Physiological, Morphological and Genetic Evaluation of some Guava Seedling Trees Growing in Alixandria, Qaluobyia and El Beheira Governorate, Egypt.

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ABSTRACT

This work was conducted during 2020 and 2021 growing seasons on selected guava trees (8 years old) planted apart at (3 x 3 m) using traditional irrigation, a Randomized Block Design with a plantfor each genotype. These trees received the recommended management at private orchards in Alexandria, Qaluobyia and El-Beheira governorates as well as El Sabahia Research Station Laboratory.Theobjective of this work is to be to assess the best genotype from four genotypes concerning the vegetative, flowering, and fruit quality and yield. The results cleared that, genotype V3 has an overall distinct attributes other trees in vegetative growth, i.e., "plant height (m), number of new shoots, leaf, length (cm), width and leaf area (cm^2), number of flowers, fruit set %, number offruits/tree and yield (kg/tree), fruit length, width, fruit weight and pulp thickness (cm)" as well as fruit TSS (%) and vitamin C (C mg/100 ml) during two seasons. On the contrary, the genotype V1 recorded the lowest values in all vegetative growth, flowering, yield and fruit quality (physical and chemical) parameters during two seasons except (seed number and acidity %). On the other hand, the Genotype V2 scored intermediate among the highest and lowest Genotypes (V3 and V1) during the two seasons of study.

The result of this we recommended the genotype V3 to be propagated via vegetative method and distributedon acommercial scale as a superior one.

The Genetic study using specific primer for salt Stress tolerant gene in *Psidium guava* indicate that genotype ElSabahiastrain bands that could be the band between 700 and 800 Bpfor a marker for the salt tolerance resistant in *Psidium Guava L*. So we also recommended the genotype ElSabahia strain to be propagated through Tissue Culture technique and distributed commercially as asalt stress tolerant Rootstock for Guava varieties.

Key words: Guava, genotype, salt stress resistant.

INTRODUCTION

The guava (*Psidiumguajava* L.) is known as poor man's apple, classified as a member of Myrtaceae family. Guava is one of the most important p qreventive fruit because it hashigher value of vitamin C (299 mg/100g) as table fruits (Balet al., 2014). It also contains broad spectrum of phytochemicals including polysaccharides, proteins, glucoside, flavonoids and saponins, fatty acids,with seeds that are rich in omega-3, omega-6 polyunsaturated fatty acids (Deo and Shastri, 2003). There is a great variability in types of fruits produced, yield and the fruit ripening date since most of the guava produced from seedling tree in Egypt Guava is a cross-pollinated crop has large variability in size of fruits as well as color of pulp. This natural variability among the species is often exploited to identify superior genotypes among wild strains available in plenty. Thus, there is an urgent need for identify, characterize and evaluate of high-yielding genotypes which can be successfully grown on commercial scale (Yogendra, 2017).

In addition, Morphological features of fruit and plant parts are the major components of identification of genotypes. The success of any breeding programmer mainly depends upon the magnitude and nature of genetics variability presents in the material.

Random Amplified polymorphic DNA (RAPD) fingerprinting was used to identify differences among many fruits Genus and varietiesas conducted on Annona and stated by (2013) and Abdelkawyand El-Nawam, (2017).

Meanwhile Chai and Wang (2007) who defined variations in Guava using both Restricted Fragment length (RFLP) and Random Amplified Polymorphic DNA (RAPD) among 18 P. guava samples from different indigenous tribes identification Polymorphism to identify guava polymorphism from different places in Taiwan and among 18 P. guava samples from different indigenous tribes, 2 from non-indigenous tribe and 12 commercial cultivars from markets in Taiwan.Finally Joshi et al. (2009) in their study, had isolated three salinity tolerant genes which one of itwerethe named *PsFDH*gene showed high level of expression only inrootsof P. Guava under salinity stress beside it may also be responsible for giving cold or drought stress tolerance.

MATERIALS AND METHODS

The study was executed during two growing seasons 2020 and 2021 at private orchards in Alexandria, Qalubia and El-Beheraas well as El-Sabahia Research Station Laboratory on four guava genotypes trees (*Psidium guava*. L.). The selected trees were about 8 years old, planted at 3 x 3 m in randomized block design with three plants in each replicate. The trees were irrigated with Flood irrigation. In April and May during two seasons, 20 shoots/tree were marked (5 shoots from each direction) spread randomly of each tree for taking the following measurements:

Vegetative growth measurements:

Average shoot length (cm):

Four new homogeneous shoots were randomly labeled on different tree and measured there lengths.

Leaf characteristics:

Leaf dimension (cm) and leaf area (cm^2) were measured according to Ahmed and Morsy (1999).

Flowering and Fruit Set (%):

Flowering date, number of the flowers/tree and fruit set (%)/tree were estimated.

Fruiting and Yield/tree (kg):

Thirty fruits from each chosen tree were selected randomly, divided into 3 replicates to determine the following physical parameters: Fruit weight (g), fruit length (cm), fruit width (cm) and Number of fruit/tree were recorded and then the yield kg/tree was calculated.

Fruit Chemical Characteristics:

Total soluble solids (TSS %) was determined by hand refractometer. Acidity % was determined by titration as described by A.O.A.C. (2013)in grams of citric acid per 100 ml juice. Ascorbic acid (Vitamin C) content was determined as (mg ascorbic acid/100 ml juice by using 2,6 dichlorophenol indophenols blue dyes as described by A.O.A.C. Fruits total sugars were determined by the methods described by Duboiset al., (1956).

I. **Plant Materials** Four *Pisidium guava* genotypes were collected from Alexandria**,** Qalubia as well as **El-Behera**. Guava leaveswerecollected from April to July; about 15 to20 leaves were collected from every guava tree in each replicate**.** Only the leaves in the sun shined position were collected from different direction of the tree**.**

DNA preparation:-

Plant leaves were rinsed with distilled water, driedand stored at -80°C**.** Total genomic DNA was purified via Gene JET Plant Genomic DNA Purification Kit (Thermo Fisher Sceintific, K0791) according to manufacturer protocol.

Salt tolerance gene:-

The oligonucleotide that used to identify the presence of salt tolerance genes according to finding of Amita et al. (2009) represent in (Figure, 1).

Oligonucleotides used in the study

Number	Sequence	Remarks
1	5′-CATATGGTTGCGGCAAAGAAGAC-3′	PsRPL30E-F
2	5′-CTCGAGTTACTGGTCACCGGGAA-3′	PsRPL30E-R

Figure (1): The oligonucleotides that specific to FIDDLEHEAD (PsFDH) salt tolerance gene off our *Psidium guava* L genotype that we used.

Amplification of FIDDLEHEAD(PsFDH) gene: Amplification was conducted for salt tolerance gene using a specific oligonucleotides that mentioned by Amita et al. (2009).

Salt tolerance gene FIDDLEHEAD (PsFDH) was amplified for the four *Psidiumguajava* genotypes. Reactions were performed in a volume of 100\L containing 50 ng of template DNA, 200 µM of dNTP, 0.4 nM of each primer (listed in Figure 1), buffer 1, 1.5 mM of $MgCl_2$, and 2.5 µL of Tag DNA polymerase. Amplification reactions were carried out by a DNA thermal cycler programmed for these cycles are made as follows: 94 C for 1 min, 60 C for 1 min, and 72 C for 5 min; were conducted (Joshiet al., 2009). All PCR products were purchased from Invitrogen (Carlsbad, CA, USA). PCR-RFLP DNA from each PCR product was digested with restriction endonuclease EcoRI according to the instructions of the manufacturer. Then digests run to electrophoresis on 2–3% (w/v) agarose gels Chromatograms were estimated using. PeqGold 100b ladder was applied as molecular weight ladder. Digi-Docit gel documentation system (UVP, England).

Statistical Analysis:

1- For the vegetative and fruit collected data were arranged in Randomized Complete Block Design (RCBD) and replicated three times. Data were statistically analyzed for ANOVA and means compared to fulfill the significance according to Steel and Torrie, (1980) and the differences were tested by L.S.D. 5% level.

2- For the genetical data Total Lab statistical program was used.

RESULTS AND DISCUSSION

Vegetative growth parameters:

Plantheight (m):

The plant height of the genotype under study, as shown in Table 1, differed significantly amonggenotypes. In both seasons of the study, genotype No. 3 had the lowest height (2.69-2.17 m) and genotype

No. 1 had the highest height (3.32-3.32 m). The findings of this study partially agree with those published by Gupta*et al.*, (2016). Who looked at seven different guava genotypes; to their assessment, plant heights varied from 1.38 m in Shweta and L-49 to 2.1 m in Red Fleshed. El-Sisy (2013) also discovered that, when she evaluated 15 guava genotypes of five years old, tree height varied from (2.55 - 4.11 m). According to Arafat et al., (2020) in evaluation of thirteen guava genotypes in 2020, they indicated that the range of tree heights was 2.80 to 3.77 meters.

Number of new shoots/tree:

Data presented in Table (1), showed that, the genotype No. 1 in both seasons gave the highest number of new shoots (344.2 – 343.7), while the genotypes No. 3 gave the lowest number of new shoots (154.8- 154.3). The results of this study was partially in going with those obtained by El-Sisy (2013) where found that, the number of new shoots/tree ranged from (383.5-336.17) and from (164.01-115.0) in 15 guava genotypes.

Average length of new shoots (cm):

The results in (Table, 1), indicated that in the first and second seasons, genotype No. 2 had the highestsignificant new shoots length (47.55–47.03 cm). In both research seasons, genotype No. 3 (29.94–29.42 cm) had the shortest average length of new shoots. These results are in harmony with those obtained by Afifi et al., (2019) who found that, the strain No. 5 and No. 13 gave significant highest in shoot length (72.50 - 69.33 cm) in 2017and 2018, respectively compared with the other strains when they studied seventeen strains.

Table (1).Some vegetative growth measurements of guava genotypes used for the experimental units in 2020 and 2021 seasons.

Characters	Plant height (m)		Length new shoots (cm)		Number new shoots (cm)	
	2020	2021	2020	2021	2020	2021
Genotypes V1	3.84 a	3.89 a	223.12	242.45	40.88 b	40.36 b
Genotypes V2	3.63 b	3.71 b	283.44	236.23	33.34c	38.21c
Genotypes V3	2.69 d	2.77 d	253.51	205.42	29.94 d	29.42 d
Genotypes V4	2.82 c	2.88 c	118.31	201.65	47.55 a	47.03 a
L.S.D 0.05	0.188	0.190	12.32	15.56	5.33	4.73

Leaf characteristics:

Leaf width (cm):

Data presented in (Table, 2), indicated that, the highest leaf width (cm) was showed in guava genotype No. 1 (15.52 and 15.00 cm) followed by genotype No.2 (13.20 and 12.68 cm) and the lowest values of guava Genotype No. 3 (11.54 and 11.02 cm) in the first and second seasons, respectively. These results are in agreement with those obtained by El-Sharkawy and Othman (2009).

Leaf length (cm):

The data in Table (2) indicated that, the maximum leaf lengthwas foundin genotype No. 1 (6.72 and 6.20 cm) during both seasons of study. On opposite, the lowest values recorded by the genotype No.3 (4.44 and 3.92cm).During the first "2020" and second "2021" seasons, respectively. El-Sharkawy and Osman (2009) reported that, the leaf rachis length ranged from (13.3-10.43 cm) when they evaluated five guavastrains.

Leaf area (cm^2):

Data in Table (2) revealed that, the guava genotype No. 1 recorded the highest leaf area (85.33 and84.81 cm^2) in both seasons, respectively. On the contrary, the lowest values of leaf area (cm^2) were associated with genotype No. 3 (44.67 and 38.4 cm^2) in the first and second seasons of study, respectively. The obtained results are

in harmony with the findings of El-Sisy (2013),who found that, leaf area (cm^2) ranged between (88.33-30.67 cm^2) and El-Sharkawy and Othman (2009), who found that, leaf area (cm^2) ranged between (47.16-27.86 cm^2) in five guava colons.

Table (2). Some leaf parameters of guava genotypes evaluated during 2020 and 2021 seasons.

Characters	Leaf length (cm)		Leaf width (cm)		Leaf area (cm^2)	
	2020	2021	2020	2021	2020	2021
Genotypes V1	15.52 a	15.00 a	6.72 a	6.20 a	85.33 a	84.81 a
Genotypes V2	13.20 b	12.68 b	5.39c	4.87 b	54.64 b	54.12 b
Genotypes V3	11.54 c	11.02 c	4.44d	3.92 c	44.67 c	44.15 c
Genotypes V4	15.22 a	14.12 a	5.89 b	4.54 b	51.34 b	55.32 b
L.S.D 0.05	1.33	1.38	0.44	0.46	8.12	9.02

Flowering, fruiting and yield:

Date of flowering:

Data presented in (Table, 3), disclosed that the guava genotypes' flowering dates began on March 24 and continued until April 8. In genotype No. 1 which considered the earliest flowering date, compared to other genotypes, while genotype No. 2 had the latest one. The findings of the current study showed that, depending on the genotypes of the trees and the environmental conditions, flowering dates varied from year to year. Additionally, these findings are slightly in line with the results of El-Sisy, (2013).And moreover, genotype No. 3 produced the highest fruit set percentage in the study.On the contrary, the genotype No.4 gave thelowestonesin the 1st and 2nd seasons, respectively.

Table (3). Date of flowering andfull bloom as well asfruit set percentage of guava genotypes evaluated during 2020 and 2021 seasons.

Characters	Beginning of flowering		Full bloom		Fruit set (%)	
	2020	2021	2020	2021	2020	2021
Genotypes V1	25/03	24/3	8/04	05/04	91.59 a	92.17a
Genotypes V2	22/05	07/06	13/06	20/06	84.13 b	86.69 b
Genotypes V3	05/03	8/04	21/04	24/04	69.18c	70.43 c
Genotypes V4	28/ 06	23/ 05	26/ 07	26/ 06	55.12d	58.32d
L.S.D 0.05	-	-	-	-	1.245	1.349

The data in Table (4). showed that, the maximum flowers number/tree wereobtained bygenotypes No. 3 (425.80 & 425.28); while the minimum flowers number/tree were noted in genotype No.4 (245.36 & 234.84) in both seasons, respectively.

Fruit number/tree and yield (kg/tree):

In this regard, the results in (Table 4),disclosed that, the highest values wereobtained by genotypes No.3. for fruit number/tree and yield (kg/tree). On reverse, the lowest values of fruit number/tree and yield (kg/tree) were obtained by genotype No. 1 in the first and second season. The data were slightly in line with those obtained by El-Sisy and Yousef (2005) in 7 guava colones with red pulp, the number of fruit ranged between (215-1014.75) and (141.5-1038.75) in 2003 and 2004, respectively. While, white pulp guava gave results (764.25, 752.5) in both seasons. Also, Babu etal., (2007) studied the performance of eight years old guava selection under Meghalaya condition and concluded that the

number of fruits/tree ranged between 184 (selection-1) and 78.66 (selection-13). On the other hand, El-Sharkawy and Othman (2009)found that, the fruit number/tree ranged between 133.5 to 282 and between 1896 and 352 in bothseasons in 5 strains of seedy guava.The results of present findings are in agreement with Patel et al., (2011), Singh et al.(2013) and Gupta et al., (2016), who stated and reported that Lucknow-49 is the most successful variety with the highest fruit yield (78 and 114 kg \tree) followed by cv. Allahabad Safeda (61 and 88 kg tree in rainy and winter season, respectively. Apple colour cv. recorded lowest (24 kg \tree) fruit yield during rainy season.However cv. Hybrid-2 observed the lowest fruit yield (43 kg tree^{-1}) in winter season.

Table (4). Number of flowers/tree, number of fruits/tree and yield of some guava genotypes evaluated during 2020 and 2021 seasons.

Characters	Number of flowers/tree		Number of fruit/tree		Yield (kg/tree)	
	2020	2021	2020	2021	2020	2021
Genotypes V1	285.36 c	284.84 c	235.66 c	235.14 c	58.74 c	58.22 c
Genotypes V2	384.35 b	383.83 b	304.53 b	304.01 b	71.61 b	71.09 b
Genotypes V3	425.80 a	425.28 a	363.68 a	363.16 a	88.11 a	87.59 a
Genotypes V4	245.36 c	234.84 c	215.66 c	200.14 c	43.74 c	38.22 c
L.S.D 0.05	44.20	40.45	33.40	30.56	11.20	15.30

Fruit Characteristics:

Fruit length and width (cm):

The data in Table (5) showed that, the highest fruit length and width (cm) in guava genotype No. 1 (7.84 &7.93 cm) and (6.37 and 6.42 cm) in both seasons. On the contrary, the minimum fruit length and width (5.39 & 5.42 cm) and (4.59 & 4.61 cm) werecorded in genotype No.3. The data were in agreement with those obtained by Ratanpalet al**,**(2002)who found that varietal variation in terms of fruit length concluded that the Sardar guava had highest fruit length. On other hand Mehta et al.,(2018)noted that maximum length of guava fruit (6.10cm) was found in the T1 (Lucknow-49) cultivar during the study of five guava varieties.As well as the results are in line with those obtained by Mehta et al., (2018) Pandey et al.,(2007) who **r**eported that among 11 guava cultivars, Pant Prabhat showed higher fruit diameter (7.13cm), followed by IIHR Hybrid-21 (6.75cm).

Fruit weight (g):

Data in (Table 5).showed the variation of fruit weight in the four genotypesof guava under investigation. Results revealed that, the genotypeNo.3 gave the highest significant values of fruit weight in both growing seasons. In the contrast, genotype No. 1 exhibits the least significant values of fruit weight, respectively, in both seasons. The results are partially in agreement with those found by El-Sisy (2013) who stated that, the maximum fruit weight was associated with genotypes No. 10 (277.37, 245.10g) in both seasons and genotypes No. 2, 5, 6, 11 & 14 (253.23, 252.23, 233.20, 240.27, 227.13g) in the second season. Mehta et al., (2018)reported that the maximum fruit weight of guava (158.08g) was attained in the T1 (Lucknow-49) cultivar and the minimum fruit weight (108.18g) was recorded under T3 (Pant Prabhat)

Table (5): Fruit length (cm), fruit width (cm) and fruit weight (g) of some guava genotypes evaluated during 2020 and 2021 seasons.

Characters	Fruit length (cm)		Fruit width		Fruit weight (g)	
	2020	2021	2020	2021	2020	2021
Genotypes V1	5.39 c	5.42 c	4.11 c	4.01 c	185.54 c	189.22 c
Genotypes V2	6.27b	6.38 b	6.19 b	6.39 b	202.42 b	201.90 b
Genotypes V3	7.33 a	7.41 a	6.37a	6.42a	217.46 a	216.94 a
Genotypes V4	6.44 b	6.35 b	4.85 b	5.46 b	200.31 b	194.4 b
L.S.D 0.05	0.481	0.493	1.197	1.209	13.20	11.40

Pulp thickness (cm. and seeds (%):

Concerningthe pulp thickness (cm) and seeds %as shown in Table (6); the genotype No. 3 showed the highest values compared to other genotypes in the 1st and 2nd seasons. Meanwhile, genotype No. 1 gave the highest seeds percentage in the 1st and 2nd seasons. On the contrary, the genotypes No. 1 performed the least No. of pulp thickness in both seasons. As for seeds percentage the least genotypes was genotype No.3 in the 1st and 2nd seasons.

Table (6). Fruit weight (g), pulp thickness (cm) and seeds (%) of some guava genotypes evaluated during 2020, and 2021 seasons.

Characters	Pulp thickness (cm)		Seeds (%)	
	2020	2021	2020	2021
Genotypes V1	1.25 c	0.73 c	3.46 a	2.94 a
Genotypes V2	1.93 b	1.41 b	1.75 b	1.63 b
Genotypes V3	2.35 a	1.83 a	1.65 b	1.13 b
Genotypes V4	1.88 b	1.34 b	2.24 a	2.67 a
L.S.D 0.05	0.24	0.32	1.22	1.01

Fruit chemical composition:

Fruit TSS (%), Vitamin C mg/100 ml juice and acidity (%):

In regard to the chemical properties of the fruits of guava genotypes during 2020 and 2021 growing seasons (Table, 7).,the results showed that the genotype No. 3 observed having the highest significant values in TSS (%) and vitamin C compared to other genotype in the first and second seasons. On opposite trend the genotype No. 1 gave the highest significant values of the acidity percentage, during both seasons of study. On the other hand, the least significant values of the TSS and vitamin C for the genotype No. 3 during 2020 and 2021 seasons, respectively. Where the least significant values for acidity percentage by genotype No.1 in the two seasons of the study. Such results are partially in Coincidence with those obtained by Gupta et al., (2016), who recorded that, the value of Total soluble sugar (T.S.S) which ranged between 16.5 to 20.4. Mehtaet al. (2018) noticed that the maximum total soluble solid (11.82) was recorded under from T3 (Pant Prabhat) guava fruits, while minimum total soluble solid was found in the (9.42) T4 (Lalit) variety. Afifiet al. (2019) mentioned that juice total soluble solids (T.S.S) % of the seventeen selected strains of Guava in two seasons, in the first season, strain No.1 gave highest value (11.00), while strains No.6 gave lowest value (7.00), in second season strain No.17 gave highest value (15.50), strains No.6 and No.16 had the titrable acidity was found to be in range from 0.49% in Red Fleshed to 0.69% in Lalit. Mehta et al., (2018) found that the maximum acidity (0.69%) was found under T5 (Sangam) variety, while minimum acidity (0.27%) was recorded in T3 (Pant Prabhat) variety. Afifi et al., (2019) acidity percent ranged between 0.49 to 0.69%. Khalilet al.

(2015)found significant differences of the acidity percentage among different selected strains of guava, the highest value (0.53 %) was for strain A2 in the first season, while, it was (0.44 %) for selected strain A3 in the second season. The lowest values were obtained by selected strains C7, C11, C12, D15, D16, D17, D18 and D19 with insignificant differences, which ranged from 0.16 to 0.21 % in the first season and from 0.18 to 0.21 % in the second season.

Table (7). Fruit TSS (%), acidity (%) and ascorbic acid (vita. C) mg/100 juice of some guava genotypes evaluated during 2020 and 2021 seasons

Characters	Fruit TSS (%)		Vitamin (C mg/100 ml)		Acidity (%)	
	2020	2021	2020	2021	2020	2021
Genotypes V1	9.21 d	8.69 d	84.20c	83.68c	0.678a	0.588a
Genotypes V2	12.44c	11.92c	80.32 d	78.65 d	0.602b	0.482b
Genotypes V3	14.33 a	14.54 a	95.93a	95.41a	0.490 d	0.370 d
Genotypes V4	13.57b	13.45 b	88.33b	87.81b	0.545 c	0.523 c

DNA debate and Interpretation:

According to Fig(2) and by using Restriction fragment length polymorphismtechnique (RFLP) patterns for FIDDLEHEAD (PsFDH) salt tolerance gene of the four studied*Psidium guava*L. genotypes genetic similarity was evaluated. (Table, 8); that compeering between Total amplified polymorphic polymorphism % for four studiedgenotypes.

The for four *Psidium guava* L. Cultivars divided into two main clusters. Salt tolerance *Psidium guajava* genotype 4 which is coming from genotype Sabahia located in separate clusters as results of highly genetic polymorphism.

Second cluster composed of two main sub clusters, both of genotypes1and 3 *Psidium guajava L.* genotypeswere located in the same sub cluster which reflected highest genetic similarity between them. *Psidium guajava* L. genotype 2 represented the second sub cluster.

Genetic similarity wasclearly appearing from (Fig 3).

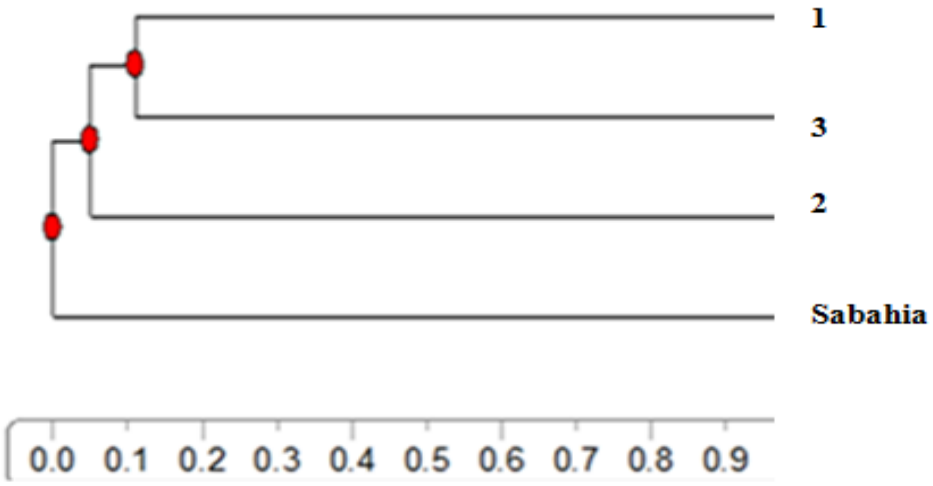

Figure (3): Phyllogenetic tree for Restriction fragment length polymorphism (RFLP) profile for FIDDL EHEAD (PsFDH)salt tolerance gene of four *Psidium guajava* cultivars.

Profile for FIDDLEHEAD (PsFDH)salt tolerance gene of four *Psidium guava L.* genotypes. Table (8), that compeering between Total amplified polymorphic polymorphism % for the four studiedgenotypes**.**Highest genetic polymorphism of genotype 4Sabahia cultivar could be explained in the light of characterized commercial traits and distinguishes a salt tolerance of this cultivar. By contrary, rest of *Psidium guava* L. genotypes reflected low polymorphism % comparing with Sabahia genotype. Genetic polymorphism was arranged descendingly as 57, 50 and 40 % for 3, 2 and 1*Psidiumguajava L.*Genotyp esdistinguished between Salt tolerance *Psidium guava* cultivar Sabahia and the other genotypes.

Table (8).Showed polymorphism % of the four *Psidium guava L.* genotypes base on Restriction fragment length polymorphism (RFLP)

***Psidiumguajava* genotype.**	**Total amplified fragments**	**Polymorphic fragments**	**Monomorphic fragments**	**Polymorphism %**
1	8	4	4	50
2	5	2	3	40
3	7	4	3	57
4sabahia	15	12	3	80

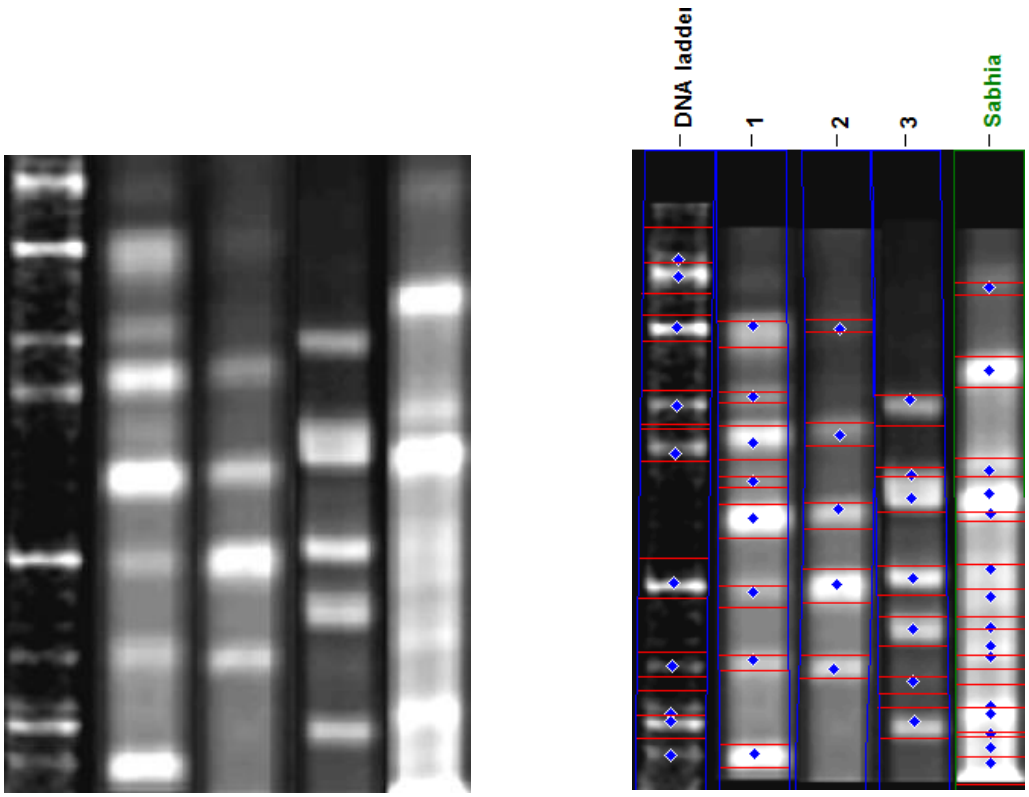

Fig (2). Restriction fragment length polymorphism (RFLP) profile for FIDDL EHEAD (PsFDH) salt tolerance gene of our *Psidiumguajava L.* genotype.

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التقييم الظاهري والفسيولوجي و الوراثى لبعض أشجار الجوافة النامية في الأسكندرية والقليوبية و البحيره بمصر

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تم تنفيذ هذا البحث خلال موسمى 2020 و2021 على أشجار جوافة عمر 8 سنوات وتروى ري سطحي (بالغمر) وتم تطبيق عليها العمليات الزراعية الموصى بها فى مزارع خاصة فى البحيره والقليوبية وبمحطة الصبحية بمحافظة الأسكندرية، والهدف من هذ البحث هو تقييم أفضل سلالة من الـ 4 سلالات من حيث النمو الخضرى والزهرى والمحصول وقياسات جودة الثمار فضلا عن تعيين الجين الخاص بتحملهم للملوحه وأوضحت النتائج التالى:

أوضحت النتائج تفوق السلالة رقم 3 فى جميع الصفات الخضرية (طول النبات، عدد الأفرع الجديدة، طول وعرض الورقة، مساحة الورقة)، الصفات الزهرية (عدد الأزهار/نبات، النسبة المئوية لعقد الثمار) وقياسات المحصول (عدد الثمار/شجرة والمحصول كجم/شجرة)، وصفات جودة الثمار (طول وعرض الثمرة، وزن وقطر ولحم الثمرة، والنسبة المئوية للسكريات الذائبة الكلية، ونسبة فيتامين ج بالمجم/100 مللي) بالمقارنة بالسلالات الأخرى فى كلا موسمى الدراسة على التوالي. كما تفوقت السلالة 3 فى النسبة المئوية للبذور والحموضة بالمقارنة بالسلالات الأخرى فى كلا موسمى التجربة، 2020 و2022 على التوالي.

ولذلك يمكن أن نوصى بإكثار وإنتشار السلالة رقم (3) من الجوافة المنتخبة والمقيمة، وتعطى إنتاج مرتفع ووزن ثمرة معقول والسكريات الكلية الذائبة.وفيما يتعلق بالدراسه الوراثيه بأستخدام برايمر ماركر لجين تحمل الملوحه ظهروجوده بوضوح فى سلاله الصبحيه ويمكن أعتبار الباند ما بين 700 و800 بيز بيرbp هماركرخاص بتحمل الملوحه ويوصى باستخدام السلالة 4 من الصبحيه كأصل متحمل للملوحه فى الجوافه.كما يوصى بعمل المزيد من الدراسات على بروتينات الجين المدروس فضلا عن إكمالدراسة إكثار السلاله من خلال زراعة الأنسجة وتسويقها كأصل متحمل للملوحة.

الكلمات الدالة: الجوافة، النظم الوراثية، مقاومة الإجهاد الملحي.