



## Supervisor's comments on doctoral studies of Mgr. Marek Šustr

Marek is my first PhD student and his doctoral studies are a continuation of his diploma and bachelor thesis, which I also supervised. So we have spent a considerable period of time working together. During these years, we have gradually shifted from the study of caesium translocation in plants to the analysis of the functions of potassium transporters of the KT/HAK/KUP family. It was Marek's interest in radiocaesium, an important anthropogenic pollutant, that was at the very beginning of our collaboration. We focused on mechanisms of radiocaesium translocation in plants to contribute to the understanding of the processes associated with its entry into the food chain, topic initiated by doc. Jan Pokorný and developed in collaboration with the National Radiation Protection Institute for several years. The high-affinity potassium transporters of KT/HAK/KUP family can transport chemically similar caesium in addition to potassium, so we focused on these transporters searching for novel players in caesium transport in plants. Specifically, three of them, KUP5, KUP7 and KUP9, which were completely uncharacterized at that time. We started our efforts to describe their functions and their role in potassium nutrition. We have gradually focused more and more on root responses to potassium deficiency and on the role of KT/HAK/KUP transporters in shaping root growth. This nicely combined together my two long-standing interests – root system and mineral nutrition. Marek was awarded and successfully completed a GAUK project for this research.

Marek and I have gone through periods of optimism and pessimism. The worst was in 2020, when the paper of Zhang and coworkers describing the root phenotype of *kup9* mutants in *Arabidopsis thaliana* was published, which took away the opportunity to publish much of the data we had at that time for the KUP9 transporter. This significantly slowed down the progress of Marek's dissertation and I very much appreciate that Marek overcame this difficulty. He found the strength to deal with the situation and gradually acquired new data, which led to publication. Although considerably later.

Marek has been a valid member of our team throughout his PhD studies. He has been actively involved in shaping the direction of the research and finding experimental solutions. He has been heavily involved in teaching and mentoring younger students in the lab as active co-supervisor of five bachelor and five master theses.

I can say without hesitation that Marek has gradually matured into an independent scientific personality during his studies and I wish him not only much success in his future career, but above all happiness in his personal life. Marek submits for defense a thesis which is a combination of four articles and in my opinion, it meets the requirements for such a thesis. I recommend it for defense.

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*Edita Tylová*

RNDr. Edita Tylová Ph.D.