



**Meet potato professionals during the
Potato Variety Days 2024
on November 6, 7 and 8**

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This e-book is made by Aardappelwereld BV in cooperation with Agrico, Danespo, Europlant, Geersing Potato Specialist, Germicopa, Interseed, Meijer Potato and Schaap Holland.

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Innovation basis for success potato breeding

Innovation, or the process by which ideas lead to a creative approach to a given challenge, is the basis of the success of the Western European potato chain. The development of a prototype of a product, service, process, or a combination of all three starts with new ideas. After this groundwork, an idea can lead to a marketable product or service that players in the potato chain are waiting for. During the Potato Variety Days 2024, held on November, 6, 7, and 8, potato breeding and trading companies will show you that this is exactly how innovative the potato sector is.

On the next page of this e-book, you will find a schedule telling you where and how participating breeding companies and trading houses want to meet their (potential) customers during this year's Potato Variety Days. Following is a series of articles providing information about the partners of this edition of our e-book project. To get an insight into the key aim of their current day breeding work, we have asked these partners about their main focus in breeding, the most important news they want to share about their varieties during this edition of the Potato Variety Days and the message they want to send out to the potato chain. To provide you with some extra knowledge, we finish this e-book with a number of articles and a blog about potato breeding.

On behalf of Team PotatoWorld, I hope that you find pleasure and inspiration in reading this e-book. We look forward to meeting you at the event and/or keep in touch online. If you share pictures or comments on social media, remember to use the #PotatoVarietyDays24. Feel free to [send an e-mail](#) to share your experiences and tips with us personally.

Jaap Delleman
Editor in Chief of PotatoWorld magazine

PS. If you want to be informed about future developments in the potato industry, [fill in this form](#) and receive our monthly free digital newsletter.



Potato Variety Days 2024: 6, 7 en 8 november

On Wednesday 6, Thursday 7 and Friday 8 November 2024, the annual Potato Variety Days will take place in the Netherlands. During these days, trading and breeding companies will present their (new) potato varieties and developments to existing and new customers, both physically and online.

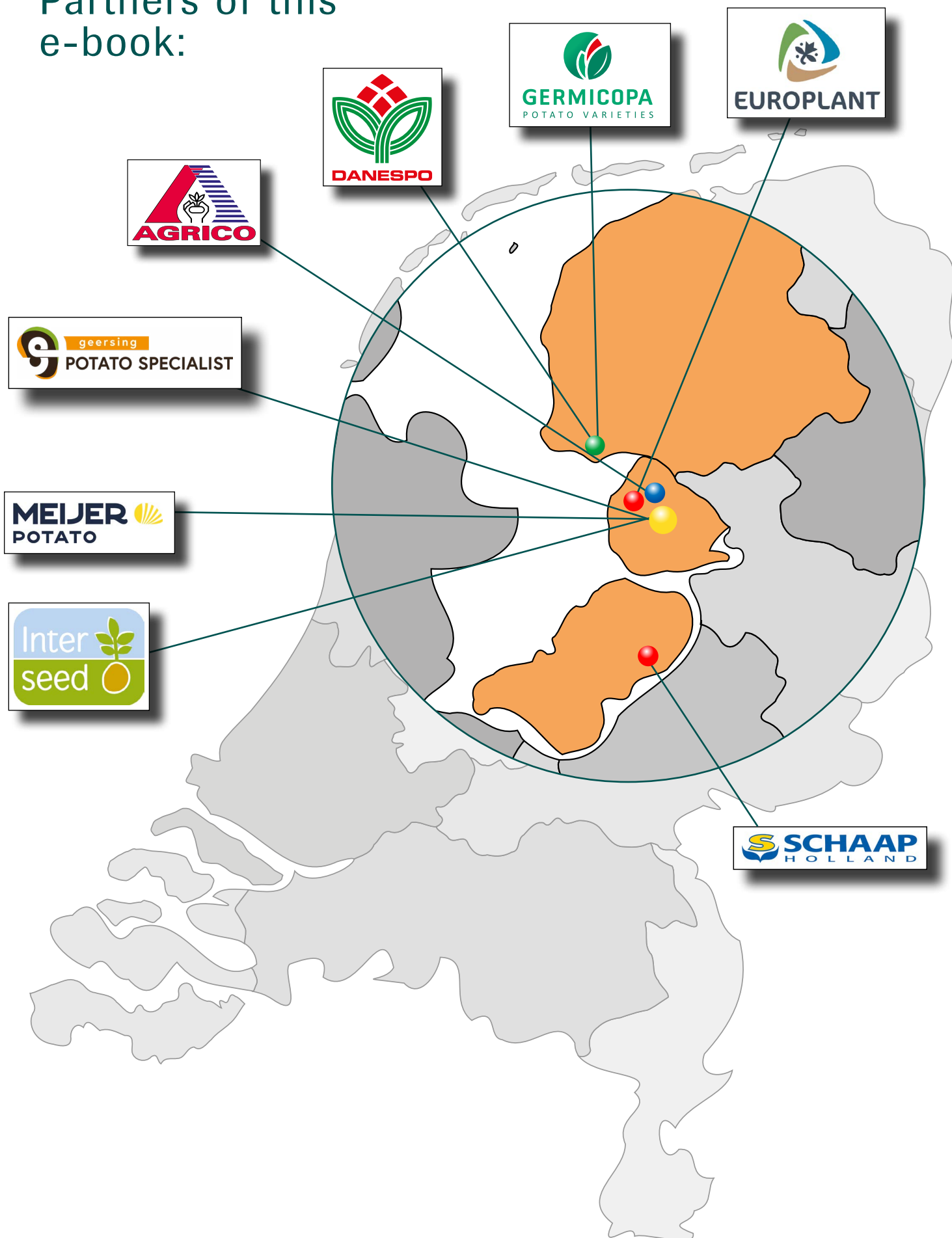
As a very closely involved partner in the Potato Variety Days, PotatoWorld magazine would like to share this complete schedule, including all participants in the upcoming event, with you. Below you may therefore find the information regarding the companies that have arranged in person and/or online activities during the Potato Variety Days 2024. We wish you a nice event and hope see you there!

Bedrijf	November 2024		
	6	7	8
Agrico-Research Burchtweg 17 8314 PP Bant		X	X
Agroplant Holland B.V. Bij Ons in de Wellerwaard Frieseпад 4a 8305 AZ Emmeloord	X	X	X
Binst Breeding & Selection Hotel van der Valk Emmeloordzaal Het Hooiveld 9 8302 AE Emmeloord	X	X	X
Bretagne Plant Innovation Hotel van der Valk Frieslandzaal Het Hooiveld 9 8302 AE Emmeloord	X	X	X
Danespo A/S Beachclub Lemmer Industrieweg 2 8531 PA Lemmer	X	X	
Europlant Aardappel B.V. Floraweg 1 (Zijweg Creilerpad) 8312 RK Creil	X	X	X
Geersing Potato Specialist Banterweg 10 8302 AC Emmeloord	X	X	X
Germicopa Beachclub Lemmer Industrieweg 2 8531 PA Lemmer	X	X	X
Solana Holland Produktieweg 2 8304 AV Emmeloord	X	X	X
Royal HZPC Group Edisonweg 5 8501 XG Joure		X	X

Bedrijf	November 2024		
	6	7	8
Interseed Holland B.V. Bedrijfsweg 130 8304 AA Emmeloord		X	X
IPM Potato Group Gildenweg 15 8304 BD Emmeloord	X	X	
Meijer Potato Verlengde Gildenweg 10b 8304 BK Emmeloord	X	X	X
NORIKA Hotel van der Valk Emmeloordzaal Hooiveld 9 8302 AE Emmeloord	X	X	X
Plantera B.V. Hamerslag 2 8316 GC Marknesse	X	X	X
Van Rijn France Hotel van der Valk Flevolandzaal Hooiveld 9 8302 AE Emmeloord		X	X
ZAP Franc 68 8305 BS Emmeloord	X	X	X
Schaap Holland B.V. Oogstweg 7 8256 SB Biddinghuizen	X	X	
STET Transportweg 7A 8304 AX Emmeloord	X	X	X
TPC Franc 68 8305 BS Emmeloord	X	X	X

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Partners of this e-book:



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Agrico: Next Generation; naturally resistant

There is a growing global demand for potatoes that are grown professionally, successfully and sustainably. As a result of climate change, world population growth and changing consumer demands, it's becoming more important than ever to continue the research into and breeding of new potato varieties.

Besides increasing acreage, today's goal of breeding is to also to minimize input (water, nitrogen, crop protection agents) while maximizing output (crop yield). For even greater efficiency and faster development of new varieties, Agrico Research is continuously improving the breeding program. Agrico Research utilizes the latest insights into (GMO-free) genetics and continuously casts a critical eye over the available breeding techniques.

Spotlight varieties

Every year, Agrico selects a number of varieties that deserve extra attention. These spotlight varieties are young, innovative varieties that are taking the market by storm. These varieties are already highly valued by our customers, based on the initial experiences. One of the spotlight varieties this year is Twister.

Twister: culinary talent and late blight resistance

Twister is an early variety that, according to Product Manager Martin Pot, is particularly suitable for organic and conventional cultivation. "It is one of Agrico's Next Generation varieties. Twister doesn't only have natural resistance to late blight, but also a beautiful skin," says Pot. "This variety is suitable for various methods of preparation and impresses in every kitchen."



Agrico Research is continuously improving the breeding program.

Due to its exceptional storability, Twister maintains its quality for a long time. "This means you can always enjoy this delicious potato with a beautiful skin. Discover the perfect balance between appearance and resistance with Twister."

Higher yield certainty with Next Generation varieties

Breeding resistant potato varieties such as those with late blight resistance, is a key objective of Agrico Research's breeding program. Our innovative Next Generation varieties, with their natural late blight resistance, are the result of these efforts. This significantly reduces the risk of crop failure, leading to higher yield certainty for our growers. ●

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Danespo: We are investing heavily in better breeding techniques for more precise potato breeding in the future

In Danespo, we place great emphasis on sustainability and varieties that are strong and efficient. Worldwide we are facing large challenges in potato production in relation to climate change, rapid development in late blight strains and security in potato production. We are trying to meet these challenges in our potato breeding, and it is important

for us to facilitate production of potatoes all over the world. We are investing heavily in better breeding techniques for more precise potato breeding in the future. That also includes trial work and continuous testing in different climates. In most cases we have implemented the use of drones for better and more precise variety screenings.

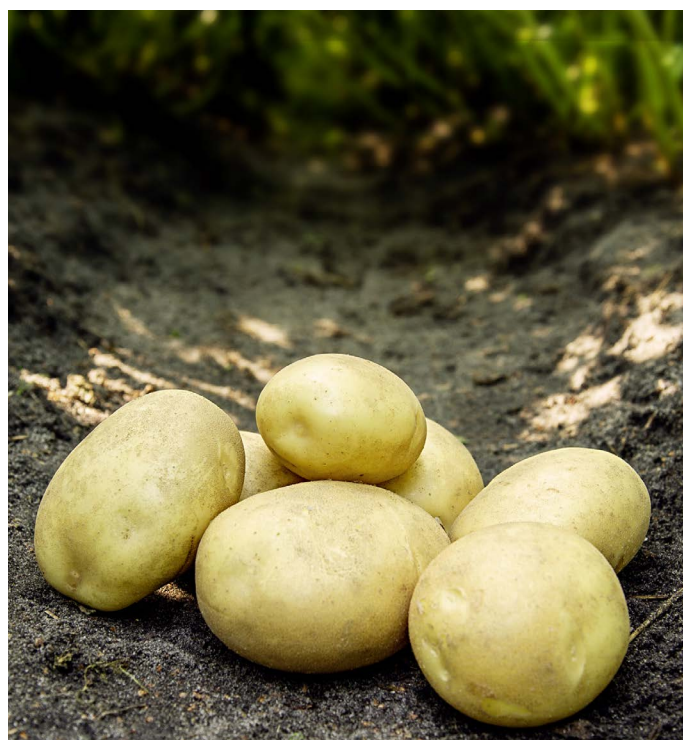
Looking at resilient varieties, we are now introducing Mikado and Argana:

Why choose Mikado?

- High yield
- Early maturity
- Nice round-oval tubers
- Smooth yellow skin finish
- Good for washing and packing
- Very strong virus resistance

Why choose Argana?

- Very high yield
- Early big-sized tubers
- Strong virus resistance
- Strong blight resistance
- Robust



Are you curious to try or know more about these fantastic varieties - please feel free to visit us in Lemmer during the Potato Variety Days or contact us - www.danespo.com. ●

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Europlant: Open days - variety news for every segment and continent!



This year at EUROPLANT, the varieties ETANA and DONATA are in the spotlight.

Both varieties are the result of strategic choices of our breeding work. Namely, breeding and selecting varieties under a very moderate fertilization program. These varieties have a robust root system and are well performing under dry and warm conditions. Important for the grower, important for the industry. Thus, we assure growers a good harvest under extreme growing conditions and the industry with a reliable supply of raw materials with sufficient tuber length. That these varieties are our appropriate answer to the trends of cultivation and sustainability is also being recognized by companies such as McDonalds. They also see in these varieties a future-proof reliable raw material supply.

And there is more to come. Furthermore, during the Open Days at EUROPLANT, we will show you more proof that our new assortment reflects this new breeding strategy with the new varieties SARATOGA RUSSET, MELANIE, KERREN and THEDA. They also guarantee high yields with low inputs.

Late blight resistance is an important factor for yield security. EUROPLANT's breeding strategy is not to introduce varieties with single resistance genes, but only to introduce varieties with combined resistance genes, such as OTOLIA and TAORMINA. Both varieties will therefore also be presented during the Open Days.

And the work goes on. In the future, we expect to present varieties with a more durable resistance, not only based on main and secondary genes, but supported by field resistance, a resistance based on many genes (polygenic), more difficult to breed, but also more difficult to break. In other words, the sustainable solution rather than the quick win.

You are most welcome to attend our Open Days! We would like to show you what is new, for every segment, for every continent... ●

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Geersing Potato Specialist: ‘PETER PAN is the strongest variety on phytophthora on the market’

Geersing Potato Specialist is a potato trading business originated at Emmeloord, the company develops and supplies potato seeds and a full portfolio of varieties. We put our main attention to our successful new variety PETER PAN, out of our own breeding program. Besides being the strongest on phytophthora on the market, the variety won last summer on an agricultural show a taste-contest. Annually we will introduce a new variety on the market, coming season we will even start registering 3 varieties.



‘PETER PAN is the strongest variety on phytophthora on the market.’ In variety trials in Holland and Belgium, our flagship CAMMEO has an average score of more than 8, CAMILLO more than 9 and PETER PAN almost 10. Our 10 resistant varieties have an average score of more than 8 and belong to the strongest available.

Every new variety much reach this score, otherwise we don’t call them resistant. A new one in the pipeline being resistant is the red skinned Chloé. We are a fast growing company and already a market-leader in this type of varieties together with the biggest, explains Geersing Potato Specialist.

To protect the resistance of our varieties we started a sustainable potato platform (SPP) together with Nufarm. The decreasing number of actives and phytophthora being resistant to some of those as well, makes that we need to go to a system where resistant varieties become the standard.

Strength against difficult growing conditions

With the phytophthora-resistance there is build-in strength against difficult growing conditions. With PETER PAN we finally have a variety of our own, that can enter markets asking for yellow flesh, like Germany. The firm cooking type and excellent taste makes it an ideal table potato in the size 40/60 and the bigger sizes are very suitable for French fries.

Total portfolio of varieties

Our network of representatives in many countries is growing fast. The main reason companies show interest in us is that we can offer a total portfolio of varieties. We developed it within the 5 years we exist, but there is a much longer history. We build our varieties on knowledge and relationship and have a strong focus. ●

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Germicopa: Resistance to biotic and abiotic stress is very important for potato breeding

What is your biggest variety news this year?

One of our highlight varieties is the crisp variety Punchy, which was listed few years ago. Today, mainly dedicated to early processing and medium term storage, this robust, uniform and highly productive variety is already listed with one of the largest crisp processors in the world.

The area of Punchy seed being grown is becoming significant, and the excellent results we've achieved so far in both ware and seed crops, gives us the confidence to expand further in the years to come. We have seen already that Punchy brings extra value to the crisping sector versus the other assortment of varieties currently available on the market.

What are important trends in breeding work?

Resistance to biotic and abiotic stress is very important for potato breeding. This year has been highly favourable to late blight and black leg, as opposed to the previous years when we had to face heat and drought. Biotic and abiotic stresses are linked, with pest and diseases specific to wet or drought conditions. Germicopa breeding is working on resistance to blight,

virus, and new diseases occurring with climate changes. In the meantime, quality traits must not be forgotten. Cooking, eating, frying qualities and yield are always priorities for relative markets.

Why should a potato professional visit your company this year?

We create varieties and distribute seeds contracted with our own growers. We control the quality of our products throughout the chain. We invest in research in all market segments to find suitable varieties worldwide.

In the fresh market, we are among the leaders in salad potatoes, and we also have a high performance selection of varieties for the table market. For the processing sector, we are developing varieties for French fries, crisps, starch and flakes. We potentially have the variety you need! ●

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Interseed: We are looking for robust low-input varieties with highest output!

What is your biggest variety news this year?

We can announce that in 2024 we have three new varieties registered. One early variety for French Fries called Auris, and two crisping varieties called Joris and Curtis. AURIS is an early variety with high yields, large blocky tubers, which is perfectly suited for processing to French Fries fresh and also out of storage. CURTIS is a mid-early variety which has a very low susceptibility for bruising and perfect frying colours even after cold storage. JORIS is a mid-early variety with a very broad nematode and wart disease resistance. Joris has a high dormancy and is perfectly suited for long term storage. All three varieties are very convincing also under dry and hot conditions and also possess an excellent uptake of nutrients.

What are important trends in breeding work?

Main trends in breeding work of Interseed Potatoes are to provide new improved varieties which are presenting a sustainable progress for the consumer, for the grower and for the processor as well! Interseed Potatoes is specialized in breeding new varieties for the processors to French fries and Chips. With the background of climate change we are looking for robust low-input varieties with highest output!

Why should a potato professional visit your company this year?

With our comprehensive and sustainable breeding concept, we can offer efficiency and supply security for the whole potato chain now and in the future.



The Interseed Potatoes team welcomes all potato professionals at their office in Emmeloord (Photo credits: Hugo Huijbers, Freshplaza)

Consumers and processors of potato products expect future varieties with better characteristics, especially regarding requirements of fertilizers and pesticides. In addition, new varieties with better tolerance to drought and heat should be preferred in comparison with established varieties on the market which do not have these imported advantages. Strong and robust potato varieties are highly necessary also under new political framework and in times of climate change to provide the consumers with healthy potato products. We are proud that we can offer already new varieties that fulfil all these expects. ●

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Meijer Potato: Breeding robust potato varieties is essential to provide a growing world population

What is your biggest variety news this year?

Our potato variety Lady Jane proves itself as a truly multipurpose variety. The stress-resistant variety with a high marketable yield scores highly with French fry and crisp producers, because of its good dry matter content and the fact that Lady Jane maintains a fine fry colour throughout the entire storage period. Besides that, the easy to cultivate variety is also very suitable for the table market for its excellent flavour, texture and deep yellow flesh colour. Lady Jane. A world of possibilities.

What are important trends in breeding work?

Beyond market developments, climate change, potato diseases and consumer needs, informatics and data are important factors in breeding new potato varieties. In fact, data-driven work



is becoming increasingly important. Our own data platform is up and running, which offers us new and improved possibilities in developing the best potatoes of the future. Breeding robust potato varieties is essential to provide a growing world population with healthy food in the face of climate change. Thanks to our own robustness index, a tool that includes seven items of different variety characteristics, we can objectively compare the robustness of varieties. The Meijer Potato Robustness Index helps our customers and us to decide together what variety fits perfectly in their business and markets. The potato variety characteristics of the robustness index are based on data that has been collected for years in our breeding program.

Why should a potato professional visit your company this year?

Come discover our range of potato varieties and experience Lady Jane. This robust and high yielding variety is truly multipurpose. Lady Jane is suitable for both the table, French fries and crisps segment, which we will gladly let you taste. We look forward to meeting you in person and update you on the latest developments within our company and on the market. Don't miss the opportunity joining us on our inspiring and enjoyable Relation Days! ●



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Schaap Holland: 'Visit us and discover for yourself what we are good at. And what we are working on.....'

What is your biggest variety news this year?

To start with, an increase of seed acreage in the Netherlands, Belgium and France has been accomplished. This increase is mainly made with our proven varieties. 'Amora', the first choice in the early French fries market. Followed by Valencia, an upcoming variety in the medium-early and maincrop French fries segment. Its virus resistance provides a reliable, stable basis for the seed potato grower. Excellent processing quality ensures that the variety is becoming increasingly popular with the industry worldwide.

No 'newcomers' have been added to our portfolio this year. Nevertheless we see promising seedlings in our breeding- and selection program. Mainly in the segments French fries and traditional fresh market. These seedlings are currently being tested in different climatic zones to assess the suitability for different markets.

'Gerona' is a versatile variety that keeps developing in the European peeling- and baby potato sector. In the USA and Canada the baby-potatoes is a rapidly developing market segment with high standards. Also in this part of the world Gerona is likely to play a more important role in the future.

What are important trends in breeding work?

In addition to the traditional way of crossing and breeding, Schaap Holland participates in 'Bioimpuls', that provides seeds including resistances against i.e. late blight, virus, wart disease and nematodes. The use of DNA marker technology is part of this. But we should not be blinded by using these techniques, agricultural properties are just as important for a new variety to become successful.



Why should a potato professional visit your company this year?

Some will say it's the fresh 'Poldergoud' golden French fries that we serve to our guests throughout the day. We certainly agree on this. However, there is more to experience than just enriching the taste buds. We welcome all potato professionals to visit us. If you are a breeder, farmer, trader, packer, processor, be welcome! Exchange knowledge and experiences of the last season and look ahead together to the new. Explore what we will be offering. ●

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International Potato Variety Days 2023

Stricter customer demands require accelerated adjustments in breeding

Customers in the international potato sector are increasingly tightening their requirements. Current terms such as regenerative agriculture and biodiversity are now being used, partly under the influence of a critically watchful society. One of the consequences of this is that crop protection chemicals and fertilisers will be drastically reduced. Various chain parties would like to see these present-day wishes translated into new varieties in order to meet the needs of their customers. During the recently held Potato Variety Days in the Netherlands, we therefore asked all potato breeding companies the following question: How do you respond to these demands and what are the most important characteristics that you will then select for your breeding programme?

By Jaap Delleman and Leo Hanse

‘Every objective has its own stress factors’

Gerard Schenk has been working at Agroplant in the town of Medemblik for many years and has recently become export manager there due to the departure of colleague Jeroen Kuin. In addition to changes within the trading company itself, he’s also noticing many changes in the world of seed potatoes. Customers have different demands as far as varieties are concerned than they did a few years ago. ‘And yes, it’s going in the direction you’ve indicated in your question’, he says.

‘The world is changing a great deal. Customers today want sustainable varieties. Some call them robust, others intelligent. What we at Agroplant have been focusing on for years now are stress-resistant varieties. Every country, every destination we supply to, has different stress factors. For example, you can’t do anything in Egypt without drought resistance. In other countries, salt tolerance or nitrogen reduction is again at the top of the wish list. For us, it’s mainly a matter of continuously searching for better varieties that meet these customer demands. That’s why we have extensive conversations every year with the Fobek breeding company in the village of Sint Annaparochie, where we put forward our current requirements. The availability of water, in our view, is going to be one of the biggest prob-

lems for the cultivation of potatoes in the coming years, with all its consequences, such as increased stress and related pests and diseases. Just look at a country like Morocco, which is important to us, they’re already having a lot of difficulty



‘We’re looking for solutions for both the country and the customer’, Gerard Schenk explains.



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>> irrigating crops with suitable water. And in a country like Spain, they now have to pay heavily for irrigation water. In Nicaragua, they're having enormous problems with Phytophthora again. For us, this means finding solutions for each individual country and customer. What we have now, for example, is the Kyra. A red-skinned variety that can cope very well with drought, needs less nitrogen and also scores a 7 for

virus and an 8 for scabies resistance. So this is attractive to both seed and ware potato growers. Such a variety can be shipped to Morocco, Uruguay or Hungary immediately, where they're crying out for them. The Baroque, a young variety from breeder Charles Hartveld, also has good drought and heat resistance qualities. And, what's more, it grows very well on more difficult soils. We have high expectations of that variety. ●

'Customers ask for a single variety with multiple resistances and important characteristics'

'Highly recognisable, this question. The issues outlined here are exactly what it has been all about in recent years', is the apt comment of international account manager Leon Haanstra at Schaap Holland in the village of Biddinghuizen. 'In response to this, we've already made a list of some fifteen characteristics on which basis we started selecting a few seasons ago.

'One of the most frequently-marked characteristics still remains "yield"'. Customers don't really want to surrender a few kilos of their yield in order to improve other characteristics. Increasingly important, and in recent years, number 2 on the list is Phytophthora resistance. But even that's no longer enough for our customers. They'd all prefer at least one other resistance added, potato cyst nematode or wart disease, for example, which are both broad resistance varieties. We're already working hard on that. The thing is that this takes a lot of time', says Haanstra. 'Especially when other desired characteristics need to be added', he continues. 'In the introduction to your question, you mention fertilisation and that, of course, is all about nitrogen now. We've already taken significant steps in the variety programme on this point, especially in combination with potato cyst nematode. A striking example of this is our Aromata variety. This versatile potato, suitable for the table, the French fry and the export segments, can achieve top yields with a maximum of 180 kilograms of pure nitrogen per hectare. That's a lot less than the 250 kilogram application that many comparable varieties currently require. In addition, the variety is only moderately susceptible to Phytophthora in foliage and tubers, and has very strong, broad nematode resistance covering *Globodera rostochiensis* 1, 2, 3 and 4 and *Pallida* 2 and 3. This also includes pathovar 1 wart disease resistance. And, as I mentioned earlier, this is exactly what customers are asking for today: single varieties with multiple resistances and important characteristics. Even more relevant today are the characteristics of earliness and virus resistance, also high on the list of fifteen, and this is where the Valencia chip variety has emerged for us. This is typically one of those potatoes that combine a very smooth initial development and earliness with high yields. As a result, this variety is usually already in the storehouse before the main harvest has started. This appeals to many



'One of the most frequently-marked characteristics still remains 'yield'. Customers don't really want to surrender a few kilos of their yield in order to improve other characteristics', says Leon Haanstra.

French-fry manufacturers at the moment and, as a result, the acreage is growing rapidly. And seed potato growers are, of course, very happy with it, thanks to its virus resistance. Last year, we had the usual 65 hectares of seed potatoes, but for the coming season we'll be going up to 80.' ●



‘Robustness is not an end in itself’

From this year onwards, the Den Hartigh seed potato trading house from Emmeloord will present itself under the name Solana, the German breeding company that has owned the Dutch company for almost ten years now. Breeder Remko Koeman is here today at the Potato Variety Days to give detailed information on the new varieties in the breeding programme. Koeman also responds to our question very aptly. ‘It’s been our goal for years now to breed robust varieties, and we believe that’s, what our customers want.’

‘Robustness is not an end in itself. You also need to make a variety SMART, or attractive. But, first of all, you’ve got to ask yourself, what is “robust” exactly? Easy to grow is at the top of the list, as far as we’re concerned. This applies not only to the ware potato grower, but also the seed potato grower. Viruses make it difficult for seed potato cultivation, so you’ll need to avoid that problem with robust varieties. Yield is another one of those factors, both for the seed and ware potato grower. A robust variety has to score kilos whatever the conditions, whether the growing season is wet or dry. This is true not only here in the Netherlands, but also in other countries with different types of soil and climates, which is why results from trial fields at home and abroad remain important in our breeding programme. Because there are fewer and fewer chemicals available, a robust variety should also be resistant to many pests and diseases. Phytophthora resistance is therefore a prerequisite’, the grower explains. As an example of a variety that will continue to develop in the coming years, he mentions the YP 18-1166. ‘This number has two strong Phytophthora genes combined with a higher yield. That’s two birds with one stone.’



‘Varieties that perform well under low input are automatically retained’, Remko Koeman emphasises.

Governments are demanding less spraying. It’s our task to discover how to comply and how to get requirements like these introduced into our varieties? This is primarily a question of identifying a range of characteristics and then setting priorities. The number of tubers and grading plus virus and scab resistances, for example, are characteristics that are important for seed potato growers. Fertilising is an important factor for ware potato growers these days. A variety like the Edison can do with 10 to 15 percent less nitrogen than a Fontane, for example. We’re already taking a look at the fertiliser requirements in the trial fields. Varieties that perform well under low input are automatically retained’. ●

‘Phytophthora, virus, and nematodes are all key issues with the customer’

A few months ago, Peter Oldenkamp took over from Sjefke Allefs as director at Agrico Research in Bant. In response to the question of how breeding can provide answers to demands from the market, he emphasises that new varieties can certainly offer a partial solution. But he tells us that adjustments are necessary both in cultivation and further down the potato chain.

‘We’ve been focusing on the Next Generation varieties for years now, which means Phytophthora resistant varieties. This is now old news for the insiders. What is new, however, is the next step we’re working on. We’re now aiming to combine several desirable genes in our varieties in order to prevent virulent Phytophthora. This requires a broad approach across the entire breeding programme. We already have 2-gene material and the first 3-gene material is already in the pipeline. We want to expand multiple varieties within segments as quickly as possible to spread the risks and to have multiple resistance genes

available in the same segment. This is the only way to create variety. Growers are expanding, as well as their plots, and that requires an increasing number of varieties with different resistances. For a disease such as Phytophthora, we’ll still need chemical crop protection agents for a long time to come. For soil-bound diseases such as nematodes, some chemical agents have already been phased out, the director confirms. Viruses are also on the rise, which he believes is related to a decreasing product package. ‘Phytophthora, virus and nematodes are all key issues with the customer and therefore also in our breeding programme. Plus the fact that, for some time now, we’ve been focusing on current needs such as finding solutions for cultivation under dry and saline conditions. This requires a search for varieties that can manage with less water and nitrogen. Finding varieties that can cope with less water isn’t easy. It’s much easier to first check whether you can use water more efficiently and economically. For areas where there’s a lack of water, such as in southern Europe, for example, it’s not enough to have



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Peter Oldenkamp emphasises that cultivation alone cannot provide the answers, but that adjustments are also necessary both in cultivation and further down the potato chain.

varieties that can get by with relatively little water', says Oldenkamp. 'Plants simply cannot do without and many kilos

will always need a lot of water. In addition to all these things, Oldenkamp says that you also have to look at the changing requirements of the final customers. 'In the retail sector, the importance of the skin quality is increasing, and there are also increasing demands being placed on the dry matter content. Unfortunately, the French-fry market is still lagging far behind when it comes to the desirable adjustments for the coming years. The introduction of the Next Generation varieties is still very slow there, while we're already completely ready for it here. Take the Armedi, for example. As far as its quality is concerned, this new variety is comparable to the Fontane, but it has even more length and greater productivity, as well as Pallida and virus resistance plus good storage properties. It's susceptible to Phytophthora in the foliage, though, but not in the tuber. And to complete the list, its resistance to potato cyst nematode is also impressive. The grade for Globodera Rostochiensis is 1 through 4 is 9 and for Pallida 2, 3 and 9 it's 8. Maturation is mid-late, also on the list these days, and the variety produces tubers with a beautiful skin. So what more could you want', Oldenkamp wonders. ●

'Abnormal tuber formation (second growth) is an increasingly important factor for both growers and processors'

'Yield is still high on the list, no matter what's changing in the world. How many kilos, is still the first question that customers ask', Andrew Birks, as technical manager at Dublin-based Irish IPM, still hears that every day. 'That was no different with the introduction of our new yellow-fleshed Fidelity French-fry variety.' And second growth is also a topical issue, he believes.

'Fortunately, we were soon able to reassure the customers who are interested in our newcomer. After all, Fidelity yields more than 50 tons per hectare without a problem, including in varying growing seasons', says Birks as he walks to a container filled to the brim. 'It's really a constant that you can count on as a grower, rain or shine. This is partly due to its low stress susceptibility when it comes to drought, but it's not bothered by flooding either', is Birk's experience. Yet another important characteristic is that the variety has absolutely no problems with second growth. 'This is certainly a factor that both growers and processors are finding increasingly important, where current requirements are concerned. And it has no problems reaching the desired underwater weight. What I'd like to mention here is the high dry matter content of 24 percent, which the French-fry manufacturers like very much, we noticed, which brings me a little closer to the topical issue, namely that this variety matures mid early. Late harvests, as this year proves once again, are now far too risky for the north-western European climate. This variety is already in the storehouse well before October. What's more, you can store Fidelity for at

least eight months. So storing them until late June to early July is absolutely no problem. In Great Britain, all these aspects have already shown satisfactory results so we think that the variety could also thrive very well in the Netherlands, both for French-fry and seed potato growers. After all, in addition to excellent cultivation and processing properties, the variety produces a lot of uniform tubers per plant, and that will undoubtedly appeal to the many seed growers here. ●



'Yield is still high on the list, no matter what's changing in the world', Andrew Birks hears regularly.

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‘More market opportunities for growers and customers when a variety has multiple purposes’

‘The question ties in fully with the programme we summarised seven years ago under the robustness index heading. Everyone looks for consistency in cultivation no matter where you come from. What’s new here is the demand for flexible varieties’, as commercial director, Johan van der Stee of Meijer Potato from the village of Rilland is observing among his customers.

‘In any case, what’s important for all our customers is what we summarise in the robustness index under the marketable yield heading. Desired characteristics that fall under this term are washability, scabies, susceptibility, virus resistance, grading and so on. What we’re increasingly seeing on the wish list and subsequently responding to is flexibility. Due to climate change, we’re seeing more irregularities in growth and the grading sometimes deviates from the cultivation target. During a dry season, tubers of a French-fry variety don’t all develop to the desired length or, in a wet season, the grading of table potatoes varies too much. When, as a grower or a buyer, you have a choice of options, that increases the chance of a good marketable yield’, says the commercial director. ‘As an example, I’d go straight to a variety that meets these conditions, the Lady Jane. It’s suitable for chips, but is just as good as a table potato and even the crisp factories are happy with it. And this type of change in market demand doesn’t necessarily mean that you have to start developing a completely new variety. Lady Jane was initially selected as very suitable for French fries. However, if another request comes along, you shouldn’t forget to examine your existing selection of varieties. Thanks to the extensive database we’ve compiled, we can fairly easily find the answers to questions in there. And this is how an already existing variety surfaced as a solution to that multipurpose usability. You grow it initially for French fries, but if you still have an undersize that you can’t use for fries,



‘Thanks to the extensive database we’ve compiled, we can fairly easily find the answers to questions in there’, says Johan van der Stee contentedly.

then it’s quite a relief that you can easily move these to other sales channels. ●

‘Breeding is mainly about setting long-term objectives’

‘Regenerative agriculture is indeed coming up strongly now. Farmers are noticeably more strongly-focused on a long-term vision. For potato breeding, this means searching for characteristics that are important for sustainable agriculture. HZPC does this by infusing the breeding programme with sustainable characteristics such as resistances. These are leading factors’, says Robert Graveland, director at HZPC research in the village of Metslawier, who set these goals together with Irene Kalfsbeek, senior marketing specialist at HZPC.

‘In order to meet the demand of the chain as it is now, our current breeding activities start with the collection of sustaina-

bility features in the form of resistances, for which we use molecular markers. Only then will we start focusing on yield, even though this is still *the* most important factor. And not just a high yield, but a stable one as well, both in kilos and dry matter content. We’ll then also examine characteristics such as heat resistance and water requirements’ Graveland explains, then continues: ‘Resistance is high on our list. The point here is that we are certain that they’re in those potatoes. You’ll have to discover the rest of the characteristics with specific field trials and tests’, Graveland explains. ‘Can we satisfy the chain players with this? If the answer is yes, then we’ll continue the testing’, Kalfsbeek adds. ‘All the data we collect from the market and from our trial fields feed our breeding



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>> system', the marketer emphasises. 'Subsequently, we get more and more information about the parents of our crossing and we already have certain outcomes in mind for later crossings. What's most important in our breeding work is setting long-term goals. You can't expect growers to come up with solutions in a short period of time. We need time to find the genetics that contribute to this. Drought, heat, disease resistance and low inputs of water and nitrogen, that's what we started working on years ago. The first question is whether genetic variation exists for these factors. If it's not in the genetics, then you need to find it in the trial fields. An example is the nitrogen demand. In recent years, fertilisation tests have shown that we've always applied too much. Mainly as an insurance premium and to use it to mask other problems', Graveland explains. 'Customers primarily look at how the potato performs in order to make a profit, preferably combined with sustainability requirements. We're just talking about robust varieties, but about an Even Greener variety. A good example of that is the Camelia. It has a high yield, what we hear is up to 80 tons, but the variety always achieves 65 tons anyway. It has also been supplemented with the necessary virus resistance and tolerance against Phytophthora. The variety doesn't need a lot of water, tolerates heat well and hardly needs any nitrogen. It's also a variety that can be widely used in the table potato segment and produces beautifully large tubers. They are excellent for boiling, mashing, frying or steaming. The look and feel also count here. The pres-



Irene Kalfsbeek (I) and Robert Graveland see excellent opportunities for the Camelia table potato variety.

entation is great in terms of shape, skin, even after long storage, and it has a deep yellow flesh colour, which is still relevant for many of our customers. And it's easy to grow, both for seed potato and ware potato growers, plus it's strong as far heat, drought and other cultivation extremes are concerned. The seed potato area in the Netherlands has doubled to over 84 hectares and we're even growing 115 hectares in Europe. What's more, it will continue to increase again in the coming year', Kalfsbeek sums up. ●

'Don't hang on to the old, choose new varieties now'

'No more talking, it's time to act!' That's what Norika director Tigran Richter from Lüsewitz in Germany sees as a mission to meet the current and future expectations of his customers. 'Don't hang on to the old, but choose new varieties now'. Legislation dictates what the sector must do', he says.

'We at Notika already had today's desired varieties ready when most people were still only thinking about it. But as long as growers don't feel the urge to change things, it won't happen. Whether it's about less fertiliser, or crop protection, or calendar farming, now that all those things are mandatory, they're opening eyes and ears. The sector can find the answers at our company, we have had them for years. If you have to harvest before 1 October, we have plenty of varieties that mature in time. If less nitrogen is a must, in our package there are enough varieties with a low fertilisation input. One thing helps the other. Varieties that are more economical with nitrogen, generally mature faster. And that needn't cause any problems for your yield. We already had varieties like this on offer four years ago, including virus resistance and more. Nice, but not necessary, our customers said at that time. Now, no-one wants varieties that require a lot of nitrogen or are susceptible to viruses any more. The same applies to Phytophthora, where

we're working hard to find proper solutions, but with the appropriate caution. If we're not careful with resistances, we'll



'We at Notika already had today's desired varieties ready when most people were only still cautiously thinking about it', Tigran Richter emphasises.



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>> lose them and then we'll have nothing. So robust with low input, that's not new for us. Climate change, with the accompanying increase in more difficult growing conditions, requires rapid measures. We should stop just talking about solutions and, we should start using them. Simply because they're already there. New legislation is coming our way and will continue. The primary task of a breeder is to ask questions and find answers for agricultural demands. Yes, that takes time,

especially when it concerns traditional breeding. That's why we'll have to speed up the pace of modern genetic techniques (New Genomics Technics, NGT) to make agriculture sustainable more quickly while keeping it profitable. This will offer the solutions to speed up our breeding work and achieve our goals more quickly. It may not solve everything, but it's a useful tool. It's now up to us to convince public opinion of the advantages and safety as quickly as possible. ●

'All our attention is now focused on Phytophthora resistance in the tuber'

'We've known for many years that it's all going to move in the direction indicated in the question', answers product and research manager Jos Bus of TPC from Emmeloord fully convinced. 'We breeders are working very hard on this, but it's not easy. Take Phytophthora resistance, for example. Last season, we took quite a beating and many varieties failed. What we mainly saw was the lack of resistance on the tuber. And that's what we're focusing on right now.'

'This year has actually made us face the facts. In many of our varieties with Phytophthora resistance in the foliage, we unexpectedly discovered significant infections on the tuber at the end of the growing period. This actually means that this dreaded potato disease has already caught up with variety development in terms of resistance. So it's now up to us to go the extra mile by also working on Phytophthora resistance in the tuber', says the experienced manager. And he believes that this can't be separated from foliage resistance. 'In the meantime, it's now become abundantly clear that some of the Phytophthora populations here are so strong that both are a must. Not only to harvest disease-free potatoes, but also to prevent the potato disease from developing into new populations that, in turn, may cause new resistance breakthroughs. All this doesn't make our breeding work any easier.' Nevertheless, breeders still have some tools available they can use, Bus believes. For example, he believes that it's important to combine Phytophthora resistance with a characteristic such as early maturity. 'In late varieties, the disease has an extra chance of breaking down into new variants due to the development of another new spore cycle. So we'll be trying to link earliness to broad Phytophthora resistance. A variety such as the Montreal is an example of this. It has moderate resistance on the foliage, but good tuber resistance. After about eighty days of growth, there will be no Phytophthora outbreak if the pressure increases. You won't have to worry that the tubers will be lost, and you'll still harvest over 40 tons per hectare. We're actually one step further with the still young Monza variety, a crossing from breeder Sjouk Brunia. A French-fry variety that fits perfectly in the Kennebec market segment and fully meets the requirements that customers are now demanding from the potato. The Monza matures mid-early, has a resistance rating of 5.5 for foliage and 7 for tubers when it comes to Phytophthora.



'We'll be trying to link earliness to broad Phytophthora resistance. A variety such as the Montreal is an example of this', Jos Bus says.

This means that you can let this variety grow longer under high disease pressure and therefore harvest more kilograms. In addition, it's blessed with resistance to leaf roll and the Y virus, among other things, which is certainly an important characteristic for seed potato cultivation in the coming years. And finally, there's also full nematode resistance to *Globodera Rostochiensis*, from A to G plus wart disease resistances to physio 1, 2 and 18. In short, this is a typical variety with which we can fully respond to the customer needs of today and tomorrow. ●

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‘Resistance is necessary to keep cultivation going’

‘We’re going down two roads at Bretagne Plants. On the one hand, we’re working on improved varieties for our own regions, and on the other, on varieties for distant sales. Sometimes, the needs of the customers vary widely’, Jean Yves Abgrall, director at the French company.

‘When it comes to breeding in Bretagne, the working area close by, a lot of attention is paid to Phytophthora and virus resistance in the trial fields. An additional request from our growers is that we find solutions for the rapidly increasing wireworm problems. We also see this increasing in other European countries. When comparing varieties we see differences in damage. We’re now trying to find out why that is. However, these problems cannot be solved by breeding alone. That’s why a major project is underway in France to see how we can tackle the issue of wireworms. Soil health, variety differences, crop rotation, we’re taking a close look at everything in the process. We now have a few interesting varieties that are strong against wireworms, and we hope to have useful results in six years’ time. And of course, we’ll try to combine these with other resistances. One of the larger seed potato companies we supply now only wants varieties for organic cultivation, which is difficult in France, especially because of the many problems with wireworms and also with Rhizoctonia, This is why the organic areas here are not increasing, but actually shrinking. This, in combination with the fact that organic produce is more expen-



‘Resistances are necessary to keep cultivation on its feet’, explains Jean Yves Abgrall.

sive, also means that consumers are ignoring organic products more often. Cultivation risks for organic farmers are therefore only increasing. It’s up to us to find answers, also for the cultivation of seed potatoes. Similarly, viruses are also a problem in France. Resistances are necessary to keep cultivation on its feet. That’s what we want to focus on in the coming years.’ ●

‘Chemicals are practically banned, and that’s a major problem for seed potato growers’

As a new shareholder of the Fobek breeding company, Marc Hoogterp, director at Van Rijn France based in Aubergenville, sees possibilities for varieties with virus resistance. ‘This is necessary to maintain the seed potato cultivation of our varieties for both France and Africa’, he says.

There’s no shortage of demand for good seed potato varieties, according to Hoogterp. ‘Both in our own country France, and in African countries such as Magreb, growers are crying out for them’, is his experience. ‘The problem, however, is having enough good seed available. Chemicals are practically banned, and that’s a major problem for the seed potato growers. In addition, there’s competition in the cultivation of French fries. An extra 40,000 hectares are currently needed to meet the demand for chips. In order to meet the demand for seed potatoes, we certainly need 4,000 hectares of extra crops in France. With higher prices for French-fry potatoes and prices for seed potatoes not keeping pace, cultivation is shifting and the area of seed potatoes is actually decreasing. The risks are sometimes too great is the experience of the seed growers. As breeders, we can do something about it, for example, provide varieties



‘We do need growers who will propagate our varieties’, explains Marc Hoogterp.



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>> with virus resistance. This will in any case save the costs of reduction or rejection. It's also important that the varieties should be easy to grow and produce good yields in kilos and numbers. More value for the seed grower, that's what it's all about. Fortunately, we already have some answers. For exam-

ple, our new Harry variety. To start with, it has good virus resistance with quality and yield. A variety like this can increase rapidly in acreage, but then we'll need growers who will propagate them.' ●

'To be a blockbuster you need to be much better'

After asking the question, Rutvik Patil, commercial manager at Stet in Emmeloord, points to a few big posters in the show room. 'That's where the answer is', he reacts enthusiastically. 'The El Mundo and SH C 1010 are two relatively young varieties that we call our blockbusters'.

'Blockbusters are varieties that have shown a consistent production over the years that was always accompanied by a high sales value. And that's not without reason', Patil says. 'They don't need a lot of crop protection agents or fertiliser in cultivation, the water requirement is relatively low, the percentage of potatoes in the usual size is high, they're easy to process and easy to grow. In short, they're typically common top varieties that customers are very happy with'. To recognise a blockbuster, Stet uses an assessment model, divided in four quadrants with their corresponding variety characteristics, he then explains. 'Top left are the blockbusters, top right the strategic varieties, bottom left the standard varieties and bottom right the varieties with possible risks in the seed or ware potato crops. We still had a lot in the latter quadrant years ago, but are quickly getting rid of them. And that also applies, naturally, to the newcomers from the trials that are in danger of ending up in this quadrant. They don't meet the needs of our time, to keep up with demand, so they're too risky in developing, cultivation and marketing. As soon as a variety ends up in this quadrant, we say "away with it, we won't mention it again".' So if we now only keep two or three new varieties a year that fall into the useful quadrants, we're already very happy.' When it comes to actual cultivation risks, virus is one of them, of course, especially for the seed potato grower,' the commercial manager concludes. 'So we've removed many vulnerable varieties from the programme. If we then look at the El Mundo and SH C 1010, you'll see that they're both less susceptible to Yntn. 'To be a blockbuster, as I've already said, you need to be much better'. For example, both varieties are also less susceptible to Phytophthora in the foliage, which undoubtedly reduces the use of pesticides. An SH C 1010 also has a long dormancy period and that means you need fewer sprout inhibitors. Blockbuster varieties are also economical with fertiliser and water. For example, the El Mundo already has enough with 80 percent of the average nitrogen dose and combines this with an efficient water uptake. And then there's also the earlier maturity of this rather waxy table potato variety, which is another plus given the increased



'Blockbusters are varieties that have shown a consistent production over the years that was always accompanied by a high sales value' says Rutvik Patil.

harvest risk when you harvest late. I could go on and on, but you now know exactly how we respond to changing times with our breeding activities.' ●

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‘Our breeding programme has long been prepared for changes that are now also happening in the Netherlands.’

When it comes to what is no longer allowed in cultivation, Denmark has been ahead of the rest of the world for years, according to product consultant Torben Nielsen of Danespo. ‘Take weed control, for which only two products are still allowed for potatoes in our country. And these may only be applied in very low doses. Our breeding programme has therefore long been prepared for the changes that are now also happening in the Netherlands.’

‘Many of our varieties already meet this requirement. I’ll take you straight to our Plenty variety. This is a promising variety in the baby potato segment. When you see its haulm development, it’s really quite incredible. Each plant develops like a shrub, after emergence the crop closes up quickly and the soil is completely covered at a planting distance of 19 centimetres in the row. This means that weeds hardly get a chance to fully develop. Apart from foliage growth, the variety has even more characteristics that relate to the needs of our time. It has long dormancy, so the Plenty is easy to store. Furthermore, it’s not very susceptible to foliage or tuber Phytophthora and has good resistance against virus Y. You’d like every variety to have the characteristics of the Plenty, for it also grows easily in all types of soil and in various climates. It’s successful in Sweden, but does just as well in Israel. In addition, the variety matures after about ninety days, so it’s harvested well before the cold and wet weather periods arrive.’ ●



Torben Nielsen: ‘To use breeding as a way to tackle the problem of weeds, you need varieties with a smooth growth start and rapid foliage development.’

‘When crossing, we only use parents with a resistance background’

Marcel Geersing, office manager at Geersing Potato Specialist in Emmeloord, is rather pleased with our question. ‘This is something that I can answer. A term like regenerative agriculture fits right in the picture of our breeding programme. In fact, we actually respond to this with our speciality, the breeding and marketing of Phytophthora-resistant varieties.’

‘We’re still only a small potato breeding company, and that’s why we opted for just one specialism. But we’re focused on one of the most important demands of our time, namely the growing of varieties that are resistant to the most common potato diseases. It’s not without reason that Europe wants us to halve the use of protection products in arable farming. The choice to breed for just that purpose also has its advantages. When crossing, we only use parents with a resistance background. However, we can’t do this alone, which is why we’re also seeking support from other parties that have potato breeding in their programme, including breeders of non-protected varieties. But we also do this with businesses abroad that want to have their varieties represented in the



‘When crossing, we only use parents with a resistance background’, Marcel Geersing says.

Netherlands. For us, they are located in Belgium, France and Slovenia. And it works both ways, also applying to our own varieties, which we sell not only in the Netherlands, but



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>> abroad too. We recently achieved great success with the Phytophthora-resistant Peter Pan variety, which will be on the variety list from 1 January 2024. It has since attracted the full interest of the Weuthen trading house, which will grow and market the variety exclusively in Germany. The intention is to use this waxy potato in organic salads. Some other characteristics of the Peter Pan are its smooth skin and the fact that the variety can easily be propagated. It produces lots of tubers

and also has very strong virus resistance, with a rating of 8 in the list. This is certainly a variety that's particularly attractive to seed potato growers.' ●

'We do everything we can to grow varieties that reduce the risks of cultivation'

'If I were to indicate the direction of our current breeding programme in response to the question, I'd say that we're doing everything we can to develop varieties for a "risk-free" cultivation process. That may not be correct English, but everyone will understand what I mean by it', says Maarten Kuijsten, who is responsible for sales and production at Europlant in Heerenveen.

'When you talk about cultivation with as few risks as possible, we mean both seed and ware potato growers. If you want to tackle all the challenges as effectively as is possible – diseases, pests, a reduction in protection agents and fertiliser, then you need proper genetics to start with. And that's what Europlant has. Take nitrogen fertilisation, for example. This is what our German breeding company started to focus on with cross-breeding thirty years ago. During the breeding programme, our varieties were selected and tested on locations where a maximum of 150 kilograms per hectare is available. And we're now reaping the benefits of that, because its importance is steadily increasing. The same applies to characteristics related to drought and maturity, two hot topics, especially this year. If you look at our variety package, you'll see varieties with good drought resistance, low susceptibility to second growth and generally early to mid-early maturation. You can now clearly see that our customers are hardly interested in the late varieties any more. These are key concerns for the ware potato grower. But we believe that the biggest challenges lie in the area of seed potato cultivation. Costs, risks, labour requirements are increasing and the package of crop protection chemicals is decreasing. And an important factor in that is the viruses. What we, as a breeding company, can contribute to the solution is the introduction and cultivation of more resistant varieties. Thanks to our breeding programme, we already have varieties in our portfolio that meet these requirements. The national percentage of the lowered presence of virus in the field inspections was more than 15 percent. If we zoom in on our varieties, then the average this year is just under 7 percent. These are figures that show that the seed potato cultivation of our varieties is less risky. A good example of this is the Donata, none of which was reduced in the field inspection. Another problem for seed potato growers are nematodes. Chemicals have virtually disappeared and what remains as a weapon is crop rotation and the cultivation of resistant varieties. Good examples we have here at the show are the Etana and Karelia varieties, which also don't mature too late. For example, both varieties have resistances to Globodera Rostochiensis 1 and 4 as well as good resistance rates for Pallida 2 and 3. ●



'You now clearly see that our customers are hardly interested in the late varieties any more', says Maarten Kuijsten.

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‘We’ve already fully answered the arguments mentioned in your question’

‘Just get our variety booklet’, indicates Gerard Bovée, director/co-owner of Plantera from Marknesse. ‘Then you’ll see that we’ve already fully answered the arguments mentioned in your question.’ Varieties can fall into five colour groups: red, orange, yellow, green and blue. The more they move towards blue, the more they meet the criteria of minimal chemical, water and fertiliser input.’

‘As soon as you enter our show room, you’ll get your answers. There, displayed on a tree stump we have three new varieties that fully meet the demand. They fall into the desired colour segments of green and blue and each one meets the appropriate criteria. Look, here we have the new Oscar table potato variety that will soon be on the Varieties List. It contains a whole list of characteristics that make it green, such as it has very strong Phytophthora resistance both in the foliage and the tuber, and a 9 for virus resistance plus a series of AM resistances. All it needs is a splash of water and that’s why it just falls short of the blue’, Bovée says in a single breath. ‘Our Virgil variety, which was added to the Varieties List two years ago so it isn’t here on the show today is in the blue segment. This is a French-fry variety with good resistance marks in a wide range of areas and also combines this with low nitrogen and water requirements. Regarding nitrogen, 135 kilograms of pure nitrogen is more than enough. That’s quite a different story from the 300 kilograms that most of today’s major French-fry varieties still require. An ever-growing group of customers no longer want that, they’re looking for different figures. An additional effect of the varieties that make do with less nitrogen is that they’re usually stronger against pests and diseases.’ Such varieties need less foliage to still achieve that higher tuber yield, is his experience. ‘And, as you see, even varieties that we’ve had in our range for some time now, such as the Vitabella, can still stay in the yellow segment for a while. Of course, this is because of its Phytophthora resistance in both foliage and tubers and also its high resistance to the Y virus, which is certainly not insignificant for the seed potato grower, given the lowering figures (the figure that reflects the reduction in the seed



‘Our varieties can be divided into five colour groups,’ says Gerard Bovée.

potato category due to virus in the NAK inspection) in the past season.’ ●

‘Our main focus is on wart disease, supplemented with nematode resistance’

‘We operate with our varieties to a large extent in the starch sector. What’s currently a very topical request, given your question, is wart disease resistance. That’s what we’re now fully focusing on in our breeding activities, in addition to the obviously longer-standing demand for resistance to nematodes. Managing director Robert Verbruggen of ZAP-Semagri from Wieringerwerf is therefore delighted with the new Solution variety from breeder Roelof Sloots, which has all these much sought-after characteristics in it.

‘Our main focus is on wart disease, supplemented with nematode resistance’. That’s why we’ve added the Solution variety to our range. You can see here that, with high resistance rates for nematodes such as on Globodera Rostochiensis, all 9s, and also high numbers for Pallida, this variety has a solid basis’, Verbruggen explains by a container full of tubers of the starch variety. ‘But the values for wart disease are unique and also the fact that pathovars are included’, he adds proudly. ‘This is so special because there are hardly any other starch varieties



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'Our main focus is on wart disease, supplemented with nematode resistance! That's why we've added the Solution variety to our range,' say Robert Verbruggen and breeder Roelof Sloots (r) proudly.

with comparable resistance. The latest pathogen found in the Dutch and German starch potato regions is pathovar 38. And this variety is already resistant to that. Growers are crying out for it, but it's still a new variety in its early development. Unfortunately, we don't yet have tons of the starting material available. So we're primarily looking at the region where pathovar 38 has already been reported and, for the Netherlands, that's the province of Drenthe. Whether we can breathe more easily with the arrival of this resistant variety, given that new pathovars are regularly popping up, Roelof Sloots, the breeder of the variety, doesn't dare to say. 'Then you'll need to know whether the new pathovar is the next one up from an existing variety, or a totally new variant. Experts have indicated that they don't know this yet, so I'm unable to answer that question. What the breeder does point out, however, is that the new variety has actually not been crossed with the specific aim of finding resistance to pathovar 38. 'This crossing dates back to 2007. Only when pathovar 38 came to light, about three years ago, did we also start looking in existing material for any presence of resistance. That's how we discovered by chance, that the seedling we still had left was resistant to it. And so you see, you shouldn't throw anything away too quickly.' Verbruggen was also pleased to point out the low nitrogen requirement of the variety, which is a nice bonus. 'The Solution doesn't need more than 90 to 100 kilograms per hectare. So you can imagine that we're extremely happy with this newcomer.' ●

'Varieties with virus resistance are already included in our French-fry varieties'

After a short introductory tour through the new Interseed NL offices in Emmeloord, director Henk Feddes takes a break in his own office to answer the question without being distracted. 'In fact, we have nothing to complain about in terms of interest in our varieties', he says cheerfully, 'especially not from the world of French fries. Because we're a fairly unusual breeding company when compared to others. After all, we only have varieties for the processing industry, 90 percent for French fries and 10 percent for crisps. With that, we're currently in the right market as far as seed potatoes are concerned, so to speak. Your question now is, what requirements do we have to meet?

'Now that the NAK's (General Inspection Service for Agricultural Seed and Seed Potatoes) post-control figures are becoming increasingly known, it appears that almost 36 percent was reduced in the category for virus and 7 percent was rejected. These are quite shocking figures. It is, of course, first and foremost the seed potato growers who need to start dealing with this. When you're losing so much, that doesn't make you very happy. Add to that the further loss of chemical products to contain the viruses in the coming years, then it's clear to everyone that things have to change. So seed potato growers



'So seed potato growers are looking for certainty, in this case by means of varieties with virus resistance. And that's what we at Interseed have had for many years in a significant part of our French-fry varieties,' Henk Feddes says reassuringly.

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are looking for certainty, in this case by means of varieties with virus resistance. And that's what we at Interseed have had for many years in a significant part of our French-fry varieties. So, for us, this is absolutely a unique selling point. Naturally, characteristics such as yield and processing quality should be just as good, but growers and manufacturers are now confident of that after years of experience with our varieties. Returning to your question about further requirements regarding the reduction of inputs such as fertilisers and the moment of ripening, our varieties have also been meeting these requirements for quite some time. Take the Alanis, for example. This French-fry

potato ripens mid-late and can therefore be harvested in good time. Furthermore, this variety has good Phytophthora tolerance and, as you can expect from us, is resistant to the Y virus. But it has an additional resistance to nematodes and wart disease. And then I'd like to point to its low nitrogen requirement. I think I've mentioned earlier that the variety can do with at least 60 percent less than its reference varieties. So this is pretty much the direction that today's buyers want to take with their choice of varieties. And, what's also important for our customers, of course, Alanis French fries are really tasty.' ●

'Our Gwenne table potato variety already provides many answers to the question asked'

'The fact that the potato sector is increasingly focusing on themes like those in your question is absolutely right', says research manager Gisèle Lairy-Joly, of Germicopa, after letting the question sink in for a moment. 'It's what we also see with our customers. When it comes to biodiversity, there's not much we can do as potato breeders. That's up to the growers themselves. However, crop protection is our job, and that's what we're already working hard on.'

'We're seeing a decline in the use of fungicides all over the world. Fewer products against Phytophthora, among other things, means that the importance of resistant varieties is constantly increasing. Like all other potato breeders in Europe, we're obviously focusing our breeding programme for the future on this.' But that's not all. Another concern, she says, is Fusarium. 'We see this disease mainly as becoming an increasing problem in seed potato cultivation. For many years we at Germicopa had a separate breeding programme focused on Fusarium resistance, but this was stopped some years ago due to a lack of interest. However, now that Fusarium has resurfaced, we've restarted it again, with the great advantage that we already have the necessary resistant crossing parents on the shelf. This allows us to combine them with other requested resistances. In addition to Phytophthora, all our attention will be focused on solutions for viruses. Within two years, very few protection agents will still be allowed for the cultivation of potatoes. If I add all this up and look at the varieties we have here, our Gwenne table potato variety already contains many answers to your question.' It has a high resistance to Fusarium, is mid-early maturing and can therefore be harvested on time, according to the research manager. What's more, it has a long dormancy that allows this variety to be stored for a long time, as the accompanying description shows. 'It also has a high yield and the tubers look really nice on the store shelves, which is a nice bonus', adds Lairy-Joly cheerfully. ●



'Fusarium is definitely becoming an increasing problem in the cultivation of seed potatoes', says Gisèle Lairy-Joly.

HIP now and later: The development of resilient cultivation systems with less input is central

It is now ten years since the idea arose in the potato sector to start a joint multi-year research project. The industry, interest groups including NAO (Dutch Potato Organisations), VAVI (Dutch Association of Potato Processors) and the government put their heads together for this. A few years later, Holland Innovative Potato, HIP for short, was born. Results achieved over the past five years and planned pre-competitive research for the coming years was discussed in full during the recently held meeting in the Dutch town of Zoetermeer. The development of resilient cultivation systems with less input is central to HIP, was the message.

Holland Innovative Potato is a research consortium of breeding and processing companies in the potato chain. Affiliated partners are Aardevo, Averis, Aviko, Bejo, Farm Frites, HZPC, LambWeston, McCain, Meijer Potato, Pepsico and Solynta, said McCain's Johan Hopman as introductory speaker. To point out what has already been done and achieved in all the years since the start of HIP, he, as leader of the scientific technical committee within the project, lists their achievements. Hopman first mentioned a number of main reasons that had prompted them to start working on a united sector research project at the time. One of these was climate change, but he also mentioned the

changing attitude of society towards agriculture as an important reason. This leads to interference and criticism when it comes to the use of chemicals, breeding techniques and fertilisation methods. 'It's an accumulation of external factors that are impacting the sector and are starting to have a negative effect on their crop yields. That declining productivity not only affects the growers but, at the same time, threatens an entire sector. It weakens the competitive position of the entire chain', Hopman concludes. So it is high time to reverse this negative spiral with all parties involved and make a positive turn, was the conclusion in 2014. All the stakeholders regard working on the development of new knowledge, cultivation methods and techniques as important tools for this and are therefore focusing on the development of resilient cultivation systems with less input. 'What measures can we use to reduce the use of fertiliser and chemicals?' is one of their practical questions. 'An important requirement here is that the solutions found must not be at the expense of yield and quality', Hopman emphasised. 'They must inspire the young and upcoming generation to become active for the sector. Due to our ever-ageing society, the number of new entrepreneurs is already decreasing. We should therefore definitely guard against solutions that will discourage potential successors in the potato sector', said the



Hopman mentioned climate change, but also the changing attitude of society towards agriculture, as important main reasons that prompted him to start working on a united-sector research project at the time.

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According to scientist Paul Struik, the mutual hectare yields from seed potatoes stored at temperatures from a usual 4 to an unusually high 17 degrees Celsius hardly differed.

'We looked very intensively in Building Block 1 at the sprouting behaviour of the seed under different storage conditions and the rate at which it aged physiologically', Paul Struik said.

initiator. 'And from that vision, HIP has emerged with the task of developing knowledge that matters, that is practical, and scientifically distinctive. That's quite a significant set of ambitions that you can't simply achieve in just a few years,' Hopman explained. The first five-year research programme has now been completed and will be followed up in the new year. Maybe even lasting until the year 2033, but that is not yet certain according to the HIP initiator. The aim of the meeting in Zoetermeer was to review the past period and describe what has emerged in the various studies so far. In these studies, a subdivision was made into three separate research programmes, which are referred to as Building Blocks, BBs.

Important mathematical model for crop growth developed

The first building block was the responsibility of Professor Paul Struik, former Professor Plant of Physiology at Wageningen University & Research. Building Block 1 was given the objective of improving yield and quality and strengthening production stability. The first assignment was mainly to learn to understand the factors that influence these aspects. To find this out, the block was divided into five sub-studies, which Struik then explained. The first involved a search for the physiological germination power of seed potatoes. 'In doing this, we looked very intensively at the sprouting behaviour of the seed under different storage conditions and the rate at which it aged physiologically. This involved a total of five different varieties. We collected and analysed data on these varieties over the five years of the study. From this we've been able to develop a useful general mathematical model which allows us, for example, to express in a number all types of behaviour and combinations of storage temperatures and varieties.' This model, genotype x environment x management, can also be used for variety research in general, but Struik will also use it in a follow-up research phase, he said. 'We also took some additional samples from all available seed potatoes for this study to determine the metabolites.

Metabolites are metabolic products that can increase plant resilience, but can also contribute to human and animal health. 'We can link the recently obtained mathematical formula to the extent to which the particular metabolites occur in the tubers during storage. However, all the necessary calculations for this are not yet finished. Their completion is a complicated process and takes a lot of time', said the professor. 'Now that we've uncovered all this, the main question naturally follows: what do the results of the sprout research on seed potatoes ultimately mean for the yield?' he continued cheerfully. 'Well, I can be brief here, it's remarkably little.' The mutual hectare yields from seed potatoes stored at temperatures from a usual 4 to an unusually high 17 degrees Celsius hardly differed, the scientist explained. 'So, although some seed potatoes no longer looked good after the storage period in an extremely warm storehouse, they eventually turned out to be able to produce plants with normal yields. This outcome is completely at odds with past literature and the usual results of the sprouting tests we've carried out in the past. Once again, that's utterly remarkable, I have no other explanation for this', Struik regretted to admit.

Developing data models for yield and quality

As the second assignment within the first Building Block, an orientation was started three years ago that focuses on follow-up research after 2023, Struik continued. The main task was to develop further the genotype x environment x management model mentioned earlier. Initially, funding was sought from the Dutch Organisation for Scientific Research (NWO). During the process, it was decided to eventually place the theme within CropXR. This is a research project that focuses on a rapid development of extra resilient agricultural crops. Because of the great importance that the government attaches to this, a sum of 43 million euros was released from the National Growth Fund for this purpose. Approximately 6 million euros of this will go towards potato research. CropXR



CropXR wants to gain innovative insight into how resilience to environmental stress works in agricultural crops, so also with the potato, in an innovative way, through research at the WUR locations.

wants to gain insight into how resilience to environmental stress works in agricultural crops, including potatoes, in an innovative way, through research at the WUR locations. To gather that knowledge, scientists like Struik focus on data science and the use of artificial intelligence. 'With this, we want to develop models that can properly predict and describe the yield and quality of the potato. The word stability plays a big role in this, according to Professor Struik. 'The more consistent the yield and quality of the crop over the years, the less impact it will experience from coincidental environmental factors.' Struik points out that there are three important tasks. 'The first is to see how to control the development of the plant during its growing period. The second assignment focuses on soil life. This will focus on interactions between the different microbiota found in agricultural soils. That leaves the third assignment, which is aimed at research in the development of the tuber during the growing period. Ultimately, the aim is to develop models from the results of the trio of studies that aim to improve cultivation, said Struik. Growers will then get a toolbox with a variety of tips on how to bring potato cultivation to a higher level. In addition, these results will also be of interest to potato breeders. 'It will allow them to look more specifically for suitable future-proof varieties', said the professor. The aim is to have results and practical tools available by the year 2028.

Important breeding result achieved

Researcher Jack Vossen of Wageningen University & Research is responsible for Building Blocks 2 and 3 within HIP. An important part of this concerns research into the restitution of fixation in the hybrid breeding of potatoes, which can be used, among other things, for improving tetraploid potatoes. 'We've achieved important results with this', he said. For a description of this, Vossen refers without further explanation to an article in November's Potato World magazine. In the relevant article, 'PhD research opens door to more efficient potato breeding', he believes it clearly describes that traditional breeding has made

a significant step forward. Another part of Building Block number 2 concerns research into the extent to which certain metabolites occur in cultivated and wild potato varieties. 'Plants are able to produce many different substances, including some that are not directly related to growth or reproduction. These are the secondary metabolites, which are often much more abundant in native crops than in cultivated crops. Certain metabolites have sometimes even disappeared completely.' This is an unfortunate loss, says the researcher, because many of them reinforce the plant's resilience and, when present in food, they contribute to the health of humans and animals. Research that has so far been carried out into the presence of secondary metabolites in potato foliage does, indeed, confirm the expectation that wild potato varieties show many more types than cultivated varieties, said Vossen. He indicated that these may indeed be substances that are beneficial to the nutritional value of the potato, but there are also certain variants that contain a specific toxicity against pests and diseases that currently affect cultivated crops. This initial study has confirmed the identification of secondary metabolites. However, it is still far from clear what properties they contain individually.

Double fusarium resistances discovered in wild species

Another study that Vossen mentioned is that of fusarium resistance in wild potato varieties. It has been discovered that some wild solanum species harbour a double resistance to two common variants, namely *Fusarium sambucinum* and *Fusarium solani*. 'These are, obviously, very interesting to start using in breeding activities', the researcher responded enthusiastically. In the sub-project, attention was also focused on two natural mechanisms for insect control. The first concerns research into glandular hairs on potato leaves, whereby certain types are deadly to insects such as aphids and white fly. The researchers label these hairs as type IV. 'These are glandular hairs that produce a sticky excretion on which the insects get



Researcher Jack Vossen of Wageningen University & Research is responsible for research into the restitution of fixation in the hybrid breeding of potatoes. 'An important result has been achieved with this.'



Another part of Building Block number 2 concerns research into the extent to which certain metabolites occur in cultivated and wild potato varieties. Many of these strengthen the plant's resilience.

trapped and, as they can't get away, they eventually die or starve. A second natural defence mechanism in the potato involves the presence of glycoalkaloids. These substances are known to be toxic, even to humans if there are excessive amounts in the tuber. There are now also glycoalkaloids in various forms. Some are found in the foliage of certain potato varieties and are toxic to Colorado potato beetles and also some to other insects, Wageningen has discovered', Vossen said.

Clear communication argued

In a discussion that followed the researchers' presentation, another important task for HIP came up which was more clarifying. People from the Ministry of Agriculture and the industry indicated that there was still the task of translating all the research into a clear practical text. Media, such as trade magazines play an important role in this, according to those present. Research on potatoes takes a lot of time, especially in order to be able to take steps in the breeding process. Funders, of which the government is a very important one, like to see value for their money as quickly as possible. Since by no means everyone at the ministries is knowledgeable as far as potatoes are concerned, policy makers argue that HIP should make more



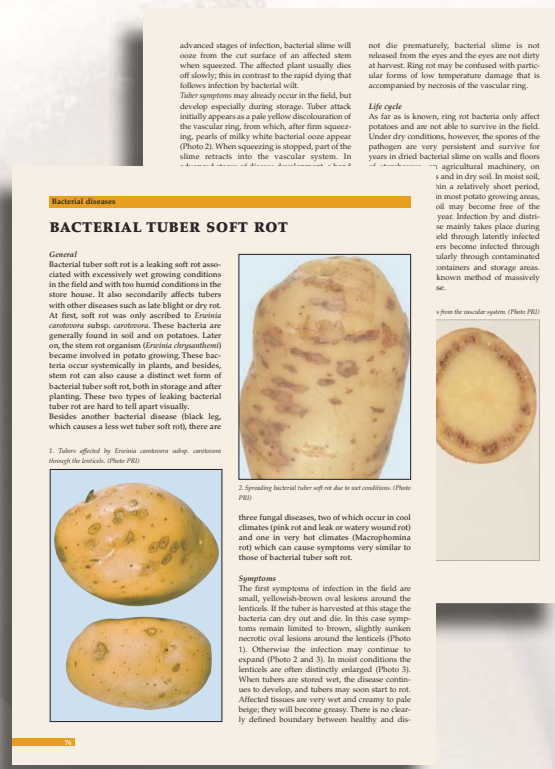
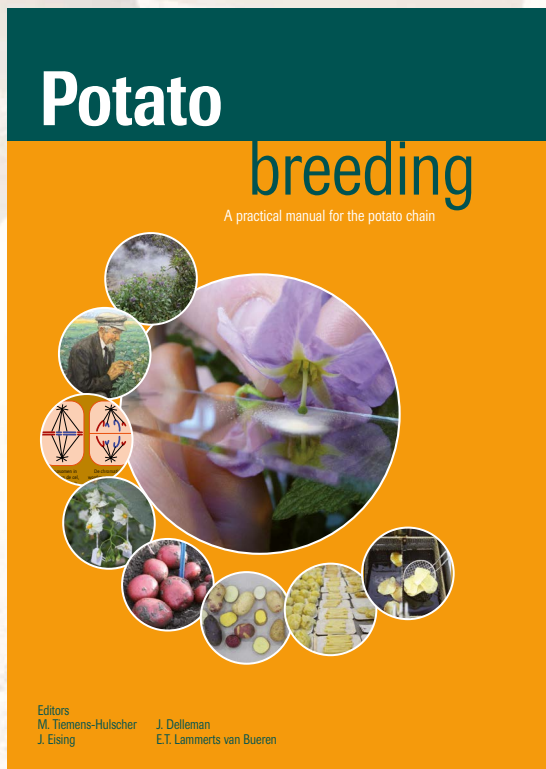
In a sub-project of HIP, attention was also focused on two natural mechanisms for insect control. One of them concerns research into glandular hairs on potato leaves, whereby certain types are deadly to insects such as aphids and white fly.

clear the importance of the long timeline that research on the crop requires in order to achieve the set goals. ●

Leo Hanse

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