

Morphological Evaluation of some Tomato Somaclones Variation under Field Conditions

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ABSTRACT

The current study was carried out at the Department of Genetics, Faculty of Agriculture, Tanta University, Egypt. The Experiment was carried out at a private farm, Kafr El-Sheikh, Egypt, during 2010 and 2015 seasons which including producing somaclones, greenhouse evaluation and field experiment evaluation. Field evaluation experiment was conducted during 2015 season. Four tomato varieties, Super StrainB, Castle Rock, AdvantageII, and Edkawy were used in this study. Ten somaclones has been driven from each variety. Yield and yield components, quality and some physiological characteristics were evaluated for all tomato genotypes. The results showed highly significant differences among somaclones and their original cultivar in all studied traits. Generally, SE10 somaclone driven from Edkawy gave the highest values of plant height, number of leaves and number of clusters, while the highest values of number of branches /plant were produced by SE1 driven from the same variety. The highest values of number of fruit/plant and total yield /plant as well as fruit firmness and fruit weight were recorded by SA6 driven from Advantage II variety. The highest values of chlorophyll content was produced by SS5 driven from Super StrainB. Somaclone SA2 driven from Advantage II variety had the largest size. Somaclone SC7 driven from Castle Rock showed the highest mean of TSS%.

Keywords: Tomato. Somaclones, Yield and quality.

INTRODUCTION

Tomato is deemed as one of the most vital vegetable crops in Egypt and the global. It comes in the second rank as vegetable crop in the world next to potato (Bhatia *et al.*, 2005; kumar and Dudi, 2011 and Osekita and Ademiluyi, 2014). Moreover, it is a temperate crop plant, but it is extensively cultivated in the tropical and subtropical regions of the world round the year. The tomato crop has several purpose and grown either for fresh market or processing. It has high concentration of in vitamin A, C and minerals like Ca, P and Fe as well as fiber and cholesterol free (Rao and Agarwall, 2000; Devi *et al.*2008). Tomato fruits are used fresh for eating in all table worldwide as salad or it is used in processing pastes and ketchup productions. Tomato is an optimum subject as a model plant for physiological and classical genetic studies. Tomato has a relatively short life cycle and easy to cross with wild species (Dielen *et al.*, 2001). Somaclonal variation as a common phenomenon in plant cell cultures includes all types of variations among plants or cells and derives from all kinds of tissue cultures (Larkin and Scowcroft 1981; Evans *et al.*,1986; Filipecki and Malepszy 2006). When plants are regenerated from somatic cells by cell culture, many show genetic variability. The best application of somaclonal variation to conventional plant breeding lines in introducing the best available varieties into cell culture and selecting among regenerated plants or their progeny for the desired changes. Although somaclonal variation has been studied extensively, the mechanism by which it occurs remains largely either unknown or at the level of theoretical speculation in perennial fruit crops (Leva *et al.*,2012). Several studies have reported the involvement of plant growth regulators used for regeneration of tissue culture and antibiotics used for transformant selection in somaclonal variations (Gaj, 2004). Morphological markers usually are used to identify species, genera and families in germoplasm collections. Somaclonal variants can be detected easily by morphological characteristics, such as plant height, leaf morphology and abnormal pigmentation

(Israeli *et al.*, 1991). For example, a sweet cherry (*Prunus avium*) somaclonal variant was characterized by morphological and parameters, namely evaluation of plant vigor, leaf morphology, stomatal density, photosynthesis activity, the formation of floral buds, and the size, shape and color of the fruit. Ghasemi *et al.*, (2015) evaluated some qualitative and quantitative traits in fruits of five tomato (*lycopersicum*) cultivars. These traits were vitamin C content, pH, total soluble solids (TSS), titrable acidity, fruit diameter, fruit volume, fruit firmness, fresh weight and dry weight. Studied cultivars were Matin F1, Yaghoot, Sunseed, Sadeen and Raha. The results showed that there were significant differences in evaluated parameters among cultivars. The highest contents of vitamin C (36.32mg. 100 g-l), diameter (6.77 cm), volume (22.25 cm³), firmness (2.45 kg. cm⁻²), fresh weight (194.29 g) and dry weight (11.3 g) were belonged to the cultivar Sunseed, The highest pH (4.3) and TSS (2.49 %) were belonged to the cultivars Yaghoot and Matin F1, respectively. The cultivar Yaghoot also showed the lowest contents of vitamin C (21.37 mg. 100 g-l), TSS (1.65 %), titrable acidity (0.274 %), diameter (5.3 cm), volume (158.75 cm³), firmness (1.825 kg. cm⁻²), fresh weight (102.55 g) and dry weight (6.19 g) in compare with other cultivars. Thus based on the results, the cultivar Sunseed can be as a valuable cultivar among other cultivars, because the highest contents of vitamin C, diameter, volume, firmness, fresh weight and dry weight were belonged to this cultivar. The main objective of the current study is morphological evaluating some tomato somaclones under open field.

MATERIALS AND METHODS

This work was carried out at the Department of Genetics, Faculty of Agriculture, Tanta University, Egypt. The Experiment farm was carried out at a private farm, Kafr El-Sheikh, Egypt, during 2014 and 2015 seasons.

Plant Materials:

Four commercial varieties of tomato (*Lycopersicon esculentum* Mill.) were used in the present study and forty somaclones derived from them (Table1). The forty somaclones were provided by Prof. Dr. Abdel-Hamed

Abdel-Hamed Ali (Genetics Dept., Fac. Agric., Kafrelsheikh Univ.).

Table 1. Name of parental genotypes and their somaclones.

Varieties Somaclones	Super strain B	Castle Rock	Advantage II	Edkawy
1	SS1	SC1	SA1	SE1
2	SS2	SC2	SA2	SE2
3	SS3	SC3	SA3	SE3
4	SS4	SC4	SA4	SE4
5	SS5	SC5	SA5	SE5
6	SS6	SC6	SA6	SE6
7	SS7	SC7	SA7	SE7
8	SS8	SC8	SA8	SE8
9	SS9	SC9	SA9	SE9
10	SS10	SC10	SA10	SE10

Studied traits:

- 1) Plant height (cm) :** it was measured in centimeters from the base of the plant to its top.
- 2) Number of leaves per plant .**
- 3) Number of clusters per plant.**
- 4) Number of fruits per cluster.**
- 5) Number of fruits per plant.**
- 6) Total yield per plant :** Total yield weight (kg/plant) of all harvested fruits was recorded.
- 7) Fruit weight(g).**
- 8) Fruit size (cm³)** Five fruits were randomly taken from each plant to determine the weight and size.
- 9) Fruit firmness:** it was measured on the two opposite sides of the fruit using fruit pressure tester with a sunken diameter of 1 cm and read gm/cm².
- 10) Total soluble solids (TSS% Brix):** they were determined by using a hand refractometer (Cox and Pearson, 1962)
- 11) Chlorophyll a content (mg/dm²).**
- 12) Chlorophyll b content (mg/dm²).**
- 13) Total Chlorophyll content (mg/dm²) (Chlorophyll a+b)** The leaf pigments (chlorophyll a, b and chlorophyll a+b) of the 6th leaf of the growing tip of plant were estimated by spectrolorimeter, as described by Moran and Porath (1982) after 90 days from transplanting in both seasons. The concentration of chl.a and chl.b was calculated by substituting the reading in the following equations
- 14) Number of branches / plant .**

Statistical analysis:

Means and variations of studied traits were calculated . A regular analysis of variance of randomized complete blocks design was conducted. Data obtained in this study were statistically analyzed using the analysis variance (ANOVA) according to Gomez and Gomez (1984). Duncan's multiple Range test was used for the comparison among genotypes means (Duncan, 1955).

RESULTS

Fourteen characters were evaluated for the forty somaclones compared with their original cultivar (Advantage II , Super Strain B, Castle Rock and Edkawy).

The results showed highly significant differences among somaclones and their original cultivar in all studied traits . For Advantage II cultivar and its somaclones, the

obtained data revealed significant improvement in its driven somaclones in all estimated traits. The somaclone SA1 gave the highest mean value in plant height, number of branches/plant, while the somaclone SA6 gave the highest mean value in number of leaves, number of branches/ plant, number of fruits/cluster, number of fruits/ plant, total yield/plant compared with the original cultivar, fruit weight (gm) and fruit firmness (g/cm²) traits (Tables 2,3,4 and 5).

Table 2. Morphological characters of tomato cultivar Advantage II, Super Strain B, Castle Rock and Edkawy and their somaclones .

	Plant height (cm)	No. leaves	No of branches/ plant
Advantage II	76.00 m	152.3 m	5.000 e
SA1	116.3 c	212.7 g	7.000 b
SA2	95.00 g	231.3 e	6.000 c
SA3	85.00 ij	172.0 k	5.000 e
SA4	92.00 h	252.7 c	7.000 b
SA5	76.33 m	192.3 i	6.000 c
SA6	91.33 h	262.0 b	7.000 b
SA7	85.00 ij	192.3 i	5.000 e
SA8	96.33 g	182.0 j	7.000 b
SA9	85.33 ij	202.7 h	5.000 e
SA10	101.0 f	201.7 h	6.000 c
Super Strain B	80.00 l	150.0 m	4.000 f
SS1	100.0 f	180.0 j	5.033 e
SS2	95.00 g	180.0 j	4.000 f
SS3	95.00 g	190.0 i	4.000 f
SS4	90.00 h	190.0 i	4.000 f
SS5	95.00 g	201.0 h	4.033 f
SS6	95.00 g	171.0 k	3.000 g
SS7	101.0 f	161.0 l	4.000 f
SS8	111.0 d	221.0 f	4.100 f
SS9	106.0 e	253.0 c	4.000 f
SS10	101.0 f	222.0 f	3.000 g
Castle Rock	60.00 n	132.7 n	4.000 f
SC1	81.33 l	152.0 m	5.000 e
SC2	81.00 l	202.7 h	6.000 c
SC3	83.67 jk	181.3 j	5.500 d
SC4	92.00 h	202.0 h	5.000 e
SC5	96.00 g	222.0 f	5.000 e
SC6	111.7 d	252.7 c	6.000 c
SC7	86.33 i	202.7	6.000 c
SC8	82.00 kl	212.0 g	6.000 c
SC9	90.00 h	182.7 j	5.000 e
SC10	91.00 h	181.3 j	4.000 f
Edkawy	81.67 kl	222.0 f	6.000 c
SE1	106.0 e	252.7 c	8.000 a
SE2	96.33 g	242.7 d	6.000 c
SE3	96.33 g	252.0 c	7.000 b
SE4	101.0 f	252.7 c	7.000 b
SE5	101.7 f	241.7 d	7.330 b
SE6	102.0 f	221.7 f	7.067 b
SE7	102.3 f	251.3 c	7.000 b
SE8	127.3 b	262.7 b	6.000 c
SE9	95.00 g	212.7 g	6.000 c
SE10	131.3 a	301.7 a	7.000 b

Table 3. Morphological characters of tomato cultivar Advantage II, Super Strain B, Castle Rock and Edkawy and their somaclones .

	Plant height (cm)	No of leaves	No of branches/ plant
Advantage II	76.00 m	152.3 m	5.000 e
SA1	116.3 c	212.7 g	7.000 b
SA2	95.00 g	231.3 e	6.000 c
SA3	85.00 ij	172.0 k	5.000 e
SA4	92.00 h	252.7 c	7.000 b
SA5	76.33 m	192.3 i	6.000 c
SA6	91.33 h	262.0 b	7.000 b
SA7	85.00 ij	192.3 i	5.000 e
SA8	96.33 g	182.0 j	7.000 b
SA9	85.33 ij	202.7 h	5.000 e
SA10	101.0 f	201.7 h	6.000 c
Super Strain B	80.00 l	150.0 m	4.000 f
SS1	100.0 f	180.0 j	5.033 e
SS2	95.00 g	180.0 j	4.000 f
SS3	95.00 g	190.0 i	4.000 f
SS4	90.00 h	190.0 i	4.000 f
SS5	95.00 g	201.0 h	4.033 f
SS6	95.00 g	171.0 k	3.000 g
SS7	101.0 f	161.0 l	4.000 f
SS8	111.0 d	221.0 f	4.100 f
SS9	106.0 e	253.0 c	4.000 f
SS10	101.0 f	222.0 f	3.000 g
Castle Rock	60.00 n	132.7 n	4.000 f
SC1	81.33 l	152.0 m	5.000 e
SC2	81.00 l	202.7 h	6.000 c
SC3	83.67 jk	181.3 j	5.500 d
SC4	92.00 h	202.0 h	5.000 e
SC5	96.00 g	222.0 f	5.000 e
SC6	111.7 d	252.7 c	6.000 c
SC7	86.33 i	202.7	6.000 c
SC8	82.00 kl	212.0 g	6.000 c
SC9	90.00 h	182.7 j	5.000 e
SC10	91.00 h	181.3 j	4.000 f
Edkawy	81.67 kl	222.0 f	6.000 c
SE1	106.0 e	252.7 c	8.000 a
SE2	96.33 g	242.7 d	6.000 c
SE3	96.33 g	252.0 c	7.000 b
SE4	101.0 f	252.7 c	7.000 b
SE5	101.7 f	241.7 d	7.330 b
SE6	102.0 f	221.7 f	7.067 b
SE7	102.3 f	251.3 c	7.000 b
SE8	127.3 b	262.7 b	6.000 c
SE9	95.00 g	212.7 g	6.000 c
SE10	131.3 a	301.7 a	7.000 b

The somaclone SA4 gave the highest mean value in number of branches/ plant total yield/ plant and TSS (%) traits, while the somaclone SA2 gave the highest mean values in fruit size (cm³) trait in the season. Regarding the Super strain variety and its driven somaclones, data in Tables, 2, 3, 4 & 5 showed that there significant differences between Super Strain and its driven somaclones in measured characteristics under field conditions. The somaclone SS8 gave the highest mean value in plant height, number of cluster/plant, number of fruits/ plant traits compared with the original cultivar mean while, the somaclone SS9 gave the highest mean values in number of leave trait in the season.

Table 4. Physiological characters of tomato cultivar Advantage II, Super Strain B, Castle Rock and Edkawy and their somaclones.

Traits Genotypes	Chlorophy II A (mg/dm ²)	Chlorophy II B (mg/dm ²)	ChlorophyII A +B (mg/dm ²)
Advantage	8.32e-j	4.020m-r	12.34 j-l
SA1	7.910 j-q	4.617f-j	12.52h-l
SA2	7.827 k-r	4.597f-j	12.42i-l
SA3	7.410 r-t	4.517g-l	11.92k-n
SA4	8.117g-m	3.997n-s	12.11k-m
SA5	7.980i-p	4.110 k-r	12.09k-m
SA6	7.540p-t	4.067l-r	11.60m-o
SA7	9.023ab	4.990c-f	14.02bc
SA8	7.307t	3.770 q-u	11.08o-q
SA9	7.483q-t	3.430tu	10.92pq
SA10	8.597b-f	4.803e-i	13.40 c-f
Super Strain B	8.137g-l	4.840d-h	12.98f-i
SS1	8.410 ei	4.153j-q	12.56g-k
SS2	8.593b-f	4.497g-l	13.09e-h
SS3	8.160 f-k	3.850p-t	12.01k-n
SS4	8.723 a-e	4.470g-m	13.19d-g
SS5	9.097a	5.540 ab	14.64a
SS6	8.600b-f	4.577 f-j	13.18d-g
SS7	8.100g-m	3.767 q-u	11.87l-n
SS8	8.500c-g	4.907 c-g	13.41c-f
SS9	7.807k-s	4.570f-k	12.38i-l
SS10	7.617 n-t	4.437h-n	12.05k-n
Castle Rock	8.450 d-h	4.740e-i	13.19d-g
SC1	7.690 m-t	3.967o-s	11.66 m-o
SC2	8.853a-d	5.330 ac	14.19ab
SC3	7.403r-t	3.540s-u	10.94pq
SC4	7.373st	3.660r-u	11.04o-q
SC5	8.990ab	4.847d-h	13.84bc
SC6	8.397e-i	5.270ad	13.66b-e
SC7	7.710l-f	4.267j-p	11.98k-n
SC8	8.927a-c	4.553f-k	13.48c-f
SC9	7.990I-o	5.130b-e	3.13e-h
SC10	8.347 e-j	5.453ab	13.80b-d
Edkawy	8.213f-k	5.590a	13.80b-d
SE1	7.963i-p	3.690r-u	11.65m-o
SE2	7.980i-p	4.540 f-k	12.52h-l
SE3	8.713a-e	5.150b-e	13.86bc
SE4	7.390r-t	4.030 m-r	11.42n-p
SE5	8.030h-n	3.900o-s	11.93k-n
SE6	7.7597n-t	3.560s-u	11.16o-q
SE7	7.637 n-t	4.343i-o	11.98k-n
SE8	7.440rt	3.320u	10.76q
SE9	7.567o-t	3.677r-u	11.24o-q
SE10	8.487d-g	4.453g-m	12.94f-j

The somaclone SS1 gave the highest mean values in branches/plant , total yield/plant and TSS (%) traits, while, the somaclone SS7 gave the highest mean values in number of fruits/ cluster in the season. The somaclone SS3 gave the highest mean values in weight (gm) and fruit size (cm³). Meanwhile, the somaclone SS6 recorded the highest mean values in fruit firmness (g/cm²) trait in the season. With respect to Castle Rock cultivar and its driven somaclones , the data showed that great variation was detected between it and their corresponding driven somaclones in all measured traits. The somaclones driven from Castle Rock showed significant improvement in its performance and yield over it original (Tables 2,3,4 and 5).

Table 5. Fruit quality traits of tomato cultivar Advantage II, Super Strain B, Castle Rock and Edkawy and their somaclones

Traits	Fruit weight (g)	Fruit size (cm ³)	Fruit firmness (g/cm)	TSS %
Genotypes				
AdvantageII	141.0 z	155.0m-p	5.467e	5.067ef
SA1	251.3 I	285.3d-i	6.533a	5.067ef
SA2	370.31 a	411.3a	6.067c	4.033i
SA3	210.3 o	240.3h-I	5.567e	4.033i
SA4	184.7 t	202.0-n	6.533a	6.033a
SA5	170.3v	197.31-o	6.567a	5.100 d-f
SA6	371.3a	405.3a	6.600a	4.033i
SA7	155.3 x	181.31-o	6.033c	4.067i
SA8	311.7d	345.7b-d	6.067c	5.033ef
SA9	171.7v	192.71-o	5.567e	5.033ef
SA10	161.3w	185.7lm-o	5.033f	4.067i
Super Strain B				
SS1	235.3rs	271.3f-j	6.033c	5.833b
SS2	245.0 n	281.3e-i	6.067c	5.033ef
SS3	300.3 g	340.3b-e	5.467e	4.833g
SS4	250.3 lm	279.7e-i	5.067f	4.067i
SS5	130.3 z-	150.3n-p	6.033c	5.233d
SS6	147.3 y	164.7m-p	6.533a	4.033 i
SS7	179.7 u	138.1op	5.767d	4.033 i
SS8	275.3 j	208.6k-n	6.033c	4.067 i
SS9	265.7 k	294.7c-h	6.233b	4.033i
SS10	244.3 n	279.7e-i	5.533e	5.167 de
Castle Rock				
SC1	99.67 z-	116.3p	6.067c	4.033 i
SC2	121.3 z-	136.7op	6.033c	5.033ef
SC3	185.3 t	204.3k-n	6.067c	4.067i
SC4	200.3 r	230.3i-I	6.033c	5.033ef
SC5	247.3mn	279.7e-i	6.033c	4.967fg
SC6	189.7s	214.7j-m	5.533e	5.033ef
SC7	227.7p	260.3g-k	6.033c	6.033a
SC8	180.3u	205.3k-n	6.033c	5.633c
SC9	139.7z	155.3m-p	5.833 d	5.033ef
SC10	160.3w	185.3l-o	5.567 e	5.533c
Edkawy				
SE1	263.0k	285.7d-i	4.067h	5.067ef
SE2	227.3j	300.0c-h	4.533g	4.033i
SE3	303.7f	331.3b-f	3.533i	4.067i
SE4	284.3i	307.7c-g	4.06h	5.067ef
SE5	307.3e	340.7b-e	4.567g	5.100d-f
SE6	311.0d	340.7b-e	5.033f	4.533h
SE7	302.7fg	333.7b-f	4.033h	5.067ef
SE8	320.0c	350.0bc	4.100h	5.033ef
SE9	290.0h	316.0c-g	5.067f	5.067ef
SE10	352.3b	391.0ab	4.033h	5.533c

The somaclone SC6 gave the highest mean value in plant height, number of leaves and number of clusters/plant trait, while the somaclone SC5 was the best somaclone in total yield/ plant traits compared with the original cultivar (17.130 kg and 2.335 kg , respectively), number of fruits/ cluster , number of fruit/ plant, fruit weight (gm) and fruit size (cm³) traits in the season. The somaclone SC1 gave the highest mean value in fruit firmness(g/cm³), while the somaclone SC7 gave the highest mean value in TSS (%) trait in the season. As for of Edkawy cultivar and its somaclones, the data revealed that the somaclones SE10 gave the highest mean values in plant height, number of leaves plant⁻¹, number of cluster /plant, total yield/ plant compared with the original cultivar(19.68 and 6.248 kg /plant, respectively) fruit weight (gm), fruit size9cm³) and TSS % traits while, the somaclones SE1 was the best in number branches/plant

and number of fruit/plant traits. Furthermore, The somaclones SE6 gave the highest mean value in number of fruit/cluster, while, The somaclones SE9 were the best in fruit firmness (g/cm³) trait . It is mentioned here, each population traits some other somaclones gave the same trend of the superior somaclones and surpassed its parent under open field experiment conditions. Generally, SE10 somaclone driven from Edkawy gave the highest values of plant height, number of leaves and number of cluster while the highest values of number of branches /plant werproduced by SE1 driven from the same variety.

The highest values of number of fruit/plant and total yield /plant as well as fruit firmness and fruit weight were recorded by SA6 driven from advantage variety.

The highest values of chlorophyll content was produced by SS5 driven from Super Strain. Somaclone SA2 driven from Advantage variety had the largest size. Somaclone SC7 driven from castle Rocks showed the highest mean of TSS%. Similar results has been reported by Emami (2014) and Ghasemi *et al.*, (2015)

DISCUSSION

The obtained data indicated that there were highly significant differences among genotypes and somaclones in all studied traits. The most derived somaclones in this studied surpassed the original cultivars in the most traits. It clears that, the tissue culture created improvement and enhancement in most somaclones. Somatic tissue culture is important toal for crop improvement in plant breeding and is common application for induction of somaclones variation. Somaclone variation can be defined as variation among plants regenerated from in vitro culture (Larkin and Scowcroft,1981) and common phenomenon in plant tissue culture (Skirvin *et al.*,1994 and Ahloowalia *et al.*,1985).

Somaclonal variation is caused by changes in chromosome number (polyploidy or aneuploidy), damage to chromosomes (insertions, deletions, translocations, mutation, etc) or change in methylation of chromatin (Evans *et al.*, 1984; Kaeppler and Phillips, 1993 and Phillipp *et al.*,1994). Chromosome damage (structure) can occur through somatic crossing over, late replication in hereochromatic regions, transposable elements, point mutations, or chromosome rearrangements (Evans *et al.*,1984; Peschke and Phillips,1992). Tissue culture activation of retotransposons has also been demonstrated in *Oryza sativa* to induce somaclonal variation (Hirochika,1993). The variation observed in tissue culture clones are of two types, epigenetic and genetic. Changes in DNA methylation often give rise to epigenetic effect, which can cause expression of genes normally suppressed (Kaeppler *et al.*,2000). Epigenetic variation is often unstable and can disappear either after plants are removed from culture or with in few clone or sexual generation (Kaeppler *et al.*, 2000 and Bardiniet *al.*, 2003).), while genetic variation is heritable Skirvin *et al.*,1994). The success in applying somalonal variation in plant breeding is therefore dependent on the genetic stability of selected somaclones. Solanaceae plants like potato(Sharma, *et al.*2007) and tomato(Bhatia.,*et al* 2005) produce a gamut of somaclonal variation over many other commercial

horticulture crops. However, to be of practical value, the frequency of somaclonal variation should be sufficient enough to select desirable traits, and the selected lines should perform well under multiple environments (Duncan, 1997). The efficiency of recovering variants *in vitro* can further be enhanced by applying selection pressure through screening of desirable traits, e.g., *in vitro* selection for tolerance against a biotic and biotic stresses (Barakat and El-Sammak, 2011). This attains more significance in view of fact that the selection of desirable traits takes several years and many generations under field conditions. *In vitro*, selection can shorten considerably the time for the selection of desirable traits under *in vitro* selection pressure with minimal environmental interaction, and can complement field selection (Jain, 2001 and Rakoczy, 2002). Grozeva and Todorova (2015) found that in pepper R0 generation, the regenerants were characterized with reduced plant height, leaf size, fruit weight and seeds per fruit. Statistical analysis of fruits morphology and productivity per plant in the next R1 generation indicated variation between lines and compared to parents. Most lines were with shorter, but wider fruits with thicker pericarp and lower productivity per plant. For breeding purposes the complex of traits is of interest for following investigation deserves lines 3/13 and 2-1/13 from initial variety Yaseen F1. Observed differences confirm the possibility for using of somaclonal variation as method for improving and enriching the diversity in pepper. Somaclonal variation has been observed in many cereal species such as wheat (Larkin *et al.*, 1984) maize (Edallo *et al.*, 1981), rice (Kabir *et al.*, 2008) and barley Li *et al.*, 2007

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تقييم بعض سلالات الطماطم الجسدية تحت ظروف الحقل

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أقيم هذا العمل في قسم الوراثة - كلية الزراعة - جامعة طنطا - جمهورية مصر العربية. كما أقيمت التجربة البحثية في المزرعة الخاصة بجامعة كفر الشيخ خلال موسمي ٢٠١٠ و ٢٠١٥ والتي اشتملت على تقييم السلالات الجسمية في الصوبة وكذلك التقييم الحقل. أقيمت تجارب التقييم الحقل خلال موسم ٢٠١٥. استخدمت أربعة أصناف من الطماطم في هذه الدراسة هي؛ Super Strain, Castle Rock, Advantagell, Edkawy. سلالات الخلايا الجسدية العشرة تم اشتقاقها من كل صنف. تم تقييم والمحصول ومكوناته والجودة وبعض الصفات الفسيولوجية لجميع التراكيب الوراثية للطماطم. تم تلخيص النتائج الرئيسية كالتالي؛ أوضحت النتائج اختلافات عالية المعنوية بين سلالات الخلايا الجسدية و إباتها في كل الصفات المدروسة. بصفة عامة، تفوقت السلالة SE 10 الناتجة من Edlkawy حيث أعطت اعلي القيم في صفات طول النبات، عدد الاوراق، عدد الفرع الثمرية بينما اعطت السلالة SE1 الناتجة من نفس الصنف اعلي القيم في عدد الفروع / نبات. سجلت السلالة SA6 الناتجة من الصنف Advantagell اعلي القيم في عدد الثمار / نبات، المحصول الكلي / نبات. كانت اعلي القيم في عدد الثمار / نبات، المحصول الكلي / نبات وكذلك fruit firmness ووزن الثمار مع السلالة SA6 الناتجة من الصنف Advantagell. اعلي محتوى كلوروفيل كان مع السلالة SS5 الناتجة من الصنف Super strain. السلالة SA2 الناتجة من الصنف Advantagell أعطت اكبر حجم أعطت السلالة SC7 الناتجة من الصنف Castle Rock اعلي نسبة من المواد الصلبة الذائبة الكلية.