*R*esearch article

Selection criteria for yield in eggplant (*Solanum melongena* L.)

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ABSTRACT

Nineteen genotypes of eggplant (*Solanum melongena* L.) were collected from different places in Syria for evaluating the selection criteria for yield parameters. Yield traits (days to 50% flowering, days to flower setting, days to maturity, plant height/cm at flowering stage, fruit weight/g, number of harvested plants and fruit yield per genotype/kg) were recorded in order to study the traits relations and to their direct and indirect effects via other traits on eggplant yield. Results showed that both plant height and number of harvested plants together with other morphological parameters had positive significant correlation with yield parameters, so it can be taken as selection criteria to increase final yield of eggplant.

KEYWORDS: *Solanum melongena* L, genotypes, correlation, path analysis

INTRODUCTION

Eggplant (*Solanum melongena* L.) belongs to Solanaceae family [1] which is cultivated widely in tropic and subtropics regions of the world [2]. It is valuable for human health as it is rich in fiber and vitamins (C, B6, K) and also minerals like calcium, iron, potassium, and phosphorus [3] and phenolic compounds and anthocyanins with antioxidant properties [4]. Eggplant has low fat content [5], thus making it important to prevent heart diseases and control blood pressure [6,7]. In Syria Eggplant is planted in spring and well consumed in many ways. Syrian researchers are interested in collecting local landraces to broaden the genetic variability of new varieties.

Yield is a complex trait which is affected by other traits, so selection for yield will be more successful when taking in consideration of the correlation and path analysis and considered with path coefficient analysis as important biometrical methods [8]. Correlation usually refers only to the ongoing relation between traits, while path analysis divides this relation into direct and indirect effects of each trait towards yield [9]. Earlier study [10] revealed path coefficient analysis in 35 varieties of brinjal (*Solanum melongena* L.) and the results revealed that the average fruit weight had positive direct effect on fruit yield. Another report evaluated different genotypes of eggplant collected from different parts of Nigeria and studied relationship of some important agronomic traits and their contributions to yield

and they found negative correlation between plant height and days to flowering [11]. There are reports on character association and path analysis in eggplant with negative correlation between days to flowering and fruit yield, and fruit weight wasn't correlated significantly with fruit yield [9]. Apart from these studies, there is report on strong positive association between morphological characters and yield in eggplant [12]. Objectives of the present study were to evaluate the traits relations and define their direct and indirect effects via other traits on eggplant yield.

MATERIAL AND METHODS

Nineteen genotypes of eggplant (*Solanum melongena* L.) were collected from different places in Syria and planted in rows at Homs Research Centre middle of Syria northern Damascus belongs to the General Commission of Scientific Agricultural research GCSAR in Syria during spring in season 2016 under rainfed conditions (Table A). The experiment was laid out in a Complete Randomized Block Design (RCBD) with three replications. Spaces between rows was 50 cm and between plants in the same row was also 50 cm. All recommended cultural practices like irrigation and pesticide control were conducted according to agricultural ministry guides, Following traits were studied from randomly ten selected plants according to earlier established method [13]:

- Days to 50% flowering: Days from sowing to 50% of flowers opening.
- Days to flower Setting: Days from sowing to flower setting.

- Days to maturity: Days from sowing to maturity of 50% of plants.
- Plant Height/cm: Recorded at flowering stage.
- Fruit weight/g: Using electric balance for each genotype in each replication.
- Number of harvested Plants.
- Fruit Yield per genotype/kg.

Correlation between traits was studied using SPSS.15, and Path coefficients analysis according to standard method [14] using Genstat.12.

RESULTS AND DISCUSSION

Correlation

Results of correlation showed positive and highly significant correlation between each of: days to flowering with days to flower setting (r = 0.941**), days to flowering with days to maturity (r = 0.694**), days to flower setting with days to maturity (r = 0.758**), plant height with fruit yield (r = 0.663**), number of harvested plants with fruit yield (r = 0.581**), while correlation was negative and highly significant between each of: days to flowering with fruit yield (r = -0.448**), days to flower setting with fruit yield (r = -0.490**), and days to maturity with fruit yield (r = -0.650**), days to maturity with plant height (r = -0.499**), the correlation was negative and significant (r = -0.302*) between days to flower setting and plant height, while positive significantly between plant height and number of harvested plants (r = 0.267*) (Table 2).

Our results are in accordance with earlier report [9] who found negative correlation between days to flowering and fruit yield,

and correlation wasn't significant between fruit weight and fruit yield, and agree with other reports [8,11,12].

Path Analysis

Results of path analysis refereed to negative low direct effect of days to maturity on fruit yield (-0.188883), and negative neglected direct effect of days to flowering and days to flower setting (-0.07528, -0.05396) for each of them respectively on fruit yield, while the direct effect of fruit weight on fruit yield was positive and low (0.13273) and was positive and high for number of harvested plants and plant height on fruit yield (0.35990, 0.43954) for each of them respectively. Results also showed that days to flowering had negative low indirect effect via days to maturity and plant height (-0.13099, -0.10685) for each of them respectively on fruit yield, as the same as days to flower setting had negative low indirect effect via days to maturity and plant height on fruit yield (-0.14319, -0.13253) for each of them respectively, also days to maturity had negative but medium indirect effect via plant height on fruit yield (-0.21925), the indirect effect of number of harvested plants on fruit yield via plant height was positive and low (0.11740), all other indirect effects were neglected positive or negative on fruit yield (Table 3). These results are in agreement with the results [8-10,12].

CONCLUSION

It was concluded from results both plant height and number of harvested plants had positive significant correlation with yield, and the direct effect of plant height on yield was the highest followed by the direct effect of number of harvested plants, then the direct effect of fruit weight.

Table (A): Average temperature in spring and summer 2016

	Min temperature	Max temperature
April	13	25
May	16	27
June	-	-
July	22.19	33.4
August	20.3	33.73
September	19.17	30.16
October	15.90	28.58
November	6.73	20.28

Table 1: Genotype collected sites

Genotype	Province	Genotype	Province
11326	Homs	11971	Al-Raqqa
11787	Al-Hassake	11974	Al-Raqqa
11850	Homs	12010	Hama
11866	Homs	12011	Hama
11901	Damascus	12057	Dair-Ezzor
11939	Al-Raqqa	12073	Dair-Ezzor
11946	Al-Raqqa	12081	Dair-Ezzor
12088	Dair-Ezzor	12135	Aleppo
12117	Aleppo	12634	Aleppo
12123	Aleppo		

Table 2: Correlation between studied traits

	FD	FSD	MD	PH	FW	HPN	YI
FD	1						
FSD	0.941**	1					
MD	0.694**	0.758**	1				
PH	−0.243	−0.302*	−0.499**	1			
FW	−0.066	−0.127	−0.126	−0.011	1		
HPN	−0.209	−0.202	−0.366**	0.267*	0.059	1	
FY	−0.448**	−0.490**	−0.650**	0.663**	0.185	0.581**	1

Where: * significant at 0.05, ** significant at 0.01, FD days to flowering , FSD days to flower setting, MD days to maturity, PH plant height, FW fruit weight, HPN number of harvested plantss, FY fruit yield per genotype.

Table 3: Direct and indirect effect of studied traits on yield

	MD	PH	FD	FSD	FW	HPN
MD	−0.18883	−0.21925	−0.05222	−0.04091	-0.01671	-0.13176
PH	0.09419	0.43954	0.01830	0.01627	-0.00147	0.09612
FD	−0.13099	−0.10685	−0.07528	−0.05077	-0.00871	-0.07523
FSD	−0.14319	−0.13253	−0.07083	−0.05396	-0.01691	-0.07277
FW	0.02378	−0.00487	0.00494	0.00688	0.13273	0.02137
HPN	0.06913	0.11740	0.01574	0.01091	0.00788	0.35990

Residual effect=0.2921. FD days to flowering, FSD days to flower setting, MD days to maturity, PH plant height, FW fruit weight, HPN number of harvested plants.

RECOMMENDATION

To depend on plant height and number of harvested plants and fruit weigh as selection criteria to increase final yield of egg plant.

AUTHOR CONTRIBUTIONS

All authors had an equal contributions.

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