

# MOLECULAR AND GENETIC STUDIES OF IRON HOMEOSTASIS IN ARABIDOPSIS

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## ABSTRACT

Iron is an essential element for plant survival. However, in excess, it is deleterious to the organism. In the present thesis we describe a functional genomic approach and a mutant screen directed towards increasing our understanding of iron homeostasis in the Strategy I model plant *Arabidopsis thaliana*.

For the functional genomic approach, Affymetrix ATH-1 microarrays were hybridized with RNA extracted from iron-deficient and –sufficient *Arabidopsis* plants. The resulting datasets were analyzed, and ten genes were chosen for further studies. Eight of them did not appear to be related to iron regulation. The other two belong to a small sub-family of four genes. All four were up-regulated in shoots and roots of iron-deficient plants. We hypothesize that all four provide redundancy to each other.

Finally, we show the screening of mutant plants with potential disruptions in iron-homeostasis system. One mutation was mapped to locus At2g34740 which encodes AtATase2 (EC 2.4.2.14). The mutation disrupted the chloroplastic purine biosynthesis pathway, which resulted in damaged chloroplasts, affecting metal homeostasis throughout the plant.