

**INTERNATIONAL JOURNAL OF ADVANCES IN
PHARMACY, BIOLOGY AND CHEMISTRY****Research Article****A Study on Foliar Epidermal Features in Artemisia,
Chrysanthemum and Cosmos of the Family Asteraceae****P.Srilakshmi*, K.C.Naidu.**Department of Botany, Andhra University,
Visakhapatnam, AP, India.

ABSTRACT: Epidermal characteristics of leaves such as epidermal cell walls, type of stomata and trichome are important parameters at generic and specific levels on different group of plants. Stomata are pores formed by a pair of specialized cells, the guard cells, which are found in the surface of higher plants and which can open and close to control gas exchange between a plant and its environment. A comparative study of the leaf epidermis of three species of Asteraceae family was done and observed the variation

KEY WORDS: Epidermis, Stomata, *Artemisia vulgaris*, *Chrysanthemum indicum*, *Cosmos sulphureus*, Asteraceae.

INTRODUCTION

Asteraceae is a very large cosmopolitan family, highly advanced and easily recognized with a worldwide distribution [1]. It is represented by 13 tribes, 84 genera and over 240 species. It belongs to the sub-class Asteridae in the order Asterales [2]. Many plants in the family are economically important as ornamental, green vegetables and weeds [3]. The members of the family are largely woody herbs, shrubs, a few are trees and climbing herbs. Important weed species in this family include *Chromolaena odorata* Linn. (which is wide spread in the disturbed area of forests), *Tridax procumbens* Linn, *Ageratum conyzoides* Linn, *Aspilla* species (pers) [4]. The ornamental species include *Zinnia*, *Tagetes* (marigold) and *Helianthus annuus* (sunflower). Some of the important species are cultivated while others grow in the wild. They include *Vernonia amygdalina* (bitter leaf), *Launaea taraxacifolia*, *Crassocephalum crepidioides* and *Lactuca sativa* (lettuce). The seeds of *Helianthus annuus* yield oil. Some members of the family are also known to be ethno medicinal uses in Nigeria. The use of anatomical methods in taxonomic investigations cannot be over emphasized. Although no character is absolutely immutable, some are more fixed than the others and it is on those that are less

plastic that the systematic analogists rely because they are not really affected by environmental conditions [5]. The taxonomic value of leaf epidermal characters is well documented [6] [7] [8] [9]. Metcalfe and Chalk [10] gave a sparse description of the general anatomy of the family Asteraceae. There were few studies about the epidermal characters in Asteraceae family species. However, the aim of study is to know the anatomical changes (stomata and trichomes) with respect to the environmental changes and the results were compared.

MATERIALS AND METHODS

Mature young leaves were collected from the local areas of Visakhapatnam, Andhra Pradesh, India. The plants were identified with the help of description given in the Flora of Madras Presidency, Flora of British India and Herbarium available in the Department of Botany, Andhra University, Visakhapatnam, Andhra Pradesh, India. Mature leaves were fixed in Formalin acetic acetaldehyde (FAA) and subsequently stored in 70% alcohol. The study comprises of three species of the family Compositae (Asteraceae). The list of plants, investigated, sources were given in **Table-1**.

The peeling of epidermis of fresh leaf material that was fixed in FAA was obtained. The peelings were taken from the middle portion of the leaf, both the surfaces [11] either by scrapping or a safety razor blade directly or by treating them with Acetic acid (1-100%) of NaOH (0.5-20%) based on the material. The preparations were stained with Saffranin and mounted in Glycerin and observed. Observations were made using Olympus compound microscope under various magnifications. Ocular micrometer was used for all the measurements and calculations were made by calibrating with stage micro meter. Figures were sketched using camera lucida and the magnifications (10x X 40x) were indicated in the illustrations.

RESULTS AND DISCUSSION

In *Artemisia vulgaris* cells were irregular sinuous anticlinal walls. In *Chrysanthemum indicum* the cells were pentagonal with slight wavy margins. In *Cosmos* they were pentagonal with more or less sinuous anticlinal walls shown in **Pictures (1, 2, 3, 4, 5 and 6)**. Different combinations of stomata occur on the same surface of the leaf. However in all the species the basic stomatal type is anomocytic type. In

addition to, anisocytic, diacytic, tri, tertacytic stomata are also present in some species along with anomocytic type. Rabieet *al* (2006) [12] discussed the epidermal cells variation in *Artemisia vulgaris*. Our results about the species, agreed with their findings regarding the shape and arrangements of epidermal cells but little variation, it may reflect the environmental changes (soil, temperature, humidity, PH, and availability of nutrients).

CONCLUSION

Studies on epidermis have gained much importance during this century. This is because these studies are widely recognized in taxonomy and in the identification of plant materials in Paleobotany, Pharmacognosy and Forensic science. This study revealed the presence of variations in stomata types belonging to the same family. Differences were observed at abaxial and adaxial surfaces of the same leaf and even at the same surface. Therefore, from the present investigation we can conclude environmental change reflect some variations. These studies can be useful for future investigations.

Table: 1 Plant material used for the study:

S.NO	Name of the plant species	Source
1.	<i>Artemisia vulgaris</i>	Visakhapatnam
2.	<i>Chrysanthemum indicum</i>	Visakhapatnam
3.	<i>Cosmos sulphureus</i>	Visakhapatnam



Fig:1 Artemisia vulgaris (adaxial surface)

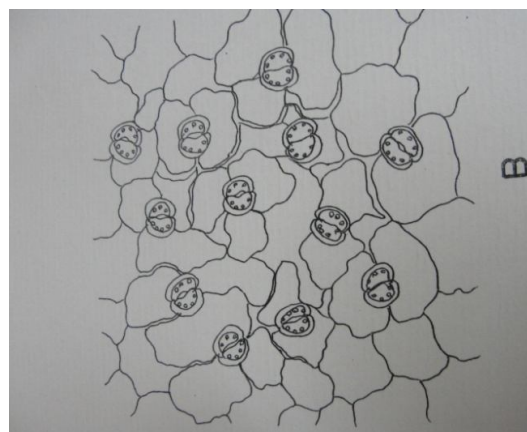


Fig:2 Artemisia vulgaris (abaxial surface)

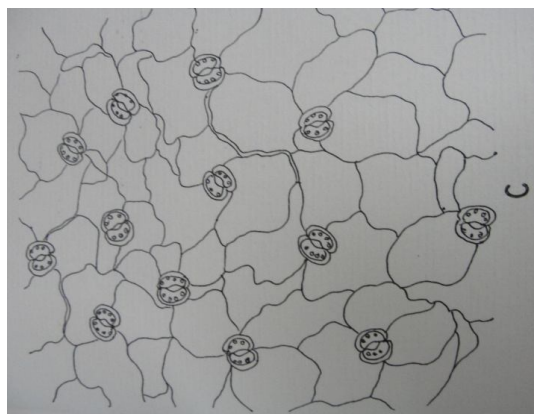


Fig:3 *Chrysanthemum indicum* (adaxial surface)

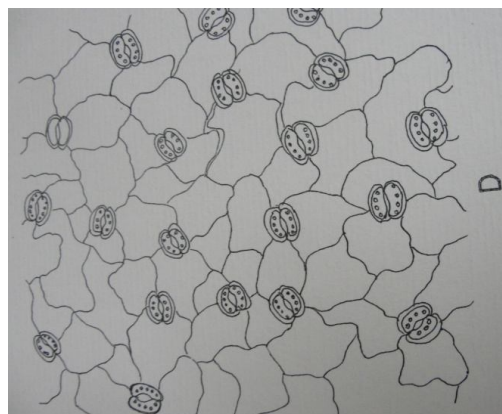


Fig:4 *Chrysanthemum indicum* (abaxial surface)

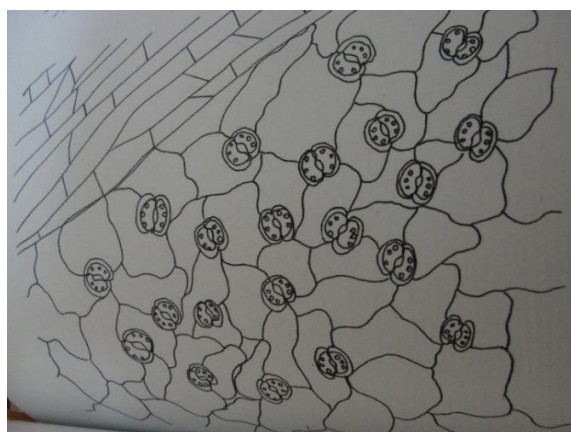


Fig: 5 *Cosmos sulphureus*(adaxial surface)

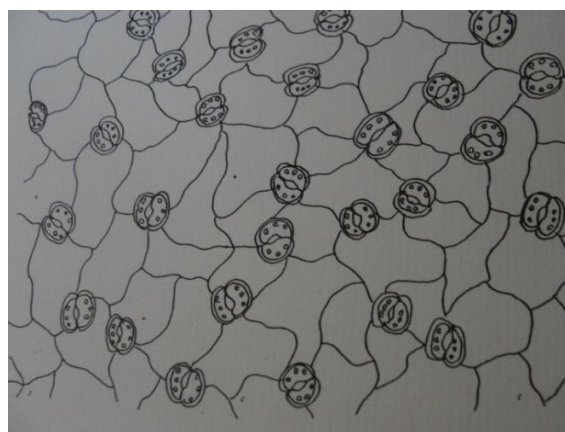


Fig: 6 *Cosmos sulphureus*(abaxial surface)

REFERENCES

- Nielsen MS (1965). Introduction to the flowering plants of West Africa; University of London Press Ltd.
- Ming LC (1999). *Ageratum conyzoides*, A tropical source of medicinal and agricultural products. In: J.Janick (Ed) perspectives on New Uses. ASHS Press, Alexandria V.A.PP.469-473.
- Olorode O (1984). Taxonomy of West Africa flowering plants. Longman Gp Ltd; London and New York.PP 98-100,158.
- Adams C.D.(1963), Compositae. In Flora of West Tropical Africa, 2nd ed. F.N.Hepper (ed). Crown Agents, London.
- Barthlott W. Epidermal and seed surface characters of plants: Systematic applicability and some evolutionary aspects. Nordic J.Bot.11981:345-355.
- Palmer and Gerbeth-Jones. A scanning with microscope survey of the epidermis of East Africa grasses,IV, Smithsonian contribution to Botany 1986;62: 1-120.
- Jayeola, A.A., J.R. Adenegan, 2001, Macro morphological studies of the West Africa Rhizophora L.Feddes Repertorium 2001;112: 349-356.
- Adedeji O, Illoh HC. Comparative foliar anatomy of 10 species in the genus Hibiscus Linn.In Nigeria. New Bot.2004; 31:147-180.
- Adedeji O. Leaf epidermal studies of the species of Emilia Cass (senecioneae, Asteraceae) in Nigeria.BotanicaLithuanica2004;10(2): 121-133.
- Metcalf and Chalke L (1950). Anatomy of the Dicotyledons Vol.1 and II, Oxford, Clarendon Press.
- Stace CA. The significance of the leaf epidermis in the taxonomy of the Combretaceae 11, the genus Combretum, sub-genus Combretum in Africa. Bot.J.Linn. Soc.1969;62:131-168.
- Rabie, M., A. Jalili and F. Zarrinkamar, 2006. Anatomical characteristics of five Artemisia species in the North of Iran.Pajouhesh-va-Sazandegi.