

PHARMACOGNOSTICAL INVESTIGATIONS OF *CORALLOCARPUS EPIGAEUS(ROTTLER) C.B.CLARK*

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ABSTRACT

The medicinal herb *corallocarpus epigaeus* (ROTTLER) C.B.CLARK, family cucurbitaceae was evaluated for its pharmacognostical standards. The investigations carried out with macro and microscopical characters of entire parts of the plant like tuber, root, stem and leaf. physical constants like ash value and extractive values were determined. Results indicated that these microscopical features can be kept as pharmacognostic standards for identifying this plant species.

Keywords: *Corallocarpus epigaeus*, anatomy, ash values, microscopy.

INTRODUCTION

The genus *corallocarpus* contains about 43 species of tendril-bearing climbing herbs, distributed in tropical Africa, Persian gulf region, and India. Root of this species occurs in many parts of India, is yellowish white, marked externally with circular rings. It has a bitter and sub-acid taste and is credited with alterative and laxative properties, and is used in syphilitic rheumatism, later stages of dysentery. It has no apparent effect on acute dysentery. It is made into a liniment and used externally in chronic rheumatism. The root contains a bitter principle allied to bryonin. In the Deccan and Mysore the root has a repute as a remedy for snakebite administered internally and applied to bitten part.^{1,2.}

EXPERIMENTAL

Material and Method:

The entire parts of the plant were collected from vasudevanallur, Tirunelveli, India during the month of February 2006 and identified by a senior botanist of government siddha medical college, palayamkottai, Tirunelveli.

Microscopical Determination:

The various parts leaf, stem, root and tuber were cut and removed from the plant and fixed in Formalin : Acetic acid : Ethyl alcohol 70% (5 :5 : 90). After 24 hours of fixing, the specimens were dehydrated with graded series of Tertiary butyl alcohol (TAB) as per the schedule given by sass³. Sections were taken by the use of rotary microtome (LEICA RM, 2135, GERMANY) and stained by various reagents like toluidine blue, safranin, fastgreen, Iodine in potassium iodide etc. The microscopic sections were observed and studied⁴⁻⁶. The details of various tissues are given in figure number

Physical Constants:

The shade dried coarsely powdered material were subjected to the determination of ash and extractive values as per the standard procedures.^{7-9.}

RESULTS AND DISCUSSION

TUBER. (Fig.- 2):

Yellowish brown tuber is spherical on upper part and becomes abruptly tapering below into narrow conical tap – root system. The root- tuber is “napiform”. The surface has numerous membranous remnants.

LATERAL ROOT:

Lateral adventitious roots are cyclindrical, thin, sparsely branched and soft, arise frequently from lateral part of the tuber. Lateral roots are thin and not storage in functions, circular in cross sectional outline with shallow fissures. It has a superficial, uniform thin and continuous periderm of 50µm wide. Inner to the periderm a narrow cortical zone of four or five layers of small angular parenchyma cells are present, in vascular bundle, cleaved radially into six or more radial segments of xylem-phloem.

TUBEROUS ROOT. (BASAL TAPERING PART). (Fig.- 4):

Tuberous root exhibits anomalous features. The central core of the root has about 12 circular nodules of vascular tissues and each nodule has a central cluster of xylem elements with radiating rows of compact, rectangular cells where phloem elements are dispersed. There are about 12 radially stretched discrete secondary xylem-phloem segments are present externally to vascular nodules. Secondary xylem portion has wide, circular, thin walled solitary vessels ensheathed by xylem fibres. Parallel, rectangular, and compact parenchyma cells are present in xylem rays, which is present in between the radial segments of vascular tissues. Compact tangentially oblong periderm is present on the superficial part. Phellem cells which possess suberised walls and a few layers of less conspicuous phelloderm.

TUBEROUS PART OF THE ROOT:

Wide continuous periderm is present superficially. Parenchymatous tissues are present internally. Central part of the tuber contains several radial thin lines of xylem elements. Major portion of the tuber has compact, thin walled parenchymatous tissue, where small nest of phloem is seen peripherally.

CELL INCLUSIONS:

All the parenchymatous cells are filled with simple or compound type of starch grains. Simple starch grains are 20µm wide, circular and concentric with central hilum, showing X shaped dark lines when viewed under polarized light microscope. The compound starch grains are 10×25µm in size, combined into an elliptical mass. Small prismatic calcium oxalate crystals are present in middle part of the periderm.

STEM.(Fig.- 3).

Stem consists of a thin continuous layer of epidermis with elliptical thin walled narrow cells. Three or four layers of outer parenchyma cells and two or three layers of sclerenchyma cells are present in cortex. Vascular system consists of several discrete vascular bundles. Those bundles towards the periphery are smaller, and the bundles in the centre are longer. Each vascular bundle is bicollateral having middle xylem elements and outer and inner phloem elements. Bicollateral bundles are oriented in such a way that the protoxylem elements are directed towards the centre.

PETIOLE:

Slightly broader at one end than the opposite side. It is 800µm× 1.3mm in size. Epidermal layer consists of squarish, thick walled cells. The ground tissue contains about three outer layers of collenchyma cells and wide thin walled compact angular parenchyma cells. There are about seven discrete vascular bundles arranged as a ring around the central part. These vascular bundles are collateral having middle xylem and outer and inner phloem elements.

LEAF. (Fig.- 5):

The leaf is dorsiventral with prominent midrib and dense epidermal trichomes on both surfaces. The midrib is planoconvex with flat adaxial side and broadly convex abaxial side. Adaxial epidermis is thin with narrow tabular cells and abaxial epidermis has small, thick walled squarish cells. The palisade layer of the lamina is horizontally transcurrent along the adaxial part of the midrib. Single arc shaped vascular bundle is present in the upper part of the midrib. The ground tissue of the midrib is parenchymatous, with circular compact cells.

LAMINA:

Lamina is 130µm thick. Adaxial epidermal layer has wide rectangular cells with thin walls. Abaxial epidermis is thin with narrow oblong cells. Mesophyll tissue consists of adaxial band of short, wide, compact palisade cells and abaxial zone of four or five layers of lobed spongy parenchyma cells. The leaf margin is blunt and straight. It has narrow epidermal cells and mesophyll tissue similar to mid part of the lamina.

EPIDERMAL TRICHOMES:

Non glandular epidermal trichomes occur on both sides of the leaf. The trichomes are multicellular, uniseriate, unbranched hairs broad at the base and pointed at the tip. The trichomes usually arise from a rosette of subsidiary epidermal cells. The walls of the trichomes are smooth and thin.

STOMATA:

Stomata occur only on the lower side of the lamina. Stomata are ranunculaceous or anomocytic type. There are no distinct subsidiary cells for the stomata. The guard cells of the stomata are two types. Some stomata are elliptical shape with bean shaped guard cells and the others have two horse-shoe shaped guard cells with wide circular stomatal aperture. The epidermal cells are amoeboid in outline with thin wavy anticlinal walls.

CYSTOLITH:

Calcium carbonate crystals called cystoliths are abundant in the epidermal cells, especially those epidermal cells that surround the epidermal trichome. The cystoliths occur in group of three to eight cells. One cystolith occurs in each cell. The cystoliths are large, smooth, circular to triangular and appear dark after staining.

CONCLUSION.

In conclusion, the present study on pharmacognostic standards of *Corallocarpus epigaeus* (ROTTLER) C.B.CLARK, will be providing useful information in regard to its correct identity and help to differentiate from the closely related other species of *Corallocarpus* **Napiform** root tuber and the bicollateral vascular bundle having middle xylem elements and outer and inner phloem elements are the important characteristic features of *Corallocarpus epigaeus* (ROTTLER) C.B.CLARK. The presence of multicellular, uniseriate, nonglandular epidermal trichomes is an important observation in the leaf. The other parameters observed may be useful for the future identification of the plant.

Table-1.: Organoleptic characters of powder.

Colour	Yellow
Odour	Odourless
Taste	Bitter
Texture	Coarse

Table-2 : Analytical values of *Corallocarpus epigaeus*.

Parameters	Values expressed as %
Total ash value	1.8
Water-soluble ash	4.2
Acid-insoluble ash	0.1
Sulphated ash	3.6



Fig.- 1:External features of the plant—A lobed leaf and mature fruit.

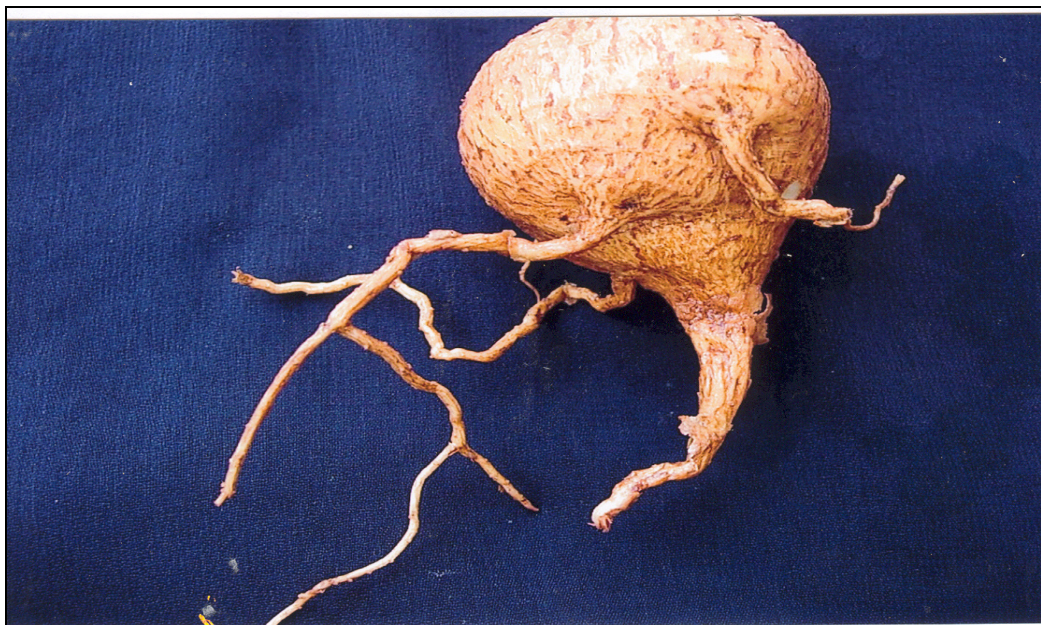


Fig.-2:Tuberous root-Entire view.

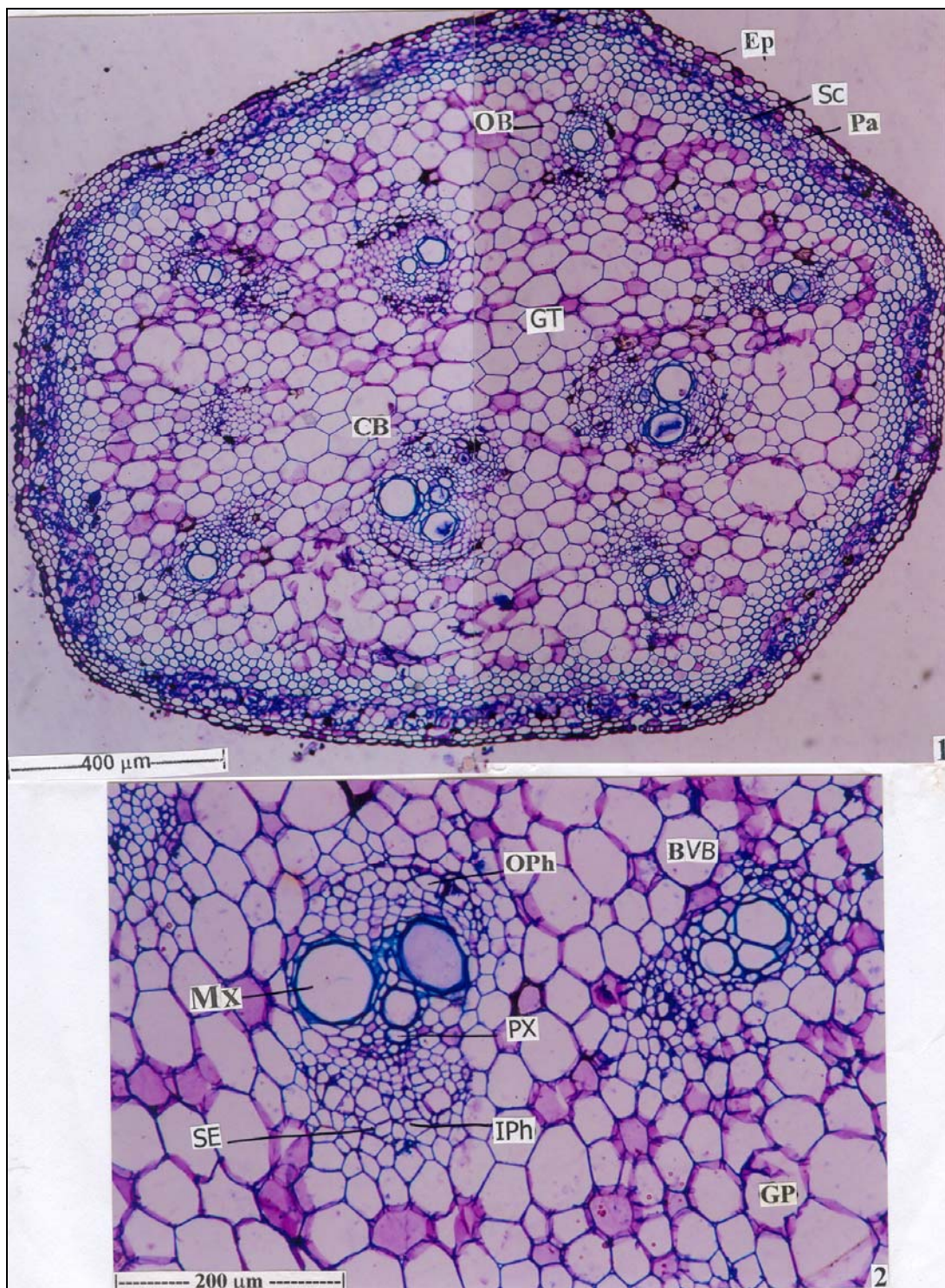


Fig.3:Microscopic structures of the stem.

1.Entire view: 2. Bicollateral vascular bundle.CB:Central vascular bundle;Ep:Epidermis; GT:Ground tissue;BVB:Bicollateral vascular bundle;GP:Ground parenchyma.IPh:Inner phloem;MX:Meta xylem;OB:Outer bundle;OPh:outer phloem.Pa:Parenchymatous cortex; Px: Protoxylem; SE: Sieve elements; Sc: Sclerenchyma

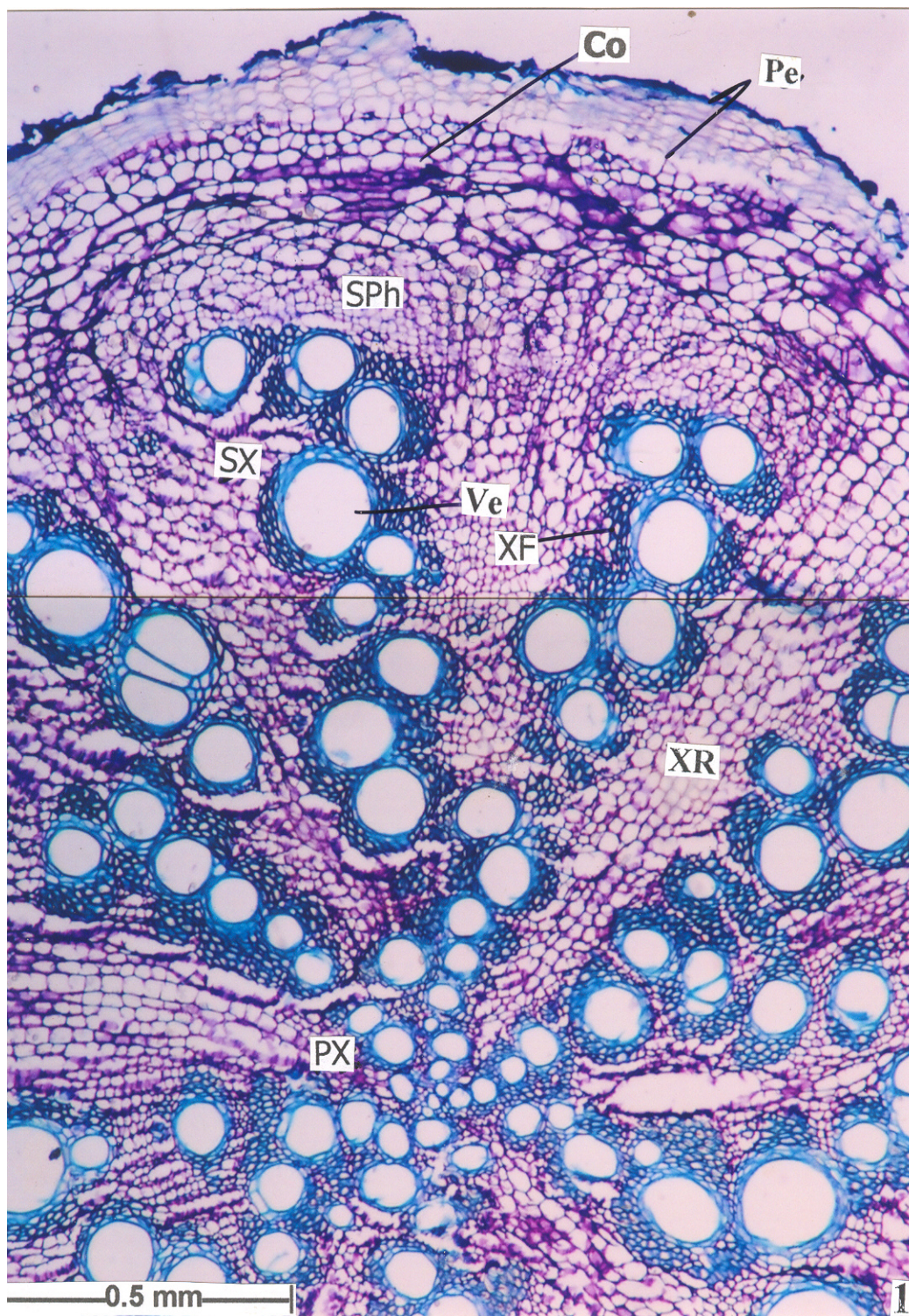


Fig.-4:Anatomy of the lateral thin root.

Co:cortex; Pe:Periderm; Px:Primary xylem; Sph: Secondary phloem;Sx:Secondary xylem. Ve: vessels. XF: xylem fibres; Xr: xylem ray –dilated.

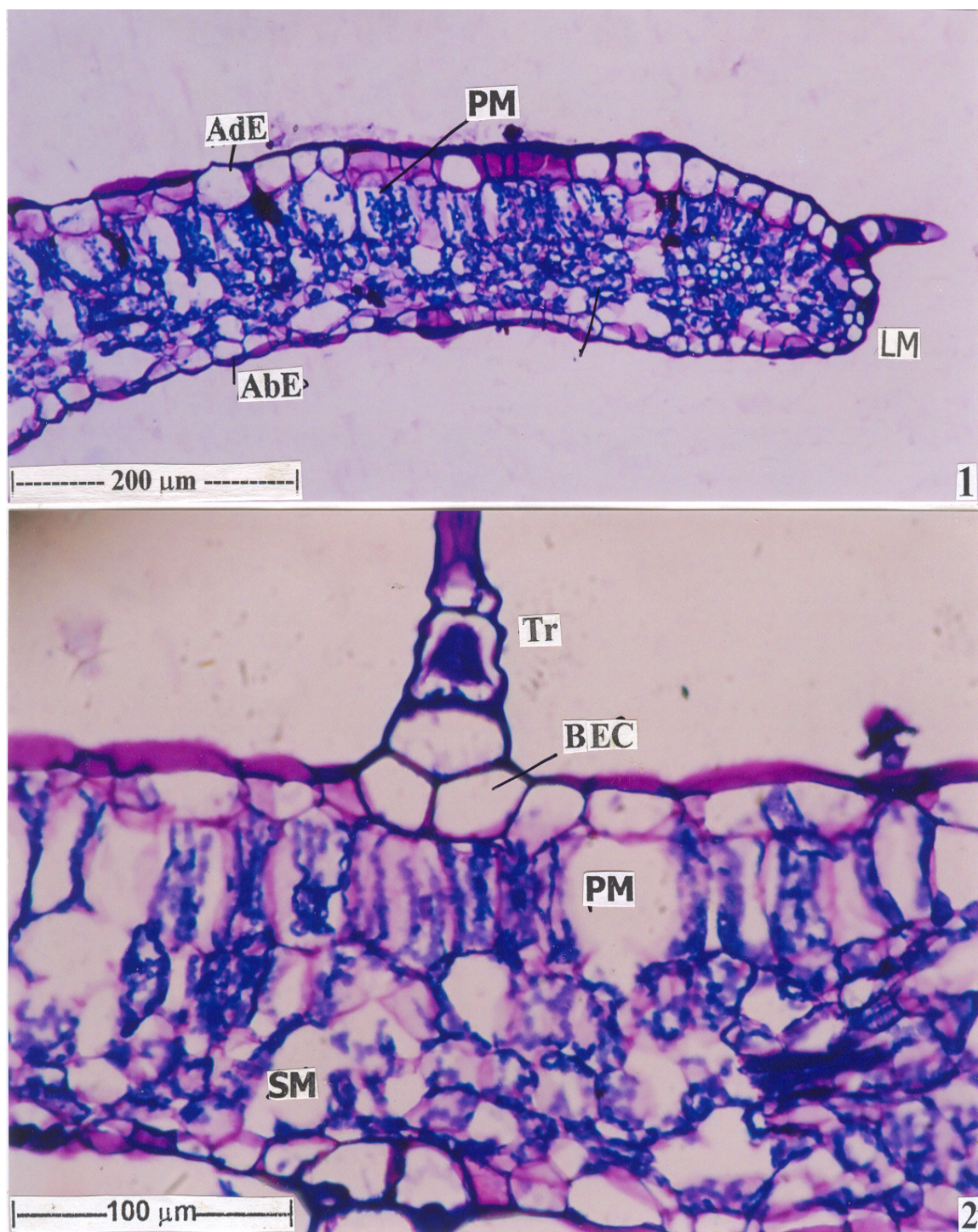


Fig.- 5: Transverse section of the leaf.

1. Leaf margin. 2. Epidermal trichomes. AbE: Abaxial epidermis; AdE: Adaxial epidermis; BEC: Basal epidermal cells around a trichome; PM ; Palisade mesophyll; SM: Spongy mesophyll Tr: Trichome

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(Received: 17 January 2009

Accepted: 23 January 2009

RJC-320)

2009 China International Resources Recycling Industry Exhibition

19-20 April 2009

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