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Australian Plant Phenomics Facility

Grain Phenomics Climate Facility

Shipping container based high precision Growth Capsules with independent control of temperature, relative humidity, multispectral LED light and CO_2. Growth Capsules can mimic diurnal and seasonal variations and can simulate extreme climate events such as heat and drought. Plant growth is monitored with cameras, thermal imagery and a 3D canopy scanner.

plantphenomics.org.au

The Australian Plant Phenomics Facility has three nodes strategically located at

THE UNIVERSITY of ADELAIDE

CSIRO

Australian National University

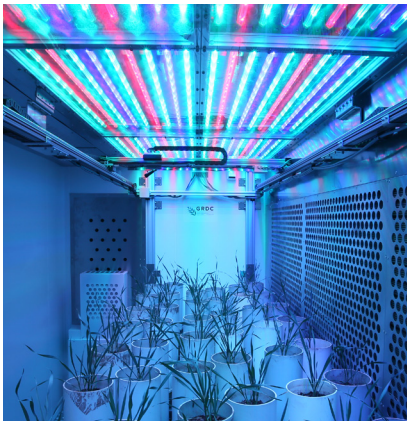
We are proudly supported by

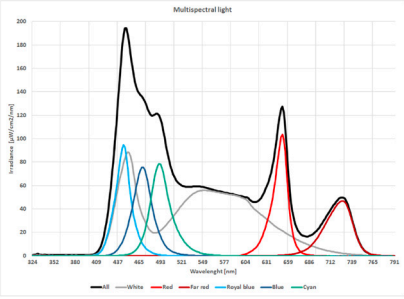
NCRIS National Research Infrastructure for Australia An Australian Government Initiative

Australian Plant Phenomics Facility

Discover more

High precision climate and lighting controls with high light to simulate real-world climate conditions





GRAIN PHENOMICS CLIMATE FACILITY

Capability highlights

- Eight controlled environment rooms (CERs) offering control of temperature, humidity, light quality and intensity, and CO_2 (four rooms)
- RGB imaging as a standard plus a 3D canopy scanner and thermal imaging room

The Growth Capsules offer the unique capability to grow tall plants (up to 2.1m) to maturity under high precision dynamic environmental conditions. They can simulate diurnal and seasonal changes as well as complex climate scenarios, enabling phenotypic comparison and large screens across various environments such as high light combined with low temperature or heat stress.

The Growth Capsules provide ample space around the cultivation area to access the plants or accommodate portable gas exchange systems. Four rooms are fitted with CO_2 injection to provide elevated CO_2 conditions.

All Growth Capsules are fitted with high resolution monitoring cameras and one room is equipped with a thermal camera and 3D canopy scanner to analyse plant physiology, 3D growth and architecture over time. An online data portal enables real-time access to Growth Capsule environmental conditions and time lapse camera data.

Research benefits

As drought and other climate variability increasingly impact Australian crops, the Growth Capsules provide the perfect controlled environment for precision experiments on tall crops growing in complex climate scenarios. The Growth Capsules can simulate diurnal and seasonal changes, location-specific climate conditions and even reproduce historical growth conditions from field trials.

Growth Capsule light lofts are thermally insulated from the plant growth area to enable experimental simulation of climatic scenarios previously difficult to reproduce such as low temperature combined with high light or heat stress.

Technical specifications

Climate control

- Temperature (4 - 40°C)
- Humidity (40- 80%)
- LED Light up to 1200µmol.m-2.s-1 PAR (standard, high light or multispectral)
- CO_2 monitoring and injection

Plant capacity

- 60 - 720 pots per room
- 3.8m W x 1.1m D x 2.1m H
- Modular, adjustable benches

Phenotyping

- RGB imaging in all rooms
- 3D canopy scanner
- Thermal imaging room

Location

- Plant Phenomics Group, Canberra

RGB cameras allow monitoring and recording plant phenotypes remotely. A thermal camera and 3D canopy scanner in one room enables a range of ecophysiological studies. Growth Capsules are lockable by key and are housed in a secure compound accessed via keycard.

Note: Growth Capsules are not PC2/ quarantine certified. Contact us for information on our PC2/quarantine dynamic growth and phenotyping environments.

Expertise at the Plant Phenomics Group

The APPF node at the Australian National University (ANU) has unique expertise in phenomics, bioinformatics, hardware and software development and data visualisation. This provides essential research support to APPF customers, linking phenomics data to underlying genomic variation. The node offers modern PC2 facilities and provides the only quarantine certified plant growth facilities in the ACT region.

Discover more: plantphenomics.org.au

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