

FRUIT PHYSICAL CHARACTERISTICS OF DATE PALM CULTIVARS GROWN IN THREE LIBYAN OASES

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ABSTRACT

Oases of Jalo, Aujla and Ejkara are the most important areas of date palm cultivation in Libya. The most common twenty date palm cultivars grown in these oases are: Saidi, Tediss, Agadi, Jadag, Msleo, Masmot, Saifi, Rattab, Saltany, Mosrum, Brolsi, Degla, Hamra, Omdiab, Omeltai, Azwa, Filfil, Nakfosh, Nefaik and Helwa. The statistical analysis showed the significance of the fruit physical properties (fruit weight, fruit dimensions, seed weight, seed dimensions, flesh weight and flesh width) in differentiation between these cultivars both in rutab and tamar stages.

INTRODUCTION

Date palm (*phoenix dactylifera*, L.) is grown in different parts of the world in several thousand of cultivars (Tisserat, 1983) Differences between date palm cultivars depends on accurate description of the parts of date palm tree (Al-Baker, 1972).

Description of the fruit characters is considered more common than the vegetative characters in differentiation between date palm cultivars (Al-Akaidy, 1994).

In Libya Date palms is distributed mainly in three areas: coastal, middle and southern districts. There were about (6) million date palm trees in Libya grown is about (400) cultivars (Edongli et al. 1993). Oases districts in middle of Libya such as Jalo, Aujla and Ejkara represent the most important date palm cultivation region in the country, where extensive date palm cultivation was established in the last two decades to represent the main source of income for the people in these areas. In despite of the importance of date palm cultivation in Jalo, Aujla and Ejkara, there is no study on the date palm cultivars has been reported. This study was proposed to differentiate between the most common date palm cultivars in the oases of Jalo, Aujla and Ejkara depends on their fruit

characters. Such study could provide valuable information that might promote production and quality of dates in the study area.

MATERIALS AND METHODS

Three oases were included in this study: Jalo, Aujla and Ej kara they are about 400 km in the South of Benghazi, the nearest is Aujla (220 km) South of Ej dabilia and 30km from the other two oases.

The survey was done three times to collect the fruit samples at the rutab and tamar stages of the most common date palm cultivars determined by visits to 40 random farms in the three Oases. The first visit was in August for the early ripening cultivars (Rattab, Omeltai, Nakfosh, Msleo), the second in September for mid ripening cultivars (Filfil, Saltany, Omdiab, Azwa, Mosrum, Hamra, Saidi, Saifi, Brolsi, Helwa) and the third for the late ripening cultivars (Degla, Tediss, Agadi, Nefaik, Jadag, Masmot) was in October 1999.

One typical farm was selected from each Oasis where the date palm trees subjected to same cultural practices and were almost of the same age (about 20 years old). Three trees were taken randomly as replicates for each cultivar selected in the farm, samples of 100 fruits were picked randomly from each replicate mixed together and then 100 fruits were taken randomly for each cultivar, put in small box and kept in the refrigerator. Fruits were taken in rutab and tamar stages depends on the main consumption of the cultivar. For the (100) fruits the following physical characters were determined: fruit weight, fruit length and diameter, flesh weight and thickness, seed weigh, seed length and diameter .The measurements were determined by using vernier caliper. The data were statistically analyzed by ANOVA and the means were tested by LSD test at 5% level of significance.

RESULTS

1-Rutab Cultivars

The results of testing the fruit characters in rutab stage in differentiation between (13) cultivars (Nakfosh , Rattab , Filfil, Saltany, Saifi, Azwa, Hamra, Helwa, Mosrum, Brolsi, Saidi, Omdiab, omeltai)

Fruit weight

“Saidi” had the maximum weight of average 15.28 gm. This value was significantly higher than those of all other cultivars. “Nakfosh”,

“Azwa”, “Hamra”, “Helwa” and “Omdiab” cultivars showed the least values (5.04) (5.13) (5.36) (5.69) (5.75) gm. respectively. However differences between them were insignificant. The range of fruit weight for the other cultivars were between 6.31 and 11.05 gm. (Table 1).

Fruit dimensions

“Filfil” cultivar showed the longest fruit (4.39 cm) which was significantly longer than those of other cultivars. “Azwa” “Helwa” cultivars showed the least values (2.45cm) and (2.48 cm) respectively without significant differences between each other. The fruit length of the other cultivars were between (2.66) and (3.94 cm.) “Saidi”, “Saifi” exhibited the greatest diameter (2.60cm) and (2.50 cm) respectively which were significantly higher than those of other cultivars.

least fruit diameter for “Azwa” “Nakfosh” “Hamra” “Omdiab” (from 1.84 to 1.91 cm).

However differences between these cultivars were insignificant. Fruit diameter for other cultivars were of value between (1.97 and 2.28 cm) (Table 1).

Flesh thickness

“Saidi” “Rattab” cultivars showed the greatest flesh thickness (0.78cm) and (0.69 cm) respectively. Each one exhibited significant differences compared to all cultivars. “Nakfosh” and “omdiab” exhibited the least flesh thickness with insignificant differences compared to each other. Other cultivars showed flesh thickness ranging between (0.42 – 0.58cm) (Table 1)

Flesh weight

“Saidi” cultivar exhibited the greatest flesh weight (13.52 gm.) This value was significantly higher than those of other cultivars. Conversely “Nakfosh” cultivar showed the lowest value (3.73 gm.) which significantly lower than all of the cultivars. The flesh weight of each of the following cultivars: “Saifi” “Saltany” “Omeltai” “Mosrum” and “Omdiab” exhibited significant differences compared to other cultivars (Table 1).

Seed weight

Fruits of “Mosrum” cultivar exhibited the least seed weight (0.78 gm.) which significantly lower than all cultivars. On the other hand “Rattab” cultivar showed the greatest seed weight (2.00 gm.) followed by “saidi” (1.76 gm.), each one exhibited significant differences compared to all cultivars. Seed weight of other cultivars ranged between (0.91 and 1.59 gm.) (Table 1)

Seed dimensions

“Filfil” showed the greatest seed length (2.76 cm) followed by “Rattab” (2.67 cm) each one of them exhibited significant differences compared to other cultivars. “Mosrum”, “Azwa” cultivars showed the least seed length (1.83cm.) and (1.84 cm.) respectively with insignificant differences between them, but both significantly lower compared to all other cultivars. (1.90 – 2.44 cm) was the range of seed length for other cultivars. (Table 1).

“Saidi” exhibited the greatest seed diameter (1.14 cm) which was significantly longer than those of other cultivars, followed by “Helwa”, “Rattab” (1.10 cm) and (1.09 cm) respectively. “Filfil” cultivar showed the least seed diameter (0.77cm.) which was significantly lower than those of other cultivars (Table 1).

2-Tamar cultivars

Among the twenty date palm cultivars included in this study seven cultivars (Degla, Jadag, Nefaik, Agadi, Tediss, Msleo, Masmot) reach the tamar stage. The results of testing the use of the fruit characters to differentiate between the seven tamar cultivars was as follows:

Fruit weight

“Jadag” showed the maximum fruit weight (8.69 gm.) which was significantly higher than all other cultivars except “Nefaik” (8.49 gm.) “Msleo” had the least fruit weight (5.46 gm.) which was significantly lower than those of other cultivars. (Table 2).

Fruit dimensions

“Degla” had the maximum fruit length (3.79cm.) followed by “Nefaik” (3.78cm.) with insignificant differences between each other

“Masmot” had the least fruit length (3.17cm.) which was significantly lower than all other cultivars. “Nefaik” had the maximum fruit diameter (2.34 cm.). This value was significantly higher than those of other cultivars. “Msleo” cultivar exhibited the least fruit diameter (1.86 cm.) which was significantly lower than those of the others (Table 2).

Flesh thickness

“Tediss” and “Masmot” cultivars showed the greatest flesh thickness (0.60 cm) and (0.56 cm.) respectively. Each one of them exhibited significant difference with other cultivars. While the least flesh thickness was in “Msleo”, “Agadi”, “Nefaik” cultivars (0.38 cm, 0.40 cm & 0.41cm.) respectively, without significant differences between the first and the second cultivars, and between the second and the third cultivar. Flesh thickness of other cultivars were in the range of (0.43 to 0.5 cm.) (Table 2)

Flesh weight

“Jadag” had the greatest flesh weight (7.405 gm.) Followed by “Nefaik” (7.155 gm.). These values were significantly higher than those of other cultivars. “Msleo” showed the least flesh weight (4.22 gm.) which significantly lower than those of other cultivars which had the values intermediate from (5.57 to 6.79 gm.). (Table 2).

Seed weight

Fruits of “Degla” cultivar exhibited low seed weight (0.849 gm.) with significant difference compared to all cultivars. On the other hand “Tediss” cultivar showed the greatest seed weight (1.426 gm.) which significantly higher than those of other cultivars which have values intermediate from (0.97 to 1.34 gm.) (Table 2).

Seed dimensions

The average seed length of “Degla”, “Nefaik” cultivars was (2.496cm.) (2.491cm.) respectively and considered the highest without showing significant differences compared to each other. “Tediss” had the least seed length (1.87 cm.) which significantly lower than all cultivars.

“Msleo” showed the greatest seed diameter (1.061cm.) which was significantly higher those of other cultivars except “Masmot” (1.036cm.)

and “Jadag” (1.033cm.). On the other hand “Agadi” had the least seed diameter (0.897 cm.) which found significantly the lowest (Table 2) .

Discussion

Although the fruit physical characters in rutab stage were of a value in differentiation between the cultivars cultivated in Jalo, Aujla and Ejkara, these properties were varied in its significance in the differentiation between the cultivars, for example fruit length in rutab stage significantly distinguished five cultivars, “Filfil”, “Saltany”, “Saifi”, “Omeltai” and “Mosrum” whereas fruit diameter distinguished “Saifi” and “Saidi” cultivars only. Regarding the fruit weight “Saidi” cultivar had average of (15.28 gm) which was significantly longer than other cultivars. This explains the wide consumption and extensive cultivation of this cultivar in the three oases compared to other cultivars. According to Hussein et al. (1976) on their study on eighteen date cultivars in Saudi Arabia, the fruits exceeded 15 grams were classified as fruits of heaviest weight. Besides to the fruit weight other fruit physical properties in rutab stage like flesh weight, flesh thickness, seed weight and seed length were of significant value in differentiation between the cultivars but it was not true for seed diameter. Similarly the fruit physical characters in Tammar stage differed in their significance in differentiation between the cultivars for example; fruit diameter differentiate four cultivars (“Degla”, “Nefaik”, “Agadi” and “Tediss”) while flesh weight differentiated only “Msleo” cultivar. Characters like fruit weight and length, flesh thickness, seed weight and seed length & diameter were of importance in differentiation between the cultivars. Other studies proved also the significance of the fruit characters in the study of cultivars like that of Nour et al.

(1986) in the study of day dates in Aswan - Egypt , Meligi et al. in their study on fruit quality and general evaluation of some Iraq Dates grown under Egyptian conditions , Selim et al. (1970) in the study on dry dates in Siwa - Egypt and Ismail (1986) in his study on Libyan date palm cultivars grown in Tripoli area. While the differences between “Helwa” and the other three cultivars were in significant in most of the other fruit characters.

Further preliminary study are needed to test the tree vegetative properties in differentiation between the date palm cultivars that may be come of practical value to determine the cultivars in absence of their fruits.

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Table 1. Fruit physical characters of some ruttab cultivars grown at Jalo, Auja and Ej kara oases during 1999 season

Cultivar	Fruit weight gm	FRUIT DIMENSIONS		FLESH	FLESH	SEED	<u>SEED DIMENSIONS</u>	
		<u>Length</u> cm	Diameter cm	Thickness cm	Weight gm	<u>Weight</u> gm	Length cm	Diameter cm
Nakfosh	5.043	2.683	1.875	0.376	3.736	1.307	2.054	0.985
Rattab	10.743	3.710	2.257	0.699	8.742	2.001	2.670	1.097
Filfil	9.090	4.395	2.052	0.470	8.174	0.916	2.762	0.776
Saltany	7.604	2.754	2.063	0.570	6.658	0.946	1.962	0.893
Saifi	8.746	3.617	2.501	0.531	7.812	0.934	2.185	0.825
Azwa	5.131	2.459	1.845	0.466	4.095	1.036	1.842	0.969
Hamra	5.361	2.668	1.911	0.424	4.274	1.087	1.904	1.005
Helwa	5.674	2.482	2.008	0.462	4.384	1.290	1.947	1.108
Mosrum	6.362	3.105	1.973	0.479	5.574	0.788	1.836	0.835
Brolsi	10.603	3.948	2.286	0.580	9.007	1.596	2.365	0.976
Saidi	15.292	3.750	2.600	0.788	13.529	1.763	2.447	1.142
Omdiab	5.758	3.226	1.889	0.392	4.794	0.964	1.915	0.957
Omeltai	7.261	2.984	2.063	0.482	6.050	1.211	2.090	1.002
L S D (0.05)	0.384	0.063	0.069	0.030	0.341	0.106	0.056	0.027

Table 2. Fruit physical characters of some tammar cultivars grown at Jalo, Aujla and Ejkara oases during 1999 season

Cultivar	Fruit weight gm	FRUIT DIMENSIONS		FLESH	FLESH	SEED	<u>SEED DIMENSIONS</u>	
		<u>Length cm</u>	Diameter cm	Thickness cm	Weight gm	<u>Weight</u> gm	Length cm	Diameter cm
Degla	7.280	3.790	1.922	0.433	6.431	0.849	2.496	0.902
Jadag	8.691	3.414	2.209	0.498	7.405	1.286	2.185	1.033
Nefaik	8.498	3.787	2.341	0.411	7.155	1.343	2.491	1.007
Agadi	6.54	3.287	2.055	0.409	5.571	0.970	2.024	0.897
Tediss	8.217	3.453	2.100	0.605	6.791	1.426	1.877	0.990
Msleo	5.467	3.638	1.867	0.387	4.222	1.245	2.306	1.061
Masmot	7.916	3.175	2.212	0.565	6.650	1.266	2.335	1.036
L S D (0.05)	0.289	0.074	0.032	0.023	0.284	0.073	0.054	0.031