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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
Total	8	293
Menu	1.33	48.83

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

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
Total	43	190
Menu	7.17	31.67

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

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.

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