

Abstract

The seasonal changes in freezing resistance and water relations in four dwarf shrub species of *Ericaceae* family: *Vaccinium vitis-idaea*, *V. myrtillus*, *V. uliginosum* and *Oxycoccus palustris* in two study areas differing in altitude were studied in this work. To establish the freezing resistance, the plants were sampled eight times, to determine parameters of the water relations, the plants were sampled six times during the growing season of 2009. For the freezing resistance examination, ice nucleation temperature (exotherm) and 50 per cent lethal temperature (LT50) were found. The water relations were described using the parameters derived from the pressure-volume curves: osmotic potential at full turgor, osmotic potential at zero turgor, cytoplasmic water fraction, relative water content at turgor loss and bulk modulus of elasticity.

An important seasonal variability in the freezing resistance was found. The highest levels of the freezing resistance were reached in the spring and in the autumn, the lowest levels were found in the summer. There were also changes in the used mechanisms of the freezing resistance – for most of the year, the plants were tolerant, they showed the avoidance mechanism only in the summer.

The seasonal changes in the water relation parameter were less unambiguous. The most of the plants showed a non-significant decrease in the values of the osmotic potential at full turgor, the osmotic potential at zero turgor, the cytoplasmic water fraction and the relative water content at turgor loss from the spring to the autumn. In *V. vitis-idaea*, *V. uliginosum* and *O. palustris* the values of the bulk modulus of elasticity increased towards the autumn. These changes may interrelate to the increasing freezing tolerance.