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Characterization Of Some Morphological And Anatomical Features In Selected Flowering Plants

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Abstract
In plant taxonomy, morphology and anatomy have historically been the most significant sources of information. Eruca sativa and Cascabela thevetia were examined in this study to characterize some morphological and anatomical features. The results revealed the presence of pentagonal nectar glands in the basal portion of the filaments of E. sativa, In addition to different anatomical features in leaf anatomy. In C. thevetia, leaves features like glossy layer of upper surface and absence of stomata in this surface, poisonous milky sap, calcium oxalate crystals and intercellular spaces may be considered the most important features to make this plant has more adaptations to different environmental conditions and for protection.
Keywords: *Brassicaceae, Apocynaceae, Druses crystals, Laticifers*

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I. Introduction

Popular worldwide, flowering plants are regarded as significant suppliers of nutrients, medicinal compounds, and decorative plants [1].One of the biggest families of angiosperms is Brassicaceae (cruciferae). There are over 338 genera and 3709 species spread across the globe. It has numerous economically significant crop and ornamental species [2] and its floral and fruiting traits make it simple to identify [3].*Eruca sativa* is a kind of annual plant that is a member of the Brassicaceae family. The seeds' abundant fatty acid oils are what make them useful [4].This species of plant is extensively dispersed offers numerous financial and health advantages[5]. This species leaf extract possesses neuroprotective and anti-inflammatory properties[6].

Numerous phytochemicals and significant secondary metabolites are known to be present in this crop [7]. Apocynaceae is regarded as one of the largest families, with five subfamilies, 424 genera, and over 4,600 species [8] This family includes woody plants with milky latex, shrubs, and herbaceous plants. Some of these plants are dangerous, but the majority are decorative [9].Apocynaceae includes the yellow oleander among its many species. The plant *Cascabela thevetia*, also known as *Thevetia peruviana*, is widely grown all over the world[10],This species contains potentially toxic cardiac glycosides that have effects akin to those of the heart medication digoxin[11].Seeds, leaves, fruits, and roots of this plant are thought to be possible sources of physiologically active substances [12] to be used as pesticides [13,14], Fungicides [15,16,17] and antibacterial agents [18,19].This study was conducted to characterize some morphological and anatomical features in both *Eruca sativa* and *Cascabela thevetia.*

II. Material And Methods

Plant parts collection: Fresh samples of the studied two plants were collected from the University of Baghdad and house garden. Free hand Cross sections in plants parts were taken to investigate some anatomical features and read the result by light microscope, In addition to the examination of some morphological features by using dissecting microscope.

III. Results And Discussion

1. *Eruca sativa*

Morphology of leaves and flowers

Leaves arranged alternatively on the steam. Shape of leaves graduated from simple to compound pinnatifid, sometimes it appeared with different lobes. Terminal lobe larger and usually ovate, and the apex is obtuse. Lower leaves have petiole and the upper leaves are sessile (Fig.1).

Figure 1: Leaves shape of *Eruca sativa*

Flowers are cruciform consist from four white to creamy petals, each one with oblanceolate shape and has dark veins on the surface (Fig.2A). Calyx consists from four oblong sepals with simple hairs (Fig.2B). Gynoecium represented by oblong pistil (Fig.2C).

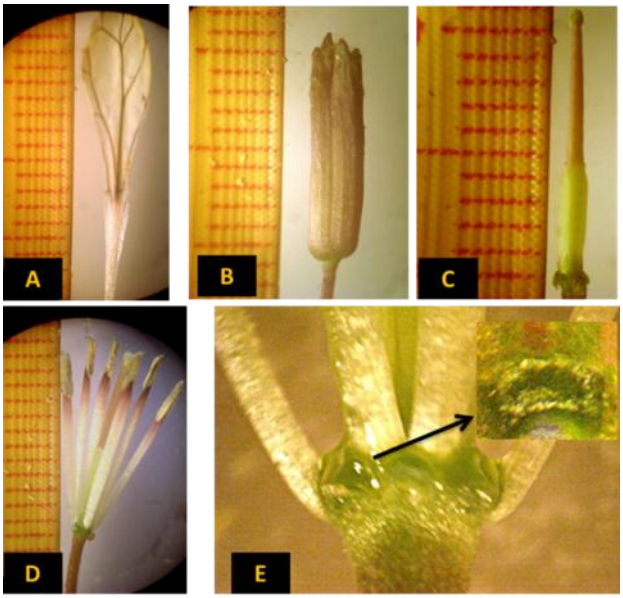

Figure 2: Shape of flower: A.Petal: B. Sepal:c. Gynoecium,D.Stamens: E.Nectar glands

Androecium consists from six yellow stamens with some violet color in both anther and the end of filaments (Fig.2D). Pentagonal nectar glands appeared in the basal portion of the filaments (Fig.2 E).

Leaves and stem cross sections

The cross section of *E. Sativa* leaf revealed the presence of one vascular bundle in the rounded middle vein (Fig.3A). Leaf is dorsiventral type, the palisade layers consist from two rows of columnar parenchyma and the spongy parenchyma, consist from three or four rows (Fig.3B). Qader,2018 illustrated that the spongy layer of this plant consist from one to two layers [20].

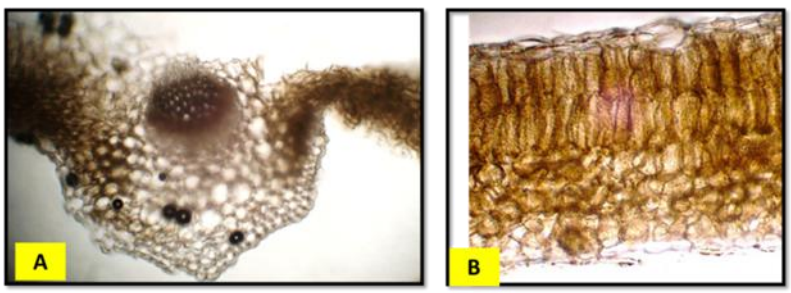

Figure3; A. Cross section in *Eruca sativa* leaf midrib: B. Palisade and spongy layers.200X.

The cross section of *E. sativa* stem revealed the presence of chlorenchyma and collenchyma tissues, and the vascular tissues represented by vascular bundles arranged in continuous ring (Fig.4 A). On the other hand, simple hairs appeared on the surface of stem section (Fig.4B).

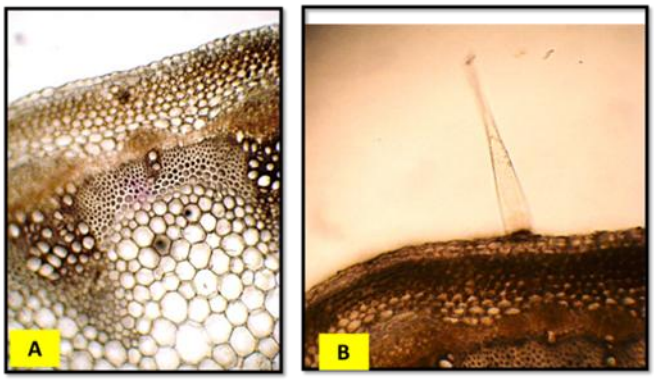

Figure4: A.Cross section in *Eruca sativa* stem:B. simple hair.200X.

2. *Cascabela thevetia*.

Leaf morphology: Leaves are alternate-spirally arranged along the stems and clustered near the tips of stems they are linear or lanceolate in shape. These leaves are hairless with glossy green upper surface, Leaf tips are pointed or acute (Fig.5).

Figure 5: *Cascabela thevetia* leaves

Stomatal complex:

The results showed that there is no stomata in the upper surface of *C. peruviana* leaves (Fig.6-A), whereas in the lower surface the stomatal complex was paracytic type. (Fig.6-B).

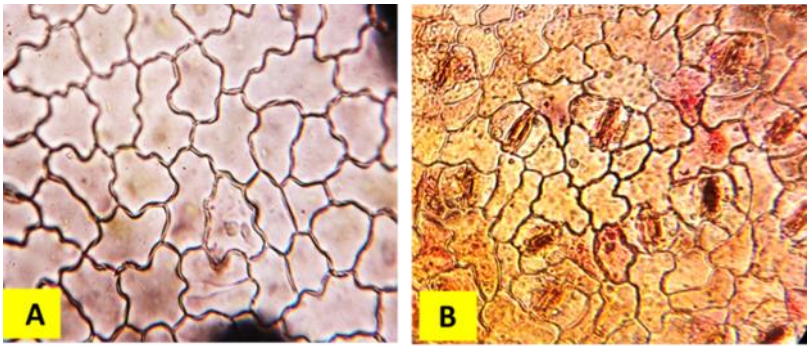

Figure 6: *Cascabela thevetia* leaves surfaces: A-Epidermal cells in the upper surface with no stomata, B-paracytic stomatal complex in the lower surface.200X

Leaves cross sections The upper leaf surface of *C. thevetia* which is more exposed to the sun, has a cuticle layer to limit transpiration by epidermal cells. Leaves consist from palisade layer and spongy layer (Fig.7-A).The upper and lower regions of midrib have lamellar collenchyma(Fig.7-B).On the other hands the results revealed the presence of large intercellular spaces in spongy layer near the midrib(Fig.7-C).

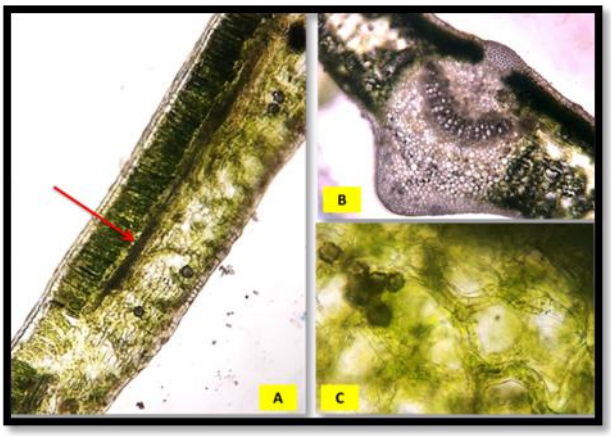

Figure 7: Cross sections in *Cascabela thevetia* leaves: A. palisade layer and spongy layer,(B): midrib with lamellar collenchyma, (C): large intercellular spaces in spongy layer near the midrib.200X.

The cross sections appeared that lactiferous ducts presence across the leaf section (Fig.8A) which produce poisonous milky sap.Yellow oleander leaves have many druses crystals Fig.(8-B).In addition to the presence of prismatic crystals in cross section of petiole and Fig.(8C). In plants, calcium oxalate crystal production seems to be essential for a number of critical processes, such as metal detoxification, herbivore defense, and tissue calcium control [21].

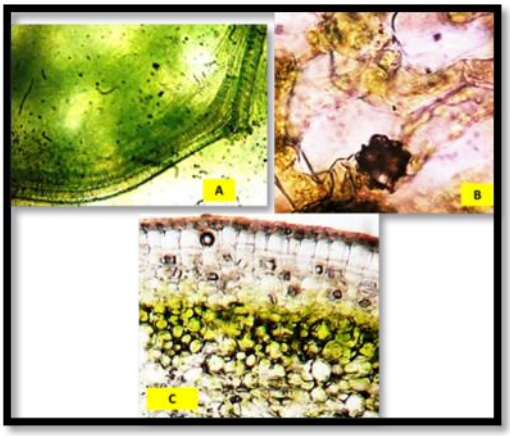

Figure 4: Cross sections in *Cascabela thevetia* leaves: A: lactiferous ducts, B: druses crystals 300X, C: prismatic crystals in cross section of petiole 200X

IV. Conclusions

Leaves features of *Cascabela thevetia* like (glossy layer of upper surface and absence of stomata in this surface, poisonous milky sap, calcium oxalate crystals and intercellular spaces) may be considered the most important features to make this plant has more adaptations to different environmental conditions and for protection.

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