Case Study:
Mud Lake Farm

Improving Yields, Quality and Energy Efficiency of Hydroponic Lettuce Growth
The first test:

TotalGrow™ Broad Grow Spectrum lights provided 20% greater weekly growth than HPS lights at equal light intensities.

The results:

- TotalGrow™ plants consistently showed better growth on average than HPS and significantly greater growth than plants under ambient lighting.
- Weekly measurements of plants starting in the nursery (middle) stage showed an average of 20% greater weekly growth than HPS and almost double the weekly growth of ambient lighting.
- 10 weeks of supplemental lighting for plants progressing through nursery and production stages resulted in a 40% greater mass increase under TotalGrow™ than HPS.
- 5 weeks of supplemental lighting for production (final stage) plants showed a marketable weight increase of 64% over ambient lighting and 13% over HPS.

Test configuration:

- 120W prototype TotalGrow™ fixtures vs. 400W high pressure sodium vs. ambient lighting
- Equal light intensities of TG and HPS (40 µmole*m⁻²*s⁻¹) for 18 hours/day
- 8 lettuce varieties
- 2 life stages; 3 trials
- October – January in a hydroponic greenhouse

The question:

- How does the optimized TotalGrow™ light spectrum affect lettuce yield relative to that of high pressure sodium lighting and no supplemental light?

From the grower:

“We tested a prototype TotalGrow™ light last fall in a direct contest with a HPS (400 Watt). Both were located in the same grow area and with the same nutrient inputs. We were very pleased with the results; not only did the TotalGrow™ light outperform the HPS by 10%, but it did so using far less energy. This fall, we invested in enough lights to fill a greenhouse. They came with a custom designed layout so that we know we are maximizing the useable light over our plants. We fully intend to switch over all our greenhouses over the next few years.
The second test:

TotalGrow™ Broad Grow Spectrum Light bulbs provided 50% more growth with 40% energy savings over T5 fluorescent grow lights.

The results:

- Lettuce germinating and growing under TG1A bulbs grew an estimated 50% greater with improved color and reduced stretching.
- Power consumption reduction potential of at least 40% was demonstrated.
- The fluorescent tubes were frequently burning out and rapidly dimming. This has been dramatically improved with the TG1As.

Test configuration:

- Flood table sole source testing (100% artificial light)
- 11W TG1A bulbs vs. 50W T5 fluorescent grow lights
- 40% less power for TG1A equivalents
- 2 weeks of hydroponic lettuce germination and early growth

The Question:

- How does germination and early growth of lettuce completely under the TotalGrow™ Broad Grow Spectrum compare to a fluorescent grow spectrum with regard to energy savings and yield?
Mud Lake Farm is firmly committed to sustainable agriculture. The potential energy efficiency and productivity of TotalGrow™ lighting attracted them to be trailblazers in testing both fixtures and bulbs. The success of each test and installation has motivated them to increase their TotalGrow™ lighting power. Each increase in lighting has enhanced their ability to supply local restaurants and customers with high quality lettuce, microgreens and herbs year-round.

“For us, TotalGrow lights last longer and use less energy and give better yields- it just makes sense.”

**Grower**
Mud Lake Farm

**Location**
Hudsonville, MI, USA

**Crop**
Hydroponic Lettuce

**Lights Tested**
TotalGrow™ TG15A & TG1A, 400W High Pressure Sodium, 50W Fluorescents

**Results**
- 50-100% yield increase over ambient lighting
- 10-40% yield increase over HPS
- 50% yield increase over fluorescent with 40% energy savings