



Australian Plant Phenomics Facility



## Drought + heat phenotyping platform

A unique capability consisting of two controlled environment rooms (CERs) specially fitted with temperature and humidity control, variable wavelength LED lighting and fully automated gravimetric platforms with high precision irrigation (DroughtSpotters) enabling parallel experiments with diverse watering protocols and drought scenarios.



[plantphenomics.org.au](http://plantphenomics.org.au)

The Australian Plant Phenomics Facility has three nodes strategically located at



We are proudly supported by



Twin CERs enable parallel experiments with different climate regimes giving an unprecedented ability to apply drought and heat stress to plants while measuring transpirational response



## DROUGHT + HEAT PHENOTYPING PLATFORM

### Capability highlights

- Twin controlled environment rooms (CERs) offering control of temperature, humidity, light quality and intensity
- Individual watering and monitoring of 96 plants in each room with individual pot capacity up to 15kg

This unique capability consists of two Conviron CERs specially fitted with temperature and humidity control, variable wavelength LED lighting up to 1000  $\mu\text{E}\cdot\text{m}^{-2}\cdot\text{s}^{-1}$  and Phenospex DroughtSpotter platforms. DroughtSpotters are fully automated gravimetric platforms with high precision irrigation to 2ml, enabling the maintenance of target weights of individual plant pots according to the researchers' experimental protocol and the calculation of plant transpiration rates at high temporal resolution based on weight lost.

The unique twin CERs, comprising 96 load cells per room, enable parallel experiments comparing environmental impacts for which watering protocols or drought scenarios can be easily customised. Individual pot weight can range from 100g up to 15kg.

### Research benefits

Australian crop yields are frequently challenged by water availability and heat stress. Applying controlled water stress is challenging in both field and controlled environments. The Droughtspotter platforms allows fine control over water availability and at the same time measures water use with high resolution.

Pots up to 15kg can be used to reduce the physical restraint on root growth that can compromise pot experiments.

The twin CERs offer control over temperature and humidity which allow for control over VPD, key to understanding plant responses to water stress. Water stress often coincides with heat stress events at flowering which restricts yield. The paired platforms enable heat and drought stresses to be

### Technical specifications

#### Climate control

- Light quality and intensity with variable wavelength LED lighting up to 1000  $\mu\text{E}\cdot\text{m}^{-2}\cdot\text{s}^{-1}$
- Temperature (5-50°C)
- Humidity (40-80%)
- Watering control ( $\pm 2\text{mls}$ )

#### Plant capacity

- 96 pots up to 15kg each per room (total 192 plants)

#### Location

- The Plant Accelerator®, Adelaide

combined for targeted studies and the programmable LED lighting in each room can be adjusted separately to a range of different light quality scenarios.

### Expertise at The Plant Accelerator® (TPA)

The TPA is a true service facility, with the team focused on delivering high quality customer support, from initial consultation through to analysis of results.

TPA researchers, with a background in plant physiology and biometry, will provide advice on experimental design and optimal use of technology, backed by a cross-disciplinary team including experts in horticulture, data analysis, mechatronics, software engineering, and statistics.

TPA is certified to undertake quarantine and GMO research, and the team can assist with the necessary applications.

Discover more: [plantphenomics.org.au](http://plantphenomics.org.au)

### Australian Plant Phenomics Facility The Plant Accelerator®

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