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Correlation and Path Coefficient Analyses in Sweet Melon (*Cucumis melo* Var. *Aegyptiacus* L.) Under Irrigated and Drought Conditions

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Abstract: Genotypic correlation and path analyses were carried out for growth, yield and fruit quality traits in 13 sweet melon genotypes collected from different places in Egypt. Seeds of these melon populations were sown under irrigated and drought stress conditions. The analysis of variance for the studied traits showed that the differences among genotypes were highly significant for all studied traits under irrigation and drought stress. Under irrigated conditions, total yield per plant was positively and significantly correlated with fruit weight, flesh fruit thickness and fruit length. Positive direct effects were exhibited for fruit weight, number of fruits per plant and stem length on total yield per plant, while maximum positive indirect effects on total yield per plant were exhibited by fruit length and flesh fruit thickness through fruit weight. In case of drought stress conditions, total yield per plant had the highest positive and significant correlation with fruit weight followed by flesh fruit thickness, fruit length and stem length. Fruit weight had the greatest positive direct effect on total yield per plant followed by number of fruits per plant, fruit length and total soluble solid content. Flesh fruit thickness and fruit length had high positive indirect effect on total yield per plant via fruit weight. The results obtained from correlation and path analyses showed that the efficiency in the selection for total yield per plant in sweet melon should increased through the selection of fruit weight under irrigated conditions and fruit weight and fruit length under drought conditions.

Key words: *Cucumis melo*, sweet melon, correlation coefficient, path coefficient, drought

INTRODUCTION

Melon (*Cucumis melo* L.) is a commercially important vegetable species and has a wide range of horticultural groups. In Egypt, the *aegyptiacus* (sweet melon), *Inodorus* (muskmelon) and *Reticulatus* (cantaloupe) groups are most important for commercial production (Tindall, 1983). However, many farmers plant local open pollinated varieties of sweet melon (*Cucumis melo* var. *Aegyptiacus* L.) using seed that they procured from local markets or from other farmers. Kahera-6, Ananas El-Dokki and Shahd El-Dokki are the most commercially important improved cultivars of sweet melon grown in Egypt. Plant genetic resources are the most important material for breeding new cultivars. Genetic diversity of germplasm of sweet melon available in Egypt gives plant breeders the sustained ability to develop new varieties (El-Shimi and Ghoneim, 2006). Hence, developing local sweet melon tolerant to abiotic stresses of drought based on local genotypes, may result in very promising outputs. Moreover, Egypt and North Africa are the native regions of the most known melon types around the world (Abd-El-Salam and Marie, 2002; Glala, 2007).

Expression of various traits is often changed as the changing breeding material and environment. Therefore, knowledge of association between quantitative characters themselves and with the yield can improve the efficiency of selection in plant breeding under irrigated and drought conditions. However, a review of breeding progress pointed out that little progress can be made by direct selection for yield because yield is the most complex quantitative trait controlled by many environmental and genes. So, indirect selection would be more effective than direct selection for yield (Yadav and Ram, 2002). In this respect, the path analysis procedure can be use to assist in identifying the useful traits as selection criteria to improve yield (Dewey and Lu, 1959).

Some workers have studied the correlation and path coefficient analyses on cucurbits. Somkuwar *et al.* (1997) revealed that correlation coefficient study revealed that improvement in muskmelon is possible by selecting genotypes for number of fruits per plant, fruits number, days to first harvest and total soluble solid content. Abd-El-Salam and Marie (2002) found that highly significant and positive correlations were detected between number of fruit per plant and total yield per plant,

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fruit weight and total soluble solids, fruit length and fruit flesh thickness. Yadav and Ram (2002) reported that fruit weight had a positive and significant correlation with fruit polar diameter, fruit equatorial diameter, flesh thickness and flesh weight, which were positively correlated with each other. The total soluble solid content was not significantly associated with any traits. Singh and Ram (2003) found that the polar diameter, latitudinal diameter and flesh thickness were positively correlated with fruit weight, while total soluble solids content has a negative correlation with fruit weight. Choudhary *et al.* (2003) observed that yield per plant had a significant positive association with vine length, number of vines per plant, fruit weight, number of fruits per plant and rind thickness. Also, they mentioned that fruit weight, number of fruits per plant, rind thickness, flesh thickness and total soluble solid content were the most important characters contributing towards fruit yield per plant. Taha *et al.* (2003) showed that positive and significant associations were found between fruit weight with plant length (+0.59). Singh and Lal (2005) found that fruit weight, flesh thickness and vine length had a significant positive correlation with muskmelon marketable yield. Kumar *et al.* (2013) found that total yield per vine of sponge gourd was found to be positively and significantly correlated with number of fruits per vine and average weight of fruit, moreover, average diameter of fruit, number of fruits per vine and average weight of fruit showed positive direct effects on total yield per vine.

Climate change due to global warming will significantly cause reduction of irrigation water availability and increase the rate of evapotranspiration, leading to severe crop water-stress conditions (IPCC, 2001). Consequently, limited water supply conditions may lead farmers to increase the irrigation interval, which creates water stress. In developing the breeding programme to improve the drought resistance of a crop, it is necessary to gain an understanding of how the crop reacts to drought. However, very little researches have been conducted in Egypt on the use of correlation and path analyses for melon under water stress conditions.

The present study was conducted with the objectives to work out the correlations among yield and morpho-physiological traits and to determine the direct and indirect effects of morpho-physiological traits on melon yield grown under irrigated and drought conditions. The available information will be helpful to devise an efficient selection criterion to select the most desirable high yielding genotypes of sweet melon under irrigated and drought conditions.

MATERIALS AND METHODS

Thirteen sweet melon genotypes (10 local open-pollinated cultivars and 3 commercial cultivars) were used as genetic material for this study (Table 1). Local open-pollinated cultivars were collected from different places in Egypt and single plants from each cultivar were selfed for one generation during the growing season of 2008. The soil texture at the experimental site is clay-loam.

All genotypes were sown and evaluated under irrigated and drought conditions at Qaha vegetable research station, Qalubia governorate on 6 April of 2009 season. Each of two experiments was designed in a randomized complete blocks with three replicates. Each experimental unit area was consisted of four ridges each of 5 m length and 1.5 m in width and one plant per hill with 50 cm apart. The culture practices were done according to the general program of sweet melon cultivation. Drought conditions were started after first irrigation and created by reducing the frequency of irrigation watering by one half to that of irrigated crop, i.e., missing alternate irrigation.

Ten plants were randomly selected from each plot and observations were recorded on days to first female flower appearance. At 60 days after planting, a random sample of six plants was taken from the two inner ridges of each experimental unit to determine the growth parameters (stem length (cm) and number of primary branches per plant). At the harvesting time, a random sample of 12 plants was taken from each experimental unit and data were recorded for number of fruits per plant, fruit weight (g), total yield per plant (g), fruit length (cm), fruit width (cm), flesh fruit thickness (cm) and Total Soluble Solids (TSS). Total soluble solids were determined using a refractometer.

Components of variances and covariances were estimated for individual environment (irrigation and drought stress conditions) data according to method of Steel and Torrie (1980). Analysis of variance was computed among thirteen genotypes according to Snedcor and Cochran (1982).

Table 1: The names and sources of sweet melon genotypes used in the study

Cultivars or lines	Collection place/area	Pedigree
Shahd El-Dokki	Agricultural research center	Commercialvariety
Ananas El-Dokki	Agricultural research center	Commercialvariety
Kahera-6 improved	Agricultural research center	Commercialvariety
Ismaelawi	Ismaelia	Local variety
Shahd Edfina	Al-Behira	Local variety
Kouz El-Asal	Al-Behira	Local variety
Albasosi	Qulybiya	Local variety
Al-Gezawi	Bush-Beni Sueif	Local variety
FBS	Al-Fashn-Beni Sueif	Local variety
AEF	Abo-Elsoud-Fayoum	Local variety
BMM	Bani Mazar-Al-Minia	Local variety
NGS	Nag El-Gawahra-Sohag	Local variety
AQ	Armant-Qena	Local variety

The genotypic variance was estimated by analysis of variance as described by Dospekhov (1984) as follows:

$$\sigma^2 g = (M_2 - M_1)/r;\ \sigma^2 e = M_1/r$$

where, $\sigma^2 g$ is genotypic variance, $\sigma^2 e$ is environmental variance, M_2 is mean square due to genotypes, M_1 is mean square due to error, r is number of replications.

The estimates of genotypic correlation coefficient was worked out by using the following equations as outlined by Singh and Choudhary (1979):

$$\text{Genotypic correlation (rg)} = \frac{\text{Cov } g_1 g_2}{(\sigma^2 g_1 \cdot \sigma^2 g_2)^{1/2}}$$

where, Cov g_1g_2 is the genotypic correlation between any pairs of traits. $\sigma^2 g_1$ and $\sigma^2 g_2$ are the genotypic variance of the first and second trait, respectively. The significant of the r_g was tested with "t" test as described by Cochran and Cox (1957).

Genotypic correlations were partitioned into path coefficient using the technique outlined by Dewey and Lu (1959) for assessing the direct and indirect effects of each trait on yield per plant.

RESULTS AND DISCUSSION

The mean squares due to local genotypes were highly significant ($p<0.01$) for all studied traits under both normal and drought conditions (Table 2). These results were expected due to the great variability among the genotypes. This can be utilized through appropriate crossing and suitable selection indices for better genotypes in the segregating populations.

Genotypic correlation

Under irrigated conditions: Total yield per plant showed the highest positive correlation with fruit weight (0.973), followed by flesh fruit thickness (0.831) and fruit length (0.756). Significant and positive correlation of total yield per plant with number of primary branches per plant (0.331) was also observed (Table 3). These results are in agreement with those obtained by Choudhary *et al.* (2003), Taha *et al.* (2003), Singh and Lal (2005), Zalapa *et al.* (2006), Reddy *et al.* (2007) and Kumar *et al.* (2013). However, these results are not consistent with Feyzian *et al.* (2009) who reported a non-significant correlation between total fruit weight per plant and number of primary branches.

Moreover, total yield per plant showed the highest negative correlation with TSS (-0.655), number of fruits per plant (-0.615) and fruit width (-0.576) (Table 3). In contrast, Somkuwar *et al.* (1997) reported that improvement in muskmelon is possible by selecting genotypes for number of fruits per plant and TSS. Also, Reddy *et al.* (2007) reported that fruit diameter exhibited a strong positive correlation with yield per plant, while number of fruits per plant and TSS exhibited a non-significant correlation with yield per plant. Moreover, Abd-El-Salam and Marie (2002) and Choudhary *et al.* (2003) and Iathet and Piluek (2006) found that fruits number per plant had highly positive correlation with yield per plant. The differences may be due to breeding material used and different environmental conditions.

Table 2: Mean squares of 13 genotypes grown under irrigated and drought conditions

Traits conditions	Stem length (cm)	No. of primary branches/plant	Days to first female flower appearance	Fruit weight (g)	No. of fruits/ plant	Total yield/ plant (g)	Fruit length (cm)	Fruit width (cm)	Flesh fruit thickness (cm)	TSS (%)
Irrigated	819.5**	0.64**	54.4**	4427622**	0.37**	18766578**	67.9**	18.5**	1.1**	5.4**
Drought	376.5**	0.53**	56.3**	3301703**	0.33**	11628496**	60.3**	17.6**	0.8**	3.2**

**: Significant at 0.01% probability level

Table 3: Genotypic correlation coefficients for different pairs of traits in sweet melon under irrigated (above diagonal) and drought stress (below diagonal)

	SL	NO.B	DF	FW	NO.F	TY	FL	FD	FFT	TSS
SL		-0.301*	0.345*	0.189	-0.102	0.179	0.172	0.089	0.143	-0.425**
NO.B	-0.055		-0.234	0.280	-0.121	0.331*	0.154	-0.322*	0.011	-0.074
DF	0.205	-0.011		-0.098	-0.206	-0.235	-0.154	-0.032	-0.331*	0.186
FW	0.494**	0.203	-0.010		-0.763**	0.973**	0.850**	-0.590**	0.847**	-0.672**
NO.F	-0.138	0.035	-0.031	-0.655**		-0.615**	-0.926**	0.531**	-0.575**	0.482**
TY	0.511**	0.247	-0.122	0.964**	-0.473**		0.756**	-0.576**	0.831**	-0.655**
FL	0.383**	0.090	-0.189	0.781**	-0.772**	0.707**		-0.377**	0.751**	-0.641**
FD	-0.102	-0.295*	-0.028	-0.627**	0.447**	-0.617**	-0.387**		-0.449**	0.502**
FFT	0.530**	-0.030	-0.184	0.828**	-0.421**	0.822**	0.670**	-0.440**		-0.714**
TSS	-0.429**	0.076	0.100	-0.531**	0.456**	-0.477	-0.450**	0.312**	-0.496**	

SL: Stem length, No.B: No. of primary branches per plant, DF: Days to first female flower appearance, FW: Fruit weight, No.F: No. of fruits per plant, TY: Total yield per plant, FL: Fruit length, FD: Fruit width, FFT: Flesh fruit thickness, TSS: Total soluble solids, *,**Significant at 0.05 and 0.01 probability level, respectively

Fruit weight, fruit length and flesh fruit thickness showed the highest positive correlation with each other and showed the highest negative correlation with number of fruits per plant, fruit width and TSS (Table 3). This confirmed the results obtained by Lal and Singh (1997) in muskmelon who found that number of fruits per plant showed a highly significant negative correlation with fruit length, fruit weight, fruit diameter and flesh thickness. Yadav and Ram (2002) found that muskmelon fruit weight had a positive and significant correlation with fruit polar diameter, fruit equatorial diameter and flesh thickness that were positively correlated with each other and the total soluble solid content was not significantly associated with any of the traits. Singh and Ram (2003) in muskmelon reported that fruit weight was positively correlated with flesh thickness and was negatively correlated with total soluble solids content. Taha *et al*. (2003), Zalapa *et al.* (2006) and Feyzian *et al.* (2009) reported a negative association between fruits number and average weight per fruit. In contrast, Abd-El-Salam and Marie (2002) found high significant and positive correlations between fruit weight and total soluble solids, fruit length and fruit flesh thickness. Also, Eduardo *et al.* (2007) found high significant and positive correlations between fruit weight and fruit diameter.

Significant and negative correlation of fruit length with fruit width suggested that any increase in fruit length will induce reduction in fruit diameter. While a decrease in this character will inversely increase fruit diameter. Negative correlation between fruit length and fruit width has also been reported by Iathet and Piluek (2006).

The stem length showed a highly significant positive correlation with days to first female flower appearance (0.345) and a highly significant negative correlation with TSS (-0.425) and number of primary branches per plant (-0.345) (Table 3). Taha *et al.* (2003) and Reddy *et al.* (2007) reported similar type of results. Whereas, Reddy *et al.* (2007) found that stem length had a non-significant positive correlation with TSS.

Days to first female flower appearance showed a highly significant positive correlation with stem length (0.345) and had highly significant negative correlation with flesh fruit thickness (-0.331) while other traits had non significant correlation with days to first female flower appearance (Table 3). Similar results were reported by Reddy *et al.* (2007).

Under drought stress conditions: Total yield per plant had the highest positive and significant correlation with fruit weight (0.964), followed by flesh fruit thickness (0.822), fruit length (0.707) and stem length (0.511) (Table 3). Fruit weight showed the highest positive correlation with total yield per plant. Increase in fruit length, flesh fruit thickness and stem length resulted in increase in fruit weight, which ultimately increased the yield per plant (Table 3). These results are in agreement with those obtained by Choudhary *et al.* (2003), Taha *et al.* (2003), Singh and Lal (2005), Reddy *et al.* (2007) and Zalapa *et al.* (2006).

Other characters *viz* fruit width, TSS and number of fruits per plant showed the highest negative correlation with total yield per plant (Table 3), these results contradicted with the findings of Somkuwar *et al.* (1997), Abd-El-Salam and Marie (2002), Iathet and Piluek (2006) and Reddy *et al.* (2007), while number of branches per plant and days to first female flower appearance showed no correlation with total yield per plant (Table 3). These results corroborate the findings of Reddy *et al.* (2007) and Feyzian *et al.* (2009).

The stem length showed a highly significant positive correlation with fruit weight (0.494), fruit length (0.383) and flesh fruit thickness (0.530) and a highly significant negative correlation with TSS(-0.429) (Table 3). Similar results have also been reported by Taha *et al.* (2003) and Reddy *et al.* (2007).

Fruit weight, fruit length and flesh fruit thickness showed the highest positive correlation with each other and had the highest negative correlation with number of fruits per plant, fruit width and TSS (Table 3). It is quite possible that with the increase in the number of fruits, the fruit weight starts decreasing. This is in good agreement with the findings of Lal and Singh (1997), Yadav and Ram (2002), Singh and Ram (2003), Taha *et al.* (2003), Zalapa *et al.* (2006) and Feyzian *et al.* (2009).

The correlations of all characters with days to first female flower appearance were non significant (Table 3), similar results were reported by Reddy *et al.* (2007). Similarly, number of primary branches per plant revealed non significant correlation with all characters under discussion, except fruit width which showed a highly significant negative correlation (Table 3). Similar results have been determined by Zalapa *et al.* (2006).

The negative associations of characters like fruit weight and TSS will become problem in combining these important traits in a single genotype for high yield per plant. Some suitable recombination might be obtained through bi-parental mating, mutation breeding or diallel selective mating by breaking undesirable linkage.

Path coefficient analysis

Under irrigated conditions: Path coefficient analysis provides an effective way of finding out direct and indirect sources of correlations, using genotypic

Table 4: Estimates of direct (bold- diagonal values) and indirect effects of studied traits on total yield per plant at genotypic levels under irrigated conditions

Variable	SL	NO.B	DF	FW	NO.F	FL	FD	FFT	TSS	rg
SL	0.070	0.008	-0.058	0.239	-0.020	-0.008	-0.006	-0.020	-0.024	0.179
NO.B	-0.021	-0.025	0.039	0.354	-0.024	-0.008	0.021	-0.002	-0.004	0.331
DF	0.024	0.006	-0.168	-0.124	-0.041	0.008	0.002	0.047	0.010	-0.235
FW	0.013	-0.007	0.016	1.263	-0.151	-0.042	0.039	-0.121	-0.038	0.973
NO.F	-0.007	0.003	0.035	-0.963	0.198	0.045	-0.035	0.082	0.027	-0.615
FL	0.012	-0.004	0.026	1.073	-0.183	-0.049	0.025	-0.108	-0.036	0.756
FD	0.006	0.008	0.005	-0.745	0.105	0.018	-0.066	0.064	0.028	-0.576
FFT	0.010	0.000	0.056	1.070	-0.114	-0.037	0.030	-0.143	-0.040	0.831
TSS	-0.030	0.002	-0.031	-0.849	0.095	0.031	-0.033	0.102	0.056	-0.656

SL: Stem length, No.B: No. of primary branches per plant, DF: Days to first female flower appearance, FW: Fruit weight, No.F: No. of fruits per plant, FL: Fruit length, FD: Fruit width, FFT: Flesh fruit thickness, TSS: Total soluble solids, rg: Genotypic correlation coefficients

Table 5: Estimates of direct (bold-diagonal values) and indirect effects of studied traits on total yield per plant at genotypic levels under drought conditions

Variable	SL	NO.B	DF	FW	NO.F	FL	FD	FFT	TSS	rg
SL	-0.014	0.014	-0.026	0.731	-0.092	0.108	0.014	-0.199	-0.024	0.513
NO.B	0.001	-0.227	0.010	0.316	0.084	0.016	0.046	0.018	-0.003	0.259
DF	-0.003	0.019	-0.118	-0.035	-0.034	-0.065	0.004	0.086	0.006	-0.140
FW	-0.007	-0.049	0.003	1.477	-0.429	0.222	0.088	-0.310	-0.030	0.966
NO.F	0.002	-0.030	0.006	-1.000	0.634	-0.231	-0.066	0.165	0.022	-0.498
FL	-0.005	-0.013	0.027	1.166	-0.520	0.281	0.055	-0.250	-0.026	0.715
FD	0.001	0.074	0.003	-0.929	0.298	-0.110	-0.141	0.164	0.019	-0.619
FFT	-0.008	0.011	0.027	1.233	-0.282	0.190	0.062	-0.371	-0.028	0.834
TSS	0.008	0.016	-0.017	-0.978	0.312	-0.163	-0.058	0.231	0.045	-0.603

SL: Stem length, No.B: No of primary branches per plant, DF: Days to first female flower appearance, FW: Fruit weight, No.F: No. of fruits per plant, FL: Fruit length, FD: Fruit width, FFT: Flesh fruit thickness, TSS: Total soluble solids, rg: Genotypic correlation coefficients

correlations of different plant attributes. Total yield per plant was selected as resultant variable, whereas, the remaining nine traits were considered as casual variables. The results of path coefficient analysis (Table 4) revealed that fruit weight exerted the highest direct positive effect (+1.263) on total yield per plant followed by number of fruits per plant (+0.198) and stem length (+0.070), while TSS had low positive effect (+0.056). It means a slight increase in any one of the above traits may directly contribute towards total yield per plant. Similar findings were reported by Pandita *et al.* (1990), Choudhary *et al.* (2003), Reddy *et al.* (2007), Tomar *et al.* (2008) and Kumar *et al.* (2013). Whereas, Reddy *et al.* (2007) reported low positive direct effect of fruit weight on total yield per plant.

The negative direct effects over total yield per plant were exhibited by days to first female flower (-0.168), flesh fruit thickness (-0.143), TSS (-0.056), fruit width (-0.066), fruit length (-0.049) and number of primary branches per plant (-0.025) (Table 4). The results were confirmed by Reddy *et al.* (2007), Tomar *et al.* (2008). However, these results did not agree with the report by Singh and Lal (2005) who reported that flesh thickness exhibited high, positive and direct effects on yield, Reddy *et al.* (2007) who found that positive direct effect of days to first female flower on total yield per plant and Tomar *et al.* (2008) who found that high and positive direct effect of flesh fruit thickness on total yield per plant.

Maximum positive indirect effects on total yield per plant were exhibited by fruit length (1.073) and flesh fruit thickness (1.070) through fruit weight (Table 4). Similar findings were also reported by Tomar *et al.* (2008). Similarly, the indirect effects of stem length and number of primary branches per plant through fruit weight were positive and fairly high. While maximum negative indirect effects were observed by number of fruits per plant (-0.963), TSS (-0.849) and fruit width (-0.745) through fruit weight (Table 4).

The indirect effects of all traits under discussion on total yield per plant through number of primary branches per plant were found at lower values between-0.007 and 0.008 (Table 4).

Under drought stress conditions: Path coefficient analysis permits a through understanding of contribution of various characters by partitioning the correlation coefficient into components of direct and indirect effects. The direct and indirect effects of investigated characters on total yield per plant under drought stress conditions are presented on (Table 5).

The results indicated that fruit weight which is positively and significantly correlated with total yield per plant (0.964) had the greatest positive direct effect (1.477) on total yield per plant. This was followed by number of fruits per plant, fruit length and TSS with 0.634, 0.281 and 0.045, respectively (Table 5). Similar findings were reported by Choudhary *et al.* (2003), Reddy *et al.* (2007) and Tomar *et al.* (2008). However, the indirect effects of number of fruits per plant and TSS via fruit weight were negative and high in magnitude (-1.000 and -0.978, respectively) (Table 5). Significant negative correlations between number of fruits per plant and total yield per plant (-0.473) and between TSS and total yield per plant (-0.477) were mainly due to their effects through fruit weight, which were high and negative (Tables 3 and 5). This showed that selection for the characters number of fruits per plant and TSS would not be realized in increased total yield per plant.

Fruit length indicates the positive direct effect and maximum positive indirect effect was noted through fruit weight (Table 5).

Stem length had negligible negative direct effect on total yield per plant (-0.014) but due its positive indirect effect via fruit weight (0.731) and fruit length (0.108) it had significant positive association with total yield per plant (0.513). The indirect effects of the other eight traits on stem length remained at lower values between -0.008 and 0.008 (Table 5).

The direct effects of other traits were negative direction towards reducing the total yield per plant. Especially flesh fruit thickness had a prominent effect on total yield per plant in negative direction with -0.371 (Table 5). The results were confirmed by Reddy *et al.* (2007) and Tomar *et al.* (2008). On the other hand, comparing total yield per plant and flesh fruit thickness the correlation coefficient was 0.834, it seemed that indirect effect appeared to be the cause of correlation (Table 5). Hence, these traits may be used simultaneously with the other characters. Flesh fruit thickness had a high positive indirect effect on total yield per plant *via* fruit weight (Table 5). Therefore, indirect selection for flesh fruit thickness through fruit weight would be effective for total yield per plant improvement.

The correlation of fruit width with total yield per plant was negative. The direct effect of fruit width on total yield per plant was also negative (-0.141), this result was confirmed by Reddy *et al.* (2007). The indirect effect via most traits was positive but negligible. The fruit width has its major influence via negative effect of fruit weight (-0.929) (Table 5). Therefore, selection through this trait will affect the total yield per plant negatively under genetic material to be studied.

Number of primary branches per plant exhibited negative direct effect on total yield per plant (-0.227) but this was compensated by other traits except TSS (Table 5).

CONCLUSION

From the above results, it may be concluded that the genetic variability in the local genotypes of sweet melon can be utilized through appropriate crossing and suitable selection indices for better genotypes in the segregating populations. While improving the total yield per plant of sweet melon varieties can be obtained by selecting plants for more fruit weight under irrigated conditions and selection for fruit weight and fruit length under drought conditions.

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