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AN ABORTIVE ANTHER OF *LILIUM FORMOSUM*

CHARLES A. HOFFMAN

While preparing sections of an anther of *Lilium Formosum* for histological study it was noted that only two of the locules were at all normal. The remaining two, on the other side of the filament, contained no pollen-mother cells and were somewhat shriveled. Since this condition had not been encountered in any of the numerous anthers studied and seemed worthy of mention, the following study was made.

The tissue in a normal anther at the time of the metaphase of the first division of the pollen-mother cells consists of the following: (1) An epidermal layer; (2) A layer of large cells which average as great a width as length and contain from fifteen to fifty large starch grains, usually about twenty; (3) A row of cells averaging a little longer than the next outer row but which are only one-half to one-fifth as wide and contain fifteen to twenty small starch grains; (4) From one to four, generally two, rows of cells about as long as the next outer ones but averaging only about one-half as wide. The outer of these rows contains fifteen to twenty small starch grains. The inner row or rows of these are narrower, the innermost sometimes being almost linear and containing very little starch. At this stage the thin-walled cells joining these linear cells to the tapetal cells have already been dissolved out, so they are represented only by fragments and a space. The tapetal cells are two to three times as long as wide and have spaces between them but there is only one row of them. Inside of these, of course, are the pollen-mother cells. A normal anther is shown in Figures 1 and 2.

In the abortive locules all of the tissue resembled the parenchyma in the filament and in the anther between the four locules. The row of cells directly beneath the epidermis was smaller than usual while the other rows were undifferentiated and isodiametric. Near the center of the locule surrounded by these vegetative cells, the remnants of the pollen-mother cells appeared as a streak of compressed material. There was less starch in the vegetative cells of the abortive locules than in those of the more normal ones.

All of the cells of these two locules had evidently proceeded normally in their development up to a certain point after which

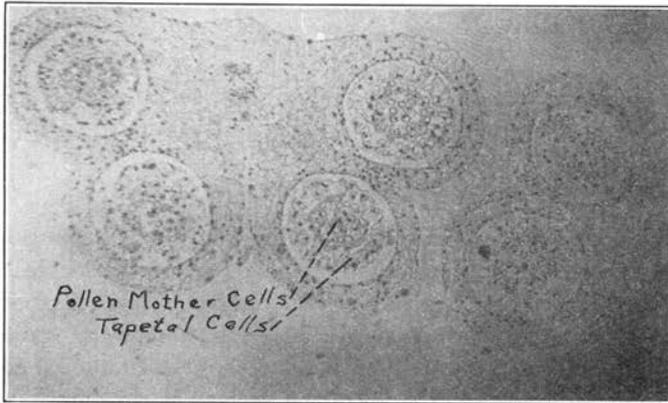


Fig. 1. Normal anther in a somewhat later stage than the abnormal anther studied. This section was taken above the junction of the filament and the anther

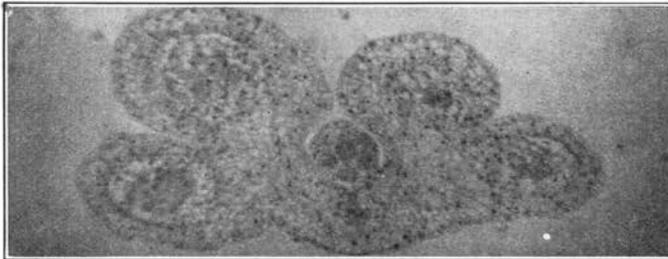


Fig. 2. Nearly normal anther, probably from the same plant as the abnormal anther. This an earlier stage than shown in figure 1 and shows the tapetal cells still connected to the wall cells. The section was taken at the junction of filament and anther and shows well the vascular bundle of the filament entering the anther

all but the sporogenous tissue developed into undifferentiated vegetative tissue which absorbed the contents of the pollen-mother cells and pushed in and filled the space usually occupied by them. Janczewski¹ reports a somewhat similar case in the gooseberry in which the development of the anthers proceeded normally until after the pollen had been formed after which the pollen grains became transparent and were absorbed by the tapetal cells. There are no more vegetative cells in the abortive locules than in a normal locule but they have expanded so as to occupy all the space usually filled by the pollen-mother cells. The tapetal cells have rounded out and perhaps multiplied. They are shown in figure 5 as the larger light cells directly surrounding the residue of the pollen-mother cells.

The absorption of the pollen-mother cells may have been due

¹ Sur les antheres steriles des groseilliers. Bul. Acad. Sci. Cracovie Cl. Math. Nat., 1908: 587-96. Pl. No. 24.

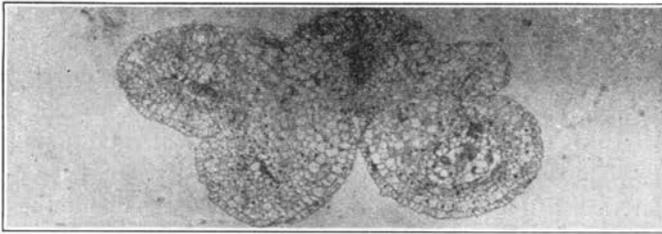


Fig. 3. Abnormal anther above the junction of filament and anther. The two locules on the left are collapsed, one on the right is very small and without reproductive tissue and the other is only partly normal

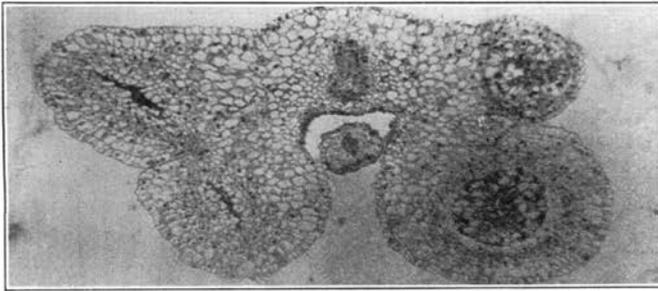


Fig. 4. Abnormal anther below the junction of filament and anther. This far down both locules on the right contain some reproductive tissue, but are still not normal. The condition shown in the two left hand locules persisted thruout their length. (Figs. 3 and 7)

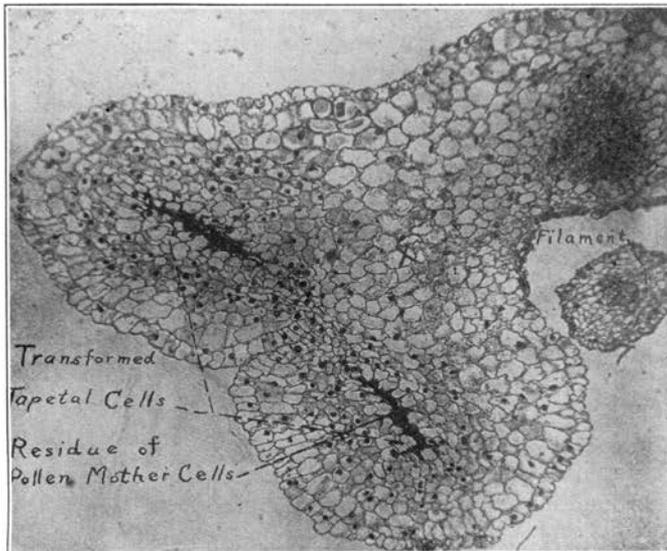


Fig. 5. A more highly magnified view of the abortive locules taken slightly below the section shown in figure 4. The small dark spots in the cells near the x are starch grains. The tapetal cells and those just outside of them which are usually linear have become differentiated and isodiametric

in part to their inability to proceed further in their development due perhaps to a chromosomal upset although it would hardly seem that this could account for all the abnormal conditions in the anther. The influence causing the abnormality must have been internal rather than external since only half of the anther was very noticeably affected.

The only abnormalities in the normal half of the anther were the presence in some places of two rows of unusually large tapetal cells instead of one, the smaller size of one locule and the arrested

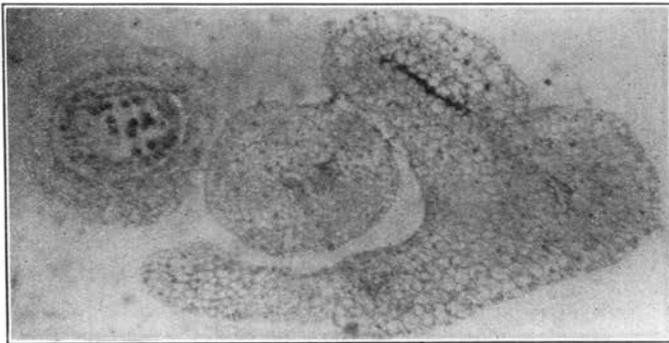


Fig. 6. Section near the bottom of the anther showing the relative length of the two right hand locules. The upper was shorter at both ends

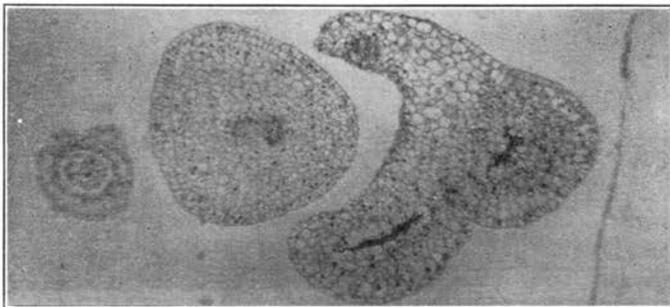


Fig. 7. The last section that showed pollen mother cells. The abortive locules are much longer than the two more normal ones.

development of the pollen-mother cells in the upper end of this shorter locule. The abnormal locules were considerably longer than either of the more normal ones.

A chromosomal and morphological upset seems to be about as definite a term as one can apply to the causes of the abnormal conditions described.

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