



Dear cucumber enthusiast,

Growers had already started cultivating cucumbers in greenhouses for high-wire tomato cultivation back in the 1990s. But to turn this into a true success, the sector needed a few more years. Nowadays, high-wire cultivation for cucumbers is seen as a system fit for today and tomorrow in many countries.

BASF is proud to have played a vital role in this development. That's why we decided to share stories and video interviews with a diverse range of people around the globe, so that we could turn 2020 into a celebration of the twenty-year success story of high-wire cultivation.

As a way of thanking you for your participation, we'd like to share this book with you. Let's look back at the stories and experiences we've created together in 2020 and honor twenty years of high-wire cucumber cultivation.

2020 was a year in which we not only reflected on the past twenty years, but also on how our future may look like. In the spring of 2021, we'll be sharing our thoughts with you about the cucumber greenhouse of the future. We hope to have many interactive discussions with you on this topic.

We hope you will enjoy this book, and we look forward to collaborating with you to create new, exciting stories over the next twenty years.

Sincerely,
Your BASF Cucumber team

TIMELINE



2000

Start of dedicated breeding with the unique COMPACT gene for long cucumbers



2004

First internal trials in Nunhem with new COMPACT varieties in high-wire



2007

Filing of the COMPACT patent

2007

Planting of 3 new COMPACT varieties at the greenhouse in Nunhem for a better understanding of their performance in high-wire circumstances and the development of a specific growing protocol



2008

Hi Tona, Hi Jack and Hi Lisa are introduced to the market as the first varieties of the Hi Revolution family with the COMPACT gene



2009

Beesan was launched for the Canadian high-wire market



2010

First large-scale 20ha commercial year of Hi Jack in traditional crops resulting in the decision to use COMPACT varieties only for high-wire cultivation



2014

Start of making specific selections in short cucumbers for high-wire crops
Mini cucumbers and Beesan arrive at the European high-wire market with the first sales in Germany and The Netherlands



2014

Hi Power replaced the first generation of Hi Revolution varieties and was widely introduced, in The Netherlands, UK and Scandinavia on to Iceland and New Zealand



2016

Introduction of SEpire in the American high-wire market

2016

Introduction of Hi Force variety for summer crops in Europe



2017

First trials of snack cucumbers in high-wire greenhouses



2019

Extended trials of new mini cucumber varieties with virus resistances at the European & American high-wire market



2019

Introduction of SEquence as the first real high-wire variety in Canada

2019

Introduction of Hi Light & Hi Pace for high-wire summer crops in Europe as the 3rd generation of the Hi Revolution family

Discovery Jack Crienen gave high-wire cultivation a boost

It's the end of June 2000 when Crienen noticed an abnormal plant in his greenhouse. "The plant had smaller, greener leaves and different fruits from the others. Its internodes were also smaller, so the production per plant was higher. The difference in yield with the other plants was large", says Crienen.

In the meantime, BASF also became aware of the special plant in Crienen's greenhouse. Together they decided to have it examined.

After a lot of trials and tests, the varieties Hi Tona, Hi Jack and Hi Lisa were introduced in 2008. Hi Tona was named after Crienen's mother, while Hi Jack is a reference to Crienen himself. "An honor, but no more than that. I'm just a normal person", he says modestly.

Twenty years later, Crienen reflects: "The introduction of the Hi Revolution varieties has given high-wire cultivation a boost" and thinks that this cultivation method is the basis for the future. "Of course, it is an investment, but if you really want to continue, it is the way to go."

"I immediately recognized the short internodes and the smaller, dark green leaves"

Jack Crienen
cucumber grower
Baarlo, the Netherlands

Morning Snack Session, at Fruit Logistica, Berlin To pack or not to pack?

We live in a time of reflecting our behavior and habits to secure the quality of life for the generations to come. Topics such as sustainability, environmental protection, and waste reduction do not only play a crucial role in the public debate but also lead to a change in our shopping and consumption behavior.

Recent studies show that consumers are increasingly opting for products that create as little packaging waste as possible. BASF is also involved in this transition. During Fruit Logistica 2020 BASF organized a 'Morning Snack Session' about this subject. During this session, Anne Jancic (Marketing and Business Development High Tech at BASF's Vegetable Seeds division) and guest speaker Victoria Wessolowski (coordinating

BASF's Industry Team Packaging Europe) took cucumber enthusiasts from all over the world onto a journey into consumers' eyes and shared facts & figures around sustainable packaging. Lead by Account Manager Cucumber Rens Muusers, the group discussed about the challenges they are facing, accompanied with some delicious cucumber snacks.

“Consumers are increasingly opting for products that create as little packaging waste as possible”

Victoria Wessolowski
Industry Team Packaging Europe BASF



“We put as many possible traits that we want in our variety in its parental lines”

Robert Swinkels
senior cucumber breeder BASF

“I still enjoy the success we achieved together as a team”

Gerhard Reuling
breeding advisor BASF



Gerhard Reuling and Robert Swinkels Enjoy the success of high-wire cucumbers

BASF’s former and current long cucumber breeders, Gerhard Reuling and Robert Swinkels, review the past 20 years of high-wire cucumber cultivation. “I still enjoy the success we achieved together as a team”, says Reuling.

In 2000, grower Jack Crienon discovered interesting plants with compact and horizontal leaves. Gerard Reuling, cucumber breeder from 1984-2013 at BASF’s Vegetable Seeds division, remembers back that time. “From that year on we started to cross these characteristics into our existing breeding material, ultimately resulting in the varieties that are currently at the market.” Reuling is proud of what he sees today. “Now, 20 years later, it’s fantastic to see that we’re still working with these characteristics and varieties.” Cucumber Breeder Robert Swinkels explains how new varieties are made: “We do this by crossing two parental lines. We put as many possible traits that we want in our variety in its parental lines, which we then cross with each other”, says Swinkels who says it is special to visit customers’ greenhouses. “When I visit them, I’m very proud to encounter the varieties I’ve worked on for such a long time. Moving forward, a major step is to further develop high-wire and achieve year-round cultivation under artificial light.”

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Gerhard Reuling
breeding advisor BASF

“Moving forward, a major step is to further develop high-wire and achieve year-round cultivation under artificial light”

Robert Swinkels
senior cucumber breeder
BASF



“The biggest challenge is to arrange labor in a good way”

Marcel Huibers
at the time of interview manager at Hortus in Futuro, Maasbree, the Netherlands



Marcel Huibers

“I got a lot of freedom to really explore the high-wire cultivation”

Marcel Huibers, at the time of interview manager of Hortus in Futuro in Maasbree, experienced the introduction of high-wire cucumber cultivation up close. At the start of this development, Huibers worked at BASF as a sales specialist for cucumbers. Between 1999 and 2015 he specialized himself in high-wire cultivation.

High-wire cultivation was back in 2000 still in its infancy. “There were several growers who had been pioneering with high-wire cultivation for a number of years. I got a lot of freedom to really explore the high-wire cultivation, and to further develop high-wire cultivation together with growers and to take it to a higher level”, says Huibers. “At that time there was an increasing demand for quality products: beautiful, straight, long, cucumbers, all uniform. That’s why growers have started to further evolve the high-wire cultivation.”

Hortus in Futuro works with the COMPACT-varieties. “For the spring cultivation, we choose Hi Power, which fits very well under lighting. For the summer cultivation we choose Hi Light, which is a variety that is very strong against CGMMV. These varieties are essential for growing cucumbers in the summer.” How does Huibers look forward to the next twenty years? “The biggest challenge is to arrange labor in a good way. The solution could be in robotization and automation.”

“For the spring cultivation, we choose Hi Power, which fits very well under lighting”

Marcel Huibers

“The solution could be in robotization and automation”

Marcel Huibers



“I remember exciting, pioneering times”

Herman Hermans
Innocrop Consulting
Baarlo, the Netherlands



Herman Hermans

“It took a very long time for high-wire to become the system of the future”

“When I think back to when we started with high-wire, I remember exciting, pioneering times. They were times of trial and error. But we knew we wanted to transition to high-wire, but we didn’t know exactly how,” says Herman Hermans from Innocrop Consulting.

Hermans tells that the main reason for the shift to high-wire was the guarantee to create more stable quality year-round and an increase in production. “At that time, the quality was very poor and not stable at all.” High-wire varieties have a number of important features, says Hermans. “First of all, quality and production. Secondly, they score well in the area of resistances and in the third place they are labour friendly.” As a consultant Hermans guided growers in making decisions and talked to them about the issues they faced. “It took a very long time for high-wire to become the system of the future. Gradually, this led to the creation of a system.” Robotization and big data will be the biggest developments in the next twenty years. “There are people who say that big data will take over growers and advisors. Maybe it will, maybe it will not. We will see who wins the battle in future.”

“Gradually, this led to the creation of a system”

Herman Hermans
Innocrop Consulting
Baarlo, the Netherlands

“Robotization and big data will be the biggest development in the next twenty years”

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Innocrop Consulting
Baarlo, the Netherlands



“It’s the perfect combination to grow high-wire with lights, but the investment is high”

Roy Rosendahl
Klagstorps Grukodling
Sweden



Roy Rosendahl A Swedish view on high-wire winter production with automatic lowering system

Roy Rosendahl from Klagstorps Grukodling is one of the very few Swedish high-wire cucumber growers who are running winter production under lights. “It’s the perfect combination to grow high-wire with lights, but the investment is high.”

Rosendahl started to grow high-wire in 2014. “The quality of the fruit is much better. We also started preparing for the next step here, to put in lights for the future. For the high-wire crops, we are normally doing three to four crops per year, depending on how beaten up it will be, temperature wise and so on.”

The grower says that to grow high-wire with lights is the perfect combination, because it creates a much better climate. “The head of the plant gets warm. You don’t have problems with mycosphaerella and so on”, says Rosendahl who thinks the main challenge in the high-wire crop is to find varieties that fit to the circumstances of the grower.

Rosendahl used to grow tomatoes before, so the step to growing high-wire cucumbers was not too far. “But it’s still much, much tougher than growing tomatoes.” According to Rosendahl the development of high-wire in Sweden is almost zero. “You can ask yourself why, but you need lights. It’s hard to grow high-wire without lights. The investment is high to put in lights, so you need to be sure to get a fixed price for the cucumbers.”

“The quality of the fruit is much better”

Roy Rosendahl
Klagstorps Grukodling
Sweden

“Our greenhouse is equipped with an automatic lowering system. We can lower the whole line in one shot”

Roy Rosendahl
Klagstorps Grukodling
Sweden

“The cucumber category will be as diverse as tomatoes”

David Coronado
Windset Farms
California, USA



David Coronado & Shiho Uzawa “Cucumbers are fresh, healthy and quick-snacking”

David Coronado is Senior Cucumber Grower at Windset Farms, one of North America’s largest sustainable suppliers of naturally grown produce. In the last twenty years he noticed a lot of developments. “The main development in North America is that cucumbers are fresh, healthy and quick-snacking.”

Coronado says that ten years ago basically all you needed were mainly greenhouse-grown cucumbers. “Now we grow mini cucumbers, baby cucumbers and cocktail cucumbers. Furthermore, we see that the U.S. market basically still prefers the field grown cucumbers versus Canada. They prefer greenhouse-grown products.” Local for local is another item that has gained importance. “That is because cucumbers have a shorter shelf life. So, suppliers like to carry local whenever possible.”

The American believes that the cucumber market will be as diverse as tomatoes. “It definitely will grow. Smaller cucumbers are very popular nowadays. Basically, what we see is that the snack cucumbers are evolving, and we see for the next ten years that cucumbers will basically be the product to have. The cucumber market is shifting to something new.”

That Windset is able to open new ways, the company proofed already with its delivery program, Windset Direct. “We created the program because we saw a need in the community, and we wanted to help.”, says David’s colleague Shiho, Marketing Manager at Windset. “There were many members in the community who were not able to leave their homes due to COVID 19. We want to make their lives easier in these uncertain times. With the Windset Direct program, we created a solution to these problems.” For Windset, their new delivery program during the summer months of 2020 was a success. Currently the company is working on the evaluation and is exploring ways to make it even better.

“One of the strongest forces behind the inception of Windset Direct was the challenges posed to our community by COVID 19.”

Shiho Uzawa
marketing manager
Windset Farms
California, USA

“For the next ten years cucumbers will basically be the product to have”

David Coronado
Windset Farms
California, USA

Lori Castillo

“People connecting over food, that’s what it comes down to”

Aiming to become the single source solution for all the produce needs, NatureSweet is expanding its trusted brand to include new products, such as mini cucumbers. In the framework of celebrating 20 years of high-wire cucumbers, Lori Castillo, VP of Marketing at NatureSweet talks about their engagement with consumers and their associates as sources of inspiration for innovation.

The NatureSweet marketing team is researching what it is about cucumbers that makes them the most attractive to their consumer base. “The most important thing is to always keep the consumer at the forefront of what you do. Taste comes first, always. Beyond that, how can we extend the value to customers? Is it crunch, transportability, shelf life? When we know what value consumers need, we will innovate”, says Lori.

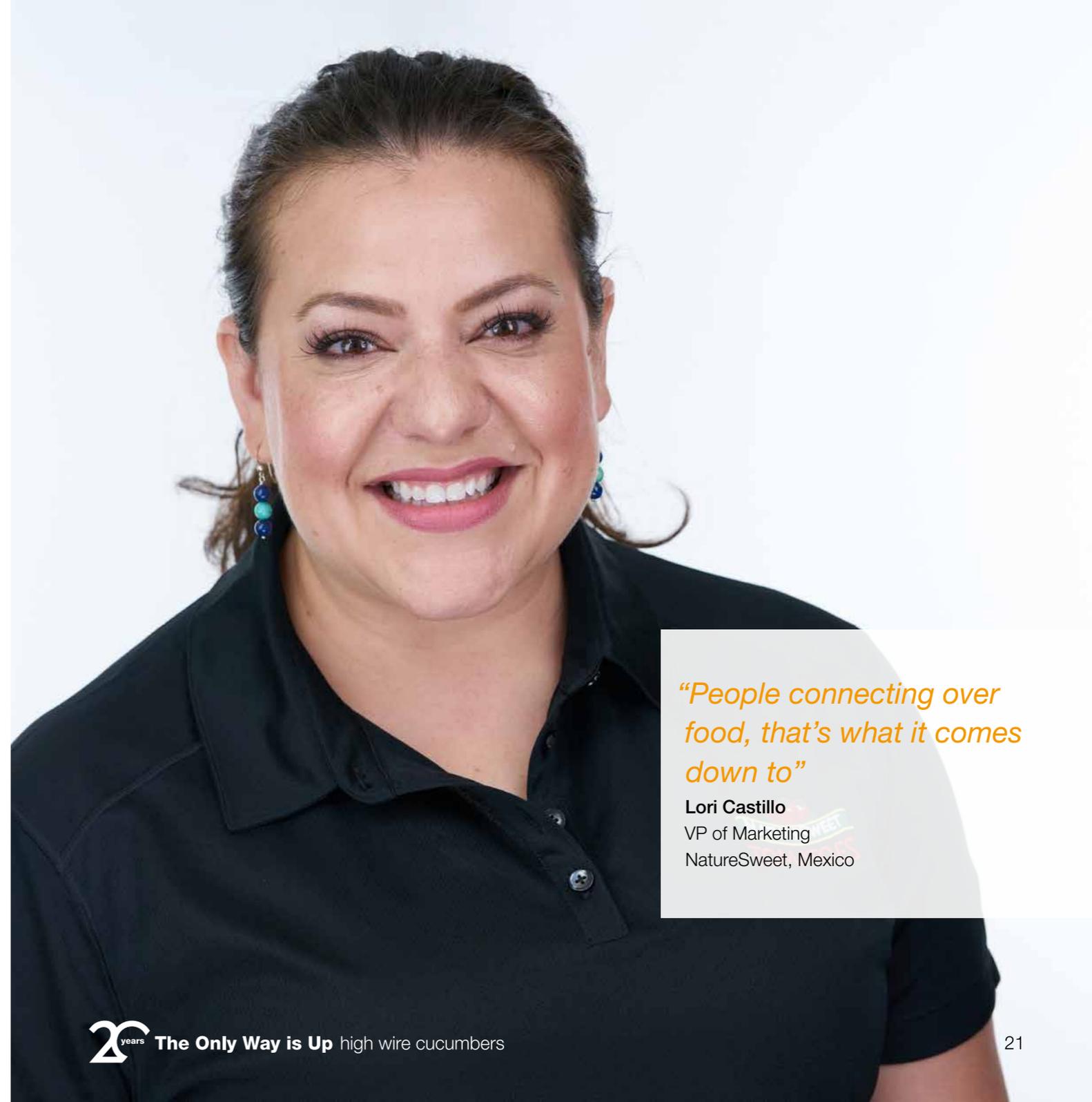
In marketing, NatureSweet has teamed up with dieticians. “We’re always looking for new and fun ways to explain how our products can help. We share healthy recipes, for example. Also, there is the obvious trend

of people taking pictures of their food. So, we have to make sure that they know: ‘Yes, it’s healthy. But it also looks beautiful and is trendy for Instagram.’ Your phone does eat first.” Over all, NatureSweet tries to keep increasing their value to consumers. And they have a clear mission: “People connecting over food, that’s what it comes down to.”

“Your phone does eat first”

Lori Castillo

VP of Marketing NatureSweet, Mexico



“People connecting over food, that’s what it comes down to”

Lori Castillo
VP of Marketing
NatureSweet, Mexico



“At BASF Vegetable Seeds we want to make healthy eating enjoyable and sustainable”

2020 was a year in which we looked back on twenty years of high-wire cucumber cultivation. But how will our future look like?

“At BASF Vegetable Seeds we want to make healthy eating enjoyable and sustainable. Therefore, we strongly believe in the development of a connected, data-driven, automated and sustainable production system with consumers’ needs in mind,” says Anne Jancic, Marketing & Business Development High Tech at BASF Vegetable Seeds.

Cucumbers will move out of the commodity. They will be more diverse, more convenient, healthy and tasty. When people will eat cucumbers in the future, it will be an experience. Also the shopping itself will most likely become more of an experience, being an inspiration by itself, becoming more digital and informative - a (virtual) place where consumers and growers meet directly.

Also the cultivation of cucumbers will develop further. Machine learning, AI, and autonomous technologies are already being incorporated into every aspect of our daily lives. They will increasingly have a place in greenhouse crop production. Naturally, powerful genetics are a part of that environment and therefore the reason why BASF is exploring the capabilities of artificial intelligence and data driven growing.

“Getting the best out of our genetics and offering vegetables people love, is always a joint effort with the growers, greenhouse suppliers, retailers, universities and the whole industry. We believe that collaboration and synergies are key and contribute to developing even smarter innovations - autonomous growing and the movement towards a real smart greenhouse is one of those examples’, closes Veronique Savelkoul, Global Sales Manager High Tech.



BASF High-tech cucumber team

Robert Swinkels

Europe
senior breeder



Cees Rodenburg

Europe
senior breeding technician

Helmy Ramaekers

Europe
lead breeding
technician



Peter Kraan

Europe
r&d coordinator

Ralf Joosten

Europe
lead breeding
technician



Monika Singleton

North America
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Rob Derks

Europe
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Ali Mohammad

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Rens Muusers

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Peter Kollen

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regional product development specialist



Anna Stepowska

Europe
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Pavel Kornilov

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Huiyi Wei

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high-tech account manager



Oswaldo Hagelsieb

North America
account manager



Marcel Huibers

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agronomist



Gregoire Vendeville

Europe
sales specialist



Heinz Ebel

North America
customer and consumer manager Americas



Matt Deceault

North America
customer and consumer manager Americas



Sam Clayfield

Australia
consumer and customer manager



Philip Stoffyn

North America
regional product development specialist



For the full stories and video interviews, please visit our 20 years high-wire cucumbers web page <https://www.nunhems.com/global/en/solutions/20-years-high-wire-cucumbers.html>



Together, keeping ahead of a changing world

20 years

The Only Way is Up
high wire cucumbers

nunhems 

 **BASF**
We create chemistry

BASF

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