

# **TREE MORPHOLOGICAL PROPERTIES OF DATE PALM CULTIVARS GROWN IN THREE LIBYAN OASES**

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## **ABSTRACT**

Tree morphological properties including: Diameter of trunk, length of leaf, width of leaf base, length of blade, length of spine area length and number of the spines, number of leaflets length and width of leaflets were statistically evaluated for differentiation between the most common twenty date palm cultivars (Saidi, Tediss, Agadi, Jadag, Msleo, Masmot, Saifi, Rattab, Saltany Mosrum, Brolsi, Degla, Hamra, Omdiab, Omeltai, Azwa, Filfil, Nakfosh, Nefaik and Helwa) grown in Jalo, Aujla and Ejkara oases in Libya.

## **INTRODUCTION**

Date palm cultivation received care probably more than any other crop in Libya. About 6 million date palm trees were cultivated in the different regions of date palm production in Libya (Edongli, et al., 1993). Because of the favourable environmental conditions for date palm cultivation in Libya and improvement of agricultural extension among the date-palm growers, the construction of date-palm farms is being increased especially in oases region in the middle of Libya like the Oases of Jalo, Aujla and Ejkara.

Although the date palm can be available in a lot of cultivars at any region. The differentiation between the cultivars is still possible through the accurate morphological description of the fruit and vegetative parts of the date palm tree (Al-Baker, 1972 & Ibrahim and Hajaj, 1998). In most cases the differentiation depends on the fruit physical properties and not on the vegetative properties. Some times there is a need to recognize the cultivar not in its fruit stage which claim the importance of determining the vegetation characters of that cultivar. This study aims to test the vegetative properties in differentiation of the most important date palm cultivars in the oases of Jalo, Aujla and Ejkara in the middle of Libya.

## MATERIALS & METHODS

Study area included the oases of Jalo, Aujla and Ejkara representing a triangle about 400 km to the South of Benghazi. Aujla oasis lays 220 km to the south of Ejdabia City, and Jalo is about 30 km to the South of Aujla, while Ejkara is about 30 km to Eastern North of Jalo.

40 farms were selected randomly according to the size of cultivation area as follows: 20 farms from Jalo and 10 farms from each of Aujla and Ejkara, According to the survey of the 40 farms the most common cultivars were determined and then one typical farm was selected from each area (Oasis) the three selected farms were subjected to the same cultural practices and of almost the same age. From each cultivar 3 trees were selected to represent 3 replicates. Their trunks were measured and then 4 leaves were taken from each replicate and the following parameters were measured, leaf base width, leaf length, blade length, pinnae number of each leaf, spines number for each leaf, pinnae length (leaflets), pinnae width, spine length, and spines area length. Analysis of variance was done and L.S.D. was used to test the significance between means at 5 % level of significance.

## RESULTS

According to the survey 20 common cultivars were selected as follows: 11 from Jalo (Nakfosh, Rattab, Filfil, Saltany, Saifi, Saidi, Msleo, Tediss, Agadi, Nefaik and jadag), 3 from Aujla (Degla, Mosrum and Brolsi) and 6 from Ejkara (Omdiab, Omeltai, Azwa, Hamra, Helwa, and Masmot). The test of the use of the vegetative properties in differentiation between cultivars was as follows:

### **Trunk diameter (thickness)**

The thickest trunk was of Azwa (235 cm) that was significantly higher than all the other cultivars "Helwa" cultivar had the thinnest trunk (126.66 cm) followed by "Msleo" (130.00 cm) and "Filfil" (130.6 cm) with no significant differences between them. The average of the trunk thickness of other varieties ranged from 160 and 220 cm (Table 1).

### **Width of the leaf base**

The widest leaf base was of "Saidi" cultivar with average (27.16 cm) which was significantly higher than the others except of "Msleo" (27.08

cm). The lowest value was for the leaf base of "Rattab" with an average of (16.5 cm) (Table 1).

### **Leaf length**

The greatest leaf length was of "Rattab" with an average of (426.5 cm) followed by "Saidi" (413.08 cm). Each of them was significantly higher than the others. The shortest leaf length for Hamra (296.91 cm) which was insignificantly lower than Omdiab (304.00 cm), "Masmot" (306.16 cm) and "Helwa" (313.75 cm). The average leaf length of the other cultivars was in the range of (318.41 cm) to (396.40 cm) (table 1).

### **Blade length**

"Rattab" cultivar had the longest leaf blade with an average of 390.25 cm which was significantly higher than that of the others except of "Saidi" (375.91 cm) and "Agadi" (371.16 cm). The shortest blade length was of "Hamra" (269.41 cm) which was only insignificantly lower than of "Omdaib" (275.75 cm). "Masmot" (281.58 cm) and "Mosrum" (289.16 cm) (Table 1).

### **Number of Pinnae (Leaflets)**

"Azwa" had the highest number of pinnae with an average of (195.91 ) followed by (193.25) and (187.50 ) for "Saltany" and "Brolsi" respectively. The lowest number of pinnae was of "Helwa" (118.75) which was significantly lower than all the others (Table 1).

### **Spine number**

"Agadi" exhibited the greatest number of spines (71) which is significantly higher than those of other cultivars. "Brolsi" had the least number of spines (24) followed by "Saidi" (28), each one of them was significantly lower than of the other cultivars which had an average number of spines in the range of 36 to 53 (Table 1).

### **Pinnae length (Leaflets)**

"Brolsi" had the longest pinnae with an average (69.75 cm) followed by "Omeltai" (65.08 cm) without significant differences between each other. The least pinnae length in "Helwa" cultivar (35.54 cm) which was significantly lower than the others except the pinnae length of "Omdiab"

(38.16 cm) and "Hamra" (38.04 cm). Most of the values for the other cultivars were of insignificant difference and in the range of 43.87 to (65.08 cm) (Table 1).

### **Pinnae width (Leaflets)**

"Omdiab" had the greatest pinnae width (3.90 cm) followed by "Azwa" (3.84 cm) without significant differences between each other. Least pinnae width in "Filfil", "Degla" (2.79 cm) and (2.80 cm) respectively without significant difference between them. Other cultivars were of pinnae width ranging between (2.85 to 3.77 cm) (Table 1).

### **Spines length**

The longest spines in "Msleo" cultivar (42.83 cm) which was significantly higher than those of other cultivars. Least spines length in "Mosrum", "Azwa", "Omdiab", "Hamra", "Helwa", "Saidi", and "Tediss" their values between (13.87-15.98 cm) with insignificant differences between each other. Other cultivars had spines length ranged between 17.30 to 33.50 (Table 1).

### **Spines area length**

The longest spines area in "Agadi" (141.25 cm) which is significantly higher than all cultivars. Least spines area length in "Brolsi" (50.91 cm) which significantly lower than all cultivars. Others ranged between 75 to 120 cm (Table 1).

### **Discussion**

Results showed that all characters tested were of efficiency in differentiation between cultivars in vegetative stage. This is in agree with other studies demonstrated the significance of the vegetative characters between date palm cultivars as in the study of Ibrahim and Sinbel (1989), Ibrahim and Hajaj (1998) on date palm cultivars in Egypt and Saudi Arabia, Ismail et al. (1986) in Wetsern coastal belt of Libya and Hussain et al. (1989) in Iraq. The results of this study claimed that the vegetative properties differed in their signicance in differentiation between cultivars, for example the cultivars "Rattab", "Saidi", "Hamra", "Omdiab" can be differentiated according to leaf length, while pinnae length significantly differentiated only the cultivar "Brolsi.". Although the characters: trunk thickness and spines length were of limited value in this study but cultivar "Azwa" could be easily and significantly differentiated by its trunk

thickness and the cultivar "Msleo" by its spines length. Among the tested vegetative properties the leaf base width and pinnae width were of limited value in differentiation between the cultivars included in the study. According to these results the use of vegetative characters can be practically important to differentiate between the cultivars in the absence of fruits. More studies are needed to confirm the value of the vegetative characters in the identification of many of date palm cultivars in different areas of the date palm cultivation in Libya.

**Table( 1) Average of vegetative characters of Date palm cultivars grown at Jalo, Auja and Ejara**

Cultivars	Trunk thickness cm	Leaf base width cm	Leaf Length cm	Blade Length cm	Pinnae number	Spines number	Pinnae length cm	Pinnae width cm	Spines length cm	Spines area length cm
Azwa	235.00	24.91	392.41	354.33	195.91	44.75	43.87	3.84	15.29	97.25
Omdiab	301.66	21.33	304.00	275.75	162.08	44.16	38.16	3.90	15.98	74.25
Hamra	171.66	20.08	296.91	269.41	147.00	47.91	38.04	2.90	14.54	92.08
Omeltai	210.00	21.00	388.00	361.91	146.83	54.16	65.08	3.06	33.58	119.33
Masmot	166.66	19.75	306.16	281.58	141.50	52.16	49.20	2.85	17.33	94.25
Helwa	126.66	20.50	313.75	285.41	118.75	42.16	35.54	2.98	14.95	116.66
Saidi	181.00	27.16	413.08	375.91	167.25	28.16	46.75	3.77	14.79	93.91
Tediss	169.00	23.50	365.75	341.66	185.83	52.66	56.50	3.37	15.12	116.50
Jadag	200.33	17.75	340.08	315.75	175.83	46.58	44.91	3.25	20.16	112.58
Rattab	158.66	16.50	426.50	390.25	177.58	45.83	59.75	3.55	28.29	113.41
Saltany	192.00	18.16	380.25	350.75	193.25	46.83	61.79	3.63	26.16	98.00
Nefaik	162.33	18.58	363.75	332.00	164.41	48.58	47.91	3.48	26.37	107.66
Filfil	130.66	18.83	356.75	328.33	167.58	45.25	64.04	2.79	30.58	78.50
Saifi	214.66	19.50	390.00	363.58	169.33	48.83	62.33	3.67	31.25	83.16
Agadi	158.00	18.08	401.91	371.16	169.08	71.66	45.66	3.21	23.05	141.25
Msleo	130.00	27.08	390.58	355.41	171.16	48.91	55.58	3.15	42.83	107.00
Nakfosh	159.33	19.91	350.91	320.83	153.75	42.25	50.91	3.01	21.33	93.41
Degla	169.33	18.25	364.66	332.41	132.33	41.08	57.41	2.80	19.83	108.33
Brolsi	187.66	22.25	396.41	366.66	187.50	24.83	69.75	3.11	18.41	50.91
Mosrum	166.66	21.25	318.41	289.16	154.16	35.83	37.91	2.85	13.87	74.08
LSD	34.003	2.19	22.49	21.14	9.33	3.24	5.52	0.322	13.87	74.08

0.05

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# ASSESSMENT OF GENETIC VARIATION WITHIN DATE PALM (*PHŒNIX DACTYLIFERA* L.) USING AMPLIFIED FRAGMENT LENGTH POLYMORPHISM (AFLP) - GENOTYPING OF APOMICTIC SEEDLINGS AS A CASE STUDY

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## INTRODUCTION

Date palm (*Phoenix dactylifera* L.) plays an important role in the socioeconomic stability of oases regions in north Africa. The Tunisian palm groves count about 4.282.000 palm trees, of which 56 % is Deglet Nour variety (GID, 1999). However, this cultivar is very sensitive to the Bayoud disease, imposing a serious threat to the Tunisian palm groves. As a consequence, new approaches for the mass propagation of date palm, more efficient than offshoot propagation, have to be developed. Apomixis, defined as the production of seeds without fertilization, has been described in angiosperms and allows the clonal multiplication of hybrid genotypes, but spontaneous apomixis has not been described in date palm.

However, the treatment of non-pollinated date palm female inflorescences by gibberellic acid (GA3) produces diploid plants whose origin is assumed to be apomictic (Ben Abdallah, 2000; Ben Abdallah *et al.* 2000), although the true-to-typeness has to be assessed.

The present paper describes the utilization of the AFLP (Amplified Fragment Length Polymorphism) technology in order to detect genetic polymorphism in date palm and to analyze the genetic relationship between the parental cultivar and seed progenies obtained by GA-induced apomixis.

## MATERIALS AND METHODS

### Plant material

This work used Deglet Nour as the female cultivar (Deglet nour), a pollinator genotype (T23, from INRAT collection), F1 hybrid plants and plants obtained from the seeds derived from the GA3 treatment of non-