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Improvement of some Economic Traits for Eggplant (cv. White Balady) to Produce Selected Pure Lines

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ABSTRACT

Selection and breeding of eggplant has resulted in development of large number of commercial varieties. Selection from the local varieties is the most practical way for this genetic improvement. Hence, balady variety of eggplant has a wide range of genetic variability in fruit characters . Therefore, this study aimed to develop promising local lines of eggplant for hybrids development or for direct integration. This study was carried out during five successive summer seasons of 2010 to 2014 at El-Barmoon Farm, Mansoura Horticultural Research Station, Dekahlia Governorate, Egypt. Seeds of the local Balady of eggplant (*Solanum melongena* L.), S_0 populations were grown and the distinct plants were determined according to growth vigor, flower's color and selfed Between and within the families selection was accomplished until reaching of S_4 generation. Phenotypic and genetic parameters were estimated after four cycles of selection in ten lines in addition to check variety. The mean squares of the selected lines were highly significant for all studied traits. The line LW.15-1 showed good performance average fruit weight and total yield per plant comparing with the other lines and original population with the meam of 204.1 and 2.573 , respectively . While the line LW.26-1 was a good donor for both plant high, number of branches per plant and number of fruits per plant with the meam of 89.15 cms, 8.711 and 13.25 , respectively but with relative small fruit size comparing with the other lines. The results showed high values for genotypic coefficient of variation between lines ($G.C.V\%_{between\ lines}$) compared with the coefficient of variation within lines ($G.C.V\%_{within\ lines}$) and moderate to high heritability in broad- sense (H^2Bs) for all studied traits. Through the early segregating generations, eggplant could be improved through applying selection based on phenotypic expression of the studied traits that would be effective in isolation and identification of promising lines in eggplant. In current study, the lines LW.15-1, LW.5-2 and LW.26-1 are highly recommended for direct integration or as parental lines for F_1 eggplant improvement.

Keywords: Eggplant, Pure Line, Selection, Heritability and Coefficient of variation.

INTRODUCTION

Eggplant (*Solanum melongena* L.) is an autogamous diploid (2n=24), with genome size of 1100Mb of DNA. Is an annual and a warm climate crop that has broad sense of diversity in color, shape and size etc. (Sidhu *et al*., 2005; Cerciola *et al*., 2013). Eggplant is an important source of vitamins A and C, minerals, fiber in addition to phytochemicals and antioxidant compounds as flavonoid which have medicinal properties (Gebhardt and Thomas, 2002; Piao *et al*., 2014). Asia, Africa, and the Mediterranean region are considered the main regions of eggplant production worldwide (Mutlu *et al*., 2008). Recently, Eggplant take place the third as most important crop of *Solanaceae* family after potato and tomato. China represents the greatest eggplant producer with17 million tons annually, followed by India with 8 million tons, while Egypt is the third place with 1 million tons per year (FAOSTAT Data 2015).

S. melongena has been subjected to different breeding programs with diverse objectives depending upon market needs and consumer preference of each production region. Resistance to biotic abiotic stress, resistance to herbicides, yield and its quality such as early maturity, colour, and the capacity for long storage quality are the most important objectives for genetic improvement. On the other hand, improvement of nutritive value as high dry matter, sugars, anthocyanin and total phenol contents, low level of polyphenol oxidase activity and orthodihydroxy phenolic compounds to avoid browning of cut fruits also represent a significant aims for eggplant genetic improvement. Selection and breeding of eggplant has resulted in a large number of eggplant varieties according to meet the consumer demands (Sidhu *et al.*, 2005; Sekara *et al.,* 2007; Cericola *et al*., 2013). Development of any new commercial varieties is highly depending on the genetic variability (Barchi *et al*., 2012; Lebeau *et al*., 2013). Normally development of new Eggplant varieties is based on intra-varietal group crossings or by the incorporation of landraces (Munoz-Falcon *et al*., 2009a). Open pollinated, pure lines and F_1 hybrid represent the principal cultivar form in Eggplant. However modern F_1 hybrids have a narrow genetic base, become the common form that used in the commercial production of eggplants (Maria *et al*., 2015). Simple selection from the local varieties represents an important approach for genetic improvement. Hence, new lines were derived from the landraces by applying different strategies of selection in Eggplant (Karmakar and Bhattacharya, 2000; Naresh-Babu *et al*. 2001). In addition, Chingakham *et al*. (2016) reported that the hybrids derived from local landraces germplasm showed competitive behavior in productivity and other quality traits comparing with the commercial hybrids.

The pure-line selection method is an integral part of pedigree selection and bulk population selection. Pedigree selection is a common approach applied in self-pollinated species for genetic improvement. The significant difference between pedigree selection and mass selection or pure-line selection is that hybridization is used to generate variability (for the base population), unlike the other methods in which production of genetic variation is not a feature. To be effective, desirable and undesirable plants should be distinguished by the breeder on the basis of a single plant phenotype. Once selected, plants are reselected in each subsequent generation. This process is continued until a desirable level of homozygosity is attained. At that stage, plants appear phenotypically homogeneous.

Balady variety of eggplant has a wide range of genetic variability in fruit characters as color, shape and size as well as in some physiological and biochemical features. This variability did not well-exploited to distinguish and segregate of promising landraces.

Therefore, this study aimed to develop promising local lines of eggplant with desirable alleles for hybrids development or as open pollinated varieties through applying simple selection method in current investigation .

MATERIALS AND METHODS

This study was carried out at El-Barmoon Farm, Mansoura Horticultural Research Station, Dekahlia Governorate, Egypt during five successive summer seasons of 2010 to 2014. Seeds of the local Balady of eggplant (*Solanum melongena* L.), S_0 populations supplied by. the local Balady cultivar and genotypes of eggplant (*Solanum melongena* L.) were collected from different four Regions of Egypt, i.e., Helwan district, Alexanderia governorate (West–Delta); Ismailia (East-Delta); Behera (Middle-Delta) and Bany sweef (Upper–Egypt). The collected seeds were bulked and classified into one group long white . About 100 plants of basic population, S_0 were grown and the distinct plants were determined according to growth vigor, flower's color and selfed. Seeds were separately collected for the selected plants to produce the S_1 population. During the following seasons, seeds of the progeny of each selected plant were sown. Selection between and within families were accomplished for some fruit characters and to segregate or distinguish the original population into a set of homozygous lines. Selection and selfing were applied until reaching of S_4 generation and grown with plants from the original S_0 in addition to the check cultivar and the degree of homogeneity was calculated again in order to determine the closing of variability . The selected lines were named according to the number of generation followed by the number of line (family) and the sequence number of plant (within plants selection). Where,(Lw)was indicates for long white. In summer season of 2014, ten lines previously selected in addition to check var. were tested in replicates in order to estimate the degree of homogeneity and some preliminary parameters. A randomized complete block design with three replicates was applied. Each line of the ten included represented by one row. The following traits were estimated in each derived line; plant height in (cms), number of branches, leave area in (cm^2), days to flowering, early yield per plant in (kg), number of fruits per plant, average fruit weight in grams, total yield, fruit shape index and total soluble solids (TSS) %. Phenotypic and genotypic parameters i.e, mean, coefficient of variation, genotypic variation between and within lines, heritability in broad sense. In order to maximize the genetic gain, selection between and within the lines was applied in attempt to obtain superior families among the selected lines. Then, selection within families was applied among these individuals until reaching the best plants of the best families. The obtained data were subjected to analysis of variance between and within plots. The statistical model using random model was as follows:

$$Y_{ijk} = \mu + G_i + B_j + \varepsilon_{ij} + \delta_{ijk}$$

where: Y_{ijk} : observation obtained by k^{th} individual of i^{th} genotype evaluated in j^{th} block; μ : general mean; G_i : random effect of i^{th} genotype; B_j : random effect of j^{th} block; ε_{ij} : random effect of variation between plots; and δ_{ijk} : random effect of variation between plants within plot. The mean performance comparisons between lines were conducted using the least significant value LSD at 5% and 1% of probability.

RESULTS AND DISSECTION

Brinjal eggplant represent the most popular and traditional vegetables in Egypt which take place the third, after potato and tomato as the most important crop from s*olanaceae* family. However, its productivity is still relatively low and the most production come from imported F_1 hybrids seeds. Hence, this study focused on maintain and conserve the national genetic resources through integrate the local varieties and landraces into breeding programs as a way for avoiding losses this germplasm and exploitation its genetic potential in production of new lines or hybrids from the current resources.

Between lines and within plot variation :

The analyses of variance and mean squares of vegetative, yield and fruit quality traits in eggplant were obtained and the results are presented in Table 1: It appeared from the Table that the mean squares of the selected lines were highly significant for all studied traits. Furthermore, the superior values between lines mean squares comparing to within plot mean squares indicated the relative magnitude variation between lines than the among the same line. This fact could be used as a primarily indicator for the success of reaching to a logical level of homozigoisty.

Table 1. Analysis of variances and mean squares for ten lines in addition to check variety subjected to four cycles of selection for vegetative, yield and fruit quality traits in eggplant.

SOV	DF	PH cms	NB/P	LA cm^2	DTF	EY/P kgs	NF/P	AFW grams	Y/P kgs	SHI	TSS
Replication	2	265.5	3.074	302.6	49.62	0.077	3.861	86.27	0.751	0.230	2.275
Lines	10	2727.3**	17.15**	1258.7**	277.0**	0.419**	33.73**	20216.**	2.797**	4.125**	2.896**
Between	20	11.88	0.104	19.46	3.093	0.006	0.164	167.78	0.139	0.017	0.154
Within plots	132	0.391	0.042	0.042	0.644	0.042	0.051	0.675	0.01	0.007	0.042

plant height PH in (cm),N.B.P: number of branches, LA : in (cm^2), D.T.F: days to flowering, EY/P: early yield per plant in (kg), NF/P: number of fruits per plant, A.F.W: average fruit weight in (kg), Y/P: total yield, SH.I: fruit shape index and T.S.S%.: total soluble solids %.

The Genotype-mean performances of the selected lines:

The mean performance of the selected lines for vegetative traits, yield components and fruit quality traits were obtained and the means are presented in Table 2 : Significant differences were observed in plant height (PH cms) among the different lines compared with the check var. The line LW.26-1 recorded the highest one with 89.15 cm followed by the line LW.5-2 with 84.3 4cm. while the plant height of check var. did not exceed 66.84 cms. On the other hand, four lines were shorter than the check var. (LW.8-1, LW.18-1, LW.34-1 and LW.24-2). Close values of plant height were obtained by (Khan *et al* ., 2013) when they studied the genetic variability in local lines of eggplant.

Regarding number of branches per plant (NB/P), the line LW.26-1 gave the highest number of branches per plant comparing with the check var.(Table2) while the rest ranged between 5 to 7 branches per plant. In general, close values of this trait were observed and no great variability in this trait was observed during the different cycles of selection.

In contrast, leave area (LA cm^2)exhibited broad range of variability where ranged from 67.15 cm^2 to 94.47 cm^2. The lines LW.5-2 and LW.8-1 showed the most extensive vegetative growth genotypes. Regarding days to flower (DTF), also significant differences were observed among the selected lines and relative to check var. The LW.5-2 line gave the earliest flowers comparing with the other lines and check var. with 48.78 days. In contrast, the line LW.30-3 was the later one with 63.81 days until flowering, fifteen days more than LW.5-2. On the other hand, LW.5-2 was earlier than the check var. by about one week which represents a desirable market price for early eggplant production.

In respect of the early yield (EY/P kgs) which estimated by adding the weight of the first two picked fruits per plant is presented in (Table 2) .The early yield ranged from 0.464 kg to 0.978 kg per plant. In the same context, the LW.39-2 line gave the highest early yield but equal to check var. (0.971 kg). Whereas, the lines LW.15-1, LW.8-1 and LW.39-2 recorded the largest yield per plant (Y/P kgs) 2.573, 2.317 and 2.115 kg/plant, respectively comparing with the check var.

Regarding number of fruits per plant (NF/P), the line LW.26-1 gave more fruits, 13.25, comparing with the check var. and also the rest of evaluated lines but less in total productivity with 1.324 kg/plant. This could be attributed to the relative small size of its fruits, about 100 grams, comparing with the other fruits of evaluated lines.

Regarding average fruit weight (AFW kgs) which represents the main component of eggplant yield, it ranged from 100.3 grams to 204.1 grams. Six of ten lines exhibited average fruit weight inferior than the check var. while only few lines exceed the check var. value but without significant differences. This fact revealed that during different cycles of selection, the increase in fruit weight was not effective enough or modest to induce a significant value in fruit weight of eggplant. On the other hand, selection could segregate the inferior genotypes among the original population and increasing or concentrate the favorable alleles and discard the unfavorable genetic factors from the original population.

The same finding was observed for shape index of fruit (SHI) where no different forms of fruits could be detected during the different cycles of selection. Finally, total soluble solids (TSS%), significant differences were observed between the line LW.24-2 and the check var. at 5.233 % of probability while no significant differences were detected for the other lines (Table 2).

Table 2. Mean performances of the evaluated breeding lines for vegetative, yield and fruit quality traits in eggplant compared with check variety.

Genotypes		PH cms	NB/P	LA cm^2	DTF	EY/P kgs	NF/P	AFW grams	Y/P kgs	SHI	TSS
LW.5-2		84.34	7.015	94.47	48.78	0.781	9.513	199.1	1.893	3.254	4.703
LW.8-1		50.28	5.308	90.01	58.26	0.783	12.35	187.3	2.317	4.235	3.905
LW.15-1		67.91	6.072	71.86	62.35	0.905	12.69	204.1	2.573	4.013	4.470
LW.18-1		55.78	5.301	77.35	63.04	0.464	10.08	184.3	1.846	3.191	4.075
LW.24-2		58.26	5.973	83.64	54.88	0.546	11.84	201.0	1.947	2.985	5.233
LW.26-1		89.15	8.711	67.15	58.52	0.754	13.25	100.3	1.324	4.285	4.664
LW.30-3		71.77	7.015	85.76	63.8 1	0.949	9.634	106.6	1.027	3.753	4.276
LW.34-1		48.92	5.275	89.03	57.07	0.816	8.641	188.6	1.632	4.665	3.971
LW.39-2		81.25	7.371	79.04	56.26	0.978	10.85	195.1	2.115	3.981	3.872
LW.47-4		69.66	6.025	69.77	60.25	0.872	9.578	179.9	1.723	3.375	3.810
check var.		66.84	7.037	89.14	56.89	0.971	10.55	191.5	2.011	3.702	4.264
LSD	5%	9.191	0.864	11.77	4.698	0.214	1.107	34.55	0.997	0.351	1.042
	1%	10.62	0.995	13.65	5.428	0.241	1.244	39.97	1.153	0.404	1.216

plant height PH in (cm),N.B.P: number of branches, LA : in (cm^2), D.T.F: days to flowering, EY/P: early yield per plant in (kg), NF/P: number of fruits per plant, A.F.W: average fruit weight in (kg), Y/P: total yield, SH.I: fruit shape index and T.S.S%.: total soluble solids %.

Homogeneity of selected lines :

Under directional selection, the genetic variance decreases due to linkage disequilibrium. Hence, after a few cycles of selection, a limit is reached where there is no further reduction in the genetic variance. In this context, obtaining of genetic parameters, as coefficient of variance, phenotypic components are of a great importance of any improvement program. coefficient of variance, phenotypic components are of a great importance of any improvement program.The coefficient of variance was estimated and presented in Table 3: for some vegetative, yield components and fruit traits after four cycles of selection in ten lines in addition to check var. For plant height (PH cm^2), the coefficient of variance ranged from 1.126 % to 5.525% along the ten evaluated lines. Seven of ten lines exhibited coefficient of variance less than the original population while the lines LW.26-1 and LW.8-1 have the less values of coefficient of variance revealed the homogeneity between their plants. For number of branches per plant (NB/P), there were two contrast cases. Some lines gave coefficient of variance more than the original population while only four lines showed coefficient of variance less than the original population. In contrast, the evaluated lines remained with low coefficient of variance for leave area trait (LA cm^2), less than 1.00 however some of the lines gave higher values of coefficient of variance more than the original population. Similar finding was reported for days to flowering trait (DTF), where the majority of lines exhibited coefficient of variance less than 1.00 except the lines LW.47-4 and LW.39-2, which gave 6.466% and 3.323%, respectively. Whereas variability within plants for each evaluated line was relatively high for early yield per plant (EY/P kgs).

This fact revealed by the broad range of coefficient of variance that ranged from 2.094 % to 75.02%. For number of fruits per plant (NF/P), it worth to note that this trait highly depended on the genotype and there was a moderate variation within plants of the same line. Coefficient of variance ranged from 1.187 % to 6.365 % for LW.26-1 and LW.30-3, respectively . The lines LW.8-1, LW.24-2, LW.26-1 and LW.39-2 showed lower variation within their plants comparing with the original population. For average fruit weight (AFW kgs), in general, there was high similarity of fruit weight within the plants of each evaluated line, consequently, low values of Coefficient of variance were observed and reported as less than one for all studied lines with close values to original population check var.Regarding total yield per plant (Y/P kgs), as it known this trait represent the outcome of different physiological and morphological traits which controlled by multiple genes often with dominant effect. However, inbreeding and the sequent generation of selefing could affect negatively on yield as a result of inbreeding depression. The mean performance of the different lines comparing with the original population check var. could confirm this finding that most of the lines gave inferior yield comparing with the original population. Generally, its coefficient of variance ranged from 1.307% to 6.497% (Table 3).

For shape fruit index(SHI) and total soluble solids (TSS %), coefficient of variance varied from 1.924 % to 6.896 % for shape index and from 2.805 % to 15.05 % for total soluble solids. In this context, low variation was detected with plants for shape form type long black fruits. In respect of total soluble solids, there was high variation relative to original population check var. since few inbred lines showed high similarity with their plants in particular the lines LW.8-1 and LW.26-1 (Table 3). Similar finding was reported by different authors among them (Kailash–Ram *et al*. 2007; Golani *et al*. 2007 and Prabhu *et al*. 2007) who found high genotypic coefficient of variation in eggplant for plant height, early and total yield, and average fruit weight. In this context, they demonstrated that the role of additive gene action in the improvement of brinjal yield and other characters by applying of simple selection.

Table 3. Coefficient of variance (CV%) values for ten lines subjected to four cycles of selection for vegetative, yield and fruit quality traits in eggplant.

Genotypes	PH cms	NB/P	LA cm^2	DTF	EY/P kgs	NF/P	AFW grams	Y/P kgs	SHI	TSS
LW.5-2	2.27	4.37	0.34	0.94	22.2	4.12	0.16	4.77	4.47	6.39
LW.8-1	1.74	2.90	0.17	0.27	7.72	1.26	0.08	1.98	2.01	2.80
LW.15-1	5.52	9.86	0.86	0.99	62.4	4.77	0.31	5.07	6.89	15.0
LW.18-1	3.22	5.73	0.40	0.58	6.70	3.23	0.17	3.40	3.39	7.59
LW.24-2	3.19	5.14	0.37	0.58	5.62	2.59	0.17	2.76	3.13	7.33
LW.26-1	1.12	2.09	0.27	0.38	2.09	1.18	0.12	1.30	1.92	2.94
LW.30-3	5.21	8.80	0.91	0.94	62.5	6.36	0.45	6.49	6.52	14.5
LW.34-1	3.50	5.87	0.75	0.63	40.5	4.40	0.21	4.60	4.19	7.40
LW.39-2	2.82	4.18	0.55	3.32	30.1	2.81	0.16	2.97	3.88	7.84
LW.47-4	5.02	9.48	0.88	6.46	75.0	6.12	0.35	6.46	6.46	15.0
check var.	4.74	4.52	0.35	0.56	32.5	3.01	0.17	3.16	3.46	7.42

plant height PH in (cm),N.B.P: number of branches, LA : in (cm^2), D.T.F: days to flowering, EY/P: early yield per plant in (kg), NF/P: number of fruits per plant, A.F.W: average fruit weight in (kg), Y/P: total yield, SH.I: fruit shape index and T.S.S%.: total soluble solids %.

Phenotypic and Genotypic parameters :

Estimation of phenotypic and genetic parameters represents a critical point for the viability of the improvement progress which could orient in strategy decision for selection efficiency. In this context, different parameters were estimated in current study for vegetative traits, yield components and some fruits quality traits in eggplant and presented in Table 4 : The magnitude of the genetic variation between lines was the most important part comparing with genetic variation within plants for all studied traits. This fact revealed that the high homogeneity that reached by the different cycles of selection in addition to maximizing the additive genetic variance within the same line and minimizing this gene action between the different lines. On the other hand, phenotypic variance within plants always remained the lowest part comparing with both genetic variances wither within or between lines.

Whereas, the coefficient of heritability in broad sense was great for all studied traits that revealed the magnitude of genetic factors in the expression of phenotypic performance. Estimates of environmental variance (oe2), genetical variance(og2), plant phenotypic variance (op2), genotypic coefficient of variation (G.C.V% $_{\text{within lines}}$ and G.C.V% $_{\text{between lines}}$), ratio and broad-sense heritability (H2Bs) for the studied traits are listed in Table(4):

The variance was varied from trait to another, since the genetic variance (og2$_{within\ lines}$ and og2$_{between\ lines}$), estimated for the studied traits were ranged from: 0.028% to 1336.6% for early yield per plant ; average fruit weight and 0.082 to 4009.8 for same traits ; respectively. In this respect, the remaining traits showed low values of difference between plant phenotypic and genetic variance, indicating that, the large portion of the plant phenotypic variance (op2) was due to the genetic variance (og2) and the observed significant differences among the selected lines are genetically.

Table 4. Genetic and phenotypic parameters for vegetative, yield and fruit quality traits evaluated in ten lines resulted from four cycles of selection.

Parameter	PH cms	NB/P	LA cm^2	DTF	EY/P kgs	NF/P	AFW grams	Y/P kgs	SHI	TSS
g $_{within\ lines.}\sigma^2$	181.0	1.137	82.62	18.26	0.028	2.238	1336.6	0.177	0.274	0.182
g $_{between\ lines}\sigma^2$	543.0	3.411	247.9	54.79	0.082	6.713	4009.8	0.532	0.822	0.548
$\sigma^2 Ph$ $_{within\ lines}$	0.391	0.042	0.042	0.644	0.042	0.050	0.675	0.010	0.007	0.042
$\sigma^2 e$	2.299	0.012	3.884	0.489	0.007	0.023	33.42	0.026	0.002	0.022
$H^2 bs$	0.995	0.994	0.984	0.989	0.985	0.993	0.996	0.950	0.991	0.946
GCV % $_{within\ lines}$	19.91	16.53	11.15	7.354	20.81	13.86	20.75	22.69	13.89	9.957
GCV % $_{between\ lines}$	34.49	28.63	19.31	12.72	36.04	24.00	35.94	39.29	24.07	17.25

plant height PH in (cm),N.B.P: number of branches, LA : in (cm^2), D.T.F: days to flowering, EY/P: early yield per plant in (kg), NF/P: number of fruits per plant, A.F.W: average fruit weight in (kg), Y/P: total yield, SH.I: fruit shape index and T.S.S%.: total soluble solids %.

For genotypic and plant phenotypic coefficient of variations (G.C.V% $_{within\ lines}$ and G.C.V% $_{between\ lines}$), estimated for the studied trait were: 7.534 to 22.69 for days to flowering and total yield per plant; 12.72; 39.29 for the same traits. Obtained broad-sence heritability (H2Bs) values for the studied traits ranged from 0.946 to 0.996, suggesting moderate to high values of heritability. The highest two value 0.994 and 0.995 were obtained from plant high and number of branches per plant, respectively.

Finally, genotypic coefficient of variation between lines was higher more than within plants which reflect the magnitude of the dominant gene action that concentrated between the different lines as a result of homozigozity case within each evaluated line. This type of gene action always recovers by hybridization between the distanced homogenous lines generating hybrid vigor or heterosis phenomena. Similar results were obtained by Mohanty and Prusti (2002) and Das *et al*. (2002) who reported high values of genotypic coefficient of variation and heritability for total yield and average fruit weight. In addition they reported that the potential using of simple selection for genetic improvement of eggplant.

In conclusion, through the early segregating generations, black eggplant could be improved through applying simple selection based on phenotypic expression of the studied traits where selection would be effective in isolation and identification of promising lines in eggplant. The line LW.15-1 showed good performance in average fruit weight and total yield per plant comparing with the other lines and original population. While the line LW.26-1 was a good donor for both plant high ,number of branches per plant and number of fruits per plant but with relative small fruit size comparing with the other lines. At the sometimes the line LW.5-2 exhibited the earliest flowers the most extensive vegetative growth genotypes comparing with the other lines. In current study, the lines LW.5-2, LW.15-1 and LW.26-1 are highly recommended for direct integration or as parental lines for F_1 eggplant improvement.

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تحسين الباذنجان الابيض بانتخاب السلالة النقية

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نتج عن التحسين الوراثى للباذنجان عدد كبير من الاصناف التجارية. هذه الاصناف تم الحصول عليها من السلالات المحلية حيث يتميز الصنف البلدى بوجود مدى واسع من التنوع الوراثى متمثلة فى الصفات الخضرية والزهريه و الثمرية . كان الهدف من هذه الدراسة تطوير سلالات واعدة من الباذنجان كنواة لانتاج الهجن المحلية او للاستخدام المباشر كسلالات مفتوحة التلقيح ومتماثلة وراثياً فيما بينها. تمت هذه الدراسة خلال العروة الصيفية للاعوام مابين 2010 و حتى 2014 فى المزرعة البحثية بالبرامون مركز المنصورة محافظة الدقهلية. تم استخدام الصنف البلدى من الباذنجان الابيض الطويل كاساس للتحسين الوراثى فى هذه الدراسة. تم عزل النباتات ذات الاختلافات المورفولجية بناءا على قوة النمو و شكل الازهار خلال الموسم الاول و تكييس ازهارها فى مرحلة البرعم لضمان حدوث التلقيح الذاتى و تجنب اى خلط. فى المواسم التالية تم تطبيق الانتخاب داخل وبين النباتات المنتخبة الناتجة عن كل دورة انتخاب سابقة حتى الوصول الى الجيل الرابع الانتخابى . تم تقدير الصفات التالية للنباتات المنتخبة: طول النبات، عدد الافرع، المساحة الورقية، عدد الايام حتى الازهار، المحصول المبكر،عدد الثمار، متوسط وزن الثمرة، المحصول الكلى، معامل الشكل الثمرى و نسبة المواد الصلبة الذائبة الكلية. تم تقدير بعض المؤشرات المظهرية و الوراثية بعد اربع دورات من الانتخاب لعشرة سلالات بالاضافة الى العشيرة الاصلية للمقارنة. اظهر تحليل التباين وجود اختلافات وفروق معنوية بين تلك السلالات الناتجة فى جميع الصفات المدروسه. اظهرت السلالة LW.15-1 اداء جيد من حيث متوسط وزن الثمرة و محصول النبات الكلى مقارنة ببقية السلالات. بينما كانت السلالة LW.26-1 معطى جيد لكل من ارتفاع النبات وعدد الافرع و عدد الثمار على النبات ولكن مع تدنى حجم ثمارها. اظهرت تقديرات معامل الانتخاب ان السلالات المنتخبة اصبحت عالية التجانس وان اختلف المعامل من صفه الى اخرى وكان معامل الاختلاف الراجع للتباين الوراثى وكذلك الكفائه الوراثية بين السلالات المنتخبة هو الاهم مقارنة بالتباين الوراثى داخل السلالات نفسها لمعظم الصفات المدروسة.وتميزت صفة طول النبات : 34.49 مقابل 19.91% وكفائه وراثيه مقدارها 0.995 وكذلك صفة متوسط وزن الثمرة : 35.94 مقابل 20.75 وكفائه وراثيه مقدارها 0.996 .كما تشيرالنتائج الى أهمية الانتخاب المبكر معتمداً على الشكل المظهرى فى تحسين الباذنجان لعزل و تحديد السلالات الفائقه منه. وبناءاً عليه يمكن التوصية باستخدام كل من السلالات LW.15-1 , LW.5-2 وLW.26-1 للاستخدام المباشر او لانتاج هجن الجيل الاول .