



ESTIMATION OF CANOPY WATER CONTENT AND NITROGEN BY NIR SPECTROSCOPY IN A TREE-GRASS ECOSYSTEM

Rosario Gonzalez-Cascon¹; Javier Pacheco-Labrador²; M. Pilar Martín³

1 - Department of Environment, National Institute for Agriculture and Food Research and Technology (INIA), Ctra. Coruña, Km. 7,5, 28040 Madrid, Spain; 2 - Environmental Remote Sensing and Spectroscopy Laboratory (SpecLab), Institute of Economics, Geography and Demography, Center for Human and Social Sciences, National Council for Scientific Research (CSIC), C/Albasanz 26-28, 28037 Madrid, Spain; 3 - Environmental Remote Sensing and Spectroscopy Laboratory (SpecLab), Institute of Economics, Geography and Demography, Center for Human and Social Sciences, National Council for Scientific Research (CSIC), C/Albasanz 26-28, 28037 Madrid, Spain.

Abstract: Canopy nitrogen and water content are key variables with a great influence in ecosystem functioning and biomass production. They are limiting factors in photosynthetic capacity and nutrient cycling especially in Mediterranean tree-grass ecosystems. Field spectroscopy is a tool that may contribute to the fast estimation of these variables over wide temporal and spatial scales for ecological and environmental monitoring. In the context of the BIOSPEC and FLUXPEC projects, field spectra of intact holm oak leaves recorded during five vegetative periods in a holm oak dehesa located in Majadas del Tiétar (Cáceres, Spain) were used for the development and validation of nitrogen and foliar water content models. The studied vegetative periods included years of climatic anomalies and all leaf development and age classes. Different pre-treatment of spectra and spectral regions allowed the optimization of PLSR models for the significant and fast estimation of these variables in intact holm oak leaves. 0,96% coefficient of determination, 1,09% standard error of calibration (SEC) and 2,1% standard error of prediction (SEP) was obtained for leaf water content (%) and 0,79% R², 0,21 SEC and 0,26 SEP for leaf nitrogen (mg/cm²).

Keywords: Field Spectroscopy, fresh intact leaves, *Quercus ilex*, foliar Nitrogen, water content

OC /CSP-1338