e-GRO Edible Alert

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Lighting resources online: Project LAMP website

Electricity for lighting has been estimated to cost the greenhouse and indoor agriculture industry in the U.S. $1 billion annually. While lighting technology has evolved over time and become more energy efficient it is still expensive upfront. LED lighting brings several control capabilities (dimming, spectral control) many times these capabilities are not being fully utilized due to a lack of research-based information or lack of research on how to best implement them.

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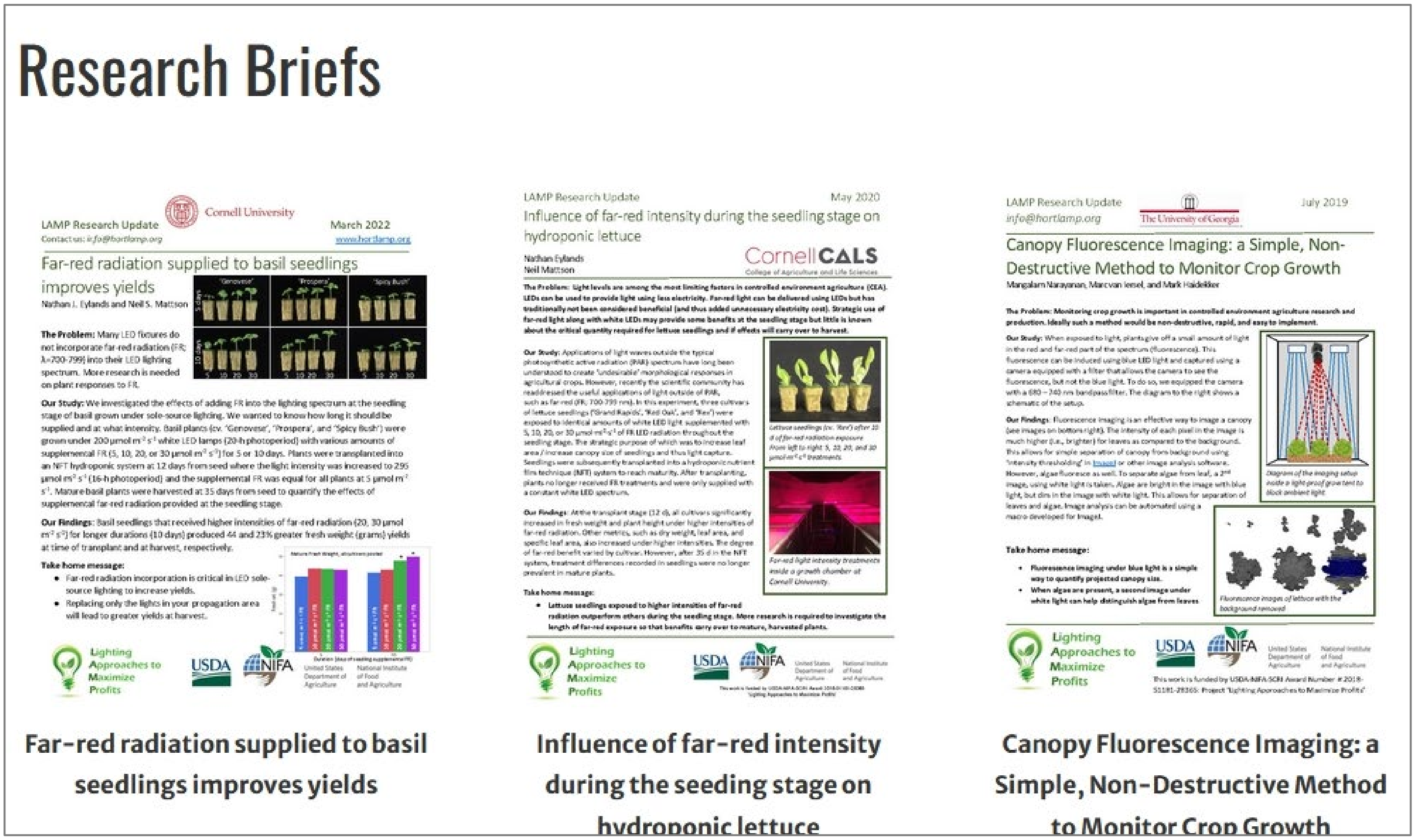


Project LAMP (lighting approaches to maximize profit) is a team of researchers that focuses on helping growers get more value out of their lighting systems. LAMP was founded by the late Professor Marc van Iersel at the University of Georgia and is now led by Dr. Rhuanito Ferrarezi at UGA. Other team members are based at Clemson University, Colorado State University, Cornell University, Rutgers University, Texas A&M, University of Minnesota, and Utah State University, and the USDA ARS in Toledo, OH. Our team combines several disciplines: horticulture, economics, agricultural & electrical engineering, computer engineering, impact assessment, and information systems, to help us better understand the impacts and economics of plant lighting decisions.

Project LAMP recently updated their website, now available at: https://hortlamp.uga.edu/ and the objective of this e-Gro Alert is to highlight a few sections that may be particularly useful to the CEA industry.

Research Briefs

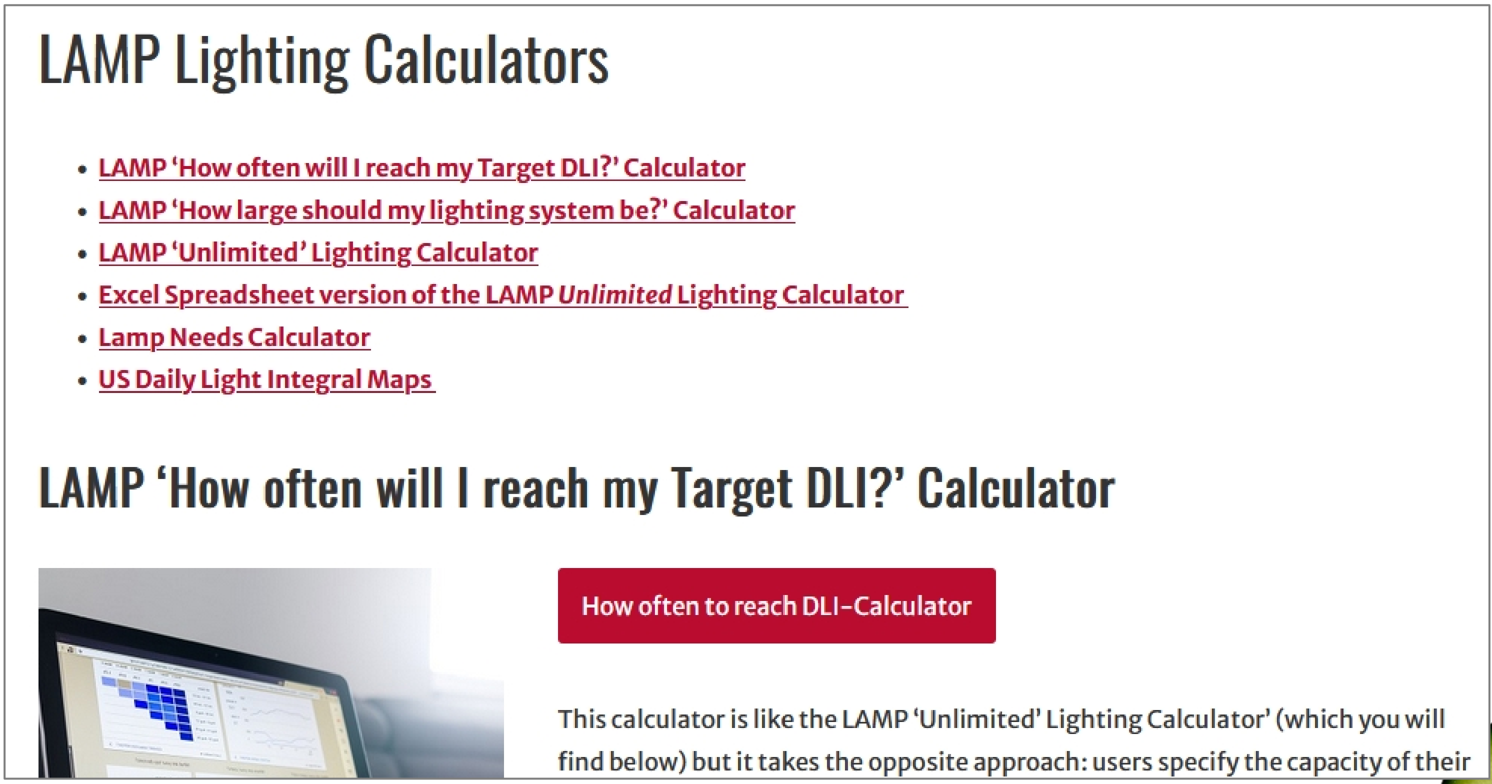
This section of the website features about 20 one-page research briefs which summarize research findings from the team into accessible nuggets of information. Briefs cover several topics such as: understanding lighting and energy units, supplemental lighting of herbs and leafy greens, canopy sensing methodologies and how these correlate to biomass, and several studies on the benefits of far-red radiation under sole-source lighting. In one of the more fascinating research topics, the team reports on the strategy of delivering the same DLI but spreading it across more hours of the day. This strategy was tested for lettuce and mizuna using dimmable LEDs. Spreading the same DLI over 20 hours vs. 10 hours per day led to an increase in fresh weight of 12% for lettuce and 20% for mizuna.

Lighting Instructional Videos

Team members are building an archive of short videos addressing lighting topics. Our aim (not always successful) is that videos are 3 to 5 minutes long. Topics so far include supplemental vs. photoperiodic lighting, carbon dioxide enrichment, understanding electricity cost vs. demand charge and many more. We'll continue to post new videos as the project proceeds.

LAMP Lighting Calculators

A signature LAMP effort has been developing a series of calculator tools to aid greenhouse operators in making lighting system decisions. The calculators have inputs such as zip code (for ambient sunlight information), greenhouse dimensions, daily light integral target (DLI), greenhouse light transmission, efficacy of the lighting system, and electricity cost. The "How large should my lighting system be" calculator allows you to specify how many days of the year you want to able to reach a target DLI. The calculator will determine the required lighting capacity to reach the target DLI and graphs the expected greenhouse DLI over an average year. Electricity use and demand costs are also calculated. This calculator is particularly useful for the design of new lighting installations. The "How often to reach DLI" calculator takes the opposite approach: the user specifies the capacity of the lighting system and the calculator estimates how many days of the year you can reach your target DLI. Finally, the "lamps needed" calculator is a downloadable spreadsheet that can estimate the number of light fixtures needed in your greenhouse. You can also input information on two light fixtures and determine estimated up-front cost and calculate a simple payback for a more expensive but energy-efficient fixture. This calculator is described in greater detail in e-Gro Alert 8.14.



LAMP Lighting Calculators

- LAMP 'How often will I reach my Target DLI?' Calculator
- LAMP 'How large should my lighting system be?' Calculator
- LAMP 'Unlimited' Lighting Calculator
- Excel Spreadsheet version of the LAMP *Unlimited* Lighting Calculator
- Lamp Needs Calculator
- US Daily Light Integral Maps

LAMP 'How often will I reach my Target DLI?' Calculator

How often to reach DLI–Calculator

This calculator is like the LAMP 'Unlimited' Lighting Calculator' (which you will find below) but it takes the opposite approach: users specify the capacity of their

I invite you to take a few minutes to explore the project LAMP site. We hope you will find some resources that help in your horticulture lighting journey. Please feel free to share feedback to me at: nsm47@cornell.edu

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hortlamp.uga.edu

Lighting Approaches to Maximize Profits

USDA NIFA United States Department of Agriculture National Institute of Food and Agriculture

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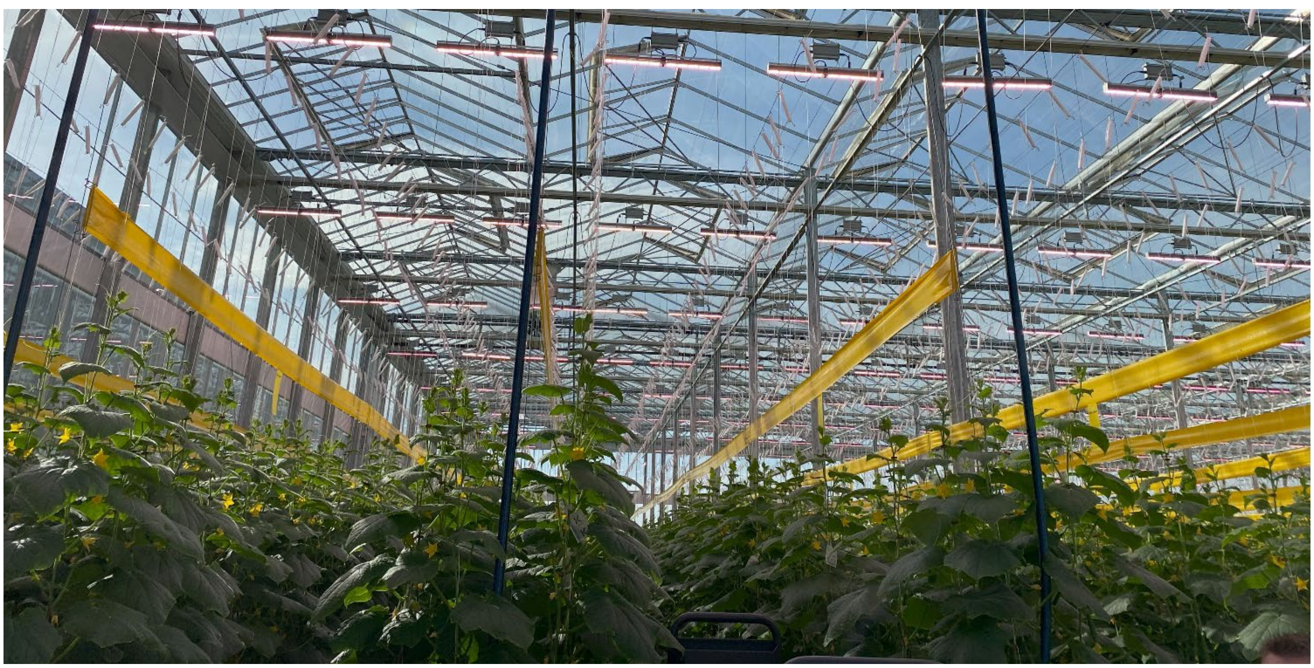

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