

*SPECIAL COMMEMORATIVE VOLUME
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PROFESSOR DR. MACIEJ ZENKTELER
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SOMATIC EMBRYOGENESIS OF *GENTIANA* GENUS
II. SCANNING AND ULTRASTRUCTURAL ANALYSIS OF EARLY STAGES
OF SOMATIC EMBRYOGENESIS IN LIQUID MEDIUM*

ANNA MIKUŁA^{1,3}, JAN J. RYBCZYŃSKI¹, TERESA TYKARSKA² and MIECZYSLAW KURAS²

¹ Botanical Garden - Centre for Biological Diversity Conservation, Polish Academy of Sciences,
Prawdziwka 2, 02-973 Warsaw, Poland

² Department of Plant Morphogenesis, Faculty of Biology, Warsaw University, Miecznikowska 1,
02-096 Warsaw, Poland

³ author for correspondence: phone (+ 48-22) 648-38-56, e-mail: obpan@ikp.atm.com.pl

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Abstract: Somatic embryogenesis initiated by a single cell or PEM (proembryogenic mass) complex by means of scanning and transmission electron microscopes is presented. The analysed plant material originated from a long term embryogenic cell suspension culture.

Gentiana cruciata (L.) single cell cultures were most probably spontaneously initiated by cells released from epidermis of globular embryos or from broken aggregates of a few cells. A thick cell wall with visually recognised cellulose multi-layer surrounded rich cytoplasm of a single cell. The cell possessed numerous mitochondria and dictyosomes, a rough endoplasmic reticulum and one large nucleus with at least two prominent nucleoli. Starch grains and vacuoles of various shapes proved the meristematic character of the cell. In small PEM aggregates numerous, three-cellular embryoids, directly sticking to each other, were found. The three-cellular proembryos revealed strong separation from each other by the thick cell wall, total lack of plasmodesmata and single embryogenic cells forming aggregates. Numerous cell divisions led to the formation of a globular structure with the differentiation of protoderm. Cells forming globular embryo were close to each other and had thin internal cell walls with several plasmodesmata. Numerous microtubules confirmed intensive cell divisions. Ultrastructural analysis of ageing PEM proved the presence of cells which underwent changes leading to differentiation of three distinguished layers: the external, internal and central with: meristematic, storage (rich in amyloplasts) and vacuolized character, respectively.

Key words: *Gentiana* sp., somatic embryogenesis, embryo development, ultrastructure

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