



## Comparison between Delta-T Devices **SunScan** Canopy Analysis System and Li-Cor **LAI-2200**

	SunScan	LAI-2200
<b>PAR Readings</b>	SunScan measures PAR (400-700nm) along its 1m probe (64 PAR sensors), which can be used for many purposes such as PAR mapping and directly measuring the PAR interception.	The LAI-2200 measures only the blue light (320 -490nm) in 5 concentric cones (with 148° field of view). These are not directly comparable with PAR measurements.
<b>Light Conditions</b>	SunScan will calculate LAI under steady and changing light conditions but is best in bright daylight.	The LAI-2200 requires steady, uniform light conditions (e.g. cloudy conditions are best) and can give significant errors (underestimation of LAI) in direct sunlight (including sunflecks).
<b>Above Canopy Reference</b>	Above canopy BF5 Beam Fraction Sensor provides immediate compensation as incident light varies. <b>Radio-link</b> is available for cable-free connection.	In varying light levels it is possible to use TWO LAI-2200s to give simultaneous canopy readings, but this is an expensive option, alternatively above and below readings have to be taken with the same probe which requires steady light conditions throughout data collection.
<b>Leaf Area Index</b>	Uses inversions to calculate LAI, taking account of Direct/Diffuse light partitioning and the incomplete absorption of light by leaf elements.	Uses similar inversions to obtain LAI, but does not include the effects of Direct/ Diffuse light partitioning and incomplete absorption of light.
<b>Theory</b>	Both instruments assume a uniform canopy, random distribution of leaf elements and ellipsoidal Leaf Angle Distribution. They therefore have similar difficulty in measuring the LAI of highly clumped and irregular canopies e.g. conifers. <i>(HemiView, also from Delta-T, is very suited to irregular canopy analysis - separate data sheet).</i>	
<b>Data Storage</b>	Rugged ergonomic PDA with Compact Flash (type I & II) facilities or with 128 – 256 MB memory. USB or RS232 data transfer	LAI-2200 has a hand held PDA unit with 128 MB memory. USB or RS232 data transfer
<b>Annotation</b>	SunData software on the PDA has a well structured file format. Readings can be fully annotated on the PDA with limited data processing also possible before download.	Data must be annotated <b>after</b> download with site locations and conditions. Post collection processing using FV2200 software at base station.
<b>Auto-logging</b>	Auto-logging – define intervals from 1 sec to 1 day, define average intervals, plus ignore/include night time.	Not available.
<b>Linear Quantum Sensor</b>	Logging function – connected to a data logger or Rugged PDA to record average PAR incident on the Probe (used as a sensor)	Not Available.
<b>Individual PAR Sensor Readings</b>	All 64 PAR sensor readings can be used for detailed PAR mapping and transects.	Repeated manual readings will enable transects to be measured.

## References:

1. Ground-based measurements of Leaf Area Index: A review of Techniques and Approaches – Dr Nathalie J.J. Bréda, 5<sup>th</sup> International Workshop on Field Techniques for Environmental Physiology, Tenerife 2003.
2. Comparison of three Leaf Area Index Meters in a Corn Canopy – W.W. Wilhelm, K. Ruwe & M.R. Schlemmer, Crop Science, 2000, 40: pp1179-1183.

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