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Indigenous Muskmelon Germplasm Assessment and Their Breeding Potential

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ABSTRACT
Ninety four indigenous germplasm of muskmelon (Cucumismelo L., 2n = 2x = 24) along with two checks viz. PusaSharbati and PusaMadhuras were evaluated for their plant architectural and fruit quality traits and reaction to major insect-pests and diseases. Analysis of the data revealed presence of sufficient variability for various characters among the genotypes. For vegetative traits PMM 133, PMM 97-17 and PMM 97-35 were found to be most promising. Fruit quality attributes were best exhibited by PMM 189, PMM 197, PMM 96-20, PMM 97-5, PMM 97-22 and PMM 97-41. All these possessed more than 11.0 % TSS along with other desirable fruit traits. All the fruit quality characters except TSS were significantly and positively correlated with each other, favouring their simultaneous improvement. TSS did not show any significant correlation with any plant or fruit character, suggesting its exclusive improvement without any adverse effect on other traits. Ten genotypes viz. PMM 124, PMM 131, PMM 133, PMM 189, PMM 197, PMM 96-20, PMM 97-5, PMM 97-22, PMM 97-41 and PMM 97-53 were found promising and worth exploiting through appropriate breeding procedures.

I. INTRODUCTION

Muskmelon is a popular and important cucurbitaceous fruit vegetable crop in the tropics and subtropics, due to its sweet taste, pleasant flavour and refreshing effects. The success of crop improvement programme in any crop, including muskmelon, primarily depends on the presence of genetic variability in the available germplasm and its appropriate utilization. Information on the presence of large amount of genetic variability for important traits and degree of association between different characters are of significance in formulating an appropriate breeding strategy aimed at exploiting the inherent variability of the germplasm. While following any breeding method, selection criteria based on fruit traits including quality components and resistance to insect-pests and diseases assume significance as they decide the breeding value of a particular muskmelon genotype. Therefore, the present investigation was undertaken to evaluate 94 indigenous genotypes of muskmelon for fruit quality, plant architecture, reaction to insect pests and diseases and correlation between important traits to select the promising donors and to decide an effective selection strategy.

II. MATERIAL AND METHODS

The study included 94 indigenous germplasm of muskmelon, collected from different towns and markets of Uttar Pradesh and Uttarakhand known for muskmelon and two checks *viz*. PusaSharbati and PusaMadhuras. Each entry consisted of a single row, 3 m long spaced 2 m apart, and the spacing within row was 0.75 m. The seeds were sown in polythene bags in polyhousein February,2019 and transplanted in the open field in March, 2019. Observations were recorded on fruit quality traits, *viz*. weight, volume, polar diameter, equatorial diameter, shape, skin colour, stripe number, stripe colour, flesh thickness, flesh colour, flesh texture. TSS, taste and juiciness; plant architectural traits *viz*. main vine length, number of lateral branches per plant and internodal length; and reaction to major diseases and insect-pests *viz*. downy mildew, Fusariumwilt, red pumpkin beetle and leaf miner. Simple correlation was calculated to work out selection strategy.

III. RESULTSANDDISCUSSION

1. Mean and Variability

A perusal of data of mean values (Table 1) indicated the presence of sufficient variability among the genotypes evaluated. Fruit weight varied from 150g (PMM 165) to 1750 g (PMM 97-49). The other genotypes with high fruit weight were PMM 97-53 (1300 g), PMM 62 (1250 g), PMM 72 (1250 g), PMM 43A (1200 g), PMM 133 (1150 g) PMM 97-15 (1100 g) andPMM 144 (1000 g). Fruit volume varied from 175 cc (PMM 165) to 1775 cc (PMM 97-49). Fruit polar and equatorial diameter, which largely determines the fruit shape and size, also varied greatly.The range of polar diameter was from 9 cm (PMM and 139) to40 cm (PMM 149), and that of equatorial diameter from 15 cm(PMM 97-22) to 46 cm (PMM 97-49 and PMM 97-53). Reddy *et al*., (2017) and Lal and Singh (1997) have also reported such variability with respect to fruit weight and size. There were only three fruit shapes prevailing in the germplasm*viz.* spherical, oval and flat-round, while spherical fruit shape waspredominant.

Table 1: Mean values for different characters of muskmelon genotypes

Sl. No.	Genotype	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
1	PMM 12A	1.75	13	5	2	500	540	14	36	SP	O	12	G	2.2	G	GR	11.0	SW	HJ	40	50	20	40
2	PMM 15A	1 85	7	7	2	1000	1000	18	42	SP	O	A	A	2.0	C	SM	3.5	NS	HJ	30	45	10	0
3	PMM 19A	1 50	12	6	1	300	510	11	23	SP	O	10	G	1.0	C	SM	5.0	NS	HJ	-	-	-	-
4	PMM 31A	1.50	9	4	3	600	510	13	33	SP	Y	8	Y	1.5	Y	GR	5.0	NS	HJ	30	55	10	0
5	PMM 34A	1.75	11	7	2	750	840	17	40	SP	O	10	G	3.0	C	GR	9.0	SW	LJ	35	45	50	50
6	PMM 40A	1.30	5	9	3	300	200	12	29	SP	O	10	G	1.5	O	GR	10.0	SW	HJ	30	40	40	0
7	PMM 43A	2.10	6	7	4	1200	1200	22	43	OV	O	9	G	2.0	O	GR	6.5	SW	HJ	45	40	50	0
8	PMM 44A	2.60	8	10	1	700	500	16	37	SP	O	10	Y	2.5	G	GR	6.0	SW	HJ	45	35	10	20
9	PMM 45A	1.70	15	7	1	400	375	14	30	OV	O	8	G	1.5	O	GR	3.0	SW	HJ	-	-	-	-
10	PMM 52A	2.10	15	10	3	250	150	10	26	SP	O	10	Y	1.0	G	GR	5.0	SW	HJ	30	55	50	60
11	PMM 53A	1.40	11	9	3	300	500	13	29	SP	O	10	G	1.5	C	SM	7.0	NS	HJ	35	50	40	0
12	PMM 56A	1.70	12	7	2	750	800	27	32	SP	O	10	O	1.5	O	SM	7.0	NS	HJ	35	50	0	60
13	PMM 62	2.12	6	6	2	1250	1250	18	40	OV	O	10	G	2.5	O	SM	7.5	NS	HJ	30	40	40	0
14	PMM 65	2.10	15	9	1	200	200'	12	30	SP	O	10	O	1.5	O	SM	7.0	SW	HJ	60	40	0	20
15	PMM 72	2.50	8	4	3	1250	1275	19	44	SP	O	10	G	2.5	LG	GR	7.0	NS	HJ	25	35	0	0
16	PMM 76	1.20	6	11	1	900	980	16	40	OV	Y	10	G	1.5	O	GR	7.0	NS	HJ	-	-	-	-
17	PMM 79	1.35	7	8	2	800	675	20	27	OV	O	12	LG	2.0	Y	GR	6.0	NS	HJ	35	55	10	20
18	PMM 101	1.50	7	8	2	400	350	10	25	SP	O	10	LG	1.5	C	GR	7.5	NS	HJ	45	0	20	40
19	PMM 108	2.50	10	9	1	750	700	18	38	OV	Y	10	O	1.0	Y	GR	5.0	NS	HJ	-	-	-	-
20	PMM 111	1.10	10	12	2	400	450	10	21	OV	Y	A	A	1.0	C	SM	5.0	NS	HJ	-	-	-	-
21	PMM 113	1.50	10	9	2	400	425	10	20	SP	O	10	G	1.0	O	SM	4.0	NS	LJ	-	-	-	-
22	PMM 117	1.90	17	6	3	180	220	10	22	OV	Y	10	W	1.5	O	GR	5.0	NS	LJ	35	60	40	60
23	PMM 124	1.80	8	9	3	450	440	15	33	OV	O	11	G	1.5	LG	SM	5.0	NS	LJ	30	40	0	0
24	PMM 126	2.05	16	7	2	750	600	15	36	FR	O	10	G	2.5	O	SM	1.5	SW	HJ	40	55	40	0
25	PMM 129	1.60	12	6	2	1000	1100	21	33	OV	O	10	O	2.5	O	SM	6.0	NS	HJ	35	25	0	0
26	PMM 130	1.70	7	9	1	275	300	11	26	SP	O	10	O	2.0	C	SM	3.0	NS	LJ	40	65	0	0
27	PMM 131	2.55	13	6	5	450	500	13	31	SP	O	10	G	1.5	O	GR	10.0	SW	HJ	35	45	0	40
28	PMM 133	3.20	16	8	3	1150	1200	19	42	OV	RB	11	G	3.0	O	SM	10.5	SW	HJ	40	25	0	20
29	PMM 137	1.65	11	8	2	550	600	12	30	OV	O	10	O	2.0	C	SM	4.5	NS	LJ	40	35	40	60
30	PMM 139	1.50	7	7	2	250	200	9	24	OV	O	12	G	1.5	C	GR	6.0	NS	LJ	35	30	0	60
31	PMM 142	2.50	15	9	3	600	500	16	33	SP	Y	10	G	2.0	C	SM	3.5	NS	LJ	35	25	0	40
32	PMM 143	1.90	17	6	1	450	425	13	3!	SP	O	11	G	1.5	O	GR	8.0	SW	LJ	-	-	-	-
33	PMM 144	1.90	19	8	1	1100	1220	20	45	SP	Y	10	G	2.5	Y	SM	6.5	SW	LJ	5	30	0	20
34	PMM 146	2.05	13	9	2	750	700	17	37	SP	O	10	G	2.5	C	SM	7.5	SW	HJ	40	60	0	0
35	PMM 147	1.60	9	8	3	250	190	14	25	SP	RB	10	G	1.0	LG	SM	7.0	SW	HJ	-	-	-	-
36	PMM 149	2.10	13	9	1	750	700	40	17	OV	O	9	G	1.0	C	SM	6.0	NS	LJ	-	-	-	-
37	PMM 150	1.80	10	6	1	500	425	15	34	FR	G	10	C	1.5	G	GR	-	NS	LJ	25	45	0	60
38	PMM 152	1.65	12	7	1	500	475	14	34	SP	G	12	W	1.5	LG	SM	9.5	SW	LJ	-	-	-	-
39	PMM 154	1.75	7	9	3	250	440	11	24	FR	Y	-	G	1.0	C	SM	4.0	NS	LJ	35	55	0	60
40	PMM 155	1.00	13	7	1	300	225	13	22	OV	O	10	G	1.5	C	SM	6.0	NS	LJ	35	30	0	80
41	PMM 156	2.00	9	9	1	400	290	11	31	SP	O	10	G	1.5	LG	SM	7.0	SW	LJ	35	35	0	80
42	PMM 157	1.20	7	7	2	250	190	11	24	SP	O	10	G	1.5	O	GR	7.0	SW	HJ	55	65	0	40
43	PMM 160	2.35	12	11	2	400	400	14	25	OV	O	10	G	1.0	C	GR	6.0	NS	LJ	-	-	-	-
44	PMM 161	1.75	14	11	1	250	275	11	25	SP	G	10		1.0	O	SM	9.0	SW	HJ	-	-	-	-
45	PMM 162	1.85	12	8	1	600	700	16	34	SP	O	11	G	2.0	O	GR	6.0	NS	HJ	40	60	0	50
47	PMM 163	1.55	8	8	3	250	220	11	25	SP	O	10	G	1.0	C	SM	7.0	SW	HJ	35	75	0	60
48	PMM 164	2.00	12	5	4	300	280	14	27	PV	O	10	G	1.5	G	GR	5.0	NS	HJ	-	-	-	-
48	PMM 165	2.45	20	9	2	150	275	10	21	SP	O	10	G	1.0	O	GR	10.0	SW	HJ	45	55	0	0
49	PMM 166	2.10	13	6	3	500	500	13	31	SP	O	10	G	2.0	G	GR	9.5	SW	HJ	15	35	0	40

50	PMM 168	2.10	20	5	2	700	625	11	38	OV	Y	10	Y	2.0	Y	GR	5.0	NS	HJ	35	40	0	60
51	PMM 169	1.75	19	5	1	300	275	12	25	OV	Y	10	G	1.5	O	SM	5.0	NS	HJ	35	55	0	20
52	PMM 171	2.10	13	4	2	200	250	10	21	OV	G	10	G	1.0	Y	GR	6.5	NS	HJ	35	35	0	20
53	PMM 172	2.10	15	10	1	750	750	17	38	SP	G	10	O	2.0	LG	GR	8.0	SW	HJ	-	-	-	-
54	PMM 173	1.85	11	14	2	600	625	14	35	SP	O	10	G	1.5	O	SM	10.0	SW	HJ	-	-	-	-
55	PMM 174	2.10	20	7	1	500	550	15	30	OV	O	11	G	1.5	O	SM	7.0	NS	HJ	45	40	0	50
56	PMM 176	1.70	5	8	1	400	450	15	24	OV	G	10	G	1.0	C	GR	6.5	NS	HJ	25	45	40	0
57	PMM 178	1.00	8	9	3	500	350	13	27	SP	O	10	O	1.5	C	SM	5.5	NS	HJ	35	55	0	0
58	PMM 180	1.70	14	8	2	500	280	14	23	FR	O	10	G	1.0	G	SM	5.0	NS	HJ	-	-	-	-
59	PMM 181	1.35	13	9	2	450	425	13	31	SP	O	12	G	1.5	O	GR	4.0	NS	HJ	-	-	-	-
60	PMM 183	2.85	16	5	2	400	320	13	29	OV	O	10	W	2.0	C	SM	5.0	NS	LJ	30	35	0	40
61	PMM 184	1.80	12	7	1	400	200	13	27	SP	O	10	G	2.0	C	SM	5.0	NS	HJ	40	45	0	40
62	PMM 185	2.10	14	12	1	300	325	12	29	SP	O	10	G	1.5	O	GR	6.0	NS	HJ	-	-	-	-
63	PMM 188	1.65	19	11	2	350	340	13	30	FR	O	9	G	1.5	C	SM	4.0	NS	HJ	35	45	0	33
64	PMM 189	2.30	9	6	3	450	510	12	25	SP	O	9	LG	2.0	C	SM	11.5	SW	HJ	30	55	0	50
65	PMM 190	1.50	7	5	1	475	400	15	32	SP	O	10	G	2.0	C	SM	5.0	NS	HJ	40	45	0	100
66	PMM 191	1.20	7	9	1	200	190	10	25	FR	Y	9	G	1.0	O	GR	8.0	SW	HJ	40	45	0	0
67	PMM 192	1.20	8	5	T	500	600	11	25	OV	O	10	O	2.0	C	SM	3.5	NS	HJ	35	40	0	80
68	PMM 193	1.25	7	8	2	600	540	13	31	SP	O	10	G	2.0	C	GR	5.0	NS	HJ	60	35	20	0
69	PMM 197	2.90	10	7	2	600	600	15	32	SP	O	8	G	2.5	O	SM	12.0	SW	HJ	40	35	0	40
70	PMM 198	1.95	10	6	3	600	675	13	33	FR	O	10	G	2.0	O	SM	6.0	SW	HJ	35	45	0	100
71	PMM 199	1.75	11	7	1	300	200	11	28	OV	O	9	G	2.0	G	SM	7.5	NS	HJ	40	35	0	40
72	PMM 96-17	2.35	17	7	2	600	400	15	37	FR	O	10	G	2.0	O	GR	4.0	NS	LJ	55	35	15	0
73	PMM 96-20	1.90	7	9	2	450	475	13	32	SP	RB	10	G	2.0	LG	GR	11.0	SW	LJ	40	0	10	20
74	PMM 96-80	1.60	7	9	3	400	350	14	30	SP	O	10	Y	1.5	O	GR	9.5	SW	HJ	35	45	10	50
75	PMM 97-5	2.10	12	7	3	400	450	11	29	SP	RB	10	Y	1.5	G	GR	12.0	SW	HJ	-	-	-	-
76	PMM 97-15	2.20	12	5	1	1100	1230	20	45	SP	O	10	G	2.5	G	GR	9.0	NS	LJ	35	25	5	0
77	PMM 97-22	2.10	1 1	12	2	400	425	11	15	S P	Y	10	G	1.5	O	GR	12.0	SW	LJ	30	55	20	20
78	PMM 97-23	2.10	20	12	3	600	700	19	35	OV	O	12	G	2.0	O	GR	8.0	NS	HJ	30	40	20	50
79	PMM 97-21	1.20	6	7	1	400	490	11	29	SP	O	10	G	1.5	O	SM	6.0	SW	HJ	35	40	40	100
80	PMM 97-25	1.50	1 1	7	2	250	110	12	28	SP	R	12	G	1.5	Y	SM	7.0	SW	HJ	-	-	5	20
81	PMM 97-28	1.80	5	5	2	500	500	14	31	SP	O	A	A	2.0	O	SM	7.0	SW	HJ	38	45	0	80
82	PMM 97-35	3.10	21	8	2	800	775	15	39	SP	O	10	G	2.0	G	GR	6.5	SW	LJ	30	55	10	0
83	PMM 97-41	1.50	11	9	2	600	650	15	36	OV	RB	10	G	2.0	O	GR	11.5	SW	W	30	30	50	0
84	PMM 97-49	1.80	13	7	3	1750	1775	25	46	OV	O	10	Y	2.5	O	GR	4.0	NS	LJ	30	30	5	0
85	PMM 97-53	2.10	9	5	2	1300	1300	20	46	SP	Y	12	G	2.5	O	GR	10.0	SW	LJ	35	30	0	20
86	PMM 97-54	1.60	9	7	3	600	600	15	34	SP	O	10	O	2.0	C	GR	4.0	NS	HJ	35	50	40	0
87	PMM 97-85	1.10	11	11	2	600	440	13	38	SP	O	10	G	2.0	O	GR	6.5	SW	HJ	35	35	40	20
88	PMM 97-101	1.10	10	8	5	150	850	14	32	SP	O	10	G	1.5	G	GR	7.0	NS	LJ	40	45	0	0
89	PMM 99-1	2.00	5	8	5	600	570	15	34	SP	O	10	W	2.0	C	GR	9.0	SW	HJ	35	55	40	50
90	PMM 99-3	1.10	9	4	4	0	475	14	32	SP	O	12	G	1.5	O	GR	8.0	SW	HJ	-	-	10	20
91	PMM 2000-14	1.50	9	8	2	400	250	12	31	SP	W	10	G	1.5	O	GR	6.0	NS	HJ	35	30	20	50
92	PMM 2000-17	1.15	7	5	1	750	700	17	43	OV	O	10	L	2.2	LG	GR	6.0	NS	HJ	40	55	0	60
93	PMM 2000-18	2.10	7	5	2	1000	1150	19	45	SP	O	10	G	2.0	G	GR	8.5	SW	HJ	30	35	20	40
94	PMM 2000-19	1.95	6	6	4	700	610	15	36	SP	O	10	G	2.5	C	SM	7.5	SW	LJ	30	50	25	60
95	PusaSharbati	2.15	7	8	2	600	450	16	35	SP	O	12	Y	2.0	O	GR	7.5	SW	HJ	30	35	0	0
96	PusaMadhuras	2.35	12	8	2	600	475	13	29	SP	O	10	O	2.0	O	SM	8.0	SW	HJ	25	35	15	40

Abbreviations used :

1. Main vine length (m);

2. Number of lateral branches

3.Inter nodal length (cm);

4. No. of fruits per plant;

5. Fruit weight (g);

6. Fruit volume (cc);
7.Fruit polar diameter (cm);
8.Fruit equatorial diameter (cm)
9. Fruit shape;
10. Skin colour;
11.Number of strips;
12. Colour of strips;
13. Flesh thickness (cm);
14. Flesh colour;
15. Flesh texture;
16. T.S.S. (%);
17. Taste;
18. Juiciness;
19. Red pumpkin beetle infestation (%)
20. Leaf miner infestation (%)
21. Downey mildew (%)
22.Fusarium wilt (%)

OV : Oval	SP : Spherical	FR : Flat Round	O : Orange	RB : Reddish brown	Y : Yellow
G : Greenish	Y : Light yellow	LG : Light green	G : Green	W : White	C : Cream
SM: Smooth	GR : Granular	SW : Sweet	NS : Not sweet	LJ : Low juicy	HJ : High juicy
A : Absent					

Fruit skin colour and presence/absence of stripes contribute to the attractiveness of the fruit. Skin colour varied from dark orange to creamy white. In between, there were orange, yellowish and light green colours also. Green coloured stripes were present on fruits of most of the genotypes. Mostly they were 10 in number however, 9 and 12 stripes were also present occasionally. Some fruits were devoid of stripes. Similar kind of result has been reported by Singh and Dhillon (2006) and Ram *et al*., (1996).

Fruit flesh characters are very important from consumer's point of view. Thick, juicy, smooth and orange coloured flesh is most desirable. The flesh thickness varied from 1.0 cm (PMM 19A, PMM 147, PMM 165 and PMM 191) to 3.0 cm (PMM 34 and PMM 133). Only two kinds of flesh texture *viz.* granular and smooth and juiciness *viz.* low juicy and high juicy were observed. Many types of flesh colour, however, were observed. These were creamy, yellowish, orange (most common), greenish white and green. These results were in close agreement with those of Bhimappa*et al*., (2018); Reddy *et al*., (2012) and Ram *et al*., (1996).

Total soluble solids (TSS) is the most important criterion of muskmelon fruit quality as it is directly related to the sweetness of the fruit. In the present investigation the TSS varying from 3.5% (PMM 192) to 12.0 % (PMM 197, PMM 97-5 and PMM 97-22) was observed. The range is in agreement with those reported by Ansari *et al*., (2020) and Lal and Singh (1997). Singh and Dhillon (2006) and Choudhary*et al*., (2010) specified that muskmelon fruits only with TSS more than 10% are considered commercially acceptable. Other genotypes with high TSS were PMM 97-41 (11.5%), PMM 189 (11.5%), PMM 96-20 (11.0%) PMM 97-53 (10.0%) and PMM 165 (10.0%).

Plant architectural traits *viz.* main vine length, number of lateral branches and internodal length varied greatly. The range for main vine length was from 1.0 m (PMM 155) to 3.2 m (PMM 133), and that for number of lateral branches from 5 (PMM 40A, PMM 176, PMM 97-28 and PMM 99-1) to 21 (PMM 97-35). Four genotypes had 20 lateral branches per plant namely, PMM 165, PMM 168, PMM 174 and PMM 97-23. Similar results have also been reported by Ansari*et al*., (2020); Bhimappa*et al*., (2018) and Ram *et al*., (1997). Longer vines with more number of lateral branches are more desirable as the lateral branches bear more fruits than the main shoot in cucurbits (Whitaker and Davis, 1962). Internodal length varied from 4.0 cm to 9.0 cm.

Reaction of the genotypes against insect-pests and diseases was also studied. More or less all the genotypesweremoderately infested from red pumpkin beetle at the seedling stage. The most affected one was PMM65 and PMM 193 (60% each) closely followed by PMM 96-17 and PMM 157 (55% each). This result was in agreement with Nath (1964). Genotypes least affected from red pumpkin beetle were PMM 144 (5%), PMM 166 (15%), PMM 72 and PMM 150 (25% each). Leaf miner infestation occurred epidemically at the later stage of the crop period affecting almost all the genotypes. Only two genotypes namely PMM 101 and PMM 96-20 were found to be highly resistant (0%), while the most affected genotype was PMM 130 (65%). However, incidence of fruit fly and white fly was almost absent. In diseases, downy mildew affected the crop to some extent (5 to 50%) while several genotypes remained resistant to it. Incidentally, there was no powdery mildew infection at all in the field. The incidence of downy mildew increases with cool weather and high humidity. As there was heavy and frequent rain during the cropping period, this might be the reason of outbreak of downy mildew. Fusarium wilt, however, affected the crop, killing the plant altogether. A good number of genotypes were found to be highly resistant to wilt. The top 5 genotypes for each character are listed in Table 2.

Table 2: Best five genotypes of muskmelon for each character

Character	Promising genotype
Main vine length (m)	PMM-133, PMM 97-35, PMM-183, PMM-44A, PMM-131
Number of primary branches per plant	PMM-97-35, PMM-97-23, PMM-166, PMM-197, PMM-188
Internodal length (cm)	PMM-99-3, PMM-3 IA, PM M-72, PMM-171, PMM-2000-18
Number of fruits per plant	PMM-97-101, PMM-131, PMM-99-l, PMM-99-3, PMM-2000-19
Fruit weight (g)	PMM-97-49, PMM-97-53, PMM-97-54, PMM-43A, PMM-133
Fruit volume (cc)	PMM-97-49, PMM-97-53, PMM-97-54, PMM-43A, PMM-133
Fruit polar diameter (cm)	PMM-149, PMM-56A, PMM-97-49, PMM-43A, PMM-129
Fruit equatorial diameter (cm)	PMM-97-49, PMM-97-15, PMM-2000-18, PMM-144, PMM-72
Flesh thickness (cm)	PMM-34, PMM-133, PMM.97-49, PMM-97-15, PMM-97-14
TSS (%)	PMM-97-5, PMM-97-22, PMM-197, PMM-97-41, PMM-189
Downy mildew (%)	PMM-2000-17, PMM-56A, PMM-97-53, PMM-72, PMM-97-101
Wilt (%)	PMM-31A, PMM-97-49, PMM-53A, PMM-97-35, PMM-40
Leaf miner (%)	PMM-101, PMM-96-20, PMM-96-17, PMM-129, PMM-142
Red pumpkin beetle (%)	PMM-144, PMM-166, PMM-52A, PMM-72, PMM-150

Table 3 : Simple correlation between different plant and fruit characters in muskmelon based on 96 genotypes

	2. Number of lateralbranches per plant	3. Internodal length (cm)	4. Number of fruits per plant	5. Fruitweight (g)	6. Fruit volume (cc)	7. Fruit polar diameter (cm)	8. Fruit equatorial diameter (cm)	9. Flesh thickness (cm)	10. T.S.S. (%)
1. Main vine length (m)	0.435*	-0.019	0.06	0.310*	0.246*	0.247*	0.286*	0.323*	0.1 10
2. No. of lateral branches		0.084*	0.152	-0.033	-0.019	0.039	-0.004	0.014	-0.114
3. Inter nodal length (cm)			-0.084	-0.200*	-0. 186	-0.074	-0.209*	-0.289*	0.081
4. Number of fruits per plant				-0.048	-0.099	-0.004	-0.087	0.032	0.145
5. Fruit weight (g)					0.931*	0.695*	0.801*	0.680 *	-0.001
6. Fruit volume (cc)						0.668*	0.764*	0.607*	0.017
7. Fruit polar diameter (cm)							0 .428*	0.405*	-0.005
8. Fruit equatorial diameter (cm)								0.697*	0.063
9. Flesh thickness (cm)									0.13
10. T.S.S. (%)									

* : Significant at 0.05 level of significance

2. Correlations

Asimplecorrelationanalysisbetween different plant andfruit characterswasdone(Table3).A perusal ofTable 3indicated that there was significant correlation of main vine length with intermodal length, fruit weight, fruit volume, fruit polar and equatorial diameter and flesh thickness. The number of lateral branches,however,didnothave anysignificant correlation with any with character, even with number of fruits per plant. The above results corroborates with that of Bhimappa*et al*., (2018); Choudhary*et al*., (2010) and Singh and Dhillon (2006). As the crop was affected by heavy rains coupled heavy infestation with leaf-miner, these resulted in poor fruit setting and thus yield. This could have been one of the reasons for the unusual non-significant association of number fruits per plant with number of lateral branches per plant. The intermodal length showed significant negative correlation with fruit diameter and flesh thickness,whilewith rest of the characters it did not have any significant correlation. The number of fruits per plant exhibited, though, negative but non-significant correlation with fruit weight and size. Similar non-significant correlation between number of fruits and weight have been reported by Ansari *et al*., (2020) and Choudhary*et al*., (2010).The poorfruit yield per plant may be one of the reasons for this. In the present study all the quality traits of fruits *viz.* weight, volume, polar diameter equatorial diameter and flesh thickness had highly significant and positive correlation coefficients with each other. This indicated that selection for combinations of several fruit traits would be effective. However, TSS, the deciding factor of any muskmelon fruit quality was found to be non-significantly correlated with all the traits. This kind of non-significant correlation has also been reported by Reddy *et al*., (2017); Singh and Dhillon (2006) and Ram e*t al*., (1996). This indicated that improvement in TSS content should be possible without affecting other traits.

IV. CONCLUSION

On the basis of *per se* performance and correlation studies it was concluded that 10 muskmelon accessions namely PMM 12A, PMM 131, PMM 133, PMM 189, PMM 197, PMM 96-20, PMM 97-5, PMM 97-22, PMM97-41 and PMM 97-53 were found to be promising and worth exploiting through inbreeding and selection and/or to be used in F_1 hybrid breeding programmes.

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