A STUDY ON LEAF AND PETIOLE ANATOMY OF ENDEMIC AND VULNERABLE SPECIES OF *GARCINIA.*

C.Priya* and N.Hari
Department of Botany, C.M.S. College, Kottayam, Kerala-686001, India

Abstract

The present study is designed to explore the anatomical features of leaf and petiole of *Garcinia indica* Choisy. of the family Clusiaceae. Microscopic characteristics are widely used to identify different species especially in pharmacological purposes. In *Garcinia* the leaves are green in colour; simple, exstipulate, opposite with acute apex and the venation is intercostae. The Microanatomy of leaf showed the presence of rubaceous stomata only on the abaxial side. The anatomical characteristics of petiole shows 6-12mm long; uniseriate epidermis, wide parenchymatous tissues with numerous secretory canals. The siphonous curved vascular tissue present in the petiole consist of interfascicular parenchyma towards the upper side with narrow gap.

Keywords: *Garcinia indica*, Anatomy, Leaf, Petiole.

Introduction:

The family Clusiaceae comprises seven genera and 1,100 species (Stevens, 2007) which are distributed in tropical and subtropical regions. In ‘’Flora of British India’’ Indian *Garcinia* was first reviewed, where Anderson (1874) describes 30 species in British India. *Garcinia* is the largest genus consisting of 260 species and distributed predominantly in tropical regions, especially Asia (Mabberley, 2017). In India, the genus is represented by 39 species and 7 varieties of which 18sps and 5 varieties are endemic (Nayar *et al*.,2014.,2015: Sarma *et al.*,2016., Shameer.,2017). In western ghats of India is a centre of diversity of garcinia with 9 species and 2 varieties (Shameer *et al*. 2016). The anatomical and morphological studies are important for solving taxonomic and evolutionary issues as well as establishing the relationships among *Garcinia* species (Pathirana & Herat 2004).

In *Garcinia indica*, the branching showed crown shaped canopy ending with horizontal branchlets. Leaves are green in colour; simple, exstipulate, opposite with acute apex; usually thick and the petiole is characterized with the presence of foveola towards the base. The venation of leaves is intercostae. As there is no huge information about the anatomical characteristics in the literature about *G.indica* , the goal of this work is to evaluate the leaf and petiole anatomy.

Materials and Methods:

Leaf samples were collected from Pachalam (10^0 00 15.8” N 76^0 16’49.8’’E) of Ernakulum district in Kerala. One of the healthy plants was selected and the mature leaves from fifth and sixth node were taken for anatomical studies (Fig.1-A). The sections were made at a position approximately half way between the base and apex of a section from one side of the lamina; stained with Toluidine blue ‘O’ and Safranin and mounted in glycerine. The slides were analysed by trilocular compound microscope (model no.10093409) and photographs were made by using the camera Nikon Coolpix 4500.

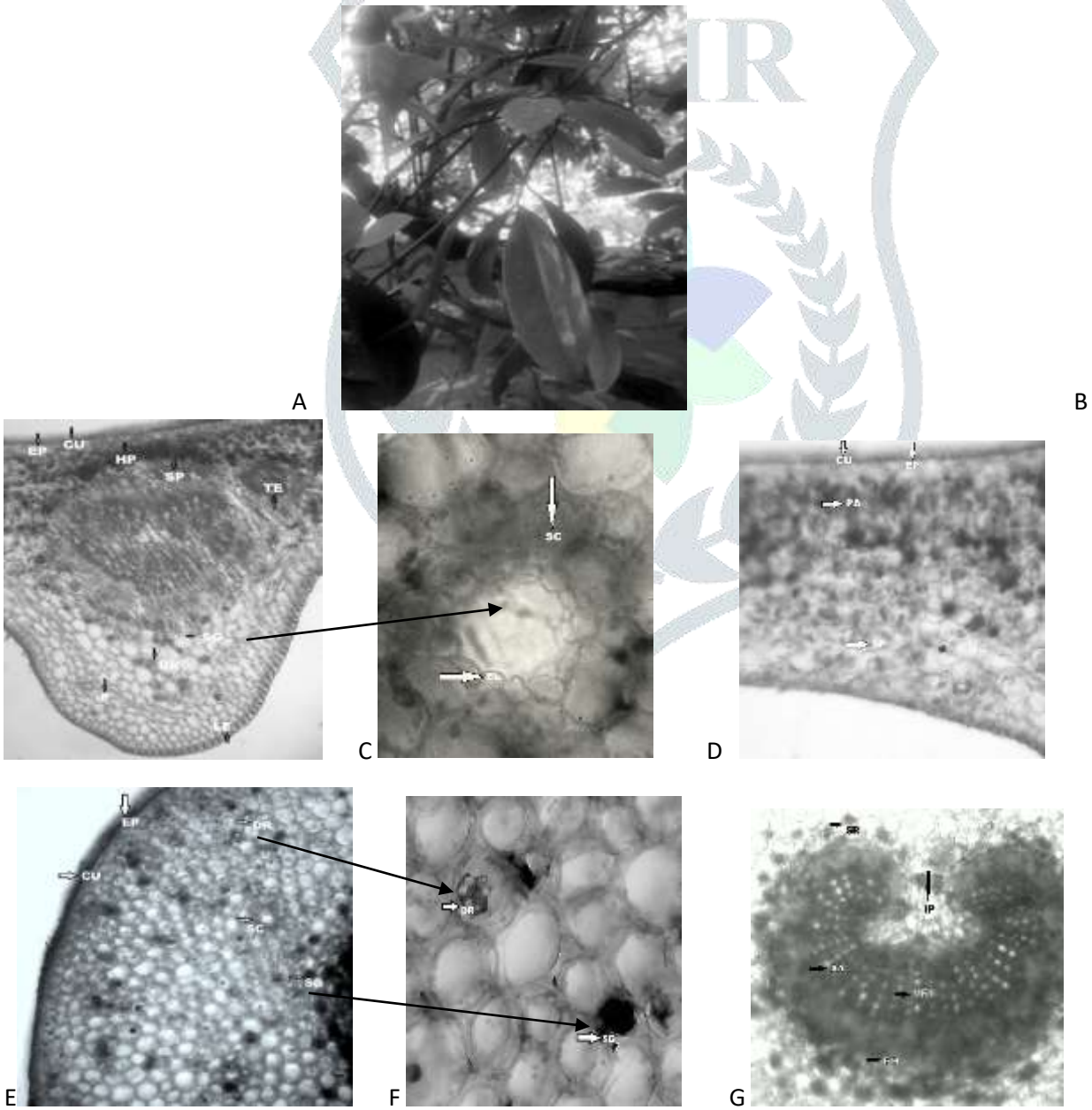
Result and Discussion:

The midrib of the leaf shows thick cuticle, uniseriate epidermis, one to several layered parenchymatous hypodermis and the cells are polygonal in shape. The cells are highly chlorophyllated. The vascular zone is

over arched with sclerenchyma. Outer to the vascular zone, the mesophyll shows the presence of druses, starch grain and secretory cavities (Fig.1-B & C). The cavities are line with epithelial cells. Amanda *et al*., (2013); Dickison (2000) and schweingruber *et al*., (2006) reported the similar features. According to Metcalfe and Chalk (1950), the thickness of cuticle and epidermis are the important traits in Clusiaceae. The leaf lamina shows thick cuticle, narrow epidermis, palisade with reticulate thickened walls and the cells. The round spongy parenchyma cells are loosely packed on the lower side (Fig.1-D).

The leaf contains highly pigmented polygonal-irregular shaped epidermal cells; the stomata with elongated stomatal pore, contain two subsidiary cells parallel to the guard cells (Fig.1-H). The stomata are rubiaceous in nature. According to Pathirana and Herat (2004), the most common stomatal type in *Garcinia* is paracytic.

The petiole shows thick cuticle; the epidermis and hypodermis are uniseriate and the cells are round in shape. The ground tissue is prominently dispersed with numerous starch grains and druses (Fig.1-F). The siphonous curved vascular tissue present in the petiole consist of interfascicular parenchyma towards the upper side with narrow gap (Fig.1-E&G). The incurved and curved nature of vascular strand was reported in two species of *garcinia* was reported by Rutuja *et al*., (2017).



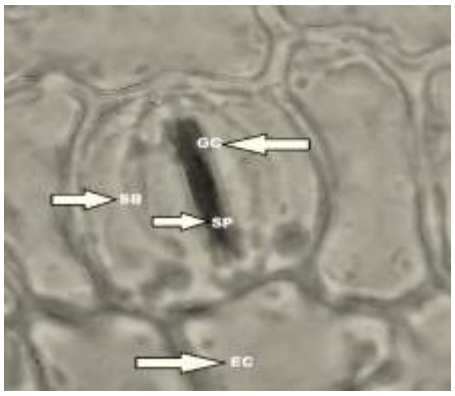
H 

Fig-1.*Garcinia indica* A – Twig of Leaf , B& D-Midrib and Lamina, C- Secretory cavities, E& G-Anatomy of petiole, F-Druses and starch grains & H- Stomata .EP-epidermal cell, CU-cuticle ,SC-secretory cavities ,H hypodermis, XY-xylem, PH-phloem, DR-druses, SG-starch grains, SB-subsidiary cell, GC-guard cell, SP-stomatal pore, MR-medullary rays, PA-palisade, TE-tracheary elements.

Conclusion:

The present study helps to identify and highlight the anatomical features of leaf and petiole in *Garcinia indica choisy*.

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