Foliar epidermis and ontogeny of stomata in *Ecbolium linneanum* Kurz.

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Abstract. The leaves are hypostomatic bearing the dia-mesogenous and diallelo-mesoperigenous stomata on the lower epidermis only. Less frequently occurring dia-mesogenous stomata have 2 subsidiaries of mesogenous origin, lying at right angles to long axis of the stomatal pore. The other type is more common and characterised by 4 or sometimes 3 subsidiaries of dual origin. Those two of the inner ring are mesogenous and the remaining two or one subsidiary cell of the outer ring, as the case may be, are of perigenous origin. However, the meristemoids of both types are dolabrate and the difference in the adult stomata is found to be dependent on the number of the cells encircling the meristemoid and the nature of the placement of the cross wall laid by the meristemoid producing protodermal cell.

Keywords. *Ecbolium linneanum* Kurz.; Acanthaceae; stomatal ontogeny; dia-mesogenous and diallelo-mesoperigenous types.

1. Introduction

The stomata, in the members of Acanthaceae, are generally of diacytic type (Metcalfe and Chalk 1957). In view of the mesogenous origin of the two subsidiaries, these stomata are regarded as dia-mesogenous type (Paliwal 1966; Inamdar 1970; Fryns-Claessens and Van Cotthem 1973). Recently, Rohweder and his co-workers (Rohweder et al 1971) have reported the occurrence of one more type of stomata viz., diallelo-mesogenous type, in some members of the above family. This stomatal type has at least three subsidiaries, lying at right angles to the long axis of the guard cells. However, there is no report available on the stomatal development in *Ecbolium linneanum*. The present paper deals with the stomatal ontogeny in this taxon.

2. Materials and methods

Leaves of various stages were collected from the plants growing in the Institute Campus. They were fixed in FAA. Customary procedures were followed for the preparation of epidermal peels. The young leaves were cleared with chloral hydrate solution and NaOH solution successively and stained with acetocarmine.
3. Observations

3.1. Mature epidermis

The costal cells of both surfaces are alike in that they are straight-walled and axially elongated bearing only non-glandular hairs. But, the intercostal cells of lower epidermis are deeply sinuous and thick-walled (figure 1) while those of upper side are straight-walled or sometimes slightly arched and thick-walled. The cystolith idioblasts and the hairs of both glandular and non-glandular types occur on both the surfaces where as the stomata are confined to the lower epidermis only (hypostomatic). However, the idioblasts are of frequent occurrence on the upper side while the hairs are abundant on the other side. The idioblasts are larger than the ordinary epidermal cells. They have a narrow and elongated surface and a swollen base, encircled by 6-8 smaller neighbouring cells (figure 1). Among the two types of hairs the glandular ones are distributed only on the intercostal areas. They possess a short, single-celled stalk and a spherical head composed of 4-8 cells with denser cytoplasm and a few oil droplets. Non-glandular hairs are uniseriate, and unbranched. They are made up of 2-4 thick-walled and warty cells, of which the terminal cell is tapering. In both the stomatal types, the subsidiaries are placed at right angles to the long axis of the stomatal pore. However, the dia-mesogenous stomata have two such subsidiaries of mesogenous origin while the dia-lelo-mesoperigenous ones possess four or some times three subsidiaries of dual origin. The stomata of former type are infrequent compared to those of other type. Among the latter those with four subsidiaries are more common than those with three subsidiaries.

Figures 1-6. Foliar epidermis (lower) of *Ecbolium linnaeanum*. 1. Mature epidermis. 2. Triangular meristemoid with a dia-mesogenous stoma. 3. Lenticular meristemoids at various developmental stages. 4. Dia-lelo-mesoperigenous stomata: note the stoma at right hand top corner with three subsidiaries. 5. Dia-mesogenous stoma; note the mesogenous subsidiaries encircled by more than four neighbouring cells. 6. Mature stomata of dia-lelo-mesoperigenous and dia-mesogenous type. (id, cystolith idioblast; m, meristemoid; ps, perigenous subsidiary cell; sc, sistercell; s1, first mesogenous subsidiary cell; s2, second mesogenous subsidiary cell).