By:

NCERA-101 Station Report: TotalGrow™ Lights 2014-2015

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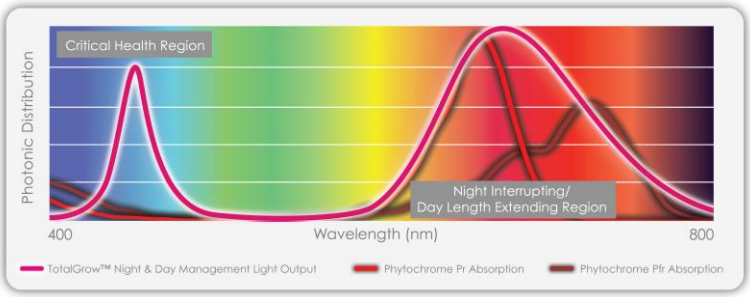
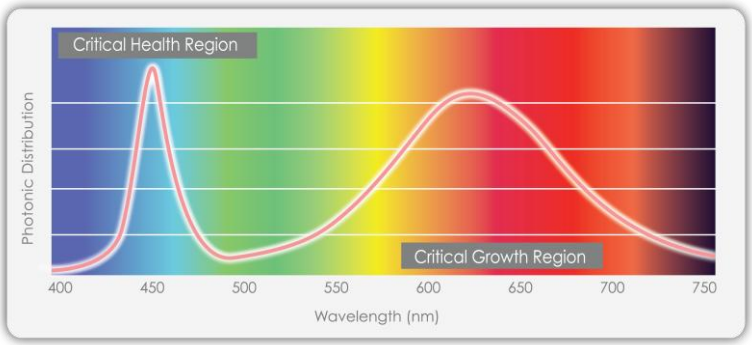
1. New Facilities and Equipment

In July 2014 TotalGrow™ released a series of low power LED-based grow light bulbs. These 11W, E26-base light bulbs are providing convenient, efficient and spectrally precise lighting for a variety of applications. The Solid State Volumetric Lighting Technology (SSVL) behind all TotalGrow™ lights provides complete color mixing and broad light distribution capabilities regardless of the spectrum and luminaire power.

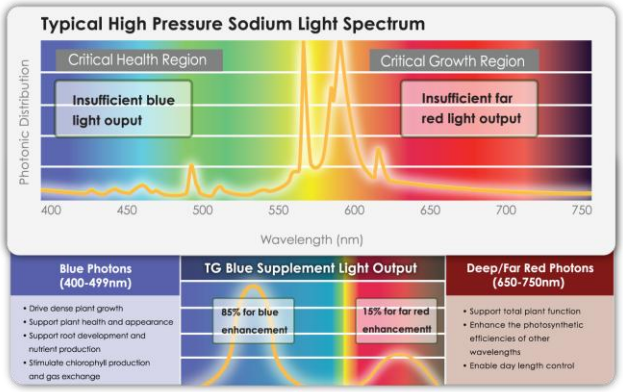
- TotalGrow™ **Night & Day Management Light** bulbs are founded on photoperiodic and photomorphogenic lighting research to simulate long days with the greatest possible efficiency while minimizing shade avoidance responses (stretching). Dozens of early-adopting growers are reporting great results at approximately 1W/m^2 or less power consumption.



- TotalGrow™ **Broad Grow Spectrum Light** bulbs are a lower powered packaging of the previously released TG15A Broad Grow Spectrum Light fixture for more confined spaces. These are being used to create vertical farming canopies, for interplant/intracanopy lighting, and for supplemental lighting to create highly uniform supplemental lighting with low overhead space, small grow areas and/or lower target light intensities.



- TotalGrow™ **Blue Supplement Light** bulbs are designed to complement high pressure sodium lights. With approximately 85% blue and 15% deep/far red, valuable photomorphogenic and photosynthetic responses are more efficiently triggered than with HPS lights alone.



2. Unique Plant Responses

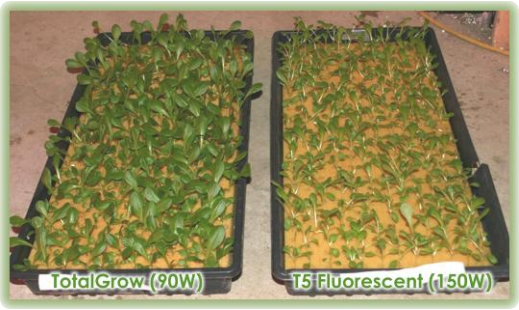
TotalGrow™ studies have been split between collaborating with growers and university researchers. Several projects remain ongoing with promising preliminary results.

A highly practical study on 26 varieties of mums was done at Kalamazoo Specialty Plants to identify the necessary light intensity with the Night & Day Management Light spectrum for photoperiodic control. 0.25 µmol/m^2/s demonstrated strong photoperiodic influence with 0.5 µmol/m^2/s demonstrating complete control of flowering. Decreasing intensities farther from the lights revealed the transition to short day effects:

This test also revealed the localization of photoperiodic control on large plants, demonstrating the importance of uniform and, ideally, diffuse light:

Plant surfaces receiving 0.25 µmol/m^2/s of light exhibited long day responses while surfaces facing away from the lights exhibited short day responses.

Other customer trials featured comparisons to HPS and fluorescent lights by growers of lettuce, bedding plants, and a variety of microgreens and herbs in different environments. Strategies varied to emphasize electricity savings (up to 65% vs. 1000W HPS while propagating perennials), prioritize increasing yield (50% more crop turns for vertically farmed microgreens at 25% power savings over T5 fluorescents), or a balance of both (10% increased lettuce yields vs. 400W HPS at equal light intensities and 25% increase yields with 40% lower power consumption vs. T5 fluorescents). Similar university studies remain ongoing for more thorough quantification of related results.



3. Key Accomplishments & Projects

In addition to the aforementioned testing accomplishments, TotalGrow™ lights are perpetually advancing in product efficacies and spectral control to offer the best solutions possible to growers. Close contact with researchers and growers continually reveals opportunities to take advantage of our current capabilities and pursue new niches. Several dozen growers in greenhouses, universities and indoor growth facilities are already using thousands of TotalGrow™ lights, and we look forward to our projected exponential growth in these numbers after a year of positive feedback.

An additional study viewed as a great accomplishment at OSU ATI compared bedding plants propagated under TotalGrow™ Broad Grow Spectrum 155W fixtures at 75-80% of the light intensities of 400W HPS fixtures. Besides the substantial energy savings, plants grew as well or better under the TotalGrow™ lights even at reduced relative light intensities.

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.