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Short Communication

Heterosis for yield and yield related attributes in muskmelon (*Cucumis melo* L.)

B. R. Choudhary, R. S. Dhaka and M. S. Fageria

Department of Horticulture, S.K.N. College of Agriculture, R.A.U., Jobner 303 329

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The scope for exploitation of hybrid vigour in any crop largely depends on the direction and magnitude of heterosis and ease with which hybrid seed can be produced. Inspite of wide range of genetic variability available in muskmelon (*Cucumis melo* L.), very little attention has been given to exploit it. Information obtained from limited crossing studies indicated that F_1 hybrids yield more than the standard cultivars [1-4]. Therefore, the study reported here was designed to gather information on the extent of heterosis for desirable attributes.

Eight genetically diverse inbred lines *viz.*, MS_1, RM-43, MHY-3, Punjab Sunehri, Jobner Local, Hara Madhu, Tonk Local and Durgapura Madhu were crossed in a dialiel fashion excluding reciprocals. The resultant 28 F_1's along with eight parental lines were grown in a randomized block design with three replications during summer season of 2001. Heterosis was determined as per the method given [5].

The cross MS_1 × Tonk Local exhibited significant increase in fruit weight (30.16 per cent) over better parent (Table 1). It was significantly higher in ten crosses compared to standard check. The higher heterosis for number of fruits per plant (15.96 per cent) was noticed in the cross Hara Madhu × Tonk Local over better parent and standard check. Significant heterosis for yield was observed in the crosses MS_1 × Hara Madhu (44.44 per cent), Jobner Local × Durgapura Madhu (38.65 per cent) and Hara Madhu × Durgapura Madhu (35.90 per cent) over better parent. High magnitude of heterosis for yield was attributed to the increased number of fruits and weight of fruit. The crosses which showed higher per cent of heterosis for yield was also had high degree of heterosis for number of fruits and weight of fruit. These crosses were derived from the parents having low × low and high × low mean values, which may be due to additive and dominance gene actions, respectively. These findings are quite similar to those of More and Seshadri [2] and Munshi and Verma [4]. Heterosis has also been observed for main shoot length, number of vines per plant, flowering attributes and harvest duration. In general, the crosses showing heterosis for day to flowering also manifested heterosis for days to fruit maturity and yield. The yield had positive and significant association with fruit weight, number of fruits per plant, number of vines per plant, harvest duration, rind thickness, shelf-life and main shoot length.

Path analysis revealed that fruit weight, number of fruits per plant, incidence of fruit fly, severity of powdery mildew, rind thickness, shelf-life and days taken to first fruit harvest exerted positive direct effect on yield. The present results are in conformity with the findings of Somkuwar *et al.* [6]. Considering the correlation and path analysis, it was observed that fruit weight and number of fruits per plant is the important fruit yield determiners. None of the crosses showed considerable heterosis for seed cavity and flesh thickness. Cross MS_1 × Punjab Sunehri showed high heterobeltiosis (23.53 per cent) for rind thickness. Similar findings have also been reported earlier [3].

The range of heterosis for total soluble solids varied from −11.14 to 16.24 and −12.43 to 2.28 per cent over better parent and standard check, respectively. Most of the experimental F_1's did not reveal positive heterosis over the better parent confirming that the character was primarily under the control of additive gene [7]. Out of 28 experimental F_1's, eighteen and seventeen crosses revealed significantly longer shelf-life over better parent and standard check, respectively. Foster [1] also reported good amount of heterosis for both the traits. Sixteen and seventeen F_1's exhibited significantly negative (desirable) standard heterosis for severity of downy mildew and powdery mildew, respectively. However, none of the crosses showed significant negative heterobeltiosis. The heterobeltiotic effects for incidence of fruit fly ranged from −23.09 to 4.11 per cent being the lowest in Jobner Local ×

Table 1. Performance of two superior F_1's (for each observation) selected out of 28 crosses in muskmelon

Crosses	Heterosis per cent over		Hybrid mean	CD at 5%
	Better parent	Standard check		
Main shoot length (m)				
MHY-3 × Jobner Local	23.15*	11.62*	2.2	1.16
MS1 × Durgapura Madhu	22.22*			
No. of vines per plant				
MS1 × Hara Madhu	16.35*	14.48*	4.3	0.32
Jobner Local × Tonk Local	15.67*	-6.67	3.5	
Days to first female flower				
Jobner Local × Tonk Local	-8.47*	-1.58	41.8	0.72
Jobner Local × Hara Madbu	-7.06*	-2.68*	41.3	
Days to first harvest				
MS_1 × Hara Madhu	-7.67*	-10.67*	74.7	1.38
Hara Madhu × Tonk Local	-6.95*	-0.80	83.0	
Av. wt. of first three harvested fruits (kg)				
MS_1 × Tonk Local	30.16*	12.33*	0.8	0.05
MS_1 × Hara Madhu	27.42*	8.22*	0.8	
Number of marketable fruits/plant				
Hara Madhu × Tonk Local	15.96*	15.96*	2.5	0.24
MS_1 × Hara Madhu	13.90*	0.00	2.1	
Fruit yield/plant (kg)				
MS_1 × Hara Madhu	44.44*	9.03	1.7	0.22
Jobner Local × Durgapura Madhu	38.65*	6.45	1.6	
Harvest duration (days)				
Punjab Sunchri × Durgapura Madhu	20.81*	14.55*	27.87	1.67
MHY-3 × Tonk Local	17.54*	8.22*	26.33	
Size of seed cavity (cm)				
RM-43 × Jobner Local	-11.95	-3.45	5.60	NS
Jobner Local × Tonk Local	-10.61	-1.21	5.73	
Rind thickness (cm)				
MS1 × Punjab Sunehri	23.53*	18.87*	0.63	0.06
Punjab Sunehri × Hara Madhu	19.61*	15.09*	0.61	
Flesh thickness (cm)				
MS_1 × Durgapura Madhu	20.33	7.81	9.0	NS
MHY-3 × Durgapura Madhu	17.37	2.97	2.77	
Total soluble solids (%)				
Punjab Sunehri × Tonk Local	16.24*	-3.15	12.31	0.52
Punjab Sunehri × Jobner Local	14.35*	-4.72*	12.11	
Shelf-life (days)				
MS_1 × Punjab Sunehri	20.27*	14.59*	2.67	0.20
MS_1 × Jobner Local	17.65*	28.75	3.00	
Severity of downy mildew (%)				
MS_1 × Durgapura Madhu	-4.87	-27.51	24.79	2.17
RM-43 × Punjab Sunehri	-4.87	-31.46*	23.44	
Severity of powdery mildew (%)				
MS_1 × Durgapura Madhu	-5.68	-28.67*	26.75	2.35
RM-43 × MHY-3	2.00	-53.87*	17.30	
Incidence of fruit fly (%)				
Jobner Local × Durgapura Madhu	-23.09*	-21.01*	38.57	3.68
RM-43 × Jobner Local	-20.26*	-18.10*	39.99	

Significant at 5% level. NS = Non-significant.

Durgapura Madhu and the highest in Hara Madhu × Durgapura Madhu. The magnitude of heterosis was found to be high for most of the characters studied in the crosses MS_1 × Punjab Sunehri, Jobner Local × Durgapura Madhu and Jobner Local × Hara Madhu.

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