



**LEAF ANATOMY AND EPIDERMAL FEATURES OF *ROTALA SERPYLLIFOLIA*
(*ROTH*) BREMEK (LYTHRACEAE)**

Anil A. Kshirsagar

Research centre, UG & PG Department of Botany, Shivaji Arts, Commerce and Science College
Kannad, District Aurangabad. (MS)

ABSTRACT

The present study deals with the leaf anatomy and stomatal features of *Rotala serpyllifolia* (Roth) Bremek belongs to family Lythraceae. The leaves are very small, isobilateral and amphistomatic. The epidermal cells are unequal in size at adaxial as well as abaxial surface. The stomata are with wall thickening noted at polar ends. It is unique in *Rotala serpyllifolia*.

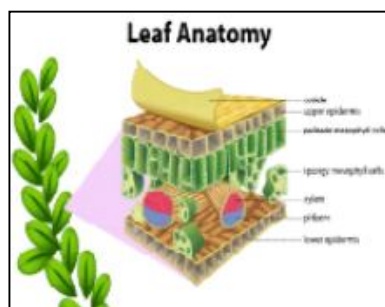
KEY WORDS: Epidermal stomata, anatomy of Leaf and *Rotala serpyllifolia*.

INTRODUCTION

The *Rotala* belongs to family Lythraceae and generally worldwide in tropical zones of India. *Rotala* is found in terrestrial and aquatic conditions. In India near about 19 species reported by Cook (1979). According to Davis and Heywood, (1963) anatomical features play a vital role in anatomy of plants. As per the opinion of Sivarajan and Joseph (1989) the two more species of *Rotala* reported from peninsular part of India. An epidermal features and taxonomic significance of *Rotala* species studied by Kshirsagar and Vaikos (2013). The study on anatomy and epidermal characters in the genus *Rotala* is very rare Solereder (1908), Metcalfe and Chalk (1950), Panigrahi (1988). Therefore for the details of anatomical features of *Rotala serpyllifolia* the present investigation is undertaken. The leaf anatomy and stomatal features of *Rotala serpyllifolia* are very unique.

MATERIAL AND METHODS

The plant materials of *Rotala serpyllifolia* from family Lythraceae are collected from Mhaismal and Kannad of Maharashtra state. The free hand sections of leaf were taken with sharp razor for anatomical studies. For observation of epidermal stomata, peels of leaves were removed by hands or sometimes if the leaves are hard then nitric acid was used for removal of epidermal peels. According to Salisbury (1927, 1932) the stomatal index was calculated by the number of stomata divided by number of epidermal cells plus stomata multiplied by hundred. The sections of leaf were mounted and stained. The epidermal peels also stained with one percent aqueous solution of saffranin and then mounted in glycerin.



OBSERVATIONS:

The leaf of *Rotala serpyllifolia* is showing identical parts on each side of axis. It also shows bilateral symmetry (Figure: 1) the stomata are located on both surfaces of leaf. The cells of upper and lower epidermis are larger, unequal sized with outer thick wall and the cuticle is thick. The stomata occur on both surfaces of leaf viz. adaxial as well as abaxial surface. The number of stomata is more towards the lower surface. The mucilage cells are common.

The mesophyll is made up of palisade and spongy tissue. The

palisade develops at abaxial and adaxial side. It is one to two layered of larger and smaller cells. While spongy tissue is of loosely arranged cells with many intercellular spaces. The vascular bundles are smaller bicollateral with parenchymatous bundle sheath. In the midrib region, the epidermis is followed by collenchymatous one to two layered hypodermis. The parenchymatous cortex consists of clustered crystals of calcium oxalate. An arc-shaped vascular bundle located at the centre. An average stomatal index (SI) of *Rotala serpyllifolia* on upper surface of epidermis (leaf adaxial) is 8.1 μm while on lower epidermis (Leaf abaxial) 11.4 μm was calculated. The stomata are observed in Intercostal region of leaf adaxial was 20.5/ mm^2 while on Intercostal region of leaf abaxial was 37.2 / mm^2 .

DISCUSSION

The leaves of *Rotala serpyllifolia* are showing bilateral symmetry having both surfaces identical to the leaf axis. The palisade occurs at the adaxial side which is one layered. The midrib exhibits variations in the distribution of collenchymas, sclerenchyma and vascular tissues. The collenchyma is developed on both the sides as shown in Figure: 1. A stomatal guard cells shows kidney shaped structure and their polar ends are thickened as shown in Figure: 2 and 3. This type of polar end wall thickening of guard cells was noted by Ansari and Vaikos, (2001) in plant *Gaura* belonging to Onagraceae family. Such stomatal guard thickening also reported by Kshirsagar and Vaikos (2007). This type of uncommon thickening of guard cells have also been reported in some dicotyledonous and monocotyledonous taxa by Kaufman et al (1970), Raju et al.(1975), Bansod, (1986) Bangar, (2002). Shows variations of guard cells as protruding dark thickening at both the polar ends of stomata. The taxonomic significance of *Rotala* species studied by Kshirsagar and Vaikos (2013). On the basis of epidermal features and anatomical parameters of leaf, guard cell ledges and palisade layers the species of genus *Rotala* can be segregated.

REFERENCES:

- [1] Cook, C. D. K. (1979) A revision of the genus *Rotala* (Lythraceae), *Boissiera* 29:1-156
- [2] Sivarajan V.V. and Joseph, K.T (1989) *Rotala* Linn. (Lythraceae) in peninsular India. *Proc. Indian Acad. Sci. (Plant Sci.)* 99(3): 179-197.
- [3] Davis P.H. and Heywood V.H. (1963) *Principles of Angiosperm Taxonomy* Oliver and Boyd London,UK.
- [4] Solereder H. (1908) *Systematic Anatomy of the Dicotyledons-I* Clarendon Press, Oxford.
- [5] Metcalfe C.R. and Chalk L. (1950) *Anatomy of the Dicotyledons-I* Clarendon Press, Oxford.
- [6] Panigrahi S.G. (1988) Contribution of Anatomy to the Systematics of *Rotala* (Lythraceae) *Bull. Bot. Surv. India.* 30: 90-100
- [7] Salisbury E.J. (1927) on the causes of ecological significance of stomatal frequency with Special reference to woodland flora. *Phil. Trans. Roy.Soc.* London.216:1-165.
- [8] Salisbury E.J. (1932) The interpretation of soil climate and use of stomatal frequency as an interesting index of water relation to the plant. *Beli .Bot. Zentrals.*49: 408-420.
- [9] Kshirsagar A.A. and Vaikos N.P. (2013) Study of taxonomic significance of genus *Rotala* (Lythraceae) *Asian journal of plant sciences* Vol. PP
- [10] Kshirsagar A. A. (2007) Anatomical studies in some Myrtales (Lythraceae), *Ph.D. Thesis* Dr. B. A. M. University, Aurangabad.
- [11] Ansari Aafreen J. and N.P. Vaikos (2001) Foliar epidermal and taxonomic significance in Onagraceae. *J. Indian bot. Soc.* 80:241-243.
- [12] Kaufman P.B. ,Petrling L.B. Yocum C.S. and Baic.D. (1970) Ultrastructural studies on stomatal development in internodes of *Avena sativa*. *Amer. Jour. Bot.* 57: 33-49.
- [13] Raju E.C. Patel J.D. and Shah J.J. (1975) An uncommon wall thickening of guard cells *Ann. Bot.* 39: 125-127.
- [14] Bansod.J. S. [1986] Morphological studies in the Monocotyledons –VIII. *Ph.D.Thesis* Marathwada University, Aurangabad.
- [15] Banger Meenakshi, A. (2002) Morphological studies in some Verbenaceae *Ph.D Thesis.* Dr.B. A. M. University, Aurangabad

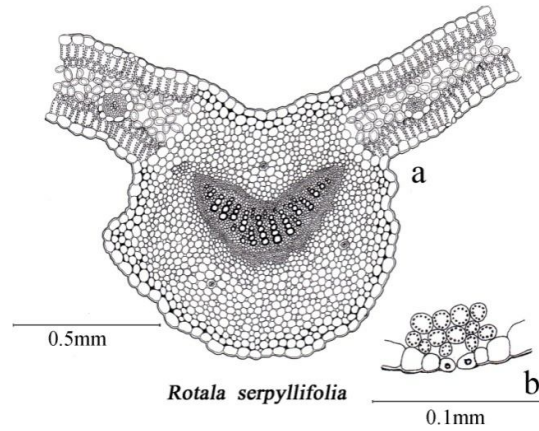


Figure 1 Anatomy of leaf in *Rotala Serpyllifolia*.

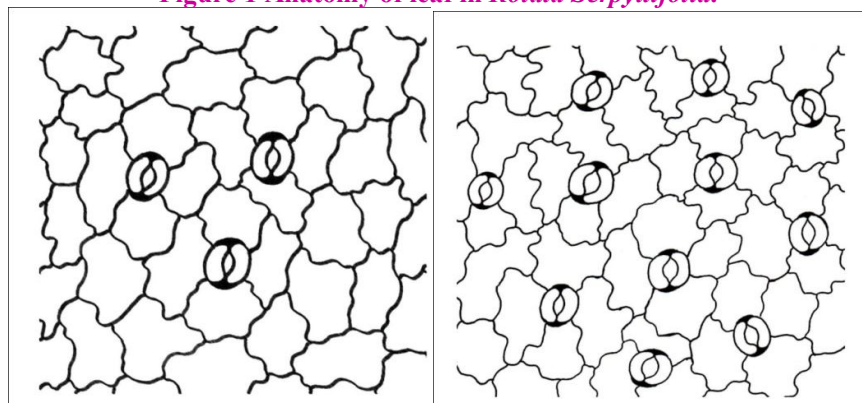


Figure 2: Leaf adaxial surface stomata. Figure 3: Leaf abaxial surface stomata.



Anil A. Kshirsagar
Research centre, UG & PG Department of Botany, Shivaji Arts, Commerce and Science College Kannad, District Aurangabad. (MS)