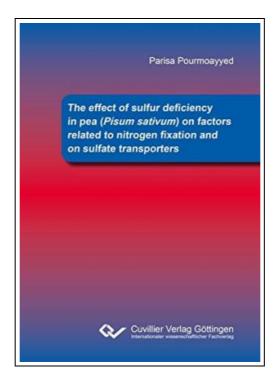
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THE EFFECT OF SULFUR DEFICIENCY IN PEA (PISUM SATIVUM) ON FACTORS RELATED TO NITROGEN FIXATION AND ON SULFATE TRANSPORTERS



Cuvillier Verlag Jul 2016, 2016. Taschenbuch. Condition: Neu. Neuware - Sulfur has a vital role in the plant life cycle. S deficiency reduces optimal yield and quality in legumes which lead to a reduction in nutritional value of food and feed. S deficiency also alters the symbiotic interaction between leguminous plants and soil nitrogen fixing bacteria which leads to a decline in N2 fixation rate. An efficient symbiotic nitrogen fixation (SNF) in the nodule demands a strong nutrient exchange between plant and bacterial cells. The plant symbiotic sulfate transporter (SST) supports adequate S supply for full activity of nodules. In the present study, I investigated how different levels of S supply affect the protein and mRNA expression of genes related to N2 fixation in Pisum sativum. Moreover, different sulfate transporter genes were identified in pea and the functional analysis was performed for the symbiotic sulfate transporter from pea after expression in yeast double mutant. Growth retardation was observed in both weak and severe S deficient plants while severe S deficiency led to a significant decline in total biomass and shoot dry weight. Chlorosis and yellowish leaves in severe S deficient plant were observed as a consequence of a 43% decline in the chlorophyll content of young leaves in comparison with the control plants. Both weak and severe S deficiency reduced nodule formation. Thus, nodules appeared smaller and green with less leghemoglobin content in the S deficient groups. Relative transcript abundance of leghemoglobin genes (PsLb5 and PsLb120) did not change significantly under S deficiency conditions in the vegetative phase, thus confirming that expression of both genes is essential to create a low O2 concentration in young nodules. In contrast, severe S deficiency during the generative phase reduced expression of leghemoglobin at mRNA and protein levels. Furthermore, the higher leghemoglobin content in...

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