LENTIBULARIACEAE

According to Willis (1966) the family Lentibulariaceae comprises 4 genera and 170 species. Of these 170 species of this family, there is not even a single report on the structure and ontogeny of stomata. The present study deals with the structure and ontogeny of stomata in one genus and one species. The present investigation is made on aerial part of stem and leaves of the Utricularia inflexa var. stellaris.

Mean values of 15 observations (lower epidermis only of lamina and stem epidermis) showing percentage of types of stomata, stomatal frequency and index per mm², size of guard and epidermal cells in μ, nature of epidermal walls and surface of the organs in the species studied are charted in the table to explanation to text figure 10:1.

OBSERVATIONS

I. EPIDERMIS:
(i) Surface:– The aerial leaves are hypostomatic and the aerial stem is stomatic.

(ii) Structure:– The epidermal cells are polygonal and isodiametrical or elongated in one direction. The elongated epidermal cells are arranged in longitudinal rows with their axes parallel
to the organ. There is no definite pattern of arrangement of polygonal and isodiametric epidermal cells. The cuticle may be thin or thick. The papillae are in the centre of each epidermal cell. The epidermal cells contain few and scattered chloroplasts (Pl. 10:1A).

(iii) Dimensions:- The maximum length of the epidermal cells is 42.5 \( \mu \) in lamina and minimum is 34.6 \( \mu \) in stem; the maximum breadth is 21.5 \( \mu \) in lamina and minimum is 19.3 \( \mu \) in stem.

II. STOMATA:

1. Mature:

(i) Distribution and orientation:- The mature stomata are uniformly distributed and irregularly oriented. The stomata are widely separated from each other by epidermal cells (Figs. 10:1C-D Pl. A, B).

(ii) Type:- The mature stomata in the leaf and stem are anomocytic (Figs. 10:1A-C Pl. 10:1A-B).

(iii) Structure:- The anomocytic stomata are surrounded by 3 to 6 epidermal cells (Figs. 10:1A-C Pl. A-B).

(iv) Abnormality:- No abnormal stomatal formation has been observed in the Lentibulariaceae studied.

(v) Size of guard cells:- The maximum length of guard cells of stomata is 22.5 \( \mu \) and breadth is 10.5 \( \mu \) in lamina and minimum length of guard cells of stomata is 20.2 \( \mu \) and breadth is 9.5 \( \mu \) in stem of *Utricularia inflexa* var. *stellaris*. 
(vi) **Percentage, stomatal frequency and index:** Only anomocytic type of stomata are observed. So the percentage of anomocytic stomata 100. The highest stomatal frequency is $128/\text{mm}^2$ and index is $19/\text{mm}^2$ in the lamina and lowest stomatal frequency is $64/\text{mm}^2$ and index is $15/\text{mm}^2$ in the stem, of *Utricularia inflexa* var. *stellaris*.

2. **Development of stomata:**

A lenticular or triangular meristemoid is cut off from the protoderm cell. The meristemoid can be easily distinguished from the adjacent protoderm cells by its shape, smaller size, prominent nucleus and dense staining properties (Fig. 10:1B). The development of the anomocytic stomata is as follows:

**Anomocytic stomata:** The meristemoid occur solitary, enlarges and directly becomes a guard mother cell (Fig. 10:1B). It divides by a straight wall to form a pair of guard cells which then develop an intervening pore (Fig. 10:1B).

3. **Morphogenetic grouping:**

The ontogeny of anomocytic stomata is perigenous as the meristemoid directly gives rise to the guard cells without cutting off any subsidiary cells.

**DISCUSSION AND SUMMARY**

According to Metcalfe and Chalk (1950) in the family Lentibulariaceae and in some species of *Utricularia* the stomata are present near the margin. In *U. montana* anomocytic type of
stomata are reported (Metcalfe and Chalk, 1950). These authors have not made any reference to the epidermis. The aerial leaves are hypostomatic. The epidermis consist of polygonal, isodiametric or elongated cells with thin straight, arched or slightly sinuous walls. Papillae like projections are present in all epidermal cells. In the stem epidermis few and scattered chloroplasts are present. Anomocytic stomata are observed on the aerial portions of stem and leaf. Anomocytic stomata have peregenous development.
Table: *(Fig.10:1, A-B-D = 350X; C = 425X)*

Showing percentage of different types of stomata, Stomatal frequency and index per mm², Size of guard & epidermal cells in μ, nature of epidermal walls and Surface.

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Name of the plant/organ</th>
<th>STOMATA</th>
<th>EPIDERMIS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Percentage</td>
<td>Frequency per mm²</td>
</tr>
<tr>
<td>A-D.</td>
<td><em>Utricularia inflexa var. Stellaris</em></td>
<td>100</td>
<td>64</td>
</tr>
<tr>
<td>A.</td>
<td>Stem</td>
<td>100</td>
<td>128</td>
</tr>
<tr>
<td>-D.</td>
<td>Lamina</td>
<td>100</td>
<td></td>
</tr>
</tbody>
</table>

D = Leaf upper epidermis
PLATE - 10:1

EXPLANATION OF PLATE FIGURES (10:1 A-B X 1070)

PEEL FROM LEAF LOWER (B) EPIDERMIS AND STEM EPIDERMIS (A) SHOWI

A•B. *Utricularia inflexa* var. *stellaris*

A. Stem:- Stoma with few and scattered chloroplasts.

B. Leaf:- Developmental stages.