

# ABSCISSION OF FLOWER BUD PEDICELS IN BEGONIA

## III. ANATOMICAL PATTERN OF ABSCISSION

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### SUMMARY

The abscission in *Begonia* pedicels was studied anatomically. The abscission zone, consisting of small, non-elongated cells, is present already in very young pedicels. The separation proceeds from the outside inward. The pattern is identical in three different clones and is not affected by growth regulators delaying or accelerating the abscission.

### 1. INTRODUCTION

The difference in the degree of flower bud abscission between three clones of *Begonia* is located in the pedicel and is probably not of a hormonal nature (HÄNISCH TEN CATE & BRUINSMA 1973). In this paper the anatomy of the abscission pattern in the three clones is studied, including the effects of the abscission accelerating and delaying hormones, abscisic acid (ABA) and indoleacetic acid (IAA), on the course of abscission.

### 2. MATERIAL AND METHODS

Three *Begonia* clones were selected from the cross (*Begonia cinnabarina* Hook. × *B. micranthera* Griessl) × *B. davisii* Veitch. The growing, preparation, and hormonal treatment of pedicel explants were described by HÄNISCH TEN CATE & BRUINSMA (1973). Explants were fixed in formalin: glacial acetic acid: ethanol (50%) = 90:5:5, during at least 24 hours (JENSEN 1962), dehydrated through the standard tertiary butylalcohol series (JOHANSEN 1940), and embedded in Paraplast (melting point 56°-57°C, Sherwood Medical Industries Inc., Missouri, USA). The sections (10 μ) were stained with fast green and safranin according to JOHANSEN (1940).

### 3. RESULTS

Particularly in older pedicels the abscission zones are visible from the outside as lightly coloured thickenings near the base. Longitudinal sections of very young pedicels show already an abscission zone of four to ten layers of small flat cells (*plate I, fig. 1*) which structure is maintained throughout the lifetime of the pedicel (*plate I, fig. 2*). Cell divisions prior to abscission were never observed.

Plate I.

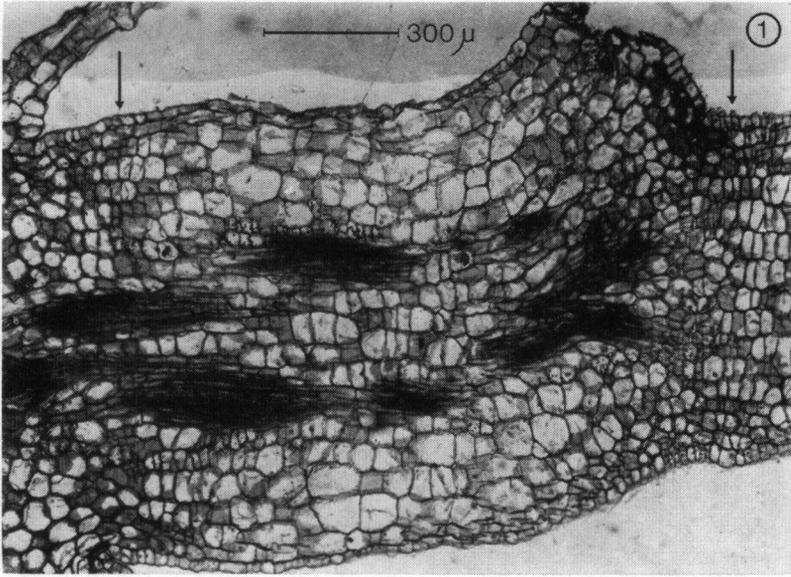


Fig. 1. Two abscission zones of a very young pedicel, indicated by the arrows.

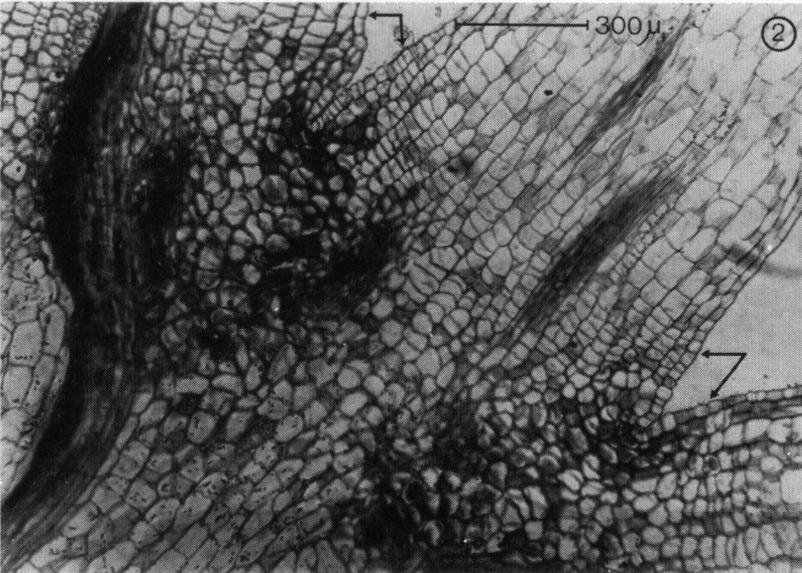


Fig. 2. The abscission zones of a central flower and two side pedicels (arrows).

Plate II.

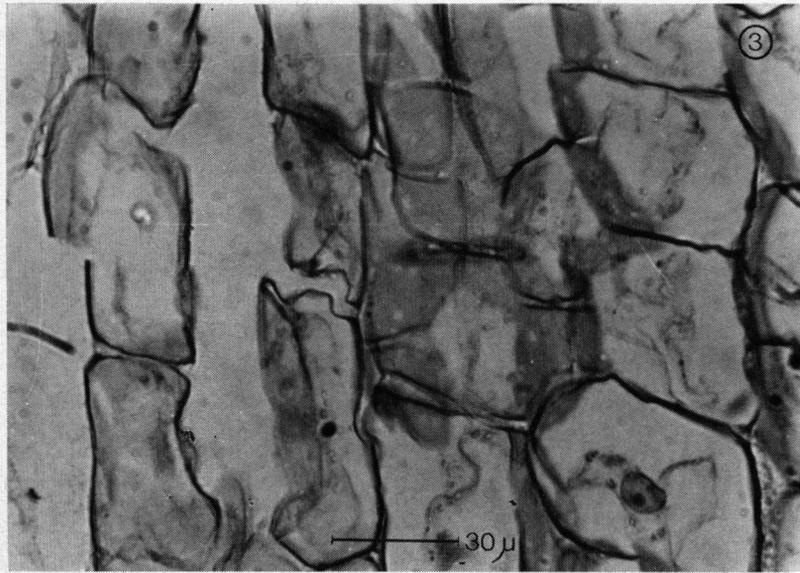


Fig. 3. Separation of cortical cells in the abscission zone.

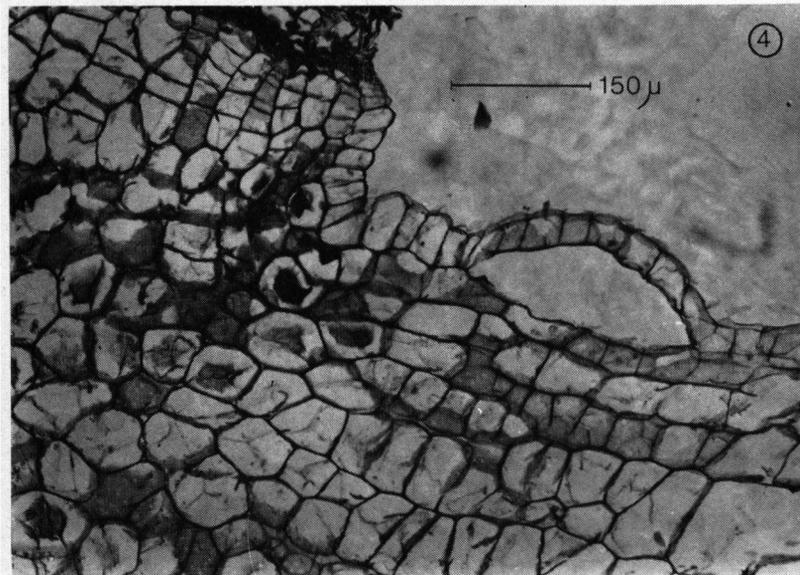


Fig. 4. The first sign of the starting of abscission by a loosening of the epidermis.

## Plate III.

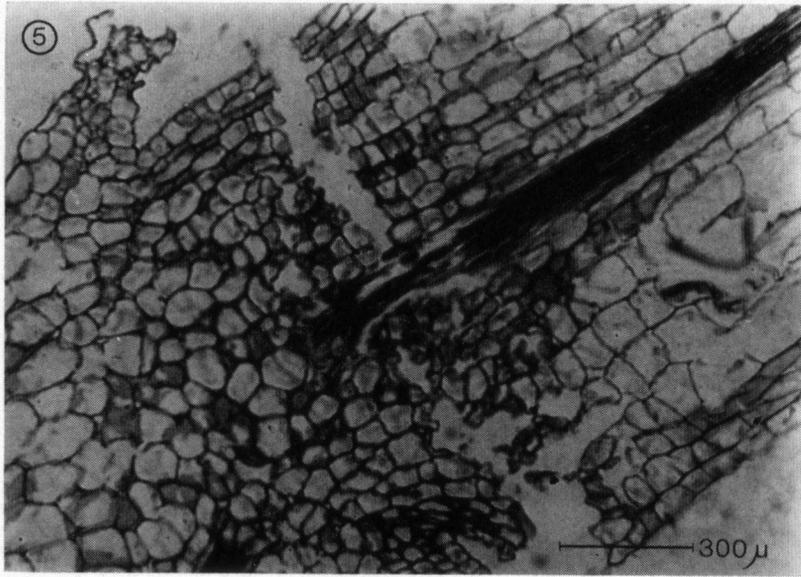


Fig. 5. The continuation of the separation to the stele.

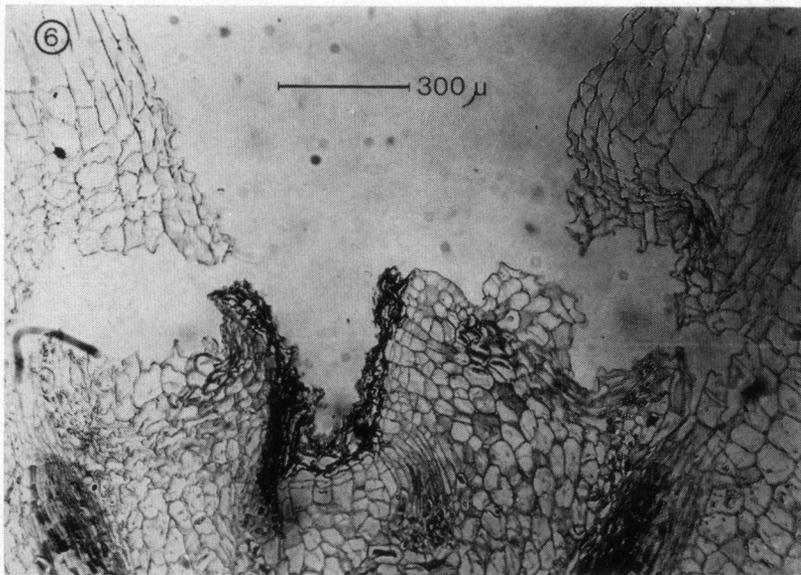


Fig. 6. Abscission of two side pedicels; the scar of the abscised central flower is covered by a protective layer.

The separation starts from the periphery in the cortex by a loosening of cell walls, the cell contents remaining intact (*plate II, fig. 3*). The first visible sign often is a gap between the epidermis and cortex (*plate II, fig. 4*). Subsequently, the separation of cell walls proceeds towards the centre of the pedicels (*plate III, fig. 5*). The pith within the five vascular bundles is the last part to show separation of cells. After the completion of the separation a protective layer of suberin is formed (*plate III, fig. 6*).

When the abscission is accelerated by ABA or retarded by IAA, the anatomical course is not changed. The three clones invariably show the same anatomical pattern.

#### 4. DISCUSSION

The abscission zone of pedicels of male *Begonia* flowers is already present at a very young developmental stage when the pedicel is still elongating. Contrary to the formation of petiole abscission zones, which are often formed by cell divisions just before the separation or earlier during the lifetime of the petiole (WEBSTER 1968, BORNMAN et al. 1967), in *Begonia* pedicels cell divisions never occur. A preformed separation zone was also observed in pedicels of flowers of *Nicotiana* (KENDALL 1918).

The comparison of the anatomical abscission pattern with the three clones gives no clue as to their difference in bud abscission, so that this difference is probably neither hormonal (HÄNISCH TEN CATE & BRUINSMA 1973) nor anatomical in nature.

#### ACKNOWLEDGEMENTS

The technical co-operation of Mr. T. Zaal and Mrs. I. Schmidt-Stolk, and the advices of Mr. A. J. Munting are gratefully acknowledged.

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