

Percival-Scientific, Inc. 2022 Station Report

New Facilities

As reported last year, with the help of USDA through the Rural Economic Development Loan and Grant Program, investment partners Minburn, CIPCO, the Iowa Area Development Group, City of Perry, and Perry Economic Development; we began development on new plant expansion. This has been completed and is currently being utilized to increase our production capacity, and has allowed us to develop larger walk-in chambers while continuing to grow our traditional product lines.

Accomplishment Summary

Percival-Scientific has developed new LED platforms to optimize spectral uniformity weighted to photosynthetic, Circadian, and insect responses. This optimization of spectral performance to use-case dependent spectral load demands led to very specific choices in LEDs for their spectral and intensity qualities. The LED selection involved solving the corresponding combinatorial problem of which LEDs to select for which defined purpose. This led us into the development of three platforms:

- A general purpose 8-color system to simultaneously hit 420nm, 450nm, 530nm, 630nm, 660nm, 730nm spectral points (chosen for UV response, Chlorophyll A/B efficiency optimization, shade avoidance, and flowering response), as well as points between by choosing whites with large color temperature differences.
- Broader, simplified dual-channel tiles. Including extended-white 3000-6000K CCT controllable white LED boards, as well as white interspaced with red to permit more efficient Circadian response regime adjustment.
- Effective linear LED patterns for incubator and insect spectral demands.

Impact Statement

Developments in lighting architecture at Percival have enabled us to expand our spectral capabilities. We can reach extended doses of intensity from UVC, UVB, UVA, particular chlorophyll peaks, particular insect response, shade response, flowering response, down to infrared regimes for bacteriochlorophyll, and are able to resolve the combinatorial issues to solve some of these spectral demands simultaneously.

Published Works

Interview with Gary Wheelock. (2022, September TBA). *Business Record*.