
11th GLASE Industry Advisory Board Meeting

June 2022 - Quarter II



OUTLINE

- GLASE Members Introductions & Updates (30 min)
- GLASE Research Updates (30 min)
- Announcements & Discussion (30 min)

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- **GLASE Members Introductions & Updates (30 min)**
- GLASE Research Updates (30 min)
- 2022 Announcements & Discussion (30 min)

26 CEA & Industry Members

ko1dr



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BRIGHT FARMS

little leaf
FARMS



TSRgrow



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The background of the entire image is a blurred, close-up shot of green grass, likely wheat or barley, with a soft bokeh effect. The colors range from a vibrant green to a darker, muted green, creating a textured and organic feel.

REAL TIME LASSI

Timothy Shelford



LIGHT AND SHADE SYSTEM IMPLEMENTATION

Was originally developed for use with High Pressure Sodium lights

HPS lights were not readily dimmable, or able to be switched off/on frequently

HPS lights take ~20 minutes to warm up to full intensity

LED lighting opens possibilities with dimmability and ease of on/off switching

GOALS

Dim lights such that a “maximum” PAR threshold, set by the user, is not exceeded

Use LASSI to predict natural light intensity that will exceed the user threshold, and shift lighting away from these times of day

The maximum PAR level is the sum of natural and supplemental light

Use traditional LASSI rules, however update interval to allow more frequent decision making



MAXIMUM LIGHT THRESHOLD

For some crops such as lettuce, too much light is detrimental

Some literature suggests that light above $800 \mu\text{mol}/\text{m}^2$ is “wasted”

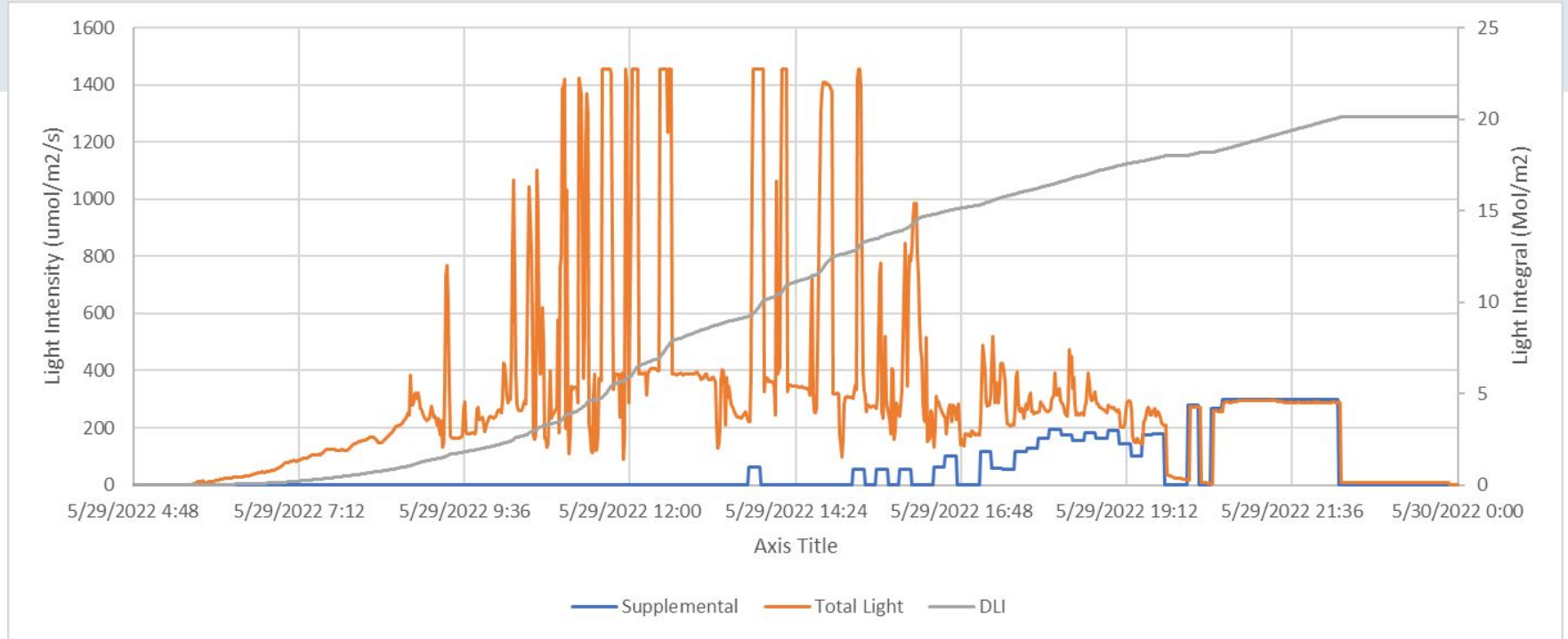
Do not want to supply lighting above the light threshold

SIMULATION RESULTS

	Average minutes of the day > 800 umol/m2/s	Displaced Hours per month (hrs)	
		180 umol/m2/s	220 umol/m2/s
January	1.5	4.50	0.00
February	14.7	9.63	0.33
March	106.1	0.00	0.00
April	110.8	0.00	0.00
May	162.9	0.00	0.00
June	267.4	0.00	0.00
July	275.0	0.00	0.00
August	235.5	0.00	0.00
September	165.2	5.29	0.00
October	38.4	9.13	0.00
November	0.5	2.83	0.00
December	0.0	0.00	0.00

- Simulations were conducted with two different supplemental light intensities
- Higher supplemental light intensity allowed more lighting in off peak hours and away from intensity peaks during the day
- With a higher supplemental lighting intensity few hours needed to be displaced

RESULTS OF OPERATION



Cornell University Research Update

Neil Mattson, Timothy Shelford, Christopher Levine, Jake Holley, Nate Eylands



Comparison of tomato growth under sole-source fluorescent (control) or LED light (with different short wavelengths)

Elsebeth Kolmos
&
Matthew
Goldman



GLASE
GREENHOUSE LIGHTING
& SYSTEMS ENGINEERING

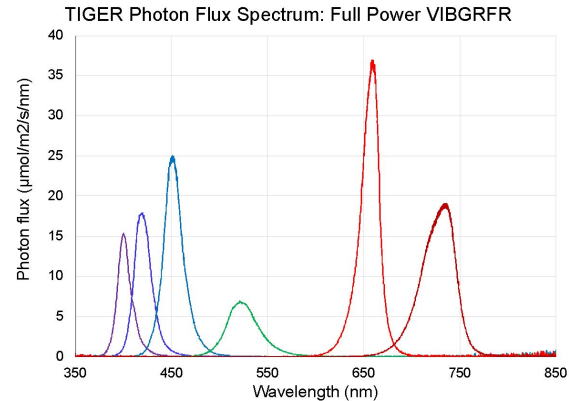


Experimental conditions

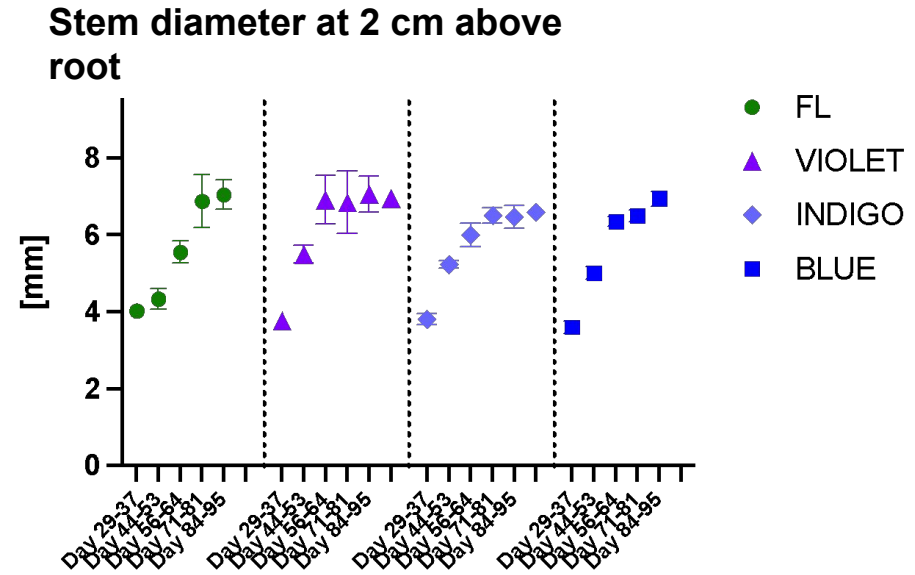
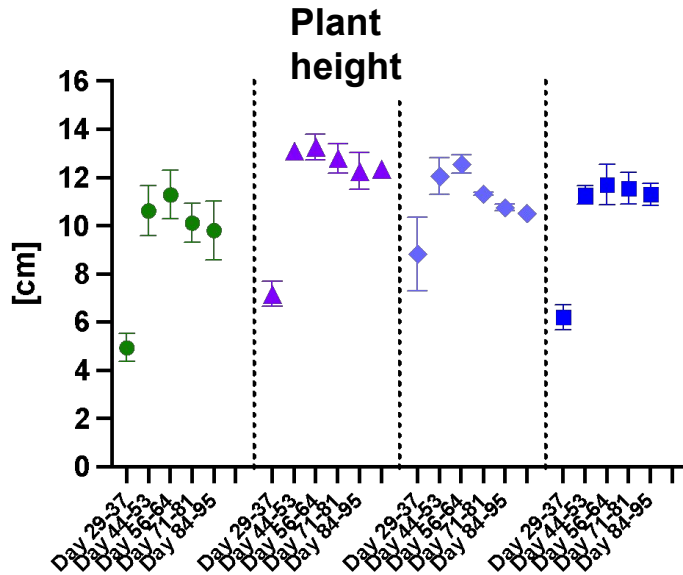
- Fluorescent light (control, Philips T5)
- LED light with different short wavelength light: **Violet** (400 nm), **Indigo** (420 nm), **Blue** (450 nm)
- Spectrum: 36 $\mu\text{mol}/(\text{m}^2\text{s})$ short wavelength, 72 $\mu\text{mol}/(\text{m}^2\text{s})$ **Green**, 256 $\mu\text{mol}/(\text{m}^2\text{s})$ **Red**, 36 $\mu\text{mol}/(\text{m}^2\text{s})$

Far-red

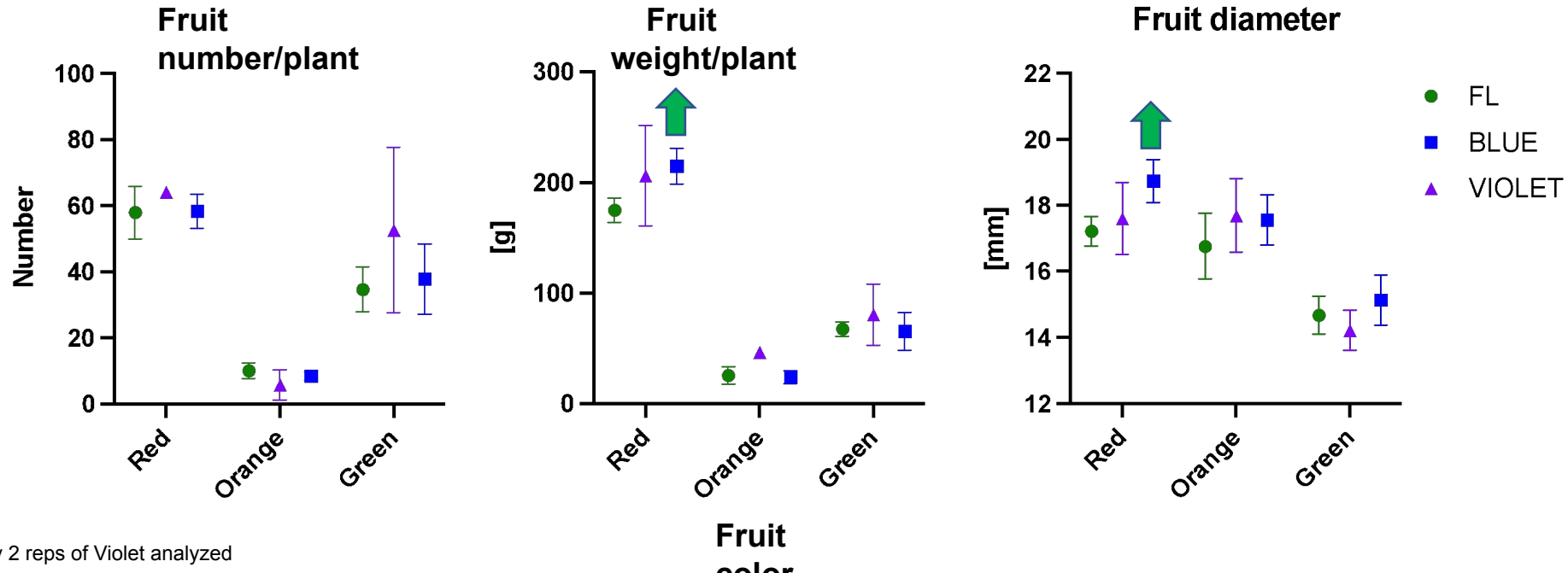
- Light intensity: 400 $\mu\text{mol}/(\text{m}^2\text{s})$
- DLI: 23 $\text{mol}/(\text{m}^2\text{d})$
- Long-day photoperiod (16 hours), 25°C/18°C
- Deep water reservoir with aeration
- 'Micro Tom' tomato variety (dwarf variety)
- Three replicated trials, *currently in progress*



Plant growth was similar under Fluorescent and LED light

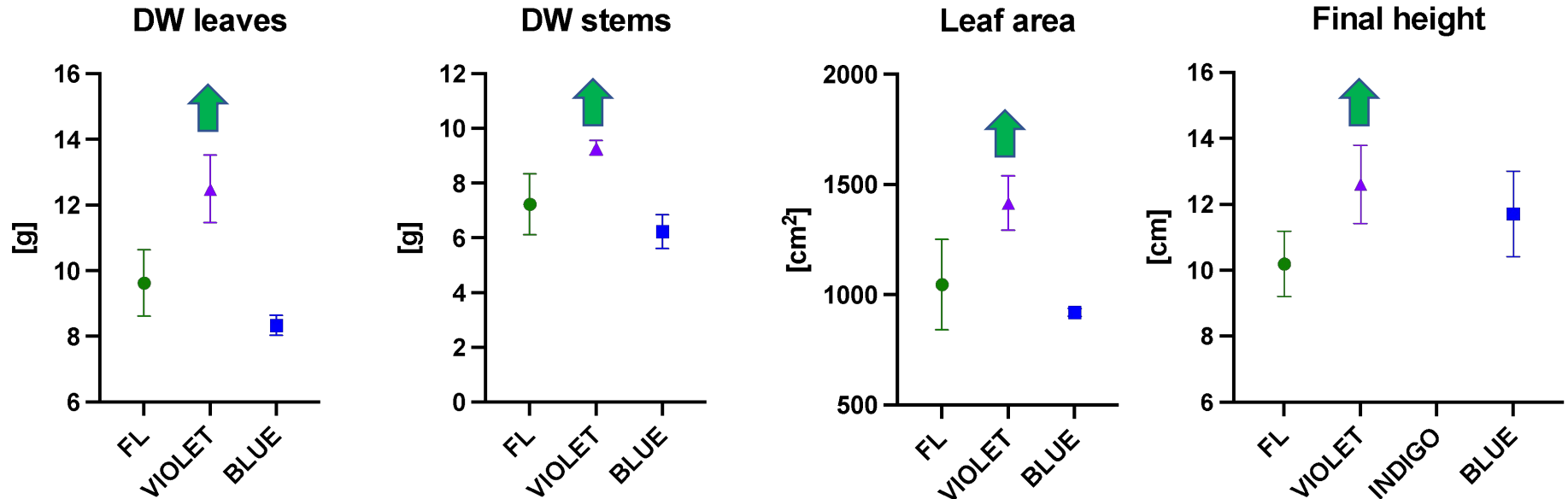


Average fruit yield was increased for BLUE compared to Fluorescent light

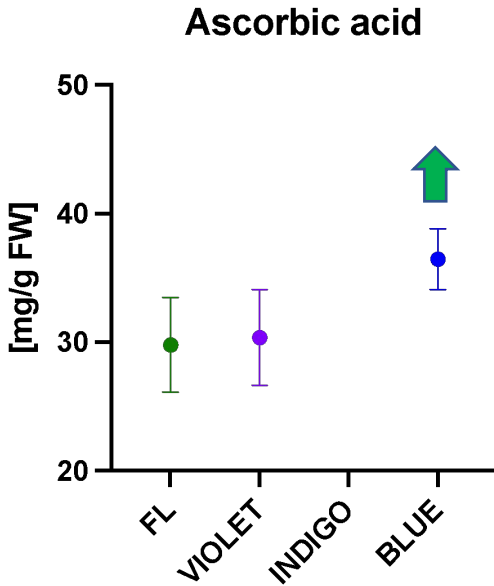
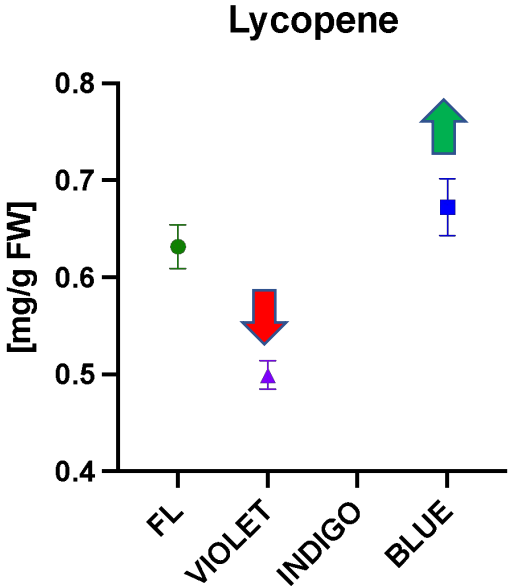
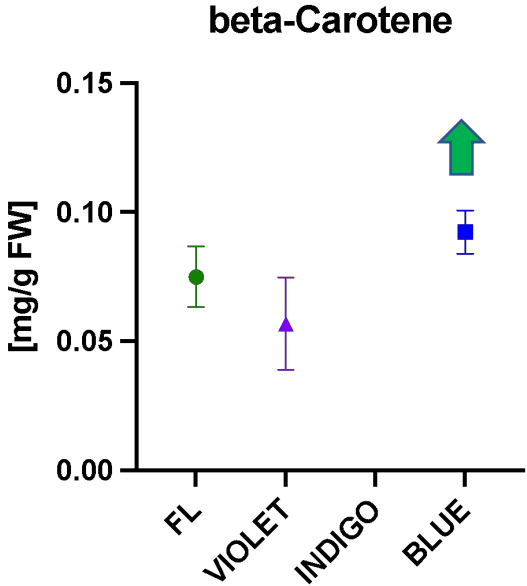


Only 2 reps of Violet analyzed

Dry weight was increased for VIOLET compared to BLUE and Fluorescent light

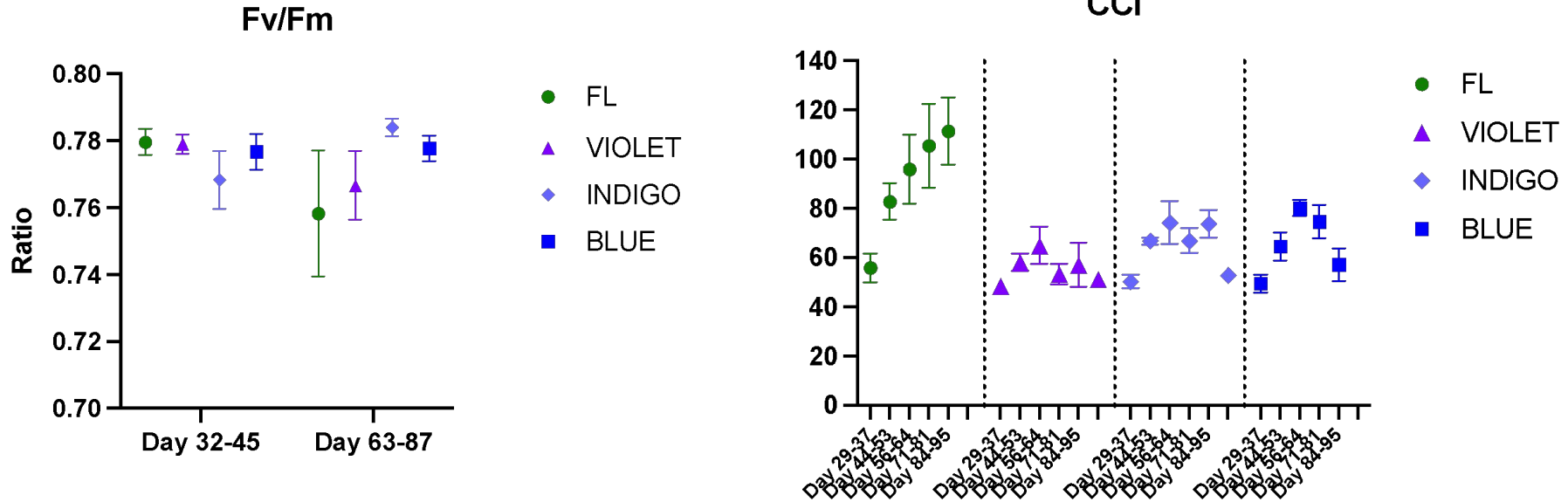


Carotenoid and ascorbic acid content under Fluorescent and LED light



Only 2 reps of Violet analyzed

Chlorophyll a fluorescence (Fv/Fm), but not Chl Content Index, was similar under Fluorescent and LED light



Preliminary conclusions

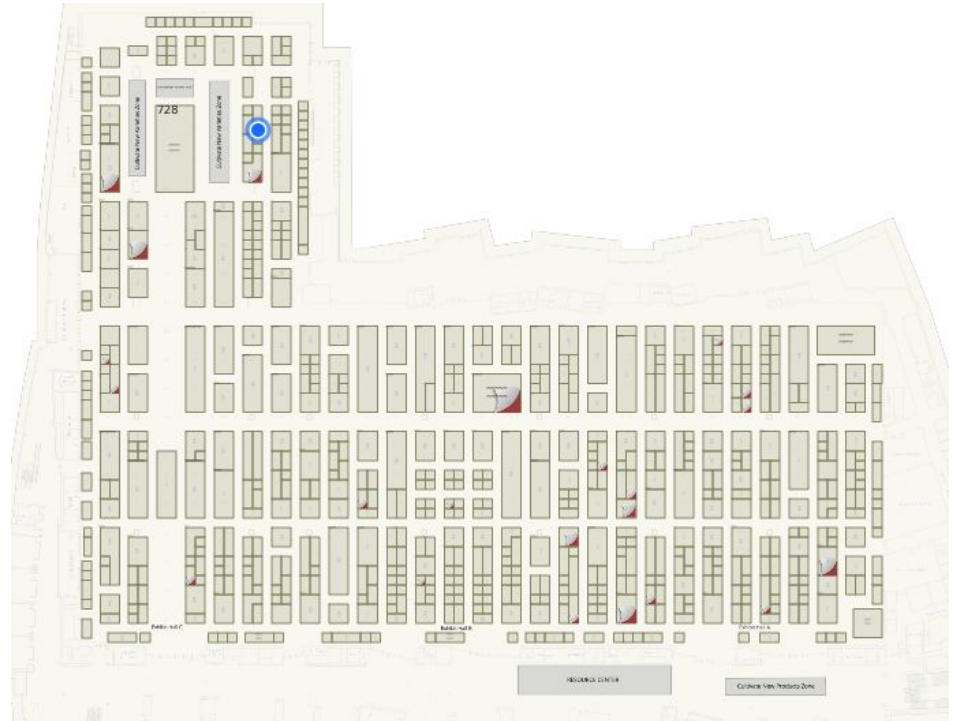
- Increased height for LED light
- Similar number fruits for LED and FL but fruits bigger for BLUE
- Higher green biomass for VIOLET
- Similar chlorophyll *a* fluorescence under FL and LED
- Higher content of carotenoids and ascorbic acid for BLUE
- Low lycopene content for VIOLET
- Yet to be completed: Indigo trials, measurements of BRIX, antioxidant capacity, total flavonoid content, fruit acidity

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GLASE at Cultivate 2022

- July 16-19, Columbus OH
- GLASE Booth: I 536 (Sun-Tues)
- Neil Mattson & AJ Both presenting (Tues)
- Interest in personal meetings or a group meet-up?

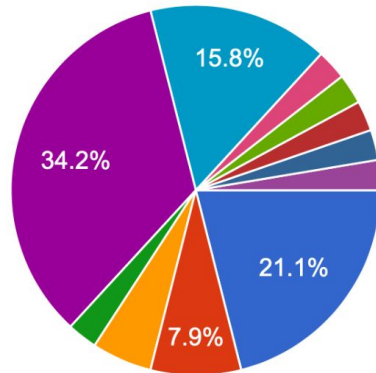


2022 Short Course Survey Results

- Virtual Short Course on Climate Control
- October 2022
- Survey still open: <https://forms.gle/H2WG96n9hCtvmibIA>

Which of the following best describes you?

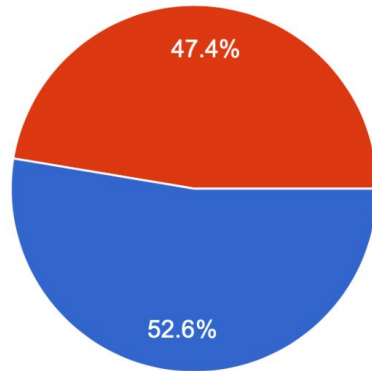
38 responses



- Greenhouse operator
- Vertical farm operator
- Allied trade
- Climate control company
- Consultant
- University/Education
- OEM
- Power supply manufacturer

Please rate your overall interest in climate control as the next short course topic.

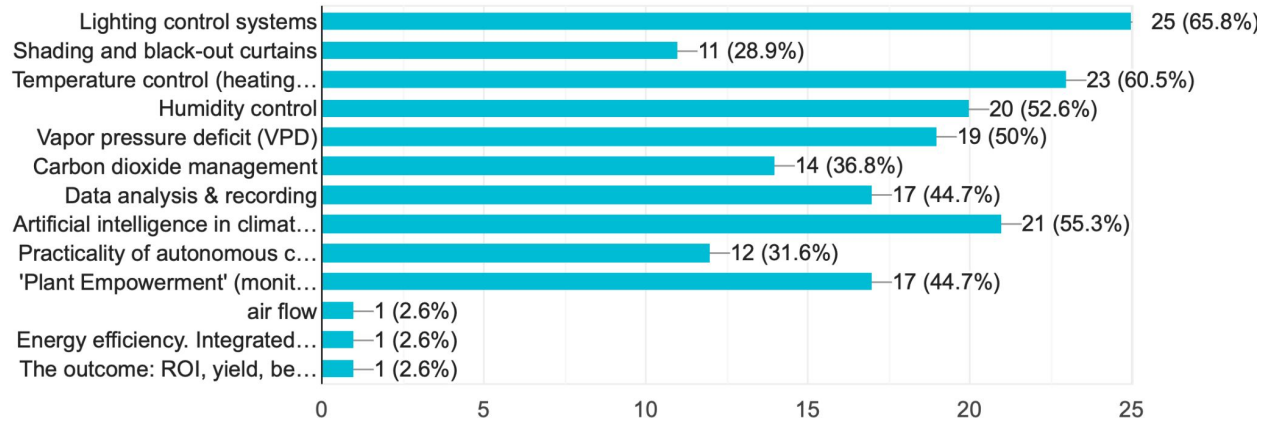
38 responses



- Very interested (will attend)
- Interested (may attend)
- Not interested (will not attend)

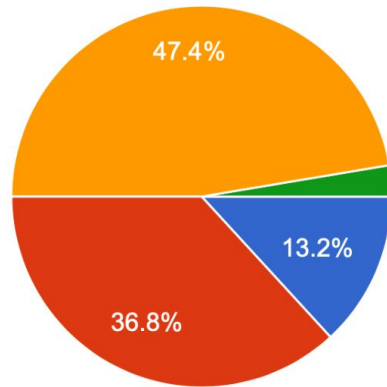
Which of the following topics in climate control would you be most interested in learning more about in this course? (select all that apply)

38 responses



In which of the following formats would you prefer to receive course material?

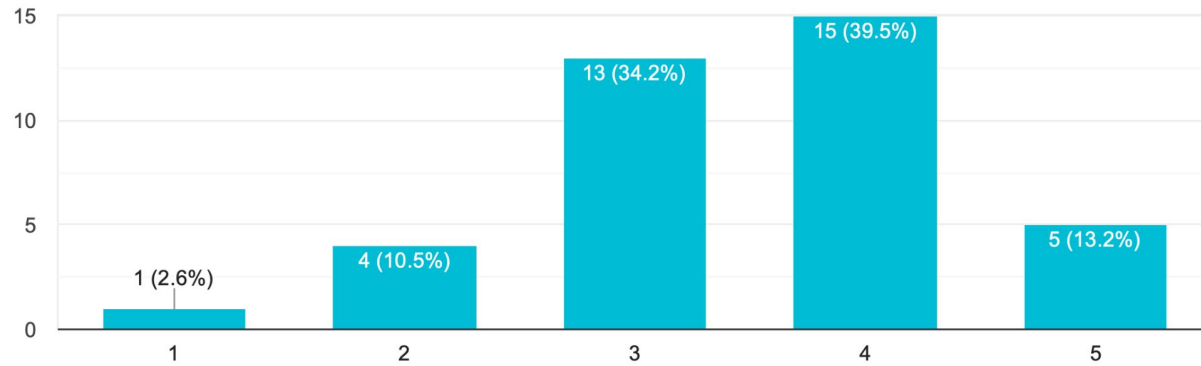
38 responses



- Recorded modules with no live elements (pre-recorded course videos uploaded to a website for on-demand viewing only)
- Recorded modules with live Q&A sessions (no live presentations, but scheduled Q&A meetings with speakers)
- Live modules with Q&A at the end (modules occur at a set time for live presentations, can be recorded for later viewing)
- Live module with slide sharing

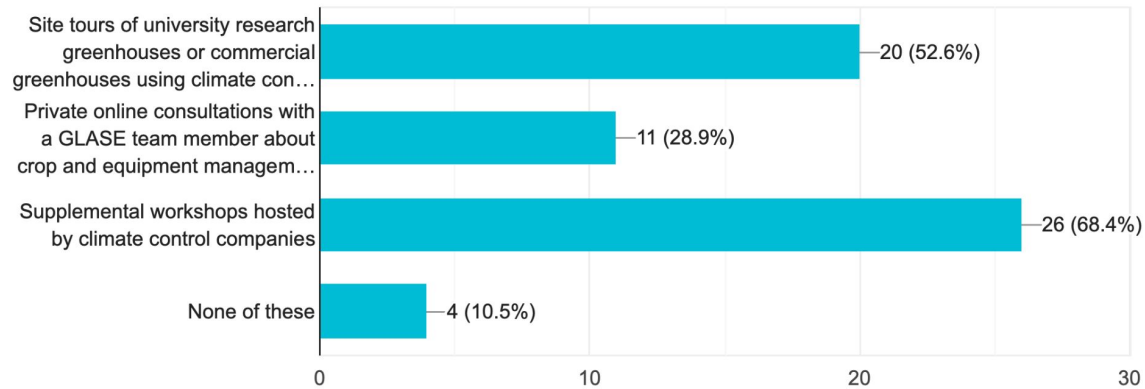
How important to you are interactive elements in an online course? (ie. live demonstrations, audience participation, question & answer sessions)

38 responses



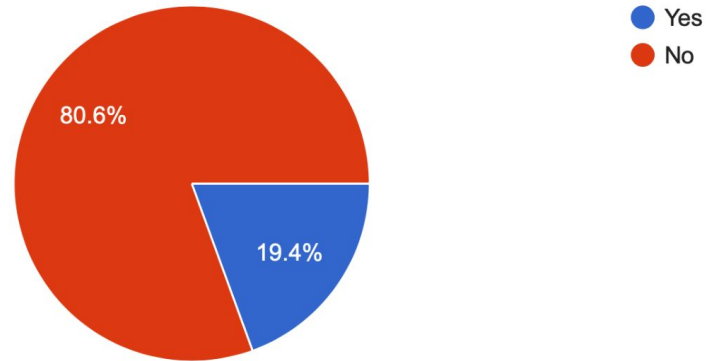
Which of the following supplemental course options would you participate in? (select all that apply)

38 responses



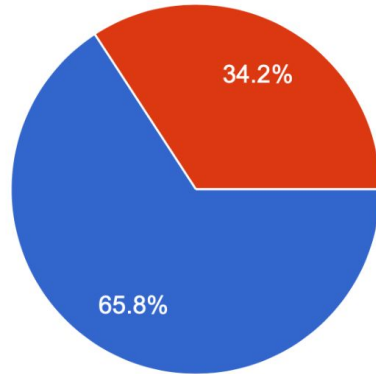
If all modules were transcribed and/or given subtitles in Spanish, would you or members of your company utilize this option?

36 responses



Last year the registration fee was \$200 (for 12 hours of content). Does this seem:

38 responses



- About right
- Too high, may limit ability for some to register
- Too low for the value proposition

Erico Mattos Pursues New Opportunity



- GLASE's Executive Director of 5 years will be moving on to a new opportunity
- GLASE is in the process of interviewing candidates and will announce a new Executive Director mid-summer