# Which potential for Near Infrared Spectroscopy to characterize rootstock effects on grapevines?

Marie-Gabrielle Harribey[1], Jean-Pascal Tandonnet[2], Marine Morel[2], Virginie Bouckenooghe[3,4], Elisa Marguerit[2], Vincent Segura[4,5], Nathalie Ollat[2]*

[1] *UMR BIOGECO, Univ. Bordeaux, INRAE, CIRAD, 33 Cestas, France*
[2] *EGFV, Univ.Bordeaux, Bordeaux Sciences Agro, INRAE, ISVV, 33882 Villenave d'Ornon, France*
[3] *IFV, 30240, Le Grau du Roi, France*
[4] *UMT Geno-Vigne®, IFV, INRAE, Institut Agro Montpellier, 34398, Montpellier, France*
[5] *UMR AGAP Institut, Univ Montpellier, CIRAD, INRAE, Institut Agro Montpellier, 34398 Montpellier, France*
*Corresponding author:*
nathalie.ollat@inrae.fr

Developing rootstocks adapted to environmental constraints constitutes a key lever for grapevine adaptation to climate change. In this context, Near Infrared Spectroscopy (NIRS) could be used as a high-throughput phenotyping technique to simplify the study of rootstocks in grafted situations. This study is an exploratory analysis to evaluate the potential of NIRS acquired on grafted tissues to reveal rootstock effects as well as the plasticity of combinations of scion/rootstock to better characterize these interactions.

Through the study of 25 combinations (5 scions times 5 rootstocks) in a dedicated experimental vineyard, we showed that NIRS obtained from grafted tissues capture rootstock and scion/rootstock interaction signals, up to 20% of the total variance at specific wavelengths. Yet, the scion effect on the spectra remains dominant over the rootstock effect, which is also the case for agronomic traits. Using NIRS data on dried leaves, which were found to best capture the rootstock effect compared to measurements on wood or fresh leaves, spectral wavelengths specific to the rootstock effect could be identified.

Predictions at the vine level carried out on twenty-eight phenotypic traits showed that those related to phenology and vigor being were better predicted. Three spectral regions were consistently identified as contributing to predictions and to differences between scion/rootstock combinations. Using data from these regions yielded predictive models as accurate as those built with the entire spectral range, underlining that NIRS capture useful information related to the combination rootstock/scion which opens prospects towards the possibility of using this methodology in a breeding context.

**Keywords:** NIRS, phenomic prediction, rootstock, scion/rootstock interaction, field phenotyping