Abstract in English

The apoplastic barriers of the root (endodermis and exodermis) represent an important regulatory mechanism for the uptake of water and nutrients from the environment, ensuring its selectivity. In addition, both layers respond to stress factors by altering its rate and degree of cell wall modification, which affects the transport properties of the root and represents adaptive plants to high heterogeneity of the soil environment. Apoplastic barriers also respond to the availability of mineral nutrients. This issue has recently been intensively studied and a number of ambiguities persist. Interestingly, the deficiency of some mineral nutrients stimulates the differentiation of barriers, while the deficiency of other mineral nutrients delays the differentiation. In addition, different plant species react differently to the deficiency of the same element. Another interesting aspect is the fact that the reaction of the endodermis and exodermis is localized and takes place mainly in that part of the root system which is directly exposed to the stress factor. This phenomenon has been observed with cadmium toxicity, but more recently with local nutrient deficiencies (nitrogen and potassium) in *Zea mays*.

This diploma thesis deals with the functional significance of localized enhancing or delaying of differentiation of apoplastic barriers in response to nitrogen and potassium deficiency and redistribution of these nutrients between individual parts of the plant body in *Zea mays*. It was further tested whether a localized response could be observed in plant species other than Zea mays. Selected species from the family *Poaceae* were tested, namely *Hordeum vulgare*, *Avena sativa* and *Sorghum bicolor*. Subsequently, attention was focused on the regulatory mechanisms of this response and the levels of selected phytohormones in plants grown in split-root cultures were measured. Simultaneously, there was testing of the effect of externally supplied phytohormones on the differentiation of apoplastic barriers.

Key words: exodermis, endodermis, apoplastic barriers, localized answer, split-root cultivation, deficiency, phytohormones, ABA, NAA, ACC, BAP, corn, barley, oat, sorghum, nitrogen, potassium