

In Greenhouses

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Hydroponic lettuce grower has most modern technology

Number 2
May 2020
Volume 9

Page 18

More insights needed to achieve real precision fertilisation

Page 29

Van der Lugt the first Lisianthus grower using Next Generation Growing

Page 44

How Californian trips and the hairy bugs see their environment



Pieter Slaman, Head Grower/Manager: "We grow a year-round safe, sustainably produced and above all fresh lettuces."

The operation is running for 20 hours a day, seven days a week

'This greenhouse has everything a grower could dream of'

Little Leaf Farms is a semi-closed high-tech greenhouse facility in Devens, Massachusetts, USA. Horticultural entrepreneur Paul Sellew was keen to offer consumers in New England fresh, locally grown lettuces all year round. The result is a hydroponic greenhouse operation based on state-of-the-art technology that is revolutionizing the lettuce market in New England and beyond.

Founded in 2016, the company produces lettuces hydroponically on 2 ha for sale throughout New England. The US lettuce

industry has traditionally been dominated by growers on the West Coast. "But that often meant that consumers were being sold lettuce that had been harvested in California almost a week previously," comments Pieter Slaman, Head Grower/Manager. "Freshness is everything. Our lettuces are cut and in stores on the same day."

The company supplies its lettuces directly to 2,500 supermarkets throughout New England, including big names such as Market Basket, Big Y, Hannaford and Ahold Stop & Shop, as well as to the food service sector through several distributors.

Winning formula

It was a conscious decision to focus on just three lettuce varieties. "Having worked for many years at a large grower in the Netherlands before moving here for Little Leaf Farms, I know just how difficult it is to produce high-quality vegetables. So, when Paul Sellew took me on to help him set up the operation, I advised him to keep things as simple as possible," explains Slaman.

"We started off small, on one ha, with just one green leaf, one red leaf and one rucola variety. On a trip to Finland, our EVP Sales & Marketing Tim Cunniff and I spotted a variety

Continued
on page 16 >



Phase 2 (middle) was added after just one year, doubling the size of the greenhouse. Phase 3 (bottom) was completed in April 2020.

that was a cross between an iceberg lettuce and a romaine. We knew if we could grow that on a baby leaf system it would be ideal for Caesar salad, which is very popular in New England. We might expand our range later, but our customers are so pleased with the quality of our products that they tell us: 'Don't change the winning formula. Just give us more.' The company added another ha to double the size of the greenhouse after just a year. phase 3, completed in April this year, has increased the greenhouse by a further 1.5 ha.

Surprising climate

"We had our fair share of teething troubles in the first year, but that's normal for most companies," recalls Slaman. "One challenge for me was adjusting to a region without a strong greenhouse culture. I soon realized I needed to go back to basics when training new employees, to make sure everyone was clear about what's expected of them. But we soon got people up to speed."

The firm now has 57 employees in total. Two shifts of up to a dozen people in the

greenhouse itself keep the operation running for 20 hours a day, seven days a week.

"I was also surprised by how much the New England climate fluctuates; it can change from rain to sun very quickly, even on the same day, and the heat builds up rapidly," he adds. "We use an active water-chiller cooling system to prevent the crop from getting too hot in the brutal summers."

Director of Food Safety

Food safety is really important to consumers and customers alike, especially following various E. coli scares in the USA. But the company is well positioned to eliminate any concerns. "We have a rigorous focus on hygiene, and perform thorough cleaning all day long, every day. We also have a Director of Food Safety who ensures that everyone sticks to the food safety protocols in our greenhouse and packing area," comments Slaman.

And hydroponics is a naturally clean and safe production method, of course, since there's no contact with soil. "We're strongly focused on sustainability, so we use a biological control system instead of pesticides, and our heating system captures and reuses CO₂ in the greenhouse for plant development. All our water comes from a rooftop rainwater collection system which includes a UV filter for disinfection. For the past three months we've been injecting liquid oxygen into the water supply tanks too, taking it from 6% to 14% oxygen. That makes it easier for the roots to take up fertilizer, so the plants grow faster and healthier."

Hands-free mobile gutter system

The greenhouse has several other high-tech features. "We have a 'hands-free' mobile gutter system, which is a double-layer system with a germination layer underneath – so each ha actually amounts to 1.4 has, and phase 3 has actually added 1.9 ha of production capacity," says Slaman.

"The seeds get four days of light to help them germinate and are then moved up to the top layer. The whole process takes 24 days, from sowing to harvesting. We have 23 growing systems, and we sow and harvest 100 gutters in each one, fully automatically, every day of



Tim Cunniff (Co-founder, EVP Sales) and Pieter Slaman (right) spotted the market potential for an iceberg/romaine cross.

the year. In terms of other technology, we also have triple screens, LEDs... everything a grower could dream of!"

Hybrid lighting system

On the topic of high-tech lighting, LEDs have been used in the greenhouse right from the start. "PB Tec have really done a great job for us with the water treatment system, the computer system, the electrics, everything. They put us in touch with Oreon for lighting, and we started out using just red/blue LEDs: Grow Light 3.0 LLF spectrum narrow beam and Grow Light 3.0 MB wide beam. We've since switched to a hybrid system of red/blue LEDs plus 1,000W and 600W high-pressure sodium (HPS) for the extra heat, especially at the top of the greenhouse on the long winter days. That has made the lettuces grow a lot faster," he continues.

Water-cooled LEDs

Oreon's unique water-cooled concept ensures that the LEDs and the electronics are continuously cooled, regardless of the ambient temperature in the greenhouse, which guarantees optimal lamp performance and extends the life of the components.

The supplier works closely with Slaman to help him fine-tune the spectrum: "We're a successful team. For me, it's not just about getting the maximum energy out of a kilowatt of light, but also about looking at what kind of light the plant needs to grow. There's a reason that the sun is made up of more than just red and blue light!" The company has recently added full-spectrum LEDs to its existing hybrid system. "My ultimate aim with lighting is to eliminate the seasons – I want to create the optimum lighting conditions for each period to maintain high product

quality and high volumes all year round," he states.

Future

Now that phase 3 is complete, the company has reached its expansion limits at the Devens site. But its growth continues, and plans are already in place to build a 10 ha facility in Pennsylvania to serve the Mid-Atlantic states as well as the New York market, where Little Leaf Farms already has a small foothold. "That greenhouse should be ready in spring 2021 – and then consumers throughout the Greater New York area will soon be enjoying our fresh lettuces in their Caesar salads too," concludes Slaman.

Summary

US-based Little Leaf Farms has become a resounding success in a short space of time, and now sells the most controlled environment agriculture (CEA)-grown lettuce in the country. The fully automated 2 ha greenhouse enables the company to guarantee leading retail and food service customers in New England a year-round supply of safe, sustainably produced and above all fresh lettuces that are a big hit with consumers.



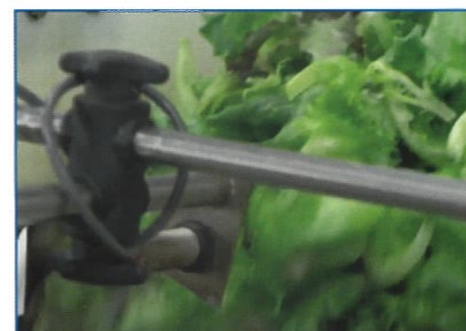
Growing on rockwool and gutters...



a cross between an iceberg and a romaine...



automatically transport to the processing area



automatically cutting the leaves...



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