

3

The third property is the duration (or photoperiod) of light. Many plants will only flower when a certain daylength is reached. Plants can generally be classified into one of three broad photoperiod categories: 1) Short-day, which flower when nights are long, 2.) Long-day, which flower when nights are short, and 3.) Day-neutral, which flower no matter the length of day. We are growing day-neutral everbearing strawberry (*Fragraria ×annassa* ‘Albion’ and ‘Ozark Beauty’) cultivars.



8 hour day **16 hour night**

Figure 2. Poinsettias are commonly grown in CEA and are an example of a short-day plant.

Join our email list to receive updates on our strawberry tasting panels!



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Glow and grow: Mastering indoor lighting

In the CEA lab at SPUR, we use sole-source lighting to grow strawberries in controlled environments for research.



What is controlled environment agriculture?

Controlled environment agriculture (CEA) is a technology-based approach for growing crops in protected environments. Controlled environments include greenhouses with access to natural light and fully enclosed warehouses and shipping container farms.



In CEA, we often use light-emitting diodes (LEDs) to help plants grow. Similar to what we can see in the visible spectrum (380-770 nm), plants primarily use what is referred to as photosynthetically active radiation (PAR; 400-700 nm).

Understanding light for growing indoors

When growing plants indoors, providing the proper lighting can be tricky. Below is a brief explanation of the three key properties of light you should keep in mind when considering electric lamps for indoor growing.

1

The first property is light intensity (or amount) of light we are supplying to the plant. A higher light intensity means that there's more energy available for photosynthesis. The light intensity for plant growth is commonly measured in quantum units ($\mu\text{mol}\cdot\text{m}^{-2}\cdot\text{s}^{-1}$). When it comes to selecting lights for indoor spaces where we work and play, footcandles or lux is commonly used for measurement as this pertains to how we perceive light. However, footcandles or lux is not appropriate for plant growth applications. The light intensity strawberry plants are growing under is $312 \mu\text{mol}\cdot\text{m}^{-2}\cdot\text{s}^{-1}$.

$\mu\text{mol}\cdot\text{m}^{-2}\cdot\text{s}^{-1}$ ✓

footcandles or lux ✗

2

The second property is the light spectrum (or color) of light. While many lamps will list specific colors of light (e.g., blue and red) emitted, the most important detail to look for is whether the wavelengths listed fall within the range of 400–700 nm. As mentioned previously, this range is referred to as PAR, which is a technical term for the specific wavelengths of light that plants use for photosynthesis and growth.

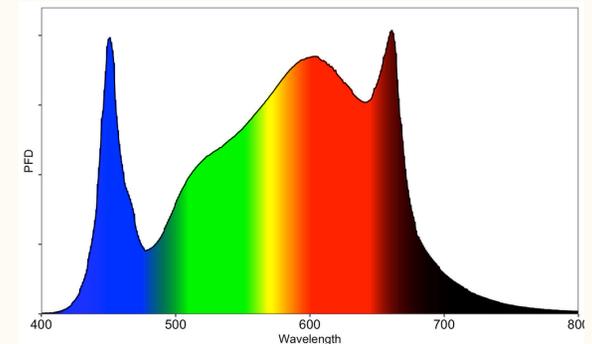


Figure 1. Colors (wavelengths) of light emitted from LED fixtures in the growth chambers in the CEA Lab including blue (400-500 nm), green (500-600 nm), red (600-700 nm), and far-red (700-800 nm).