

Interaction of leaf aging to iron nutrition in the iron homeostasis of chloroplasts

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In chloroplasts iron (Fe) is required for the development and function of the photosynthetic apparatus. The reduction-based Fe uptake of chloroplasts is thought to be operated by PIC1-NiCo complex, whereas the action of FRO7 ferric chelate reductase is also essential. MAR1 were also associated to Fe uptake and homeostasis of chloroplasts previously. Although some components of the uptake machinery is known already, the regulation of the system has not characterized yet. *Brassica napus* of deficient, optimal and superoptimal Fe nutrition status were subjected to quantification studies of FRO7, MAR1, PIC1 and NiCo during and after the leaves reached their full maturity. Fe and chlorophyll contents together with the function of the photosystem II (PSII) were used to model the physiological status of chloroplasts. Fe deficiency not only retained the Fe accumulation in chloroplasts, but induced an early increase in the inactivation of PSII. In parallel, PIC1 and FRO7 showed a repression by reaching the full maturity, whereas NiCo and MAR1 became upregulated. In contrast, superoptimal Fe supply lead to the delays of these signs of senescence: PSII activity and Fe content remained stable even in older leaves. In conclusion, NiCo and MAR1 are suggested not participating in Fe uptake. A small but tendentious decrease in the Fe content is coupled to the aging of non Fe-overloaded plants' leaves, whereas a delayed senescence is coupled to a stable Fe homeostasis under superoptimal Fe nutrition. Nevertheless, the priority of internal senescence signals and the organism-level need for Fe in the alterations of chloroplast Fe homeostasis has not been resolved yet.

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