



ISSN: 0976-3031

Available Online at <http://www.recentscientific.com>

International Journal of Recent Scientific Research
Vol. 8, Issue, 1, pp. 15400-15402, January, 2017

**International Journal of
Recent Scientific
Research**

Research Article

FOLIAR ANATOMICAL DIVERSITY IN SOME ACANTHACEAE

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ARTICLE INFO

Article History:

Received 17th October, 2016

Received in revised form 12th

November, 2016

Accepted 04th December, 2016

Published online 28th January, 2017

ABSTRACT

Anatomical observations are extended for 12 species belonging to 06 genera of the Acanthaceae. Leaves are generally dorsiventral. The variations with respect to vascular tissue, occurrence and development of collenchyma, sclerenchyma, palisade and spongy tissues, cell inclusions, etc. are revealed. The leaves are fundamentally similar but vary taxon to taxon and hence appear taxonomically significant.

Key Words:

Foliar anatomy, Acanthaceae.

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INTRODUCTION

Leaves are important as they carry on main activity of photosynthesis. They withstand varied environmental factors and hence usually exhibit different endomorphic features (Metcalf and Chalk, 1950). The present authors investigated foliar anatomy of Acanthaceae, a part of it is being communicated in this paper. It will focus anatomical diversity in detail.

MATERIALS AND METHODS

The plants were collected from various places like Tropical Botanic Garden and Research Institute, Palode, Thiruvanthapuram District (Kerala), Lalbag Garden, Bangalore (Karnataka), Munnar, District Idukki (Kerala), Forest Research Institute, Peechi (Kerala), Govt. Botanical Garden, Ooty (Tamilnadu) and adjacent areas. Herbarium specimen especially of *B.plumbaginifolia* was received from Herbarium, Department of Botany, Calicut University, Kozhikode (Kerala). Leaves were fixed in F. A. A. and preserved in 70% alcohol. Free hand transaction were stained in safranin (1%) and fast green (1%) and mounted in DPX after dehydration. Middle parts of lamina were selected for sectioning. Camera lucida drawings were drawn and inked. The various anatomical features are provided in the Table - I

Abbreviations: (i) Col = Collenchyma, (ii) Cyt = Cystolith, (iii) Scl = Sclerenchyma, (iv) Sph = Sphaeraphides.

RESULTS AND DISCUSSION

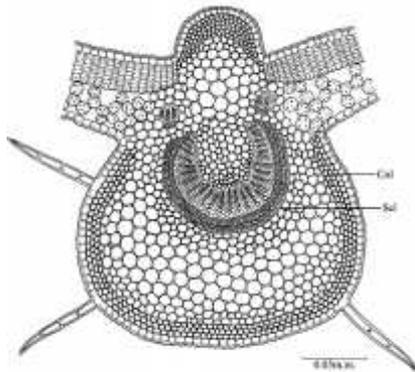
Total 12 species belonging 06 acanthaceous genera are studied for the present account. Of these, majority of taxa studied are hypostomatic, except *A.beddomei*. The mesophyll is differentiated into palisade and spongy tissue. The former is either one layered or two layered. Majority of taxa have 1-layered palisade, while others are 2-layered e.g. *A.beddomei*, *A.elongata*, and *A.macrobotrys*. The palisade extends in some species in midrib region e.g. *A.alata*, *A.elongata*, *A.macrobotrys*, *A.wightiana*, *B.plumbaginifolia*, and *D.foetida*. The cells of spongy tissue are generally rounded. The vascular tissue is resolved variously. In majority of species, the central vascular arc is lunar-shaped, except *A.spinossus*, *A.stellulata*, and *B.plumbaginifolia*. Sometimes, the leaves receive additional vascular traces (bundles) ranging from one to six. Vascular tissue is capped by sclerenchyma in few species. The conjunctive tissue have generally rounded cells. The cell inclusions are of two types viz., sphaeraphides and cystoliths (lithocysts). Presence of both types of cell inclusions are noted in some species viz., *A.elongata*, *A.macrobotrys*, *B.prattensis*, *B.plumbaginifolia* and *D.foetida*. In others, either of them occur. The adaxial and abaxial epidermises are consistently uni-layered with varying development of cuticle. They are interrupted at places by the stomatal openings. Thus there is fair diversity of anatomical features and cell contours and inclusions. They appear taxonomically significant as thought by Carlquist (1961) and Patil and Patil (2014).

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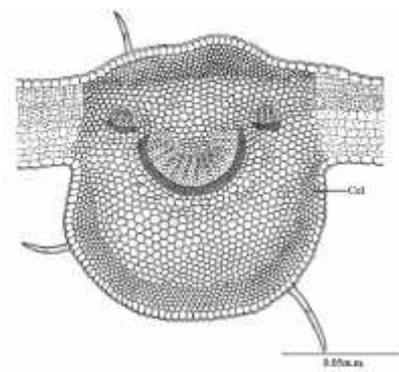
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Table - I Anatomical observations of Leaves

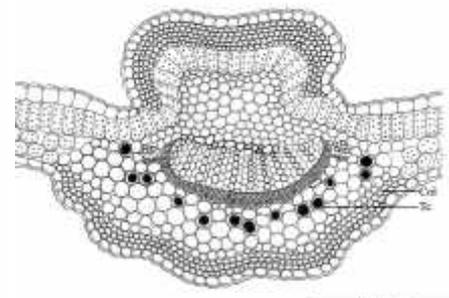
Fig. No.	Plant species studied	Amphi/Hypostomatic	No. of palisade Layers	Palisade layers extends in midrib	Shape of spongy cells	Shape of central vascular arc	No. of additional vascular bundles	Vascular tissue capped by sclerenchyma	Shape of cells of conjunctive tissue	Sphaeraphides present/absent	Cystoliths present/absent	Wings present/absent
1.	<i>Acanthus spinosus</i> L.	Hypostomatic	01-layer	Absent	Rounded	Horse shoe	02	02 – layers	Rounded	Absent	Absent	Present
2.	<i>Adhatoda beddomei</i> C. B. Clarke	Amphistomatic	02-layer	Absent	Rectangular	Lunar	02	---	Rounded	Absent	Absent	Present
3.	<i>Andrographis alata</i> (Vahl) Nees	Hypostomatic	01-layers	Present	Rounded	Lunar	02	---	Rounded	Absent	Absent	Present
4.	<i>Andrographis elongata</i> (Vahl) T. And.	Hypostomatic	02-layers	Present	Rounded	Lunar	02	02 – layers	Rounded	Present	Present	Present
5.	<i>Andrographis macrobotrys</i> Nees	Hypostomatic	02-layers	Present	Rounded	Lunar	01	---	Rounded	Present	Present	Present
6.	<i>Andrographis stellulata</i> C. B. Clarke	Hypostomatic	01-layer	Absent	Rounded	Horse shoe	02	02 – layers	Rounded	Absent	Present	Present
7.	<i>Andrographis wightiana</i> Arn.ex Nees	Hypostomatic	01-layer	Present	Rounded	Lunar	---	02 – layers	Rounded	Absent	Absent	Deeply channelled
8.	<i>Barleria prattensis</i> Santapau	Hypostomatic	01-layers	Absent	Rounded	Lunar	02	02 – layers	Rounded	Present	Present	Present
9.	<i>Beloperone comosa</i> Nees	Hypostomatic	01-layer	Absent	Rounded	Lunar	02	---	Rounded	Absent	Present	Present
10.	<i>Beloperone nemorosa</i> Nees	Hypostomatic	01-layer	Absent	Rounded	Lunar	04	02 – layers	Rounded	Absent	Present	Present
11.	<i>*Beloperone plumbaginifolia</i> (N. Jacquin) Nees	Hypostomatic	01-layer	Present	Rounded	Horse shoe	06	Patches	Rounded	Present	Present	Deeply channelled
12.	<i>Dicliptera foetida</i> (Forsskal) Blatter	Hypostomatic	01-layer	Present	Rounded	Lunar	02	02 – layers	Rounded	Present	Present	Present



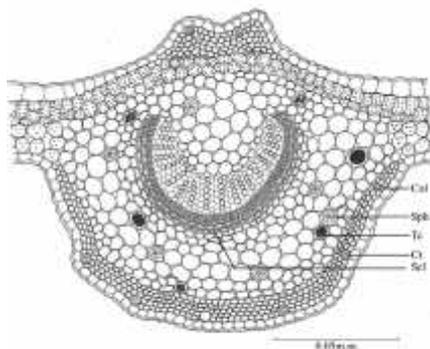
1. *Acanthus spinosus*



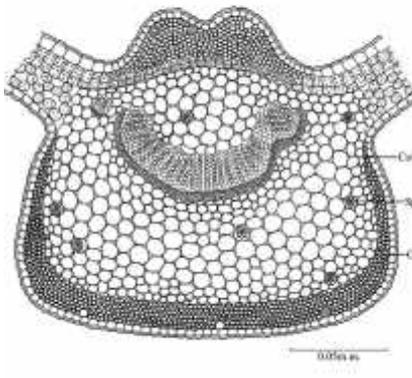
2. *Adhatoda beddomei*



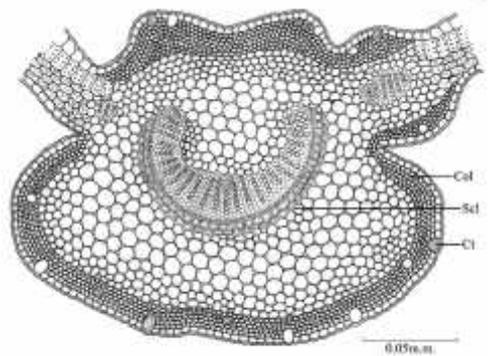
3. *Andrographis alata*



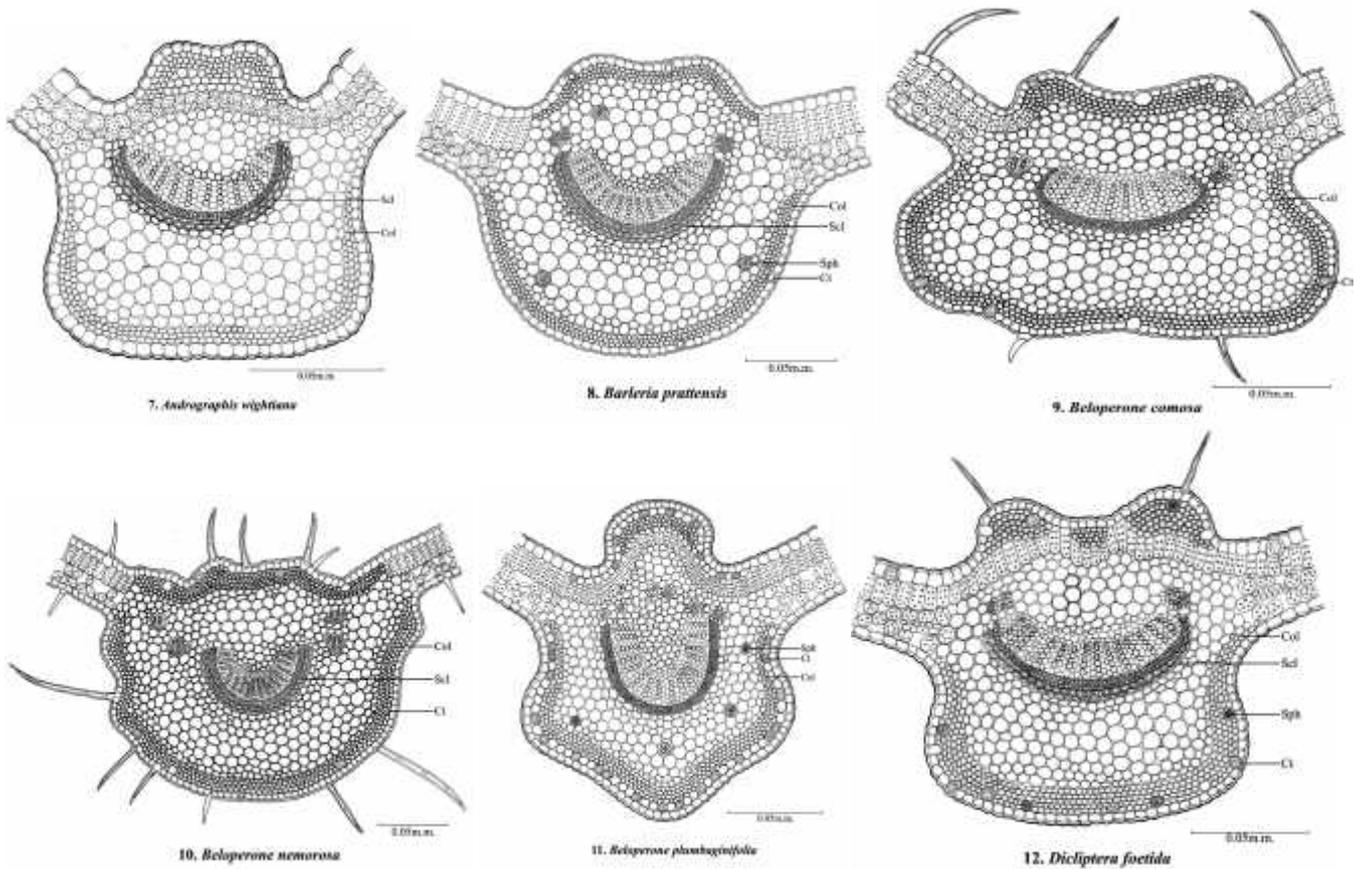
4. *Andrographis elongata*



5. *Andrographis macrobotrys*



6. *Andrographis stellulata*



Acknowledgements

The authors are thankful to Dr. E. S. Santhoshkumar, (Department of Botany, Tropical Botanical Garden and Research Institute, Palode, Kerala) and Dr. A. K. Pradeep, (Department of Botany, University of Calicut, Kerala) for their help in procuring plant materials and their identification. The authors are thankful to the authorities of S.S.V.P.Sanstha for laboratory and library facilities.

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How to cite this article:

Patil, A.M and Patil D.A.2017, Foliar Anatomical Diversity in Some Acanthaceae. *Int J Recent Sci Res.* 8(1), pp. 15400-15402.