

INTER-ASSOCIATION OF CHARACTERS IN WATERMELON

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Six inbred parental genotypes and their 30 F₁ hybrid (direct and reciprocals) combinations were used to elicit the information on inter-relationship between 10 yield determining characters and their association with fruit yield during summer 1988. Fruit yield/vine showed significant positive correlation with average fruit weight, number of fruits/vine, harvest index, number of seeds/fruit and LAI on 60th day of sowing.

Correlation studies are of considerable importance especially in selection and breeding for high yielding varieties of crop plants. Certain characters may be strongly associated with yield and selection based on these components may be desirable to bring out rational improvement in yield. It is thus accepted that a study on character association is indispensable.

MATERIALS AND METHODS

A total number of thirty F₁ crosses obtained from six inbred parental genotypes of watermelon representing a wide geographical diversity were raised in a randomized block design replicated twice during summer (March-June) 1988 at College of Horticulture, Coimbatore. A spacing of 2.5 m between tow rows of furrows and the intra-row spacing of 0.90 m were adopted. Five plants in each cross combination per replication were selected for recording observation on days to first female flowering, average fruit weight, flesh-seed ratio, number of fruits/vine, number of seeds/fruit, leaf area index (LAI) at 30th and 60th day of sowing, net assimilation rate (NAR), relative growth rate (RGR) and harvest index (HI). Recommended horticultural practices and plant protection measures were followed in the experimental field (TNAU, 1985). The phenotypic and genotypic correlations coefficient were computed as per the method suggested by Johnson *et al.* (1955a, b).

RESULTS AND DISCUSSION

Parameters on phenotypic and genotypic correlation coefficients between yield and various yield components and inter-relationships among the traits are furnished in Table 1. The magnitude of genotypic correlation coefficients was invariably higher than that of phenotypic correlation coefficients for all the characters indicating that there was a strong inherent association between various characters studied. These findings are in agreement with earlier reports by Johnson (1955b), Swarup and Changale (1962), Nishi and Kurigama (1963) and Nath and Saini (1980). In the present study, high degree of positive association at phenotypic and genotypic levels existed between fruit yield and other traits like average fruit weight, number of fruits/vine, harvest index, number of seeds/fruit and LAI on 60th day of sowing. The 'r' values were significant and ranged from 0.693 to 0.983. These results are in line with the findings of Thakur *et al.* (1981), Sidhu and Brar (1981), Swamy *et al.* (1984), Haribabu (1985) and Prudek (1986). A strong negative relationship at phenotypic and genotypic levels between yield and the period taken for the appearance of female flower ($r = -0.571$) was observed. The phenotypic and genotypic levels of correlations between flesh-seed ratio, LAI on 30th day, NAR and RGR were not significant.

Regarding the inter-association of various yield components at phenotypic and

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Table I. Genotypic (upper right) and phenotypic (lower left) correlation matrix between eleven attributes

	Yield per vine	Average fruit weight	No. of fruits per vine	Days to first female flowering	Flesh seed ratio	No. of seeds per fruit	LAI at 30th day	LAI at 60th day	NAR	RGR	Harvest index
Seed per vine	-	0.983**	0.925**	-0.571**	0.269	0.704**	0.102	0.693**	-0.048	-0.139	0.826**
Average fruit weight	0.931**	-	0.959**	-0.611**	0.374*	0.763**	0.121	0.652**	-0.027	-0.073	0.874**
No. of fruits per vine	0.815**	0.656**	-	-0.378*	0.164	0.693**	0.007	0.686**	0.049	-0.267	0.855**
Days to first female flowering	-0.436**	-0.395*	-0.377*	-	0.440**	-0.476**	-0.128	-0.606**	0.005	0.227	-0.597**
Flesh-seed ratio	0.258	0.347*	0.169	-0.320	-	0.009	0.357*	0.173	0.023	-0.187	0.332*
Number of seeds per fruit	0.649**	0.736**	0.428**	-0.276	-0.320	-	0.220	0.503**	0.111	0.106	-0.695**
Leaf area index 30th day of sowing	0.079	0.111	-0.032	-0.107	0.280	-0.032	-	-0.213	-0.359*	-0.096	0.044
Leaf area index at 60th day of sowing	0.496**	0.477**	0.416*	-0.454**	0.115	0.416*	-0.128	-	-0.177	-0.027	0.495**
Net assimilation rate	-0.039	0.009	-0.080	0.073	-0.036	-0.080	-0.218	-0.189	-	0.539**	-0.129
Relative growth rate	-0.102	-0.031	-0.149	0.095	-0.133	-0.149	-0.082	-0.035	0.489**	-	-0.275
Harvest index	0.783**	0.816**	0.698**	-0.392*	0.294	0.698**	0.001	0.319	-0.124	-0.224	-

** Significant at 1 per cent level;

* Significant at 5 per cent level

genotypic level, the average fruit weight had significant positive association with number of fruits/vine, flesh-seed ratio, number of seeds/fruit, LAI on 60th and harvest index, the 'r' values of 0.693, 0.686 and 0.855 respectively. The number of fruits/vine had significant negative relationship with days to first female flower ($r = -0.378$). Similar trend of association was also observed through phenotypic correlation coefficients.

The number of days taken for first female flower had significant and positive genotypic association with flesh-seed ratio ($r = 0.440$). The genotypic association between days taken for first female flower and other traits viz., number of seeds/fruit, LAI on 60th day and harvest index were significant and negative ($r = -0.476$ to -0.606). With regard to phenotypic correlation, days taken for first female flower was significant and negatively related with LAI on 60th day and harvest index ($r = 0.454$ and -0.392).

The flesh-seed ration and the number of seeds/fruit had significant positive genotypic association with LAI on 60th day ($r = 0.357$ and 0.503 respectively) and harvest index ($r = 0.332$ and 0.695 respectively). At the phenotypic level, number of seeds/fruit was positively related to harvest index only.

The LAI on 30th day had only a significant and negative relationship with NAR ($r = -0.359$). The LAI on 60th day had a genotypic positive association with harvest index ($r = 0.495$). The NAR was significantly and positively related to RGR both at genotypic ($r = 0.539$) and phenotypic ($r = 0.489$) levels.

The results of the present study stressed the need for giving maximum weightage to

average fruit weight, number of fruits/vine, harvest index, number of seeds/fruit and LAI on 60th day of sowing in formulating selection indices in watermelon.

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