

Monitoring olive phenology and phenometry through NDVI - MODIS dynamics, in Vichigasta, La Rioja

Luna Toledo, E. S. and P.I. Figuerola

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Summary

Knowledge of the phenology, phenometry and seasonal behavior of vegetation is a valuable tool for understanding the operation of an agricultural system. Traditional methodologies for observation in situ are laborious and expensive when applied in large agricultural and/or natural areas, making them nonviable. The Normalized Difference Vegetation Index (NDVI), obtained from satellite sensors, can be used as an estimator of plant phenology and phenometry, and as an indicator of seasonal patterns of vegetation. The aim of this study was to explore the relationship between the NDVI-MODIS product (MOD13Q1) and olive data phenology and phenometry (Var. Picual and Arbequina), measured in situ in a commercial orchard in Vichigasta, La Rioja Province, Argentina, by conventional observation and measurement methods. NDVI dynamics in olive trees (evergreen species) showed a behavior different to other typical fruits of the region (e.g., vines, deciduous). The maximum NDVI values were found in olive in the autumn-winter period and minimum values in the spring-summer period. A nonlinear relationship was also observed between the phenological phases and the NDVI dynamics, with a high coefficient of determination ($r^2= 0.92$). Finally, the NDVI was significantly related to canopy volume ($r= 0.68$). The use of this methodology seems to be promising for the remote monitoring of phenological and phenometrical variables in olive.

Key words: Arbequina; Picual; vegetation index; seasonality