

# Cerealier

No. 01/2025

A magazine from  
Lantmännen  
Research Foundation



ON THE MENU

**Polish soup  
for an extra boost**

NEW THESIS

**The positive  
health effects  
of rye**

PREPAREDNESS

**Peas and beans  
increasingly  
important**



THEME

# RYE



**Helena Fredriksson**  
**The benefits of rye!**

**R**ye, *Secale cereale*, which is the theme of this issue, grows well at our Nordic latitudes. This part of the world is also where most rye is consumed, not least in Denmark and Finland. We have the Nordic Rye Forum, a successful Nordic research collaboration on rye and health that is highlighted in an interview with Rikard Landberg, researcher and professor at Chalmers University of Technology.

You can also read about Thérèse Hjorth's doctoral thesis in which food with a low glycaemic index is linked to improved blood sugar control. Wholegrain rye will probably be part of the solution.

ON PAGE 23, we tell you about the new projects in the area of food that have been granted funding from our research foundation. The health benefits of eating rye are not new, but more knowledge is needed. In one of these new projects, to which I am sure we will return, researchers will study the impact of wholegrain rye on heart health.

You will almost certainly have noticed that the editorial board likes cereal-based foods. When we were looking for recipes for this issue, we found a Polish soup called Zurek – it is based on fermented rye and can even be served in bread. A Polish culinary coach helped us test it, guaranteeing the correct, slightly astringent flavour. The recipe for this warming dish and sides makes enough for several mealtimes.

Pleasant reading!

**Helena Fredriksson**

Lantmännen Research Foundation

“The health benefits of eating rye are not new ...”



PHOTO: MATTIAS SÖDERMARK / LANTMÄNNEN

# Rye

– full of fibre

*We delve into the research on our most fibre-rich cereal* **Pages 7–15**

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PHOTO: HARSHAL KELKAR

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LANTMÄNNEN  
RESEARCH FOUNDATION

## White cabbage waste becomes novel foods



Every year, eight of our most common foods produce 450,000 tons of waste. Vinnova,

Sweden's innovation agency, wants more innovation and new products, so is supporting a pilot project in which waste from the food industry will be refined into new raw materials. In the first stage, residual streams from white cabbage processing are being fermented so the fibres can be used for food ingredients. ●

Read more: [www.vinnova.se](http://www.vinnova.se)

PHOTO: ISTOCK

## Gene mapping can give growers better grains



Researchers from twelve countries have mapped the genomes of over a thousand barley varieties.

This will make it easier for plant breeders to develop new and improved varieties. Barley is the fifth most widely grown crop in the world and varieties that can withstand pests and a warmer climate are increasingly important for the global food supply. ●

Read more: [www.nature.com/articles/s41586-024-08187-1.pdf](http://www.nature.com/articles/s41586-024-08187-1.pdf)

**35** kg

OF RYE per person is consumed annually in Poland, Belarus and Estonia. ●



PHOTO: MÅRTE SVENSSON / SLU

## New method speeds up barley breeding

The Swedish University of Agricultural Sciences and Lantmännen will develop a method for breeding spring barley that benefits northern growers. Spring barley is the most important cereal crop

in northern Sweden, but so far breeding new varieties has been concentrated in the south, because most barley is grown there.

THE NEW METHOD, which uses genome information rather than time-consuming field

trials, means that new and better varieties for northern growers can be developed more quickly. ●

Read more (in Swedish): [www.slu.se/ew-nyheter/2024/12/kornets-framtid-sakras-i-norra-sverige/](http://www.slu.se/ew-nyheter/2024/12/kornets-framtid-sakras-i-norra-sverige/)

## Foods with fibre are good for the memory

Our diet not only improves our physical health, it can also affect our ability to remember.

In a study at Lund University, the participants' working memory improved after eating foods with fibre, particularly from barley and rye.

The researchers established a link between how certain dietary fibres affect our metabolism and regulate blood sugar, which is beneficial for memory and learning. ●



ILLUSTRATION: PAGE



# Low GI diet has a positive effect on blood sugar

A doctoral thesis by Thérèse Hjorth, at Chalmers University of Technology, shows that the Mediterranean diet, which has a low glycaemic index (GI), improves blood sugar control and reduces its daily fluctuations.

**I**n her thesis, she used data from the MEDGI-Carb study, in which people with elevated BMI, high blood sugar and elevated blood cortisol levels ate a healthy Mediterranean diet for twelve weeks.

**THE RESULTS SHOW** that a low GI Mediterranean diet improves blood sugar control after meals and reduces blood sugar variations. According to Hjorth, the same health benefits can be achieved by eating according to the new Nordic Nutrition Recommendations.

“Both dietary patterns have been

shown to have similar positive effects on heart health. The choice between these diets can thus be adapted to individual preferences, cultural differences and the availability of local foods.”

**HJORTH HAS ALSO** used data from the Carb-Health study, in which participants with elevated long-term blood sugar swapped their standard bread for a bread enriched with beta-glucan (an oat fibre) for sixteen weeks. The results showed that

this did not improve the participants’ long-term blood sugar control.

“In the study, participants were allowed to decide when and how they ate the fortified bread, which may have meant that the amount of beta-glucan needed to affect the blood glucose response was not always achieved at each meal. The participants also had relatively low baseline HbA1c values, an indicator of long-term blood sugar. This may have made observing any improvements more difficult, as the effects of beta-glucan were more pronounced with higher initial HbA1c levels.”

**Karin Janson**

## THE MEDGI-CARB STUDY

...was an international collaboration between universities in Italy, Sweden and the USA. In Sweden, Gothenburg’s Chalmers University of Technology participated and was also one of the centres in the Carb-Health study, along with universities in Norway and Germany.

Thesis: Thérèse Hjorth, *Efficacy of a low glycaemic index diet and effectiveness of oat β-glucans on cardiometabolic risk factors: Results from randomized controlled trials.* Chalmers. 2024.

## Danes gather around food in Nykøbing

 “Madens folkemøde” is the official annual food-themed event in Denmark. This year, it will be held 15–17 May on the islands of Lolland-Falster. Researchers, chefs, entrepreneurs, producers, politicians and visitors meet and discuss how Denmark should develop its food. In addition, Nykøbing will be hosting a series of events, food markets and cooking competitions during the festival. ●

Read more: [www.madensfolkemode.dk](http://www.madensfolkemode.dk)

## Upcoming doctoral theses in Finland

 Three doctoral students at the University of Helsinki have studied cereals and legumes. Prabin Koirala has investigated how cereal residues from beer production can be processed using lactic acidification. Fabio Tuccillo has studied consumer interest and taste reactions to ingredients made from faba beans. Markus Nikinmaa has researched how extrusion affects wholegrains and dietary fibres. ●

## The best crispbread sandwich

Sweden’s first crispbread sandwich competition has been held. The winner was Elsa Hassler, whose sandwich featured creamed peas, roasted carrot, parmesan and walnuts. The competition was organised by Sweden’s Bread Institute and Knäckebrödsakademien. ●

Read more (in Swedish): [www.brodinstitutet.se](http://www.brodinstitutet.se)



ILLUSTRATION: LENE DUE JENSEN

# Sweden’s Chef of the Year 2025 starting soon

**C**ompetition season is about to start for Sweden’s Chef of the Year, the national championships for

professional chefs. A qualifying competition will be held at Stockholm’s restaurant college on 12–13 June. The final will also be in the capital on 2 October.

New for this year is Lantmännen’s role as the event’s main partner. ●

Read more (in Swedish): [www.aretskock.se](http://www.aretskock.se)

## 2025’s food trend – the leguminati

In 2024, British newspaper *The Guardian* identified a growing group of foodies, the leguminatis – food nerds who have dived into the wonderful world of legumes and are singing their praises.

In this year’s review of new and continuing food trends, they predict that this group will continue growing, as will interest in unusual legumes and the sales of domestic lentils, beans and peas. ●

Read more: <https://www.theguardian.com/food/2025/jan/26/how-to-be-a-foodie-in-2025>



ILLUSTRATION: PAGE

## THEME

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# RYE

*Swedes say that eating rye bread gives you “a spine of rye” (råg i ryggen), meaning both physical and moral strength, and this is probably partly true. Rye is the most fibre-rich cereal and several studies have shown that eating rye has positive health effects. Our theme on rye brings you scientists who are studying exactly this, as well as rye’s genetics and its special form of pollination. ►*

**Photo Golden Retriever**





PHOTO: ANNA-LENA LUNDOVIST / LIFE SCIENCES CHALMERS

➤ Rikard Landberg,  
Professor of Food and  
Health, Chalmers Uni-  
versity of Technology.

# RYE – SUSTAINABLE FOR THE



*Rye research has taken a big step forward in the eight years of the Nordic Rye Forum's activities. The forum is now exploring how the societal cost of ill health can be reduced by eating more wholegrains, specifically wholegrain rye.* **Text Ingar Nilsson**

**R**ikard Landberg, professor of food and health at Chalmers University of Technology, Gothenburg, was one of the organisers of the conference that launched the Nordic Rye Forum in 2017. At the time, he was a researcher at the Swedish University of Agricultural Sciences in Uppsala and he now leads food science research at Chalmers, where the Nordic Rye Forum is based.

“Our foundation was an existing collaboration among the eight Nordic universities that started the Nordic Rye Forum,” he says. “We wanted to build on this by starting up more research on rye, working more closely with industry and communicating more about what we were doing, among other things.”

**ONE REASON WAS**, and still is, that cereal research has mainly concentrated on wheat, which is grown and most used in food in much of the world, while the cultivation of rye is concentrated to north-east Europe. Over the years, members of the Nordic Rye Forum have succeeded in broadening the field of research and creating joint pilot projects, while encouraging debate and disseminating information on rye and health.

“We can see that the arguments for eating wholegrains have broken through, and people know the effects of wholegrain rye,” says Landberg. “We have also raised awareness of rye through research and shared work.”

In an as-yet unfinished pilot project, the forum is looking at the impact of

“...eating more domestically grown cereals, particularly rye, will improve environmental sustainability.”

**Rikard Landberg** Professor, Food and Nutrition Science, Chalmers University of Technology

eating more wholegrains on health economics, as well as the health risks of not increasing our consumption. In addition to individual health, Landberg sees a number of societal benefits if the rye consumption receives a boost.

“Sweden’s food preparedness will improve if we grow more grain. Also, eating more domestically grown cereals, particularly rye, will improve environmental sustainability.”

**ONE IMPORTANT FOCUS** is to scientifically verify rye’s health effects through intervention studies, in which people eat rye in the way they normally would, as well as seeing how the results obtained so far can be used to make real changes to consumption patterns that lead to better public health, according to Landberg.

“However, not everyone reacts in the same way, so it is also important that we can have tailored solutions,” he says.

Rye is high in dietary fibre and can influence individual metabolism. Landberg saw this very clearly in a research project in China, a country where people don’t usually eat rye.

The subjects’ gut flora was positively affected by a diet that included rye. The study’s results included a reduction in the presence of bacteria that cause inflammation in the gut.

“However, rye may not have this effect on everyone,” he says. “So researchers need to develop simple markers that show how individuals respond to wholegrain rye. This would mean we can discover from a blood test whether someone’s health is affected by eating wholegrain rye.” ●

Read more: <https://www.nordicryeforum.info/>

### **NORDIC RYE FORUM**

Researchers from universities and institutes in the Nordic countries are part of the forum. They represent a wide range of disciplines and research areas.

Industry is represented by Pâgen, Fazer, Lantmännen, Leksands knäckebröd and Barilla. Together they all work to disseminate information about wholegrains and rye and identify what new research is needed.

# ENVIRONMENT AND FOR HEALTH

*Can a wholegrain diet contribute to weight loss and lower blood sugar levels in people with overweight and obesity? In a new doctoral thesis, researcher Sebastian Åberg presents three different studies that examined the effects on appetite, body weight and blood sugar when foods made using sifted wheat are replaced with products that use wholegrain rye.* **Text Ingar Nilsson**

**New thesis:**

# Health benefits from wholegrain rye

**T**he first study was conducted in 2018 and 2019 in New Zealand, with a group of 28 people who had diabetes and an elevated BMI. During the study, participants were allowed to eat wholegrain products such as bread, porridge, pasta and rice, replacing finely ground wholegrain flour products with those that were more coarsely ground or even had whole kernels.

“The results showed that products with more intact kernels lowered blood sugar and reduced fluctuations compared to products made from finely ground wholegrains, so this may be an important factor for diabetics to consider when choosing cereal products,” Åberg says.

**THE NEXT STUDY** was conducted in Gothenburg in 2021, when healthy people with overweight and obesity were recruited for a dietary study that focused on hunger, satiety and metabolic response. Participants followed a strict dietary regimen in which meal composition was controlled; all meals contained cereals, which contributed about a third of the total calorie intake. Sifted wheat products were compared with wholegrain rye products, and the study participants ate both diets in repeated trials.

“Participants reported less hunger and higher satiety at dinnertime if they ate wholegrain rye during the day. We also measured lower levels of ghrelin, the hunger hormone, after meals with wholegrain rye,” says Åberg.

Studies of blood sugar control after meals also had interesting results. The rye-based diet lowered the blood sugar response by 30% compared to the wheat-based diet.

**THE AIM OF** the third study was a 12-week comparison of the effect of consuming products based on sifted wheat or wholegrain rye on weight and

fat mass. A total of 229 people with overweight and obesity participated in the study.

“To our surprise, the participants lost about the same amount of weight, regardless of diet,” says Åberg. However, the wholegrain rye diet led to a clear difference in gut flora and the presence of short-chain fatty acids, which have been linked to positive health effects. Also, the CRP inflammation marker was significantly lower after 12 weeks with wholegrain rye compared to sifted wheat, despite equal weight loss.

**ADDITIONALLY, NEITHER** the satiety-stimulating effects of rye nor specific gut bacteria could be linked to weight loss. Instead, metabolic factors were important. People’s fat mass and ability to lose weight were affected by whether they had low-grade inflammation and increased insulin resistance.

“Our findings show that individuals with elevated inflammation and insulin resistance may benefit from choosing wholegrain rye over sifted wheat,” Åberg concludes. ●

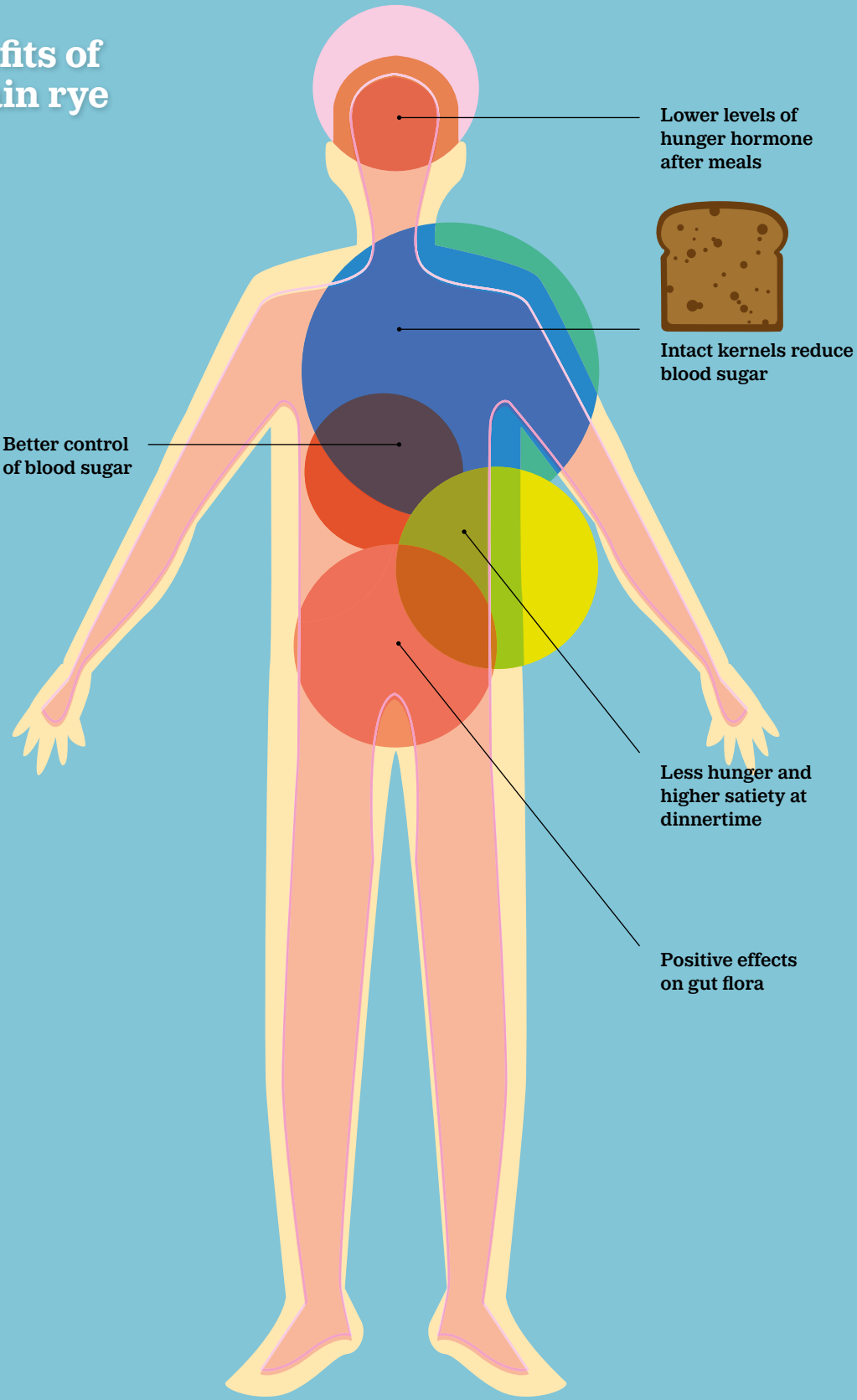


**“Participants reported less hunger and higher satiety at dinnertime if they ate wholegrain rye during the day.”**

**Sebastian Åberg** Postdoctoral Researcher, University of Gothenburg

Thesis: Sebastian Åberg, *Metabolic Effects of Whole Grains: Emphasis on Glycemic control, Appetite, and Body Weight*. Chalmers. 2024.

# The benefits of wholegrain rye



# German geneticists focus



# on rye's unique pollination



PHOTO: UNI HALLE / MARTIN SCHOLZ

In 1878, agronomist Julius Kühn sowed a field of autumn rye at Martin Luther University in Halle-Wittenberg, starting one of the world's oldest cereal cultivation trials. Initially, the trials focused on finding optimal growing conditions and nutrients for rye. Today, the focus is instead on genetics and rye's unique pollination method.

Text Ingar Nilsson

Since receiving his PhD in 2019, Steven Dreissig has had responsibility for the research group that studies the genetics of plant reproduction at the University of Halle-Wittenberg, Germany. He has just moved operations slightly north, to Gatersleben, a research facility run by the Leibniz Institute for Plant Genetics and Crop Plant Research. This is home to one of the world's largest gene banks and is a world-class research environment for a geneticist, says Dreissig.

"The crops at Halle are valuable because the trials there have been running for so long in the same conditions. The rye fields have been cultivated as a monoculture for almost 150 years, with no pesticides or fertilizers, so the soil is quite nutrient-poor. Since the conditions are stable, we can investigate how rye responds to nutrient deficiency as a stress factor."

GATERSLEBEN HAS A gene bank with a large amount of rye material from around the world, which gives Dreissig and his research group unique opportunities for studying genetic

**"Plant breeders use cross-breeding to produce rye hybrids that give bigger yields."**

Steven Dreissig PhD, Martin Luther University Halle-Wittenberg

differences and how they can affect the properties of rye.

Unlike other cereals, rye is not self-pollinating; instead, it cross-pollinates with other rye plants. Rye flowers bloom between April and September, releasing pollen in large clouds that can travel several kilometres. One focus in Dreissig's work is studying the genetic composition of rye seeds to identify the factors that govern pollination.

"Plant breeders use crossbreeding to produce rye hybrids that give bigger yields. Using DNA sequencing and studying the pollen's size and shape, we can identify its characteristics and understand its behaviour," he says. "This provides the opportunity to better control the pollen."

TEMPERATURE AND OTHER environmental factors, such as soil type, affect pollen development and fertilization. If it is too cold when it flowers and there is no pollination, the plant can become susceptible to disease.

"Small pollen grains travel further, while large ones stick more easily and quickly. The key is finding the ideal size, and if we can find the genetic answer to what determines pollen size, we can transfer that knowledge to other cereals," says Dreissig. "We will also be able to see which gene variants affect the plant's developmental processes. This is important for determining how resistant a crop is to changes in climate, for example." ●

Reference: Dreissig et al. "Characterising the Genomic Landscape of Differentiation Between Annual and Perennial Rye." *Evolutionary Applications*. 2024.

Steven Dreissig, research leader for a group studying the rye's genetic traits.

# Study may show the way to the rye effect

*Eating wholegrain wheat and rye increases the gut's production of substances that are linked to positive health effects. Rye has the greatest effect, according to a clinical intervention study conducted in the UK.*

Text Karin Janson

**G**rainMark is a study that shows that consuming wholegrain wheat and rye products produces specific components, metabolites, in the blood and urine. The suggestion is that these metabolites have a positive effect on blood sugar regulation, which may prevent type 2 diabetes and reduce the risk of cardiovascular disease and low-grade inflammation.

“We discovered some previously unknown metabolites that could be linked to rye intake. These can be used to develop new biomarkers for rye, which will allow us to understand the effects of rye on the body even better,” says Ville Koistinen, postdoctoral researcher in clinical nutrition at the University of Eastern Finland and the University of Turku.

**THE STUDY INVOLVED** 70 healthy people who ate 48 or 96 grams of wholegrain rye or wheat over two four-week periods.

“They ate porridge, muesli, cereals, pasta and wholemeal bread. We tried to choose products that were as familiar as possible to the

participants, although most of the rye products came from Finland,” says Koistinen.

**THE HIGHER DOSE** of wholegrains, 96 grams, was found to have the greatest impact on the metabolites that were measured. This effect was greater for wholegrain rye than for wholegrain wheat. This could be partly because people in the UK do not usually eat a lot of rye, according to Koistinen.

“If the increase is because participants do not normally eat rye, so it has a greater effect, performing a similar study in a population that eats a lot of rye would be interesting, perhaps

## GRAINMARK

The GrainMark study was conducted in the UK to investigate the effect of wholegrain rye and wholegrain wheat on markers in the blood. In total, 70 participants with BMIs between 20-32 kg/m<sup>2</sup> were recruited. Eligibility criteria also included being over 40 years old and not smoking, taking medication or having any food allergies.



“We can now identify around 200 different components in rye, but there are around 4,000.”



↑ In the study, participants ate wholegrain pasta, bread and cereals.

PHOTO: ISTOCK

also comparing this with a group that never eats rye.”

The GrainMark study also showed that the concentration of a metabolite called pipercolic acid betaine increased with increased rye intake, but not with wheat intake. This metabolite is unique for rye consumption and is not seen after eating any other cereal. Because pipercolic acid betaine helps to control blood glucose, it can be linked to the “rye factor”.

“We now have a clear link between rye intake and this metabolite specifically. Pipercolic acid



↑ Ville Koistinen is a researcher at the University of Eastern Finland and the University of Turku.

betaine could be used as a biomarker for rye in the future,” says Koistinen.

**IN FUTURE RESEARCH**, he wants to map rye at the molecular level.

“We can now identify around 200 different components in rye, but there are around 4,000. If we really want to understand how rye bread affects our body at the molecular level, we need to know more.” ●

Reference: Koistinen et al., *Npj Science of Food* 2024.

# Rye – the cereal with the most fibre

Rye is high in dietary fibre, which is good for our health. Despite this, the cultivation of rye and its use as food is declining. For feed manufacturers, on the other hand, rye is on the up.

Text Ingar Nilsson

**R**ye has many beneficial components. Its dietary fibre content is up to 20% and compared to other cereals, rye has the highest concentration of arabinoxylan, a dietary fibre. It also contains lignans, which are a group of polyphenols. Long-term intake

of lignans may be linked to a lower risk of cardiovascular disease.

The oldest finds of rye pollen are over 6,000 years old. They are probably from weeds, as rye cultivation properly started much later, around the Black Sea and in the mountainous regions of the Middle East and Russia in 800 CE.

**RYE THRIVES** in colder climates, and 95% of the world's rye is currently grown in an area that stretches from the North Sea to western Russia. The Soviet Union was long the world's largest producer of rye. In the EU, Poland

“Compared to other cereals, rye has the highest concentration of arabinoxylan, a dietary fibre.”

↓ Rye thrives in colder climates, and 95% of the world's rye is currently grown in an area that stretches from the North Sea to western Russia.

is at the top for rye cultivation, with almost 700,000 tons of rye harvested annually. Next is Denmark, which harvests 112,000 tons per year. However, the area under cultivation in EU countries has steadily decreased in favour of other cereals, such as the introduction of triticale, which is used as animal feed.

**RYE CONSUMPTION** in the Nordic countries has gradually declined and is currently 10-15 kg per person annually. Despite this, rye accounts for up to 40% of daily dietary fibre intake in Denmark and Finland, the Nordic countries where people eat the most rye.

Rye is used for a variety of foods, such as traditional rye bread, pumpnickel, crispbread and rolls, breakfast cereals, protein bars, porridge and pasta. Rye flour has different baking properties than wheat flour. It does not form the same kind of gluten network during kneading with water and rye flour contains more of the dietary fibre arabinoxylan. One way to make rye bread moister is to bake with sourdough. If about 40% of the total rye flour in rye bread is fermented to make a sourdough, the dough's pH drops, which increases the arabinoxylans' water absorption capacity.

**RESEARCHERS AT THE** Swedish University of Agricultural Sciences are studying the function of rye and wheat in dog food. In Germany, almost two thirds of cultivated rye is now used in pet food. ●



PHOTO: LANTMÄNNEN / JONAS ENGSTROM

References: Németh et al. *Acta Alimentaria*. 2021. Ikram et al. *International Journal of Food Properties*. 2023. Marklinder. *Surdeg: brödbakning med rågad passion över gränserna*. Self published. 2015.





PHOTO: ISTOCK

RECIPE

# A warming soup

*This Polish sourdough rye soup is both filling and delicious. You can shorten the preparation time by buying a ready-made soup base online or in a Polish food shop. This recipe provides enough base for several meals. To make it extra special, serve it in crusty bread.*

Recipe [matmorsan.wordpress.com](http://matmorsan.wordpress.com) Culinary coach Sylwia Persson

## Zurek

Preparation: 30 min + 4 days

Cooking: 1 hour

### Soup base

- 500 g wholegrain rye or oat flour
- Dry sourdough bread in pieces (2 slices)
- 3 garlic cloves
- 2 litres boiled water

### Soup

- 100 g celeriac
- Half a leek
- Bunch of leaf parsley
- 1 bay leaf
- 1 tsp marjoram
- 1.5 litres meat stock
- 250 g pork slices or bacon

- 4–5 medium-sized potatoes
- 500 ml soup bases

### To serve

- Hard-boiled eggs in wedges
- Spicy sausages, fried
- 100–200 g boiled beef, roast pork or ham
- Leaf parsley
- 2 tbsp grated horseradish

### MAKE THE BASE

1. Measure the flour into a bowl and add the bread cubes. Pour over 1 litre of hot water and add a whole clove of garlic. Stir and leave at room temperature for 24 hours.
2. Bring another 1 litre of water to a boil and let it cool. Pour it into the bowl and add 2 crushed garlic cloves. Leave

at room temperature for 3 days. After this, the base is finished.

### MAKE THE SOUP

1. Cut the vegetables and pork into small cubes.
2. Sauté the vegetables until soft, with the pork. Add the diced potatoes, parsley stalks and seasoning.
3. Add the stock. Boil for 20 minutes or until the potatoes are completely soft.
4. Remove the parsley stalks. Whizz the soup to a rough texture. Add 0.75 litres of the soup base. The soup should be thick and have an astringent taste. Boil for 5 more minutes. Season with salt and pepper.
5. Serve the soup with pieces of sausage, meat, ham and wedges of boiled egg. Sprinkle with grated horseradish and chopped parsley leaves. ●



# How to improve preparedness

*Swedish food production must become more competitive. A new research centre in Lund will examine the potential for this, with cereals, peas and beans having been identified as particularly important crops for this transition.* **Text Ylva Carlsson**

**M**uch of the food we eat in Sweden is produced abroad. In addition, our food production depends on material inputs that are transported here via complex logistics chains. Five new research centres have therefore received funding from Formas to develop more sustainable solutions for the Swedish food system. In these, researchers will engage with business and the public sector on research and innovation issues that focus on preparedness and competitiveness.

Cecilia Tullberg is a researcher at Lund University and the project coordinator for FORCE, one of the five new research centres. She and her colleagues see an urgent need to reduce Sweden's dependency on imports.

"Unfortunately, many players have disappeared from the Swedish food market. We will be examining important aspects such as profitability and opportunities for empowering local producers."

**PRODUCTS BASED ON** cereals, peas, beans and oilseed crops have been identified

as particularly important. Continuing stable production is good for both the climate and for developing nutritious foodstuffs, says Tullberg. One area of FORCE is therefore focusing on the potential to increase the cultivation, availability and consumption of peas and beans.

"We will look more closely at incentives for growers, as well as at opportunities for plant breeding and how to highlight the value of beans and peas in the end products," she says.

**IN ADDITION TO** Lund University, the Swedish University of Agricultural Sciences and KTH Royal Institute of Technology are participating in the collaboration, along with Lantmännen and some 20 other actors from business, the public sector and civil society. Around 25 researchers from different disciplines are already involved.



## in the food sector

“Because we come from a range of scientific backgrounds, we can work with our industrial partners to create a relevant overall picture of what preparedness is needed. This is true whether we are talking about military, environmental or other types of crises,” says Tullberg.

Alongside longer projects, FORCE researchers want to identify issues that are suitable for shorter tasks, such as how the public sector can work with unsoaked peas and beans. FORCE can help with recipes or other support. Other parts of FORCE will identify risks and strengths within the Swedish food system, and look at issues related to policy, trade and consumption.

TULLBERG PROVIDES MORE examples, saying “Another focus area is food safety, logistics and packaging, how we can work on issues such as storage capacity and ensuring that the food we eat is safe, even during crises when electricity supplies may be unstable.” ●

Read more (in Swedish): <https://portal.research.lu.se/sv/projects/force-center-för-livsmedelsresiliens-och-konkurrenskraft>

↖ The pilot hall at the Department of Food Technology, Engineering and Nutrition, Lund University.

↑ Oilseed crops, such as hemp, are one of FORCE’s focus areas.

### FORMAS

The Formas research council has granted SEK 300 million to five new interdisciplinary centres. Over four years, they will implement initiatives that help the transition of Swedish food production.

The five centres are:

- AgroDrive – Transition to Fossil-Free Energy in Sweden’s Agricultural and Food Systems
- FORCE – Centre for Food System Resilience and Competitiveness
- PLATE – Swedish Research Centre for Resilient Meals
- PLENTY – Centre for Symbiotic and Circular Food Provisioning
- Food Defence Research Centre: Detering, Detecting and Managing Attacks on the Food System.

PHOTO: CHRISTOFFER NILSSON



“... and how to highlight the value of beans and peas in the end

products.”

**Cecilia Tullberg** Researcher at Lund University and Project Coordinator for FORCE

# EU project will help consumers change their eating habits

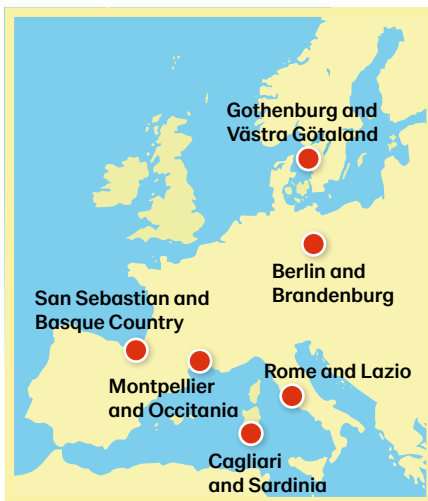
The SWITCH project is running in eight EU countries and aims to help EU citizens eat food that is good for both their health and the environment. In Sweden, Västra Götaland is home to one of the project's six food hubs – meeting places where researchers meet consumers, industry and public sector organisations. Together, they will develop solutions that encourage more people to choose sustainable seafood, a more plant-based diet and more wholegrains.

Text Ingar Nilsson

**T**he project has reached its halfway point and is now gearing up; the participants have come together, set quantitative targets for how much plant-based food, wholegrains and seafood is necessary in the diet to achieve for health and sustainability, defined problems and opportunities in the region, and started activities to achieve the targets.

“One example of this is a project for sustainable seafood in school meals, where one of several pilot projects in this activity is that pupils at a school in northeast Gothenburg that has a low socioeconomic profile will have a seafood week, with sustainable seafood dishes on the menu. Ideas have also been developed for training material that can be expanded on when the project has been completed,” says project manager Maria Biörklund Helgesson.

**MALIN BARMAN, RESEARCHER** and project manager at Chalmers University of Technology, will lead a large dietary



intervention with 300 participants. Over 12 weeks, participants in the study will eat a diet that meets the project's targets, which include 800 grams of vegetables, fruit and berries and 90 grams of wholegrains per day, as well as 360 grams of legumes and 450 grams of seafood per week.

## SWITCH

The EU's SWITCH project is running in six different European regions. Its aim is to transform the EU's food production and consumption, reducing climate impact and promoting healthy eating habits among the population. This should be done in a just way, so the results benefit everyone, regardless of their socioeconomic status. In Sweden, the project is run by the RISE research institute and Chalmers University of Technology. The project started in 2023 and will run for four years.

“We are conducting interventions in two areas, to include both high and low socioeconomic groups and better understand the barriers to change in each group, and how we can overcome them,” says Barman.

Participants receive various forms of support to change their eating habits. One group receives dietary advice, another receives food items in addition to dietary advice and a health coach who provides behavioural support. The third group receives dietary advice and behavioural support, but no food items. In parallel, the impact of the diet on the health of the participants will be studied, and the effects on carbon emissions, water use and other environmental impacts will also be measured.

**ANOTHER ADVOCACY EFFORT** conducted in 2024 was a nudging campaign at football matches to inspire people to eat more plant-based foods. To make healthy and sustainable food more attractive, the project will also work on language and communication in menus and in stores. In addition, one of the restaurant schools in Gothenburg offers a module in theoretical and practical knowledge, which will result in dishes served in the school's public restaurant.

“We researchers look at numbers and studies and know which food choices are healthy and environmentally sustainable. Consumers make their decisions on a completely different basis, so we need to use more than just information to communicate healthy and sustainable food choices,” says Biörklund Helgesson. ●

Read more: [www.switchdiet.eu](http://www.switchdiet.eu)



↑ A SWITCH meal at an event that includes spicy mashed Swedish legumes, roast potatoes and cabbage, Swedish black beans, micro-greens and herbs.



# New initiative to get us to eat more wholegrains

Too few Swedes eat enough wholegrains. Sweden's newly launched FullkornsFrämjandet – wholegrain promotion – wants to change that. The inspiration comes from Denmark, where a similar initiative has helped Danes double their intake of wholegrains.

**Text** Ylva Carlsson

**Illustration** Lene Due Jensen

**L**aunched in October 2024, FullkornsFrämjandet is a partnership of around 20 different stakeholders from business, academia, government and industry organisations (see info). Its aim is to get Swedes to eat more wholegrains by increasing knowledge and awareness.

“We need more people to understand the health benefits of choosing wholegrains, so the step to switching to wholegrain bread won't be so long,” says Maria Alexandersson, project manager at FullkornsFrämjandet.

Studies show that wholegrains are one of the most important dietary factors for reducing the risk of cardiovascular

disease, colorectal cancer and type 2 diabetes, among other diseases.

ACCORDING TO THE Nordic Nutrition Recommendations 2023, we should eat 90 grams of wholegrains per day. This is roughly equivalent to one portion of oatmeal, one slice of wholegrain bread and one portion of wholegrain pasta. But few of us eat that much wholegrain; the current average is 42 grams.

“My top tip is oatmeal or overnight oats for breakfast. This is a simple routine for eating a lot of wholegrains early in the day,” says Alexandersson.



**Maria Alexandersson**  
Project Manager, FullkornsFrämjandet

“We need more people to understand the health benefits of choosing wholegrains.”

FULLKORNSFRÄMJANDET LAUNCHED its website in February. It offers facts about wholegrains, information on their health effects and tips on easy ways to eat more wholegrains.

Alexandersson highlights their collaboration with the Danish Fuldkornspartnerskabet (wholegrain partnership) as an important source of inspiration. This was launched in 2007 and, in addition to regular activities, Denmark celebrates an annual “wholegrain day” in January.

“After 10 years of work, the Danish population's wholegrain consumption had doubled. This is a clear example of how change is possible if you have patience.”

An important part of FullkornsFrämjandet's work is a dialogue with the food industry on the need for new and more types of wholegrain products on the shelves. Here too, Denmark is a pioneer, and now has around a thousand products with special wholegrain labelling on store shelves.

“In Sweden, many companies are also now showing strong interest in product development and making labels clearer for consumers. It should be easy to do the right thing,” Alexandersson says. ●

Read more: <https://fullkornsframjandet.se/en/>

## WANT TO GET WHOLEGRAIN SMART?

Here are three tips from FullkornsFrämjandet:

- **Breakfast** Choose oatmeal.
- **Snacks** Keep crispbread in your bag and eat a couple of slices every day.
- **Dinner** Eat as normal but choose wholegrain rice and pasta.

## PARTICIPANTS IN FULLKORNSFRÄMJANDET

Association of Swedish Bakers and Confectioners, Swedish Cancer Society, Chalmers University of Technology, Swedish Association of Registered Dietitians, Fazer, Swedish Heart Lung Foundation, City of Gothenburg, Lantmännen, Leksands knäckebröd, Swedish Food Federation, Swedish food Agency, Nestlé, Paulig, Polarbröd, Brödinstitutet (Bread Institute), Sveriges bagerileverantörers förening (Swedish association of bakery suppliers), Svensk dagligvaruhandel (Swedish grocery trade) and Wasa.

FullkornsFrämjandet works with the EU's SWITCH project (read more about SWITCH on page 20) – and is located at GoCo Health Innovation City in Mölndal.



PHOTO: LANTMÄNNEN / DAVID GRIBING

↑ A deeper understanding of the health effects of wholegrains and dietary fibre is the focus of some projects that have received funding from Lantmännen Research Foundation.

# Whole grains, oats and legume-based ingredients in new research projects

**Better understanding of the health effects linked to consuming dietary fibre and wholegrains, how to bake the best oat bread, and adding value to legumes – these are the aims of a few of the projects that received funding in Lantmännen Research Foundation’s autumn call.**

**Helena Fredriksson** Head of Research  
Lantmännen Research Foundation

**T**he call was for knowledge that can contribute to the development of new healthy foods and ingredients based on cereals or legumes.

Consuming dietary fibre has strong links to health. In addition, low consumption of wholegrains is the biggest global risk factor for cardiovascular disease and diabetes. Research on fibres’ and wholegrains’ connections with health are therefore important areas for the foundation. Örebro University is starting up a project that we reported on in the

last issue of *Cerealier*, *The Blue Muffin Study*. This investigates whether fibre fragments are created during digestion, how they affect the gut and possible differences in effects at the individual level. Another new project at the University of Eastern Finland will study the impact of wholegrain intake from rye on heart health, focusing on different metabolites produced in the body.

OVER THE YEARS, our foundation has supported several projects that involve baking with oats. One of the major challenges is that oats do not form a

gluten network, unlike when baking with wheat. Researchers at Nofima in Norway will now delve further into this topic and examine how different flour qualities affect the properties of oat bread.

INTEREST IN LEGUMES remains high, not least because of their high protein and fibre content, which makes them potential raw materials for producing food ingredients. A new project at the University of Copenhagen will investigate the relationship between the structure of pea proteins and their function. In another project, at RISE, the goal is to develop a functional fibre ingredient from pea shells. One use for this knowledge is the development of legume-based ingredients at Lantmännen’s new factory in Lidköping.

We are eagerly awaiting the results and discovering how this new knowledge will contribute to the development of future foods. ●

## HOW FUNDING WAS ALLOCATED

In total, Lantmännen Research Foundation invested SEK 25 million in research in 2024, of which SEK 13 million was for projects related to the food and bioenergy processing industries. The remaining funds were invested in agricultural research.



PHOTO: ISTOCK

↑ Search dogs will be trained to find weed seeds in grass cultivation.

## Recently granted projects



### Dogs search out weeds

It goes without saying that seeds should be weed-free, but this is currently checked manually by field staff. Researchers at the Swedish University of Agricultural Sciences, in cooperation with the region of Västra Götaland, will investigate the potential for using search dogs to find weeds in grass seed crops. ●



### Healthy peas

Soil-borne diseases can cause problems when cultivating peas and faba beans. In a new collaborative project, the Swedish University of Agricultural Sciences and the network of Rural Economy and Agricultural Societies will develop an analysis method for finding and quantifying soil contamination. This will help to ensure successful cultivation. ●



### Green plastic

Non-degradable plastics are a growing and global environmental concern. Researchers at Lund University will now evaluate the possibility of using a microbial process to produce biological biodegradable plastic, PHA, using bioethanol as the raw material. ●

## About the research foundation

Lantmännen Research Foundation supports research in the entire chain, from field to fork. It grants SEK 25 million to research annually, focusing on three areas:

- Agriculture and machinery
- Bioenergy and green materials
- Food and health

The goals of this research funding include increased agricultural production with minimised

environmental impact, and establishing how agriculture can contribute to the development of a biobased society. In the area of food, we want to increase knowledge of grains and legumes as a natural element of healthy and sustainable future food.

The foundation has an open call for proposals every year. Applications are assessed on their newsworthiness, scientific quality and business potential. ●

See: [www.lantmannen.com/researchfoundation](http://www.lantmannen.com/researchfoundation)

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