

Nitrogen uptake, translocation and YAN in berries upon water deficit in grapevines with contrasting stomatal sensitivity.

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Abstract (250 words)

Nitrogen (N_2) is critical in grape berries, especially in organic wine making. After intake, N_2 follows various metabolic and allocation routes and, from veraison, partly reallocates into berries. Water deficit affects the N_2 nutrition due to a poor diffusion in soil solution and vascular mobilisation. Also, affects photosynthesis and the energy needed for metabolism, whose extent would depend on the stomatal sensitivity of the plant. We have assessed the effect of a moderate water deficit from pea size, in 3 years old field grown potted plants of Chardonnay (CH) and Cabernet Sauvignon (CS), differing in stomatal sensitivity, on the N_2 status of plant parts. Water deficit reduced photosynthesis, leaf area and fresh and dry plant mass along the season, but up to a higher extent in CS. V_{cmax} , tightly linked with Rubisco, an important N_2 sink in leaves, was strongly reduced after water deficit in both varieties, even though the total leaf N_2 at harvest was only reduced in CS under deficit. The yeast assimilable nitrogen in berries, on the other hand, was not affected at harvest, but only after the water deficit was imposed in CS, mainly accountable for ammonium, not primary amino acids. Yet, arginine, the most abundant amino acid in CH was affected by water deficit. N_2 allocation to berries is highly favoured, despite the reduced capacity for N_2 uptake as inferred from the reduced transcript abundance for N_2 transporters in active roots. Further discussion will be made based on N_2 transporters in plant parts.

Keywords: nitrogen intake, nitrogen transporters, photosynthesis, water deficit, YAN