

Percival Scientific, Inc. 2025 Station Report

Unique Fungal Responses

- Replicated CO₂ production rate noted by Justin Hyunjae Chung of 1 to 5 gCO₂/kg substrate/day.

Accomplishments

Short-Term Outcomes

- Used 18°C, 85-90%RH, and <1000 ppm to achieve average 1200g/flush harvests in Pleurotis, Hericium, and Adiposa fungal species.

Outputs

- Designed a marine LED tile to hit peak wavelength bands for Ch1A, Ch1C2, peridinin, coral fluorescence, and algae growth while maintaining high IP65+ rating.
- New controlled environment chambers for pollen.
- PetriClear® LED patent and ASABE AE50 Outstanding Innovations award.

Activities

- Researching pollen storage systems using a drying rate schedule to improve viability.
- Product degradability, air filtration, requisite airflow studies for Mycology chamber.
- Nitrogen and ethylene monitoring for food ripening control and studies.
- Empirically derived drying rate formula based on air flow and absolute humidity differential.
- Material testing of nanoscale coatings.

Milestones

- Made plans to transition to keep up with the new regulations in refrigerants in the industry, and test A3 refrigerant systems.
- Obtaining new ethylene monitoring systems.

Impact Statement

- Percival has continued to be involved in the ASABE X642.2 panel to help quantify lighting uniformity regulations.
- Involved in the search for new viable A3, low GWP refrigerants to enable the industry to comply eventually with Kigali Amendment and EU F-Gas directives for controlled environments.
- Improvement in humidification technology has been a central concern, with new humidification and dehumidification designs, including a new ultrasonic humidification design. This is important to hit low dehumidification specifications for seed storage (<0°C dew points) and high humidification specifications (up to 95%RH) for mycology research.

Published Works

Presentations

Imberti, David. 2024. *Balancing for Success: Optimizing CO₂, Light, and Temperature*. Indoor Ag Con, Las Vegas, U.S.. March 11.

Popular Articles

Christopher, Mark. 2024. "Testing." *Percival-Scientific, Inc.* November 25. percival-scientific.com/wp-content/uploads/2024/12/105-White-Paper-High-Standard-for-Testing-112524-FNL.pdf.

Imberti, David. 2024. "LED Spectra in Plant Growth." *Produce Grower*.

Percival-Scientific, Inc. 2024. "Reducing Condensation in Tissue Culture (CU) Chambers." *Percival-Scientific, Inc.* February 26. percival-scientific.com/wp-content/uploads/2025/02/105-White-Paper-Reducing-Condensation-in-Tissue-Culture-Chambers-022625-FNL.pdf.

Resource. 2025. "ASABE AE50 Outstanding Innovations AWARD." Jan. and Feb.: 12.

Patents

Imberti, Henry, David Imberti, and Daniel Kiekhaefer. 2024. Environment Controlled Chamber with IR Condensation Reduction. Patent US 2025/0002833. May 21.