STUDIES ON THE EVALUATION OF FRUIT CHARACTERISTICS OF SAMANY DATE PALM GROWN IN ASWAN.
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National Research Center, Cairo, Egypt

ABSTRACT

This study aimed to evaluate physical and chemical fruit characteristics of Samany date palm grown at Kom-Ombo-Aswan Governorate and El-Kanater, Kalubia Governorate. The data reveal that Samany cultivar grown at El-Kanater gave the highest bunch weight and total yield which compared with those grown at Kom-Ombo in the second season. Fruit moisture content percentages was significantly higher in fruit from El-Kentar, while reducing sugars percentage and crude fiber were not significantly affected under the two locations in both seasons. Samany date palm grown at Kom-Ombo gave the lowest fruit, weight and size, seed and pulp weight in the two seasons, but gave the largest fruit length and diameter in the second season only as compared with the Samany grown at El-Kanater. Samany grown at Kom-Ombo gave the highest total and reducing sugars percentage, total soluble solids percentage and the lowest percentage of total acidity.

It could be generally concluded that Samany cv. produced early yield and gave fruit with better physical and chemical characteristics under Aswan conditions.

INTRODUCTION

Date palm (Phoenix dactylifera L.) is widely distributed in different districts of the world. In Egypt, date palms are distributed in Nile valley, Oases and desert districts. Date palm cultivars are of three main types according to its fruit moisture content, i.e. soft, semi-dry and dry cultivars (Selim et al., 1970). Date palm trees could grow under unfavorable conditions where many of other fruit species may not grow. Samany cv. is one of the most important soft dates in Egypt. Several investigators have evaluated some date palm varieties, Selim et al. (1968, 1970), Salem and Hegazi (1971), Khalifa (1973), El-Azzouni et al. (1975), Bondok (1975), Hussein and Hussein (1982), Meligi et al. (1983), Habib et al. (1984), Hussein et al. (1984), Nour et al. (1986), Souriol et al. (1986), El-Gamdi (1996) and Hussein et al. (2001). The main objective of this study is to evaluate the physical and chemical properties of Samany date palm grown under Aswan and El-Kanater conditions.

MATERIALS AND METHODS

The present investigation was carried out in two successive seasons of 2000 and 2001 at Kom-Ombo center, Aswan Governorate, Egypt. Where nine mature Samany date palms of about 12 years old were used. Similarly, nine date palms of Samany cv. grown in El-Kanater-El-Khairia-Kalubia Governorate were used as the standard cultivar for comparison. The trees were of nearly of similar vigor and height. Normal cultural practices were
carried out as usual used for date palms. Only 9 bunches were left on each experimental palm date of pollination was recorded in order to facilitate fruit age calculation in Table (1).

The trees were arranged in a complete randomized statistical design with three replications (three palms for each replication). The yield of experimental palms was harvested at the first of August in the first season but in the second one it was the second half of July (Samany grown at Aswan and the second half of September (Samany grown at El-Kanater) in each season and the following estimates were carried out.

Table (1): Fruit age (days). Time of pollination and harvesting of Samany date palm grown at Kom-Ombo and El-Kanater region.

<table>
<thead>
<tr>
<th>Index</th>
<th>Season</th>
<th>Female Palms</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Kom-Ombo</td>
</tr>
<tr>
<td>Date of pollination</td>
<td>2000</td>
<td>Feb. 15</td>
</tr>
<tr>
<td></td>
<td>2001</td>
<td>Feb. 07</td>
</tr>
<tr>
<td>Date of harvesting</td>
<td>2000</td>
<td>Aug. 05</td>
</tr>
<tr>
<td></td>
<td>20001</td>
<td>Jul. 30</td>
</tr>
<tr>
<td>Fruit age</td>
<td>2000</td>
<td>172</td>
</tr>
<tr>
<td></td>
<td>2001</td>
<td>174</td>
</tr>
</tbody>
</table>

* Season 2000: harvesting early 57 days
** Season 2001: harvesting early 86 days

1- Average yield and bunch weight.
2- Fruit physical properties.

Samples of 90 fruits per each tree (10 fruits/bunch) were taken to determine fruit weight, pulp weight and size, seed weight and fruit dimensions.

3- Fruit chemical properties:

Ten date fruits from each treatment divided into pieces and seeds were omitted. Fifty g of pieces was mixed with 100 ml distilled water using special electric mixer for extraction, then filtered and the filtrate was used for determinations.

Moisture content, total soluble solids (TSS) as a percentage by using hand refractometer, acidity (%) as malic acid, crude fiber content, reducing, non-reducing and total sugars percentages were determined according to A.O.A.C. (1995).

All collected data were subjected to statistical analysis according to Snedecor and Cochran (1980). Treatment means were compared using the Duncan Multiple range test at the 5 percent level of probability in both seasons of experimentation.

RESULTS AND DISCUSSION

1- Yield per palm (Kg):

Data presented in (Table 2) show the average yield and bunch weight of Samany date palm.

Significant difference was detected in yield during in the second season of study. Yet, Samany date palm cultivar grown at Kom-Ombo
produced the lowest yield (136.8 kg) as compared with the same cultivar grown at El-Kanater (160.2 kg).

2- Bunch weight (kg):
The bunch weight gave a similar trend to the yield. Since Samany cultivar grown at Kom-Ombo gave the bunch weight (15.2 kg) compared to (17.8 kg) for those grown at El-Kanater.

In this respect, Selim et al. (1976) Nour et al. (1986) and Hussein et al. (2001) reported that number and weight of bunch were affected according to cvs and district.

Fruit characteristics:
Data concerning the physical and chemical properties of the fruits in the two seasons are presented in Table 2 and 3.

Table (2): Fruit physical characteristics of Samany grown at Kom-Ombo and El-Kanater during 2000 and 2001 seasons.

<table>
<thead>
<tr>
<th>Location</th>
<th>Yield (kg)</th>
<th>Bunch weight (Kg)</th>
<th>Fruit weight (g)</th>
<th>Seed weight (g)</th>
<th>Pulp weight (g)</th>
<th>Fruit size (cm³)</th>
<th>Fruit length (cm)</th>
<th>Fruit diameter (cm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kom-Ombo</td>
<td>126.9a</td>
<td>14.1a</td>
<td>29.50b</td>
<td>2.40b</td>
<td>27.10b</td>
<td>31.7b</td>
<td>5.6a</td>
<td>3.1a</td>
</tr>
<tr>
<td>El-Kanater</td>
<td>127.8a</td>
<td>14.2a</td>
<td>35.58a</td>
<td>2.89a</td>
<td>32.69a</td>
<td>36.9a</td>
<td>5.7a</td>
<td>3.2a</td>
</tr>
<tr>
<td>Kom-Ombo</td>
<td>136.8b</td>
<td>15.2b</td>
<td>26.41b</td>
<td>2.30a</td>
<td>24.11b</td>
<td>27.0b</td>
<td>5.6a</td>
<td>3.0a</td>
</tr>
<tr>
<td>El-Kanater</td>
<td>160.2a</td>
<td>17.8a</td>
<td>31.21a</td>
<td>2.67a</td>
<td>28.54a</td>
<td>33.0a</td>
<td>5.4b</td>
<td>2.9b</td>
</tr>
</tbody>
</table>

Table (3): Fruit chemical characteristics of Samany grown at Kom-Ombo and El-Kanater during 2000 and 2001 seasons.

<table>
<thead>
<tr>
<th>Location</th>
<th>Moisture content (%)</th>
<th>Total soluble solids (T.S.S) (%)</th>
<th>Total Acidity (%)</th>
<th>Sugars (g/100g DW)</th>
<th>g/100 gDW</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Total sugar (%)</td>
<td>Reducing sugar (%)</td>
<td>Non-reducing sugar (%)</td>
<td>Crude fiber</td>
</tr>
<tr>
<td>Kom-Ombo</td>
<td>62.6b</td>
<td>25.7a</td>
<td>12.08b</td>
<td>58.26a</td>
<td>20.15a</td>
</tr>
<tr>
<td>El-Kanater</td>
<td>67.1a</td>
<td>22.9b</td>
<td>0.207a</td>
<td>49.91b</td>
<td>29.95b</td>
</tr>
<tr>
<td>Kom-Ombo</td>
<td>70.8b</td>
<td>23.9a</td>
<td>0.121b</td>
<td>59.69a</td>
<td>25.4a</td>
</tr>
<tr>
<td>El-Kanater</td>
<td>73.3a</td>
<td>22.5a</td>
<td>0.172a</td>
<td>57.47a</td>
<td>23.2a</td>
</tr>
</tbody>
</table>

(A) Physical properties:
1- Fruit weight (g):
Samany date palm cultivar grown at El-Kanater had the maximum fruit weight of 35.57 and 31.20 g. These values were significantly higher than those of Samany cultivar grown in Kom-Ombo, 29.50 and 26.4 g in the first and second seasons, respectively.
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These results are in agreement with the general trend reported by Ragab et al. (1956), Selim et al. (1968), Fakhry (1969), Khalifa (1973), Sourial et al. (1986) and Hussein et al. (2001) on various date cultivars.

2- Fruit size (cm³):
Concerning the fruit size, the data indicate that there are significant differences in the two seasons. Samany date palm grown in Kom-Ombo gave the lowest fruit size (31.7 and 27.0) as compared with the same cultivar grown in El-Kanater (36.9 and 33.0), during the two seasons, respectively.

3- Pulp weight (g):
Regarding the pulp weight, the results indicated significant differences in both seasons. Since Samany date palm grown in El-Kanater gave the highest pulp weight (32.69 and 28.54 g) than those Samany date palm grown at Kom-Ombo (27.10 and 24.11 g) in the first and second seasons, respectively.

4- Seed weight (g):
Concerning seed weight, the results indicated that there are significant differences in Samany cultivar grown in the two regions especially in the first season. Samany date palm grown in Kom-Ombo gave the lowest seed weight (2.40 and 2.30 g), as compared with grown in El-Kanater (2.89 and 2.67 g) in the first and second seasons, respectively. In this respect, Sourial et al. (1986) found that the seed weight ranged between 1.88 - 2.39 g for four soft date cultivars. While Hussein et al. (2001). Found that the seed weight ranged between 1.18 - 1.67 g for five soft date cultivars.

5- Fruit length:
Data indicated was significant differences in fruit length of Samany dates palm from El-Kanater and Kom-Ombo regions in the second season only. Since, Samany date palm grown in Kom-Ombo gave the largest fruit length (5.6 cm) as compared with the Samany date palm grown in El-Kanater (5.4 cm).

6- Fruit diameter (cm):
Data showed that the fruit diameter produced similar trend as shown from fruit length. Samany date palm grown in Kom-Ombo gave the highest fruit diameter (3.0 cm) as compared with those grown at El-Kanater (2.9 cm), in the second season only.

These results were in parallel with those reported by Selim et al. (1968), Khalifa (1973), Wakid (1973), Sourial et al. (1982) and Hussein et al. (2001) working on various soft-date cultivars grown in Egypt.

(B) Chemical Properties:
1- Moisture content (%):
Significant differences were detected in moisture content percentage in both seasons. Samany dates grown in El-Kanater gave the highest moisture percent in the first and second seasons. The results are in line with those of Selim et al. (1970), Hussein and Hussein (1982), Nour et al. (1986) and Hussein et al. (2001).
2- Total Soluble Solids (TSS %):
Results indicated that the total soluble solids percentage was significantly different in Samany date palm grown at El-Kanater and Kom-Ombo regions.
Samany dates grown at Kom-Ombo gave fruit with the highest total soluble solids percentage (25.7 and 23.9%) as compared with the Samany grown at El-Kanater (22.9 and 22.5%) in the first and second seasons, respectively. Al-Ghamdi (1996) and Hussein et al. (2001) showed significant differences among cultivars in total soluble solids.

3- Total acidity (%):
Samany date palm grown at El-Kanater revealed higher percentage of total acidity (0.207 and 0.172 %) as compared with Samany date palm grown at Kom-Ombo (0.128 and 0.121 %) in the first and second seasons, respectively.
Generally, differences between Samany grown at Kom-Ombo and El-Kanater regions were significant. In this regard, Khalifa (1973), El-Azzouni et al. (1975) and Sourial (1986), working on various date cultivars found that total acidity percentage ranged between (0.062 – 0.128 %).

4- Sugar contents:
4-1- Total sugars (%):
Data indicated that the total sugar percentage was of significant differences between Samany date palm grown at Kom-Ombo and the same cultivar grown at El-Kanater in the first season only. In this respect, Samany date palm grown at Kom-Ombo gave the highest total sugar % (58.26 %) as compared with the Samany grown at El-Kanater (49.91%).

4-2- Reducing sugars (%):
Results indicated that the reducing sugar % was similar to those found of the total sugars.

4-3- Non-reducing sugars (%):
No significant difference was obtained in non-reducing sugar percentage in the two seasons. Samany date palm grown at Kom-Ombo gave the highest non-reducing sugar percentage (20.15 and 25.4%) than those the Samany date palm grown at El-Kanater (19.96 and 23.2%) in the first and second season respectively.
Many other studies reported that the content fruit sugars in some of dry date palm cultivars on dry weight basis. In this respect, Cook and Furr (1953) found that the total sugars ranged between 68.00 - 85.00% for 51.00 cultivars. Selim et al (1973) and Hussein (1982) reported that total sugars of fruit ranged between 55.99 to 58.89% for Sakkoty fruit.

5- Crude fibers content
No significant differences were detected in crude fiber during both seasons. Yet, Samany date palm grown at Kom-Ombo gave the highest values (1.31 and 1.39 g/100g DW) as compared with grown at El-Kanater.
(1.25 and 1.27 g/100g DW) in the first and second season respectively. These results are in agreement with Melegy (1993) who found that the final crude fibers content had no remarkable trend in relation to different pollen sources.

Hussein et al. (1976a) working on “Barhee” dates in Saudi Arabia, found that crude fibers content was 2.18% of the dry weight at “Rutab” stage. Furthermore, Kamel et al. (1976) found that crude fibers content of “Hallawy” and “Sayer” fruits at harvest was 1.82 and 1.74 %, respectively.

(C) Heat requirement

Since, the heat requirement was about 1891 – 1947 at Kom-Ombo and 1668 – 1535 at El-Kanater during the both seasons in the study (Table 4). From this data can be said that Samany grown at Kom-Ombo and the harvest date was earlier than Samany grown at El-Kanater since the harvesting early were 57 and 56 days in the first and second seasons, respectively.

Generally, It could be concluded that Aswan conditions are suitable to give a good growth, early yield and fruits with high quality of Samany date fruits.

Table (4): Heat requirement of Samany date palm under Kom-Ombo and El-Kanater regions during 2000 and 2001 seasons.

<table>
<thead>
<tr>
<th>Year</th>
<th>Month</th>
<th>Feb</th>
<th>Mar</th>
<th>Apr</th>
<th>May</th>
<th>Jun</th>
<th>Jul</th>
<th>Aug</th>
<th>Sep</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean daily temperatures (2000)</td>
<td>16.66</td>
<td>20.90</td>
<td>29.42</td>
<td>31.75</td>
<td>33.57</td>
<td>35.47</td>
<td>33.98</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Heat requirements (2000)</td>
<td>-18.76</td>
<td>89.90</td>
<td>342.6</td>
<td>426.25</td>
<td>467.10</td>
<td>541.57</td>
<td>79.9</td>
<td></td>
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</tr>
<tr>
<td>Mean daily temperatures (2001)</td>
<td>17.39</td>
<td>25.10</td>
<td>28.27</td>
<td>31.03</td>
<td>33.39</td>
<td>34.59</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Heat requirements (2001)</td>
<td>-13.42</td>
<td>220.1</td>
<td>308.1</td>
<td>403.83</td>
<td>461.70</td>
<td>497.7</td>
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</tr>
</tbody>
</table>

“Samany grown at El-Kanater”

<table>
<thead>
<tr>
<th>Year</th>
<th>Month</th>
<th>Feb</th>
<th>Mar</th>
<th>Apr</th>
<th>May</th>
<th>Jun</th>
<th>Jul</th>
<th>Aug</th>
<th>Sep</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean daily temperatures (2000)</td>
<td>28.00</td>
<td>20.50</td>
<td>33.35</td>
<td>29.10</td>
<td>28.70</td>
<td>23.65</td>
<td></td>
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<td></td>
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<tr>
<td>Heat requirements (2000)</td>
<td>-</td>
<td>152.00</td>
<td>77.50</td>
<td>460.50</td>
<td>344.10</td>
<td>331.70</td>
<td>169.50</td>
<td>1535.3</td>
<td></td>
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</tr>
<tr>
<td>Mean daily temperatures (2001)</td>
<td>22.25</td>
<td>27.10</td>
<td>28.90</td>
<td>30.05</td>
<td>29.54</td>
<td>28.00</td>
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<tr>
<td>Heat requirements (2001)</td>
<td>-</td>
<td>97.75</td>
<td>282.10</td>
<td>327.00</td>
<td>373.55</td>
<td>357.74</td>
<td>230.00</td>
<td>1668.14</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Agriculture Research center (Cenental Laboratory For Agriculture Climate).

REFERENCES


دراسات على تقييم صفات ثمار نخيل البلح السماني المنزرع في أسوان

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المركز القومي للبحوث - القاهرة - جمهورية مصر العربية


وضربت النتائج المحققة فيها ما يلي:

- ظهرت قروق معوية في وزن السوماطة والمحمولة وثمار نخيل البلح السمناني المنزرع في كوم أمبو مثاليه المنزرع في القنطرة، حيث توقفت الإشجار المنزرة في القنطرة على كوم أمبو خاصة في الموسم الثاني.

- أعطى نخيل البلح السمناني المنزرع في كوم أمبو أقل وزن للثمار وكذلك أقل وزن للبترة والحم والحم بالممارسة السبانية المنزرع في القنطرة وذلك خلال موسم الدراسة.

- أعطى نخيل البلح السمناني المنزرع في كوم أمبو زيادة في طول وقطر للثمار عن مثيله المنزرع في القنطرة وذلك خلال الموسم الثاني فقط.

- ظهرت قروق معوية في النسبة النموية لمحتوى رطوبة الثمار، بينما لم تظهر قروق معوية في النسبة النموية للسكريات السكر منخفضة وذات الألف في نخيل البلح السمناني المنزرع في كوم أمبو مثاليه المنزرع في القنطرة وذلك خلال موسم الدراسة.

- أعطى نخيل البلح السمناني المنزرع في كوم أمبو مثايرا ذات محتوى كلياً منخفضة مع ارتفاع في نسبة السكريات السكر منخفضة وذات الألف في المواد المسالة ذاتية الكبيرة مثالية مع مثيله المنزرع في القنطرة.

وبناء على النتائج المحققة عليها وجد أنه من الممكن زراعة وانتشار نخيل البلح السمناني في جنوب مصر حيث يمكن للأصناف الطبيعية وذات كيميائية مناسبة مع محصول السكر إشرار تكامل في القنطرة.