

Grodan and Philips Horticulture LED solutions demonstrate energy-efficient cultivation strategy

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Philips Horticulture LED Solutions and Grodan are further exploring ways for growers to reduce energy costs by using LED lighting and effective root zone management, along with climate control and active dehumidification. Producing high-quality, year-round tomatoes with reduced energy input and lower costs is made possible when all aspects of the cultivation strategy are under control.

The Botany Research Centre began researching low-energy tomato growing under full-LED lighting in late 2023 and early 2024, in collaboration with Grodan and Philips Horticulture LED Solutions' partners (Ridder, BASF, Wireless Value, Normec Groen Agro Control, and Maurice Kassenbouw). The first trial demonstrated the potential to achieve a 50% reduction in heat input.

By targeting specific Daily Light Integrals (DLI) and deactivating the least efficient LED colors, this year's trial aims to enhance electrical efficiency. Advanced climate screens have shown promising results for energy savings through superior thermal insulation and improved heat recovery through dehumidification systems. Monitoring vertical plant temperature and improving crop balance and development from top to bottom also contribute to enhanced energy efficiency. High yields and high-quality fruits are achieved by optimizing plants' water and nutrient uptake while maintaining the lowest possible electrical conductivity (EC).

Irrigation management

In addition to lighting, irrigation management plays an important part in maintaining optimum plant growth and development to support the reliable production of high-quality fruits in a low-energy strategy, according to Lee.

“Thanks to their accurate and responsive steerability, Grodan’s stone wool growing media are an excellent fit in a Controlled Environment Agriculture (CEA) setting such as this,” he says. “Because we have full insight into and control over all aspects of the greenhouse environment, we can precisely align our irrigation strategy to supply the crop with exactly what it needs to achieve high total production with minimal inputs.”

“In terms of steering generative plant development and protecting root quality, we targeted a sufficient decrease in WC% overnight. By focusing on the uptake of water between stopping and restarting irrigation, we were able to optimise the stop and start times. As a result, we succeeded in achieving a WC% decrease of 9-10% during the day because we have a firm understanding of water uptake we are able to supply precisely what the plants need, the result is a very low drain percentage around 5%.”