

Histological analyses of endosperm development in *Cyclamen persicum* as a basis for optimization of somatic embryogenesis

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Abstract:

The endosperm plays an important role for the development of zygotic embryos, while somatic embryos lack a seed coat and endosperm and often show physiological disorders. This study aims at elucidating the cellular and physiological processes within the endosperm of the ornamental species *Cyclamen persicum* Mill. Histological analyses were performed from 0 to 11 weeks after pollination (WAP). At 3WAP, a syncytium was clearly visible with a globular zygotic embryo. From 4WAP, cellularization of the endosperm, at 5WAP a small torpedo shaped embryo, and from 7WAP cell expansion was observed. By 11WAP the endosperm appeared fully differentiated. Total soluble proteins were extracted from the endosperm at 4, 5, 7, 9 and 11WAP and resolved using two dimensional isoelectric focussing/sodium dodecyl sulphate-polyacrylamide gel electrophoresis (2D IEF/SDS-PAGE). A shift from high-molecular-mass proteins to low-molecular-mass proteins during endosperm development was observed. A total of 1137 proteinspots/gel were detected in the three protein fractions extracted at 7, 9 and 11WAP. Mass spectrometry analysis of the 48 predominant protein spots in endosperm at 7, 9 and 11WAP resulted in the identification of 62 proteins, ten of which were described for the first time in *Cyclamen*. Additionally, 186 proteins were identified using the *C. persicum* embryo proteome reference map. Proteins involved in abscisic acid signalling and oxidative stress responsive proteins were found to be important for seed development in *Cyclamen*. The new insights into endosperm physiology including storage compounds are discussed.