Morphological and anatomical comparison of leaves of date palm cultivars (*Phoenix dactylifera* L) grown in the southeastern region (Algeria)

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Abstract

This study was carried out in the laboratory of the Faculty of Natural and Life Sciences at the University of ElOued. Where this work aims to study the anatomical comparison for leaves from the date palm of five varieties (Garess, Hamray, White Deggla, Nour Deggla, Tekermist) and cultivated in the area EL-oued (Hassi Khalifa), Through a morphological description (The length and width of the frond, payoff) and anatomical study (the diameter of the clipsome of the leaf, the diameter of the large, medium and small vascular bundles, the diameter of the large fibrous bundle, the number of fibrous bundles between the two large bundles, the number of small and medium vascular bundles between the two large bundles, The area of the primary and secondary wood in the large beam, the thickness of the epidermis and waxy layer and the middle tissue).

Through the results obtained, it was found that the Hamraya varietiy achieved the most returns by the number of buds in the palm, Where this breed is distinguished (Hamraya) With the largest number in the medium vascular bundles compared to other varieties, It was also characterized by the smallest thickness of the wax layer, the diameter of the medium vascular bundle as well as the diameter of the large fibrous bundle, while in The rest of the characteristics were average compared to the other varieties**.**

Keywords: dates palm (*Phoenix dactylifera* **L**), morphological traits, leaf anatomy.

Introduction

The leaf plays an essential role in plants because it is the supra-plantar organ dedicated to carrying out the process of photosynthesis. To this end, the leaf is usually flat and thin, exposing the greatest possible surface area and the greatest amount of chlorophyll-containing cells to sunlight and allowing light to penetrate all of the leaf tissue. The leaf is also responsible for respiration, transpiration and excretion. It also has great importance in influencing the growth rate of the plant, its size and the structure of its organs on the one hand, and on the speed of its entry into its different phenological components. steps on the other hand. Therefore, this study came with the aim of comparing the anatomical and morphological comparison of the leaves of certain Phoenix dactylifera date palm cultivars to know the differences in the cell layers and tissues that make up the leaf, which are reflected in the genetic differences. and the yields of these cultivars and the influence of growing medium and surrounding conditions.

Materiel and Methode:

For this experiment, 5 cultivars of date palms (Phoenix dactyliferaL) were chosen, as follows: Ghars, Deglet Al-Bayda, Deglet-Noor, Takremset and Al-Hamraya, where these cultivars were close in age between 18 and 20 years and the planting area and they are watered with well water and live in about the same conditions.

The experiments in this research were conducted on leaf samples of the aforementioned cultivars, where a leaf (wicker) was taken from the middle of the leaf located in the middle of the leaf cycles (leaf), which is considered to be fully mature and fully green.

Cross-sections of each leaf were made using a microtome (Thermo Scientific HM325 Microm), then double staining was performed, and the following characteristics were calculated:

Length of wicker (μm)	width of wicker (μm)	diameter of cut X10 (μm)	The thickness of the medial tissue X10 (μm)
The thickness of the waxy layer X40 (μm)	cuticle thickness X40 (μm)	The number of fiber bundles between two large bundles X4 (μm)	Large fiber bundle diameter X10 (μm)
The number of small vascular bundles between two large bundles X10 (μm)	The diameter of the small vascular bundle X10 (μm)	The number of intermediate vascular bundles between two large bundles X4	The diameter of the median vascular bundles X10 (μm)
Large vascular bundle diameter X10 (μm)	Initial wood space in a large bundle X10 (μm^2)	Secondary lumber space in a large bundle X10 (μm^2)	

Results and discussion

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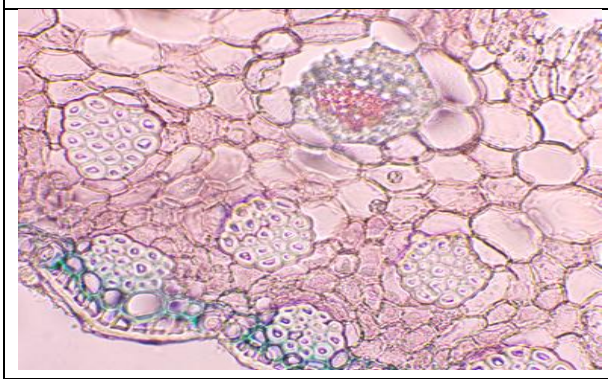
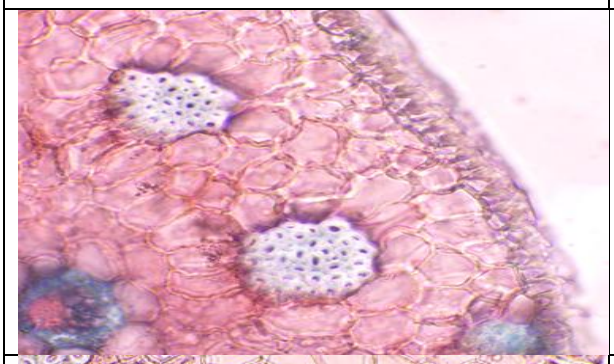
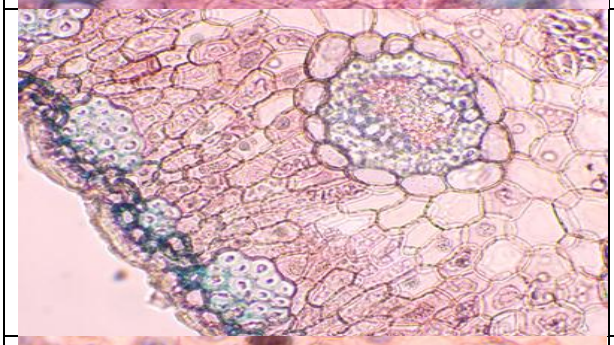
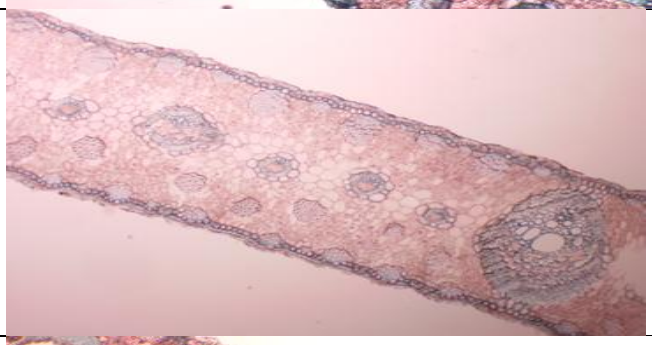
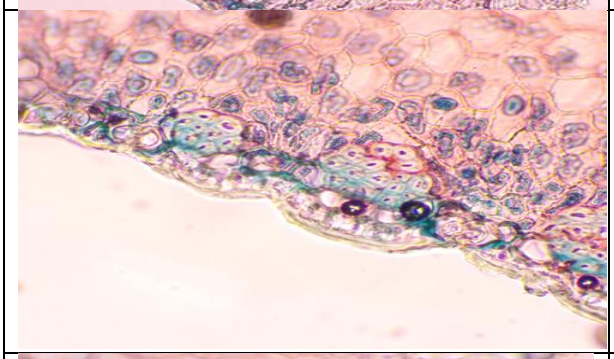
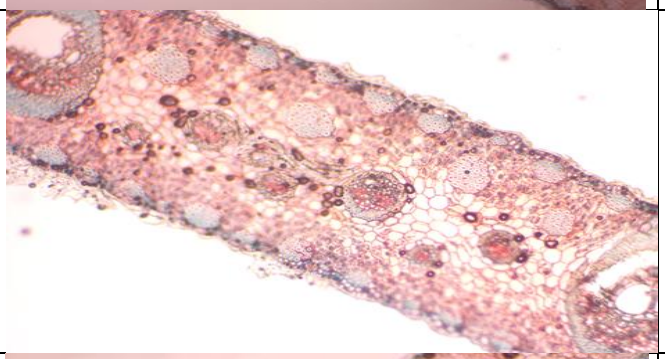
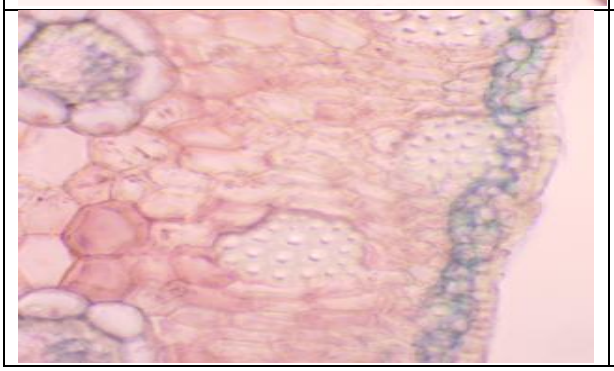
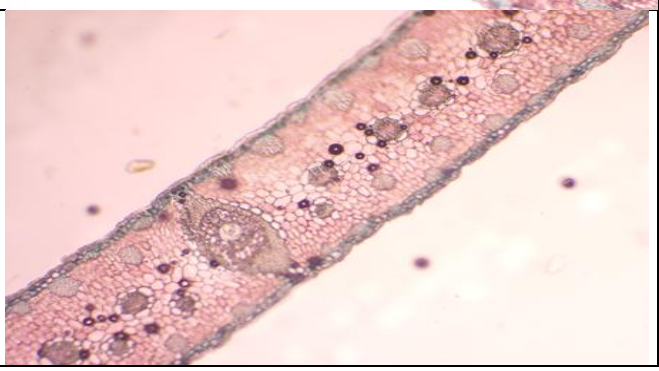
Magnification 40x	Magnification10x	variety
		Ghars
		Deglet Al-Bayda
		Deglet-Noor
		Takremset
		Al-Hamraya

Leaf cross-sections of the five variety

This study aims to compare the anatomical and morphological leaves of some date palm cultivars (Phoenix dactylifera L), which is shown in planting, Deglet White, Deglet Nour, Takremsto and Hamaraya, to learn about the differences in the cell layers that make up the leaf, which affect the yield of these varieties and the impact of l growing environment and surrounding conditions. Where this study projected the state of El Oued from the Algerian diameter, through the morphological description (length and width of the wicker) and the anatomical study (diameter of the leaf cup, The thickness of the medial tissue, The thickness of the waxy layer, the diameter of the large fibrous bundle, the number of fibrous bundles between the two large bundles, the number of small vascular bundles The median between the two large bundles, the area of the primary and secondary xylem in the large bundle, the thickness epidermis, waxy layer and mesenchyme). Transverse sections made on the leaf showed that it consists of a waxy layer, an epidermis and a mesenchyme interspersed with vascular bundles and fibrous bundles.

Through the results of the analytical study, we find that in the characteristic of the width of the fronds, the Deglet Nour variety outperforms the rest of the cultivars, while in the characteristic of the length of the fronds, it is superior to the Deglet Blanche. variety, whose role is to increase the leaf area and therefore increase the number of layers and cells, and the superiority of the planting variety over the rest of the varieties In the following characteristics: thickness of the epidermis, thickness median of the tissues, number of fibrous bundles between two large bundles, the surface of secondary wood in the large vascular bundle, and it is also noted that the thickness of the waxy layer is equal between the two cultivars of the plantation and the deglazed white, and each of these traits works in order.

It provides support and protection to the internal tissues and to the mechanism of the plant, photosynthesis because it contains plastids, strengthens the leaf and participates in the maintenance of the leaf in particular and the leaf in general, in the transfer of imperfect copies from the roots to the leaves, preventing the loss of water inside the leaf and preserving it as long as possible. We also noticed the superiority of the White Diklet variety in the diameter of the large and of the small vascular bundle, and the superiority of Deglet Nour in the number of small vascular bundles between two large bundles, and the Takramst variety in the diameter of the section of frond, the diameter of the large fibrous bundle, the area of the first wood in the large bundle, the diameter of the bundle Intermediate vascular bundles, and it is noted that it is equal to the class of erythroderma in terms of the number of intermediate bundles vascular bundles between two large beams. Finally, note that the Al-Hamrayah variety outperforms the rest of the varieties by the number of florets it bears, and therefore an increase in general yield.