NUKE PLANTS WITH LIGHT

We already saw that the increase of PPFD above a certain level does not bring an equivalent increase in yield, taste, or plant health. However, it is claimed by some that the light duration (photoperiod - the length of time a plant is exposed to light during each 24-hour period) might influence the grow in a positive way. The DLI (Daily Light Integral), or the cumulative PPFD delivered during a 24 hour period, is expressed in µmol/m2/day. But it must be borne in mind that the length of the photoperiod also influences the transition from vegetative to reproductive growth (Flowering) in several plant species. This transition usually happens when the photoperiod is reduced to around 12 hours per day. Thus it is the increasing dark period (scotoperiod) rather than the photoperiod which ignites the transition. On the other hand, several plant species are day neutral, and the length of the photoperiod does not influence flowering.

OUR LADIES & NANOMETERS (NM)

The spectrum of light from any source is a range of light wavelengths, measured in nanometers (nm). Not all of any spectrum, from the sun or from a grow light, is useful to plants. The wavelengths of the spectrum which are useful to plants are called the PAR (Photosynthetic Active Radiation). The wavelength of light is measured in the same way waves in the ocean can be measured, from peak to peak, the wavelength being the distance between 2 consecutive peaks of the wave's oscillation. A nanometer is one billionth of a meter (1×10^{-9} m), and these units are used because the wavelengths of light are very small.

We've described a lot of LED terminology and basic knowledge, but at the end it all comes down to what the plant does. The main receptor of light within the plant is chlorophyll A - the principal pigment involved in photosynthesis. Chlorophyll B is the accessory pigment, which collects the energy in order to pass it on to chlorophyll A.

For chlorophyll A the most effectively absorbed wavelengths of the spectrum are 429 nm and 659 nm, which are responsible for violet-blue and orange-red colours.

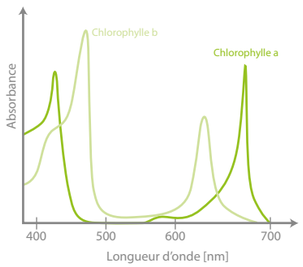
For chlorophyll B, the most effectively absorbed wavelengths of the spectrum are 455 nm and 642 nm, which are responsible for violet and red colours.

Assuming you have the right wavelengths (nm) combined with the right PPF (µmol/s) your plants will love LED.

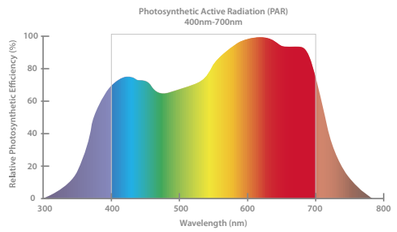
OUR THOUGHTS

This is the disclaimer stating that we, as humans, only know a little about light and plants in general. We appreciate that with your plants, it is the feeling and the love you put into the grow that determines the outcome. But we also know that we have found a great solution with our new LUMii 720W 6-Bar LED. Combining all of our knowledge, we believe it is currently the best solution for growing with LED.

OUR LADIES CHLOROPHYLL



PAR



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LUMii BLACK

LUMii LIGHTS

OUR LITTLE SECRET

ONCE UPON A TIME IN THE WEST...

Once upon a time it was easy to choose a grow light - you decided the wattage you wanted for the grow, bought a ballast, a reflector and an HPS lamp and off you went. The investment cost was not and still is not very high. For around 100 Euro you can buy a complete budget-level HPS kit.

Research shows that LED lighting can improve taste and increase the productivity of plants, while using less electricity. Things are changing. With the introduction of the LUMii BLACK 720W 6-Bar LED quality and low prices go hand in hand, now is the time to decide the kind of LED lighting which best suits your growing needs. In this paper we will try to explain some of the facts and parameters for floriculture, horticulture, and intensive indoor gardening. LED lights are initially more expensive, but in the long run they will save you money and provide the same or better results. You might find these few paragraphs very interesting.

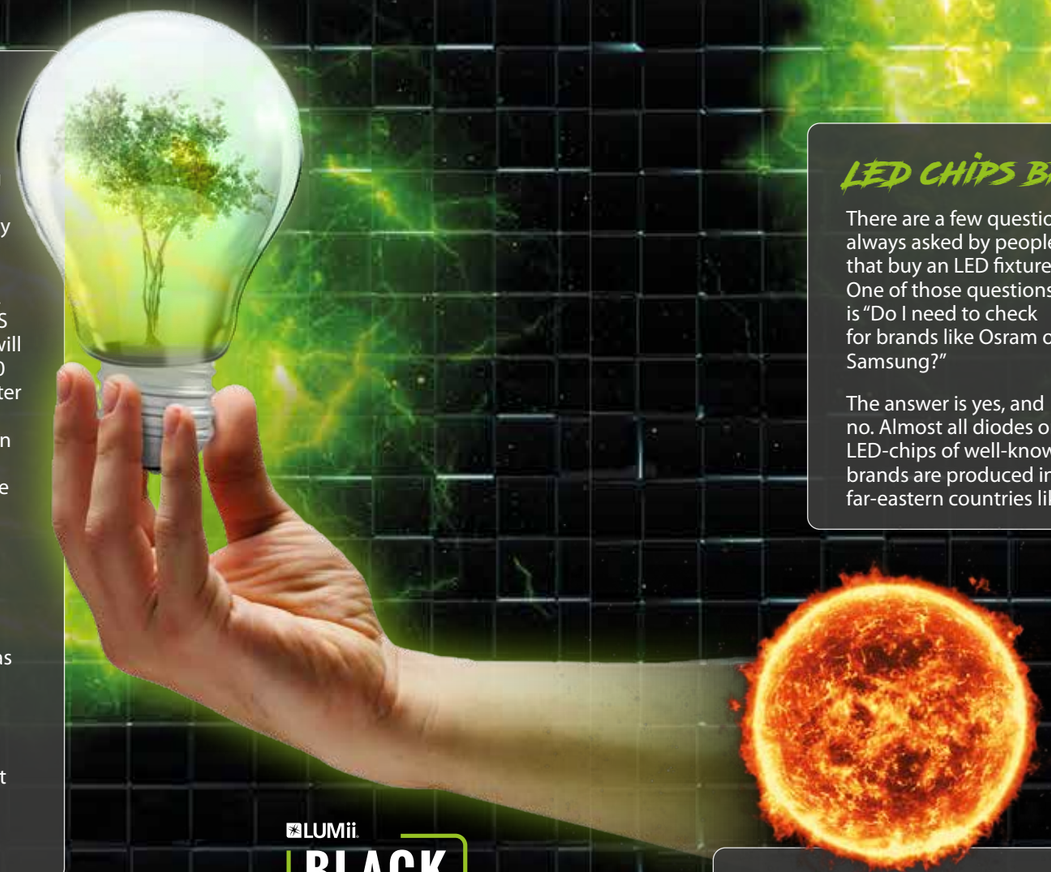
WATT REALLY MATTERS:

Watt stands for energy and is the most common measure of grow light intensity. It represents the amount of electricity consumed. Most growers know this; it's familiar as the well-known power rating of HPS lamps - 250W, 400W, 600W and 1000W. By comparison the light output of an average LED rated at 600W can be comparable with 800W of HPS lighting. The LUMii BLACK 720W 6-Bar LED gives a maximum output similar to a standard 1000W HPS lamp.

If the LUMii BLACK 600W Electronic Ballast powering the fixture is dimmed to its 400W setting (it will actually have demand around 440 watts) then the LED fixture gives a PPF of 1222 µmol/s. By comparison, a 600W HPS lamp (drawing 640 watts) will only give an output of 1000 µmol/s PPF. Due to its greater efficiency, a 3W LED diode gives a greater output when drawing 1 watt of power than a 1W diode would give when drawing 1 watt.

PAR

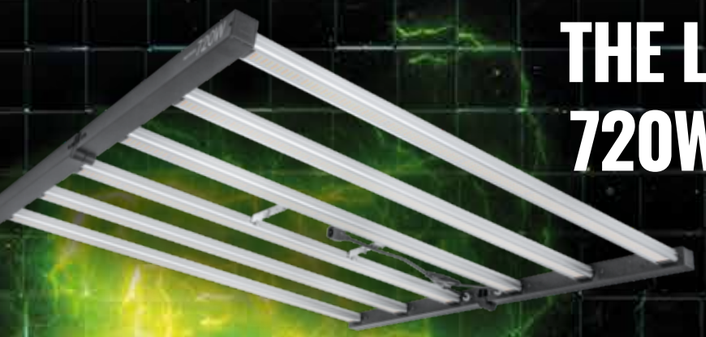
Or Photosynthetically Active Radiation (PAR) .This is not used as a measurement at all. This is the "spectrum" of light colours that can be absorbed by plants (and coincidentally seen by us). It ranges from 400 to 700nm. Together with Watts it is often used as reference with HPS lamps, specifically because many regular non-horticultural lamps do not have such a broad spectrum of different colours of light.



LUMii BLACK

THE LUMII BLACK LED 720W 6 BAR FIXTURE

IS SURE TO GIVE IMPRESSIVE RESULTS



TECHNICAL SPECIFICATIONS:

Light Source	**Full Spectrum 660nm diodes**
Light Output PPF	**1870 µmol/s**
Efficacy PPE	**2.6 µmol/W**
Lifetime	**L90: >50,000 hr**
IP Rating	**IP65**
Weight (LED fixture only)	**7.8 kg**
Overall size in use	**110cm x 108cm x 5cm**
Item No.	**111609 (EU)**

THE LUMii 720W LED

Why do we call it a 720W LED when it is powered by the LUMii BLACK 600W Electronic Ballast???

The energy efficiency of LEDs is much higher than that of normal HPS lamps. That means that a ballast rated at 600W, suitable for 600W HPS (high pressure sodium) lamps provides more than 600 watts of energy and this can be used by the LED fixture. A LUMii BLACK 600W Electronic Ballast, when its maximum 600W Boost setting is selected, will run at 720 Watts.

LED CHIPS BRANDS

There are a few questions always asked by people that buy an LED fixture. One of those questions is "Do I need to check for brands like Osram or Samsung?"

The answer is yes, and no. Almost all diodes or LED-chips of well-known brands are produced in far-eastern countries like China. That means the technological know-how is also based within these countries. This technology and expertise is transferred to the LUMii brand and that is how we make good-quality, reliable LUMii LEDs, specially designed and produced for the horticultural industry.

LUMii BLACK

SUNLIGHT VERSUS HPS VERSUS LED

The PPFD of full daylight sun at noon in the summer is around 2000 µmol/m2/s. The figures differ between Europe and a desert in Africa, but 2000 µmol/m2/s is too much for most plants anyway. Most plants don't actually need this much sunlight. Because the Sun's strength is only 2000 µmol/m2/s at noon on a clear day, most plants are adapted to thrive with less light. Giving plants too much light for a prolonged period of time will cause stress and very likely damage them. A 'light response curve' shows how effectively a plant utilizes light at differing intensities. Depending on the plant, at PPFD levels greater than 800-1000 µmol/m2/s the efficiency that a plant uses the light starts to slow. This means that you can provide your plant with more light than this, but you might not see a huge change in outcome.

EFFICIENCY (µmol/j) what else?

Efficiency Micromole per Joule (µmol/j)

When comparing different LED lights, their Efficiency is often cited. The Efficiency of an LED light is simply the amount of photons (light-particles) it produces for a given amount of energy supplied to it. Efficiency is usually measured in micromoles per Joule (µmol/j) but may also be given as PPF/W. Both measures are equivalent. µmol and PPF give the quantity of photons, and j and W the quantity of energy (1 Watt = 1 Joule per second).

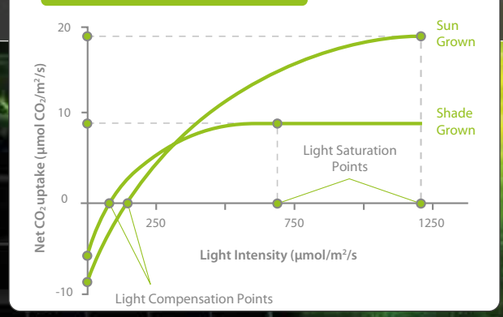
Highly efficient LED grow lights range from 1.5 µmol/j to 2.9 µmol/j (and the figures are constantly improving). By comparison, a top brand HPS (high pressure sodium) lamp has a photon output of 1000 µmol/s PPF, which equates to an Efficiency of 1000/600 or 1.67 µmol/j.

PPF & PPFD (Photosynthetic Photon Flux & Density)?

The PPF of an LED light is linked with efficiency, but is also often cited independently of the power consumption (wattage). PPF (Photosynthetic Photon Flux) is the total rate of production of light useful to plant photosynthesis from a grow light. PPF is measured in micromoles of photons produced per second (µmol/s)[1].

PPFD (Photosynthetic Photon Flux Density) is the rate of production of light useful to plant photosynthesis over a given area of the canopy. It is measured as the amount of photons striking one square meter each second (often written as µmol/m2/s, µmol/m2/s, or µmolm-2s-1). Unlike PPF which can't be manipulated, the PPFD value of a grow light can be increased by measuring extremely close to the light or by focusing the light's output by some means, for instance by the use of lenses.

SUNLIGHT VERSUS LED



[1]µmol = photons