



By fitting two slabs with five sensors, crop manager Lucas Aertsen now has a better idea of what is happening inside the slabs. In the next crop cycle, he will spread the sensors out over ten slabs.

Stress-free crop and higher yields due to improved irrigation

Crop manager Lucas Aertsen: 'Slab sensors firm up decision-making'

This spring, Lucas Aertsen of tomato nursery Den Berk Délice installed ten slab sensors at their new site in Rijkevorsel, Belgium. They provide a constant supply of accurate data on the water content, EC and temperature in the rockwool slab. Within just a few weeks, this prompted the crop manager to adjust his irrigation strategy. "The sensors are more accurate than my gut feeling."

A few weeks before the tips of the lit crop are pinched out, Lucas Aertsen describes his experience with the CARA MET slab sensor. Designed in collaboration with SenseNL, this sensor is used by Saint-Gobain Cultilene to support customers.

Aertsen manages the crop at the Belgian tomato company's newest branch, which has around 60 ha of glass across several sites. The 9.7 hectare growing facility in Rijkevorsel was put into operation in September last year and is equipped for growing cherry tomatoes Axiandy (5 ha) and Juanita (2.3 ha) and the Briosso cocktail tomato (2.3 ha) under HPS and LED lighting.

No need to check

Up until four months ago, the company's crop managers managed their irrigation based on knowledge and experience, adding in weight measurement data on the Exact Air substrate, which gives an indication of the water content in the slab and moisture uptake by the crop.

Aertsen: "There have been sensors on the market for some time, of course, and we have worked with some of them in the past. But previous generations were quite sensitive to dirt, so they weren't very reliable. You used to have to check them a lot, and that's not what you want when you buy a sensor. But things have moved on, and initial reports on these sensors have been very positive. So I get to try them out for myself now on this site."

Wireless and affordable

Cultilene didn't rush into the development of the CARA MET slab sensor. The team worked closely with former Wageningen researcher Max Hilhorst, who is regarded as the spiritual father of the first generation of slab sensors, and with Dutch TNO spin-off SOWNet

Technologies/SenseNL, which has in-depth experience in sensor and wireless communication technology.

“We had a long wish list and we had to pull out all the stops to achieve our ultimate goal,” says business development manager Mariëlle Klijn. “We got there in the end, and we’re very proud of that.”

More sensors per ha

Although Klijn doesn’t want to downplay their merits, previous slab sensors have various limitations, she says. They can be less accurate, particularly with high ECs, and are often very expensive, which is why growers usually only buy them in small numbers.

“If you only use one sensor per ha, you can never get a representative picture of an entire greenhouse or nursery,” Klijn explains. “We reckon with one base station and ten wireless slab sensors per ha. If growers are to be persuaded to make the switch, the system must be affordable.”

Developing a reliable plug-and-play wireless measuring system with a user-friendly dashboard at an attractive price was no mean feat. The wireless system communicates via the cloud and displays the data on a dashboard which runs on the LetsGrow.com platform.

Dose size reduced later

Den Berk Délice has one base station with ten sensors. To get a better understanding of the system and the dynamics of the water balance inside the slabs, Aertsen divided the sensors over two slabs only to begin with. “Three sensors under the blocks and two in between makes five sensors per slab”, the crop manager says.

“Of course, that’s not how it’s supposed to be, but it does give me a very detailed picture of what happens in those two slabs throughout the day. So during the hot spell in May/June I quickly discovered that the EC in the slab was structurally higher around midday than I had estimated. In that kind of weather, I normally reduce the dose size from half past one, but based on the data I obtained, I decided to wait a bit longer.”

Unlike last year, the crop has not suffered from stress at all, which costs energy and



Each sensor has five pins which are inserted horizontally into the slab.

would have been at the expense of growth and yields. The new greenhouse roof is glazed with diffuse glass (5% haze) and has a double AR coating. “The roof here is less diffuse than at our other sites, so it’s easy to grow generatively,” the crop manager explains. “I also apply the lessons learned from the slab sensors to the other sections, allowing for any differences based on variety characteristics, crop status and development phase.”

Focus still on Brix

Aertsen is convinced that thanks to the sensors, the almost 10 ha of tomatoes at the new site are performing better than they would have done without the measuring system. “In the summer, you control growth mainly via temperature and irrigation, which you do via the EC, the dose size and the irrigation frequency,” he says.

“In two weeks, we will be pinching out the tips, and so far the crop has remained nicely balanced and active. That’s how it should be if you want to harvest kilos as well

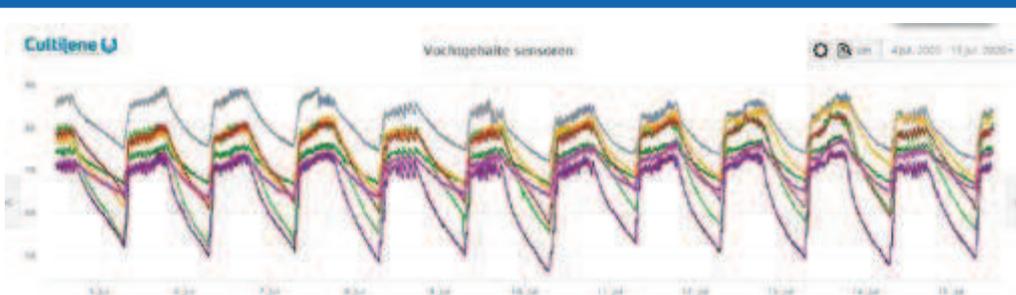
as quality. The Brix value of the fruits is the ultimate litmus test. For Axiandy it must always be above 10, and we achieve that. The other varieties are also in perfect condition and are producing very consistently.”

Handy tool

The crop manager points out that the sensor system works very well and is easy to use. Up to now he has mainly used the sensors to gain knowledge and experience. “It goes without saying that I share that with my colleagues,” he says. In the next crop, each sensor will be allocated to a separate slab, spread throughout the section.

“That will be a new learning curve, but I now have the confidence to rely on the data. These slab sensors give me a lot more security. They are a useful tool for making sound decisions, so the crop can perform even better.”

Figure. Moisture content at sensors



Development of moisture content in the slab. Aertsen currently takes measurements in two slabs, with five sensors per slab. Each line represents one sensor. The irrigation cycles and dry-back in the slab are clearly visible in brief peaks and a prolonged, sharp drop in the water content.

Summary

When enough wireless slab sensors are used, they can provide an accurate and representative picture of the water content, the EC and the temperature in substrate slabs 24/7. Irrigation can then be fine-tuned to the current needs of the crop and the plants suffer less stress. Crop manager Lucas Aertsen of the Den Berk Délice nursery has used the data from the sensor system to refine his irrigation strategy.