P11. Influence of metabolic stress on apogamy in *Pottia intermedia* diplophase

O.V. Lobachevska[1], N.Ya. Kyjak[1], O.Ya. Khorkavtsiv[1], A.I. Dovgalyuk[1], O.Yu. Klyuchivska[2], R.S. Stoika[2], R.T. Ripetsky, D.J. Cove[3]

[1] Institute of Ecology of the Carpathians, National Academy of Sciences of Ukraine, Stefanyk Str. 11, Lviv, Ukraine 79000
[2] Institute of Cell Biology, National Academy of Sciences of Ukraine, Drahomanov Str. 14/16, Lviv, 79005 Ukraine
[3] Center for Plant Sciences, University of Leeds, Leeds LS2 9JT, UK

E-mail: gen6djc@leeds.dc.uk

The theory that the capacity for apogamy in mosses may be related to the behaviour of some mobile facultative component of the genome may be tested by investigating the effects of different metabolic stresses on expression of apogamy. Short (3-5 cell) apical cuttings of the aposporous protonema were treated with Tween-20 (0,01% for 15 min.) followed by RNase (0,5 mg/ml for 3 hours). The penetration of RNase into living cells being confirmed cytochemically and morphogenetically. No effect of the RNase treatment on the formation of apogamous structures was observed, even after 60 days growth. This result fails to support the theory that the capacity for apogamy is due to self-maintaining circuits of gene activity, which are disturbed by the de-polymerization of cytoplasmic RNA. Pb^{2+} stress (treatment of protonema with $Pb(NO_3)_2$ at a sub-lethal concentration (1000 M) for 18 hours) did not eliminate the capacity for apogamy. A single treatment of protonema with kinetin (10 M for 14 h) had a much stronger effect on apogamy. We achieved the elimination of apogamy as a result of prolonged growth of protonema on Murashige-Skoog medium containing 1 M kinetin and 1 M abscisic acid. ASfter prolonged culture on this medium, small protonemal explants transferred onto basal medium, gave rise to protonema mats, 25% of which proved to be non-apogamous.

The transition of tip to callus-like growth took place in aposporic protonema on Knop medium containing 0.25% of casamino acids. Single cells of two-month old callus gradually reversed to tip growth. Protonema explants transferred back to casamino-free medium, gave rise to protonemal mats with leafy shoots bearing few or no apogamous structures.

The inhibitory effect of acridine orange and ethydium bromide was accompanied by callus-like growth from protonema apical cells. In contrast, some intensification of protonema growth was observed in the presence of Hoechst 33258 and 33342. Maximal accumulation of the applied dyes was found in the apogamic structures, beginning at the onset of their formation, indicating higher concentrations of nucleic acids, particularly DNA, in these structures.

This research was supported by INTAS–2001 grant for Research Project _ 508.