

## STUDY OF LEAF ARCHITECTURE AND STOMATA STRUCTURE IN SOME SPECIES OF GENUS *Euphorbia*

K.A. More

Department of Botany and Research Institute, Yahvantrao Chavan Arts and Science Mahavidyalaya  
Mangrulpir, Dist Washim MS, India  
kmore1914@gmail.com

### ABSTRACT

*Stomata is a epidermal outgrowth of Leaf epidermis which play a important role in the transpiration of plant. Taxonomically it also play a important distinguish character of Angiosperm plants it shows great variation among all the taxon of plant group venation pattern of leaf is also important character to distinguish the among the taxa, In this paper we study five species of Genus Euphorbia. Which discuss follow.*

**Keywords:** *Stomata, venation pattern, species of Euphorbia, Taxonomy.*

### Introduction

Stoma gives characters of ordered importance. This is because of the way that genera and even families show incredible steadiness for their ownership of a specific stomatal complex. The investigation of stomatal edifices turns out to be exceptionally valuable to comprehend the developmental relationship of plants when the old style strategies for cytology and hereditary qualities and so on can't be applied. Aside from stomatal complex surface perspective careful cells and the gap have ordered significance. Stomata can detect little changes in carbon dioxide focus and react in like manner. An adjustment in carbon dioxide focus in air gets rolling a progression of biochemical responses in watchman cells. This causes the development of gatekeeper cells accordingly opening and shutting of stomata. This property of stomata can be used in deciding the air quality in the climate. Sen and De (1992b) states that 'the credits of stomata of certain plant taxa can be utilized as biomonitors of air-contamination'. The investigation of ontogeny of stoma and stomatal complex has enormously improved our insight about the foundation of cell extremity, advancement, separation and example arrangement over leaf surface. Another part of stoma is ending up being an entrancing subject for examination. Stomata are additionally ending up being the subject of examination of antitranspirants. Antitranspirants are utilized to close stomata empowering a harvest plant to withstand a time of dry spell. Because of conclusion of stomata

photosynthesis is forestalled accordingly lessening yield. Transpirational water misfortune is additionally forestalled. Lasting harvests are exposed to such treatment for a specific season when their endurance turns out to be a higher priority than great yields. Abscissic corrosive, headache medicine and so forth are utilized as antitranspirants.

Stomata are personally connected to physiological cycles that are basic for endurance in earthly conditions.

### Material and methods

For leaf architectural, the leaves were cleaned by immersing in 10-20 % aqueous sodium trichloroacetic acid and phenol solution 2.1 and stained with Kores stamp pad purple ink ( Rao et al., 1980 ) and micro photographs were taken with the help of Asia Pentax camera.

For dermal studies peels from fresh preserved leaf materials were taken and stained it in 1 % Safranin, line drawings and micro photo

Where

'S' is the number of stomata per unit area,

'E' is the number of epidermal cell in the same area

Stomatal index have been calculated out of an average of 10 readings.

For dermal studies peels from fresh preserved leaf materials were taken and stained it in 1 % Safranin, linedrawings and microphotographs were taken. The stomatal index was calculated by using following equation ( Salisbury, 1927 and 1932 )

$$SI = \frac{S}{E+S} \times 100$$

Where

‘S’ is the number of stomata per unit area,

‘E’ is the number of epidermal cell in the same area

Stomatal index have been calculated out of an average of 10 readings.

## Result and Discussion

### *Euphorbia barnhatii* Corizat, Euph.

#### Stomata :- (Plate No. 1) :-

The leaves are amphistomatic but stomata are more in number on abaxial side of the leaf. The stomata are cruciferous type. The stomatal index is 25. The average size of stomata is 36 x 22 mu.

#### Leaf architecture : (Plate No 1) :-

The type of venation pinnate, simple, random reticulate. Aeriolation quandrangular, veinlets branched twice.

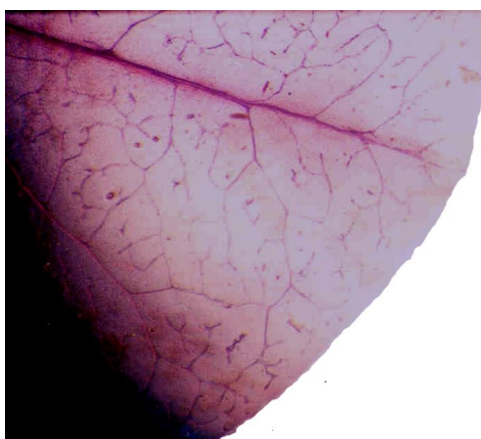
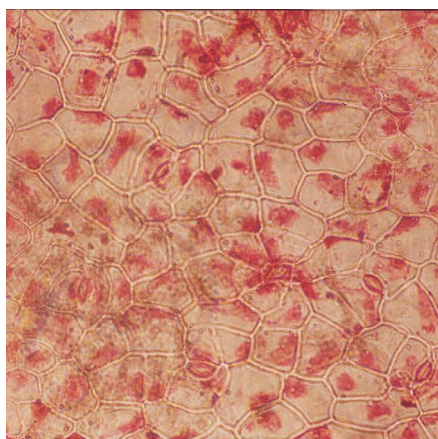


Plate No 1

### *Euphorbia Caducifolia* Haines, Ind.

#### Stomata :- (Plate No. 2)

The leaves are amphistomatic but stomata are more in number on lower surface of leaf. The stomata are cruciforus type the stomatal index

is 27.32 the average size of stomata is 42 x18 mu.

#### Leaf architecture :- (Plate No. 2)

The venation is pinnate, craspedromous, simple, reticulate venation. aeriolation are quandrangular, veinlets are branched

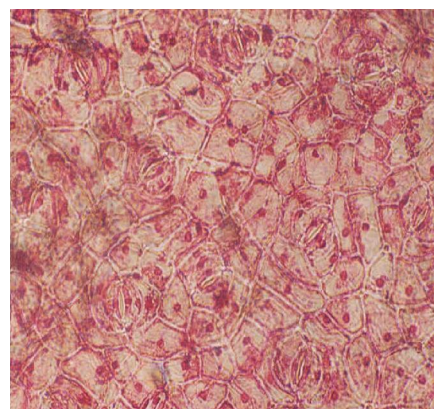
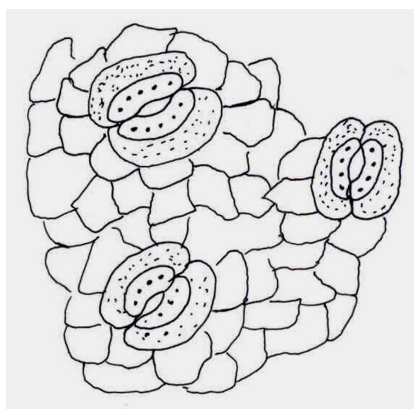
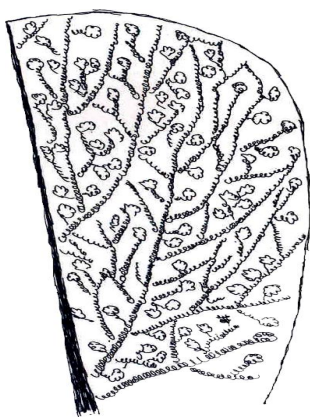


Plate No 2



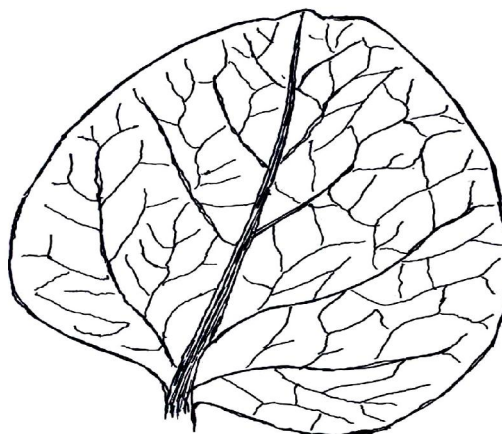
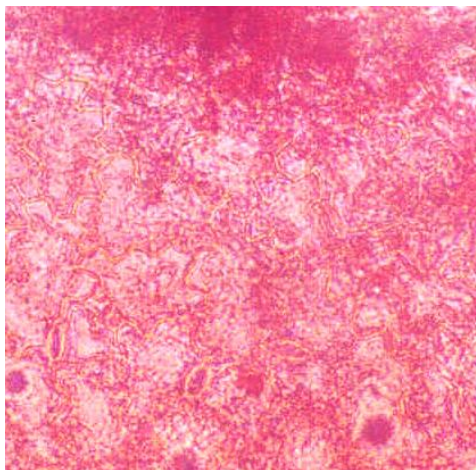
***Euphorbia Cyathophara* Murr.****Stomata :-** (Plate No. 3)

The leaves are amphistomatic but stomata are more in number on abaxial side of the leaf. The stomata are Rubiceous or cruciferous type. The

stomatal index is 54. The average size of stomata is  $33.2 \times 22.8 \mu$

**Leaf architechture**

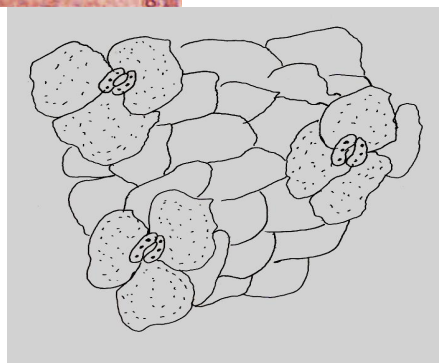
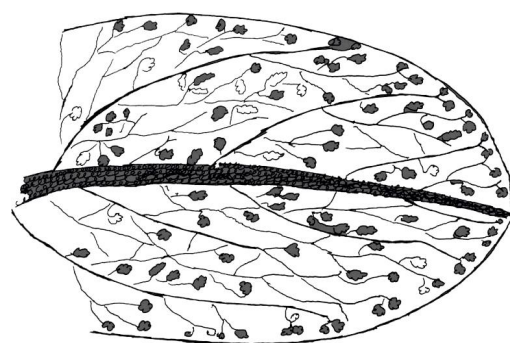
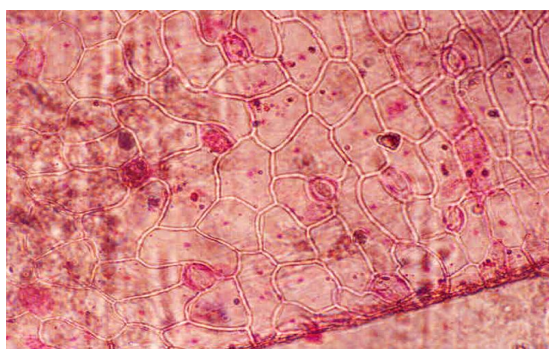
The type of veination pinnatcamptodromous, brochidodromous, aeriotes development is incomplet and veinlets are branched

**Plate no 3*****Euphorbia dracunculoides* Lamk****Stomata -(Table No.:- 4)**

The leaver are amphistomatic but stomata are more in number on abaxial side. The stomata are cruciferous type. The stomatal index is 42. The average size of stomata is  $36 \times 16 \mu$ .

**Leaf architechture -(Table No.:- 4)**

The type of veination is pinnate, semi cratedodromous, ramified, exmedial. Aeriolation shape quadrangular and veinlets are simple branched - twice, tip of veinlets are oval elongated and spiral

**Plate no 4**

***Euphorbia heyneanaspreng.*****Stomata -**

The leaves are amphistomatic but stomata are more in number on abaxial side of the leaf. The stomata are cruciferous type. The stomatal index is 43, the average size of stomata is 24 x 18  $\mu$ m.

**Leaf architecture**

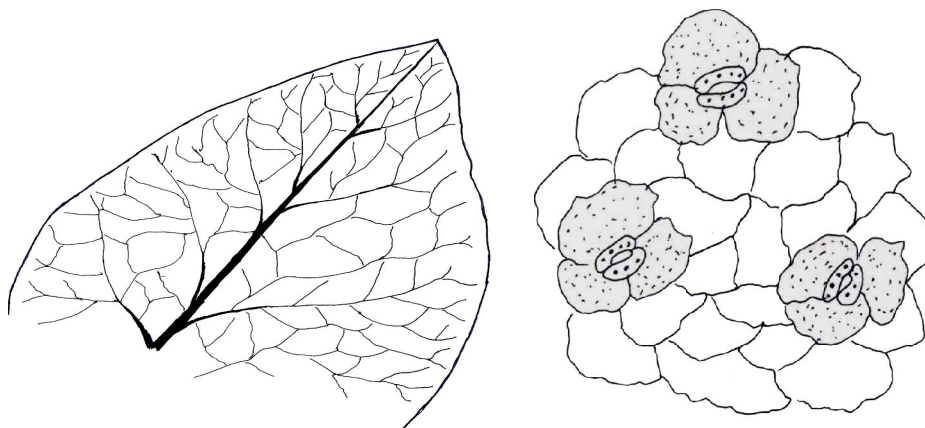
Type of venation is acrodromous in perfect basal, venation is reticulate. Aerials quadrangular and veinlets are simple curved.

***Euphorbia hirta* L.****Stomata :- ( plate No. 5 )**

The leaves are amphistomatic but stomata are more in number on abaxial side of the leaf. Stomata are cruciferous type the stomatal index is 52. The average size of stomata is 18 x 12.6  $\mu$ m.

**Leaf architecture :- ( plate No. 5 )**

The type of venation is acrodromous, imperfect, suprabasal. Aerials completely developed. Veinlets are branched and tooth architecture is simple.



**Plate No 5**

### Conclusion

The stomatal index is more in *E. hirta* as compare to the *E. Heyneana*, *E. dracuneuloides*, *E. Cyathophara*, *E. Caducifolia*, *E. barnhatii* average length of stomata is more in *E. Caducifolia*. Similarly, vein parameters also play an important role. In *E. caducifolia*, *E. barnherti* veination is pinnate craspedodromous, aeriolation are quadrangular slight difference is in *E. barnhrti* veinlets branch twice, *E. caducifolia* veinlets branched only once. In *E. Caducifolia* veination is pinnate camptodromous sub type brochindodomous, aeriolation is quadrangular veinlets are branched.

Levin (1929) emphasized taxonomic value of vein-islet areas he opined that vein-islet number is nearly constant for all species of Genera and can be used as a value specific charactor.

The stomatal index is higher in the *E. hirta* (52) and lowest in *E. cyathophora* (25) the average size of stomata is large in *E. dracuneuloides* (42 x 32) and it small in the *E. hirta* (18 x 26  $\mu$ m) compare to, *E. heyneana*, *E. cyathophora*. Type of venation pattern is play an important role, *E. cyathophora* veination is pinnate, camptodromous sub type brochidodromous difference is in *E. indica* aeriolation quadrangular and veinlets are simple in *E. cyathophora* aeriolation in complete veinlets are branched in *E. heyneana* and *E. hirta* aeriolation incomplete and veinlets are branched.

### References

1. Bahadur B., Rajagopal T., Ramayya N. (2008). Studies on the structural and developmental variation and distribution of stomata in the Rubiaceae. Bot. J. Linn. Soc., 64(3): 295-310.
2. Baruah A. and Nath S.C. (1997). Studies on the foliar epidermal characters of some members of the Euphorbiaceae. Advances in Plant Sciences, 10: 117-123.
3. Chaudhary N.Y, Imran M. (1997). Comparative study of stomata in some members of Malvaceae and Euphorbiaceae. Pak. J. Pl. Sci., 3(1): 33- 45.
4. Gale R.C. and Toma C. (2006). Comparative anatomy of the vegetative organs of some Euphorbia species (Euphorbiaceaejuss.) from the Romanian flora. Romanian Journal of Biology-Plant Biology, 51: 39-47.
5. Payne, W. (1970).Helicocytic and Allelocytic Stomata: Unrecognized Patterns in the Dicotyledonae. American Journal of Botany, 57(2), 140-147. Retrieved February 14, 2021, from <http://www.jstor.org/stable/2440505>
6. Rao V.S., Shenoy K.S. and Inamdar, J.A.(1980). Clearing and Staining technique for leaf architectural studies, Microsc. Acta 83: 307-311.
7. Singh, V. Jain D.K. and Sharma, M. (1976). Leaf Architerchure in Salix,School of plant Morphology, Meerut College, Meerut, J. Indian bot.soc.55: 140-150.