Para Lumen Paradigm Shift

High Intensity Fluorescent Plant Growth – T5 and TT105

By Charles Winslow

T5 lighting above peppers

Roots of peppers grown under T5 lighting

Vertical T5 lighting

Through time, humanity on occasion has come up with quantum leaps in technology. Hydroponics, the printing press, electricity, the light bulb, the radio, the TV, HID lighting, the Internet, and, yes, high intensity fluorescent indoor grow lights. They are a complete paradigm shift, a new way of looking at things.

Stephen R. Covey has said, *"If you want to make small changes in your life, change your attitude and change your behavior. If you want to make quantum leap changes, then change your paradigm!"* Indoor growing with high intensity fluorescent systems is just that: a quantum leap in indoor gardening. It means less heat and more production at less than half the energy consumption. It also means plants that are happier, healthier, and produce a greater yield.

In multiple controlled tests, we have documented a 25% increase in production with half the wattage for vegetative growth. We have seen 210 to 220 watts outperforming 400 watts metal halide lamps and 420 to 440 watts outperforming 1000 watt metal halide lamps. Not only did the plants produce more – they were healthier, with tighter internodal spacing and a hardier stem wall. The hardier plants also acclimated much better to being transplanted outdoors.

For some of us who have been indoor gardeners for over 30 years, this was unbelievable. I thought I was very wise when I said *"Fluorescents are good for the first inch of growth – if that. Spindly, low production, weak plants, etc."* And yet! At no time in my life have I enjoyed eating my words more.

High intensity fluorescents offer many advantages. Because the units consume half the energy, you can gang more units on a 15 amp system. The units can be hung vertically or horizontally for additional lower canopy plant lighting. With less heat emitted, more units can be run with less ventilation, closer to the plants. The lamps have a much longer life than metal halides. Finally, their light spectrum is closer to daylight.

Most gardeners know that a plant's canopy is very good at preventing light from reaching the lower parts of the plants. With vertical lighting, this is no longer a problem. When the plants go into flowering, additional T5s can be hung on the sides of the plants or a sodium fixture can be placed over the canopy and the T5/TT105 can be moved to the sides for an increased production.

In the last month, we have done several transfers of hydroponic plants from indoor gardens to outdoors. The basil under T5s performed beautifully with no loss. The peppers grown under a 1000-watt sodium lamp took a 60% loss. The new fluorescent lights drastically add new value and production for indoor gardening.

Compared peppers under HID lighting

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THE TEST

The Satellite Fluorescent Light II Test

By Charles Winslow

It appears that in a side-by-side trial, the Satellite II fluorescent light surpasses metal halide lights.

In a three-month, side-by-side test, habañero pepper plants growing under a 210-watt Sunleaves Satellite II fixture exhibited healthier, more compact growth than habañero peppers grown under a standard 400-watt metal halide lamp. Aside from the spacing and the type of light offered, the growing conditions of the pepper plants were identical: hydroponic system, type and amount of nutrients, substrate and light cycle duration.

All plants were grown in continuous aeration hydroponic systems. In each system, a submersible pump suctioned to the bottom of the nutrient reservoir continually splashed Technaflora's Recipe for Success vegetative growth formula onto the roots. The pepper plants were started in horticultural grow plugs and then placed in plastic net cups containing expanded clay pellets.

With regard to light intensity, the Satellite II, equipped with two full-spectrums TT-105 fluorescent "grow" bulbs, emitted a total of 21,000 lumens and the metal halide lamp put out 30,000 lumens. The pepper plants were positioned as near each light as possible without scorching – 46 centimetres from the metal halide lamp and 10 centimetres from the fluorescent fixture. Despite the marked difference in total lumen output, light meter readings taken at the plant canopy level registered higher for plants growing under the Satellite II. Plants received 18 hours of light daily.

Figure 1 – On the left, habañero pepper seedlings grow under the metal halide lamp while seedlings on the right grow under a fluorescent light. Note: metal halide and fluorescent lights are contained on each side with the help of a hanging Mylar divider.

Figure 2 – Pepper plants growing under the metal halide lamp on the left appear slightly taller and paler than plants growing under fluorescents on the right.

Figure 3 – In addition to setting some early blooms, the plants growing under fluorescents exhibit more compact growth with visibly shorter inter-nodal spacing.

Figure 4 – The pepper plants on the left have now set some blooms, but, overall, the vegetative growth looks "leggy" with very long inter-nodal spacing. The plants on the right have larger leaves and denser growth.

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These tests were carried out in the USA using a comparable fluorescent lighting system using equivalent tubes.