# Development of methods for pre-symptomatic detection of grapevine diseases like esca, phytoplasmoses and viruses using hyperspectral sensors

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In the course of a growing season grapevines have to compete against many different pathogens which is flanked by plant protection treatments. For a number of diseases like powdery and downy mildew since long suitable control strategies are available. In contrast, diseases/ disease complexes like esca, phytoplasmoses and viruses are especially problematic since they cannot be cured by chemical plant protection. The pathogens can be present in vines in a latent mode without showing any symptoms but finally leading to losses in yield as well as quality and eventually resulting in death of infested vines. Therefore, the BigGrape-project focuses on the analysis of these disease complexes. Since esca, phytoplasmoses and viruses can be transferred during grafting dissemination with the young grafted vines cannot be excluded. Hence, early diagnosis is particularly important for viticulture.

The BigGrape-project aims are the development of pre-symptomatic and specific detection methods of the endogen grapevine diseases esca, phytoplasmoses and viruses. These methods serve as the basis for a regional monitoring of vineyards and the development of control strategies. Within the project a phenotyping pipeline for the early detection of these diseases shall be developed using non-invasive air- and ground-based hyperspectral and multispectral analyses. Visual rating, PCR-based methods and chemical analyses are applied to get reference data to be correlated with the data of the spectral analyses.

This new and non-invasive method provides the opportunity to optimize the monitoring of grapevine diseases in viticulture and also the possibility of selection for grapevine propagation and breeding.