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STOMATAL STUDIES ON SOME SELECTED PLANTS OF MALVACEAE

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ABSTRACT

Malvaceae family is well known for its economic importance. Plants like *Hibiscus esculantus* is commonly used as a vegetable called 'Okra' *Adensonia digitata*, known as baobab tree has a lot of medicinal potential. *Bombax ceiba* yields Kapok which is a very fluffy material made from the abundant silken hairs that are attached to the ripe seeds of several species in the silk cotton family. As mentioned in the literature, plants belonging to Malvaceae are economically important not only with respect to edible purposes but are also known to be exploited for their medicinal potential. Anatomy is a very useful tool for identification (taxonomy). Epidermal characters can prove to be of importance with respect to identification of a particular plant species. This can also provide reliable information in standardisation of an ayurvedic/herbal drug.

KEYWORDS: Stomata, Malvaceae, Epidermal characters.

INTRODUCTION

Stomata are the tiny openings on the surface of leaf for gaseous exchange. In green leaves they occur either on both surfaces (amphistomatic leaf) or on only one, either the upper (epistomatic leaf) or more commonly on lower that is hypostomatic leaf. Leaf epidermal anatomy, particularly stomatal architecture - the number, form, and arrangement of specialized epidermal cells associated with the stomatal guard cells. Stomatographic studies (i.e., those on stomatal architecture and sometimes other features) have shown that stomata can provide valuable taxonomic and systematic evidence.

Malvaceae family is one of the most exploited plant family. Plants belonging to malvaceae are used as food, for fibre, for their ornamental value and also for their medicinal value. Anatomy deals with the internal study of plants which may help in standardization of medicinal plants. Epidermal characters like stomata, palisade ratio, trichomes etc are known to be used as a tool for identification. A lot of work has already been reported with respect to importance of stomata in identification. For the present study, 14 different economically & medicinally important plants belonging to family Malvaceae were collected. These were studied with the aim of:

- ✓ To study the stomata of the said plants to lay down the anatomical standardisation parameters in case of medicinally important plants.
- ✓ To delimit the species by knowing and comparing these characters in order to establish a relationship.

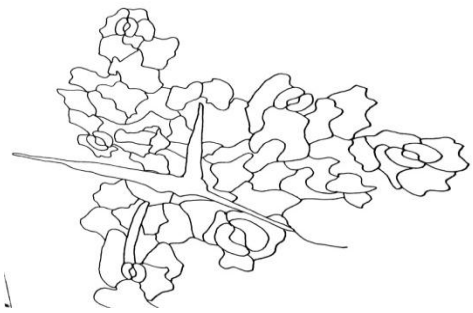
MATERIAL AND METHODS

For the study of stomata the leaf pieces were boiled in concentrated nitric acid with little potassium chlorate added to it. The leaves turn brown and then yellowish white. They were then transferred to water to separate the epidermal peelings. These peelings were washed thoroughly, stained with aqueous Saffranine or Delafield Haematoxylin and mounted in Glycerine (Gupta,1961).

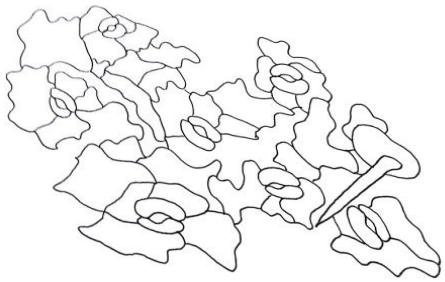
Stomata were sketched by using Erma Camera Lucida at 10 x 45X magnification. The terminology used in anatomical studies is in accordance with Dilcher (1974).

OBSERVATIONS AND RESULTS

Abutilon Ranadei: Upper epidermis shows anomotetracytic, cyclocytic type of stomata with kidney shaped guard cells. Epidermal cells are irregular with wavy margin. Text Figure 1 Lower epidermis shows anomotetracytic, anisocytic type of stomata with kidney shaped guard cells. Epidermal cells are irregular with wavy margin. Text Figure: 2



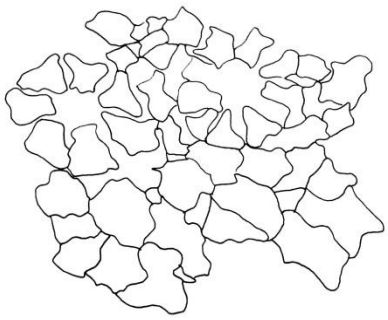
Text Figure 1



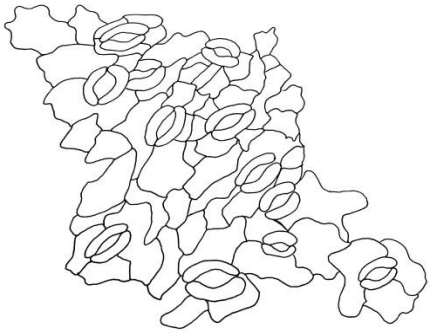
Text Figure 2

Adensonia digitata: Upper epidermis shows polygonal cells which form glands with wavy margin. Hypostomatic. Text Figure 3.

Lower epidermis shows anisocytic, anomotetracytic and cyclocytic type of stomata with kidney shaped guard cells. Epidermal cells are irregular with wavy margin. Text Figure 4.

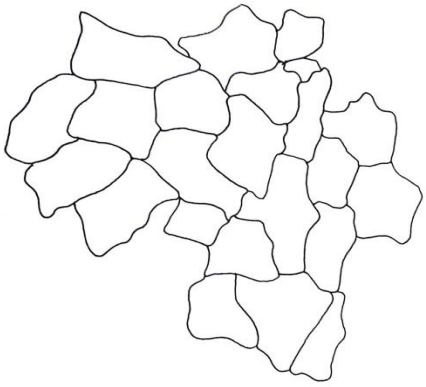


Text Figure 3



Text Figure 4

Bombax ceiba: Upper epidermis shows tetra-pentagonal cells. Hypostomatic. Text Figure 5. Lower epidermis shows anisocytic, anomotetracytic and cyclocytic type of stomata with kidney shaped guard cells. Epidermal cells are irregular with wavy margin. Text Figure 6.

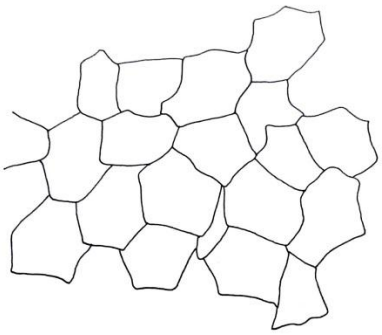


Text Figure 5

Text Figure 6

Bombax malabaricum: Upper epidermis shows pentagonal to hexagonal epidermal cells which are irregularly scattered. Hypostomatic. Text Figure 7.

Lower epidermis shows anisocytic, & paracytic type of stomata with kidney shaped guard cells. Epidermal cells are irregular with wavy margin. Text Figure 8.



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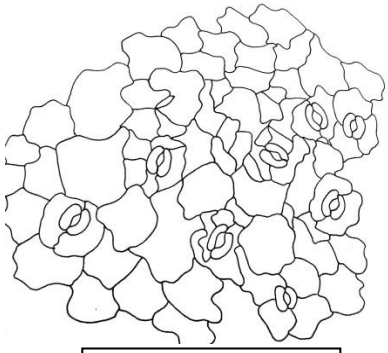
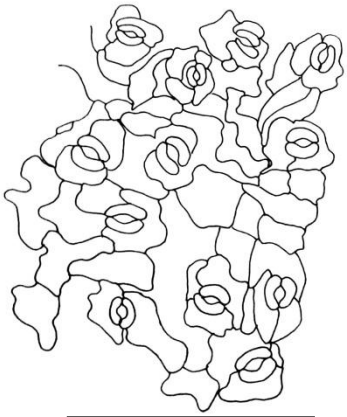


Text Figure 8

Hibiscus decusseta: Upper epidermis shows anomocytic, paracytic & anisocytic type of stomata with kidney shaped guard cells. Epidermal cells are irregular with wavy margin. Text Figure 9.

Lower epidermis shows pentagonal cells, cells arranged to form glands. Hyperstomatic. Text Figure 10.



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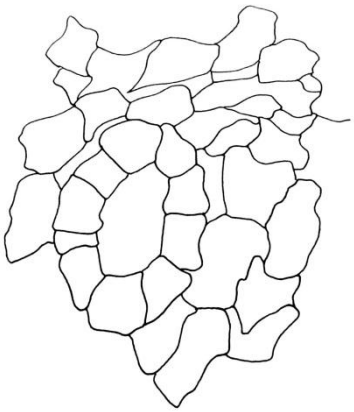
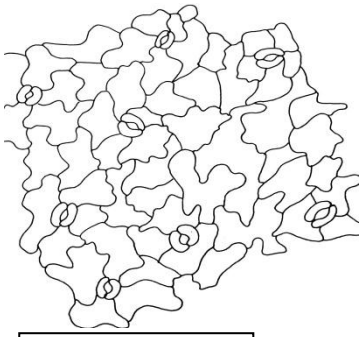


Text Figure 10

Hibiscus ficulneus: Upper epidermis shows anisocytic & anomocytic types of stomata with kidney shaped guard cells. Epidermal cells are irregular with wavy margin. Text Figure 11. Lower epidermis shows anisocytic type of stomata with kidney shaped guard cells. Epidermal cells are irregular with wavy margin. Text Figure 12.



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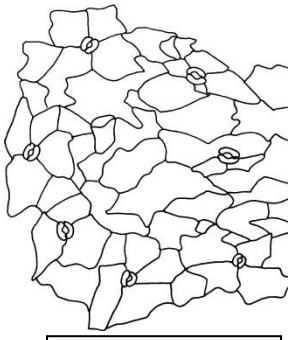
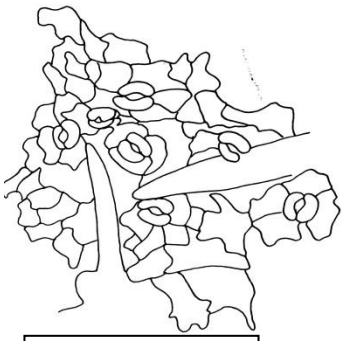


Text Figure 12

Hibiscus hirtus: Upper epidermis shows anisocytic & anomocytic types of stomata with kidney shaped guard cells. Epidermal cells are irregular with wavy margin. Text Figure 13. Lower epidermis shows pericytic & paracytic types of stomata with kidney shaped guard cells. Epidermal cells are irregular with wavy margin. Text Figure 14.



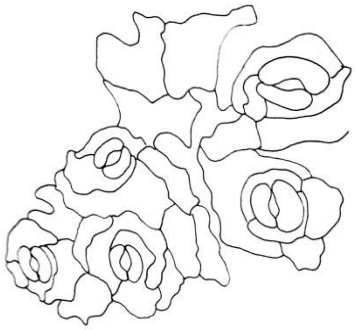
Text Figure 13

Text Figure 14

Hibiscus rosa-sinensis: Upper epidermis shows polygonal epidermal cells which are irregularly scattered to form glands. Hypostomatic. Text Figure 15.

Lower epidermis shows diacytic stomata with kidney shaped guard cells. Epidermal cells are irregular with wavy margin. Text Figure 16.

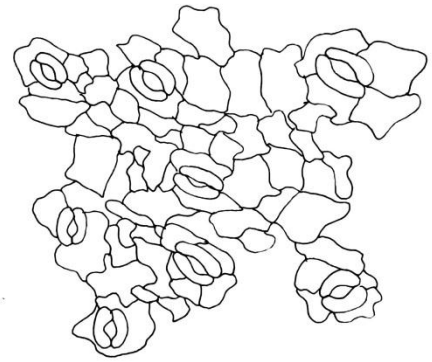
Text Figure 15



Text Figure 16

Malachra capitata: Upper epidermis shows anisocytic, anomocytic types of stomata with kidney shaped guard cells. Epidermal cells are irregular with wavy margin. Text Figure 17. Lower epidermis shows anisocytic, anomocytic types of stomata with kidney shaped guard cells. Epidermal cells are irregular with wavy margin. Text Figure 18.

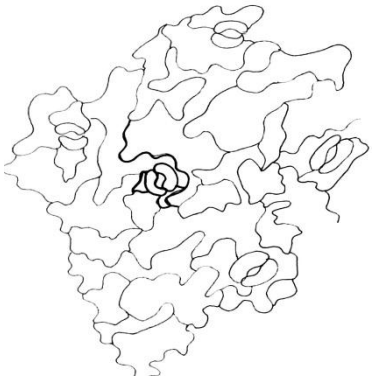
Text Figure 17



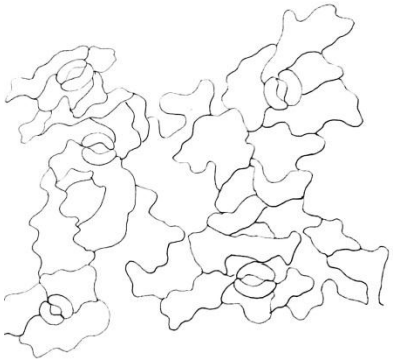
Text Figure 18

Malvaviscus arboreus: Upper epidermis shows paracytic type of stomata with kidney shaped guard cells. Epidermal cells are irregular with wavy margin. Text Figure 19.

Lower epidermis shows anisocytic & anomocytic type of stomata with kidney shaped guard cells. Epidermal cells are irregular with wavy margin. Text Figure 20.



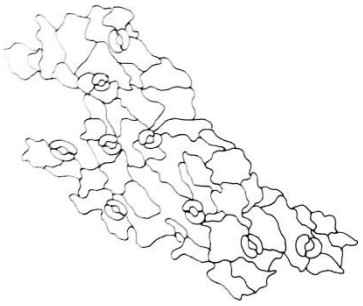
Text Figure 19



Text Figure 20

Sida acuta: Upper epidermis shows anisocytic, anomotetracytic and cyclocytic type of stomata with kidney shaped guard cells. Epidermal cells are irregular with wavy margin. Text Figure 21.

Lower epidermis shows anomocytic, anomotetracytic and paracytic type of stomata with kidney shaped guard cells. Epidermal cells are irregular with wavy margin. Text Figure 22.



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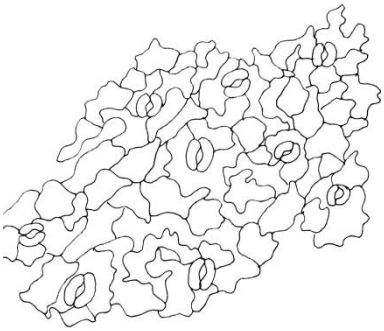
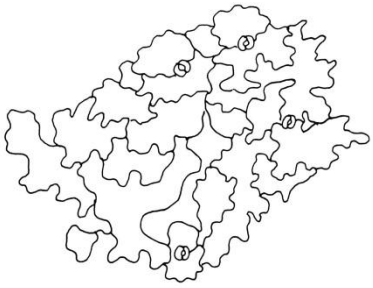


Text Figure 22

Sida rhombifolia: Upper epidermis shows anisocytic & anomocytic type of stomata with kidney shaped guard cells. Epidermal cells are irregular with wavy margin. Text Figure 23 Lower epidermis shows diacytic type of stomata with kidney shaped guard cells. Epidermal cells are irregular with wavy margin. Text Figure 24.

Text Figure 23

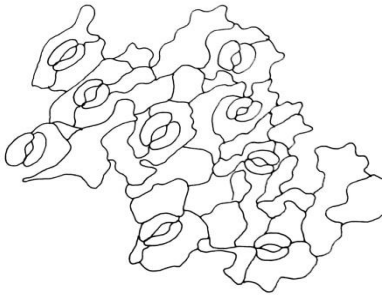


Text Figure 24

Thespesia populnea: Upper epidermis shows irregularly arranged epidermal cells. Hypostomatic. Text Figure 25.

Lower epidermis shows paracytic, diacytic, anomotetracytic, anomocytic types of stomata with kidney shaped guard cells. Epidermal cells are irregular with wavy margin. Text Figure 26.

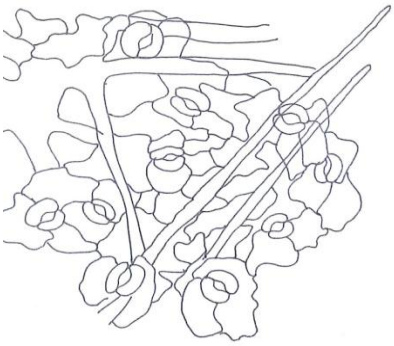
Text Figure 25



Text Figure 26

Urena lobata: Upper epidermis shows paracytic, anisocytic & anomocytic type of stomata with kidney shaped guard cells. Epidermal cells are irregular with wavy margin. Text Figure 27.

Lower epidermis shows anisocytic, paracytic & anomocytic type of stomata with kidney shaped guard cells. Epidermal cells are irregular with wavy margin. Text Figure 28.



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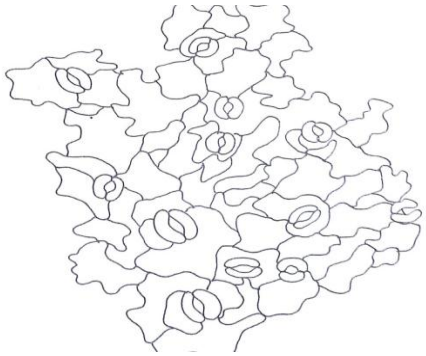

Text Figure 28

DISCUSSION AND CONCLUSION

The epidermal characters of plants in systematic studies in distinguishing certain groups of plants have been used. Stace 1973; Ahmad ,1964 a, b; Ramayya and Rajgopal 1971. The different type of stomata have been reported on the same surface of an organ in diverse angiospermic families have been reported by Tognini, 1897; Loftfield ,1921; Sen ,1958; Pant and Kidwai, 1964; Paliwal,1965; Pant and Mehra ,1965; Inamdar ,1969; Bahadur et al ,1971 & Vaidya 2015. So this work is a small contribution as an aid in the identification of the species with the help of anatomical studies.

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