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(22nd SPPS Meeting)

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Here we investigated the key physiological, biochemical and molecular parameters involved in the processes of root acquisition and tissue utilization of Fe by cucumber (*Cucumis sativus* L.), as both Strategy 1 model and Si-accumulating species.

Silicon nutrition increased the accumulation of apoplastic Fe and Fe-mobilizing compounds in roots, as well as upregulated the expression of genes (*AHA1, FRO2, IRT1*) encoding the main components of the reduction-based Fe uptake machinery (Pavlovic et al., 2013). In leaves, Si affected relative Fe distribution by enhancing Fe remobilization from old leaves via increased NA accumulation and expression of the *YSL1*, which stimulated Fe chelation and its retranslocation to younger leaves (Pavlovic et al., 2016). This for the first time demonstrated a new beneficial role of Si, *i.e.* in increasing nutrient acquisition, transport and utilization by crops.

Keywords: cucumber (*Cucumis sativus* L.), iron deficiency, leaf retranslocation, root acquisition, silicon.

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Characterization of *Arabidopsis GLN1;5* knockout mutant

ST1-3

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Glutamine synthetase is a key enzyme of plant nitrogen metabolism that assimilates ammonia into glutamine. The *Arabidopsis* genome encodes one chloroplastic (*GLN2*) and five cytosolic isoforms, *GLN1;1* through *GLN1;5*, with different expression patterns, kinetic properties, regulation and functions. Physiological roles of different isoforms have been elucidated mainly by studying knockout mutants. However, the role of *GLN1;5*, which is expressed in dry seeds, remained unknown. To elucidate the *GLN1;5* function, we have studied a *GLN1;5* knockout line (GLN1;5KO), homozygous for T-DNA insertion within the *GLN1;5*. The *GLN1;5* deficiency results in a phenotype with slightly delayed bolting and fewer siliques. The dry weight of GLN1;5KO seeds is 73.3% of WT seed weight, with seed length 90.9% of WT seeds. Finally, only 18.33% mutant seeds germinated in water within 10 days, in comparison to 34.67% of WT seeds. KNO_3 strongly stimulated germination of both GLN1;5KO and WT seeds, while germination in increasing NH_4Cl concentrations potentiates the differences between the two genotypes. It can be concluded that GLN1;5 activity supports silique development and grain filling and that it has a role in ammonium reassimilation within the seed, as well as assimilation and/or detoxification of ammonium from the environment.

Keywords: Arabidopsis, glutamine synthetase, knockout mutant, phenotype, germination

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