



Morpho-Anatomical Studies Of *Lagerstromia Parviflora* (Roxb. Pl. Cort. 66.1795 Wight). An Important Medicinal Plant, Chittor Dt. Of Andhra Pradesh, India

¹V. Naga Padmavathi and ²G.S.Ranganayakulu

¹Dr. V. Naga Padmavathi, Lecturer in Botany, SRR& CVR Government degree college, Vijayawada, Andhra Pradesh, India.

²Dr. G. S. Ranganayakulu, Assistant Professor, Dept of Botany, Rayalaseema University, Kurnool-518007, Andhra Pradesh, India.

Abstract: *Lagerstromia parviflora* belongs to the family Lythraceae and widely used for various ailments as ethno medicine in and around Chittor Dt. of Andhra Pradesh. In this present study based on morpho anatomical studies of root, stem and leaf, in order to provide a scientific basis we authenticated that the *Lagerstromia parviflora* is an important medicinal plant. The medicinal properties and other taxonomical, microscopical characters confirmed that *L. parviflora* has apparent anatomical distinctiveness and peculiarities which differentiate with any adulterant taxa and other important things were discussed here.

Key words: *Lagerstromia parviflora*, Morpho anatomy, Adulteration.

I. Introduction:

Systematic taxonomical identity is most prerequisite criteria for specific species of plant to knowing the medicinal and other importance of particular plant taxa. Because now a days somany similar plant drugs available in market. So overcome duplications we have to examine and identify plant species through systematic taxonomical classifications, then only we will get authentic plant drug. If the plant identityfication is incorrect, the entire work on that plant species becomes invalid (Tulasi Rao et al., 2012). Sivaji et al., (2012) and Ramesh et al., (2013) worked on the taxonomic ambiguity and adulteration of phytodrugs in many number of medicinal plant species. In this present study we did botanical investigation of *Lagerstromia parviflora* due to presene of high ethnobotanical claim by the tribal and local people. The plant is widely used by tribal women to help them overcome lactation issues. According to conventional wisdom, the entire plant can be used to cure gastrointestinal strangulation and syphilis. This herb can also efficiently manage coughs, fevers, asthma, and bronchitis (Chaudhari 1993, Krishen, 2013). Morphological and microscopical

studies of Root, Stem and Leaf were done as an attempt to establish genuine morpho-anatomical characterization and to differentiate with other adulterated speculated species. *Lagerstroemia parviflora* Roxb is a medium-sized tree, indigenous to India. it is widely cultivated throughout India as a medium, sized deciduous plant, available even up to a height of 900m in the Himalayas. The tree is tall around 15-18m in stature until just now, this plant has been used in India to cure a variety of ailments. The observed adulterants of *Lagerstromia parviflora* are *Simarouba glauca* DC. Simaroubaceae *Aglaia elaeagnoidea* (A. Juss.) Benth. and *Walsura trifoliata* (A. Juss.) Harm. of Meliaceae and *Lagerstroemia indica* L.- Lythraceae.

Taxonomic description of *Lagerstromia parviflora* Roxb. Pl. Cort. 66.1795; Wight

Family : Lythraceae, Common names are crape flower, small flowered crape myrtle, ben teak, *Lagersromia parviflora* is a large deciduous tree, upto 15-30 m high. Leaves simple, opposite; intrapetiolar stipules are present. Leaf lamina 3.5-7.5x2-3 cm, elliptic-ovate, margin entire, acute, glabrous, leathery; side veins 5-9 pairs, prominent. Flowers hermoproduct, short lived in dense showy masses, white, fragrant in lax lateral branches. Calyx lobes 6, tubular, glabrous, persistent in the fruit. Corolla with 6 petals, up to 6 mm long. Stamens numerous, 6 outer stamens longer than the rest, at the base of the corolla stamens are attached, exserted. Ovary half-superior, 4-6 locular, ovules numerous per locule, axile; style curved; stigma capitate. Fruit a leathery capsule, surrounded by persistent sepal cup, oblong, 3x1.5 cm, 3-4 valved, ovoid, woody, brown. Seeds numerous. Flowering and fruting April-February. Ethnobotanical documentation in Chittor Dt. Revealed that *Lagerstromia parviflora* is a potential plant which brought the interest to investigate.

II. Materials and methods:

Collection of plant material: Plant material of *Lagerstromia parviflora* were collected from Sadasivakona, Talakona, Nagapatla reserve forest near Tirupati; Avacharikona, Vedapatasala, Kakulakonda, Kumaradhara theertham, Tirumala.

Identification of the plant was done by the author. Perusal of standard literature (Gamble, 1915, Madhavachetty et al ,2018) collections from the herbarium of Botany Department, S.V University, Thrupati.

III. Results and discussion:

Our studies reveals that the *Lagerstromia parviflora* differentiate with other taxa based on macroscopic, microscopic features (anatomy of root, stem and leaf) powder microscopy, cell inclusions, and measurements of different tissue systems cells.

Macroscopic characters:

Macroscopic studies reported are as follows:

Leaves are simple, Flowers white, in lateral branches. Sepals tubular, 6 lobed and persistent and covered in the capsule. Corolla with 6 petals. Stamens numerous. Fruit leathery capsule with persistent sepal cup Root is yellow thick characteristic smell and bitter taste. Stem is hard light brown, bitter taste. Leaf ovate-elliptic, green, no characteristic smell and lite bitter taste.



Fig.1.Morphology of *Lagerstromia parviflora*

Morpho-Anatomical studies

Anatomy of root:

The root is 1.2 mm in size. The root consists of outer broken and fissured epidermis, continuous secondary phloem and thick wide and dense secondary xylem cylinder. Inner to the epidermis is a welldefined periderm which includes horizontal rectangular tissues of suberin containing phellem. There are three or more parenchymatous layers of cortex inner to the phellem.

Secondary phloem: Secondary phloem is wide and modified into external collapsed phloem and internal non collapsed phloems. The collapsed phloem includes several discontinuous of fibers arranged in successive cylinders. In between the segments of fibers occur collapsed sieve elements. At the end of the boundary of the collapsed phloem occurs a noncollapsed phloem elements small, rectangular and are arranged incompact radial lines. The sieve elements corners companion tissue is present. These are phloem parenchyma cells which are angular and some of the cells possess druses.

Secondary xylem: It is a dense thick cylinder lacking central pith. It includes solitary oval or circular or radial multiples of vessels, lignified fibres and straight xylem rays. The xylem fibres are present in radial files. The xylem fibre cells possess starch and crystals of oxalates of calcium.

Anatomy of stem

The young stage of the stem is roughly rounded in out line, 1.7-2.0 cm in diameter. The young stem consists of thin epidermis, thick cortical ground tissue, bicollateral vascular cylinder and wide pith. The layers of the epidermiswith spindle shaped tissues. Six or seven layers of collenchyma cells with uniform wall thickness are present below the epidermis; inner to the colleen chymatous cortical zone is an endodermal layer and wider and smaller angular compact parenchyma cells lying inner of the endodermis.

The vascular portion of external phloem and internal phloem, in between which occupies thick xylem cylinder. The outer phloem is thick and continuous cylinder comprising angular elements arranged in compact radial files. The phloem includes phloem rays, sieve elements, parenchyma cells companion cells and phloem rays. The elements of phloem are in small discrete units. The pith is broad and includes circular parenchyma cells.

Thick old stem

The thick stem measures 3 mm in size. The stem includes thick periderm, narrow cortex and thin continuous cylinder of vascular tissues enclosing narrow central small pith. The epidermal layer and outer cortical tissues are peeled off due to formation of the periderm. The periderm includes outer part of phellem; the inner phelloderm is not evident. The phellem includes six layers of rectangular or squarish cells arranged in radial files and circles. The tangential phellem walls are lignified and other is suberised. The lignified phellem cells are phelloid cells.

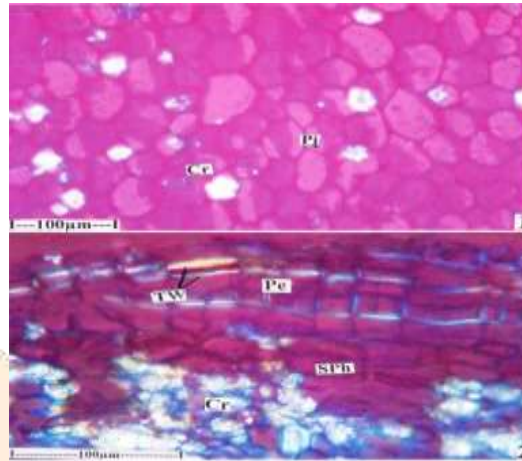


Fig.2. Anatomy of stem

Two or three rows of cortex with cylindrical tangentially elongated cells and the cells beneath are angular, compact and thin walled. The cortical cells have dense accumulation of calcium oxalate crystals.

Secondary phloem: It is a cylinder encircling the xylem portion. The phloem includes outer layer of wide squarish sclereids and the rest of the region consists of small phloem elements and phloem parenchyma cells arranged in compact radial lines.

Secondary xylem: It is a thick cylinder and includes central wide cylinder and outer wider cylinder. The central cylinder has smaller vessels which are diffuse in distribution. The outer cylinder of xylem has wider vessels which are solitary or radial multiples of three or four vessels. Wider fibers of xylem contain prominent lumen. Rays of xylem are distinct, straight and include small thick walled cells. The outer vessels are 50 µm wide.

Leaf anatomy:

The leaf is with biconvex midrib and thin lamina. The main vein has an adaxial broad and short hump. The abaxial part has broad and thick, flat midrib. The adaxial hump consists of a narrow region of collenchyma cells. The abaxial flat thick region has thin epidermal layer, and 5-6 layers of angular thick walled sclerenchymatous zone. The vascular strand includes a broad semi-circular main bicollateral vascular strand and secondary phloem tissue occurs in between the cylinders of fibres a small flat horizontal adaxial vascular bundle. The main vascular strand includes thick walled ground tissue in which there are numerous radial lines of radial multiples of vessels with the protoxylem directed towards adaxial side. Adaxial and abaxial areas of the xylem strand lies the thin continuous layer of the phloem.

The adaxial vascular strand is smaller and occurs in small segments. It consists of adaxial part of fibers and a few vessels (xylem) which are scattered. On the upper and lower parts of xylem occurs a thin layer of phloem.

Crystals of oxalate of calcium are present in the central part of the parenchymatous ground tissue and phloem region. The phloem parenchyma cells have minute crystal particles, whereas in the ground parenchyma is prominent druses. These crystal bodies are uniseriately arranged.

Lateral vein:

The side vein is plano-convex and measures 400 μm thick. The tissues of the adaxial epidermis are little larger, squarish and have cuticular layer. The tissues of the lower epidermis are small, thick and bear short unicellular non-glandular trichomes.

Lamina:

The lamina is bifacial and dorsiventral. It is 300 μm in thickness. The adaxial epidermis layer has wide squarish thin-walled cells and very thick cuticle. The abaxial epidermis has small circular cells and bears short cylindrical unicellular thin-walled nonglandular trichomes. The trichomes are up to 50 μm long and 10 μm thickness. Upper palisade layers and lower parenchymatous spongy tissues are present in the mesophyll zone. The palisade layer with about six rectangular cells in each vertical row and the tissues are compact and dense. The tissues of the spongy parenchyma are small, spherical, linked with one another resulting in the formation of large air-chambers.

Powder microscopic studies:

Powder microscopic studies of selected plant species were done by the following phyto-drug powder samples and also light grinding of the herbal powders using maceration fluid of Jeffery's (Johansen, 1940)

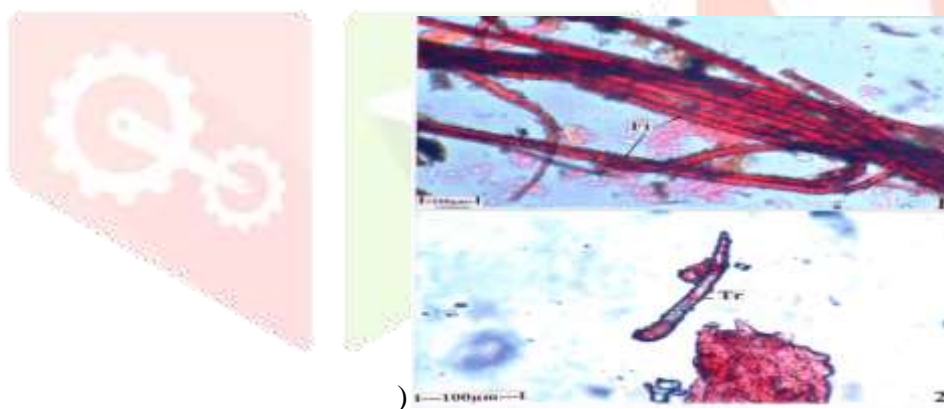


Fig.3. Powder microscopic studies *Lagerstromia parviflora*

VI. Summary and conclusion:

The characteristics of anatomy of species are used for distinguishing species close to each other and to confirm the deemed status of many plant species (Eltahir et al., 2018). *Lagerstromia parviflora* is a rare species in Chittoor district is known for its ethno-medico-botanical relevance. Few studies have been carried out by other researchers which have fragmentary information on specific parts. No Morphological and anatomical studies have been done till date. Our investigation highlights the botanical standardization of whole plant of *Lagerstromia parviflora*, which is claimed as potent ethnomedicinal plant in the form of drug. This work presents a descriptive study of the morphoanatomical characters of vegetative parts viz., Root, Stem and Leaf. Photo-micrographs of Transverse sections show distinct characters which authenticate the identification of *Atalantia racemosa*. We conclude that, the Morphoanatomical findings viz., Xylem and

phloem fibers, vessel elements, epidermal tissues, calcium oxalate crystals, trichomes, and unique foliar architecture with micrographic information which has provided taxonomic value for identifying and classifying the desired plant taxon to the other against adulteration.

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