CHAPTER - 5

TRIBE : MUTISIEAE

INTRODUCTION

The tribe Mutisieae includes 51 genera which are mainly distributed in the North American region. Embryology of the tribe was not known till 1957 when Maheswari Devi (1957) investigated the embryology of *Gerbera jamesonii*. Kapil and Sethi (1962a) studied the embryology of *Ainsliaea aptera*. It is quite clear that the tribe is embryologically very poorly studied. Hence the present investigation was undertaken to study the embryology of the available species *Dicoma tomentosa* Cass.

OBSERVATIONS

Microsporangium, Microsporogenesis and Male gametophyte:

The anther is tetrasporangiate. The male archesporium consists of a hypodermal row of 4 cells (Fig. 4 A). These cells become prominent with large size and conspicuous nuclei. They expand radially and undergo periclinal division resulting in primary parietal layer towards the epidermis and primary sporogenous layer towards the connective side (Fig. 4 B). The primary parietal layer undergoes one more periclinal division resulting in inner layer of tapetum and outer parietal layer

(Fig. 4 C). The outer parietal layer undergoes one more periclinal division resulting in a hypodermal layer and a middle layer (Fig. 4 D). This type of wall development according to Davis (1966) is known as the Dicotyledonous type. The epidermal cells undergo anticlinal division keeping pace with the expanding anther. These cells, at maturity get much elongated and flattened. The hypodermal cells develop fibrous thickenings when three-celled pollen grains are formed and the layer is known as fibrous endothecium. The middle layer gets crushed and degenerated at the time of meiotic divisions in the pollen mother cells. The inner most layer of the anther wall is the anther tapetum which is of the Periplasmodial type (Fig. 4 E). Cells of this layer undergo nuclear divisions resulting in 2-6 nuclei (Fig. 4 F). Some times nuclear divisions are followed by fusions resulting in polyploid nuclei of various shapes and number (Fig. 4 G & H). The periplasmodial formation commences only after the initiation of exine on the pollen grains.

The primary sporogenous cells undergo only transverse division resulting in only one row of pollen mother cells (Fig. 4 D). The pollen mother cells round off and undergo meiotic divisions. Pollen tetrads are of the decussate or tetrahedral type (Fig. 4 I & J). Micro-

spore after its release from the tetrad enlarges considerably and develops thick exine (Fig. 4 K & L). The pollen grains at anthesis are three-celled with three germ pores (Fig. 4 L).

Ovary and Ovule:

The ovary as in other Compositae is bicarpellary syncarpous and unilocular with a single basal anatropous unitegmic and tenuinucellate ovule. The ovule arises as a papillate out growth (Fig 4 M) from the base of the ovary in which archesporial cell becomes differentiated. Anti- and periclinal divisions of the epidermal and hypodermal cells on the adaxial side of the ovule lead to the unilateral growth and the apex first assumes a position at right angles to the funicle and then comes to lie parallel to it in the typical anatropous form (Fig. 4 N & O). Soon after the curvature of the ovule is initiated localized divisions take place in the epidermal cells of the nucellus at the level of the base of the megaspore mother cell. The resulting fold of tissue is the primordium of a single massive integument which grows over beyond the nucellus, until it reaches the funicle (Fig. 4 N & O).

The nucellus consists of a single archesporial cell surrounded by a single layer of nucellar epidermis

Fig. 4 A - Q

Fig. 4 A - Q : *Dicoma tomentosa*

Fig. 4 A : L.S. part of anther lobe showing archesporium.

4 B : L.S. part of anther lobe showing primary parietal layer and primary sporogenous layer.

4 C : L.S. part of anther lobe showing two parietal layers and sporogenous layer.

4 D : L.S. part of anther lobe showing wall layers and pollen mother cells.

4 E : L.S. part of anther lobe showing periplasmodium and one-nucleate pollen grains.

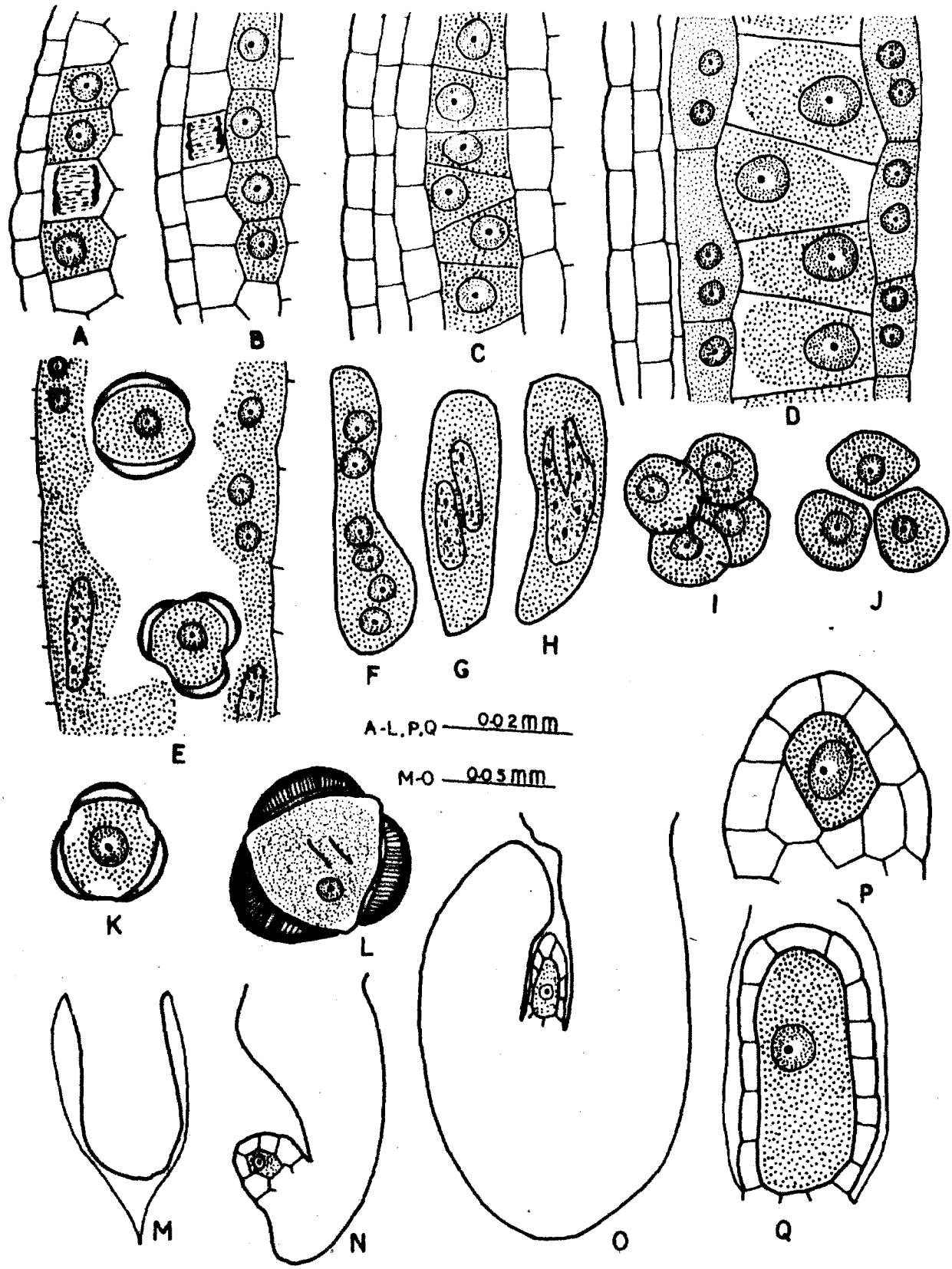
4 F - H : Anther tapetal cells.

4 I & J : Decussate and tetrahedral pollen tetrads respectively.

4 K & L : One-nucleate and 3-celled pollen grains respectively.

4 M & O : Development of ovule.

4 P & Q : Archesporial cell and megaspore mother cell respectively.


A
B
C
D
E
F
G
H
I
J
A-L, P, Q — 0·02 mm
M-O — 0·05 mm
K
L
P
M
N
O
Q

(Fig. 4 P). The archesporial cell functions directly as the megaspore mother cell (Fig. 4 Q).

DISCUSSION

The anther tapetum in the family is of the Periplasmodial type. In Ainslaea aptera (Kapil and Sethi, 1962a) the walls of the tapetal cells break down and the protoplast protrudes inside the locule along with their nuclei. This according to Kapil and Sethi (op. cit.) is not a true Periplasmodial tapetum. A similar condition is also observed in Dicoma tomentosa (present study). But in my opinion the anther tapetum in both the species is also of the Periplasmodial type as the walls of the tapetal cells break down and protoplast protrudes inside the locule. In Gerbera jamesonii, Maheswari Devi (1957) recorded a true Periplasmodium.

The anther wall development in Dicoma tomentosa is of the Dicotyledonous type as in all other Compositae. Pollen grains are shed at 3-celled stage as in most other members of Compositae. The ovary in the tribe Mutisieae is bicarpellary syncarpous and unilocular with a single basal anatropous ovule. But in Ainslaea aptera in a few cases two ovules per ovary are observed in the same locule.