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ANATOMICAL STUDIES OF NODE, LEAF, VESSEL ELEMENTS AND EPIDERMAL FEATURES OF *ROTALA ROTUNDIFOLIA (BUCH-HAN-EX-D.DON) KOHENE* BELONGS TO FAMILY LYTHRACEAE.

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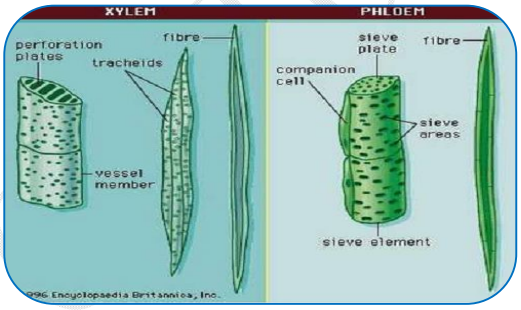
ABSTRACT :

The present paper deals with the anatomical studies of node, leaf and stomatal epidermal features of Rotala rotundifolia (Buch-han-ex-D.don) kohene belongs to family Lythraceae. The leaf is amphistomatic,mucilage cells are common in occurrence while spongy tissues are loosely arranged in leaf. The node is unilacunar one traced. The length of vessel length measures from 285.5µm to 392.7 µm. The perforation plates of vessels is simple, lateral wall thickening is pitted, end walls of vessel elements are oblique and transverse noted.



KEYWORDS : *Vessel elements , Leaf, node, epidermal features and stomata, Rotala.*

INTRODUCTION:

The family Lythraceae consist of about 24 genera and 500 species widely spread in tropical countries **(**Cronquist, 1981) According to Hooker, (1879) in India it is represented by 11 genera and 45 species. The family Lythraceae shows ample variation in habitats ranging from shrubs, trees to small aquatic herbs (*Cuphea, Lagerstroemia* and *Rotala*). According to (Graham et.al. 2005) the family Lythraceae comparises 32 genera and about 600 species worldwide distribution. In south India this plant species of *R. rotundifolia* are found to be endemic (Prasad et.al., (2012),Sunil et.al., (2013), Prasad and Raveendran (2013a, 2013b), Gaikwad et.al., (2013), Rateesh Narayanan et.al., (2014), Anto et.al., (2014), Lemiya and Pradeep,(2015,2017) The leaf epidermal features are very important as taxonomic point of view is concern. The genus *Rotala* is consisting of about 44 species distributed all over the world according to Mabberley (2005), Panigrahi S.G. (1980, 1988.) Has studied the anatomy of stem, leaves of two herbaceous genera Ammannia and Rotala and notified some important characters. There are 31 different types of stomata are reported in angiosperms (Prabhakar, 2004). A foliar epidermal feature of *Rotala* has observed by Kshirsagar A.A. (2013). The nodal anatomy in some species of *Rotala* was studied by Kshirsagar A. A. (2017). The leaf anatomy and epidermal features of *R. serpyllifolia* examined by Kshirsagar A.A., (2018a), Study of node, leaf anatomy and epidermal features of *R. densiflora* also worked out by Kshirsagar A.A., (2018b) the genus *Rotala* shows diversity in region of tropical Asia Cook (1979). Several other workers noted anatomical character in the genus *Rotala* is very rare (Solereder (1908), Metcalfe and chalk (1950). Therefore to undertake study of anatomy and epidermal features of *Rotala rotundifolia*.

MATERIAL AND METHODS:

The plant material of *Rotala rotundifolia* was collected from Kolhapur region of Maharashtra state. The collected fresh material was preserved in 70% alcohol. For vessel maceration frgments of stem material was taken in petry plates add a mixture of 10% HNO_3 and 10% $K_2Cr_2O_7$ solution in equal proportion for vessel maceration. The transverse sections of node and leaf were taken by free hand sections with fine blade or razor. The sections were passed in customary dehydration process. Sections were stained with 1% safranin and 1% fast green solutions later mounts in Canada balsam. Observed the slides under microscope and anatomical characters were noted. While epidermal stomata are observed by simple peeling method.

OBSERVATIONS:

1) **Epidermal features:** The stomatal type is mainly anisocytic and isotricytic observed in R. rotundifolia. The leaf is amphistomatic. An anticlinal walls are wavy and sinuous on both adaxial and abaxial surface are noted**.(Fig.1a and 1b)** The epidermal cells are polygonal isodimetric or anisodimetric on abaxial surface (Leimya K.M. and Pradeep A. K.,(2017)

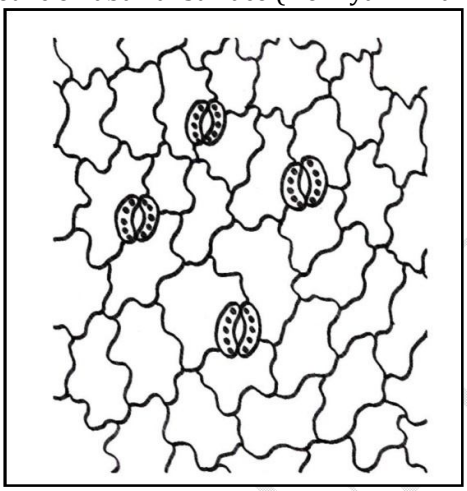


Fig.1a: Laf adaxial surface stomata.

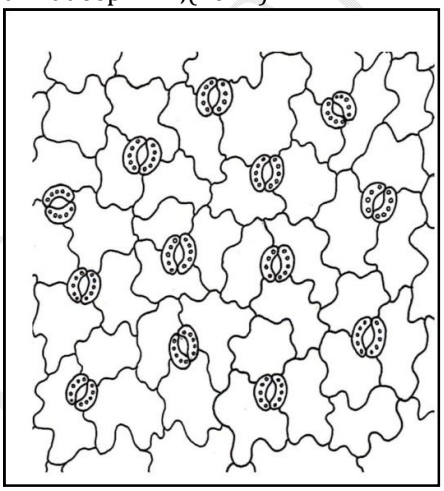


Fig.1b: Laf abaxial surface stomata.

2) **Leaf anatomy:** The leaf is homogeneous and amphistomatic, the cells of upper epidermis are larger with thick outer walls. The cuticle is thick; the cells of lower epidermis are smaller. Stomata are occurs on both lower and upper surfaces of epidermis. The stomatal guard cells with outer ledges. **(Fig.2b)** the mucilage cells are common .The mesophyll consist of only spongy tissues. The cells of spongy tissues are loosely arranged they are smaller and larger in size. The cortex is parenchymatous in the regions of midrib. The vascular bundle is solitary, bicolateral and is caped with parenchymatous bundle sheath. **(Fig.2a).**

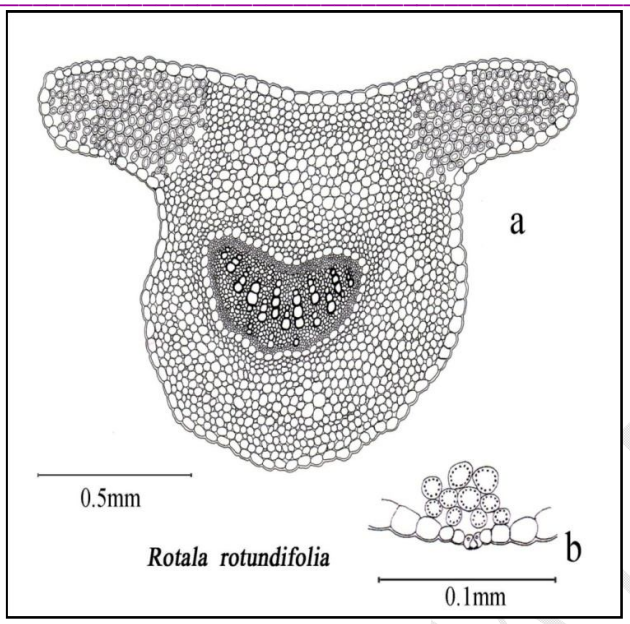
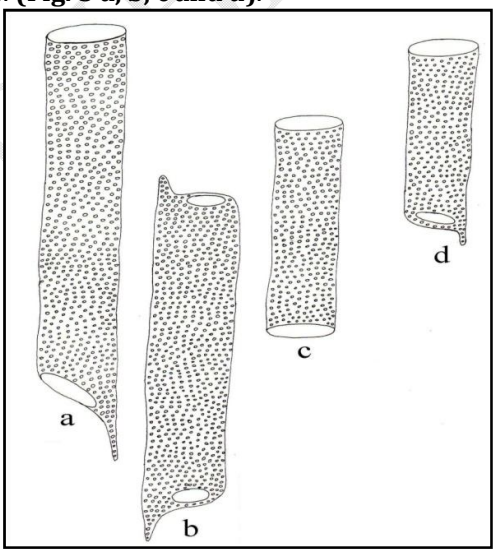


Fig. 2a: Anatomy of leaf in *R. rotundifolia* **Fig. 2b: Stomata.**

3) Vessel elements: (Stem vessels) after maceration the vessel elements of stem was observed. The length of vessel is ranging from 285.5 µm to 392.7 µm. The average length is 332 µm.The diameter of vessel element ranges from 21.4 µm to 49.9 µm were noted. While average diameter of vessels was 34.9 µm was recorded. The perforation plate is simple, terminal in position, lateral wall thickening are pitted. An arrangement of pits was alternate. Vessel tail was blunt. End wall of vessel was oblique and transverse. **(Fig. 3 a, b, c and d)**.



4) **T.S. of Node:** The vascular cylinder bears median trace which later on extends into the leaf. The trace is an arc shaped and prominent. The node is unilacunar one traces are noted. (Fig. 4 a, b, c and d).

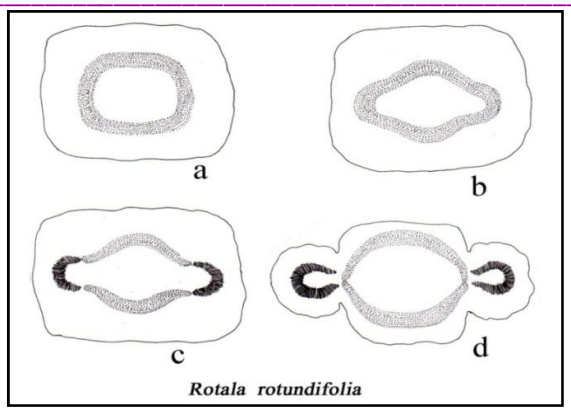


Fig. 4a, b, c and d: Anatomy of Node in *R. rotundifolia.*

DISCUSSION:

The anatomical characters are plays important role for making dichotomous key it will helps to segregate plants from one another. The present studies mainly focus on the anatomical features and epidermal features of *R. rotundifolia*. The cuticular features of selected species of Ammannia, Rotala and Nesaea in south India was noted by Lemiya K.M. and Pradeep A. K., (2017). Some of the studies on Lythraceae of some workers are supported by Rajgopal (1979), Metclfe and Chalk (1950), Muenscher (1915), Camargo and Marenco, (2011).

Panigrahi S.G. (1981), Zoric et.al. (2009) all are describes the species were to distribution of stomata in large populations.

CONCLUSIONS:

The present anatomical studies of *R. rotundifolia* are utilized for the taxonomic delineation of species. It shows great variations in anatomy of node, leaf epidermal features and vessel elements. The anatomical parameters are widely utilized for making dichotomus key.

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