

Food Forward: The promising future of strawberry cultivation

Knowledge and control: key to year-round high quality production



In short

After the classic greenhouse vegetables (tomatoes, cucumbers, peppers), strawberries are also on the rise in high-tech greenhouses. Due to the extensive knowledge that has been gained and the emergence of new techniques, the crop has great potential for year-round cultivation under glass. Not only does this allow growers to better control their strawberry production, but it can also maintain quality and cost-efficiency.

While there are already many positive developments in the production of strawberries within the sector, growers still face several challenges. How can they make the crops more resistant to extreme weather conditions, deal with the pressure on the labor market, and changing regulations? And how can new techniques, such as data-driven cultivation and robotics, offer a solution?

In this Food Forward, we discuss the possibilities and challenges of growing strawberries in the greenhouse with three experts from the sector: Dieter Baets, Data Analyst and researcher Strawberries at Proefcentrum Hoogstraten, Ronald de Meester, Operational Director at Genson, and Hans Baekelmans, Crop Consultant at Grodan. They give updates on the latest trends and developments in greenhouse strawberry cultivation, and share their predictions for future-proof, efficient strawberry cultivation.

Strawberries: complex cultivation with room for innovation

Dieter Baets, Hans Baekelmans, and Ronald de Meester agree: the developments in strawberry cultivation are extremely interesting. Baets, who is leading several trials at Proefcentrum Hoogstraten to investigate the cultivation possibilities of strawberries in the greenhouse, explains: “The many different varieties and possibilities make strawberry cultivation particularly complex.

While the June-bearers – which produce flowers once a year during a short peak period – are very predictable, ever-bearers are much more difficult to control. The complexity and challenges involved in growing under glass all year round really appeal to me.” Baekelmans, who represents Grodan in the trials at Genson and Proefcentrum Hoogstraten, fully

agrees: “What we have seen in greenhouse vegetables in recent decades is now also increasingly visible in strawberry cultivation. Knowledge and cultivation techniques increase controllability, making us less dependent on the weather and other factors that influence cultivation. More and more growers see that there is still potential for improvements,

especially in the longer strawberry cultivations,” says Baekelmans. De Meester, involved in various strawberry trials at Genson, adds: “Actually, the somewhat old-fashioned sector that it used to be is being revived by young, entrepreneurial people with a different background and through techniques that we have learned from other crops.”





Challenges and solutions

Hence, growing strawberries in the greenhouse offers many opportunities for growers. But what are the challenges and how can growers ensure the most efficient production possible? Baets, Baekelmans, and De Meester zoom in on the most important challenges and possible solutions.

1. Resistant to extreme weather

Baekelmans: "Whereas with greenhouse vegetables you can anticipate weather changes by, for example, watering more or less, traditional strawberry cultivation is very weather dependent. As part of the cultivation is currently still done outside or under plastic protection, many growers are dependent on the weather. This makes it a challenge to achieve the most stable production as cost-efficiently as possible." Baets adds: "In any case, you have to deal with many different changing climates in Europe. The Dutch provinces Limburg and Brabant, for

example, were ideal for growing strawberries, but in recent years heat and extreme weather - such as the heavy rainfall this summer - have become more and more common."

A solution? "We will have to grow more and more indoors, allowing the grower to have better control over the crops. Many growers realize this themselves and a trend is visible," says Baekelmans. According to him, we can learn a lot from the various experiences gained in recent years in greenhouses throughout Europe. Baets sees this too: "We can learn from our neighbors how high-quality fruits are grown in a

different climate setting. In Russia and throughout Asia, for example, there are many initiatives for vertical cultivation. In Paris, cultivation is done indoors in containers in the middle of the city center. Although in my opinion it is not appropriate to do that here now, we can certainly learn from these initiatives." Baekelmans agrees: "Vertical farming is certainly interesting as a supplement, a source of knowledge. In the long run, for example, we can gain knowledge about how other varieties and types of plants can produce as optimally as possible."



2. Converting knowledge into control

In recent years, we have learned from cucumber and tomato cultivation that it is possible to control a greenhouse remotely through autonomous cultivation, as well as to deal efficiently with labor and energy for a high production. Data-driven cultivation is also on the rise in strawberry cultivation. In order to achieve optimal results based on data, it is very important to build up more knowledge about the growth of strawberries in the greenhouse.

Baets: "We have to look for ways to process current information and gather new knowledge, to achieve a better understanding of the entire system. We have to embrace new technology with the grower in mind," says Baets. That is why data-trials to better regulate strawberry cultivation are being carried out with stone wool growing media at various locations, including at Genson and Proefcentrum Hoogstraten.

Baekelmans: "This often involves more extreme trials to obtain a lot of information about what is and is not possible. At Genson, we mainly experiment with the cultivation concept itself, while at Hoogstraten we mainly look at EC levels. We see that higher nutritional standards and

higher EC values have an impact on quality and yield."

Baets adds: "Stone wool is particularly interesting for the ever-bearers. With short crops, the advantage of controllability is still relatively limited, whereas with longer crops there is potential for improvements. With GroSens sensors from Grodan, we can measure and control the moisture content, EC and temperature directly in the root zone. Based on this data, growers can make adjustments depending on the cultivation phase and thus better control the optimal growing conditions."

3. From cutting to seed

Until now, strawberries have mainly been grown from cuttings. However, initiatives to enable cultivation from the seed are increasing. For example, Wageningen University & Research (WUR) is conducting various trials. Baekelmans is enthusiastic: "We look at it positively. We work with a young plant of 100% pure material, which is the basis for a clean and programmable plant, and which increases the possibilities for standardization and automation. Cultivating seeds is also interesting from a cost point of view; there may not even be a need for a cooling

period in the future. An additional advantage is that it is much easier to send seeds around the world, which can be interesting for strawberry propagators and growers."

Baets also sees the added value of seeds: "Fungal diseases that currently can be passed on from the mother plant no longer stand a chance. From that point of view, growing from the seed is important. Things can go fast if WUR, or another party, discovers a variety that can be grown from the seed."

De Meester prefers to stick to the cuttings: "If I use stone wool growing media, I no longer have any diseases and I can regulate the cultivation well. In addition, it is more hygienic than growing in the open ground. That is why I see no added value in seeds."





4. Robotics as the answer to labor shortages

Another well-known challenge in the traditional (strawberry) sector is the labor-technical aspect. Baekelmans explains: "A general challenge in greenhouse horticulture is to find enough qualified people. This is also the case for strawberry cultivation."

An important solution for this, is that more growers are switching to ever-bearers. "Professional growers are (partly) switching to ever-bearers to spread the labor peaks in strawberry cultivation," says De Meester. "By switching from June-bearers to ever-bearers, you can distribute and deploy the manpower much better. Instead of a peak where you might need 100 people at the same time for a short period, you can now deploy 50 employees over a longer period."

In the future, the gentlemen also see the benefit of robotics to solve the labor problem. "Within ten years I dare to dream of a picking robot. The first steps have already been taken, but to match it to a worker still takes a lot of work," says Baets.

Baekelmans agrees: "There will always be a need for human impact in the greenhouse. Now, still a lot of work is done by hand in the sector. However, if the issue becomes more pressing, the industry will be pushed to make the step to use robots for faster harvesting, for example."

5. Acting on new legislations

A challenge that growers are also increasingly faced with is European regulations, which are being tightened further as a result of climate change. For example, although traditionally a common method, the use of organic substrates for strawberry cultivation, is now under pressure. Stone wool offers a solution, says De Meester: "It is a very clean working method and easier to regulate than the organic substrate. I think it can also increase production for growers once they know how to optimally control and regulate the plant."

The researchers at Hoogstraten Test Center also decided to use stone wool growing media because of hygiene advantages. "At

Hoogstraten, we do a lot of tests on the water. In the tray field, we specifically look at how we can disinfect water so that we can reuse it during cultivation. We noticed that the water was coffee-colored on coconut and peat substrates, and it remained cloudy even after disinfecting it. That is why we ended up with stone wool. With our trials, we encourage growers to get started with this themselves," says Baets.

Growers also have to deal with stricter legislation in the area of expansion. For example, it is becoming increasingly difficult to obtain permits to expand greenhouses in the Netherlands and Belgium, given the scarcity of space. "In the future, vertical farming can offer a solution," says Baets, "Working vertically is a solution to increase production. Although the quality still lags behind and the moisture balance is not yet in order, it is expected that steps will be taken towards this cultivation method in the coming years."

A view on the future

While the first steps towards more manageable strawberry cultivation have been taken, a lot will continue to change in the sector in the coming years. Baekelmans predicts: "Due to the high demand for space and the changing weather conditions, a step-by-step

transition will be made towards more indoor cultivation. In the long term, this will also happen due to stricter regulations. Because stone wool is well suited for greenhouse cultivation, Grodan expects an increasing demand for it in the long term. Part of the strawberry

cultivation will always remain outside. But some growers will take the step to move completely indoors and grow the plants as optimally as possible with new techniques and acquired knowledge."

More information

[New direction in strawberry cultivation](#)

[Precision growing in strawberry cultivation: first results positive \(in Dutch\)](#)



Bio's

Dieter Baets

Dieter Baets is Data Analyst and Researcher Strawberries at Proefcentrum Hoogstraten, a center active in research and education in strawberry cultivation. Baets is mainly involved in project-based research into soil-born strawberry diseases on substrates and water purification in open field propagation of strawberry plants. Furthermore, Baets seeks to streamline larger data flows from sensors and automatic platforms, so growers can more easily bring the knowledge into practice.

Ronald de Meester

Ronald de Meester is Operational Director at Genson Group, which is one of the top international suppliers of soft fruit plants for the professional grower. Besides the cultivation and propagation of plants, Genson produces the best quality strawberries and raspberries for the Dutch market. De Meester mainly ensures that the production of plants goes well.

Hans Baekelmans

Hans Baekelmans is Crop Consultant at Grodan. It is his mission to inform customers in the greenhouse sector as well as possible, as well as to offer technical cultivation support. He participates in several projects of the business development department in the strawberry area.



Dieter Baets



Ronald de Meester



Hans Baekelmans

About Food Forward

In Food Forward papers, Grodan highlights current developments and trends in horticulture by talking to various experts. By discussing their perspectives, Grodan provides more background information about topical issues and contributes to social discussions concerning our current food production system.



Grodan supplies innovative, sustainable mineral wool substrate applications for professional horticulture, based on the Precision Growing principle. These applications are used for the growing of vegetables and flowers, such as tomatoes, cucumbers, capsicums, aubergines, roses and gerberas. Grodan supplies stone wool substrates in combination with customized advice and innovative tools to support growers with Precision Growing. This facilitates sustainable production of healthy, safe and delicious fresh produce for consumers.

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