

# The opportunities of indoor strawberry cultivation

Higher value is here



# Introduction

Global strawberry cultivation is at a turning point. Growers are faced with sharp cost increases, while they also need to continue to guarantee high quality and consistent products, as consumers demand healthy, fresh fruits throughout the year. That is why strawberry propagators and growers are constantly looking for ways to optimise their growth strategy, maximise their yields and minimise their costs. This is the reason for the increasing trend towards the production of everbearers worldwide.

One solution to optimise strawberry cultivation, is to move indoors and to grow strawberries on stone wool growing media in high-tech greenhouses. Growing strawberries on Grodan stone wool with a focused irrigation strategy has been shown to increase yield and increase brix levels. It also allows the re-use of all drain water from the start of the cultivation, allowing strawberry growers to reduce fertiliser costs and meet legislative demands on drain water discharge.

In the past years, we have already seen a large increase of strawberry production in greenhouses worldwide. At Grodan, we believe this trend will continue in the coming years. We are leading the way, by helping 'early adopter' propagators and growers to shift to strawberry cultivation on stone wool. By providing the most innovative growing media solutions, and guiding customers to take full advantage of the benefits they bring, Grodan is aiming to transform the way strawberries are cultivated.

In this paper, three Grodan experts will explain why more and more strawberry propagators and growers are interested in growing their products on stone wool growing media, what the benefits of cultivating strawberries on stone wool are, and how Grodan can support propagators and growers to meet the challenges of our time.



*Andrew Lee*  
Global Technical Knowledge  
Manager, working from the UK



*Phil Johnson*  
Business Support Manager,  
working from North America



*Thomas Peters*  
Business Development Manager,  
working from the Netherlands

# Global trends

In the strawberry market, we see three main mega trends:

1. Increasing consumer demand for fresh and healthy food;
2. Year-round production of consistent quality;
3. Greater realisation of the role that high-tech hydroponic greenhouse plays in sustainable food production systems.

Estimates from the UN are that by the year 2050, the world's population will increase to 10 billion<sup>1</sup>. This means an ever-increasing demand for food, including fresh and healthy fruits. Andrew Lee, Global Technical Knowledge Manager at Grodan says: "Consumers want food that is safe, healthy and of consistent quality. At the same time, consumers are getting more and more used to year-round availability of any types of fruits."

These trends are also evident in North America", says Phil Johnson, Business Support Manager at Grodan North America: "Here, too, consumers want availability of healthy fruits all year round. And supermarkets expect consistent quality, of the product and its supply. As a consequence, in North America, the berry business is booming."

While we see a worldwide growing need for consistent quality and year-round availability, growers and propagators are also faced with high energy prices and increased production costs. That is why it is becoming even more important to minimise the risks in the cultivation process, and to control the growth of the plants as much as possible. As a result, we see more and more growers around the world move indoors to grow strawberries on stone wool growing media.

This is in line with a wider trend in global food production, in which we see an increasingly important role of the high-tech hydroponic greenhouse in sustainable food production systems.

Lee: "Meeting the growing demand for food, requires increased production from a controlled environment. That means an uptake in greenhouse cultivation globally, as this allows more yield per unit of land to be achieved."

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<sup>1</sup> <https://www.un.org/development/desa/en/news/population/world-population-prospects-2019.html>

# Year-round production

We have also seen a trend in the use of everbearing varieties in the high-tech greenhouse, notably in North America, but also in the Netherlands and the UK.

Thomas Peters, Business Development Manager at Grodan explains: "Putting everbearers into high-tech greenhouses makes total sense, as we can now grow long season strawberry, just like we grow tomato, cucumber and pepper in similar

hydroponic systems. Why have months of no production in a high-tech greenhouse when you can be consistently producing a high quality berry year-round?"

With these trends in mind, there is an enormous opportunity for propagators and growers to shift strawberry production to the high-tech greenhouse, where they can grow everbearers on stone wool growing media.

## The benefits of stone wool growing media solutions

### **Stone wool growing media enable propagators to produce more with less water, nutrients and space.**

For the past years, Thomas Peters has been involved in different projects and trials to support propagators to cultivate strawberries on stone wool. Together with these 'early adopters', Peters was able to gain promising results in strawberry production. He explains: "Stone wool growing media enable propagators to produce more with less water, nutrients and space. With stone wool, they can optimise the fruit production of a plant, quickly and very precisely.

This innovative way of growing helps to increase strawberry production, using the same resources."

Phil Johnson has also been involved in several local growth and propagation trials in Canada:

"We have seen promising first results with both production trials and propagation trials. For instance, we have already seen the ability to reduce the propagation period when using stone wool."

As a result of our projects and trials with different clients, we have identified five clear benefits for growers as well as propagators of growing strawberries on stone wool:





### **1. Clean hygienic substrate ensures pathogen-free growing with less fertiliser**

Specifically for propagators, by bringing propagation inside, both the arial and root zone environments can be controlled. As a result, the risk on pathogens and diseases can be significantly reduced in a greenhouse. Peters: "Stone wool is clean and inert, which allows for full recirculation of water. Grodan stone wool blocks have been designed for use in ebb and flood systems. By using bottom up irrigation, the crown of the strawberry plant remains dry. Consequently during production it will be less susceptible to disease ingress. Next to that, we can also apply precise quantities of fertiliser in the correct ratios with each irrigation moment. This reduces the amount of fertiliser which is needed in other cultivation methods."

Grodan stone wool blocks, once irrigated, will re-saturate to around 80-85% WC%. The WC% will then slowly reduce based on water uptake by the plant. Traditional vegetable crops are watered when the WC% falls to 40% or 60% and these same principles have been applied to strawberries with great success.

### **2. High level of product uniformity allows for maximum control**

Using steerable and measurable stone wool growing media allows growers to minimise water and energy use. Johnson: "Grodan stone wool is

steerable, which means we can effectively control the WC, nutrient levels and EC of the growing media."

Lee adds: "This way of working is standard in high-tech vegetable cultivation, so why not start thinking this way when it comes to strawberry production in high-tech greenhouses? By using the GroSens sensor we can accurately measure real-time water content percentage (WC%), temperature and electrical conductivity (EC). This helps the growers to make precise decisions in the greenhouse."

Johnson: "Contrarily, in traditional cultivation methods, it is more challenging to measure these elements. For example, it is difficult to check and adjust the EC in the root zone. This makes steering the 'balance' of the tray plants in traditional growing methods almost impossible."

### **3. Stone wool enables a targeted irrigation strategy**

"Another challenge many growers are facing is adopting an effective irrigation strategy", says Johnson. In his region, North America, this is even more pressing, as lack of water in large producing areas such as California are pushing growers towards more water-efficient cultivation methods. Johnson: "Meeting the increasingly high consumer and business market demands is much easier if you grow indoors and control the climate and irrigation. And that's exactly what the strawberry growers I'm working with are doing", he says.

#### 4. Stone wool can be recycled, water can be re-used

The use of stone wool itself is a resource-efficient method of greenhouse cultivation. This is because it is possible to recycle this material.

Lee: "Grodan offers recycling solutions, which also makes it a very environmentally friendly solution." In the Netherlands, 100% of the stone wool used is already recycled.

Next to that, cultivating on stone wool helps growers and propagators manage their water use. This is particularly relevant considering the European Water Directive 2027, that implies water quality 'in' has to equal their water quality 'out'.

Lee: "Roughly translated this means that growers need to recycle and reuse all the water that goes 'in'. In markets like the Benelux this legislation already exists. The target was 2027, but with Grodan stone wool growing media, our research partners at Wageningen University (WUR) demonstrated that 100% reuse of applied irrigation water was already possible with cucumber and pepper in 2014, with the correct technical installation. So why not apply this to strawberry today?"



#### 5. Labour planning

Particularly with cultivating everbearers in the high-tech greenhouse, growers and propagators can plan their labour more consistently. Johnson:

"When you grow everbearers indoors, operational planning in respect to labour is more consistent over the duration of the cultivation. This is a direct result of eliminating 'peaks' in production, which is a major disadvantage for June bearers".

Lee: "We can actually adopt the principles of Precision Growing, which propagators and growers have already been using for years with vegetable cultivation on stone wool", he says.

## Grodan's work with early adopters

**With our knowledge on irrigation management and root zone management, we help our customers manage their water, energy and nutrient use, and optimize their growth strategy.**

While we know the benefits of growing strawberry on stone wool, it is important to continue to test and improve the cultivation process. That is why Grodan has been involved in different trials, and worked closely with early adopters in the past years

to constantly measure and optimise the results of strawberry production on stone wool. Grodan is developing growing knowledge and root zone knowledge specifically for strawberries that will be used to support propagators and growers in achieving their goals. Johnson:

"Grodan has come to the market with over 50 years of experience with growing vegetable crops in stone wool growing media. With our knowledge on irrigation management and root

zone management, we help our customers manage their water, energy and nutrient use, and optimize their growth strategy and therefore align to climate management. Using this knowledge and experience, we will continue to study the strawberry crop to truly define the needs of the plants, and to optimize yields and quality of the fruits.”



## The way forward

### **If they grow tomatoes, cucumbers and peppers indoors, why not consider strawberries as well?**

We need to translate the thinking and principles of a high-tech vegetable propagator and a high-tech vegetable grower towards high-tech strawberry growing in greenhouses. Grodan see the biggest challenge in changing the mindset.

Peters: “We need to leave the conventional way of irrigating strawberries at the door and be open for new opportunities offered by Grodan stone wool growing media. This is of course the challenge we face, and we are working with our industry and research partners to help transfer this message into the market.”

Phil: “Given the results that I have already witnessed in the North American market, I believe propagators and growers around the world need to be open for new opportunities offered by stone wool growing media.”

Peters: “We understand it will take time to shift to this new cultivation method, and indeed we are in it for the long term. As Grodan, we are making the investments in new knowledge related to the way strawberries are propagated and grown.”

Lee concludes. “We need to translate the way of thinking of the high-tech vegetable propagator and grower towards strawberries. If they grow tomatoes, cucumbers and peppers indoors, why not consider strawberries as well? An increase in greenhouse cultivation globally will ultimately allow more yield per unit of land, water and fertiliser.”

## More information

We at Grodan are here to support you and give you advice on an optimal strawberry cultivation strategy. Are you considering to shift (part of) your production of strawberries indoors? Or are you thinking about using a part of your greenhouse for year-round production? We can share our experiences and lessons from previous projects and

trials with you, and can discuss together what is the best way forward for you.

Please reach out to your local Grodan contact person to get in touch. Or visit [www.grodan.com/strawberry](http://www.grodan.com/strawberry) for more information.



## Growing a better future

Grodan is the global leader in supplying innovative, sustainable stone wool growing media solutions for the professional horticulture industry, based on Precision Growing principles. These solutions are applied to the cultivation of vegetables and flowers, such as tomatoes, cucumbers, sweet peppers, egg plants, roses and gerberas.

Research shows that high-tech greenhouses have the biggest positive impact on the UN Sustainable Development Goals compared to all other growing systems and score highest within water and nutrient efficiency. The use of stone wool Precision Growing media in a greenhouse can produce higher yields with significantly less resources than other cultivation methods. The key is precision. The essence of Precision Growing is use of less soil, less water, less fertiliser, lower CO<sub>2</sub> emissions, and gaining a higher yield. Combined with stone wool growing media, Grodan enables Precision Growing by offering a MultiSensor system, a software platform and personal advice to help maximise crop potential with data-driven cultivation.

Grodan's innovative growing media solutions facilitate the sustainable production of healthy, safe, and fresh food produce. Furthermore, it creates the possibility to use biocontrol and reduce, or even eliminate, the use and risk of chemical plant protection products.

Sustainability plays a prominent role within Grodan, from the manufacture of stone wool substrates to end-of-life solutions. Grodan was founded in 1969 and is active in more than seventy countries worldwide. The head office is located in Roermond, the Netherlands.



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