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Deciphering variations of phloem and xylem sap metabolite profiles in response to N availability in *Arabidopsis* accessions.

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Abstract

The allocation of carbon (C) and nitrogen (N) in higher plants results from the long-distance transport between shoot and roots of a range of metabolites, including carbohydrates, amino acids and organic acids. This highly integrative process also participates in plant adaptation to mineral availability. To unravel the metabolic and transport pathways involved in carbon allocation, we exploited the natural variation within *Arabidopsis thaliana* to analyze the translocation of organic C and N in the phloem and xylem. A metabolome profiling of the phloem and xylem saps was carried out in five natural accessions grown in plethoric or limiting N supply. The organization of the vascular tissues in the petiole and the stem were also analyzed. As expected, the nutritional regimes explained most of the variability. However, we also observed significant variations due to the genotypes, with some interaction effects due to nutrition. This study revealed different strategies in C and N transport depending on the accessions and showed an unexpected important role of organic acids in long distance allocation of nutrients.