

COMPARATIVE STUDY ON PRODUCTIVITY OF SOME ARABIAN AND LOCAL DATE PALM CULTIVARS GROWN IN THE DESERT REGION AT GIZA GOVERNORATE

IBRAHIM, EL-SAYED G., AMANY M. HAMED and NEHAD M. ABD EL- GAWAD

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Abstract

Eight Arabian date palm cultivars i.e. Madjool (Majhool), Bahree, Nabtet-Seif, Halawy, Braym, Khalas, succary and Lolo in comparison with the commercial cv. Hayany (locally grown date palm) in the desert region at Giza Governorate. Fruit set percentage, date of harvest, average number of bunches/palm, bunch weight, yield per palm as well as physical and chemical properties of fruits and Numerical evaluation were recorded and calculated for some tested soft date palm cultivars. Significant differences were observed for fruit set percentage of some tested date palm cvs. Highest fruit set percentages were obtained from Madjool (95.40 – 97.50%), and Hayany (81.00 & 80.00) in comparison with other tested cvs. as well as Nabtet-Seif which produced the lowest fruit set percentage (55 – 58.5%). Braym, Barhee and Halawy were early in harvest by the first half of Aug., Madjool, Hayany and Khalas as midseason (September), while Nabtet-Seif, Succary and Lolo are late in harvest (October). Barhee, Nabtet-Seif, Halawy, Braym, Khalas, Succary, Lolo and Hayany fruits are eatable at Khalal and rutab stage, while Madjool was not eatable at khalal stage increase tannins and acid content in the khalal fruits, Madjool was suitable for raw eating at rutab and tamer stage. Among the physical fruit characteristics are, fruit weight (18.00 & 18.74 gm), fruit length (4.00 & 4.00 cm) and seed weight (1.64 & 1.59 gm) were the highest in the Hayany in tested seasons. Fruit flesh percentage was the highest with Barhee and lowest with Hayany. As for chemical fruit characteristics, total soluble solids and total sugars contents recorded the highest in the Halawy and Succary. Fruits of Halawy and Barhee had lower tannins and acidity percentage, while it reached the highest content in Hayany. The numerical evaluation (total unit 100) of some tested soft date palm showed that, they were ranked as follows: Barhee (89.77 unit), Madjool (84.25 unit), Hayany (80.96 unit), Succary (77.52 unit), Halawy (75.56 unit), Khalas (71.28 unit), Nabtet-Seif (69.82 unit), Lolo (75.23 unit) and Braym (65.95 unit) in average both tested seasons. In addition, total score of fruit quality (70 unit) of tested soft date palm was ranked as follows: Madjool (63.25 unit), Barhee (59.47 unit), Succary (58.28 unit), Lolo (56.28 unit), Hayany (55.18 unit), Halawy (54.65 unit), Khalas (54.23 unit), Nabtet-Seif (50.79 unit) and Braym (48.09 unit) in average both tested seasons. Generally, the obtained herein results proved that Madjool, Barhee and Hayany showed better results and could be recommended to be cultivated in the desert region at Giza Governorate, due to their high yield

and fruits physiochemical characteristics than the other tested soft date palm cultivars. Although the yield of date palm cvs., Succary and Lolo grown in desert region Giza Governorate was relatively low in comparing with Hayany cv. (local date palm) which showed high physiochemical characteristics for its fruits. On the contrary, Nabtet-Seif and Braym showed less yield and poor fruit quality than the standard studied cv. Hayany.

Key words: Arabian and local date palm - fruit quality – Numerical evaluation – Barhee – Madjool – Halawy – Nabtetseif – Succary – Hayany - desert region at Giza Governorate- fruit physiochemical characteristics.

INTRODUCTION

Date palm (*Phoenix dactylifera L.*) is one of the oldest crops known to man in the Middle-East date palm has been cultivated at least since 6000 BC (AL-Qarawi *et al.*, 2003). Egypt is considered the first country of the top ten date palm that produces Hayany date which is the most economically important soft cultivars grown in Egypt that is usually harvested and consumed at the Khalal and Rutab stages. At present 2000 or more different cultivars of date palm are known to be existed all over the world, but only few important ones have been evaluated for agronomic performance and fruit quality (AL-Hooti *et al.*, 1997 and Ali-Mohamed & Khamis, 2004) Based on botanical description, there are about 27 cultivars in Egypt (EL-Shibli, 2009). The date palm has been an important crop in desert regions of Arabian countries and has formed the source of survival for many ancient decades, this continues to be true today (Zaid and Wet, 2002). There are thousands of date palm cultivars including those with soft, semi-dry and dry fruits (depending on their water content at harvest when fully - ripe). Examples of soft date cultivars (> 30% moisture) include Barhee, Halawy, Samany, Hayany, Madjool, Khalas, Lolo and Braym. Semi - dry date cultivars (20- 30 % moisture) include Amry, Deglet Noor, Sewy, Dayri and Zahidi. Dry date cultivars (< 20% moisture) include Badrayah, Bartamoda, Sakkoty, Horra and Thoory (Kader & Hussien 2009). Arabian date palm cultivars grows successfully all over Egypt (Souria *et al.*, 1983, Salem & Hamdy 1993, Ahmed *et al.*, 1996 and Sayed, 1999). A significant variation in physio-chemical properties among the date varieties (Vij *et al.*, 2005, Abdelsalam *et al.*, 2008, Khan *et al.*, 2008, Iqba *et al.*, 2011 and Hamed, 2012).

This led to a comparative study of productivity of some Arabian (Majdool, Bahree, Nabtet-Seif, Halawy, Braym, Khalas, Succary, Lolo and local (Hayany)) soft date palm cultivars grown in the desert region at Giza government, evaluate the yield as well as physical and chemical properties of fruit and the numerical evaluation. The

total score for yield and fruit quality (100) and total score for fruit quality (70) of tested soft date palm were determined.

MATERIALS AND METHODS

This experiment was carried out during two successive seasons of 2012 and 2013 to evaluate the behavior of some Arabian soft date palm cultivars, Madjool (Majhool), Barhee, Nabtet-Seif, Halawy, Braym, Khalas, Succary, and Lolo in comparing with Hayany cv. (local date palm). These varieties were planted at 8X8 meter apart grown in private orchard at Giza, twenty seven palms of similar vigour were selected about 11 years old at the beginning of this study and subjected to the same agricultural practices were exposed. The other practice so as pollination, pest, disease and weed control, offshoots plants separation and leaf to bunch ratio (8.1) were same for each treatment.

This experiment was arranged in completely randomized block design with three replicates on palm per each. Average maximum temperatures as well as relative humidity percentage for Giza region during 2012 & 2013 years were recorded from Giza Metrological station and are shown in Table (1). The soil texture was sandy and recently reclaimed according to mechanical and chemical analysis of the samples according to Champan & Pratt, 1975 (Table 2). The drip irrigation with one line per single row and promising micro-flapper emitters was used. Six drippers/palm (8 liter/hour/dripper) were given a total discharge of about (48 liter/hour/dripper) to keep pressure.

The obtained data were used for calculating the following parameters:

1- Fruit set percentage : initial fruit set percentage were evaluated one month after pollination. Five female strands per bunch were randomly selected from each replicate. The percentage of fruit set was calculated using the following

$$\text{Fruit set \%} = \frac{\text{Total number of set fruit/strand}}{\text{Total number of flowers/strand}} \times 100$$

2- Harvesting data:

All the investigated soft date palm cvs. were harvested at full color stage exactly at the end of khalal stage (partially - ripe) according to Hussien *et al.*, (1979).

3- Yield :

At time of harvesting average number of bunches /palm, weight of bunch and yield/palm were recorded.

Samples of 50 date fruits were randomly selected from each palm for determining the following fruit properties.

4- Physical characteristics of fruit:

Fruit weight, pulp % (fruit flesh weight %), fruit dimension, fruit shape index and seed weight.

5- Chemical characteristics of fruit:

Flesh moisture percentage, T.S.S., acidity, reducing, non – reducing and total sugars which were determined according to the methods of A.O.A.C. (2000) total soluble tannins percentage in the flesh was determined according to Balbaa (1974).

6- General evaluation of the tested soft date palms cvs. were calculated on the basis of 100 units which were divided among various fruit characteristics according to (Mousa, 1981) with simple modification as follows: 30 units for the yield/palm, 10 unit fruit set percentage, 15 unit for fruit weight, 10 units for total sugars content, 5 units for each of T.S.S. content, fruit length, fruit diameter, seed weight, acidity and tannins. Each palm that gave the best results in any characteristics was given the full mark specified for this character, while each of the other tested palms took lower units equal to their quantities.

Statistical analysis:

The obtained data were subjected to analysis of variance in randomized complete block design according to Snedecor & Cochran (1980). The averages were compared by using the method of new least significant differences (New L.S.D.) described by Waller & Duncan (1969).

Table 1. Average temperature, relative humidity and possible sunshine duration for desert region at Giza Governorate during two experimental seasons :

Month	2012					2013				
	Temp. Max. (°C)	Temp. min. (°C)	Temp. average (°C)	Relative Humidity (%)	sunshine duration (hr)	Temp. Max. (°C)	Temp. min. (°C)	Temp. average (°C)	Relative Humidity (%)	sunshine duration (hr)
May	34.2	20.0	27.2	50	13.5	35.1	19.7	27.8	47	13.5
June	36.9	23.5	30.1	55	13.9	36.0	22.4	29.3	53	13.9
July	37.6	25.3	29.5	64	13.6	35.2	22.5	28.8	60	13.6
Aug.	37.7	24.8	29.4	58	13.1	37.2	23.7	30.3	60	13.1
Sept.	34.9	22.1	26.2	55	12.2	35.8	22.2	28.8	58	12.2
Oct.	33.0	20.6	24.3	62	11.3	30.1	17.3	24.2	59	11.3

Table 2. Soil characteristics of date palm at the beginning of the experiment

Properties	Depth (cm)		
	0-40 cm	40-80 cm	80-120 cm
Clay %	2.9	4.00	6.40
Silt %	11.4	7.3	8.80
Fine send %	21.2	20.3	29.5
Coarse send %	64.5	68.4	55.3
Texture	Sandy soil	Sandy soil	Sandy soil
PH	8.01	8.02	8.04
EC	0.40	0.53	0.56
CaCO ₃ %	0.84	0.06	0.06
Na mg/L	2.21	1.65	1.20
K mg/L	0.04	0.04	0.04
Ca mg/L	1.22	1.11	1.00
Cl mg/L	0.68	0.92	0.99
So ₄ mg/L	0.79	1.31	1.6

RESULTS AND DISCUSSION

1- Fruit set percentage :

The number of setted fruit/stalks, of the experimental Arabian(Majdool, Bahree, Nabtet-Seif, Halawy, Braym, Succary, Khalas, Lolo and local Hayanydate palm cultivars grown in the desert region at Giza governorate during 2012&2013 seasons are described in Table (3). Average fruit set percentage was significantly varied in most of the tested soft date palm cultivars. It ranged from 95.40& 97.5% in Madjool date palm to 55.00 & 58. 50% in Nabtet-Seif date palm cv. In the two seasons. The remainder date palm cvs. had an intermediate value of fruit set percentage. Similar results were obtained by Salem &Hamdy (1993) and Hamed, (2012).

Table 3. Fruit set percentage in some Arabian and local soft date palms grown in the desert region at Giza Governorate (2012 & 2013 seasons):

Soft date palm cultivars	2012	2013
Madjool (Majhool)	95.40	97.50
Barhee	66.00	60.00
Nabtet-Seif	55.00	58.50
Halawy	82.00	79.00
Braym	59.00	61.50
Khalas	61.00	64.00
Succary	56.00	59.00
Lolo	78.40	75.00
Hayany	81.00	80.00
New L.S.D at 0.05	3.66	4.42

2- Date of harvesting :

From Table (4) it is clear that under desert region conditions Giza governorate, Braym dates were the earliest to harvest (2 Aug. & 10 Aug.) followed by Halawy (10 Aug. & 14 Aug.), Barhee (11 Aug. & 10 Aug.), Madjool (1 Sep. & 27 Aug.), Hayany (1 Sep. & 25 Aug.), Khalas (10 Sep. & 16 Sep.), Succary (1 Oct. & 8 Oct.), Nabtet-Seif (10 Oct. & 5 Oct.) and Lolo (31 Oct. & 25 Oct.) in tested seasons respectively. Barhee, Nabtet-Seif, Halawy, Braym, Khalas, Succary, Lolo were eatable on khalal and rutab stage while Madjool was eatable on rutab and tamre stage. Fruit colours of fruits of Barhee, Nabtet-Seif, Halawy, Braym, Khalas, Succary, Lolo were yellow, Madjool was orange – yellow, Hayany was red. In harmony with the present results those obtained by Sourial *et al.*, (1983), Salem & Hamdy (1993) and Sayed (1999).

Table 4. Date of harvesting, colour of khalal fruits and stages of fruit ripening in some soft date palm grown in the desert region at Giza Governorate (2012 & 2013 seasons):

Soft date palm cultivars	2012			2013		
	Date of harvesting	Colour of Khalal fruits	Stages of eating fruits	Date of harvesting	Colour of Khalal fruits	Stages of eating fruits
Madjool	1 st Sept.	orange - yellow	Rutab - Tamer	27 th Aug.	orange - yellow	Rutab - Tamer
Barhee	11 th Aug.	Yellow	Khalal - Rutab	10 th Aug.	Yellow	Khalal - Rutab
Nabtet-Seif	10 th Oct.	Yellow	Khalal - Rutab	5 th Oct.	Yellow	Khalal - Rutab
Halawy	10 th Aug.	Yellow	Khalal - Rutab	14 th Aug.	Yellow	Khalal - Rutab
Braym	2 nd Aug.	Yellow	Khalal - Rutab	10 th Aug.	Yellow	Khalal - Rutab
Khalas	10 th Sept.	Yellow	Khalal - Rutab	16 th Sept.	Yellow	Khalal - Rutab
Succary	1 st Oct.	Yellow	Khalal - Rutab	8 th Oct.	Yellow	Khalal - Rutab
Lolo	31 st Oct.	Yellow	Khalal - Rutab	25 th Oct.	Yellow	Khalal - Rutab
Hayany	1 st Sept.	Red	Khalal - Rutab	25 th Aug.	Red	Khalal - Rutab

3- Average number of bunches /palm and bunch weight of some tested soft date palm cvs.:

It is clear from Table (5) that number of bunches/palm was insignificantly variable due to cultivars average bunch weight that was significantly variable in most of the tested date palm cultivars (Table 5). Data concerning the bunch weight in some Arabian cultivars grown at Giza governorate during 2012 & 2013 seasons are shown in

Table (5). In this respect, the test cultivars can be arranged descendingly as follows: Barhee(17.15&15.85 kg.), Madjool(14.87&14.0 0 kg.), Hayany (14.19&13.33 kg.), Nabtet-Seif (11.18&11.62 kg.), Braym (13.05&11.49 kg.), Halawy (10.27&9.70kg.), Succary (12.60&11.08 kg.), Lolo (12.90&10.78 kg.) and Khalas (11.3&10.72 kg.) in the first and second seasons respectively.

4- Fruit yield/ palm:

It was possible to arrange the tested cvs. descendingly according to their average yield/palm as follows: Barhee (171.50 & 158.50 kg/palm), Madjool(119.0&112.00 kg/palm), Hayany (149&140 kg/palm), Nabtet-Seif (104&104.6 kg/palm), Braym (96.00&100.00 kg/palm), Lolo (116.40&104.60 kg/palm), Succary (104.00&107.50 kg/palm) , Khalas (90.5&96.50 kg/palm)and Halawy (92.5 & 88 kg) in tested seasons (Table 5). These results are in agreement with those reported by Sourial *et al.*, (1983), Salem &Hamdy (1993), Sayed (1999), Khan *et al.*, (2008), Iqbal *et al.*, (2011) and Hamed (2012) who stated that there was a wide and great variations on fruiting behavior of most date palm cvs.

Table 5. number of bunches /palm, average bunch weight and yield /palm of in some soft date palm grown the desert region at Giza Governorate (2012 & 2013 seasons):

Soft date palm cultivars	2012			2013		
	Average number of bunches/palm	Bunch weight (Kg)	Fruit yield (Kg/palm)	Average number of bunches/palm	Bunch weight (Kg)	Fruit yield (Kg/palm)
Madjool	8.00	14.87	119	8.00	14.00	112.0
Barhee	10.00	17.15	171.50	10.00	15.85	158.50
Nabtet-Seif	9.30	11.18	104.0	9.00	11.62	104.60
Halawy	9.0	10.27	92.5	9.00	9.7	88.0
Braym	9.00	13.05	96.00	8.70	11.49	100.00
Khalas	8.00	11.31	90.50	9.00	10.72	96.50
Succary	9.30	12.60	104.00	9.70	11.08	107.50
Lolo	9.00	12.90	116.40	9.70	10.78	104.60
Hayany	10.50	14.19	149	10.5	13.33	140
New L.S.D at 0.05	N.S	1.29	5.94	N.S	1.18	4.42

5- Fruit quality :

A- Fruit physical characteristics:

Results shown in Table (6) indicated that there are significant differences in fruit weight, flesh percentage, fruit length, diameter, fruit length/diameter and seed weight of some Arabian and local date palm cv. grown in the desert region under Giza governorate. Hayany fruit was the heaviest among the tested cultivars (18.00 & 18.74 gm) while Braym fruit was the lightest (9.00 & 9.30 gm) compared with the soft date palm cvs. In both tested seasons. In this respect, the tested cultivars can be arranged descendingly as follows: Hayany, Madjool, Barhee, Succary, Nabtet-Seif, Lolo, Halawy, Khalas and Braym. Similar results were obtained by Salem & Hamdy (1993), Sayed (1999) and Hamed (2012). It can be stated from the obtained data that flesh (pulp) percentage, fruit length and fruit diameter in all the investigated soft date palm were significant varied pulp (flesh) percentage ranged from 93.56 & 93.06 % to 88.33 & 87.67 % in both tested seasons. The maximum fruit length was recorded in Hayany (4.00 & 4.00 cm) and Madjool (3.90 & 4.10 cm) date palm cv. while the minimum fruit length was recorded in Braym (2.30 & 1.94 cm). Fruit diameter varied between (2.80 & 2.70 cm) in Madjool and (1.60 & 1.54 cm) in Barymcvs. The remainder date palm cvs. had an intermediate values of fruit dimension. The date also revealed that fruit of Hayany had the heaviest seeds (1.64 & 1.59 gm) against those of the Braym (0.84 & 0.80 gm) and Barhee (0.92 & 0.94 gm) in both tested seasons. Seed weight of other tested cvs. were in between comparing to previous ones. The obtained results are in accordance with the findings of other investigators (Sourial *et al.*, (1983), Salem & Hamdy (1993), Vij *et al.*, (2005), Abdelssalm *et al.*, (2008), Khan *et al.*, (2008), Iqbal *et al.*, (2011) and Hamed (2012)).

Table 6. Physical characteristics of fruit in some Arabian and local soft date palm grown in the desert region under Giza governorate (2012 & 2013 seasons):

Soft date palm cultivars	2012					
	Fruit wt. (gm)	Fruit flesh weight% (pulp%)	Fruit length (cm)	Fruit diameter (cm)	Fruit length / diameter (L. /D.)	Seed weight (gm)
Madjool	16.40	93.29	3.90	2.80	1.39	1.10
Barhee	14.30	93.56	3.60	2.30	1.56	0.92
Nabtet-Seif	13.00	91.53	3.10	2.40	1.29	1.10
Halawy	11.40	90.96	3.50	1.90	1.84	1.03
Braym	9.00	90.66	2.30	1.60	1.43	0.84
Khalas	11.30	91.50	3.50	2.40	1.45	0.96
Succary	13.70	88.68	3.60	2.60	1.38	1.55
Lolo	12.00	91.75	3.20	2.40	1.33	0.99
Hayany	18.00	88.33	4.00	2.30	1.73	1.64
New L.S.D at 0.05	0.82	2.14	0.33	0.31	N.S	0.24
Soft date palm cultivars	2013					
	Fruit wt. (gm)	Fruit flesh weight% (pulp%)	Fruit length (cm)	Fruit diameter (cm)	Fruit length / diameter (L. /D.)	Seed weight (gm)
Madjool	17.30	93.06	4.10	2.70	1.51	1.20
Barhee	13.40	92.98	3.50	2.60	1.34	0.94
Nabtet-Seif	12.50	90.08	3.00	2.30	1.30	1.24
Halawy	11.20	90.00	3.20	1.89	1.69	1.12
Braym	9.30	91.39	1.94	1.54	1.25	0.80
Khalas	12.80	91.40	3.50	2.50	1.40	1.10
Succary	14.01	89.93	3.70	2.60	1.42	1.4 1
Lolo	12.40	90.80	3.40	2.50	1.36	1.14
Hayany	18.74	87.67	4.00	2.40	1.66	1.59
New L.S.D at 0.05	0.77	2.35	0.35	0.34	N.S	0.25

B- Fruit chemical characteristics:**- Moisture content :**

Tables (7&8) show that moisture content was high in Halawy and Hayany fruits (40.00 % and 40.00%) in the first season and Nabtet-Seif (39.00%) in the second season followed in a descending order by those of Succary (38.00%), Nabtet-Seif (36.00%), Braym (35.00%), Madjool (34.00%), Lolo (31.00%), Barhee (31.00%), Khalas (30.00%) in the first season, while Hayany (38.00%), Succary (36.00%), Halawy (36.00%), Barhee (35.00%), Lolo (34.00%), Braym (32.00%), Madjool (30.00%) and Khalas (29.00%) in the second season (Table 7&8). These results are in line with Sourial *et al.*, (1983), Harhash& Abdel-Nasser (2010) and Soliman&Harhash (2012).

- T.S.S. :

Data recorded showed the superiority of Succary and Halawy in T.S.S. % as compared with the other tested cv. fruits of those cvs. attained the highest T.S.S. % (49.00% & 49.00% and 50.00% & 49.00% respectively) against 40.00% for Braym in the first season and Hayany (40.00%) in the second season. The other tested cvs. showed intermediate T.S.S. values (Tables 7&8). Analogical results were reported by Sourial *et al.*, (1983), Salem &Hamdy (1993) and Sayed (1999).

- Acidity :

The minimum value of fruit acidity in Halawy (0.131 & 0.120 %) and Barhee (0.140 & 0.122 %) while the maximum value in Braym(0.189& 0.190 %). The *other tested cvs. showed intermediate acidity values.*

- Total sugars , reducing sugars and non-reducing sugars content:

From Tables (7&8) it is obvious that total sugars content in fruits ranged between 51.00 & 51.00 % for Halawy to 39.00 % for Hayany in the first season, while it was 36.50 % for Nabtet-Seif. Meanwhile, reducing sugars content ranged between 43.00 & 41.00 % to 29.00 & 26.00 % in the fruit of all the studied date palm cvs. In addition, non-reducing sugar content ranged from 14.00 & 16.00 % in both tested seasons respectively.

- Tannins content :

Data recorded clarify that fruits of Halawy and Barhee showed the lowest value in tannins percentage(0.101 & 0.116 %), and (0.124 & 0.104 %) respectively in both tested seasons as compared with those of the other tested cultivars. While tannins content high was recorded in the fruits of date palm cvs. Hayany, Nabtet-Seif and Braym. These results are in line with those obtained by Sourial *et al.*,(1983), Salem &Hamdy (1993), Sayed (1999), Vij *et al.*, (2005), Abdelssalm *et al.*, (2008), Khan *et al.*, (2008) and Iqbal *et al.*, (2011) which assured a significant variation in physio-chemical properties among the date varieties.

Table 7. Chemical properties of fruits in some soft date palm grown Giza Governorate desert region (2012 seasons):

Soft date palm cultivars	Moisture %	T.S.S. %	Acidity %	Reducing sugars %	Non – Reducing sugars %	Total sugars %	Total soluble tannins %
Madjool	34.00	46.00	0.181	34.00	12.00	46.00	0.123
Barhee	31.00	48.00	0.140	36.00	13.00	49.00	0.121
Nabtet-Seif	36.00	43.00	0.183	29.00	11.00	40.00	0.164
Halawy	40.00	49.00	0.131	43.00	9.00	51.00	0.101
Braym	35.00	40.00	0.189	34.00	14.00	48.00	0.152
Khalas`	30.00	47.00	0.180	34.00	14.00	48.00	0.142
Succary	38.00	49.00	0.145	39.00	11.00	50.00	0.123
Lolo	31.00	48.00	0.181	40.00	8.00	48.00	0.134
Hayany	40.00	44.00	0.151	29.00	10.00	39.00	0.179
New L.S.D at 0.05	1.64	1.14	0.015	1.49	0.79	0.99	0.016

Table 8. Chemical properties of fruits in some soft date palm grown in Giza Governorate desert region (2013 seasons):

Soft date palm cultivars	Moisture %	T.S.S. %	Acidity %	Reducing sugars %	Non – Reducing sugars %	Total sugars %	Total soluble tannins %
Madjool	30.00	43.00	0.174	34.00	11.00	44.00	0.121
Barhee	35.00	44.00	0.122	38.00	12.00	50.00	0.104
Nabtet-Seif	39.00	45.00	0.174	26.00	10.50	36.50	0.141
Halawy	36.00	49.00	0.120	41.00	10.00`	51.00	0.116
Braym	32.00	43.00	0.190	32.00	16.00	48.00	0.129
Khalas	29.00	43.00	0.180	35.00	12.00	47.00	0.134
Succary	36.00	50.00	0.142	38.00	12.00	50.50	0.121
Lolo	34.00	48.00	0.174	39.00	9.00	48.00	0.132
Hayany	38.00	40.00	0.160	31.00	9.00	40.00	0.176
New L.S.D at 0.05	1.73	1.19	0.018	1.54	0.68	0.84	0.012

6-Numerical evaluation:**Total score for yield and fruit quality (100unit):**

Data pertaining the general evaluation of the studied cultivars in Tables (9&10) revealed that Barhee and Madjool cvs. seemed to be the higher cv. in yield and fruit quality as it attained the highest score units (89.47 unit) and (84.25 unit) as compared with Hayany cv. (local date palm) (80.96 unit) in average both tested seasons. The numerical evaluation of Arabian date palm showed that : they were descending as follows : Barhee (89.47 unit), Madjool (84.25 unit), Hayany (80.96 unit), Succary (77.52 unit), Halawy (75.56 unit), Lolo (75.23 unit), Khalas (71.28 unit), Nabtet-Seif (69.82 unit) and Braym (65.95 unit) in average both tested seasons.

Total score for fruit quality (70 unit) :

The tested cvs. could be arranged descendingly based on total score (70) for fruit quality as follows: Madjool (63 unit), Barhee (59.47 unit), Succary (58.28 unit), Lolo (56.28 unit), Hayany (55.18 unit), Halawy (54.65), Khalas (54.23 unit), Nabtet-Seif (50.79 unit) and Braym (48.09 unit) in average both tested seasons. Madjool, Barhee, Halawy, Succary fruits were excellent in some properties whereas they were lower in other specifically T.S.S. %, total sugar % and pulp % (flesh fruit) as compared with Hayany fruits. In harmony with the present results those obtained by Hajian (2007) and El-Shibli (2009) reported that Madjool and Barhee are of the most commercial and popular date cultivars in the world. Soliman & Harhash (2012) who found to be acceptable by Saudi consumers. Hamed (2012) who found that Barhee and Succary performed better under Giza conditions.

Arabian date palm varieties subject to this study (grown in the desert region under Giza governorate) were widely different in their growth fruit set percentage, date of harvesting, yield and physio-chemical properties variations among these cultivars could be mainly due to their genetically and adaptability differences.

The adaptability of those date palm cvs. under different climatic and soil conditions was remarkably variable. Heat accumulation in various regions considering the limited factor for the suitability of date palm cvs. for growing in any location .

Generally, the obtained herein results proved that Madjool, Barhee, Hayany and Halawy performed better and it could be recommended to be grown in the desert region at Giza governorate for its high in yield and fruit quality comparing to the other tested soft date palm cultivars.

Table 9. General score evaluation of some soft date palm grown in at Giza Governorate the desert region (2012 seasons):

Soft date palm cultivars	units	2012								
		Madjool	Barhee	Nabtet-Seif	Halawy	Braym	Khalas	Succary	Lolo	Hayany
Yield/palm	30	20.81	30.00	18.27	16.18	16.79	15.83	18.14	18.24	26.06
fruit set.%	10	10.00	6.80	5.76	8.59	6.18	6.39	5.87	8.21	8.49
Fruit wt.	15	13.66	11.91	10.83	9.50	7.50	9.41	11.40	10.00	15.00
Pulp%	5	4.98	5.00	4.89	4.86	4.84	4.88	4.73	4.90	4.72
Fruit length	5	4.87	4.50	3.87	4.37	2.87	4.37	4.50	4.00	5.00
Fruit diameter	5	5.00	4.10	4.28	3.39	2.85	4.28	4.64	4.28	4.10
T.S.S.%	5	4.70	4.90	4.40	5.00	4.10	4.80	5.00	4.70	4.50
Total sugar%	10	9.01	9.62	7.80	10.00	9.40	9.40	9.80	9.40	7.60
Acidity%	5	3.09	4.65	3.01	5.00	2.7	3.19	4.45	3.09	3.09
Tannins%	5	3.09	3.8	1.88	5.00	2.4	2.9	3.09	4.29	1.13
Seed wt.	5	4.35	4.46	4.35	4.41	5.00	4.43	4.08	4.42	1.61
Total scour fruit quality	70	63.57	59.69	51.07	55.75	47.84	54.04	57.54	56.3	55.63
Total unit yield/palm	100	84.38	89.69	69.34	76.3	64.63	69.88	75.68	74.54	81.69

Table 10. General score evaluation of some soft date palm grown in Giza Governorate
the desert region (2013 seasons):

Soft date palm cultivars	units	2013								
		Madjool	Barhee	Nabtet- Seif	Halawy	Braym	Khalas	Succary	Lolo	Hayany
Yield/palm	30	21.19	30.00	19.79	16.65	18.29	18.26	20.34	19.79	26.49
fruit set.%	10	10.00	6.15	5.94	8.10	6.30	6.56	6.05	7.69	8.20
Fruit wt.	15	13.84	10.72	10.00	8.96	7.44	10.24	11.21	9.92	15
Pulp%	5	5.00	4.99	4.83	4.83	4.91	4.91	4.83	4.87	4.71
Fruit length	5	5.00	4.26	3.65	3.90	2.36	4.26	4.51	4.14	4.87
Fruit diameter	5	5.00	4.81	4.25	3.50	2.85	4.62	4.81	4.62	4.44
T.S.S.%	5	4.30	4.40	4.50	4.90	4.30	4.30	5.00	4.80	4.00
Total sugar%	10	8.62	9.61	7.15	10.00	9.41	9.21	9.90	9.41	7.84
Acidity%	5	2.75	4.9	2.75	5.00	2.08	2.5	4.41	2.75	2.33
Tannins%	5	4.18	5.00	3.22	4.42	3.7	3.5	4.18	3.65	1.53
Seed wt.	5	4.25	4.42	4.23	4.30	5.00	4.32	4.12	4.29	1.78
Total scour fruit quality	70	62.94	59.47	50.52	53.55	48.35	54.42	59.02	56.14	54.74
	100	84.13	89.26	70.31	74.82	67.27	72.68	79.36	75.93	80.23
Average two seasons										
Total score for quality	70	63.25	59.47	50.79	54.65	48.09	54.23	58.28	56.22	55.18
Total score for yield and fruit quality	100	84.25	89.47	69.82	75.56	65.95	71.28	77.52	75.23	80.96

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دراسة مقارنة لبعض اصناف نخيل البلح العربية والمحلية النامية في المنطقة الصحراوية بمحافظة الجيزة

السيد جمعه ابراهيم ، امانى مصطفى حامد ، نهاد مصطفى احمد عبد الجواد

قسم بحوث الفاكهة الأستوائية - معهد بحوث البساتين - مركز البحوث الزراعية - الجيزة

تم تقييم سلوك ثمانية اصناف من نخيل البلح العربية (مجدول (مجهول) - برحى - نبتة سيف - حلاوى - بريم - خلاص - سكرى - لولو) بالصنف المحلى التجارى (الحيانى) النامية فى منطقة صحراوية بمحافظة الجيزة . تم تسجيل النسبة المئوية لعقد الثمار - ميعاد جمع الثمار - متوسط عدد السوبات / نخلة ووزن السوباتة ووزن المحصول الكلى/نخلة وكذلك بعض الصفات الطبيعية والكيماوية للثمار و الترقيم الرقمى الكلى و الترقيم الرقمى لجودة الثمار للاصناف المختبرة . وقد اظهرت النتائج ان نسبة عقد الثمار تختلف معنويا باختلاف الاصناف المختبرة . فقد سجلت اعلى نسبة عقد للثمار فى الصنف المجدول (٩٥.٤-٩٧.٥%) ، يليه الصنف الحياى (٨١.٠٠ & ٨٠.٠٠%) بالمقارنة بالاصناف الأخرى ، كما اعطى الصنف نبتة سيف اقل نسبة عقد الثمار (٥٥.٠٠-٥٨.٥٠%) . كما وجد ان اصناف البريم و البرحى و الحلاوى تجمع ميكرا فى النصف الأول من اغسطس بينما اصناف مجدول و الحياى و الخلاص تجمع فى منتصف الموسم (شهر سبتمبر) بينما اصناف نبتة سيف و سكرى و لولو متأخرة الجمع (فى شهر اكتوبر) و من النتائج وجد ان ثمار اصناف الخلاص و السكرى و لولو و الحياى تؤكل فى مرحلة الخلال و الرطب بينما صنف المجدول لا يؤكل فى مرحلة الخلال لأرتفاع محتوى الثمار من التانينات و الحموضة بينما يؤكل بطعم جيد فى مرحلة الرطب و التمر . ومن النتائج تبين ان الصنف الحياى سجل أعلى القيم من حيث متوسط وزن الثمار (١٨.٠٠ & ١٨.٧٤ جم) ومتوسط طول الثمرة (٤.٠٠ & ٤.٠٠ سم) ووزن للبذرة (١.٥٩ & ١.٦٤ جم) ، كما وجد ان محتوى الثمار الأعلى من المواد الصلبة الكلية و السكريات فى الصنف الحلاوى و السكرى كما احتوى ثمار الحلاوى و البرحى على اقل نسبة من التانينات و الحموضة بينما ثمار الحياى اعلى نسبة من التانينات و الحموضة . و طبقا للنتائج فقد اظهر الترقيم الرقمى الكلى (١٠٠ وحدة) للاصناف المختبرة ، ان الترتيب التنازلى كالاتى : البرحى (٨٩.٤٧ وحدة)، المجدول (٨٤.٢٥ وحدة)، الحياى (٨٠.٩٦ وحدة)، السكرى (٧٧.٥٢ وحدة)، خلاص (٧٧.٥٢ وحدة)، حلاوى (٧٥.٥٦ وحدة)، لولو (٧٥.٢٣ وحدة)، نبتة سيف (٦٩.٨٢ وحدة) و بريم (٦٥.٩٥ وحدة) لمتوسط موسمى الدراسة . كما وجد ان الترقيم الرقمى لجودة الثمار (٧٠ وحدة) للاصناف المختبرة ترتب تنازليا كالاتى : مجدول (٦٣.٢٥ وحدة) ، برحى (٥٩.٤٧ وحدة)، السكرى (٥٨.٢٥ وحدة)، الحياى (٥٥.١٨ وحدة)، حلاوى (٥٤.٦٥ وحدة) ، الخلاص (٥٤.٢٣ وحدة)، نبتة سيف (٥٠.٧٩ وحدة) و البريم (٤٨.٠٩ وحدة) لمتوسط موسمى الدراسة.

عموما من النتائج المتحصل عليها التوصية بزراعة اصناف البرحى و المجدول و الحياى فى المنطقة الصحراوية بمحافظة الجيزة لتفوقهم فى المحصول و الصفات الطبيعية و الكيماوية للثمار عن الاصناف الأخرى المختبرة و على الرغم من ان كمية المحصول فى اصناف نخيل البلح السكرى و اللولو النامى تحت ظروف التجربة تكون منخفضة نسبيا مقارنة بالصنف الحياى (المحلى) فان لهما خصائص جودة طبيعية و كيماوية للثمار عالية، كما وجد ان اصناف نبتة سيف و بريم اقل فى المحصول و جودة الثمار مقارنة بالصنف الحياى (القياسى) .