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## The microtubule stability increases in abscisic acid-treated and cold-acclimated differentiating vascular root tissues of wheat

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### Abstract

The effects of low temperature and exogenous abscisic acid (ABA) on the structure of microtubule (MT) cytoskeleton in root cells of three winter wheat cultivars with different frost resistance were investigated with immunocytochemical and related methods. The effects of the different treatments on the MT cytoskeleton were measured as tolerance to the MT depolymerising agent, oryzalin. The cold acclimation (3°C, 7 d) and ABA treatment (30 µmol/L ABA in the growth medium) of the plants increased the MT stability in differentiating vascular tissue of roots but not in the root meristem or elongation zone. The comparison of the structure of MT cytoskeleton in differentiating vascular tissue from control, cold-acclimated, ABA-treated and both cold-acclimated and ABA-treated roots of different wheat cultivars indicated that the changes in the structure of MT cytoskeleton were modified by the genotype of the wheat cultivar. An oryzalin-sensitive MT cytoskeleton was typical to the cold-resistant cultivars, in which it appeared to respond efficiently to ABA treatment and to cold acclimation by cytoskeletal changes that may improve the cold resistance of the cultivar.

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### Keywords

Abscisic acid, Cold acclimation, Cytoskeleton, Microtubule stability, Oryzalin, *Triticum aestivum* L.