Poster Communication Abstract – PH.24

HYPERSPECTRAL DETECTION AND MONITORING OF PLANT DISEASES AND STRESS

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The need for rapid, automatic and non-destructive approaches for early detection of biotic and abiotic stress is a crucial issue for plant pathology and related disciplines. One such emerging technology is hyperspectral reflectance (i.e., high-resolution measurement of reflected light, both at the remote and proximal levels). Due to improvements in the sensitivity of instruments, as well as in computation power and chemometric modeling methods, it enables the estimation of a variety of plant traits and physiological processes based on the optical properties of living foliage. The ability to capture even minimal changes in vegetation spectra caused by biotic and abiotic factors can assist in better understanding plant response under unfavorable conditions. Also, hyperspectral reflectance can be used for reliable, precise and accurate estimation of disease severity, the degree of sensitivity to abiotic stress, assessment of germplasm for disease resistance, yield loss prediction, monitoring and forecasting of epidemics, as well as to understand fundamental biological processes. This work presents basic concepts of vegetation spectroscopy, concerning plant-light interactions, instrumental set-up, and spectral data analysis (e.g., investigation of vegetation indices, spectral estimation of widely-used plant traits, discrimination of spectral signatures). Furthermore, recent research is reviewed to show the potential of hyperspectral reflectance to early detect plant reaction to pathogens and abiotic limiting factors.