

ULTRASTRUCTURAL ANALYSIS OF INITIAL STAGES  
OF DEDIFFERENTIATION OF ROOT EXPLANTS  
OF *GENTIANA CRUCIATA* SEEDLINGS

ANNA MIKUŁA<sup>1</sup>, TERESA TYKARSKA<sup>2</sup>, JAN RYBCZYŃSKI<sup>1</sup>, MIECZYSLAW KURAŚ<sup>2</sup>

<sup>1</sup> Botanical Garden – Centre for Biological Diversity Conservation, Polish Academy of Sciences  
Prawdziwka 2, 02-973 Warsaw, Poland  
e-mail: obpan@ikp.atm.com.pl

<sup>2</sup> Department of Plant Morphogenesis, Faculty of Biology, Warsaw University  
Miecznikowa 1, 02-096 Warsaw, Poland

(Received: May 17, 2002. Accepted: August 28, 2002)

ABSTRACT

The studies were carried out on isolated roots of 10-day old seedlings of *Gentiana cruciata*, which were placed and cultured on induction medium of Murashige and Skoog (1962) supplemented with 1.0 mg/dm<sup>3</sup> dicamba + 0.1 mg/dm<sup>3</sup> NAA + 2.00 mg/dm<sup>3</sup> BAP + 80.0 mg/dm<sup>3</sup> adenine sulphate. Changes in explants from the 3rd to the 11th day of culture with the help of light and electron microscope were observed. Observations showed gradual dedifferentiation of root tissues, which was seen earliest in cortex at the proximal end of the explant and shifted gradually inwards the root and towards distal parts of its elongation zone. The most intensive callus formation appeared at cut surface of explant, where proliferation of cells in both cortex and axial cylinder was recognised. In the distal part of the elongation zone, cell divisions occurred only in endoderm and in axial cylinder. The meristematic part of the root was inactive. Finally, the following areas were distinguished in the explant: (I) an area of intensive cell divisions, i.e., the elongation zone; (II) an area of cell dispersion; and (III) the inactive meristem.

The ultrastructure brought evidences of cell reorganisation as the meaning of cell readiness to the division. Observations showed an increased activity of mitochondria and Golgi structures, thickening of walls and disappearance of plasmodesmal connections. Amyloplasts and lipid bodies in tissues in which they had been scarce or had not appeared before founding. Intensively dividing cells showed features of meristematic cells. They had dense cytoplasm with numerous organelles, large centrally located nuclei, and „nucleolar vacuoles” inside nucleoli. Cortex-derived callus formed aggregates. Both pericycle and endoderm produced callus of characteristic dense structure and regular type of divisions.

KEY WORDS: seedling root of *Gentiana cruciata* L., dedifferentiation, ultrastructure, callus development.