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Horticulture
LED Solutions

Case study
Testing Station for
Olericulture (PSKW)

Sint-Katelijne-Waver, Belgium

Philips GreenPower LED toplighting

LED lighting in lettuce cultivation

Improves red coloration and reduces edge burn

Proefstation
de Groentete



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Flemish growers were interested in the energy savings of LED, **and curious about how the growth of the lettuce varieties can be influenced.**”

Joris van Lommel, supervisor of the trial



Background

The Testing Station for Olericulture (PSKW) supports the vegetable production sector in its efforts to bring about developments leading to an innovative, competitive and sustainable position in horticulture. This is achieved through education, knowledge transfer and practical research. The results of the research conducted at the PSKW are passed on to the various technical committees: “lettuce – mobile gully system” is one of them. It was this committee that asked about the possibilities offered by LED lighting for lettuce cultivation.

The challenge

The PSKW researches the practical uses of LED lighting at the request of Flemish growers that cultivate lettuce by means of hydroculture. “They were mainly interested in the energy savings that LED lighting can give,” Isabel Vandeveldt tells us. She, together with Joris van Lommel, has been supervising the trial. “They were also curious about how the growth of the lettuce varieties can be influenced by the use

of LED lighting. Particularly important parameters are the red coloration of Lollo Rossa and Red Oakleaf lettuce, the incidence of edge burn and the head weight.”

The solution

The trial was conducted in two identical adjacent greenhouses covering an area of over 200 m². When lit, these greenhouses were separated from one another by a light-tight screen. One greenhouse was used as the reference greenhouse: 600 W high-pressure sodium (HPS) luminaires were installed in this one, with a light level of 50 micromol/m². Philips GreenPower LED toplighting with the same light level was installed in the second greenhouse. A small section of the greenhouse was fitted with LEDs with a higher percentage of blue. This was so as to observe possible effects on red coloration of the lettuce. Three varieties of lettuce were grown: multicolor lettuce (combination of Lollo Rossa, Lollo Bionda and Red Oakleaf lettuce) and Red Oakleaf lettuce and Lollo Rossa separately.

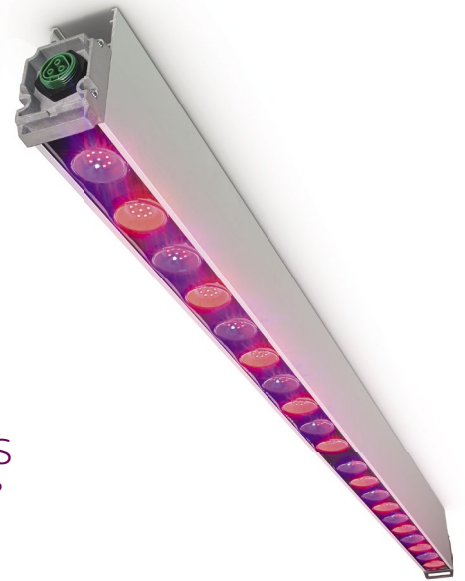
Benefits

“The trial went well,” says Isabel. “The work was mainly done using multicolor lettuce. The red lettuce varieties showed better red coloration in the LED greenhouse in the winter (December–March) than the ones in the reference greenhouse. The red coloration was evaluated up until March on the basis of a color chart. The color was scored on a scale of 1 to 5, with 5 being the darkest red coloration. A total of 9 cultivation rounds took place and on average the HPS lighting scored 3.7 for red coloration and the LED treatments 4.6. No difference was observed between the red coloration of the lettuce with the high blue LED treatment and the ‘normal’ LED treatment. In addition, in four of the six harvests in which there was damage from

edge burn, less edge burn was observed in the LED greenhouse. Besides improved red coloration, the Red Oakleaf lettuce was also more compact, with the same head weight, and the Lollo Rossa in the LED greenhouse was heavier by a significant amount: 20 grams.” As well as all these botanical advantages, a reduction of 37% in electricity consumption was also achieved. However, the LED greenhouse had to be heated a little more so as to maintain the same 24-hour temperature. Unfortunately it was not possible to monitor the additional gas consumption required for this. Isabel has this to say: “The better red coloration and reduced edge burn under LED lighting are particularly important quality improvements compared with cultivation under HPS lighting.”

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Facts

Grower

Testing Station for Olericulture (PSKW)

Segmentation/Sector

Research

Crop

Lettuce varieties

Location

Sint-Katelijne-Waver, Belgium

Solution

Philips GreenPower LED toplighting

Philips LED Horti Partner

Maïs

Results

Improved red coloration, less tipburn, 37% reduction in electricity consumption



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