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ORIGINAL ARTICLE

Comparative anatomical study for the two species of the genus *Conocarpus* L. (Combretaceae)

Khansaa Rasheed Al-Joboury
Iraq Natural History Research Center and Museum, University of Baghdad, Baghdad, Iraq
***Corresponding Author**: Khansaa R. Al-Joboury* mkansaa@yahoo.com

ABSTRACT
Different external and internal anatomical and venation and pollen grain characteristics were studied in the examined studies for the two species which belongs to the family Combretaceae, they are Conocarpus erectus L. and Conocarpus lancifolius Engl. In this study the result showed that the species Conocarpus erectus L. recorded highest range for the thickness of epidermis, which was 19-22 µm and the average thickness for the cuticle was 2-3.5µm. Also the study recorded the measurements for the anatomy of the leaves. The venation of the leaves was Brochidodromous and in the pollen grain result found that the two species was Tricolporate but there are many different in the measuring for the polar view and equatorial view for the pollen grain between the two species.
***Keywords**: anatomy, Conocarpus L., Combretaceae, species, study*

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INTRODUCTION

The family Combretaceae contain 600 species in 20 genera which these are trees, shrubs, and lianas distributed in tropical and subtropical regions, especially in Africa [1,2]. *Conocarpus* L. is a genus for two species for flowering plants belongs to the family Combretaceae, native in tropical regions for the world. One for the two species is a widespread mangrove species, the other is found in a small area [3,4]. Buttonwood (*C. erectus L.*), is an evergreen shrub which finds on the edges of salt flats, rock lands. *C. lancifolius* is also Combretaceae (a family for trees, shrubs and lianas), a native plant on different areas of the coastal areas of Yemen, Somalia and Djibouti [5,6].Only a few studies have been conducted the family Combretaceae in particular and the two species in general [4].This shrub deserves attention because it grows in rapid, also it can endure the unrelenting, fierce tropical sun, and can tolerate the high salinity levels (halophytic plant) if it is supply with water [7]. It provides the food and cover of wildlife, protects the soil in storm surges and helps fix dunes [8,9]. The objective for this study was to examine the anatomical traits and for the purpose of distinguishing between the two species for the same family and for finding taxonomic characteristics that help researchers diagnose them by other researchers.

MATERIAL AND METHODS

Sample collection and preparation

Young and mature samples from 6-year-old trees were used to comparative study at different areas in Baghdad, Iraq. Transverse and longitudinal freehand sections were stained with toluidine blue or astra blue and basic fuchsine using hand sectioning method.

Pollen grain

The anthers collected from flowers that may involve taking a number of flowers for finding healthy anthers and high pollen content using the needle or laboratory wire loop, carefully and gently try scraping the pollen from the anthers and store them in the pipette tip or a micro-tube.

RESULTS AND DISCUSSION

Anatomical studies are important for understanding the plants adaptations to any change in environment .*C. erectus* L. is usually a dense multiple-trunked shrub but *C. lancifolius* engl. leaves are simple, leathery, petiolate and arranged pairs alternating and each other on an angle less than 180°.

Stem

The stem in *C. erectus* is cylindrical, 2–4 m tall, and possible grow to a tree up to 20 m probably more tall, has a trunk more than 1 m in diameter, very dark green have many *non- glandular* hairs and also have- glandular hairs and the other species *C. lancifolius* (Damas) is an evergreen tree which grows more than 20 m in height and 60-250 cm maybe more in diameter. So it is believed the larger tree has now been always entirely felled and it is a multi-branched tree for its natural habitat, straight stem, and it has the same in this anatomical quality as it contains many non- glandular hairs and also have - glandular hairs. primary stems for the species *C. lancifolius* show a one-seriated epidermis with an average thickness was18-20 µm but in the species *C. erectus* we found that the thickness of epidermis was 19-22µm. the cuticle has an average thickness of 2-3 µm forthe species *C. lancifolius* but in *C. erectus* was 2-3.5µm, this is consistent with[10] . In the cortex the result showed that the collenchyma layer found2 layer in *C. lancifolius* while in the species *C. erectus* was 3 layer and the parenchyma layer was 8 in *C. lancifolius* but 6 in *C. erectus*. The vascular system in our sampled region of the stem is at the beginning in the development for secondary tissue showing vascular cambium and secondary xylem and phloem in the two species. So epidermis, cortex and pith cells contained tannin materials and crystal druses and raphides. These qualities are all present in many this family species this agreement with [11] . In our study the result showed that there is no mucilage duct in phloem or any extraxyler fibers in secondary phloem (Fig 1).

Leaves

The leaves of *C. lancifolius* structure containing palisade parenchyma at the adaxial side and abaxial side which called Isobilateral containing 6-8 layer, the leaf epidermis in both the adaxial and abaxial sides is one-seriated and the average of the thickness is 30-35 µm covered by cuticle layer which has 2-5 µm in thickness while in *C. erectus* cuticle layer has 2-3 µm in thickness and the thickness of the mesophyll was 300-360 µm. The sizes of the epidermal cells in the two species were similar, as the cells of the upper surface were larger than the cells of the lower surface, So the thickness of the cuticle and epidermis are important features and data in this family taxonomy and its species this data agree with [12,13].

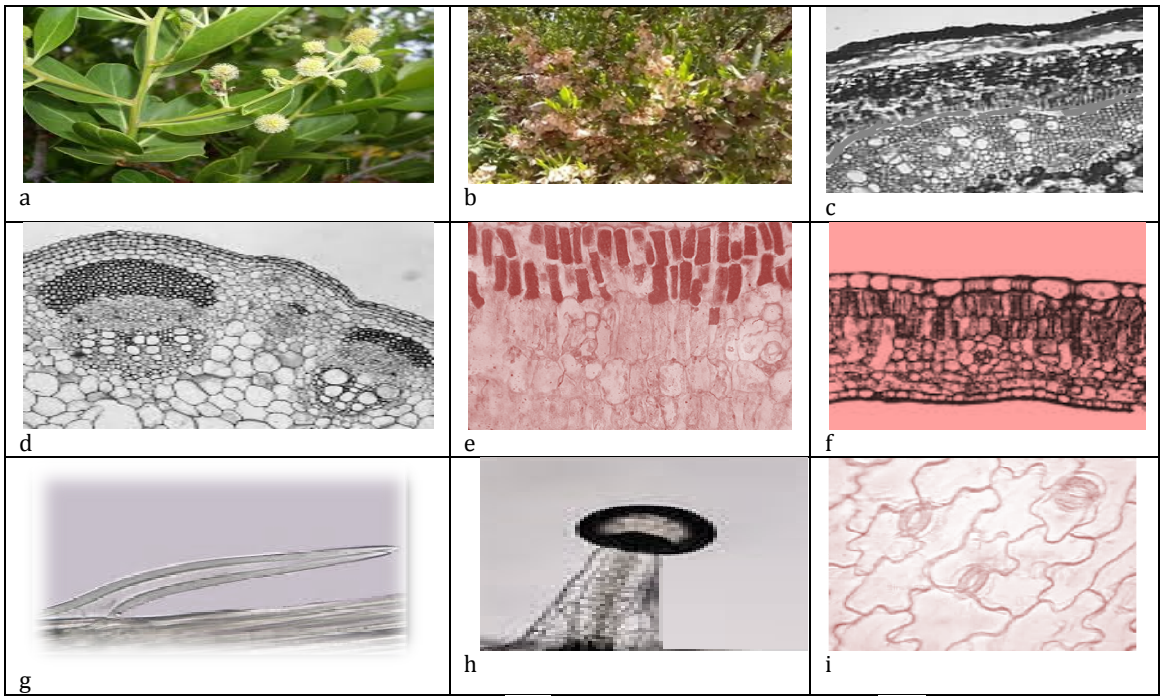

Fig.1 The two species *C. erectus* L. and *C. lancifolius*Engl., a: *C. erectus* L., b: *C .lancifolius* Engl., c: anatomical section for the stem of *C .lancifolius* Engl., d: anatomical section for the stem of *C.erectus* L., e: anatomical section for the leaf of *C. lancifolius* Engl., f: anatomical section for the leaf of *C. erectus* L., g: simple hairs, h: glandular hairs, i: the stomata

Venation

The results showed that the venation of the leaves was reticulate pinnate, the midrib very prominent especially on the top surface of the vegetable leaf, it was straight and the venation was brochidodromous, there is a set of loops that are festooned brochidodromous which it refers to a type of leaf venation which the secondary veins do not terminate to the margin but join to form a series of prominent arches that form a submarginal nerve and the secondary veins possess closed loops toward their apices. Also in this study show intersecondary veins [13].

Pollen grain

The pollen grain in the species *C. lancifolius* was prolate in the equatorial view and ***circular*** shapeinpolar view, tricolporate [14], the measurements are showed that the polar view recorded about 10-20 µm and in equatorial view recorded 14-18 µm, while in the species *C. erectus* measurements recorded 12-18 µm in polar view but in equatorial view recorded 10-19 µm (Fig 2).

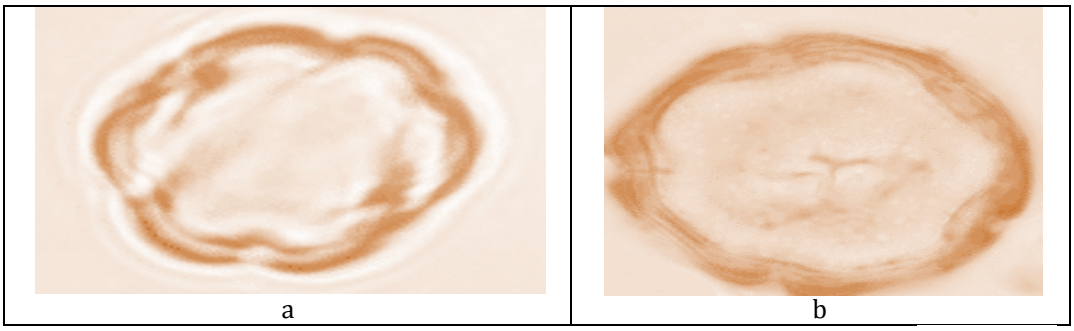

Fig 2 The pollen grain a: 2 The pollen grain for *C. erectus,* b:The pollen grain for *C. lancifolius*

CONCLUSION

The stem structure and leaf anatomy of the two species shows many differences which help the other researcher in plant taxonomy and evolutionary studies. Anatomical works concerning about this family are very rare,, So further works may help in the understanding for the taxonomy, physiology, and ecology of this family.

REFERENCES

1. Al- Surrayai T, Yateem R, AL- Kandari T and Bin Haji A. (2009). The use of *Concarpus lancifolius* trees for the remediation of oil–contamination soils. Soil and Sediment Contamination: An International Journal. 18 (3): 354-368.
2. Tewfik S, and El Wakeel A. (2010). Effect of thinning on the above ground biomass of (*Conocarpus erectus* L.) trees in the western region of Saudi Arabia. Environ. Arid Land Agric. Sci., 21: 3-17.
3. Al-Humaid A. (2005). Effects of hydrophilic polymer on the survival of Bottonwood (*Conocarpus erectus*) seedlings grown under drought stress. Eur. J. Hort. Sci., 70: 283-288.
4. Al-Humaid A, and Moftah A. (2007). Effects of hydrophilic polymer on the survival of buttonwood seedlings grown under drought stress. J. Plant Nutr., 30: 53-66.
5. El-Mahrouk M, El-Nady M and Hegazi M. (2011). Effect of diluted seawater irrigation and exogenous proline treatments on growth, chemical composition and anatomical characteristics of *Conocarpus erectus* L. J Agric. Res., 36: 420-446.
6. Redha, A., P. Suleman, R. Al-Hasan and M. Afzal. 2012 Responses of *Conocarpus lancifolius* to environmental stress: a case study in the semi-arid land of Kuwait. Phyton. 81:181-190.
7. El-Waziry A. (2014). Evaluation of *Conocarpus* (*Conocarpus erectus*) leaves and Bermuda grass (*Cynodondactylon* L.) using chemical analysis and in vitro gas production technique. Bulgarian Journal of Agricultural Science 20(4):824-829.
8. Abdel-Hameed S, Bazaid S, Shohayeb M, El-Sayed M and El-Wakil E. (2012). Phytochemical Studies and Evaluation of Antioxidant, Anticancer and Antimicrobial Properties of Conocarpus erectus L. Growing in Taif, Saudi Arabia. European Journal of Medicinal Plants, 2(2), 93-112.
9. Asif M, Saqib M, Yousaf B, Adnan M, Yousaf A, Ali A and Sabir D. (2014). Growth and ionic composition of Buttonwood (Conocarpus erectus L.) in response to soil salinity and water stress. Adv. Life Sci. Technol., 19: 42-51.
10. Tilney P. (2002). A contribution to the leaf and young stem anatomy of the Combretaceae. Bot. J. Linn. Soc. 138: 163- 196.
11. Redha A, AL-Mansour N, Suleman P, AzelM and AL- Hasan R (2011). Leaf traits and histochemistry of trichomes of Conocarpus lancifolius a Combretaceae in semi – aride conditions . Amer. J. Plant Sci., 2 (2): 165-174.

12. Schoener T, (1988). Leaf Damage in Island Buttonwood, Conocarpus Erectus: Correlations with Pubescence, Island Area, Isolation and Distribution of Major Carni-vores," Oikos, Vol. 53, 1988, pp. 253-266.
13. Metcalf C, Chalk L. 1950. Anatomy of the Dicotyledons (Leguminosae): Leaves, Stems and Wood in Relation to Taxonomy with Notes on Economic Uses. Oxford, Clarendon Press, 1, 153
14. Krystyna P (2008). Pollen production in selected species of anemophilous plants. ActaAgrobotanica. 61 (1): 41–52.