

## Technical innovation for year-round fruit production

- ★ There is a clear shift amongst growers and propagators towards intensive, hydroponic methods of cultivating soft fruit, which enables year-round production. The team behind the PlantGoed project are developing a range of solutions to help flatten labour peaks and boost the competitiveness of the soft fruit sector in the region around the Belgium-Netherlands border, as **Simon Craeye** explains.

**An increasing number** of soft fruit growers in the area around the Belgium-Netherlands border are adopting intensive, hydroponic cultivation methods, which opens up the possibility of producing all year-round. The PlantGoed project team - together with important stakeholders - identified the most ideal production plans and worked their way back in the supply chain to facilitate the best possible propagation strategies, as high-quality plant material is first required. Currently strawberry plants are propagated outdoors on container fields for this purpose. "In the cross-border region between Belgium and the Netherlands, this is mainly done in the Summer and Autumn, when the climate is conducive," outlines Simon Craeye, a researcher at Inagro, research and advisory institute for agriculture and horticulture in Belgium. This plant-cultivation process is very seasonal, leading to marked labour peaks on farms, an issue that is addressed collaboratively within the framework of this project. "Our idea is to try and spread plant cultivation over the whole year, adapted to the specific production plans, so we can flatten the labour peaks," he explains. "We need other types of propagation facilities to achieve this. We cannot do it all on container fields outdoors, as they are affected by the climate. If we move the propagation phase

indoors, to a greenhouse or a vertical farm for example, we can then control the climate, and make the plant believe that it's Summer, when actually it's Winter."

### Aligning propagation and production

The amount of light that a plant is exposed to is an important consideration here, as a classical junebearing strawberry plant will only initiate flowers when daylight hours are reduced, which will then lead on to the eventual production of the fruit. Many other parameters must also be taken into account, and Craeye says the conditions under which

"If we move the **propagation phase indoors**, to a greenhouse or a vertical farm for example, we can then **control the climate**, and make the plant believe that it's **Summer**, when actually it's Winter."

soft fruits thrive are fairly well known. "We are already quite good at making strawberry plants in a fully closed system. We know about how long the days should be, about the humidity levels and temperature, and about how much light and what kind of light should be transmitted to plants," he says. "The production of the fruit follows a peak pattern: junebearers showing one strong peak while classical propagated everbearers yield in two or three consecutive peaks.

For the latter, there are still many research questions about how we can propagate them in atypical seasons."

The project team is now looking to build upon this knowledge and develop solutions to enable the continuous cultivation of strawberries and raspberries, starting from the mother plants that produce the cuttings. "We're looking into management strategies for mother plants to advance or delay the season of hanging strawberry cuttings, enabling year-round production. The question arises whether this is possible with the current production facilities," outlines Craeye.

This is part of the project's work in essentially aligning the propagation and cultivation of soft fruit, and making plants tailored for specific production systems. If the aim is to produce fruit in a greenhouse in Summer, then a particular kind of plant is required, while another type will be better suited to producing fruit in Spring. "We are not trying to change the entire system - we want to broaden it out and make it as efficient as possible," continues Craeye.

The solutions developed in the project are intended primarily for intensive producers and plant propagators, and so the economics of production and likely levels of demand for soft fruit at different times of year must also be taken into account. "If you produce strawberries in Winter you are likely to gain a higher income from those plants, so you will be able to pay a little more for them. So the plant can be produced or propagated in a more controlled environment. Whereas if you are producing fruit in a period where they are traditionally more abundant, it's maybe not necessary to have a very expensive plant," says Craeye.

### Using vision and AI

A further aspect of the project's work is the use of AI tools, with a view to producing high-quality fruit all year round. "We're investigating how we can use vision techniques combined with AI to identify the best time to harvest cuttings and what characteristics of the plant will lead to the best quality fruit. We're looking towards automating strawberry propagation to improve labour-efficiency," outlines Craeye. "To reach this goal, we've taken lots of pictures of strawberry cuttings, which we are now analysing - we're looking at how we can then automatically classify the cuttings and plants in terms of quality. This is very important in giving us a prognosis on the overall quality of the plant material, and identifying the point at which it should be harvested later on."

The wider aim is to boost the competitiveness of the soft fruit sector in the area around the Netherlands-Belgium border, which is an important contributor to the regional economy. Other fruit-producing regions have lower labour costs, so Craeye says farmers in the area need to be open to technical innovations if they are to remain competitive in the market. "We cannot invest as much time in our soft fruit propagation and cultivation as they do in other countries where labour costs are lower, so we have to find new ways to stay competitive," he stresses. Craeye believes these innovative new methods can help provide a sustainable, reliable, year-round supply of high-quality fruit. "We are able to maintain consistent high quality fruit output and boost productivity by more tightly aligning propagation and production, and applying higher levels of control, let's say programming the plants," he explains. "If we move propagation systems to an indoor facility like a vertical farm, we will be able to close the water and nutrient cycles



even more. We will also be able to reduce pesticide use, as pests and diseases will more easily be kept out of these facilities."

### Energy efficiency and vertical farms

A vertical farm of course requires energy to maintain the right levels of artificial light, set the right climate and run key processes. These processes can be electrified however, and the project team are investigating various ways to improve energy efficiency in the cultivation of plant material, reflecting an overall commitment to sustainability. "We want to develop plant propagation strategies while at the same reducing the environmental impact of these methods through optimising resource-efficiency," says Craeye. This work is currently ongoing, and with the project around halfway through its overall funding term, Craeye says the research is progressing well. "We're testing different production systems and strategies, and together with our partners we've made several kinds of strawberry and raspberry plants, tailored for specific production systems," he outlines.

The technology is still being modified, with researchers working to optimise different systems, with a view to their future application in plant cultivation. The views of growers and propagators are central in this respect, so Craeye and his colleagues actively seek out their opinions and ideas, which will help shape the ongoing development of the project's solutions. "We've held some co-creation sessions together with growers and propagators, where we learned about how they want the plants and the production cycles to look. We're working towards that goal now, and we aim to have more diversified production systems by the end of the project," he says.

Management of mother plants and strawberry cuttings being discussed by the project partners.

## PlantGoed

Developing and deploying various innovations in the cultivation of plant material for year-round plant material and soft fruit production

### Project Objectives

PlantGoed aims to enhance soft fruit production efficiency by tailor made plant material, ensuring predictable, high quality yields and smoother labour demand. With innovations like indoor propagation and vision controlled automation, it boosts control over cultivation and drives a smarter, more sustainable, year-round supply chain. Challenges are tackled through a co-creative approach, engaging all relevant stakeholders in the discussion.

### Project Funding

PlantGoed is a Interreg Vlaanderen-Nederland project with grant number Int6A038. "Medegefinancierd door de Europese Unie"

### Project Partners

• Inagro • Delphy • Proefcentrum Hoogstraten • Aris • Van der Avoird Trayplant

### Contact Details

Ir. Simon Craeye  
Project Coordinator  
Inagro vzw.  
Ieperseweg 87  
8800 Rumbekke-Beitem  
Belgium  
T: +32 487 58 27 60  
E: [simon.craeye@inagro.be](mailto:simon.craeye@inagro.be)  
W: <https://interregvlandeu/plantgoed/>  
W: <https://inagro.be/projecten/plantgoed>  
W: <https://interregvlandeu/en/plantgoed/contact-2>

### Simon Craeye



**Simon Craeye**, a trained bioscience engineer has worked at Inagro since 2014, where he manages European and regional research projects focussing on the cultivation of strawberries and fruit vegetables in CEA-systems. He has a deep expertise in various themes whereas innovative cultivation techniques, water and nutrient management, circularity, digitalisation. He is skilled in project coordination, stakeholder engagement, and knowledge transfer.



### PlantGoed

