



Whistler Building

PLANT GROWTH ROOM

College of Agriculture

Plant Growth Chamber Center

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New Resources for the College of Agriculture Research Community

The purpose of this document is to inform the College of Agriculture research community about a newly available resource for the production of small model crops.

About the PGCC

The PGCC is a decentralized facility that offers both controlled-environment equipment with specific services to researchers within the College of Agriculture.

Currently, the PGCC manages the WSLR greenhouse, 59 growth chambers, and 38 light racks at WSLR, HGRH, and LSR North Chamber Room.

About the WSLR Plant Growth Room

In 2010, WSLR #141 was renovated to provide an abundance of space and resources for successful basic plant research rendered by a faculty in the Department of Horticulture and Landscape Architecture.

In 2021, the Associate Dean of Agricultural Research and Graduate Education, Dr. Bernie Engel, asked the Plant Growth Chamber Center to operate and manage the WSLR Plant Growth Room for the entire College of Agriculture research community. The room was refitted with new materials to ensure productive and impactful research would continue.

This room consists of vertical racks with ebb and flow trays offering automatic irrigation. This is one of the larger and more sophisticated plant growth rooms at Purdue. In total, this room offers 1,152 square feet of growing area across 36 individual shelves. *Arabidopsis*, *Camelina*, *Brachypodium*, and similar height crops would work well in this facility.

Specifications of WSLR Plant Growth Room

Location – The WSLR Growth Room (WSLR #141) is on the first floor adjacent to the greenhouse.

Vertical Rack Design – This room boasts a series of metal racks with three levels of shelves to accommodate a large volume of plant material (Fig 1 and 3). The light canopy height from shelf bottom is 18 inches.

Ebb and Flow Trays – Each shelf is fitted with one ebb and flow tray (4 ft x 8 ft). Edges of trays are approximately 2.5 inches in height. There are 36 total trays (Fig 2).

EF Tray Plumbing – Each EF tray has a recessed water fill and drain fitting to accommodate automatic irrigation and subsequent drainage.

Automatic Irrigation Valves – EF trays are fitted with 24 v solenoid valves (Fig 4) which are operated by irrigation controls mounted in close proximity to tray.

Irrigation Controls – Controls allow for multiple daily irrigation events to less frequent (i.e. 1x every 5 days) events. Each tray can be filled for approximately four minutes without overflow. A four-minute fill will take several minutes to drain. Sensors are located on floor under shelves to alert PGCC staff of accidental overflow.

Inline Fertilizer Injector – An inline fertilizer injector allows for rapid dispensing of water-soluble fertilizer to plants produced in all EF trays.

Lighting Equipment and Photoperiod – Each tray has ten fixtures that each power two Philips TLED light bulbs (20 total bulbs per tray). Lamps are 4000 K broad spectrum LEDs and will emit up to 200 $\mu\text{mol}/\text{m}^2/\text{sec}$ PPFD. All fixtures are powered by one large lighting contactor providing a 16-hour photoperiod.

Climate– A Liebert air-handling system provides a 22 C air temperature. This system relies on chilled water or direct expansion cooling to provide proper room temperature. Each EF tray has a series of ducts that provides a laminar distribution of conditioned air across plants. The room is monitored for temperature and reports loss of temperature control to PGCC staff via Sensaphone.

Cooler – A 4 C walk-in cooler is sited on the west side of this room. It can be used for stratification purposes. The cooler is monitored for temperature and reports loss of temperature control to PGCC staff via Sensaphone.

Images of WSLR Plant Growth Room



Figure 1. End View of Rack Systems

Figure 2. Ebb and Flow Tray



Figure 3. Side View of Rack Systems

Figure 4. Automatic Solenoid Valves

Use of Plant Growth Room

At this time, the PGCC would like to partner closely with College of Agriculture researchers in order to develop effective standard operating procedures designed to ensure successful and impactful experimental results. Concurrently, the Costing Center is helping approve future rates for use of this growth space. Rates will be communicated to all well in advance of recharge implementation. We expect recharge rates to be in effect starting **January 1st, 2022**.

If interested, please contact Nathan Deppe for a tour of the growth room (ndeppe@purdue.edu).

For more information about the PGCC, please visit our website at this [link](#)