



RESEARCH ARTICLE

PHARMACOGNOSY

**FOLIAR TRICHOMES OF SOME MEMBERS OF THE FAMILY ACANTHACEAE
AND THEIR TAXONOMIC UTILITY**

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ABSTRACT

Looking into the importance of micromorphological characters in classification of taxa at various levels and for identifying the important plants even in the absence of floral characters, a preliminary study is conducted in 13 members of the family Acanthaceae. Trichomes were a common feature in the plants screened having located in 11 out of the 13 plants studied. Both glandular and non-glandular trichomes were present. A key based on the trichome characters was prepared to identify the plants bearing them even in the vegetative conditions. These characters can serve as pharmacognostic biomarkers in cases of medicinally important plants.



KEY WORDS

Acanthaceae, micromorphological characters, biomarkers, trichomes.

INTRODUCTION

Micromorphological characters including the trichomes of plants have assumed great taxonomical significance recently as viable taxonomic markers. These characters which would be of help in identifying plants even in vegetative state will be of great use for field taxonomists in identifying plants in the absence of flowers and fruits which are available only in certain seasons of the year. It was Solereder¹ and Metcalfe and Chalk² who made some significant contributions to the micromorphological characters of plants. Plant morphologists had used many micromorphological characteristics as foliar trichomes to resolve the taxonomic conflicts and thus these characters have played an important role in plant taxonomy³⁻⁴. Recently, foliar trichomes are used for the discrimination of different taxa within the genus *Artemisia*. In case of medicinal plants, trichome characters act as biomarkers to identify the plant even in the raw material or powder form⁵. The presence of glandular trichomes in many of the medicinal

plants is considered indicative on the concentration of secondary metabolites with pesticidal, pharmacological, and fragrant properties⁶. The family Acanthaceae and Asteraceae are the families which are particularly rich in different types of trichomes which are used as an aid for identification⁷⁻⁸. Therefore, in the present work, 13 members of the family Acanthaceae were studied for their foliar trichomes, to examine their utility in identification.

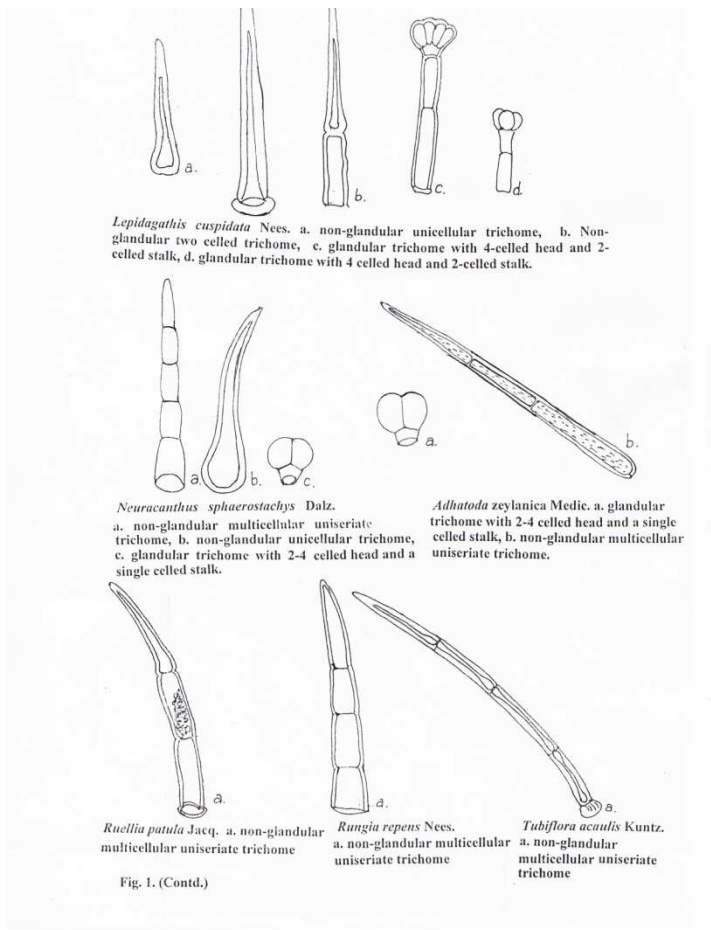
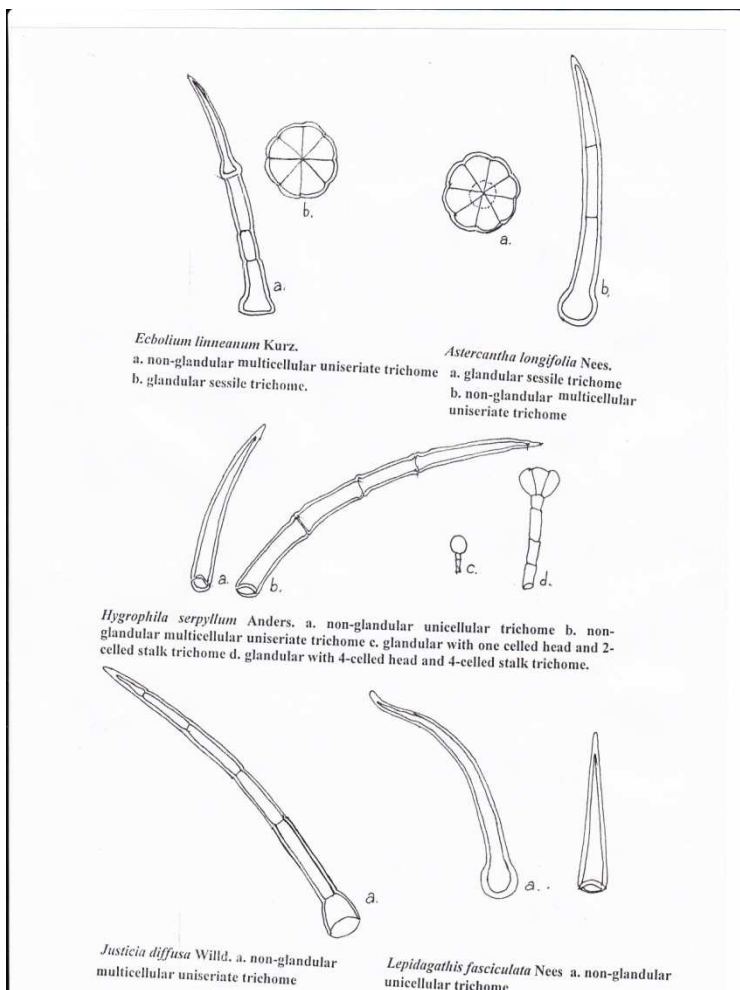
MATERIALS AND METHODS

The epidermis was peeled or was cut into suitable sizes. One end of leaf was held firmly with a thumb and the other end scraped gently with a razor blade, until a thin clear peel was cut off. The pieces were washed off in water and was stained with in safranin, and mounted in glycerin on a clean slide.

RESULTS AND DISCUSSION

The trichomes of the plants of Acanthaceae screened is presented in Fig. 1. Out of the 13 plants studied, two plants, *Daedalacanthus roseus* Anders. and *Rungia parviflora* var. *pectinata* Nees. were found to be glabrous. Of the remaining 11 plants, 6 possessed glandular trichomes and each of these trichomes was found to be different from others. Of the plants containing glandular trichomes, both *Ecbolium linneanum* Kurz. *Asteracantha longifolia* Nees. contained sessile, disc shaped trichomes with 4-8 cells. Both contained non-glandular uniseriate trichomes also. But the uniseriate trichomes of *Ecbolium linneanum* had the apical cell which is long and swollen at the base. All the remaining

four plants contained stalked glandular trichomes. The glandular trichomes of *Adhatoda vasica* Nees. and *Neuracanthus sphaerostachys* Dalz. were having a single celled stalk and 4 celled head but the latter plant possessed unicellular trichomes also. In *Lepidagathis cuspidata* Nees. and *Hygrophila serpyllum* Anders. there were two types of glandular trichomes. The large trichome of *Lepidagathis cuspidata* Nees. had 2 celled stalk (with thick walls) and 4 celled head. While, that of *Hygrophila serpyllum* Anders. the stalk was 4-celled. The small trichome of the former possessed a four celled head while that of latter had a single celled head.



remaining 2 plants, *Tubiflora acaulis* Kuntz. and *Justicia diffusa* Willd. the trichome of the former plant had very thick walls and very narrow lumen whereas that of *Justicia diffusa* had a swollen basal cell.

An artificial key using trichome character for the identification of some species belonging to the Acanthaceae is prepared and presented below.

ARTIFICIAL KEY USING TRICHOME CHARACTERS FOR THE IDENTIFICATION OF SOME SPECIES BELONGING TO THE ACANTHACEAE:



1. Plants glabrous.....*Daedalacanthus roseus* Anders and
Rungia parviflora var. Nees.
1. Plants with trichomes:
 2. Glandular trichome present, non-glandular trichome present or absent:
 3. Glandular trichome sessile;
 4. Non-glandular trichome 3-celled with upper cell long and swollen at the base.....*Ecbolium linneanum* Kurz.
 4. Non-glandular trichome 3-celled without any cell being swollen.....*Asteracantha longifolia* Nees.
 3. Glandular trichome stalked:
 5. Stalk of glandular trichome unicellular
 6. Unicellular non-glandular trichome present
Neuracanthus sphaerostachys Dalz.
 6. Unicellular trichome absent.....*Adhatoda zeylanica* Medic.
 5. Stalk multicellular:
 7. Stalk 2-celled.....*Lepidagathis cuspidata* Nees.
 7. Stalk more than 2-celled.....*Hygrophila serpyllum* Anders.
 2. Glandular trichome absent:
 8. Non-glandular trichome unicellular.....*Lepidagathis fasciculata* Nees.
 8. Non-glandular trichome multicellular:
 9. Cells broad:
 10. Cells with brown contents.....*Ruellia patula* Jacq.
 10. Cells empty.....*Rungia repens* Nees.
 9. Cells narrow:
 11. Cell wall thick, lumen very narrow.....*Tubiflora acaulis* Kuntz.
 11. Cell wall thin, with swollen basal cell.....*Justicia diffusa* Willd.

CONCLUSION

The significance of micromorphological features is proved beyond doubt in the present study. The utility of the artificial key in identification of plants in the absence of floral

characters is a proof to this. In case of medicinal plants the trichomes aid as biomarkers useful in identifying the plants in the powder form.

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