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A precise irrigation monitoring system to provide an accurate measurement of water status in crops

HORIZON 2020

A precise irrigation monitoring system to provide an accurate measurement of water status in crops

Reporting

Project Information Funded under StemSense INDUSTRIAL LEADERSHIP - Innovation In SMEs Grant agreement ID: 848361 Total cost € 2 102 350,00 Project website **EU** contribution DOI € 1 471 645,00 10.3030/848361 Coordinated by SATURAS LTD Project closed 🗢 Israel EC signature date 18 March 2019 Start date End date 1 May 2019 30 April 2021

Periodic Reporting for period 2 - StemSense (A precise irrigation monitoring system to provide an accurate measurement of water status in crops)

Reporting period: 2020-05-01 to 2021-04-30

Summary of the context and overall objectives of the project

Saturas develops a Decision Support System (DSS) based on miniature Stem Water Potential (SWP) sensor that is embedded into the trunks of trees, vines, and plants. As part of an automatic irrigation system, the Saturas sensor provides accurate information for optimized irrigation in order to reduce water consumption and increase fruit production and quality.

Water is becoming scarcer and more expensive. With direct and reliable information on crop water status, farmers can save water and increase yields. Today, due to the lack of direct and reliable measurement, farmers typically overwater crops by up to 20% "just to be on the safe side." Overwatering puts pressure on an already scarce and expensive resource, increases pollution from nutrient-rich runoff, affects the quality of the fruit and reduces profitability.

Stem Water Potential (SWP) is a scientifically recognized, highly accurate parameter, for determining water status in crops. Today, Stem Water Potential (SWP) can only be measured in a labor-intensive, manual procedure. Despite numerous approaches to sensor-based irrigation, including measuring soil and leaf moisture, the market lacks a solution that combines accuracy, ease of use and affordability. Saturas' Stem Water Potential (SWP) sensing system automatically collects accurate data using a minimal number of sensors per hectare (1 – 2 sensors). It transmits the processed data to the central automated irrigation control system. The technology tailors irrigation to real-time water needs of the crop, resulting in more efficient water use and increased yields, fruit size and sugar content (e.g. vineyards). Embedding the sensor into the trunk eliminates the common problem of damage to sensors placed in the soil or on the tree/vine.

In the two-year "StemSense" project, Saturas will optimize its unique sensor for better performance and further miniaturization to fit a larger variety of crops, opening up new markets for the company. Saturas will also scale up its manufacturing and QA processes, in preparation for commercialization. Additionally, Saturas will make use of the SME Network and coaching services to develop its distribution network in the European market.

Work performed from the beginning of the project to the end of the \sim period covered by the report and main results achieved so far

Within the project, Saturas successfully miniaturised the StemSense system to enable use in a wider range of trees and plants. The communication system and associated software have been optimised for improved usability and in-field performance. Saturas successfully tested its technique for embedding the sensor into the stem. The field tests were conducted on peach and citrus trees. The results were consistent with the stem water potential measurement using manual measurement tools and successfully demonstrated continuous measurement of the water status in the tree. Saturas has ongoing trials with both the large and miniaturised sensor in Israel, Spain and California. This has provided data which Saturas has actively promoted during the project attending events in Europe, the USA and China.

Progress beyond the state of the art and expected potential impact (including the socio-economic impact and the wider societal implications of the project so far)

Saturas's patented sensor, the StemSense[™], is the first commercially, cost effective technology to directly measure Stem Water Potential (SWP). Embedded into the tree's trunk and connected to the vascular tissue, our sensor provides one specific value that is all you need to know in order to optimize irrigation. Precision irrigation technology can provide solutions to enable farmers to irrigate at the right time and use the precise amount of water. As a result, the farmer: increases fruit yields and income, minimises risks & losses, saves 10-20% water, reduces water costs, enables more planted area within water allotments, avoids overwatering, produces healthier trees and lowers groundwater contamination. This project marks a major milestone in the development of the company, and for the development of the smart irrigation market as a whole.



StemSense sensor installation

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