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CORRELATION AND PATH COEFFICIENT ANALYSIS IN MUSKMELON

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Muskmelon (*Cucumis melo L.*) is an important member of family cucurbitaceae. In muskmelon, fruit quality assumes a greater significant from consumer's viewpoint (Chadha and Lal, 1993). In order to combine an optimum balance of fruit quality traits in one variety, knowledge on character correlation and path coefficient in b. . material to be used in breeding programme is imperative. Accordingly, this study was undertaken in the indigenous lines available in the muskmelon growing area of western Uttar Pradesh and Uttaranchal.

Fifty-six types of fruits/ groups of fruits were collected from muskmelon growing areas of western Uttar Pradesh and Uttaranchal including the Tarai region during summer 1998. The ripe fruits were evaluated for various fruit traits. The quantitative data were utilized for determining simple correlation and path coefficient by using the formula of Searle (1961) and Dewey and Lu (1959) respectively.

Of several pairs of correlations among quantitative traits, the correlation involving fruit weight and TSS content deserve special mention as these two characters along with some other desirable qualitative traits namely fruit shape flesh colour, juiciness of flesh, flesh flavour, skin netting decide the consumer's preference. The correlation of seven fruit characters VIZ. stem scar size (0.403), fruit polar diameter (0.769), fruit equatorial diameter (0.881), flesh thickness (0.550), seed cavity size (0.798), flesh weight (0.983) and seed weight (0.708) were found to have positive correlation with fruits weight with fruit weight. Therefore, it is obvious that fruit weight can be easily manipulated to the desired level through selection based on these seven characters (Table 1). It was further noted that these seven characters were positively correlated among themselves also. This indicates no hindrance at all in manipulating muskmelon fruit size through breeding approaches. TSS an important fruit character from consumer's preference viewpoint failed to manifest significant correlation with any of the fruit character. The results on path analysis showed that flesh weight and seed cavity size contributed substantially as direct effects 0.702 and 0.189 respectively towards the corresponding correlations (Table 2). Thus, the role of flesh weight and seed cavity size was apparent in determining fruit weight. Another important character TSS exhibited low and negative correlation with fruit weight. Its direct effect upon this correlation was although positive but very low (0.030). TSS proved to be inconsequential to affect fruit size even when indirect effects of other characters *via* this character were taken into account. These indirect effects were very low ranging from 0.006 (*via* seed weight) to 0.004 (*via* stem scar size).

The residual factor was low (0.0187) indicating that most of the variability in fruit weight was explainable by the characters under consideration. In support of these results, it is worth while to mention that Hoffmann (1939) found highly significant correlation among several fruit density components and fruit weight but only rarely he could find significant correlation between these characters and TSS. Davis et. al. (1967) reported that fruit diameter and flesh thickness were correlated with seed number per melon. This was in agreement with our results where fruit polar diameter, fruit equatorial diameter and flesh thickness were positively correlated with seed weight (0.745, 0.615 and 0.445 respectively).

The genotypes identified as potential ones based on the over all assessment of fruit characters were MM97-6, MM97-28, MM97-36, MM97-41 and MM97-50. These could be improved upon as such through mass selection/inbreeding and could also be used as potential parental cultivars in developing hybrids after inbreeding for requisite number of generation.

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Table 1. Simple correlation among fruit characters in muskmelon

Characters	Blossom end scar size (cm)	Fruit polar diameter (cm)	Fruit equatorial diameter (cm)	Flesh thickness (cm)	Seed cavity size(cm)	Flesh weight (g)	Seed weight (g)	TSS (%) (g)	Fruit weight
Stem scar size (cm)	0.409**	0.224	0.538**	0.438**	0.424**	0.362**	0.375**	0.119	0.403**
Blossom end scar size (cm)		-0.317*	0.118	-0.060	0.209	-0.019	-0.185	0.047	-0.024
Fruit polar diameter (cm)			0.523**	0.437**	0.398**	0.763**	0.745**	-0.140	0.769**
Fruit equatorial diameter (cm)				0.482**	0.935**	0.848**	0.615**	-0.124	0.881**
Flesh thickness (cm)					0.189	0.542**	0.455**	0.014	0.550**
Seed cavity size (cm)						0.764**	0.528**	-0.160	0.798**
Flesh weight (g)							0.667**	-0.189	0.983**
Seed weight (g)								-0.207	0.708**
TSS (%)									-0.154

*Significant at 5% level of probability
**Significant at 1% level of probability

Table 2. Path analysis for fruit quality traits in muskmelon

Characters	Correlation coefficient with fruit weight	Direct effect	Stem scar size (cm)	Blossom end scar size (cm)	Fruit polar diameter (cm)	Fruit equatorial diameter	Flesh thickeness (cm) (cm)	Seed cavity size(cm)	Flesh weight (g)	Seed weight (g)	TSS (%)
Stem scar size (cm)	0.403**	0.001	-	-0.006	0.021	0.007	0.029	0.080	0.255	0.013	0.004
Blossom end scar size (cm)	-0.024	-0.015	0.001	-	-0.029	0.002	-0.004	0.039	-0.014	-0.007	0.001
Fruit polar diameter (cm)	0.769**	0.093	0.000	0.005	-	0.007	0.031	0.075	0.538	0.026	-0.004
Fruit equatorial diameter (cm)	0.881**	0.013	-0.001	-0.003	0.049	-	0.032	0.177	0.596	0.022	-0.004
Flesh thickness (cm)	0.550**	0.066	0.001	0.001	0.044	0.006	-	0.036	0.381	0.016	0.000
Seed cavity size (cm)	0.798**	0.189	0.001	-0.003	0.037	0.012	0.012	-	0.536	0.019	-0.005
Flesh weight (g)	0.983**	0.702	0.001	0.000	0.071	0.011	0.036	0.144	-	0.024	-0.006
Seed weight (g)	0.708**	0.036	0.001	0.003	0.069	0.008	0.030	0.100	-0.469	-	-0.006
TSS (%)	-0.154	0.030	0.00	-0.001	-0.013	-0.002	0.001	-0.030	-0.133	-0.007	-