Bedding Plant Propagation: Quality and Energy Efficiency over HPS

Case Study: Ohio State University ATI
Bedding plants grown under a 155W TotalGrow™ fixture had equal or significantly better growth than plants grown under 400W HPS fixtures - up to 65% energy savings!

The question:
- Can TotalGrow™ Broad Grow Spectrum 155W lights produce equal or greater bedding plant quality than 400W HPS lights while consuming 65% less energy?

The test:
TotalGrow™ partnered with Dr. Robert McMahon at Ohio State ATI to compare the plant quality of 4 bedding plant varieties grown under TotalGrow™ Broad Grow Spectrum Fixtures vs. 400W high pressure sodium (HPS) fixtures.

The results:
- Primrose plants averaged 34% greater widths and 36% greater heights when grown under TotalGrow™ lights than HPS.
- In 3 varieties, wax begonia, sweet alyssum and verbena, plant growth quality was of equally high quality under both light sources.
- TotalGrow™ lights accomplished equal or better growth with 21% lower light intensities (µmol/m²/s PAR) due to spectral optimization, contributing the 65% lower energy consumption.

From the grower:
“TotalGrow™ lights demonstrated the potential for drastic energy savings over HPS lights while producing crops of equal or better quality in our bedding plant testing. With 20% less PAR light intensity, our primrose plugs grew over 33% wider and taller with better green pigmentation than HPS.”

– Dr. Robert McMahon, Ohio State ATI
Test details:
- TotalGrow™ lights arranged to generate intensities at 75-80% of HPS levels to test spectral effectiveness and maximize the energy reduction.
- 5 ft x 5 ft grow areas blocked from light on 3 sides.
- 2 grow areas per lighting type.
- 2 flats each of primrose, wax begonia, verbena and sweet alyssum plugs per grow area.
- 18 hours per day of supplemental lighting provided for 2 months (March – May).

By The Numbers:

<table>
<thead>
<tr>
<th></th>
<th>TotalGrow™</th>
<th>High Pressure Sodium</th>
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</thead>
<tbody>
<tr>
<td><strong>Power</strong></td>
<td>155W</td>
<td>455W</td>
</tr>
<tr>
<td><strong>Amps (120/240V)</strong></td>
<td>1.3/0.65</td>
<td>3.8/1.9</td>
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<tr>
<td><strong>Tested Intensity (Avg.)</strong></td>
<td>61 µmol/m2/s</td>
<td>77 µmol/m2/s</td>
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<tr>
<td><strong>Hazardous Materials</strong></td>
<td>None</td>
<td>Mercury</td>
</tr>
<tr>
<td><strong>Sweet Alyssum Avg. Weight (oz)</strong></td>
<td>54</td>
<td>54</td>
</tr>
<tr>
<td><strong>Primrose Avg. Width (cm) x Height (cm)</strong></td>
<td>14.0 x 7.1</td>
<td>10.4 x 5.2</td>
</tr>
<tr>
<td><strong>Wax Begonia Avg. Weight (oz) x Height (cm)</strong></td>
<td>22.0 x 25.0</td>
<td>25.0 x 23.6</td>
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PROFILE: Dr. McMahon
Dr. Robert McMahon is an associate professor in the horticultural technologies division at The Ohio State Agricultural Technical Institute. He supervises the 13,000 square foot greenhouse complex used for teaching and research purposes while growing commercial greenhouse crops and training the next generation of greenhouse managers.

Grower
Dr. Robert McMahon, Associate Professor, Horticultural Technologies Division, Ohio State ATI

Location
Wooster, OH, USA

Crop
Bedding Plants – Primrose, Sweet Alyssum, Wax Begonia & Verbena

Lights Tested
TotalGrow™ TG15A Broad Grow Spectrum Fixtures & 400W High Pressure Sodium Lights

Results
- Up to 65% energy savings demonstrated with equal or better plant growth rates and quality.
- Light intensity demands reduced by at least 20% with the TotalGrow™ Broad Grow Spectrum compared to HPS.
- Primrose plants grew over 33% wider and taller with improved color over HPS.

<table>
<thead>
<tr>
<th>Item</th>
<th>TG15A</th>
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<tbody>
<tr>
<td>Product Type</td>
<td>Light Fixture</td>
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<tr>
<td>Power Consumption</td>
<td>155W</td>
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<tr>
<td>Projected Service Life</td>
<td>50,000+ hours</td>
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