 100 seed weight, seed per flesh proportion and yield per plant.

The data generated was subjected to analysis of variance suggested by Panse and Sukhatme (1985) and GCV, PCV and h^2 as suggested by Burton (1953) and Johnson et al (1955).

RESULTS & DISCUSSION

The analysis of variance (Table 1) showed highly significant differences among the genotypes for all

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the characters studied. This indicated presence of substantial amount of variability among the genotypes studied for almost all characters. The number of fruits per vine ranged from 1.16 to 2.0, average weight of fruit from 377.6 to 747.3 gm, length of fruit from 9.0 to 13.8 cm; diameter of fruit from 7.10 to 11.6 cm, rind thickness from 0.73 to 1.50 cm, flesh thickness from 1.96 to 3.03 cm and fruit cavity from 70.3 to 160.6 cm^2. Thus indicated wide range of variability for these metric traits. These results confirm the earlier findings of Thakur and Nandapuri (1974), Sidhu and Brar (1978), Chhonkar *et al*. (1979); Vijay (1987).

While looking to estimate of GCV and PCV (Table 2), it was observed that the estimates PCV was higher than the GCV for all the characters, indicating the substantial modifying effect of environment in the expression of the all traits studied.

The highest genotypic coefficient of variation was observed for percentage of fruit set followed by yield per vine. These results confirm the findings of Vijay (1987) for number of fruits per vine, pulp thickness and yield per vine. Whereas highest phenotypic coefficient of variation was found in percentage of fruit set, yield per vine, number of fruits per vine, rind thickness and length of vine at harvest.

The node at which first female flower appears, number of fruits per vine, length of fruit, diameter of fruit, flesh thickness, number of seeds per fruit and 100 seed weight, showed moderate genotypic coefficient of variation suggesting the scope for improvement of these characters by selection.

The GCV and PCV were low for days required for opening of first female flower and days for first fruit harvest. These characters thus offer little scope for improvement by selection. Chhonkar *et al*. (1979) and Somkumar and More (1997) reported similar findings days to harvest. Similar type of finding also confirmed in bottle gourd by Raj Narayan *et al*. (1996).

High heritability was recorded for the character length of vine at harvest (78.64%). Singh *et al.* (1976) and Dhaliwal *et al.* (1996) reported high heritability for maturity, TSS, number of fruits per plant and fruit weight. However, the characters, number of leaves per vine at maturity, internodal length, length of fruit, diameter of fruit, weight of fruit, flesh thickness, total soluble solids, weight of seeds per fruit, 100 seed weight, seed per flesh proportion and yield per plant recorded medium heritability (50.31-64.21%) whereas the remaining characters like number of primary branches per vine at harvest, node at which first female flower appears, days required for opening of first female flower, percentage of fruit set, days for first fruit harvest, number of fruits per vine, rind thickness, size of cavity, number of seeds per fruit were recorded low heritability (22.15- 42.29%). Somkumar *et al.* (1977) reported low heritability for days to first harvest.

The genetic advance in the present study ranged from 0.16 for number of fruits per vine to 112.65 for weight of fruit. High genetic advance for average weight of fruit and yield per vine was also reported by Chhonkar *et al*. (1979) and Dhaliwal *et al*. (1996) in muskmelon.

The low genetic advance for characters viz., number of fruits per vine, number of primary branches per vine, node at which first female flower appears, days required for opening of first female flower, flesh thickness, rind thickness, seed per flesh proportion and yield per plant was observed in the present investigation. Dhaliwal *et al*. (1996) reported low genetic advance for number of fruits per vine and pulp thickness. Somkuwar *et al*. (1997) reported medium genetic advance for F:C ratio, per cent disease

Table 1
Analysis of Variance of Means for Different Characters

Sr. No.	*Name of character*	*Block*	*Varieties*	*Error*
1	Length of vine at harvest (cm)	189.30	1196.36**	99.29
2	Number of primary branches per vine at harvest	0.64*	0.67**	0.21
3	Number of leaves per vine at maturity	88.19	227.58**	43.40
4	Leaf area at maturity (cm^2)	294.00	3459.94**	597.74
5	Internodal length (cm)	0.50	1.85**	0.40
6	Node at which 1st female flower appears	0.14	1.26**	0.52
7	Days required for opening of 1st female flower	0.65	2.25**	1.19
8	Percentage of fruit set	124.30	523.24**	269.14
9	Days to 1st fruit harvest	9.42	19.62**	8.81
10	Number of fruits per vine	0.10	0.19**	0.10
11	Length of fruit (cm)	0.64	4.48**	1.04
12	Diameter of fruit (cm)	2.57	3.39**	0.83
13	Weight of fruit (g)	6701.92	19770.98**	3990.70
14	Rind thickness (cm)	0.009	0.111**	0.039
15	Flesh thickness (cm)	0.087	0.220**	0.083
16	Total soluble solids (%)	1.37	4.09**	0.85
17	Size of cavity (cm^2)	551.65	1156.03**	241.07
18	Weight of seeds per fruit (g)	12.21	25.52**	5.42
19	Number of seeds per fruit	2841.87	9394.80**	4623.02
20	100 seed weight (g)	0.12	0.94**	0.089
21	Seed per flesh proportion (%)	0.171	0.409**	0.196
22	Yield per plant (kg)	0.009	0.109**	0.018

* Significant at 5% level ** Significant at 1% level

Table 2
Range, Mean and Estimates of Genetic Parameters in Muskmelon

Sr. No.	*Name of character*	*Range*	*Mean*	*PCV*	*GCV*	*Heritability (%)*	*EGA*	*EGA over mean (%)*
1	Length of vine at harvest (cm)	80.6-160.2	103.23	20.83	18.52	78.64	34.93	33.83
2	Number of primary branches per vine at harvest	2.7-4.53	3.72	16.30	10.60	42.29	0.52	13.97
3	Number of leaves per vine at maturity	73.5-107.93	84.83	12.06	9.23	58.58	12.35	14.55
4	Leaf area at maturity (cm^2)	171.9-301.6	221.73	17.76	13.93	61.48	49.89	22.50
5	Internodal length (cm)	8.36-12.4	9.54	9.86	7.28	54.53	1.05	11.00
6	Node at which 1st female flower appears	6.5-9.2	7.72	11.37	6.45	32.19	0.58	7.51
7	Days required for opening of 1st female flower	30.3-33.8	31.9	3.90	1.85	22.72	0.58	1.81
8	Percentage of fruit set	9.8-52.7	27.30	68.89	33.70	23.93	9.27	33.95
9	Days to 1st fruit harvest	75.5-85.6	80.58	4.37	2.35	29.03	2.10	2.60
10	Number of fruits per vine	1.16-2.10	1.44	25.11	11.82	22.15	0.16	11.11
11	Length of fruit (cm)	9.0-13.8	11.52	12.85	9.28	52.20	1.59	13.80
12	Diameter of fruit (cm)	7.1-11.6	9.37	13.88	9.85	50.41	1.35	14.40
13	Weight of fruit (g)	377.6-747.3	475.03	20.24	15.26	56.86	112.65	23.71
14	Rind thickness (cm)	0.73-1.50	0.96	26.22	16.20	38.17	0.19	19.79
15	Flesh thickness (cm)	1.96-3.03	2.40	12.07	8.93	54.76	0.33	13.75
16	Total soluble solids (%)	6.0-11.5	7.98	17.43	13.01	55.75	1.59	19.92
17	Size of cavity (cm^2)	70.3-160.6	106.47	23.97	14.92	38.75	20.37	19.13
18	Weight of seeds per fruit (g)	16.2-25.4	20.91	16.64	12.37	55.28	3.96	18.93
19	Number of seeds per fruit	442.6-625.3	548.3	14.37	7.27	25.59	41.56	7.57
20	100 seed weight (g)	3.2-5.3	4.59	11.63	9.31	64.21	3.83	83.44
21	Seed per flesh proportion (%)	3.7-4.9	4.31	7.69	6.13	63.63	0.43	9.97
22	Yield per plant (kg)	0.40-1.13	0.68	32.32	25.56	62.53	0.28	41.17

intensity, yield per plant, number of fruits per plant and fruit weight in muskmelon.

In the present study the highest estimates of heritability coupled with higher genetic advance were obtained for the characters length of vine at harvest and weight of fruit. Evidently, the heritability for these characters was due to additive gene effects and is desirable for effective selection in the breeding programme. Dhaliwal *et al*. (1996) reported high heritability with high genetic advance for fruit weight. Medium heritability coupled with medium or low genetic advance as exhibited by internodal length, length of fruit, diameter of fruit, flesh thickness, TSS, weight of seeds per fruit, 100 seed weight and seed per flesh proportion is attributed to the non-additive gene effects. This indicates that hybridization followed by selection will be effective for genetic improvement of these characters. These results are in agreement with those of Somkuwar *et al*. (1997).

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