REAL TIME CANOPY MAPPING OF AN APPLE ORCHARD WITH NEW APPLIED SENSORS

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One of the most difficult challenges in the everyday practice is to describe the canopy growing of fruit trees in an orchard. The accuracy of data determines the available yield quantity and quality. The photosynthetic activity is the basic of the primer production of plants, since there is a very close relationship between water use and the dynamic of tree development and the photosynthetic activity. Beside genetic characteristics the canopy size is influenced by some factors in artificial ecosystems such as nutrient and water management, health condition and phytotechnology as well. The measurement of leaf area and determination of the photosynthetic activity could be occurred with some methods elaborated under experimental conditions. On orchard level, there are only estimation and approximate methods available for surveying the surface of leaves. One of the most general indices to determine the leave surface is the leaf area index (LAI), which can be estimated based on field works or satellite data. Although in many cases these results shows errors comparing to the actual value. In this article the authors present an integrated methodology, which is ideal to determine the geometric and spectral characteristic of fruit trees under field conditions. Laser scanning technology was used in order to investigate the geometric-topological characteristics and simultaneously active infra-red sensor to collect spectral data about an apple orchard. The surveys were carried out in an intensive apple orchard with drip irrigation system protected by hail net in Study and Regional Research Farm of the University of Debrecen near Pallag. Present study introduces the filtering and interpretation methods of created data. The produced high accuracy data can directly be used in the precision horticulture. It could serve guiding data for the implementation of a future "virtual horticulture". The higher spatial and temporal resolution may help a better understanding of orchards' water balance. Therefore, the results achieved may provide basis for water and energy saving technologies to reduce the ecological footprint of fruit production.