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## Stomatal Studies in *Euphorbia hirta* L.

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**Abstract :** The study of stomata was conducted on *Euphorbia hirta*. It is a herbaceous plant with different types of medicinally rich chemical compounds in the present study the micro morphological characters like epidermal cell and stomata of this plant has under taken.

**.Key words:** Stomata, Stomatal index, Length and width.

### INTRODUCTION

*Euphorbia hirta* is an important medicinal plant of family Euphorbiaceae. It is commonly known as Dudhi ghas. The entire plant is collected in flowering and fruiting stage and dried which constitutes the drug. It is widely used in the treatment of bronchitis, anthelmintic, bowel, asthma, cough, promotes milk, gonorrhoea. On the basis of their phytochemical studies, which is also correlated with previous ones (Adedapo et al., 2005; Falodum et al., 2006), Kala S. Johnson M., Jankiraman N., Arokia A., Anto, Raj S Iyan and Bosco Dorin, suggested that it is used as antispasmodic, antiasthmatic, expectorant, anticatarrha and antisyphilitic agents. Peruma Pilla I Cai Lee Wei, Mahmud and Ramanathan concluded that *E. hirta* plant extracts posses potential antimicrobial effect against wide array of pathogenic micro organisms with MIC values lower 1 mg/ml.

Stomata are the suitable avenue for transpiration. De Wet (1954) opined that stomatal size may be considered as basis for cytological criteria. The number of stomata is

varies in every plant so stomatal studies also helpful in identification of plant. Family Euphorbiaceae as well as this plant received little attention of the anatomist in past Hidayat and Kusdianti (2009) studied the stomata diversification and phylogenetic analysis of 13 species of family Euphorbiaceae and classified the family into two major groups. Aworinde, Nwoye, Jayeola, Olagoke and Ogundale (2009) studied Taxonomic significance of foliar epidermis in some member of Euphorbiaceae. Raju and Rao (1977) studied variation in the structure and development of foliar stomata in the Euphorbiaceae. Inamdar and Gangadhara (1978) studied the structure and ontogeny of stomata in some genus of Euphorbiaceae. Arya, Dubey and Khatoon (2009) studied the development of quality control parameters of ingredients of a folk remedy for piles and their comparative chemo profiling with homeopathic drugs. Sudeep Kumar and DN Sen (1985) has worked on three spp. of *Euphorbia* in arid condition regarding stomatal index and observed due to low stomata index, *Euphorbia hirta* survive under water condition of Indian arid zone. Chakrabarty and Gupta (1981) recorded increased stomatal frequency of *Euphorbia hirta* growing along the railway track. Gupta

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and Ghose (1987) also recorded increased stomatal frequency *Euphorbia hirta* in polluted area.

The present investigation puts on record the different types of stomatal features in relation to the subsidiary cells as well as their length and width.

**MATERIALS AND METHODS**

The plant *Euphorbia hirta* was taken for the study of epidermal anatomical characteristics, such as stomatal index, shape of epidermal cell and the size of stomata. The stomatal studies was done by mechanical peeling off or scrapping off the epidermis from fresh leaves (Topno and Ghosh, 1997). Scrapping off epidermis was done at both dorsal and ventral surface of leaf and were stained with aqueous saffranine and mounted in glycerine. The stomatal index was calculated by using following formula :

Stomatal Index (SI) =

$$\frac{\text{No. of stomata per unit area}}{\text{No. of epidermal cell per unit area} + \text{No. of stomata per unit area}} \times 100$$

Length and width of stomata were measured with the help of ocular micrometer.

**OBSERVATION**

**Dorsal Surface :**

**Table 1:**

No. of Observation	No. of stomata under High Magnifying Power Microscope (10X) x (15X)	No. of Epidermal Cell
1	1	30
2	1	32
3	2	65
4	2	66
5	1	60
6	1	40
<b>Total</b>	<b>8</b>	<b>293</b>
<b>Menu</b>	<b>1.33</b>	<b>48.83</b>

$$SI = \frac{1.33}{1.33 + 48.83} \times 100 = 3$$

**Ventral Surface :**

**Table 2:**

No. of Observation	No. of stomata under Low Magnifying Power Microscope (10X) x (15X)	No. of Epidermal Cell
1	6	30
2	8	32
3	8	33
4	7	31
5	8	33
6	6	31
<b>Total</b>	<b>43</b>	<b>190</b>
<b>Menu</b>	<b>7.17</b>	<b>31.67</b>

$$SI = \frac{7.17}{7.17 + 31.67} \times 100 = 18$$

**RESULTS AND DISCUSSION**

The study revealed that stomata of *Euphorbia hirta* was tricytic, quadricytic and pentacytic type with bean shaped guard cells. The epidermal cell of stomata was irregular in shape in both dorsal as well as in ventral surfaces. Stomatal index in dorsal surface was 3 and in ventral surface was 18. The length and width of stomata was 6 and 4 in both dorsal and ventral surfaces. Because stomata was present in both dorsal and ventral surface, the distribution of stomata was amphistomatic.

**REFERENCES**

**Hidayat Topik and Kusdianti. January, 2009.** Stomata diversification and phylogenetic analysis of 13 species of family Euphorbiaceae sennsutalo, Biodiversitas, Volume 10, Number 1, Page – 19 – 22.

**Aworinde D.O., Nwoye D.U., Jayeola A.A., Olagoke A.O. and Ogundele A.A. 2009.** Taxonomic significance of foliar epidermis in some members of Euphorbiaceae family in Nigeria, Res.J., Bot., 4 : 17 – 28.

**Raju V.S. and Rao P.N. 1977.** Variation in the structure and development of foflar stomata in the Euphorbiaceae,

**Kerketta & Dipti. : Stomatal Studies in *Euphorbia hirta* L.**

Botanica Journal of the Linnean society, Volume – 75, Issue – 1, Page. 69 – 97.

**Chakrabarty T and Gupta Dilip. August, 1981.** Morpho-histologic studies on three herbaceous species of railway track, Indian Acad. Sci., (Plant Sc.), Volume – 90, Number – 4, Page – 305 – 312.

**Gupta MC. And Ghose A.K.M. 1987.** Effect of coal smoke pollutants from different sources on the growth, Chlorophyll content, stem anatomy and cuticular traits of *Euphorbiaceae hirta* L., Environmental pollution, Volume – 47, Issue – 3, Page – 221 – 229.

**Topno S and Ghosh T.K. 1997.** Comparison of epidermal character of cassia Linn. Columban J Life Sci. 5 (1 and) : 239 – 242.

**Arya K.R., Dubey Priyanka and Khatoon Sayyada. May 2009.** Development of quality control parameters of ingredients of a folk remedy for piles and their comparative chemo profiling with homeopathic drugs, Journal of Scientific and Industrial Research, Volume – 68, Page – 385 – 392.

**Inamdar J.A. and Gangadhara M. 1978.** Structure and

Ontogeny of stomata in some Euphorbiaceae, Phytion (Austria), Vol. 19, page – 37 – 60.

**Kala S., Johnson M., Janakiraman N., Arokiaraj A., Anto, Raj S. Iyan and Bosco Dorin. September, 2011.** Pharmacognostic and Phytochemical studies on some selected ethnomedicinal plants of Tamilnadu, South India, Int. J. Med. Arom. Plants, Volume – 1, Number – 2, Page – 89 – 94.

**Perumal Shanmugapriya, Pillai Suthagar, Cai Lee Wei, Mahmud Rosiahanim and Ramanathan Suresh. 2012.** Determination of Minimum Inhibitory concentration of *Euphorbia hirta* (L.) Extracts by Tetrazolium Microplate Assay. Journal of Natural products, Volume – 5, Page – 68 – 76.

**Adedapo A.A., Shabi O.O., Adedolum O.A. 2005.** Anthelmintic efficacy of the aqueous extract of *Euphorbia hirta* (L.) in Nigerian dogs, Veterinary Archives, 75 (1), page – 39 – 47.

**Falodun A., Olunzobe L.O. and Uzoamaka N. 2006.** Phytochemical screening and anti-inflammatory evaluation of methanolic and aqueous extracts of *Euphorbia heterophylla* Linn. (*Euphorbiaceae*) African Journal of Biotechnology, 5 (6), Page – 529 – 531.

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**\*\*BIOSPECTRA\*\***

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