

# The Origin of Adventitious Roots From Leaf Cuttings of *Saintpaulia ionantha* Wendl.

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## ABSTRACT

Leaf cuttings of *Saintpaulia*, which is commonly known as the African violet, were found to root readily from the cut surface of their petioles within 18 to 20 days after planting in moist sand boxes. The purpose of this investigation was to study the origin and development of adventitious roots thus formed.

Microscopic sections of the basal portions of petioles, which had been planted from 4 to 18 days, were studied and compared with vertical and transverse sections through petioles of various ages, which had not been planted.

The first noticeable change from the normal structure of the petiole is the formation of a zone of meristematic activity in a region immediately surrounding the vascular bundles (Fig. 2, a). This activity appears to be correlated with a basal enlargement of the petiole.

A circular trough is formed by the disintegration of parenchyma cells in a region immediately outside the zone of increased activity. This disintegration of cells and the failure to produce callus tissue are attributed to the succulent nature of the petiole.

Root primordia are initiated within the zone of increased activity by the division of small groups of parenchyma cells in: (a) the undifferentiated central region in one side of the vascular bundle; (b) a region in line with the undifferentiated central region of neighboring bundles; (c) the parenchymatous zone adjacent to the xylem or phloem of a vascular bundle.

The formation of a root primordium involves the change of several parenchyma cells from an inactive to a meristematic condition, and subsequent radial and tangential divisions of these cells.

Growth of the primordium is by: (a) the division of initial cells, (b) enlargement of newly formed cells, (c) initiation of divisions in adjacent parenchyma cells and their incorporation into the root complex.

Differentiation of root tissues begins soon after the organization of the root apex.

A young root grows at right angles to the axis of the petiole, but turns down before reaching the epidermis. Roots begin to emerge through the cut surface of the petiole 18 days after planting, and within 8 to 10 days after their initiation (Fig. 1).

Fig. 1a. Petiole 3 weeks after planting. 1b. Petiole with adventitious shoot. 2. Cross-section of mature petiole. 2a. Crescent of vascular bundles surrounded by parenchyma cells in which divisions in localized groups of cells are initiated. 3. *Saintpaulia ionantha* Wendl.