

## EVALUATION OF SOME DATE PALM CULTIVARS GROWN UNDER EL BAHARIA OASIS, GIZA, EGYPT

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The present study was carried out two successive seasons, i.e. 2000 and 2001 on nine date palm cultivars grown at El Baharia Oasis, Giza, Egypt. The evaluation parameters included different physical and chemical fruit properties at harvesting time of each cultivar.

The Sewy date palm considered to be the standard and local cultivar in such location, revealed that "Falik" cultivar was the best ones among the studied cultivars, where they exhibited the relatively greatest fruit weight, flesh weight, fruit volume and fruit diameter. In addition, they showed the highest total soluble solids, sugars, and the lowest fibers content and phenols percentage. On the other hand, "Soltani" cultivar fruits were the best for fruit length and non-reducing sugars content. Conversely, "Hemily" cultivar fruits showed the lowest fruit weight, flesh weight, fruit volume, fruit length and fruit diameter. However, one can recommend the "Falik" cultivar to be used as semi dry cv. and can be consumed at rotab stage as soft cv. in Giza and other Northern Governorates of Egypt. Whereas, the "Soltani" cultivar is suitable as a dry date palm cultivar for the extension in Southern Egyptian Governorates specially Qena and Aswan.

**Keywords:** date palm, cultivars, El Baharia Oases.

Date palm trees considered the main economic source to the people of the Egyptian desert. Some of date palm fruits are packed and marked to the people in other governorates of Egypt or to export to foreign countries especially Europe. Sewy date palm is the dominant local cultivar in the Egyptian oases. It is followed by some dry fruit cultivars.

Population of date palm trees whether concentrated or scattered in El-Baharia oases reaches 316,745 date palms with 148,396 females among the concentrated and 5631 one among the scattered ones. The rest of date palm trees are still young ones distributed among both concentrated and scattered populations. The area cultivated by date palms reaches 3705 feddans (feddan = 0.42 hectare), while that planted to other fruit trees

(olives, apricots, citrus trees, grapes and other pomology) reaches 1838 feddans (The Agricultural Directorate of El Baharia Oases, 2000).

Baharia Oases consists of six directorates namely El-Bawity, El-Kasr, Mendisha, El-Zabo, El-Hara and El-Haiz. They belong to Giza governorate despite being very remote to the west into the western desert; about 360 km from 6 October City. There exists some artesian wells that flow continuously with good quality water, i.e. low salinity (water analysis; PH = 6.7, Ec = 2.56 mmho/cm).

This study objects at a comprehensive evaluation of some common local cultivars of date palm in El-Baharia oases area and selection of the cultivar with the best physical and chemical fruit properties, i.e. fruit quality. This will help define the best commercial cultivars that could be relied upon for propagation in the study area and the similar dry area.

## MATERIALS AND METHODS

This study was conducted on nine date palm cultivars that are common to the area of El-Baharia Oases in sand soil (climate conditions, average temperature 70<sup>0</sup> F, average humidity 44.2 %), in the years of 2000 and 2001. Each cultivar was represented by 6 trees replicates. The trees were similar and received the same orchard management. Fruits collected at the ripe fruit stage for both soft and semi-dry fruits, while at the full dryness stage for the dry ones. Regarding semi fruits, they were collected at Khallal stage (maturity fruit) because of dropping during rutab stage (soft fruit) under the conditions of El-Baharia Oases. Fruit samples of the cultivars Sewy, Frehy, Soltani and Kake'a from El-Zabo village (Mendisha), Mangouri, Glazed Yellow, Hamrawy and Hemily from Kebala village (Mendisha), and Falik from El-Hara area.

For fruit properties, twenty fruits were taken randomly from each bunch, fruit characteristics, were determined as weight, volume, length, diameter, pulp weight and seed weight.

Chemical properties of juice (50 g of pieces were mixed with 100 ml distilled water using special electric mixer for extraction, then filtered) were determined as outlined by A.O.A.C. (1965) including moisture content, total titratable acidity as malic acid, total soluble solids (TSS) percentage (by hand refractometer), phenols and fibers. Total, reducing and non-reducing sugars were determined according to Thomas and Dutcher (1994).

The obtained data was subjected to statistical analysis based on the randomized complete blocks statistical design (Snedecor and Cochran, 1980). Differentiation among treatment means was accomplished using Duncan (1984).



## RESULTS AND DISCUSSION

Table (1) showed that fruit weight was significantly had the highest for the cultivar Falik (20.63 g) as a mean of the successive seasons of the study, followed by Sewy (13.98 g), then Soltani (12.91 g), whereas the cultivar Hemily had the least one (6.53 g).

Seed weight was significantly the highest for the cultivars Sewy, Falik and Soltani (1.5, 1.48 and 1.36 g, respectively), while the cultivar Mangori was significantly the least (0.91 g).

Flesh weight was significantly the highest in Falik date palm (19.16 g), followed by Sewy and Soltani (12.53 and 11.54 g, respectively). The cultivar Hemily was the least one (5.33 g). In the first season, there were no significant differences among cultivars. Regarding percentage of pulp in the second season, this ratio was significantly the highest for Falik (92.82%), followed by Hamrawy (88.80%), while the least ratio dealt with the cultivar Hemily (81.60%).

In both seasons, fruit volume was significantly the greatest ( $19.30\text{cm}^3$ ) for the cultivar Falik, which was followed by Sewy and Soltani cultivars ( $12.00$  and  $11.73\text{cm}^3$ , respectively). Hemily was the lowest ( $5.88\text{cm}^3$ ).

**TABLE (1). Physical characteristics of fruits of some local date palm cultivars grown under El-Baharia Oases condition in 2000 and 2001 seasons.**

Cultivar	Fruit wt. (g)		Seed wt. (g)		Pulp wt. (g)		Pulp %		Fruit vol. ( $\text{cm}^3$ )		Fruit length (cm)		Fruit diameter (cm)	
	2000	2001	2000	2001	2000	2001	2000	2001	2000	2001	2000	2001	2000	2001
Sewy	13.99 b	13.97 b	1.50 a	1.49 a	12.52 b	12.53 b	75.98 a	89.34 c	12.00 b	12.00 b	3.68 c	3.64 cd	2.22 b	2.28 b
Soltani	12.86 c	12.95 c	1.37 c	1.35 bc	11.48 b	11.59 b	89.35 a	89.56 c	11.75 b	11.75 b	4.70 a	4.63 a	1.83 de	1.71 d
Fakea	8.88 de	8.75 e	1.15 e	1.16 e	6.73 d	7.59 de	86.87 a	86.57 d	7.58 c	8.58 de	3.42 d	3.51 de	1.88 ede	1.94 e
Frehy	8.69 de	8.73 e	1.25 de	1.26 cd	7.44 cd	7.47 de	85.63 a	85.53 d	8.42 c	8.50 de	3.74 c	3.72 c	1.98 cd	1.97 e
Hemily	6.45 f	6.60 f	1.19 de	1.20 de	5.25 e	5.40 e	81.40 a	81.79 e	5.88 d	5.88 f	2.77 f	2.79 g	1.71 e	1.70 d
Banjory	8.76 de	8.82 de	0.94 f	0.88 f	7.82 cd	7.96 cd	89.05 a	89.78 bc	8.08 c	8.08 e	2.82 f	2.82 g	2.00 cd	1.99 cd
Glazy Yellow	8.24 e	8.25 e	1.47 b	1.42 ab	6.77 d	6.83 e	82.17 a	82.77 e	7.83 c	7.83 e	3.11 e	3.09 f	1.85 ede	1.88 cd
Hamrawy	9.68 d	9.67 d	1.28 cd	0.89 f	8.42 c	8.78 c	86.82 a	90.78 b	9.17 c	9.17 cd	3.49 d	3.79 e	2.03 c	2.01 e
Falik	20.78 a	20.48 a	1.47 b	1.49 a	19.31 a	19.00 a	92.92 a	92.73 a	19.35 a	19.25 a	4.38 b	4.37 b	2.48 a	2.52 a

Values followed by the same letter in each column are not significantly different at 5% level.



Concerning fruit length, the cultivar Soltani significantly scored the greatest length (4.67cm) over all the tested cultivars in both seasons. Falik followed Soltani (4.38cm), whereas Hemily scored the least fruit length (2.88cm). Regarding fruit diameter, Falik was significantly the best one (2.50cm) followed by Sewy (2.25cm), while Hemily was significantly the least (1.71cm).

Generally, the data of both seasons of study revealed that the cultivar Falik was the highest one compared with all studied cultivars in fruit weight (20.63gm), pulp weight (19.16gm), percentage of fruit pulp (92.82%), fruit volume (19.30cm<sup>3</sup>), and fruit diameter (2.50cm). Soltani followed the Falik cultivar. In such concern, where its fruit length was 4.67cm, fruit weight 12.91gm, fruit flesh 11.54gm and fruit volume 11.73cm<sup>3</sup>. The cultivar Hemily was significantly the least one, where its fruit weight was 6.53gm, pulp weight 5.33gm, pulp ratio 81.60%, fruit volume 5.88cm<sup>3</sup>, fruit length 2.88cm, and fruit diameter 1.71cm.

Table (2) showed that the moisture content in fruits of Sewy cultivar was significantly the highest in both seasons of study (31.5%). Due to fruit collection at khelal stage before full ripening Falik and Soltani cultivars followed Sewy one (28.81 and 25.22%, respectively), while the cultivar Fraihy showed the least moisture content in its fruits (22.45%). Hussein (1972) found that moisture percentage in the fruits of Sewy date palm was 23.9%, while Selim *et al.* (1970) found that it was 24.0% in Sewy and 12.5% in the Fraihy cultivar.

The highest content (29.87%), followed by Sewy and Soltani (29.51 and 27.93%, respectively), while the Hamrawy cultivar showed the least TSS % compared with other cultivars.

Concerning the percentage of total sugars, it was observed that the Falik cv. gave the highest content (79.88%), followed by Sewy and Soltani (78.93 and 78.58%, respectively). Maximum reducing sugars were observed in the Soltani cultivar (51.48%), followed by Fakea and Sewy (51.68 and 51.55%, respectively), while Falik gave the highest significant value (37.98%), followed by Sewy date palm (27.54%).

Selim *et al.* (1970) found that the percentage content of total sugar, reducing sugars and sucrose in the fruit dry weight of the Sewy date palm were 57.5, 49.2 and 8.3%, respectively. While, Hussein (1972) reported these components, in the Sewy cultivar as 75.5, 73.3 and 2.2, respectively.

Concerning the percentage of fibers, Falik significantly gave the least percent (1.89%) as a mean of both seasons of study compared with all studied cultivars. Sewy, Soltani and Fakea gave high values in the first season (2.5, 2.34 and 2.43%, respectively), while there had no significant differences in the second season.

In a study on eighteen date palm cultivars in Saudi Arabia, Hussein and El Zaeid (1974) found that fibers content ranged between 1.97 and 4.1% of fruit flesh dry weight.

Regarding total phenols, Falik showed the least content (0.78%), while the cultivars Glazy Yellow and Sewy gave the highest content (1.13 and 1.06%, respectively). Concerning free phenols content, Falik showed significantly the least (0.53%) in the first season, while in the second there were no significant differences among cultivars with Falik being also the least value, because it is a soft fruit cultivar and matures early.

**TABLE (2). Chemical characteristics of date fruits of different cultivars grown at El-Baharia Oases in 2000 and 2001 seasons.**

Cultivar	Moisture %		TSS %		Total sugars %		Reducing sugars %		Non-reducing sugar %		Fibres %		Total phenols %		Free phenols %	
	2000	2001	2000	2001	2000	2001	2000	2001	2000	2001	2000	2001	2000	2001	2000	2001
Sewy	31.32 a	30.77 a	29.32 b	29.70 b	78.50 b	79.35 b	51.43 b	51.67 b	27.40 b	27.68 b	2.50 a	2.38 a	1.05 ab	1.07 ab	0.73 ab	0.70 a
Soltani	23.30 cd	27.13 c	28.72 c	28.53 c	78.50 b	78.67 c	52.43 a	52.52 a	18.07 c	26.15 c	2.43 a	2.25 a	0.98 bc	0.97 bc	0.75 ab	0.63 a
Fakea	21.93 cd	22.13 e	28.22 d	28.07 d	78.25 b	78.08 d	51.68 b	51.67 b	18.57 c	26.42 c	2.43 a	2.32 a	0.93 c	0.98 bc	0.70 bc	0.65 a
Frehy	22.38 cd	22.47 e	27.50 e	27.02 e	76.68 c	75.80 e	51.38 b	50.95 c	25.20 b	24.85 c	2.18 b	2.30 a	0.98 bc	0.98 bc	0.68 bc	0.68 a
Hemily	26.30 bc	26.35 cd	26.13 g	26.03 g	74.85 d	74.10 f	48.80 c	48.58 d	22.05 bc	25.35 d	2.25 b	2.38 a	0.98 bc	1.03 bc	0.67 bc	0.67 a
Banjory	25.12 bc	26.65 c	26.62 f	26.63 f	74.48 d	73.97 g	48.68 c	48.37 d	25.70 b	25.60 d	2.23 b	2.28 a	1.07 a	1.00 bc	0.80 a	0.56 a
Glazy Yellow	20.88 d	25.77 cd	25.72 h	25.68 h	73.78 c	73.13 h	48.85 c	48.42 d	22.93 b	24.72 e	2.23 b	2.43 a	1.13 a	1.12 a	0.62 c	0.62 a
Hamrawy	23.33 c	25.05 d	24.68 i	24.88 l	73.83 c	73.90 g	48.50 c	48.37 d	25.33 b	25.53 d	2.38 b	2.28 a	0.92 c	0.93 bc	0.63 c	0.63 a
Falik	28.43 ab	29.18 b	29.77 a	29.98 a	79.77 a	79.98 a	41.88 d	41.92 c	37.88 a	38.07 a	1.88 c	1.89 b	0.68 d	0.87 d	0.53 d	0.55 a

Values followed by the same letter in each column are not significantly different at 5% level.  
TSS = total soluble solids.

Hussein *et al.* (1974) found that total phenols content ranged between 0.6 and 1.4%, while free phenols were between 0.6 and 0.9% in the dry flesh date palm fruits in South Sinai.

Generally, Falik was the superior cultivar Compared with other cultivar under study in the fruit content of TSS (29.87%), total sugars (79.88%), non-reducing sugars (37.98%), while it was the inferior cultivar regarding fiber content (1.89%), total phenols content (0.78%), and free phenols (0.54%). All the aforementioned characteristics are the most desirable properties for date palm consumers



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## تَقْيِيمُ بَعْضِ سِلَالَاتِ نَخِيلِ الْبَلَحِ النَّامِيَةِ بِمِنْطَقَةِ الْوَاحَاتِ الْبَحْرِيَّةِ - الْجِيزَةُ - مِصْرَ

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أُجريت هذه الدراسة لمدة عامين متتاليين (٢٠٠٠، ٢٠٠١) على تسعة سلالات بلح نامية في منطقة الواحات البحرية بمحافظة الجيزة بمصر بغرض تقييم ثمارها من حيث صفات الجودة الطبيعية والكيمائية ومعرفة أنسب المناطق للتوسع في زراعتها في مصر. وباعتبار الصنف "السيوي" الأساس في المقارنة حيث أنه الصنف الشائع والمنتشر في منطقة الدراسة وهو من أصناف البلح نصف الجافة والتي يمكن استهلاكها أيضا في مرحلته الرطب في مصر فقد أوضحت الدراسة أن السلالة "فالق" هي أفضل السلالات من حيث وزن الثمرة - حجم الثمرة - وزن اللب - قطر الثمرة، كما أظهرت الثمار أعلى نسبة مواد ذائبة كلية وأعلى نسبة سكريات وأقل نسبة ألياف ومواد فينولية وهذه جميعها صفات مرغوبة للمستهلك المصري. ومن جهة أخرى كانت ثمار السلالة "سلطاني" أفضل الثمار طولا ومحتوى من السكريات غير المختزلة (السكروز). أما السلالة "هيملي" فكانت ثمارها أقل جودة من جميع السلالات التسعة تحت الدراسة حيث أظهرت أقل وزن للثمرة - أقل حجم للثمرة - أقل نسبة للحم في الثمرة - أقل طول وأقل قطر للثمرة.

وتشير نتائج الدراسة إلى إمكانية التوصية بالتوسع في زراعة السلالة "فالق" كصنف نصف جاف ويمكن استهلاكها كذلك في مرحله الرطب يزرع في محافظة الجيزة وباقي المحافظات الشمالية بمصر. أما السلالة "سلطاني" فيمكن زراعتها بنجاح كصنف بلح جاف في المحافظات الجنوبية من مصر خاصة محافظتي قنا وأسوان.