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CIENCIA PURA

Is the optimal light really an optimal light for plants?

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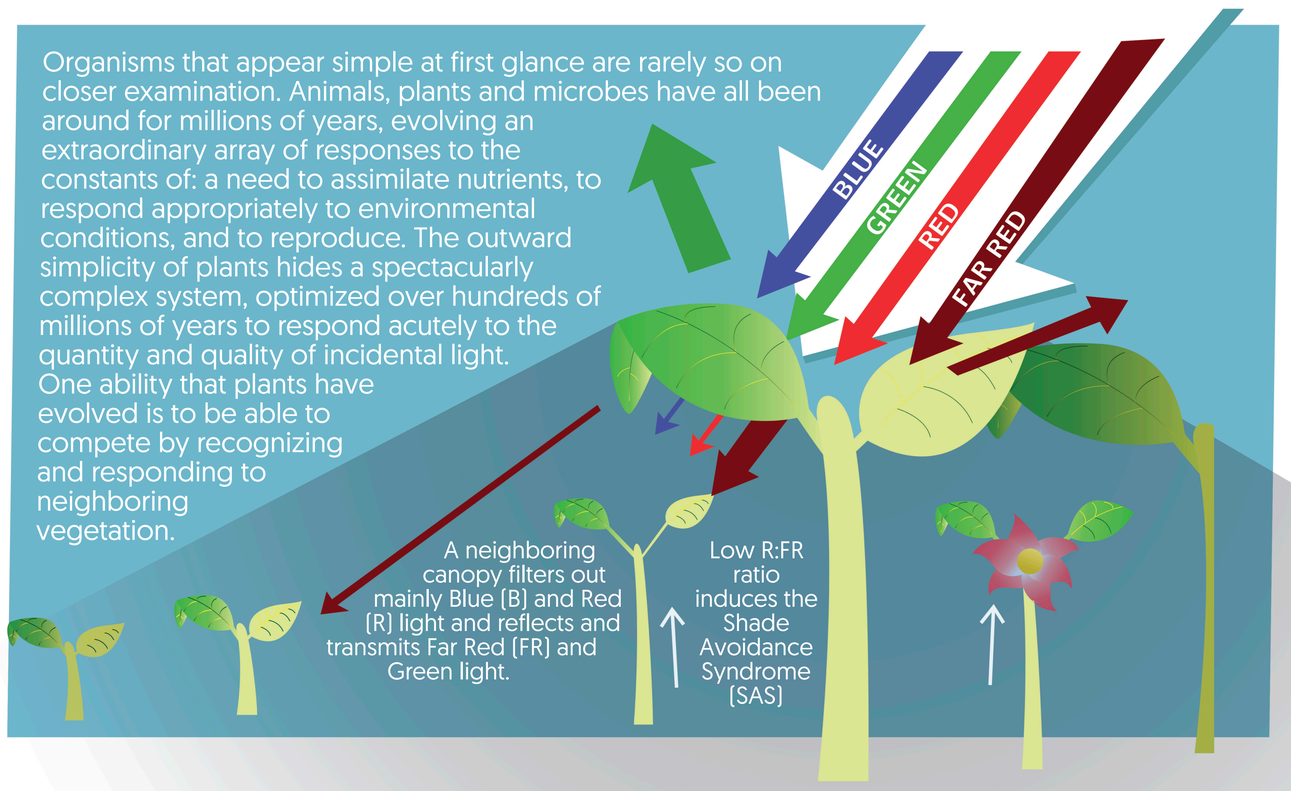
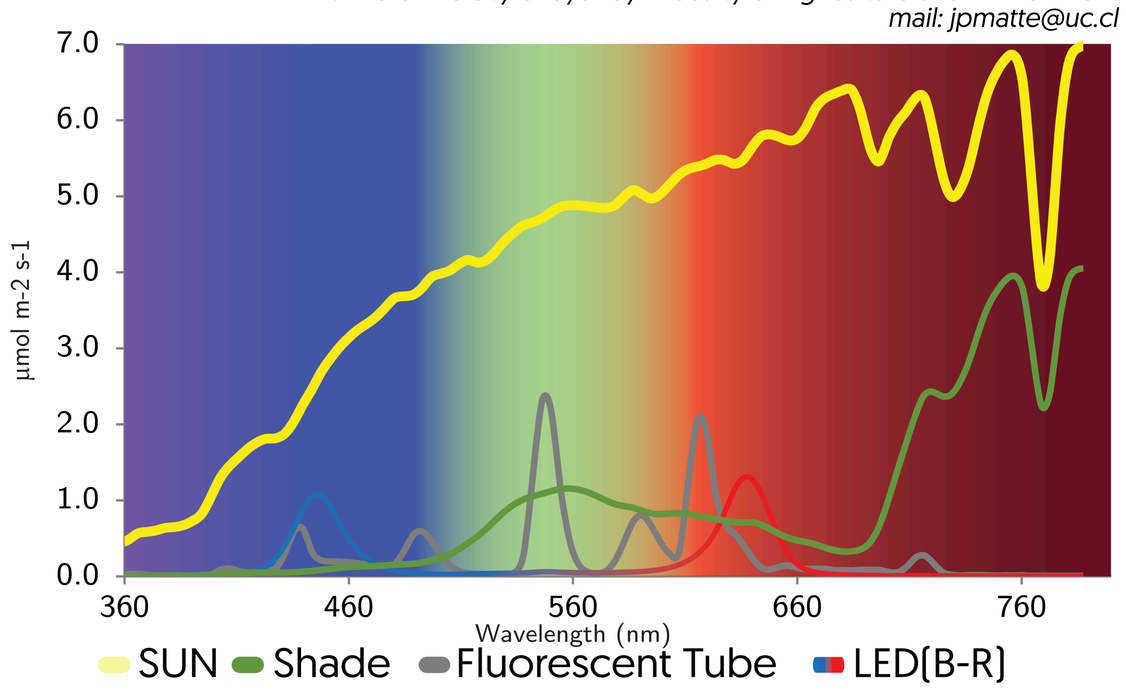
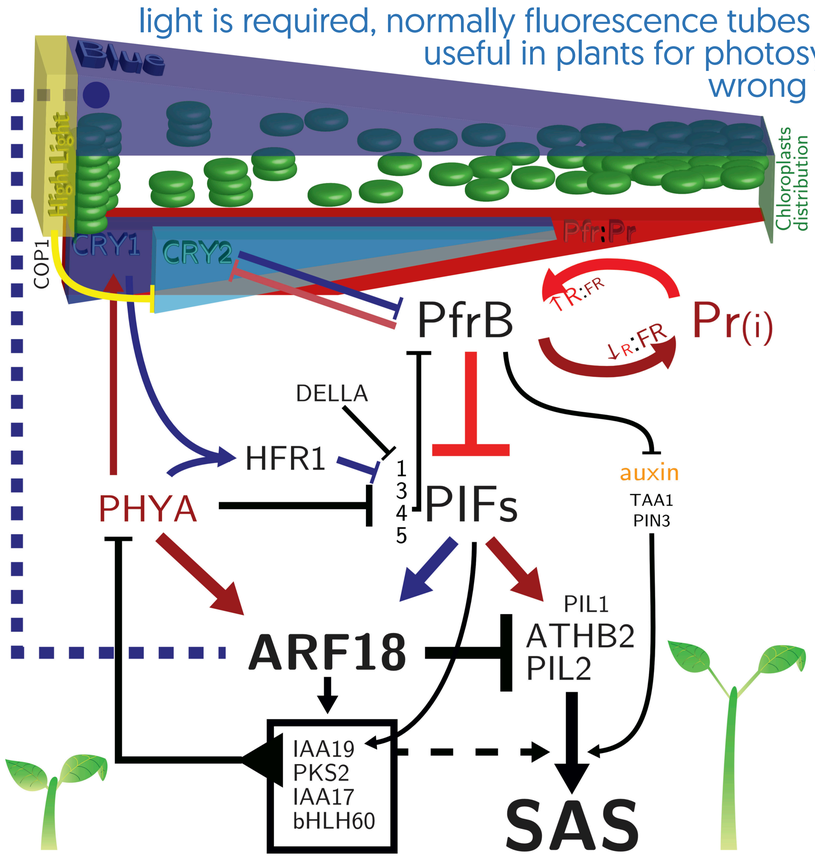


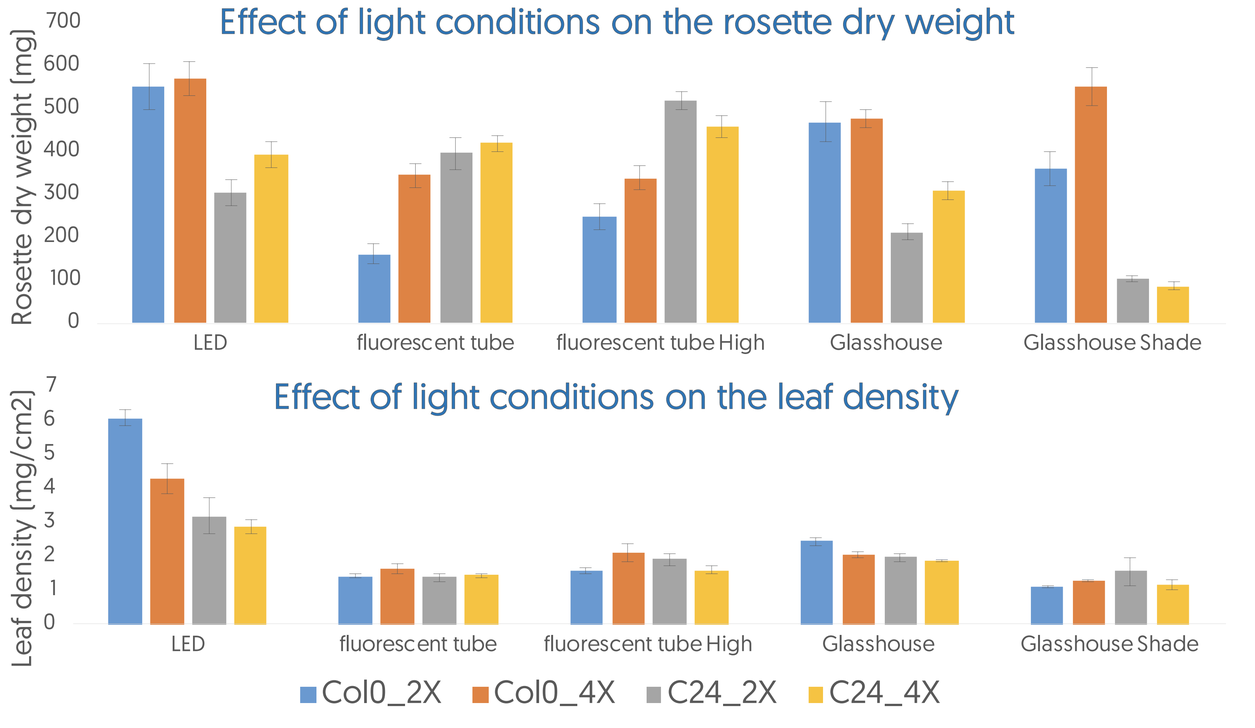


The spectral range from 400 to 700nm has been designated as the photosynthetically active radiation (PAR). When the spectrum is measured under the shade of vegetation, most of the Blue and Red light is filtered. The optimum light intensity that is recommended to grow *Arabidopsis* plants (according to ABRC[1]) is 130-150 µmol/m2/s, which mimics 60% shade cloth in summer greenhouses. In growth rooms, when artificial light is required, normally fluorescence tubes and, recently, a new type of white LEDs are chosen. But is that the right choice? Only Blue, Red and Far Red are useful in plants for photosynthesis and signals, and more than 50% in those artificial lights is Green, with the possibility of a potential wrong measurement of the light intensity.

[1]Arabidopsis biological resource center



Plants respond to changes in the ratio between R:FR through the Phytochrome light photoreceptors (PHYA-E). Perception of blue light levels appears to be primarily through the Cryptochrome and Phototropin photoreceptors, but PHY-mediated signal response mechanism also appears to be involved. Other important elements in the response mechanisms have recently been identified, including the Phytochrome Interacting Factors (PIF) and elements of the auxin response pathway.



In a simple experiment, several plants of *Arabidopsis thaliana* (Col0 and C24 ecotypes, in 2 ploidy levels, n=5) where placed in 5 different light conditions. LEDs with only Blue and Red colors, Fluorescent tube set at 150µE and at 200µE for high light, Glasshouse at full light and 60% shade cloth. Comparing the rosette dry weight, Col0 accumulate more biomass under LED and glasshouse growth conditions, and both ecotypes produce denser leaves under LED growth conditions.
This simple experiment shows that we should be more careful in selecting the type of light, and pay attention to the growth conditions that could be affecting various genetics pathways that could interfere in other results.

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