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Introduced in Uzbekistan Conditions *Lagerstroemia Indica* L. Taxonomic Information about the Anatomical Features of Vegetative Organs

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Abstract This article incorporates information from the region of Kashkadarya from the introduction of *Lagerstroemia indica* L. the results of data that were first analyzed about the worldwide distribution of the species as well as the anotomic characteristics of the species are given. Analysis of anatomical data in the shell region as well as studies of the characteristics of the acclimatized species, analytical data on changes in the anatomical characteristics of the species due to the influence of environmental factors are presented. **Methods:** Thin-cut cuts were made. A few drops of 99% ethyl alcohol on the incision were kept in washed water. The alcohol solution was added to soften the tissues, and then 2-3 drops of saffron paint were dripped, after the excess paint was washed off with water, a drop of glycerin was rinsed with distilled water, and a 2-5 cm cut of the leaf epidermis was examined after processing. Micrographs were taken with a computer microphoto attachment with a Canon A123 digital camera under a Motic B1-220A-3 microscope.Linear drawings were obtained using a drawing apparatus in the light of the camera. **Results:** The leaves of Lagerstroemia indica are almost sessile, oblong, elliptical or obovate, almost leathery, fluffy along the veins below. For the first time, the anatomical structure of the vegetative organs of *Lagerstroemia indica* L. was studied under the conditions of the introduction of Kashkadarya, and the diagnostic signs were determined. **Conclusions:** Changes in the structural and functional properties of plants under the influence of environmental factors, the emergence of adaptation mechanisms at different levels, aspects of adaptation to environmental factors have been studied.

Keywords Introduction, Ornamental plants, Vegetative organs, Anatomical structure, Diagnostic signs, Lagerstroemia, Climate

1. Introduction

Indian Lagerstroemia (*Lagerstroemia indica* L.) is a type species of the genus Lagerstroemia L. belongs to the family (Lythraceae J.St.-Hil.), Whose representatives are distributed throughout the globe, with the greatest diversity in the tropics. This beautiful deciduous tree is native to China and is widely cultivated throughout Southeast Asia. The first acquaintance of Europeans with lagerstremia occurred at the end of the 18th century in India, hence its trivial name "Indian lilac". Lagerstremia india is perhaps one of the best flowering woody plants on the Black Sea coast. The culture deserves the attention of breeders, the breeding of winter-hardy forms will make it possible to use this valuable breed in urban landscaping in more northern regions [1].

Its representatives are distributed around the world, with about 50 species widely distributed around the world. *Lagerstroemia indica* L. is an evergreen shrub and darxt in the form of Indian subcontinent, Southeast Asia, Northern Australia and its southern parts, and is also acclimatized in African states, one of the warm-climate regions worldwide [1], [2]. *Lagerstroemia indica* L. to give this species a beautiful view of the surroundings of urban gardens and Acholi houses in the form of an ornamental shrub originally in Nigeria. Pers. and *Lagerstroemia speciosa* L. species begin to be planted. This species is considered economically profitable, and its wood is also used in the preparation of unique furniture, home decor.

In folk medicine, decoctions of flowers and seeds are used to eliminate diseases of species tumors, diabetes mellitus, urinary incontinence. It is used in home conditions for fever and digestive disorders, in the form of decoctions to reduce cholesterol levels, lower blood pressure and lose weight. L.indica L helps prevent erosion in soils where drought is present in large quantities when planted and bovine soil warms up [6]. L. there is little data on the anatomical signs of indica L and its structure. In this regard, there is information in the form of reports from various scientists, including Data

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is provided in [7] work on the location of stomata in the cell of the plant. Insufficient data on the anotomic properties of this species, increasing the relevance of this study, the main goal is L.indica provides an opportunity to tax the anatomical data as well as to study the specifics of the acclimated species in the Chestnut houdis, comparing the changes that environmental factors have affected the anatomy of the species.

The cultivation of wild species in conditions that differ from their natural habitat in nature affects the rhythmological, anatomical and biomorphological processes inherent in the adaptation of plants to a new habitat. Plant introduction testing often refers to the study of plant species diversity within a genus. In this case, information is important not only about biomorphological variability, but also about the anatomical features inherent in the adaptation of plants in a new habitat. The structure of the leaf is determined by the internal laws of the organism, which have developed in its phylogenesis, and not every species is plastic, in which the hereditary reason is expressed. It is known that when plants are transferred from one condition to another, quantitative changes in the anatomical structure of the leaf are manifested and parallelism between modification and hereditary adaptations is revealed [1-2].

The anatomical structure of the vegetative organs of Lagerstroemia indica under the conditions of the introduction of Kashkadarya has not been studied. This determines the relevance and novelty of our research.

The aim of the study is to study the anatomical structure of the vegetative organs of the decorative species Lagerstroemia indica, to identify diagnostic signs and structural features of this species.

2. Materials and Method

Acclimatized L. in the country for research.the leaf and stem of indica were used. The resulting na'munas are mostly derived from their growing location and The anatomical modifications from the methods of Ajayi and others [8] Kadiri and Ayodele [10] to authenticate the assembled herbarium were done using Wilkinson's terminologies. Thin-cut cuts were made. A few drops of 99% ethyl alcohol on the incision were kept in washed water. The alcohol solution was added to soften the tissues, and then 2-3 drops of saffron paint were dripped, after the excess paint was washed off with water, a drop of glycerin was rinsed with distilled water, and a 2-5 cm cut of the leaf epidermis was examined after processing. Greases from the standard median part of the Leaf lamina near the middle on the leaf epidermis [11], [12], [13] were taxied by methods. Take the sample for 8-24 hours to soften the mesophyll. Tissue breakdown the layers of vesicles and epidermis were separated and water was placed for cleaning. Different levels of ethanol droplets of up to 50% -100% were added in turn to dehydrate cells.

The objects of research are the perennial shrub Lagerstroemia indica L. of the genus Lagerstroemia from the family Lythraceae, growing under the conditions of introduction of the Kashkadarya region of Uzbekistan. Along with the morphological description, vegetative organs (leaf, petiole and stem) were recorded in 70° ethanol for anatomical study. For the preparation of sections of vegetative organs, a manual method was used. The epidermis was examined on paradermal and cross sections. The cross-sections of the leaf, stem and root were prepared by hand using a safety razor. Cross-sections of the leaf are made through the middle, and the petiole and stem are made through the base. Sections were stained with methylene blue and safranin, followed by gluing in glycerol-gelatin [4]. Descriptions of the main tissues and cells are given according to K. Esau (1969), N.S. Kiseleva (1971), epidermis - according to S.F. Zakharevich (1954). Micrographs were taken with a computer microphoto attachment with a Canon A123 digital camera under a Motic B1-220A-3 microscope. Linear drawings were obtained using a drawing apparatus in the light of the camera.

3. Results and Discussion

The leaves of Lagerstroemia indica are almost sessile, oblong, elliptical or obovate, almost leathery, fluffy along the veins below. On the paradermal section, the outlines of epidermal cells on the adaxial side are rectilinear, the projection is polygonal, the abaxial one is slightly tortuous, the projection is polygonal. The cells of the adaxial (upper) epidermis are larger than those of the abaxial (lower) epidermis. On the adaxial structure of the leaf epidermis there are numerous mucus passages than the abaxial one. Adaxial and abaxial leaf epidermis are pubescent with simple, unicellular trichomes (Figure 1).

Leaves are hypostomatic - the stomata are located on the abaxial (lower) side of the epidermis of the leaf blade and are located transversely to the longitudinal axis of the leaf. All this leads to a reduction in water loss from the leaf surface. The shape of the stomatal cells (from the surface) is oval; the stomata are of the lenticular-equally thickened type, in which two identical crescent-shaped cells are arranged symmetrically [8]. On the frontal plane, the thickened shells are almost uniform. The slit is fusiform. The stomata are not submerged, of an anocytic type (Figures 1, 2).

Leaf mesophyll on a cross section of the dorsiventral type [9], which is represented by palisade cells located under the upper epidermis of the leaf mesophyll, spongy cells - above the lower epidermis of the leaf mesophyll. The epidermis is represented by one row of cells with a thin-walled cuticle layer. The cells of the adaxial epidermis are larger than those of the abaxial epidermis. Assimilation tissue, consisting of palisade and spongy cells, is located between the adaxial and abaxial epidermis.

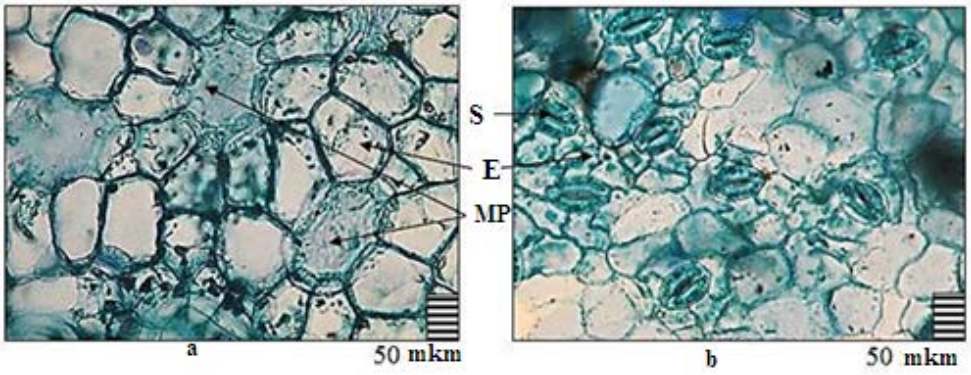

Figure 1. Anatomical structure of the epidermis of the Lagerstroemia indica leaf in a longitudinal section: a - upper (adaxial) epidermis; b – lower (abaxial) epidermis. Legend: MP - mucus passages, S – stomata, E - epidermis

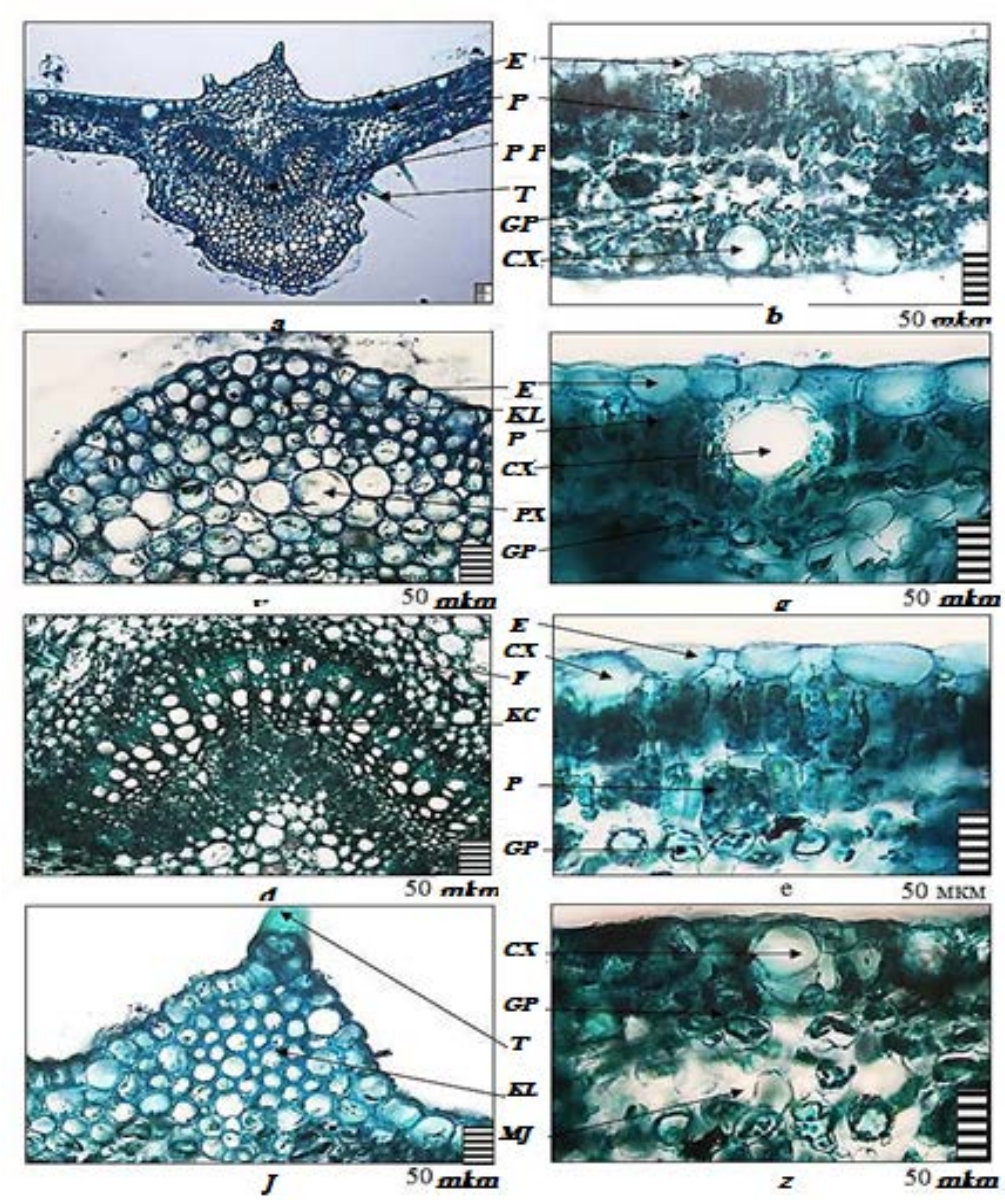

Figure 2. Anatomical structure of the Lagerstroemia indica leaf in a cross section: a - detail of the main vein of the leaf; b - detail of the leaf mesophyll; c - epidermis and collenchyma; d - mucus passages; e - conducting beams; e - epidermis and palisade parenchyma; g - epidermis and collenchyma; h - mucs passages and spongy parenchyma

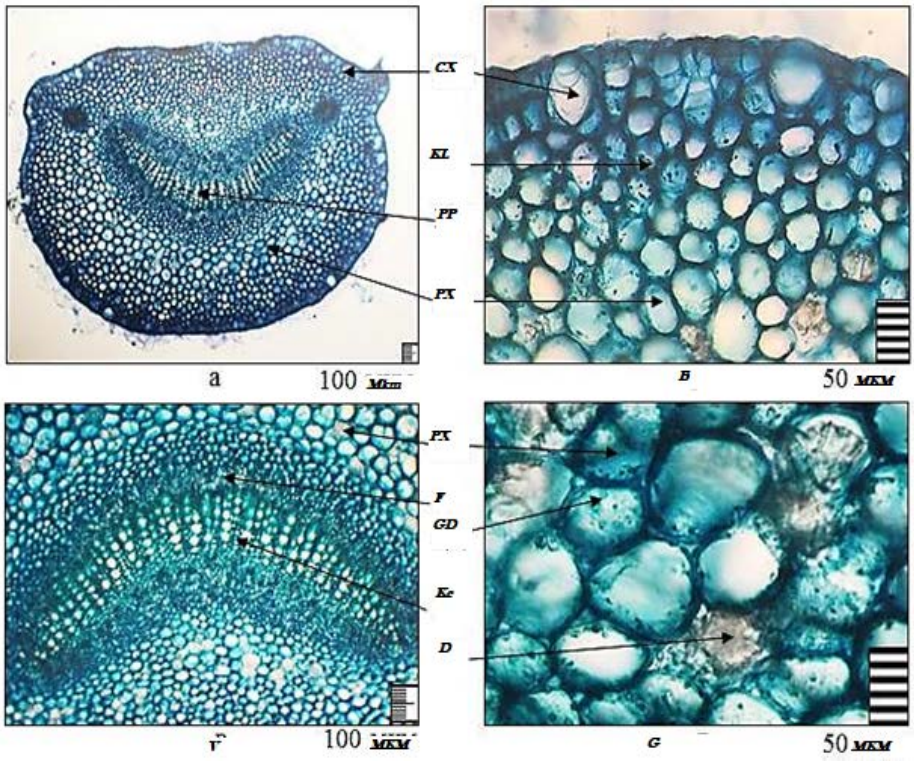

Figure 3. Anatomical structure of the leaf petiole of Lagerstroemia indica in a cross section: a - general view; b- - epidermis and parenchyma;c - conducting beam; d - parenchymal cells and druses of calcium oxalate. Legend: HD - hydrocytic cells, D - drusen, CL - collenchyme, Kc - xylem, PP - conductive bundle, CX - mucus passages, F - phloem

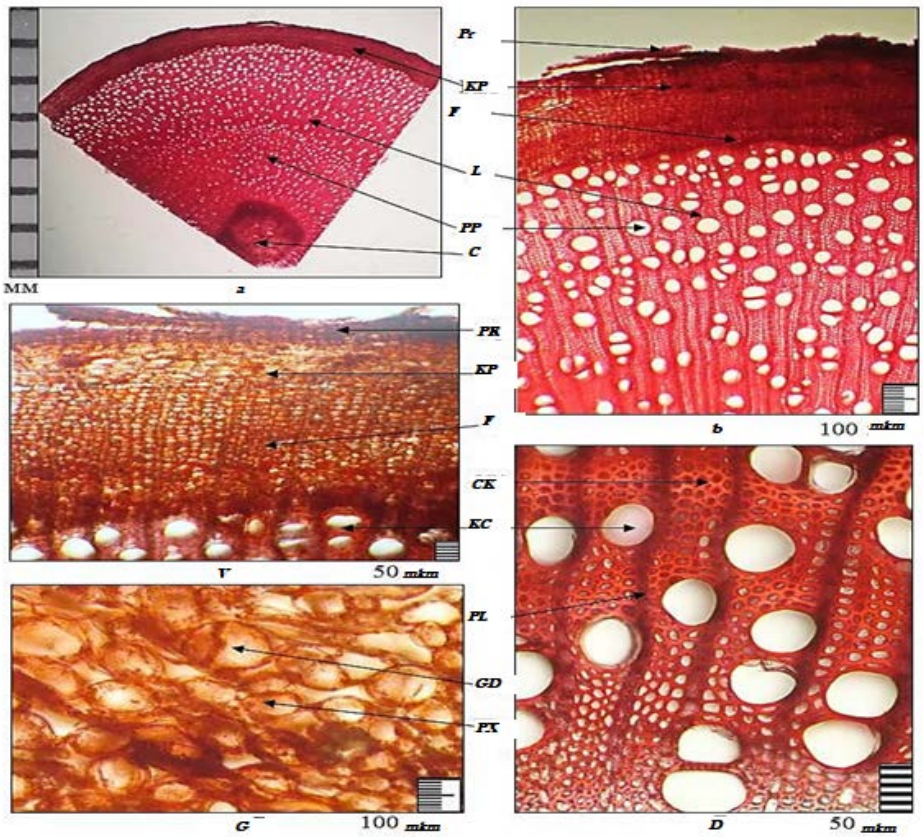

Figure 4. Anatomical structure of the stem of Lagerstroemia indica in a cross section: a - general view of the stem; b - detail; c - crustal parenchyma; g - core; e - secondary conducting beams. Legend: HD - hydrocytic cells, CP - crustal parenchyma, Kc - xylem, L - libriform, RL - radial rays, PP - conducting bundles, Pr - periderm, C - core, SC - sclerenchyma, F - phloem

The palisade parenchyma is located under the adaxial epidermis. The palisade parenchyma is the most chlorophyll-bearing, large and elongated, which consists of 2 rows of cells and is located between the adaxial epidermis and the spongy parenchyma. The spongy parenchyma is chlorophyll-bearing, consists of 5-6 rows and is located between the palisade parenchyma and the abaxial epidermis. The spongy parenchyma is round, large and small cells with large intercellular spaces. Medium palisade and spongy cells localize numerous mucus passages, which are schizogenic containers, consist of long canals, rounded-oval, closed cavities or individual cells filled with mucous substance. Mucus has the property of retaining a significant amount of water (sometimes with minerals), which is of great importance for this species growing in arid conditions of Kashkadarya. Numerous lateral vascular bundles with 3-4 small vessels are located between palisade and spongy cells (Figure 2).

The main vein of the leaf protrudes on the abaxial side. Under the adaxial and abaxial epidermis, in the costal parts of the leaf, there are 4-6 row lamellar collenchymes. The rest of the vein is occupied by the main parenchyma, into which one conductive bundle is immersed; the cells of the parenchyma are thin-walled, rounded-oval in shape, among which there are hydrocytic cells. Conductive bundles of a closed bicollateral type, consisting of phloem and xylem. Xylems are thin-walled, elongated. Their walls are thickened in the form of spirals (Figure 2).

Numerous druses of calcium oxalate were found in parenchymal cells, which have spherical formations consisting of many small accrete crystals, as well as hydrocytic cells are found in the parenchyma (Figure 3).

The base of the stem in the cross section is rounded, of the bundle type, divided into three topographic zones: the periderm (cork), the secondary cortex, and the central cylinder. The cork consists of several rows of radially arranged cells with thick corky membranes. Its cells are dark cinnamon, thick-walled, tightly closed.

Outside, when dividing by tangential partitions, phellogen cells form cork cells, and inside - phelloderm cells. Under the peridermis, there is a rounded-oval secondary crustal parenchyma, which consists of 4-5 rows. The phloem is extensive, located between the bovine parenchyma and the libriform (Figure 4).

The wood is disseminated vascular, consists of vascular segments, fibrous elements, woody, radial parenchyma and occupies most of the cylinder surrounding the pith, which is located in the center in the stem. Primary conductive tissues are preserved in the stem, and then the secondary ones immediately form a solid cylinder, which looks like an almost solid ring on the cross section.

Secondary xylem that occupies most of the stem. Radial rays are 1-2 row, their cells are elongated, filled with tannins. The core is not wide, represented by large and small round-oval, thin-walled parenchymal cells and they contain hydrocytic cells (Figure 4).

Thus, the anatomical structure of the vegetative organs of Lagerstroemia indica was studied and the following diagnostic signs were determined. The leaf contains the dorsiventral type of leaf mesophyll; thick-walled outer walls of the epidermis; hypostomatic leaves; non-submerged stomata; chlorophyll-bearing palisade and spongy parenchyma; closed bicollateral type of conducting bundles; the presence of numerous mucus passages. In the petiole - beam type of structure; rounded-oval, thin-walled parenchymal cells and they contain hydrocytic cells; closed bicollateral type of conducting bundles; the presence of numerous mucus passages and druses of calcium oxalate. In the stem - bundle type of structure and more lignified; extensive libriform; the radial rays are elongated and short; the phloem is extensive, located between the cow parenchyma and the libriform; the core is not wide, represented by large and small, rounded-oval, thin-walled parenchymal cells and they contain hydrocytic cells [14].

The identified diagnostic features reflect more xeromorphism of this species under conditions of introduction. All characters were compared, and we concluded that the anatomical features of the leaf, petiole and stem can be useful in providing diagnostic features to distinguish the studied taxa [15]. The results obtained indicate that this species is more adapted to the natural and climatic conditions of Kashkadarya and show signs of drought resistance.

4. Conclusions

The article presents the results of studying the perennial ornamental shrub *Lagerstroemia indica* L. introduced in the Kashkadarya region.

For the first time, the anatomical structure of the vegetative organs of *Lagerstroemia indica* L. was studied under the conditions of the introduction of Kashkadarya, and the diagnostic signs were determined. Changes in the structural and functional properties of plants under the influence of environmental factors, the emergence of adaptation mechanisms at different levels, aspects of adaptation to environmental factors have been studied. On the basis of diagnostic features, a high xeromorphicity of this species, its full adaptation to the arid conditions of the Kashkadarya region, was established.

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