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LOW-COST SPECTRAL REFLECTANCE SENSOR PROVIDES HIGH-QUALITY DATA FOR CONTINUOUS MONITORING OF PLANT DEVELOPMENT

Labcell has introduced the Decagon Devices SRS Spectral Reflectance Sensors for measuring NDVI (normalised differential vegetation index) and PRI (photochemical reflectance index) at the plot or plant stand scale. This new low-cost sensor, which is believed to offer a unique combination of features, will be of interest to farmers, horticulturalists, plant research scientists and forestry managers.

SRS sensors measure the electromagnetic radiation reflected from canopy surfaces, which corresponds to canopy variables such as biomass accumulation, LUE (light use efficiency), light interception, phenology and photosynthetic performance (CO₂ uptake). Applications in the UK are expected to focus on monitoring crop development and the effectiveness of irrigation, though the versatile sensors can also be used for a much wider range of studies.

Monitoring can be carried out remotely on a continuous, non-destructive basis to provide valuable data for greenup, senescence and plant stress. Using this spatially explicit data, it is possible to improve crop growth models.

The SRS is a compact, rugged, research-grade sensor that has been designed for long-term deployment over an entire growing season or even over a number of years. Being low-cost, the sensor is affordable for applications where a number of sensors need to be installed to maximise spatial coverage. Furthermore, the sensors can be connected to one of the Decagon Devices EM50 series of data loggers or other SDI-12 compatible data loggers. If the Decagon Devices EM50G data logger is employed, the sensors can be monitored remotely from any internet-connected computer, or even from mobile phones and tablets. Data can be analysed graphically using Decagon Devices' DataTrac 3 software.

Approximately the same size as a matchbox, the SRS is a multiband radiometer that can be easily mounted on a fence post, tripod or meteorological tower, with the mounting height dictating canopy area that is monitored; if required, a sensor can be mounted so as to monitor an individual plant. Far more robust than most spectrometers, and considerably cheaper than handheld plant canopy measuring instruments, the SRS can be used for long-term monitoring with minimal measurement drift. By measuring just two narrow bands in the visible light spectrum, the sensors can be manufactured far more economically than full-feature spectroradiometers.

Each sensor is calibrated to NIST standards, and the calibration data is stored on the device so there is no need to maintain records of sensors and their calibration coefficients. NVDI and PRI are calculated as the ratio between reflected and incident radiation, so an upward-facing SRS sensor must be used as well as those directed at the canopy. However, one uplooking sensor can provide reference values for multiple downlooking sensors. While the downlooking sensors have a 20-degree field of view, the uplooking sensors have a hemispherical field of view.

The SRS Spectral Reflectance Sensors are available in the UK from Labcell, together with EM50G data loggers, DataTrac 3 software and a broad portfolio of other instrumentation relating to plants and soils. Contact Labcell to request more information by telephoning +44 (0)1420 568150 or email mail@labcell.com. Alternatively, find out more and download data sheets from Labcell's website at www.labcell.com.

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