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Anatomical and chemical study on the growing *Eriobotrya japonica* in Anbar Governorate

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Abstract. current research consists of an anatomical find out about of the *Eriobotrya japonica* from the Rosaceae in Anbar Governorate, which is in the structure of planted trees. The anatomical features of the s, leaf blade and market have been studied and its traits and floor have taxonomic significance in keeping apart and diagnosing this type. Appearance qualities can be linked with anatomical qualities to achieve an built-in classification. The quantity of layers and thickness of every organ, vascular bundles characteristics, wide variety of vessels, the traits of epidermal cells and cross-section structure are all studied contributing to taxonomic significance . The current study also dealt with the phenotypic characteristics of the stem, leaf and stalk, and it became clear through this study that the stems of the type *Eriobotrya japonica* were cylindrical and hard with many branches and were distinguished by a greenish-brown color. It is not a fixed characteristic of the single type in addition to the shape of the leaf, which is one of the important features in the classification. The stalk is characterized by being short and covered with hairy and green or yellowish green color, and these characteristics are important in the classification of this type. The fatty acids were detected in the hexane extract of *Eriobotrya japonica* in the gas chromatography device - GC, and the results indicated that this type contains fatty acids, the highest percentage of linoleic acid was 60% and the lowest Linolenic acid by 0.17%.

1. Introduction

The Rosacea household is one of the good sized botanical households with about 3000 species and one hundred genera [1]. It is one of the households noted in the Iraqi Flora of Iraq and it consists of one hundred forty genus and this household is unfold in the areas of the world and has been assigned a classification key in Iraq incorporates eleven . species and is in the structure of trees, shrubs, and herbs. [2 , 3] cited that there are 19 species and forty three species that are both wild or cultivated. [4] it carries one hundred fifteen species and 3200 species unfold in North America, East Asia, and Europe and there are 19 species and 50 species in Iraq. *Eriobotrya japonica*, an evergreen tree

belonging to the Maloideae of Rosaceae that consists of about 940 species .[5] Its size is 10m and perhaps the smallest in size between (3- 4) m.[6] This plant has medicinal and dietary significance as used in the remedy of many et al illnesses. [7] And It is a supply of dietary phenols. [8] It is additionally an decorative tree and an essential supply of nectar for beekeeping .[9] It has been cultivated for extra than 2000 years and is now cultivated commercially in 30 nations [10] The leaf



frequently reaches 30 cm in width and 9 cm in width in which the top floor is smooth and the decrease one consists of fluff [11] The anatomical find out about is vital in the classification of species, ranks, and households .[12] and additionally has extra interest in figuring out the genetic

2. Materials & Methods

2.1. Collection of samples:

This find out about relied on the smooth samples of the plant *Eriobotrya japonica*, which had been gathered from the Heet areas of Anbar Governorate in the duration from June 2019 to March 2020. The components that are wholesome have been.

relationships between species and taxonomic degrees .[13] The anatomical learn about helped in resolving matters The troubles encountered by way of the researcher or classifier in the match of overlap or similarity in phenotypic traits .[14] The purpose of this find out about was once to provide an anatomical photograph to some vegetative components such as the leaf, stem, and the market for the plant *Eriobotrya japonica*, which are nearly non-study in Iraq, as properly as the lack of lookup and sources That research the anatomical aspect in Iraq and the world.

besides ailments and rupture. A pattern of the plant was once taken and was once recognized the usage of the supervisor and relied on the classification keys referred to in the Iraqi flora [14] .

2.2. Anatomical study:

Prepare permanent vertical sections of the organs slides of the stem , leaf and petiole, The wax method mentioned was used [8].

3. Results and discussion

3.1. The section of leaf lamina

The modern-day find out about of the kind *Eriobotrya japonica* proven in Table No. 1 and determine 1 confirmed that it consists of easy dermis consisting of Uniseriate rectangular cells in which the higher epidermal cells regarded large than the decrease dermis and the common epidermal thickness was once 15 Mm, whilst the common thickness of the decrease dermis reached 19 Mm, it grew to be clear that the Mesophyll tissue in this kind was once Unifacial, which means that the palisade layer is positioned simply beneath the higher pores and skin and is aligned to one floor and then the spongy layer [12] mesophyll consists two layers layer of palisade is the type that follows the top pores and skin and the quantity of ranks (4- 2) and are cells compact and common thickness reached 92 The 2d layer is spongy layer used to be had 5-4 ranks, which reached a thickness charge 100 Mm which is characterised through free and disjointed cells and there are between interfaces distances cells and types are irregular and both the center vicinity of race grew to become out to be made up of parenchyma tissue that characterised their cells as are the dimension of there is a area between them and incorporates prolonged and giant vascular bundles.

Each bundle consists of xylem and Phloem wood. The common thickness of the wooden is sixty four and the thickness of the bark 33. The quantity of rows of vascular devices in the center vein 35-22 and the diameter of the vascular bundles 401Mm, this learn about coincided with . [14] the anatomical learn about gave many vital elements that helped aid the phenotypic traits used in classification and additionally this find out about helped to isolate this kind by way of identifying the traits of the Mesophyll tissue of the leaf and additionally by means of the quantity of layers of the tissue and additionally this kind can be remoted thru The variety of vascular devices in the vascular bundle of the leaf

3.2. *Surface coating Idumentum*

The results of the Eriobotrya japonica shown in fig. (4) it contains trichomes that differed in their dimensions and distribution according to the different plant members, which are of the Eglandular and unicellular trichomes with a cylindrical shape and end as pointed or rounded and found on leaves and stem And the petioles these results were in agreement with [9].

3.3. *The section of Stem*

The modern-day learn about of the stem of the kind Eriobotrya japonica, proven in Table (2) fig. (2). the stem in this kind used to be circular, Solid and Pith occupies the center, the area used to be displaying the center of the stem, in general, incorporates an exterior layer known as Cuticle surrounding In the pores and skin from the outside, its cells are uneven with a common thickness of 6 Mm, and then the dermis layer comes in. The cells are nearly rectangular, fairly small, and consist of one layer, and they are continuous. After the dermis layer comes to the cortex, which consists of multilayers in which the cells are various and the common thickness is 517. The first layer in the Eriobotrya japonica consists of the Collenchyma tissue, and this is observed via the Parenchyma tissue. The thickness of the Collenchyma tissue 105. Its thickness (178). As for the vascular cylinder, it grew to become clear that it is a non-stop annular cylinder round the circumference of the stem that is parallel to the Cortex. The vascular cylinder consists of xylem wood (sixty eight) Mm and the Phloem bark, 17 Micrometers. The pith is placed in the core of the stem, and it consists of large-sized, large-scale parenchyma cells[12]. The partitions are thin, stored, and formed in a round polygon. The thickness of the pulp in this kind reached 494 Mm. Through the anatomical facets of the vascular cylinder the place they have been of the non-stop kind and information of the houses of the vascular bundles and the thickness of every layer in the stem have a classification fee in setting apart and diagnosing the type.

3.4. *Leaf petiole Section*

The cutting-edge learn about of the Eriobotrya japonica petiole market confirmed its facts in Table three and fig. (3), the cross-section from the center of the organ is a part from the backside a little sharp and from the pinnacle convex there is a cuticle from the backyard and has a thickness of 3 Mm and surrounds the pores and skin consisting of one row of The cells are nearly cubic in form and include the bases of hairs and their thickness is 15 (after the epidermis). The layer of the cortex is made up of two sorts of tissues. The first layer consists of non-stop Columbia tissue with a common thickness of 158Mm and the tissue that comes after it is the Parenchyma tissue whose thickness used to be 226Mm. As for the vascular bundles in this type, they are open and the wide variety of bundles in them is 3 mid-site bundles and two lateral bundles. The wide variety of rows of vascular gadgets (6-8) and the variety of vascular gadgets per row (5-2). The cross-section of the Eriobotrya japonica market had an necessary classification value, as nicely as the structure of the vascular bundle that was once open and the separated bundles and their number, are three bundles one of them is the web page intermediate and two facet bundles and the size of the bundle are

remoted and additionally the collenchyma tissue of the cortex in this kind used to be of the angular collenchyma kind and the thickness of these layers [13]. All qualities have a taxonomic fee in isolation and prognosis of the species. Through this find out about and know-how of the anatomical traits, these features that have been recognized in this learn about can be localized in isolation of the kind and additionally can hyperlink between the anatomical and phenotypic features the place between the researcher [14] for the duration of his announcing it is feasible to acquire an built-in herbal and best classification solely when linking the anatomical data with Observations stemming from phenotypic studies, and this is what used to be emphasised in this learn about and the opportunity of making anatomical records got to serve the plant classification[15].

Table 1. shows the dimensions of the leaf blade of *Eriobotrya japonica* measured

Cuticle thickness	Epidermis thickness		Mesophyll			Vein		
	upper	lower	Palisade layers	Palisade thickness	Spongy layers	Spongy thickness	Rows of Vessels element	Vascular Bundle diameter
(0.9-4.5)	(6-24)	(4-33)	(2-4)	(40-143)	(3-4)	(70-130)	(22-35)	(212-590)
2.7	15	19		92		100		401

Table 2. The quantitative characteristics of *Eriobotrya japonica* stems measured in micrometers.

Cuticle thickness	Epidermis thickness	Cortex thickness	cortex layers		Xylem thickness	Phloem thickness	Pith thickness
			Collenchyma tissue thickness	Parenchyma tissue thickness			
(2.5-9)	(9-12)	(422-612)			(45-90)	(11-22)	(488-500)
5.8	11	517	(66-144)	(85-270)	68	17	494
			105	178			

Table 3. The quantitative characteristics of *Eriobotrya japonica* petiole, measured in Micrometers.

Cuticle thickness	Epidermis thickness	Cortex layers		Number bundle	Number Of rows Vascular units	Number Of Vascular Units per row	Bundle length
		Collenchyma tissue thickness	Parenchyma Tissue thickness				
(1.3-4)	(6-24)						
2.7	15			3	(6-8)	(2-5)	(66-120)
							93

		(95-221)	(119-332)				
		158	226				

. (The values inside the arcs represent the minimum and maximum values and the values outside the arcs represent the mean) .

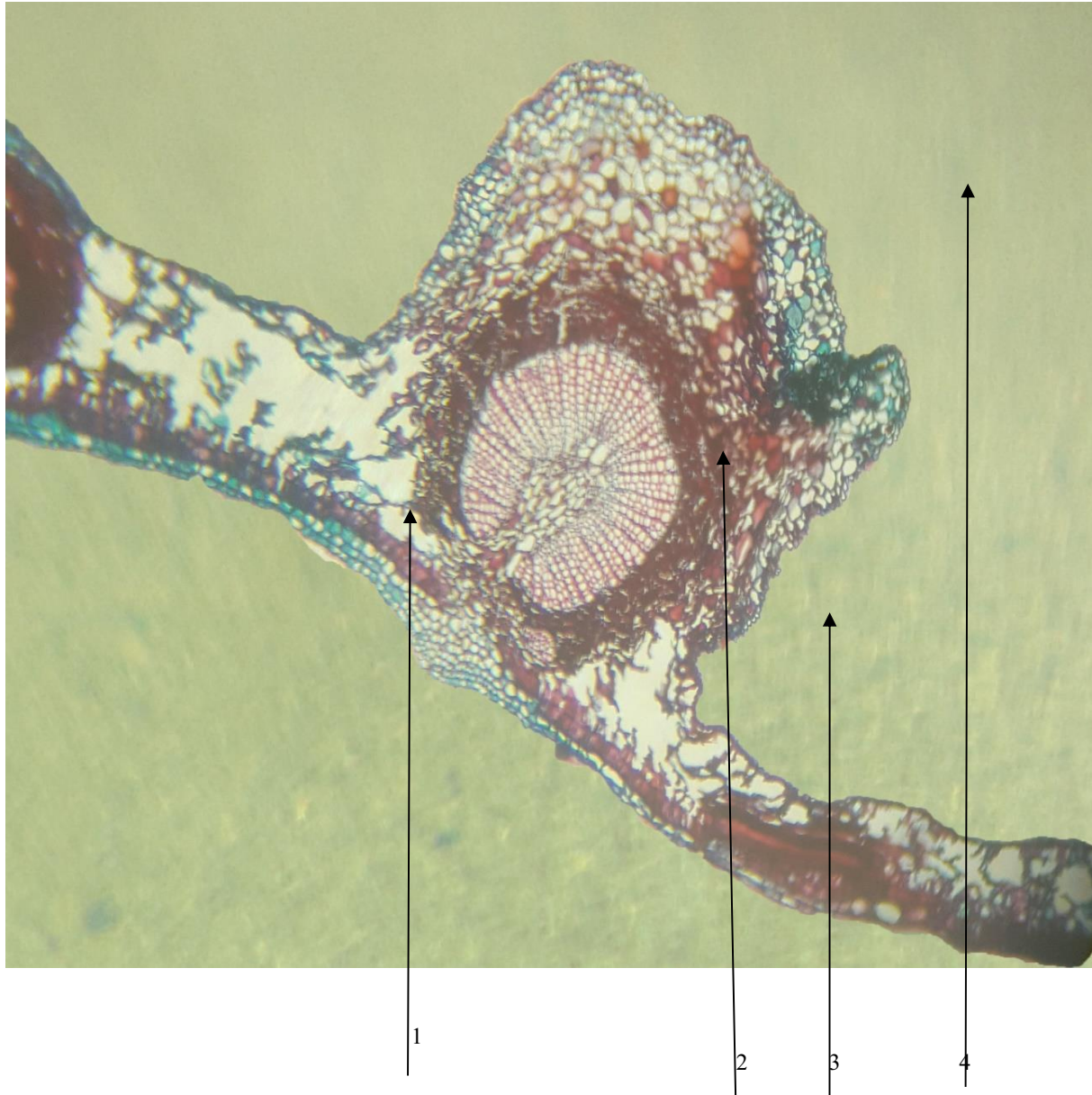


Fig.1. Transverse section of *Eriobotrya japonica* leaf 40 X

- 1-Upper epidermis
- 2- Xylem
- 3- Phloem
- 4-Lower epiderm



Fig. 2. Transverse Section of *Eriobotrya japonica* leaf Mesophyll layers illustrate 40X
1- Palisade layer
2- Spongy layer

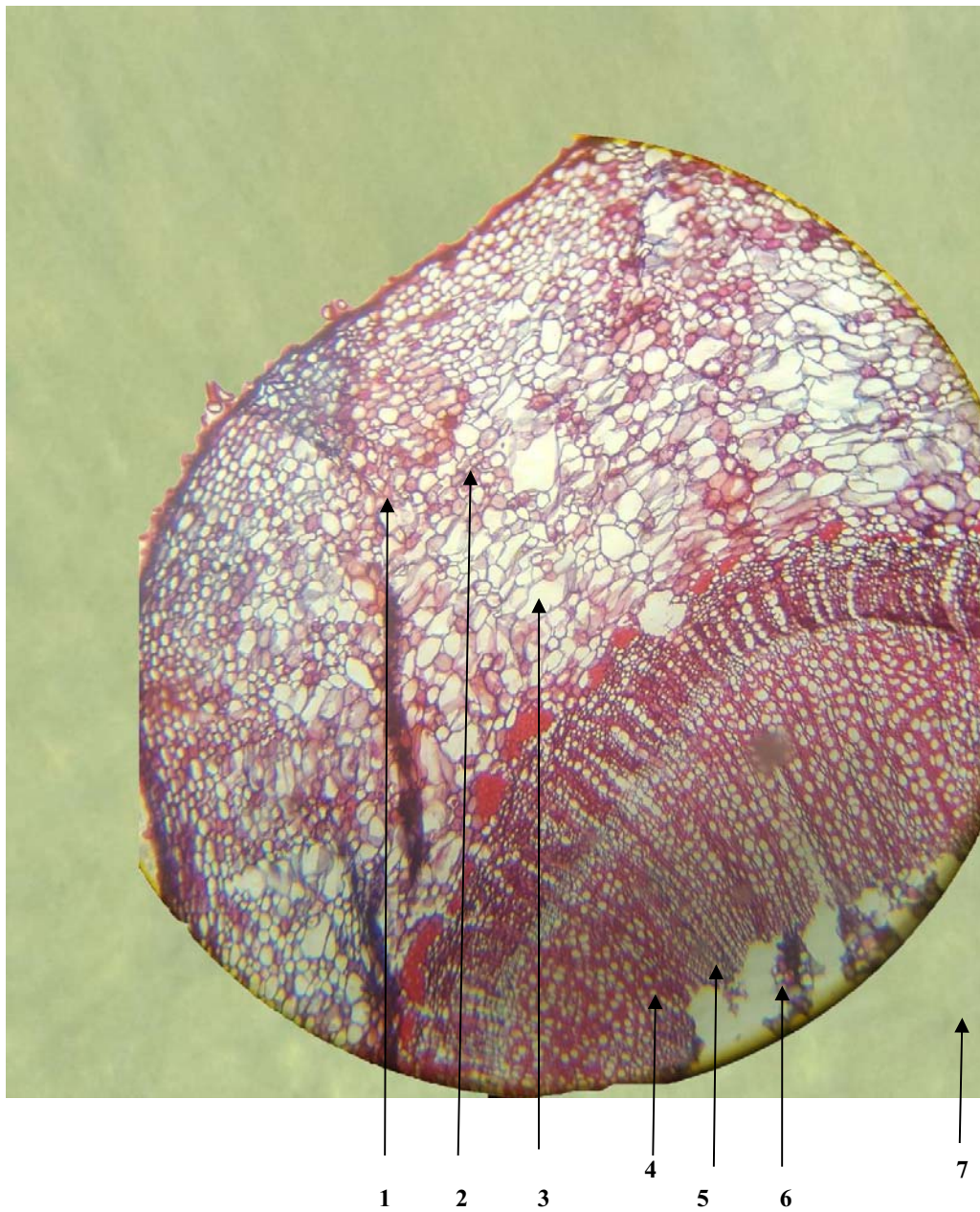


Fig. 3. Transverse section of *Eriobotrya japonica* stem 40X

- 1-Epidermis
- 2- collenchyma } Cortex
- 3- parenchyma }
- 4- phloem } Vascular bundle
- 5-Xylem }
- 6- pith }



Fig. 4. Transverse Section of *Eriobotrya japonica* Petiole 40X.
1-vascular bundle 2- pith 3-phloem 4-xylem 5-cortex 6-Epidermis.



Fig. 5. E glandular trichm of *Eriobotrya japonica* 40X

3.5. Morphological study

Stems & Twig legs and branches

The current study revealed that the stems of the type *Eriobotrya japonica* are cylindrical in shape, solid, and have many erect branches. The quality of the leg is shown in Table (4).

Table 4. Shows the quantitative and qualitative characteristics of the stem for the species *Eriobotrya japonica*

Plant height	Nature of plant	Nature of stem	Branches	Branching type	Branching color
(2-8)m	Trees	Erect	Many	Upper	Green brown

3.6. Leaves.

The leaves are one of the basic physiological axes of the plant as it performs important processes such as photosynthesis and transpiration as it works alongside other plant devices such as wood and bark and contributes to the absorption of nutrients and water from the soil through the roots and allows the transfer of metabolic products from them to the rest of the plant body. *Eriobotrya japonica* leaves are distinguished. It is simple, petiolate, and alternate, and it should be noted that the leaves from the vegetative parts that are more susceptible to environmental conditions and the characteristics that are most exposed to variations are the dimensions of the leaf, then followed by the shape of the blade, its base, its edge and finally the color of the leaf. In this study the shape of the blade was fixed and the table (5) It shows the quantitative characteristics of the leaves of the type [16]. The dimensions of the paper were different in terms of length and width, where the average length of the blade was (260) mm and the average width was (90) mm. The upper, open color in the lower surface, and the shapes and structure of the blades have basic features and have an important role in classification. Acute is sharp, while the edge of the leaf in *Eriobotrya japonica* is serrated, and the edge of the blade is one of the most important characteristics that distinguish the leaves, in addition to its shape. The edge of the blade gave a taxonomic weight no matter what it is not a fixed characteristic for individuals of the same species. As for the leaf base, it was rounded. It was identical to the plant wealth in Iraq [17]. As for the surface covering of the leaves, it was almost smooth on the upper surface and had dense fluffy filaments on the lower surface.

Table 5. Shows the dimensions of the leaf blade for the type *Eriobotrya japonica* measured in MM.

Blade length	Blade width	Average blade length\ Average blade width

(130-390)260	(50-130)90	2.9
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3.7. Petiole

The study of the type *Eriobotrya japonica* showed that the stem is circular in the cross section, but it showed variations in its dimensions, as the stems of this type were short and covered with a capillary covering and the color of the stalk is green or yellowish green. The width of the stem is (5) mm, and the average length of the stalk to the average of the stem width is (2.6) mm

Table 6. Shows the dimensions of the petiole for the type *Eriobotrya japonica* measured in MM.

Petiole length	Petiole width	Average petiole length/Average petiole width
(7-19)13	(3-6)5	2.6

Table 7. The fatty acid present in *Eriobotrya japonica* extract By GC

Fatty acid	Concentration %
Palmitic acid	5.10
Palmitoleic acid	1.74
stearic	3.18
Oleic acid	4.45
Linoleic acid	60.0
Linolenic acid	0.17

The results of the extract of *Eriobotrya japonica* in the gas chromatography device - GC showed that the plant contains several types of fatty acids, where the highest percentage of linoleic acid was 60%. Table (4) Unsaturated fatty acids are important compounds for metabolic processes inside the body of the organism, as Linoleic acid helped expand the respiratory tracts and build red blood cells, and its deficiency leads to high cholesterol in the blood and liver and leads to stunted growth in children [11] Also, fatty acids are anti-inflammatory and prevent type 2 diabetes and prevent high blood pressure [12].

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