



PHILIPS

Horticulture
LED Solutions

Case study
Sierra Gold
Nurseries

Yuba City, California, USA



Philips GreenPower LED production module

The payback in only
a few years **made the
decision much easier**

Another energy-related factor that influenced Beumel's decision to install LEDs is the amount of heat given off by the lights



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Plant performance is better under the LEDs, there is a major energy savings difference and the payback is a few years. **It was a no-brainer for us as to which lights to install.**”

Cliff Beumel, Vice President, Sierra Gold Nurseries



Background

Sierra Gold Nurseries was founded as a bare-root fruit and nut tree propagator in 1951 in Yuba City, California. The company now produces both bare-root and containerized trees on about 200 acres. Most of the millions of trees produced annually are shipped to nut and fruit growers in California, Washington and Oregon. Some are sold to growers in the Mountain States and along the East Coast. Most of the trees are produced as 1-year-old trees.

The challenge

Sierra Gold Nurseries has purchased tissue culture-propagated rootstock from suppliers for over 10 years. Seven years ago the nursery produced all of its trees as bare root. During the last few years the nursery has doubled its containerized production every year. To meet the increasing demand for its trees, Sierra Gold opened a 10,000-square-foot tissue culture lab. Orders were increasing and there were new rootstocks being developed that would eventually lead to more than half of the company's propagation material originating from tissue

culture. Initially, all of the rootstocks produced in the new lab will be for internal use only. Eventually the rootstocks could generate supplemental income through outside sales.

The solution

Before the decision was made as to the type of lights that were going to be installed in the tissue culture lab, a lot of information was collected from other labs, researchers and consultants from around the world. After determining the options available and conducting a cost analysis of LEDs vs. fluorescent lights, company officials were so confident in choosing LEDs that no trials were conducted between LEDs and fluorescent lights. The company did do some trials with different LED lights. Working with Hort Americas, Sierra Gold Nurseries installed Philips GreenPower LED production modules Deep Red/Blue in its lab.

Benefits

Cliff Beumel, Vice President of Sierra Gold Nurseries, says operating a tissue culture lab is like running a factory in terms of maintaining uniformity. "This is difficult to achieve with

plants, but the closer you can get to it the better. Uniformity of plants under LEDs is better across the lab than under fluorescents.' Another critical factor for success with a tissue culture lab is multiplication rates. 'There are two parts to the multiplication equation,' Beumel says. 'There is the number of plantlets that are produced from each multiplication cycle, and there is how quickly these cycles occur. We believe because the LEDs deliver more usable light in the grow room that the plant proliferation rates should improve due to either greater uniformity or enhanced plant growth.'

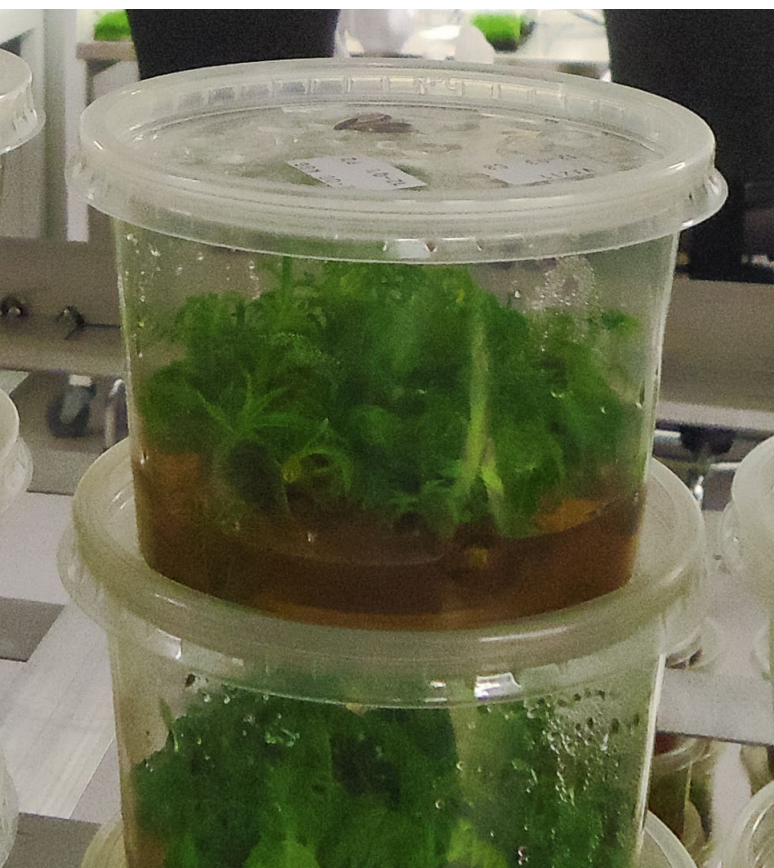
According to Cliff Beumel, even if LEDs only operated equally to fluorescent lights in terms of plant growth, the energy savings alone provided by the LEDs convinced him they were the right choice for the lab. The fact that the payback was only a few years made the decision that much easier. Another energy-related factor that influenced Beumel's decision to install LEDs is the amount of heat given off by the lights.

'In a tissue culture growth room the plants have to be kept at the right temperature. A temperature increase of only $-15^{\circ}\text{C} / 5^{\circ}\text{F}$ can have an adverse effect on the plants. If plants grow too fast vitrification can occur. The plants grow so fast that they can't sustain themselves and plant quality suffers tremendously. This can occur when there is a slight change in the temperature.'

Beumel says a fluorescent ballast with two 40-watt bulbs sitting underneath a tissue culture shelf can raise the temperature of the shelf above the lights. He says there must be enough space between the lights and the shelf or the warmer temperature can lead to problems with plant uniformity. The closer the spacing between shelves means more shelves and more plants in the lab. Not having to be concerned with a temperature increase from LEDs allows Beumel to install more shelves to grow more plants, making for a more efficient set-up.

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Facts

Grower

Sierra Gold Nurseries

Sector

Trees

Crop

Propagation of fruit and nut trees, including almonds, pistachios, walnuts, apples, cherries, pears, peaches and prunes

Location

Yuba City, California, USA

Solution

Philips GreenPower LED production module

Philips LED Horti Partner

Hort Americas

Results

More efficient tree propagation



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Document order number: 3222 635 69536
01/2015
Data subject to change

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