

Using smartphones and tablet PCs for canopy architecture assessment to upscale physiological parameters: LAICanopy© App.

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Abstract

Up-scaling single point physiological measurements and data obtained with continuous instrumentation (such as sap flow probes) require the assessment of canopy architecture and leaf area index (LAI). LAI is a critical parameter widely used for experiments that involve the estimation of growth and development of grapevines, modelling growth and water use and functional plant modelling. Current methodologies to assess canopy architecture and LAI require tedious and time consuming methods, such as allometry, or expensive instrumentation (LiCOR 2000; 2100, Ceptometers). An App (LAICanopy®) has been developed by a team from the University of Adelaide to characterise the canopy architecture of grapevines and leaf area index (LAI) using the camera capabilities of smartphones and tablet computers. This App also incorporates the GPS capabilities of these devices, which allows mapping results to identify zones of growth and spatial canopy architecture within a field. The App works using upward digital imaging and gap analysis algorithms, which up to date have rendered highly comparable results with traditional methods, such as allometry and more expensive specialised instrumentation (i.e. LiCOR 2000, Ceptometer). Furthermore, this technique has been tested for other species, such as eucalyptus trees and apple trees among others with similar results. This App could become an important tool for growers, irrigation practitioners and scientists to assess spatial and temporal growth and canopy architecture dynamics that can be associated to final yield and quality of grapes.