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EVALUATION OF SOME SOFT AND SEMI DRY DATE PALM SEEDLING COLONES GROWING UNDER ASSIUT CONDITIONS

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ABSTRACT

The present investigation was carried at Assiut governorate for two successive seasons, of 2006 and 2007 on eleven seedling colonies. Date palm was classified into six semi dry palms and five soft. Vegetative parameters, yield, physical and chemical characteristics of the fruit were assessed to select the superior colonies.

In soft colonies "palm 1" had the highest percentage of fruit set and total yield while "palm 4" had the lowest values of total yield per palm. Also palm 1 produced the highest average of fruit weight, height, diameter and produced the highest values of TSS as well as total and reducing sugar contents and the lowest values of acidity and moisture percentages compared with the other soft seedling types. In addition palm 2 gave the highest moisture content compared to the other palm types. In the semi dry colonies palm 6 gave the highest percentage of fruit set total yield as well as fruit weight, size, diameter and pulp thickness compared to the other semi dry seedling types. Chemical properties, showed that palm 11 produced the highest values of TSS and sugar content with the lowest values of acidity and moisture percentages. The data showed considerable differences among colonies in most vegetative parameters as well as physical and chemical fruit characteristics during the two seasons.

Soft and semi dry date palm seedling colonies namely palm No. 1 and No.11 can be considered the superior colonies under Assiut conditions.

INTRODUCTION

In Egypt, date palms are distributed in the Nile Valley Oasis and Desert districts .Date palm could grow under unfavorable conditions where most of the other fruit species could not thrive. For this reason it is considered as one of the most favorable trees cultivated in many textures of soils.

Date palm cultivars are classified into three main groups: soft , semi dry and dry cultivars according to the available heat units and fruit moisture content .Heat units were calculated in relation to temperature above 18 C° during the period from the first week of May to the end of October (Swingle1904).

In Egypt there are about 20 commercial cultivars which are well adapted to Egyptian ecological conditions; more than ten millions of fruitful female palms were distributed in all governorates. Above 400000 fruitful female palms are distributed in Assuit Governorate on approximately 211 feddans. Seedling palms represent about 95 % of the female date palms while soft and semi dry varieties represent about 5 % (Hassan, 2008)

The sexual propagation of the date palms by seeds is considered an easy and cheap way of propagation. As a result of sexual reproduction, some of the seedling date palms are highly desirable for fruit quality.

The main objective of this work was to evaluate the seedling types at Assiut governorate to select the superior colonies to be used for vegetative propagation (unsexual propagation) at various areas.

MATERIAL AND METHOD

This study was carried out during two successive seasons of 2006 and 2007 on eleven seedling female date palm types grown at Dairout district, Assiut Governorate to select some initial colonies according to total yield and fruit quality, and the highly desirable ones should be vegetatively propagated.

The selected palms were classified into two groups, the first group included 5 of the soft seedling palm types enumerated from palm 1 to palm 5, while the second group included 6 of the semi dry

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seedling palm types, numerated from palm 6 to palm 11. The tested palms of each group were of about 30-40 years old, uniformed and healthy. All selected trees were grown on clay loam soil and were subjected to the same horticulture management. The eleven palms were pollinated by the same male from the same district to avoid xenia and metaxenia effects and performed to maintain leaves / bunch ratio at 8 / 1. The number of bunches per palm was adjusted to 8 bunches nearly equal in size by removing excess number from the earliest and latest small ones .

Evaluation parameters included:-

Vegetative parameters: included palm height(m), girth (m) and leaf morphology; leaf length(cm), leaflet length(cm) and width (cm) and spin length(cm).

Yield parameters: included, initial fruit set and total yield per palm.

Initial fruit set % = $\frac{\text{Av. number of dates}}{\text{Av. number of dates} + \text{Av. number of flower scars}} \times 100$

Total yield = Number of adjusted bunches x bunch weight

Physical and chemical characteristics of the fruit:

Samples of 30 date fruits were taken at random from each bunch of the three chosen bunches of each seedling palm type to determine the physical and chemical characteristics as follow:

Physical characteristics:

Fruit weight (g) and size (cm): Fruit size was measured by water displacement using graduated measuring cylinder (in ml), fruit height and diameter (cm) using a vernier caliper. pulp thickness (cm) and seed weight (gm).

Chemical characteristics:

Total soluble solids (TSS) was determined by using Handy refractometer; total acidity as malic acid was determined by titration using 0.1 N sodium hydroxide and phenolphthalein as an indicator (A.O.A.C. 1985); moisture content was determined by taken about 50

(gm) of chopped flesh sample and dried in a draft oven at 70 C until a constant weight was obtained; sugar content: Total and reducing sugars were determined according to (A.O. A. C. 1985) then non-reducing sugars were calculated.

Data were statistically analyzed using L.S.D. test to recognize the significance of the differences among various treatment means (Snedecor and Cochran, 1972)

RESULTS AND DISCUSSION

Data presented in Tables 1 to 6 show vegetative characters yield and fruit physical and chemical characteristics of the investigated semi dry and soft seedling date palm types.

Vegetative Parameters:

Table 1 shows that in soft seedling, palm 3 had the highest palm and leaf length (14.1 and 4.4 m)*, while palm 5 had the highest palm girth (2.1 m) followed by palm 2 (1.76m). The lowest values of palm height and girth were obtained with palms 2 and 1 (6.89 and 1.29 m), respectively. The highest values of leaflet length and width were obtained on palms 5 and 4 (73.37 and 1.4 cm), respectively, while the lowest values of the same characters (41 and 0.52 cm) were obtained on palms 3 and 5, respectively. Concerning to spine length palm 3 gave the highest values (12.64cm) while the lowest values of the same character were obtained on palm 5 (8.41 cm).

*All values were as are the mean of the values of the two investigated seasons .

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Table 1 : Vegetative and yield parameters of soft seedling date palm colonies under Assiut conditions during 2006 and 2007 seasons

Seedling palms	Palm height (m)	Palm girth (m)	Leaf length (m)	Leaflet length (cm)	Leaflet width (cm)	Spin length (cm)	Fruit set %	Total yield (kg)
2006								
Palm 1	9.00	1.20	3.47	58.64	1.32	12.00	27.36	114.52
Palm 2	6.75	1.7	3.42	63	0.77	11.30	26.34	73.92
Palm 3	14.00	1.5	4.78	42	1.08	12.83	22.15	83.00
Palm 4	10.00	1.5	3.65	44.69	1.38	11.37	25.40	48.00
Palm 5	7.00	1.22	3.70	74.66	0.52	8.00	21.41	94.68
LSD. at 5 %	0.78	0.01	0.08	2.65	0.16	3.23	2.39	3.33
2007								
Palm 1	9.23	1.37	3.68	60.78	1.20	13.2	32.58	110.83
Palm 2	7.03	1.82	3.62	67.18	0.88	11.68	28.33	75.50
Palm 3	14.23	1.62	4.03	40.02	1.02	12.55	21.59	85.17
Palm 4	10.22	1.60	3.92	44.10	1.45	11.42	25.64	60.76
Palm 5	7.22	2.2	3.60	72.08	0.53	8.83	18.83	92.23
LSD. at 5 %	0.70	0.06	0.06	1.03	2.22	1.22	1.31	2.21

The vegetative parameters of semi dry seedling types are tabulated in Table 2 . Palm 9 has the highest values of palm height and girth (15.1 and 1.58 m).The lowest values of palm height was in palm 7 (6.09 m) , while the lowest palm girth was recorded in palm 6 (1.23 m).The same palm gave the highest leaf length and leaflet width (5.23 m and 1.48 cm), in addition palm 9 gave the lowest leaf length (3.97 m) while palm 7 had the lowest leaflet width (0.76cm) .According to spin length palm 11 gave the highest value (25.58 cm) compared to the other date palm types .

Yield parameters (initial fruit set % and total yield (kg)):

Results in Tables 1 and 2 show that palm 1 had significantly the highest fruit set (29.97) and total yield (112.67kg) per palm compared to the other soft seedlings .The highest yield was recorded as a result of high values of fruit set % with high values of fruit weight (positive relationship) .The lowest values were obtained with palm 5 for set % (20.12 %) and palm 4 for total yield per palm (54.33 kg) . The results of the semi dry types (Table 2) show that palm 6 had a higher fruit

setting % and total yield per palm compared to the other 5 seedling types, while the lowest fruit set % and total yield per palm were obtained in palms 8 and 9 respectively. These results are in accordance with those obtained by Rahemi (1998), Marzouk *et al* (2002), El-Hammady *et al* (2006) and Hassan (2008), who found a positive relationship between fruit setting % and yield .

Table 2 : Vegetative and yield parameters of semi dry seedling date palm colonies under Assiut conditions during 2006 and 2007 seasons

Seedling palms	Palm height (m)	Palm width (m)	Leaf length (m)	Leaflet length (cm)	Leaflet width (cm)	Spin length (cm)	Fruit Set %	Total yield (kg)
2006								
Palm 6	8.00	1.20	5.15	42.48	1.50	6.47	33.50	121.16
Palm 7	6.00	1.50	4.77	63.11	0.75	11.79	32.89	67.65
Palm 8	10.00	1.55	4.65	55.60	1.37	11.52	15.60	90.00
Palm 9	15.00	1.55	3.97	64.67	1.40	8.95	21.43	40.90
Palm 10	13.00	1.35	4.73	44.33	1.18	9.11	24.08	67.40
Palm 11	12.00	1.5	4.00	45.67	1.47	27.00	22.52	60.50
LSD at 5 %	0.21	0.07	0.05	1.69	0.04	2.83	2.43	3.03
2007								
Palm 6	8.17	1.27	5.32	42.82	1.42	6.52	32.53	118.0
Palm 7	6.17	1.57	4.75	61.80	0.78	11.35	29.98	72.
Palm 8	10.20	1.62	4.45	57.52	1.42	11	17.60	47.3
Palm 9	15.20	1.62	3.97	67.26	1.57	8.42	22.33	52.00
Palm 10	13.17	1.48	4.47	45.68	1.18	8.13	26.63	75.33
Palm 11	12.20	1.60	4.13	48.90	1.52	24.17	23.33	61.72
LSD at 5 %	0.12	0.09	0.11	1.23	0.04	0.85	1.12	2.61

Fruit physical characteristics

a) Fruit weight and size:

The values of fruit weight and size of the soft seedling types are presented in Table 3. The results show that the highest values of fruit weight and size (29.06 gm 30.58 cm³) were observed in palm 1. The lowest values (7.95 gm and 8.29 cm³) were obtained in palm 4. Palm 6 produced the highest average of fruit weight (25 gm) and fruit size

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(22.25 cm³) in the semi dry seedling, while palm 9 had the lowest values. These results are in accordance with those obtained by Al-Ghamdi *et al* (1988), Sálem and Hamdy (1993) and Khalifa (1999) who reported that fruit weight and size are influenced by female type.

b) Fruit height and diameter:

Tables 3 and 4 show that soft palm seedling No. 1 produced the highest fruit height, while palm 5 had the highest fruit diameter compared with the other soft seedlings. In semi dry seedlings, palm No. 10 produced the highest fruit height and the lowest fruit diameter as compared with the other semi dry seedlings. These results are in line with those results reported by Hussien *et al* (1979) who observed that values of fruit height and diameter changed in various cultivars according to pollen types.

c) Pulp thickness:

It can be seen from Tables 3 and 4 that, soft palm seedling No.5 and semi dry palm seedling No.6 had the highest fruit pulp thickness compared with the other types, being 0.70 cm and 0.61cm respectively. A significant differences were observed between the values of the seedling palms. Such results are in agreement with those observed by Higazy *et al* (1983) and El-Makhtoun and Abdel-Kader (1990).

d) Seed weight:

Highest values of seed weight during the two seasons in soft and semi dry seedling date palms were obtained in palms 1 and 8, while the lowest values were recorded in palms 2 and 9. Significant differences between values were found. Such results are in accordance with those reported by Dawoud (2001).

Table 3 : Fruit physical properties of soft seedling date palm colonies under Assiut conditions during 2006 and 2007 seasons

Seedling palms	Fruit weight (gm)	Fruit size (cm ³)	Fruit length (cm)	Fruit diameter (cm)	Pulp thickness (cm)	Seed weight (gm)
2006						
Palm 1	28.63	29.33	6.39	3.95	0.40	2.76
Palm 2	14.73	10.33	3.01	3.63	0.48	1.69
Palm 3	20.75	22.78	3.79	3.60	0.62	1.95
Palm 4	7.00	7.20	3.38	2.86	0.39	1.84
Palm 5	23.67	26.00	5.60	4.43	0.68	1.78
LSD at 5 %	2.61	1.38	0.24	0.16	0.09	0.27
2007						
Palm 1	29.50	31.83	6.13	3.72	0.43	2.84
Palm 2	15.22	13.27	2.98	3.60	0.53	1.98
Palm 3	21.27	24.71	3.89	3.37	0.61	2.20
Palm 4	8.90	9.37	3.33	2.80	0.41	1.84
Palm 5	25.29	28.07	5.85	4.85	0.72	1.72
LSD at 5 %	1.44	2.16	0.19	0.16	0.05	0.15

Table 4 : Fruit physical properties of the semi dry seedling date palm colonies under Assiut conditions during 2006 and 2007, seasons

Seedling palms	Fruit weight (gm)	Fruit size (cm ³)	Fruit length (cm)	Fruit diameter (cm)	Pulp thickness (cm)	Seed weight (gm)
2006						
Palm 6	24.33	21.50	5.91	3.31	0.63	1.38
Palm 7	13.53	13.50	4.84	3.05	0.48	1.77
Palm 8	18.00	19.92	4.69	2.16	0.52	2.72
Palm 9	8.18	7.18	3.05	2.45	0.34	1.02
Palm 10	13.73	14.66	6.20	1.83	0.35	1.06
Palm 11	12.01	14.33	5.30	1.86	0.33	1.14
LSD at 5%	0.85	0.97	0.92	0.12	0.11	0.19
2007						
Palm 6	25.67	23.00	5.85	3.25	0.6	1.30
Palm 7	14.27	14.74	4.85	2.85	0.42	1.73
Palm 8	16.82	19.30	4.68	2.20	0.57	2.40
Palm 9	9.15	8.40	3.18	2.43	0.34	1.12
Palm 10	13.33	15.08	6.15	1.90	0.38	1.10
Palm 11	11.68	14.57	5.13	2.03	0.31	1.18
LSD at 5%	0.70	2.83	0.17	0.17	0.04	0.10

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Chemical properties:

1- Moisture content

Data tabulated in Tables 5 and 6 clearly show that palm 2 significantly, had the highest moisture content and the lowest values (46.91 %) were obtained in palm 4. Fruits of palm 7 contained the highest moisture content compared with the other semi dry seedling palm types. The differences between values were significant, and more or less the same in the two seasons. Similar results were reported by Shaheen *et al* (1989) and Al-Saikhan (2006).

Table 5 : Fruit chemical properties of the soft seedling date palm colonies under Assiut conditions during 2006 and 2007, seasons

Seedling palms	TSS%	Total sugars %	Reducing sugars %	Non reducing sugars%	Acidity %	Moisture %
2006						
Palm 1	35.00	33.24	27.23	6.01	0.197	48.75
Palm 2	22.00	27.14	23.17	4.07	0.205	61.90
Palm 3	22.50	26.32	21.23	5.09	0.272	54.44
Palm 4	33.00	31.81	26.36	5.45	0.272	46.69
Palm 5	28.00	30.04	27.10	2.94	0.272	48.30
LSD at 5 %	1.03	2.45	1.31	0.10	0.002	1.65
2007						
Palm 1	36.40	31.43	29.73	1.70	0.197	50.20
Palm 2	24.73	22.49	19.85	2.52	0.197	62.13
Palm 3	26.07	24.92	21.27	3.75	0.205	56.07
Palm 4	33.28	28.15	25.12	2.83	0.272	47.18
Palm 5	29.18	25.13	22.52	2.60	0.272	50.23
LSD at 5 %	1.90	1.34	1.95	0.13	0.001	1.17

Table 6 : Fruit chemical properties of the semi dry seedling date palm types under Assiut conditions during 2006 and 2007, seasons

Seedling palms	T s s %	Total sugars %	Reducing sugars %	Non reducing sugars%	Acidity %	Moisture %
2006						
Palm 6	32.17	29.80	18.54	10.26	0.253	31.00
Palm 7	34.00	30.45	22.14	8.31	0.253	31.85
Palm 8	31.33	32.41	21.30	11.11	0.272	31.15
Palm 9	40.00	36.47	24.18	12.29	0.253	29.15
Palm 10	40.00	37.40	23.40	14.00	0.253	29.75
Palm11	43.00	41.82	27.12	14.70	0.205	25.75
LSD at 5 %	0.24	0.65	2.01	0.53	0.001	0.97
2007						
Palm 6	33.45	30.80	19.53	11.25	0.272	31.20
Palm 7	32.90	28.50	19.50	8.80	0.272	33.00
Palm 8	35.20	29.29	18.33	10.84	0.272	32.10
Palm 9	41.20	35.20	23.40	11.80	0.253	28.50
Palm 10	38.25	33.60	20.47	14.12	0.253	29.23
Palm11	44.15	40.77	30.47	9.75	0.253	26.12
LSD at 5 %	0.92	1.80	1.40	0.85	0.001	0.68

2. Total acidity %:

In soft date palm seedling types, total acidity ranged between 0.272 for palms 3, 4 and 5 and 0.197 % for palm 1, while ranged between 0.272 % for palms 7 and 8 and 0.205 % for palm 11. Semi dry seedlings had the same values. Smilar results were reported by Bakr *et al* (2003).

3. Total soluble solids (TSS %):

Results clearly show that fruits of palm 1 significantly had the highest percentage of T.S.S. (35.70 %) compared with other soft seedling palm types. Palm 11 had the highest TSS (43.67%) in the semi dry types. The differences among values in the two palm types were significant. These results are in accordance with those reported

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by El-Ghayaty (1983) , Moustafa et al (1986) , Bakr *et al* (2003), El-Kosary and Soliman (2003) and Awad (2006).

4. Reducing and total sugar content

Results show that in soft seedling palm types, palm 1 had the highest total and reducing sugars compared to the other seedling palm values .In the semi dry seedling palm types, the highest values of total and reducing sugars were in palm 11 compared to the other values of the tested palms. A negative relationship between moisture on one hand and TSS and sugar content on the other hand was observed .Similar results were obtained by Abdalla (2002), El-Kosary and Soliman (2003) and Hassan (2008) who reported that total sugars directly influenced by female variety. Also, Alsaikhan (2006) reported the effect of pollen type on reducing sugars differed according to both cultivar and year.

5. Non reducing sugars:

It is clear from Tables 5 and 6 that palm soft seedling No. 4 significantly contained the highest non reducing sugars compared to the other soft seedling types during the first season. The lowest values of non reducing sugars (1.57 %) were obtained in palm 5. The highest non reducing sugars during the second season was obtained in palm 3 (3.75%). In the semi dry seedling types palm 11 contained the highest value of non reducing sugars (14.70 %) during the first season, while palm 10 gave the highest value (14.12 %) during the second season. The lowest non- reducing sugars (8.31 %) was obtained in palm 7 in the semi dry colone during the two seasons.

As a conclusion , palm No. 1 could be considered as an initial of a soft seedling date palm type being superior in yield palm and having the highest fruit set, fruit weight, height, diameter, TSS % and fruit sugar content with the lowest content of acidity and moisture. While palm 11 was the superior in semi dry seedling date palm type since it had the highest values of TSS and sugar content with the lowest values of acidity and moisture and with moderate values of total yield and fruit weight and size.

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تقييم بعض السلالات البذرية الرطبة والنصف جافة لنخيل البلح النامية تحت ظروف أسبوط

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معهد بحوث البساتين - مركز البحوث الزراعية- الجيزة- مصر

أجريت هذه الدراسة خلال موسمي ٢٠٠٦ و٢٠٠٧ على عدد ١١ سلالة نخيل بذرية منها ٦ سلالات نصف جافه و ٥ سلالات رطبه نامية تحت ظروف محافظة أسبوط بهدف تقييم هذه السلالات من حيث الصفات الخضريه لكل نخله والصفات المحصوليه وكذلك الصفات الثمرية الطبيعية والكيميائية .

أوضحت نتائج السلالات الرطبة تفوق السلالة رقم "١" حيث أعطت أعلى قيم لنسبة العقد والمحصول ووزن وارتفاع وقطر الثمره والمحتوى الثمرى من المواد الصلبة الذائبة الكلية وكذا المحتوى من السكريات مع اقل قيم للمحتوى من الحموضه الكلية والرطوبة بينما كانت اعلى القيم لسلك اللحم للثمرة مع النخلة رقم ٥ بينما النخلة رقم ٢ سجلت اعلى القيم لنسبة الرطوبة بزيادة معنوية عن باقى السلالات .

أما بالنسبة للسلالات النصف الجافه فقد سجلت السلالة رقم "٦" اعلى القيم لنسبة العقد والمحصول وايضا وزن الثمرة وحجمها وقطرها وكذا سلك اللحم بينما سجلت النخلة رقم ١٠ اعلى القيم لارتفاع الثمرة بينما اعطت النخلة رقم ١١ اعلى القيم لنسبة المواد الصلبة الذائبة وكذا المحتوى الثمرى من السكريات .

أوضحت النتائج أيضا وجود فروق معنوية بين السلالات النصف جافه وبعضها وبين السلالات الرطبه وبعضها فى كثير من الصفات الثمرية . كما اوضحت ايضا النتائج ان الاتجاه كان واحدا وذلك خلال موسمي الدراسة.

كانت سلالة النخيل الرطبة والجافة رقم ١ ، رقم ١١ على التوالي هما من سلالات النخيل المتميزة تحت ظروف أسبوط.