Water Absorption Capacity of Vines: Depending on Rootstock and Geological Soil Type

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This study investigated the water absorption capacity of grapevines in the Bündner Herrschaft, a viticultural region in the canton of Grisons, Switzerland. It examined how soil types influence vine water status and whether multispectral drone imagery can assess total water potential. Two vine rootstocks were studied: 3309 (slow-growing, nutrient-loving), and 5C (fast-growing, lime-tolerant). Measurements were conducted in two vineyards with different soil types: Prättigau-flysch in the Markstaller vineyard (Malans) and calcareous soil in the Neuwingert vineyard (Fläsch). The first research question examined how total vine water potential and soil moisture tension differed between rootstocks and soil types, as well as their interaction. The total vine water potential was measured using a Scholander pressure chamber, soil moisture tension with tensiometers and precipitation data were obtained from Agrometeo. Results showed higher soil moisture levels in Markstaller, supporting the initial hypothesis. Both rootstocks had a higher total water potential in Markstaller. While no statistically significant differences were observed in Markstaller, 5C had a higher total water potential than 3309 in Neuwingert. Although the hypothesis predicted a higher total water potential of 3309 in Markstaller and 5C in Neuwingert, the results only partially confirmed this. The second research question evaluated whether comparable conclusions about total water potential could be drawn using multispectral drone imagery and the vegetation indices NDVI and RENDVI. The results showed an increase in vegetation index values at lower total water potential, which contradicts the expectation that higher vegetation index values are associated with vigorous vegetation.

Awards Won: