

# Evaluation, DNA Fingerprinting and Productivity of Some Superior Seeded Female Egyptian Date Palms

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**Abstract:** - This investigation was carried out to study the fingerprinting and genetic relationships between new two soft seeded date palms namely Baker (1) and Baker (2) comparing with Zaghoul female cultivar grown in Giza Governorates, Egypt. RAPD technique was used to detect DNA fingerprinting for the investigated genotypes. Concerning the molecular level, 9 primers were used for RAPD-PCR analysis. These primers gave a total 69 of different bands for three genotypes. The most Polymorphic Information Content (PIC) value and polymorphism percentage that detected by OPB-07 markers showed the high score (11 bands) with 85.71% polymorphism. Primer OPA-02 revealed a low level of bands (5 bands) with 60% polymorphism. The relationships among the genotypes divided into two clusters. The first cluster included Zaghoul and Baker (2). The second cluster included Baker (1) only. The results revealed that, Zaghoul cultivar recorded the highest value of vegetative parameters such as trunk length and girth, while seeded female date palm namely Baker (1) and Baker (2) recorded higher numbers of leaves/palm, leaf length, number of leaflets/leaf and leaflet length. Also, Baker (1) and Baker (2) produced the heaviest bunch weight and yield/palm as compared with Zaghoul cultivar. On the other hand, Baker (2) recorded the highest fruit weight and fruit dimension. Also, Baker (1) and Baker (2) produced high values of fruit chemical properties such as total soluble solids (TSS), non-reducing sugars %, reducing sugars % and total sugars % in both studied seasons. These results revealed that female date seeded date palms namely Baker (1) and Baker (2) are considered as promising to be new high yield strains with a good fruit quality compared with Zaghoul date palm cultivar.

**Key words:** Female seeded date palm, Baker (1), Baker (2), Zaghoul, DNA fingerprinting, RAPD-PCR.

## I. INTRODUCTION

Date Palm (*Phoenix dactylifera* L.) is one of the important fruit crops grown in Egypt. Date palms are distributed in many types of land such as Nile valley and sandy soils and can grow well under drastic environmental conditions which could be not suitable for many other fruit crops. Date palm cultivars divided into three main groups according to their fruit moisture content, i.e., Soft (more than 30 %), Semi-dry (from 20-30 %) and dry group (less than 20 %). Egypt is considered to be the leading Arab countries in producing date (FAO, 2014).

DNA markers are generally classified as hybridization-based markers and polymerase chain reaction (PCR)-based markers. In the former, DNA profiles are generated by hybridizing restriction-digested target DNA by a labeled probe of known sequence, for example, restriction fragment length polymorphism (RFLP) and restriction landmark genomic scanning (RLGS). In PCR-based assays, in vitro amplification of a particular region or loci is done using a specific or arbitrarily chosen oligonucleotide sequence called a primer.

The amplified products are separated electrophoretically and banding patterns determined, for example, amplified fragment length polymorphism (AFLP), simple sequence repeats (SSR) and inter-simple sequence repeats (ISSR), random amplified polymorphic DNA (RAPD), single nucleotide polymorphism (SNP), and sequence-characterized amplified regions (SCAR).

Molecular markers have been extensively used in date palms (*Phoenix dactylifera* L.) for detecting phylogenetic relationships of cultivars, somaclonal variation, cultivar identification, and sex determination using different markers such as RFLP (Corniquel and Mercier, 1997), AFLP (Maryam *et al.*, 2016) and Saker *et al.*, (2006), SSR [Khierallah *et al.* (2011), Sabir *et al.* (2014), Al-Ameri *et al.* (2016) and Yusuf *et al.* (2015)], ISSR [Ahmed and Al-Hadidi (2013)], and RAPD [Al-Khalifah and Askari (2003), Marsafari and Mehrabi (2013), Mirbahar *et al.* (2014)].

A good extraction procedure for the isolation of DNA should yield adequate and intact DNA of reasonable purity. Various protocols for DNA extraction have successfully been applied to many plant species (Edwards *et al.*, 1991) utilized SDS and phenol instead of CTAB as a detergent for the same function of pure DNA isolation. Reichardt and Rogers (1994) used high CTAB concentration, which is an active detergent to deter DNase activity and removes polysaccharides.

The decrement of superior cultivar numbers is a big problem due to planting most date palm orchards with seeded palms. For successful improvement, an evaluation must be done for the unknown seeded date palms that already grown in a big population (Rokba *et al.*, 1990).

Morphological characteristics, fruit physical and chemical properties are a start evaluating point for developing the promising date palms (**El-Sharabasy et al., 2003 and Jaradate and Zaid, 2004**). Chemical and physical properties consider as indicators for firmness and ultimately of quality, also they reveal new and essential informations for better understanding of date fruits that help to enhance industrialization and probation of the best date varieties that satisfy consumer demands (**Ismail et al., 2006 and Gadall, 2013**).

There are hundreds of date palm clones that have the potential to become commercial cultivars. Further, many cultivars were transferred from one country to another with new names.

The main objective of this investigation was to study and evaluate the vegetative growth, fruiting and fruit characteristics of new two soft seeded female date palms namely Baker (1) and Baker (2) comparing with Zaghoul cultivar grown under Giza conditions.

## II. MATERIALS AND METHODS

This study was conducted in two successive seasons (2014 and 2015) on two seeded genotypes of date palm grown at a private orchard located at El-Badrshin district, Giza Governorate, Egypt, comparing with Zaghoul cultivar grown under the same conditions.

### *Molecular Studies and DNA extraction*

Molecular studies aimed to determine phylogenetic tree and relationships between three genotypes of date palm in steps; DNA was extracted from three genotypes by Bio basic kits protocol.

### *PCR- Amplification and RAPD analysis*

Amplification reaction was carried out in 25µl reaction mixture contained 2µl of genomic DNA, 3µl of the primer, 2.5µl of 10X Taq DNA polymerase reaction buffer, 1.5 units of Taq DNA polymerase and 200 µM of each dNTPs. The following PCR program was used in a DNA thermo cycler (PTC-100 PCR version 9.0-USA). Initial denaturation at 94°C for 5 min, followed by 35 cycles of 94°C for 30 s, 42°C for 90 Sec. for annealing temperature, 72°C for 90 Sec. and final extension at 72°C for 2 min. Products by RAPD- PCR were separated on 1.5% agarose gels in 1X TAE buffer and detected by staining with ethidium bromide according to **Sambrook et al. (1989)**. DNA ladder 100bp was used and PCR products were visualized by UV-transilluminator and photographed by gel documentation system, Biometra - Bio Documentations, the amplified bands were scored as (1) for presence and (0) for the absence of all studied date palms according to gel analyzer protocol. A set of nine random 10-mer primers (Table 1) was used in the detection of polymorphism among the nine broad wheat accessions. These primers that synthesized at RAPD-PCR were carried out

according to the procedure given by **Williams et al. (1990)** with minor modifications.

Table (1): Names and sequences of nine RAPD primers

No.	Primer name	Sequence (5'→3')
1	OPA-02	CAGGCCCTTC
2	OPA-04	AATCGGGCTG
3	OPA-07	GAAACGGGTG
4	OPB-07	GGTGACGCAG
5	OPB-10	CTGCTGGGAC
6	OPO-10	TCAGAGCGCC
7	OPO-13	GTCAGAGTCC
8	OPO-14	AGCATGGCTC
9	OPO-19	CAATCGCCGT

### *Horticulture study:*

The selected seeded date palms were 20-25 years old. This study included new two soft female seeded date palms in comparison with Zaghoul cultivar that arranged as follows:

- Baker (1), Baker (2) and Zaghoul female cultivar.

Each of the seeded date palms under study was near similar in age and growth. The chosen female palms were subjected to the same horticultural practices and hand pollinated using pollen grains of a selected male date palm. Each spathe was pollinated within two days after opening. In each experimental season, an aspects and parameters of the field and laboratory work were as follows:

### *1-Vegetative parameters:*

*Trunk height and girth (m):* The palm trunk height and girth were measured one meter above soil surface at the end of October every season.

*Leaf measurements:* leaf length (cm), number of leaflet per leaf, leaflet length (cm) was measured at the end of each season.

2. *Yield:* All bunches were harvested when reached the commercially derived color. The yield of each palm was recorded in terms of weight (kg) and number of bunches/palm. 3- *Fruit properties:* Samples of 30 fruits were picked from each bunch randomly to determine their physical and chemical properties.

*Physical characteristics:* Physical characteristics included fruit weight (gm), fruit dimensions (cm) were determined. After peeling, both flesh and seed weight (gm) were determined and recorded.

### *Chemical characteristics:*

1. Total soluble solids (TSS) were determined by a hand refractometer.

2. Total titratable acidity % was determined as malic acid.
3. Reducing, non-reducing and total sugars content were determined according to the method of **A.O.A.C. (1990)**.

*Statistical analysis:* The data were subjected to the statistical analysis of variance and means separation were done according to **Duncan at 0.05 % level (1955)**.

### III. RESULTS AND DISCUSSION

#### *RAPD Analysis:*

RAPD-PCR technique of nine primers was used in Fig. 1 and Table (2). They revealed 69 different bands where of them twenty three were monomorphic bands with ratio of polymorphism (33.33%) and forty six were polymorphic bands with polymorphism 66.67% that showed in Table (2).

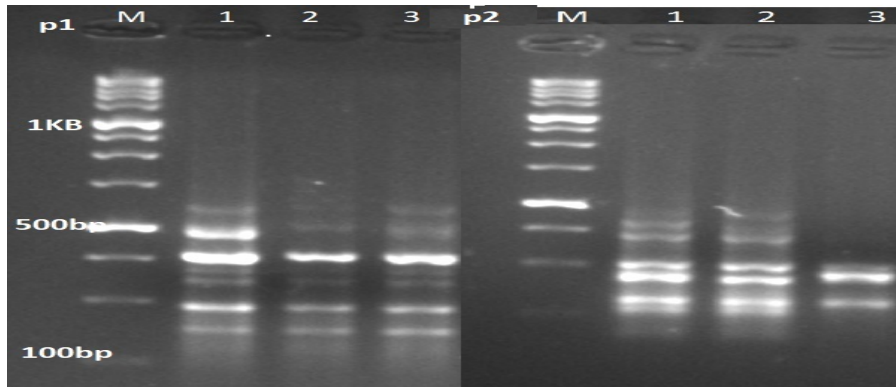


Fig.1: DNA amplification fragments using P1 (OPA-02) and P2 (OPA-04) RAPD primers for three date palm genotypes Zaghoul Cv., Baker (1) and Baker (2), M= 100bp ladder.

Table (2): Total number, monomorphic, polymorphic of alleles and percentage of polymorphism as revealed using nine RAPD primers of tree for date palm genotypes

No.	Primer code	Total bands	Monomorphic bands	Polymorphic bands	% polymorphism
1	OPA-02	5	2	3	60%
2	OPA-04	8	3	5	62.50%
3	OPA-07	9	4	5	55.56%
4	OPB-07	7	1	6	85.71%
5	OPB-10	6	1	5	83.33%
6	OPO-10	6	2	4	66.67%
7	OPO-10	11	5	6	54.55%
8	OPO-10	8	3	5	62.50%
9	OPO-10	9	2	7	77.78%
Total bands		69(100%)	23(33.33%)	46(66.67%)	(66.67%)

On the other hand, the phylogenetic tree revealed high value between two cultivars Zaghoul and Baker (2) were 100% and the middle value between Zaghoul and Baker1, 87% showed that, in Proximity matrix (Table 3). Moreover, the

relationships between Baker (1) and Baker (2) was %15, the tree for relationships divided to two clusters, the first one included Zaghoul and Baker (2), while the second included Baker1 only. These results are shown in Figures (1 and 2).

Table (3): Proximity matrix among two superior seeded and Zaghoul cultivars

Case	Matrix File Input		
	Zaghoul	baker1	baker2
Zaghoul	1.000	.....	.....
Baker (1)	0.87	1.000	.....
Baker (2)	1.000	.150	1.000

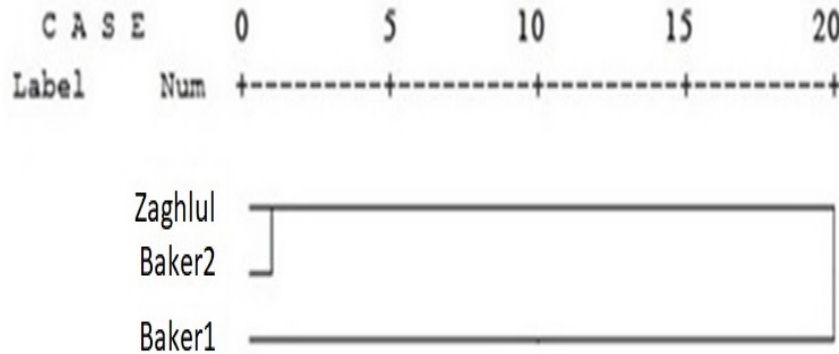


Fig (2): Dendrogram using average linkage between two superior seeded and Zaghloul cultivars.

In this study nine RAPD primers were used to discriminate among three date palm genotypes, they produced multiple band profiles with a number of bands ranged from 5 to 11 bands. While, the total number of fragments produced by the nine primers was 69 with an average of 7.67 fragments/primer, the number of polymorphic fragments was ranged from 54.55 to 85.71% of polymorphism. A maximum number of (11 bands) were amplified with OPO-10 primer; while the minimum number of fragments (5 bands) was amplified with primer OPA-02. The highest polymorphism ratio (85.71%) was detected using OPB-07 primer Table (3).

Sedra *et al.* (1998) showed that 19 out of 123 prescreened random primers revealed polymorphic and reproducible results. However, Hussein *et al.* (2002) stated that a presence of intra-varietal polymorphism among five Egyptian date palm cultivars from the Delta area was detected. In this study these discrepancies could be attributed to the use of different primers and different reaction conditions, RAPD results revealed very low intra-varietal polymorphism and comparing between three genotypes. To determine the genetic relationship among the highest similarity value was 87% between Zaghloul and Baker (1). However, Hussein *et al.* (2002) pointed out the presence of intra-varietal polymorphism among five Egyptian date palm cultivars from the Delta region the 14 accessions, using 16 primer combinations were used to compute the similarity matrices through Dice coefficient. The estimate genetic similarity was

ranged from 80.4% to 99%. This confirmed the high level of genetic similarity among the studied genotypes, the highest genetic similarity (99%) was between Sewi/El-Kharga and Sewi/El-Dakhla. The lowest genetic similarity value (80.4%) was detected between Malkaby/Aakab and Sewi/Tamazough. The results were in agreement with (Adawy *et al.*, 2005) estimated the genetic relationships among the six cultivars using the common bands between the different accessions representing each cultivar, the genetic similarity estimates ranged from 96.1% to 99.9%. The highest genetic similarity (99.9%) was between Sakkoty and Bertmoda, while the lowest genetic similarity (96.1%) was detected between Fraihy and Gandila. Hamza *et al.* (2012) revealed confirmation among large genotypes and primers.

*Vegetative growth:*

Trunk height and girth (cm)

Results in Table (4) show a significant variation due to date palms namely Baker (1), Baker (2) and Zaghloul cultivar during the two seasons.

The highest value of trunk height was obtained from Zaghloul cultivar (13.6 m and 13.8 m) in the first and second seasons, respectively, followed by the seeded date palm namely baker (2) (13.3 and 13.4 m) in both seasons of the study.

Table (4) Vegetative characteristics of some seeded female date palms comparing with Zaghloul cultivar grown at Giza governorate during 2014 and 2015 seasons Concerning trunk girth, results took the same trend of trunk height in both seasons of the study.

Characters	Trunk height (m)		Trunk girth (m)		Number of leaves / palm		Leaf length (m)	
	S1	S2	S1	S2	S1	S2	S1	S2
Baker (1)	12.2 <sup>b</sup>	12.3 <sup>b</sup>	1.6 <sup>c</sup>	1.7 <sup>c</sup>	24.0 <sup>a</sup>	23.7 <sup>a</sup>	3.7 <sup>a</sup>	3.8 <sup>a</sup>
Baker (2)	13.3 <sup>ab</sup>	13.4 <sup>a</sup>	1.8 <sup>b</sup>	1.9 <sup>b</sup>	21.0 <sup>b</sup>	22.0 <sup>a</sup>	3.4 <sup>ab</sup>	3.5 <sup>b</sup>
Zaghloul Cv.	13.6 <sup>a</sup>	13.8 <sup>ab</sup>	2.2 <sup>a</sup>	2.3 <sup>a</sup>	19.2 <sup>b</sup>	19.7 <sup>b</sup>	3.1 <sup>b</sup>	3.2 <sup>c</sup>
LSD at 0.05 level	1.36	1.12	0.15	0.15	2.2	1.77	0.3	0.2

The highest value of trunk girth ( 2.2 and 2.3 m) was obtained from Zaghoul date palm cultivar in the first and second seasons, respectively, followed by female seeded date palm namely Baker (2) ( 1.8 and 1.9 m) in both seasons of the study. The lowest trunk girth was obtained from female seedling date palm namely Baker (1) which gave 1.6 and 1.7 m in the first and second seasons, respectively.

#### Number of leaves/ palm

Results in Table (4) show a significant variation among the two female seeded date palms namely Baker (1), Baker (2) and Zaghoul date palm cultivar.

The highest number of leaves per palm was recorded by the date palm namely Baker (1) which recorded 24 and 23.6 leaves, followed by female seeded date palm namely Baker (2) since it recorded 21 and 22 leaves in the first and second seasons, respectively.

The lowest number of leaves per palm was recorded by Zaghoul date palm cultivar which recorded 19.2 and 19.7 leaves in the two seasons of the study.

In case of leaf length, the highest leaf length value was recorded with female date palm namely Baker (1) which gave 3.7 and 3.8m in the first and second seasons of the study, followed by Baker (2) which gave 3.4 and 3.5 m in the first and second seasons, respectively. While, the lowest leaf length was obtained from Zaghoul date palm cultivar that recorded 3.1 and 3.2m in both seasons of the study.

#### Number of leaflets/ leaf

Results in Table (5) show that number of leaflets/ leaf was significantly varied due to female date palms namely Baker (1), Baker (2) and Zaghoul date palm cultivar in both seasons of the study.

The highest number of leaflets/ leaf was obtained from the seeded date palm namely Baker (1), followed by Baker (2) in both seasons of the study.

The lowest number was recorded by Zaghoul date palm cultivar which recorded 160 and 166 leaflets/leaf in the first and second seasons, respectively.

Spine number and spine length took the same trend of number of leaflets/leaf in the two seasons of the study.

Table (5) Vegetative characteristics of some female date palm comparing with Zaghoul cultivar grown at Giza Governorate during 2014 and 2015 seasons.

Characters Treatments	Number of leaflet/leaf		Leaflet length (cm)		Number of spines		Spine length (cm)	
	S1	S2	S1	S2	S1	S2	S1	S2
Baker (1)	224.3 <sup>a</sup>	227.7 <sup>a</sup>	33.5 <sup>a</sup>	34.3 <sup>a</sup>	25.0 <sup>a</sup>	25.3 <sup>a</sup>	10.8 <sup>a</sup>	11.3 <sup>a</sup>
Baker (2)	203.0 <sup>b</sup>	208.0 <sup>b</sup>	32.0 <sup>a</sup>	32.9 <sup>a</sup>	21.7 <sup>b</sup>	22.7 <sup>a</sup>	10.1 <sup>a</sup>	10.9 <sup>a</sup>
Zaghoul Cv.	160.0 <sup>c</sup>	166.0 <sup>c</sup>	21.0 <sup>b</sup>	21.7 <sup>b</sup>	18.9 <sup>b</sup>	19.7 <sup>b</sup>	8.2 <sup>b</sup>	8.5 <sup>b</sup>
LSD at 0.05 level	5.9	8.5	1.9	1.9	3.0	2.9	0.9	0.6

The obtained results are in line with those obtained by **Rokba et al. (1990)**, **Abdalla (2002)**, **El-Sharabasy et al. (2003)**, **Jaradate and Zaid (2004)**, **Ismail et al. (2006)**, **Ibrahim (2008)**, **Abdalla (2012)**, **Gadalla (2013)**, **El-Salhy et al. (2016)** and **Ashour et al. (2017)**, who mentioned that there was a wide and great variation on vegetative growth of most date palm strains or cultivars.

## 2. Yield

#### Number of bunches/palm

Results in Table (6) indicate that female date palms namely Baker (1), Baker (2) and Zaghoul date palm were significantly varied in bunch number/palm.

Bunch number ranged from 10.5 to 10.9 bunches with Zaghoul date palm cultivar in both seasons, respectively, followed by the seeded date palm namely Baker(2) which gave 10.2 and 10.6 bunches in the first and second seasons, respectively. The lowest number of bunches/palm was recorded by the seeded female date palm namely Baker (1) which recorded 10 and 10.5 bunches in the two seasons of the study.

Table (6) Bunch weight and yield /palm of some seeded female date palms comparing with Zaghoul cultivar grown at Giza Governorate during 2014 and 2015 seasons.

Characters Treatments	Number of bunches/ palm		Bunch weight ( kg)		Yield/palm (kg)	
	S1	S2	S1	S2	S1	S2
Baker (1)	10.0 <sup>b</sup>	10.5 <sup>c</sup>	22.9 <sup>a</sup>	23.8 <sup>a</sup>	229.3 <sup>a</sup>	249.5 <sup>a</sup>
Baker (2)	10.2 <sup>ab</sup>	10.6 <sup>b</sup>	22.3 <sup>b</sup>	22.7 <sup>b</sup>	226.3 <sup>a</sup>	239.9 <sup>b</sup>
Zaghoul Cv.	10.5 <sup>a</sup>	10.9 <sup>a</sup>	15.6 <sup>c</sup>	16.2 <sup>c</sup>	163.8 <sup>b</sup>	176.2 <sup>c</sup>
LSD at 0.05 level	0.3	0.1	0.4	0.3	10.4	4.4

*Bunch weight (kg)*

Concerning bunch weight, results in Table (6) reveal that the seeded date palm namely Baker (1) recorded the highest significant bunch weight (22.9 and 23.8 kg) followed by Baker (2) (22.3 and 22.7 kg) in the first and second seasons, respectively.

*Yield/palm*

The highest yield/palm (229.3 and 249.5 kg) was obtained from the female seeded date palm namely Baker (1), followed by the anther seeded one namely Baker (2) which recorded 226.3 and 239.9 kg in the first and second seasons, respectively. While, the lowest yield /palm was obtained due to the female Zaghoul cultivar which recorded 163.8 and 176.2 kg in both seasons of the study.

Table (7): Fruit physical properties of some seeded female date palms comparing with Zaghoul cultivar grown at Giza Governorate during 2014 and 2015 seasons

Characters	Fruit weight (g)		Fruit length (cm)		Fruit diameter (cm)		Flesh weight (gm)		Seed weight ( gm)	
	S1	S2	S1	S2	S1	S2	S1	S2	S1	S2
Baker (1)	14.0 <sup>c</sup>	15.3 <sup>c</sup>	5.4 <sup>c</sup>	5.7 <sup>c</sup>	2.1 <sup>c</sup>	2.0 <sup>c</sup>	12.4 <sup>c</sup>	13.3 <sup>c</sup>	1.6 <sup>a</sup>	1.9 <sup>a</sup>
Baker (2)	26.2 <sup>a</sup>	26.7 <sup>a</sup>	6.8 <sup>a</sup>	7.0 <sup>a</sup>	2.7 <sup>a</sup>	2.8 <sup>b</sup>	24.6 <sup>b</sup>	24.8 <sup>a</sup>	1.6 <sup>a</sup>	1.8 <sup>a</sup>
Zaghoul Cv.	20.5 <sup>b</sup>	21.4 <sup>b</sup>	6.0 <sup>b</sup>	6.2 <sup>b</sup>	2.4 <sup>b</sup>	2.5 <sup>a</sup>	19.2 <sup>a</sup>	19.2 <sup>b</sup>	1.3 <sup>a</sup>	2.1 <sup>a</sup>
LSD at 0.05 level	1.1	0.8	0.4	0.4	0.2	0.1	0.8	0.8	NS	NS

*Fruit dimensions*

Results in Table (7) indicate the highest fruit length and fruit diameter were recorded by the seeded date palm namely Baker (2) which recorded 6.8 and 7.0 cm for fruit length and 2.7 and 2.8 cm for fruit diameter in the first and second seasons, respectively, followed by the female Zaghoul cultivar, which recorded 6.0 and 6.2 cm for fruit length and 2.4 and 2.5 cm for fruit diameter in the both seasons, respectively. The lowest fruit length and diameter (5.4 and 5.7 cm for fruit length and 2.1 and 2 cm for fruit diameter) were recorded due to the seeded date palm namely Baker (1) in the two seasons of the study.

Flesh weight took the same trend of fruit weight, fruit length and diameter in both seasons of the study.

Seed weight did not show significant differences among the two seeded female date palms namely Baker (1), baker (2) and Zaghoul in both seasons.

The above results are agreed with those Sourial *et al.* (1983), Rokba *et al.* (1990), Salem and Hamed (1993),

*Fruit physical characteristics**Fruit weight (g)*

Results in Table (7) indicate significant differences among female date palms namely Baker (1), Baker (2) and Zaghoul cultivar.

The highest fruit weight (26.2 and 26.7 gm) was reached by seeded female date palm namely Baker (2) in the first and second seasons, respectively, followed by Zaghoul cultivar, since it recorded 20.5 and 21.4 gm in both seasons. While the lowest fruit weight was obtained from female date palm namely (Baker (1) which recorded 14 and 15.3 gm in the first and second seasons, respectively.

Sayed (1999), Abdalla (2002), El-Sharabasy *et al.* (2003), Jaradate and Zaid (2004), Ismail *et al.* (2006), Khan *et al.* (2008), Ibrahim (2008), Abdalla (2012), Gadalla (2013), El-Salhy *et al.* (2016) and Ashour *et al.* (2017) who reported that there was a wide and great variation on fruiting behavior of date palm strains or cultivars.

*Fruit chemical characteristics:**Total soluble solids (TSS %)*

Percentage of total soluble solids in the fruit was significantly varied among the female seeded date palms namely Baker (1), Baker (2) and Zaghoul cultivar.

The highest percentage of TSS (35.0 and 36.5 %) was recorded due to Baker (1) date palm, followed by the seeded date palm namely Baker (2) which recorded 33.3 and 34.3 % in the first and second seasons, respectively. The lowest percentage of total soluble solids (27.2 and 28.3 %) was recorded by Zaghoul cultivar in both seasons of the study (Table 8).

Table (8): Fruit chemical properties of some female date palm comparing with Zaghoul cultivar grown at Giza Governorate during 2014 and 2015 seasons.

Characters	TSS (%)		Acidity (%)		Non-reducing sugars (%)		Reducing sugars (%)		Total sugars (%)	
	S1	S2	S1	S2	S1	S2	S1	S2	S1	S2
Treatments										
Baker (1)	35.0 <sup>a</sup>	36.5 <sup>a</sup>	0.30 <sup>a</sup>	0.29 <sup>a</sup>	36.0 <sup>a</sup>	43.0 <sup>a</sup>	47.0 <sup>a</sup>	43.0 <sup>a</sup>	83.0 <sup>a</sup>	85.0 <sup>a</sup>
Baker (2)	33.3 <sup>b</sup>	34.3 <sup>b</sup>	0.30 <sup>a</sup>	0.30 <sup>a</sup>	35.7 <sup>a</sup>	40.0 <sup>a</sup>	47.7 <sup>a</sup>	45.6 <sup>a</sup>	83.4 <sup>a</sup>	85.6 <sup>a</sup>
Zaghoul Cv.	27.2 <sup>c</sup>	28.3 <sup>c</sup>	0.32 <sup>a</sup>	0.28 <sup>a</sup>	34.7 <sup>a</sup>	32.0 <sup>b</sup>	44.0 <sup>b</sup>	40.5 <sup>b</sup>	78.7 <sup>b</sup>	72.5 <sup>b</sup>
LSD at 0.05 level	1.9	0.9	NS	NS	NS	3.1	2.0	2.1	3.5	1.9

#### Acidity:

Acidity percentage was not significantly affected in the fruits of Baker (1), Baker (2) seeded date palms or Zaghoul cultivar in the two seasons of the study.

These results are in accordance with those reported by **Baker et al. (2003)**, **El-Kosary and Soliman (2003)**, **Awad (2006)**, **Badran and El-Shenawy (2009)**.

#### Non-reducing sugars %

Results in Table (8) show that the percentage of non-reducing sugars was not significantly affected in fruits of any date palms under the investigation, while in the second season there were significant differences among them.

The highest value of non-reducing sugars % was obtained from Baker (1) seeded date palm which recorded 43 %, followed by 40 % with Baker (2). Then lowest non-reducing % was obtained by Zaghoul cultivar since it was 32 %.

#### Reducing sugars %

In Table (8), the highest value of reducing sugars (47.7 and 45.6 %) was obtained from the seeded female date palm namely Baker (2) in the first and second seasons, respectively, followed by Baker (1) date palm which recorded 47 and 43 % in the two seasons of the study. The lowest reducing sugars % was found in fruit of Zaghoul cultivar which recorded 44 and 40.5 % in the first and second seasons, respectively.

#### Total sugars

As for total sugars %, the highest total sugars 83.4 and 85.6% was recorded from female date palm namely Baker (2) in the first and second seasons, respectively, followed by Baker (1) which recorded 83 and 85 % in the both seasons of the study

The lowest value of the total sugars 78.7 and 72.5 % was recorded with Zaghoul date palm cultivar in the first and second seasons, respectively.

Similar results were obtained by **Abdalla (2002)**, **El-Kosary and Soliman (2003)**, **Khan (2008)**, **Badran and El-Shenawy (2009)** who reported that total sugars directly influenced by female variety.

#### IV. CONCLUSION

From the abovementioned results it could be concluded that RAPD analysis using 9 primers gave a total of 69 different alleles for three date palm genotypes. The most (PIC) value and polymorphism percentage that, detected by OPB-07 primer showed the highest score (11bands). DNA markers were succeeded in detecting relationships among these genotypes and showed the correlation between yield traits and molecular traits. Finally, RAPD method appears to be a powerful technique for analysis of genetic diversity and identification of variable varieties.

On the other hand, the new two soft seeded female date palms namely Baker (1) and Baker (2) could be initial of date palm types that being superior in bunch weight yield/palm. Also, Baker (2) having the highest fruit weight, yield/palm, highest fruit dimension (length and diameter). Meanwhile, Baker (1) recorded the highest total soluble solids (TSS), reducing, non-reducing and total sugars %. Therefore the seeded date palms namely Baker (1) and (2) are considered promising high yield and good characteristics with fruit quality.

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