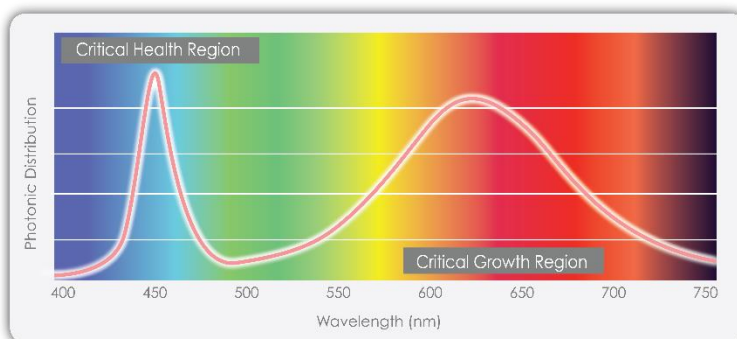


NCERA-101 Station Report: TotalGrow™ Lights 2015-2016

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1. New Facilities and Equipment

The newest equipment released in the TotalGrow line is the TotalGrow Light Rack. This accessory facilitates simple and versatile installations and customizations of growth chamber and vertical farming light canopies. TG1A Broad Grow Spectrum light bulbs are easily arranged to match the grow area shape and desired intensities while ratcheting hangers to adjust heights as plants grow or to provide greater access to the plants. This further capitalizes on the versatility built into the Broad Grow Spectrum by emphasizing key photosynthetic and photomorphogenic regions with broad spectrum support for complete, balanced health.



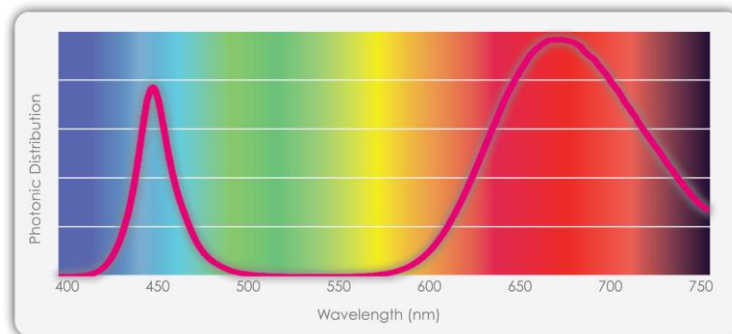
2. Unique Plant Responses

One set of profoundly valuable plant responses worth noting occurred at Micandy Gardens in Hudsonville, MI. TotalGrow Night & Day Management Light bulbs were installed to replace incandescent and compact fluorescent lights and expand photoperiodic coverage areas thanks to the reduction in power load by about 90%. Besides accomplishing the photoperiodic goals of the lighting setup, the growers quickly noticed that their cuttings were rooting drastically quicker than in any other zones.

We discovered that we can drastically reduce rooting times with TotalGrow™ Night & Day Management Lights for fuchsia, petunia, calibrachoa, verbena, bacopa and other crops – as little as 1/3 of the time compared to even high intensity HPS lighting with up to 98% power savings! We are also amazed by the coverage uniformity, utility savings and electrical infrastructure savings.

-Andy Buist, Head Grower

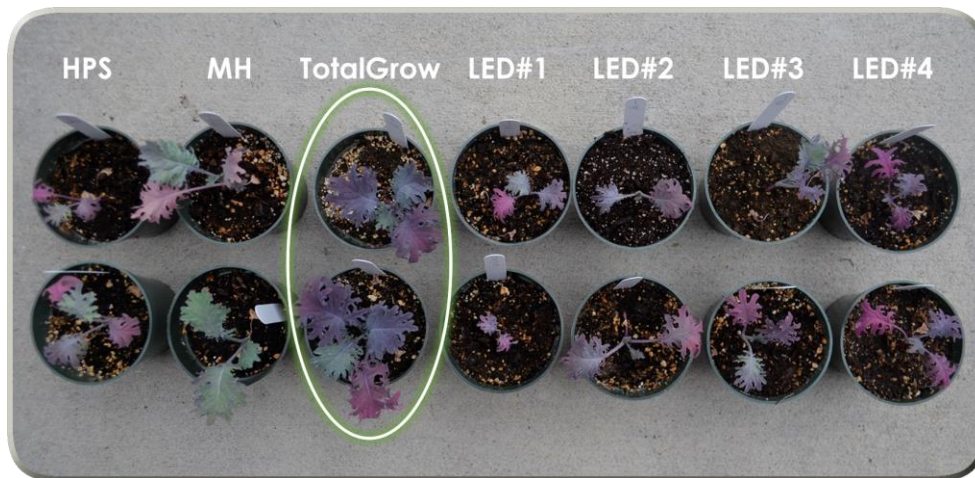
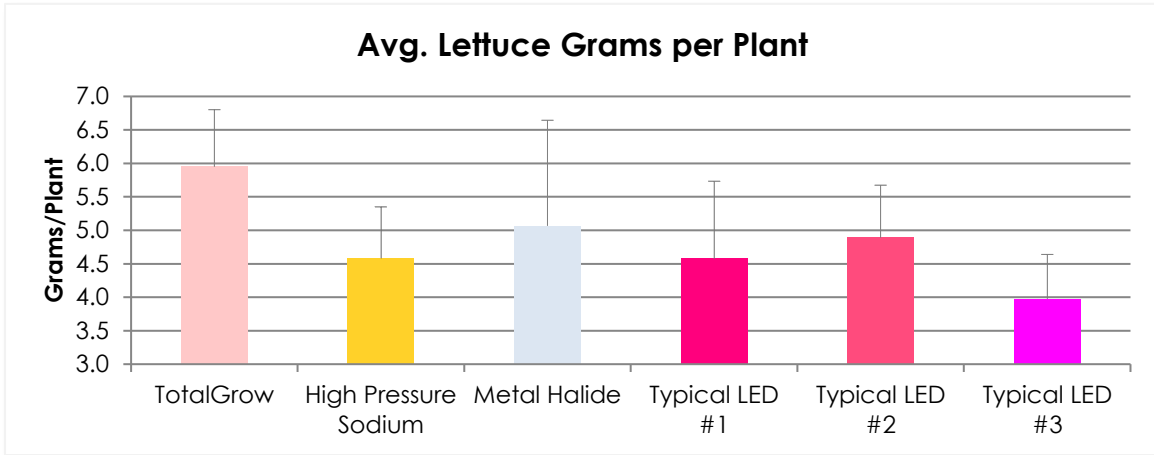
As noted, rooting was improved even compared to high intensity HPS lighting regions utilizing 400W HPS lights with 8'x8' spacing. Approximately $1 - 1.5 \mu\text{mol} \cdot \text{m}^{-2} \cdot \text{s}^{-1}$ of the spectrum shown below used for 2 hours after sunset and 2 hours before sunrise accomplished this highly valuable result. Other night interruption or day length extension timings were also effective, but this technique minimized stretching as well. Other growers are currently attempting to replicate these results as well.



3. Key Accomplishments & Projects

Testing at West Virginia University under Dr. Youyoun Moon has also proved extremely favorable for TotalGrow lights. Dr. Moon has conducted testing over the past two years with TotalGrow Lights along with various other grow light sources with several crops. HPS, metal halide, several LEDs, induction and LEP have been tested at different intensities over diverse crops, including tomatoes, basil, lettuce, kale, and petunias, in sole source environments. The results have provided strong support for the value of the breadth and spectral emphases of the TotalGrow Broad Grow Spectrum. As Dr. Moon reports, "All plants we have tested looked healthier under

your TotalGrow lighting and used far less energy than the competing light sources." Some preliminary results for lettuce growth and images of Red Russian kale are shown below:



A more complete report is available at http://totalgrowlight.com/downloads/experiments_and_testimonials/WVU_Test_Reports.pdf.

4. Impact Statement

TotalGrow™ lights deliver a high quality light spectrum for optimal plant growth using Solid State Volumetric Lighting (SSVL), a next generation light emitting diode technology. Using as little energy as possible, TotalGrow™ lights blanket plants with amazingly uniform light in the wavelengths plants need most for quick and healthy growth.