



Thesis title:

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Date & location of the oral examination (if known) :

Confidential: **Yes** **No**

Abstract (max 300 words)

Topic position & objectives:

Remote sensing can provide a fast alternative for traditional *in situ* water status measurement in vineyards. The aim of this study is to assess the vine water status through multispectral imagery, as possible alternative solution of the traditional pressure chamber measurement.

Methods:

Several vegetation indices (VI) derived from aerial multispectral imagery were tested for estimating midday stem water potential (Ψ_{stem}) of grapevine. The experimental trial was carried out in a vineyard in the Shangri-La region, located in Yunnan province in China. Statistical methods and artificial neural network (ANN) approach were used to evaluate the correlation between Ψ_{stem} and VI.

Results:

Results by simple regression between VI and Ψ_{stem} showed no significant correlation, with coefficient of determination (R^2) smaller than 0.3 for almost all the indices studied. The Optimal Soil Adjusted Vegetation Index (OSAVI) was the only index that showed higher correlation ($R^2=0.42$) and significance ($p \leq 0.001$). Otherwise, the results obtained by ANN, showed high correlation between the estimated water potential through ANN ($\Psi_{stem ANN}$) and the actual measured Ψ_{stem} . Training, validation and testing data set presented correlations of 0.8, 0.72 and 0.62 respectively.

Main conclusions:

These results propose that single VI are weak estimators for Ψ_{stem} on vines, but the combination of indices that integrates Green, Red, Red edge, and NIR regions could improve the Ψ_{stem} estimation.

Keywords (5):

Remote sensing, multispectral imagery, water status