



Australian Plant Phenomics Facility



ArduCrop

ArduCrop is a wireless, infrared temperature sensor network specifically designed for measuring crop canopy temperatures under extreme conditions in the field environment.



plantphenomics.org.au

The Australian Plant Phenomics Facility has three nodes strategically located at



We are proudly supported by



An advanced wireless, infrared canopy temperature sensor network



ARDUCROP

Capability highlights

- High resolution infrared (IR) temperature sensor, calibrated to deliver 0.5°C accuracy.
- High-throughput data capture - samples every second, reporting the minute average (60 values/hour).
- Real-time data access through the phenoSN™ application in phenoSMART® for real-time analysis and reporting.
- Large sensor networks of 30 sensor nodes available, all shipped in one convenient crate.
- Simple design for fast and easy installation.
- Robust design with adjustable sensor pole and onboard solar charging for high reliability.

Thermal imaging using IR sensors is an established technology for phenotyping plants for differences in stomatal behaviour. Canopy temperature is a strong indicator of how well a plant is managing its water use through stomatal responses to environmental conditions. The high precision capability of the ArduCrop sensor allows for small differences in temperature to be detected between plant varieties making it a powerful phenotyping tool.

Capability benefits

With a robust design, high precision sensor and high-throughput data capturing capabilities, the ArduCrop system is the ideal solution for field phenotyping research applications and irrigation management.

The wireless ArduCrop sensor network consists of many individual sensor nodes that continually collect high precision temperature data from the field. Individual sensors relay data to a 3G coordinator base station that sends data directly to the phenoSN™ application in phenoSMART® for real-time data access and analysis through an online web portal.

Technical specifications

32x sensor nodes (+2 spare) and 1x coordinator with telescopic poles shipped in a single crate 120 x 80 x 50cm

Infrared sensor

- Field of view (FOV) 10°
- Accuracy 0.5°C
- Sampling rate: 1x sample/second, 1x report/minute, producing 60x temperature values/hour

Telemetry

- Sensors - internal Xbee radio: 2.4GHz, 100m range (line of site)
- Coordinator: reports on the hour through the 3G Telstra Network

Power

- Battery: rechargeable Li-on battery
- Solar charging: 3 watt solar panel

As plant water relations are the basis of canopy temperature measurements, ArduCrop sensors are also highly effective for irrigation management. The ArduCrop sensor network delivers timely information on the overall water stress of crops allowing managers to make well-informed decisions for irrigation.

Expertise at the High Resolution Plant Phenomics Centre (HRPPC)

The HRPPC combines expertise in plant science and engineering to develop and build (i) cutting-edge phenotyping technologies to support medium-throughput phenotyping of model and potted plants in controlled environments, and (ii) novel plant phenotyping solutions to support research experiments at large scale and high-throughput in the field with a capacity of over 250,000 plots p.a.

Discover more: plantphenomics.org.au

Australian Plant Phenomics Facility High Resolution Plant Phenomics Centre

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