

To our visitors,

Welcome to the Department of Horticulture and Landscape Architecture's Plant Growth Facilities. We are especially proud of this complex as it provides our department with state-of-the-art facilities for our education, research and out-reach programs.

The "seed" for building new plant growth facilities was planted over seventeen years ago. Many years of planning and hard work by dedicated individuals were involved in moving from the dream of modern plant growth facilities at Purdue University to the completion in 1998 of this state-of-the-art complex. We are grateful for the confidence that Purdue University and the State of Indiana have shown in making this investment in our department's programs. Likewise, we are ready to shoulder the added responsibility that accompanies such an investment.

We are confident that after touring these facilities you will share in our excitement about the added opportunities for teaching, research and out-reach that are available for us. These world-class facilities will help us train the next generation of leaders in horticulture and landscape architecture, and assist us in discovering new knowledge to support our horticultural industries.

Edward Ashworth
Head, Department of Horticulture
and Landscape Architecture



Description of Plant Growth Facilities

- ◆ Construction started - September 96
- ◆ Construction completed - March 98
- ◆ Project costs - \$7.2 M
- ◆ Plant Growing Area - 34,800 ft²
- ◆ 24 individual greenhouse sections (1200 ft² each)
- ◆ Polyhouse (3400 ft²)
- ◆ 2 growth rooms (900 ft² each)
- ◆ 33 reach-in growth chambers (485 ft² total)
- ◆ 4500 ft² headhouse work area
- ◆ 5 walk-in cold rooms (500 ft² total)
- ◆ 720 ft² tissue culture laboratory
- ◆ 430 ft² tissue culture transfer hood area
- ◆ 2 - 360 ft² tissue culture growth rooms

The greenhouses are a Nexus ridge and furrow design with 32-inch wide glass glazing. Each 1200 ft² greenhouse is controlled using Priva Computers Inc. sensors, microprocessors, weather station and Priva's latest Supervision software. Weather station data of light, temperature, humidity, rain, wind speed and wind direction allow the microprocessors to anticipate heating and cooling requirements, resulting in precise temperature control while minimizing equipment cycling. If a temperature problem occurs, the greenhouse computer will automatically page the manager. To provide "24/7" response to temperature alarms, the greenhouse heating and cooling equipment can be remote-controlled via laptop computer or handheld wireless device.

Many rooms or "zones" are required in a research and teaching facility so that differing environments can be achieved. We can program up to 27 different environments, though many zones are a standard 75 degrees.

The greenhouses are heated with hot water and cooled using fans and evaporative pad cooling. No vents are

present in the ridge or sidewalls (other than fan shutters), allowing for a better seal, reduced maintenance, and reduced insect pressure. Clear water and fertilizer solutions are independently plumbed into each greenhouse, and reverse-osmosis purified water plumbed into half of the greenhouses. Compressed air for aeroponic/hydroponics culture and computer ports for specialized equipment are also available in each greenhouse. Many of the crops are irrigated automatically using a computer to trigger irrigation solenoids based on accumulated sunlight.



Within the 4500 ft² headhouse, two 900 ft² growth rooms each are illuminated with 90 high intensity lamps (400-watts each). Chilled water exchangers are used to cool the rooms. A five-compartment walk-in refrigeration unit provides cold storage, seed treatment, and space for cold hardiness research. Thirty-three Conviron and Percival growth chambers in 3 buildings are linked to a central computer for monitoring and control similar to the greenhouse system. These chambers have an operating range of 50° – 117° F. The growth chambers are part of a decentralized multi-user facility obtained through a \$450 K **National Science Foundation** MRI grant plus equivalent matching funds from Purdue University. The HLA Plant Growth Facilities Manager operates the multi-user facility, hiring students from the HLA department for a labor team.

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For more info on the facility, click on the "facilities"
link of our webpage:
www.hort.purdue.edu

Plant Growth Facility

**Department of Horticulture
and Landscape
Architecture**



Purdue University
West Lafayette, Indiana

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