

WAGENINGEN WORLD

MAGAZINE OF WAGENINGEN UR ABOUT CONTRIBUTING TO THE QUALITY OF LIFE

nr.2 2011



‘Breaking down the
Afsluitdijk would do
more to help restore
eel stocks’

Guido van den Thillart, page 12

New options **for flexitarians** | **Stringy meat** tender in four minutes | **CO₂ in the seabed**: a good idea?
Greenhouses in the Turkish sun | **European streams** warm up | **Plant protection** then & now



10

THE EEL SLIPS THROUGH OUR FINGERS

Alarm bells have been ringing for the eel for years. Catches are falling dramatically, and very few young eels are reaching Dutch inland waters. Will the new eel fishing ban help?

28

SHADE FOR STREAM-DWELLERS

Animals inhabiting streams are highly sensitive to the warming of the water and fluctuations in runoff. All over Europe, the search is on for ways of making streams more resilient to climate change.



32

SEMI-VEGETARIAN GETS MORE CHOICE

Environmental considerations and the growing world population make it essential to reduce meat consumption in the west. But this will only work if we improve meat substitutes and change the carnivorous culture.



COLOPHON Wageningen World is the quarterly magazine for associates and alumni of Wageningen UR (University & Research centre) and members of KLV, the Wageningen Alumni Network. A PDF version of the magazine is available at <http://www.wur.nl/UK/publications/Periodicals> **Publisher** Wageningen UR, Viola Peulen **Editorial board** Paul den Besten, Hans Bothe, Ben Geerlings, Wilbert Houweling, Lotte Kerkhoven, Jeanette Leenders, Francine Loos, Jac Niessen, Judith Pierik, Helene Stafleu, Erik Toussaint, Hans Wolkers **Editor-in-chief** Gaby van Caulil (editor-in-chief Resource), Pauline Greuell (Corporate Communications Wageningen UR) **Managing editor** Miranda Bettonville **Copy editor** Rik Nijland **News editor** Maaike Breedveld **Translation** Clare McGregor **Art direction and design** Jenny van Driel (Wageningen UR, Communication Services) **Cover picture** Hollandse Hoogte **Magazine design** Hemels Publishers **Printer** Mediacer Rotterdam **ISSN** 2210-7908 **Address** Wageningen Campus, Akkermaalsbos 12, 6708 WB Wageningen, Post box 409, 6700 AK Wageningen, tel +31 317 48 40 20, wageningen.world@wur.nl **Change of address** **alumni** www.wageningenalumniportal.nl **Change of address associates** wageningen.world@wur.nl, giving code address label **Changes to career details** alumni@wur.nl

The mission of Wageningen UR (University & Research centre) is 'to explore the potential of nature to improve the quality of life'. Wageningen UR includes nine specialist applied research institutes, Wageningen University, and Van Hall Larenstein University of Applied Sciences. These institutions have joined forces to contribute to finding answers to crucial questions related to healthy food and and living environment. Wageningen UR has a staff of 6,500, 10,000 students, 35,000 alumni and 40 sites, with a turnover of 662 million euros. Institutes of Wageningen UR: Alterra, LEI, Plant Research International, PPO, Wageningen UR Livestock Research, Central Veterinary Institute, Wageningen UR Food & Biobased Research, IMARES and RIKILT.



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4 UPDATE

The news in brief about research and developments at Wageningen UR.

16 INNOVATION

The Nutri-Pulse e-Cooker could be the next revolution in the kitchen. Meals ready in seconds.

18 THE DEBATE

Underground storage of CO₂ has met with strong opposition from local communities. Is storing CO₂ under the sea a better idea? Four experts air their views: Jan Brouwer from CATO-2, Chris Karman from IMARES, part of Wageningen UR, Eelco Leemans from the North Sea Foundation and Rik Leemans from Wageningen University, part of Wageningen UR.

22 FLIGHT ARTISTS

Several hundred Dutch citizens are contributing to science by filming flight movements with a high-speed camera. 'We are going to see things we have never seen before.'

26 SYNERGY

Wageningen UR Greenhouse Horticulture is working with partners from the business world on developing a demonstration greenhouse in Turkey. Greenhouse constructor Ton Schrover and researcher Ruud Maaswinkel paid a visit...

38 THEN & NOW

Horticulturalists have always relied on their own eyes to know whether their plants are diseased. This task is gradually being taken over by high-tech machinery.

FEATURES

40 LIFE AFTER WAGENINGEN

Gerjo Koskamp and Henk Oldenzil both came to Wageningen in 1990 to study Animal Sciences. More than twenty years later, they look back.

44 WAGENINGEN UNIVERSITY FUND

Kenyan Winnie Raey is studying Bioinformatics at Wageningen. This would not have been possible without the parents of her friend Madelon Lohbeck and the Anne van den Ban Fund.

46 KLV

Announcements from alumni network KLV.

48 ALUMNI

News for alumni of Wageningen University.

50 PERSONALIA

News of the lives and careers of alumni of Wageningen University, part of Wageningen UR.



PHOTO GUY ACKERMANS

Bee deaths need analysing

Alarm bells are ringing all over the world about the death of bee populations. Although it is not known exactly how severe the decline is, it is important to take the problem seriously. The signals are alarming and the bee is important, not just for natural ecosystems but also for the pollination of most vegetable crops and fruit trees.

The bee needs a varied diet to stay healthy, and one cause of the rising death rate may be a lack of variety in the available food sources. But that is just one piece of the jigsaw puzzle; there are probably several factors involved in the decline. We should also look into the limited genetic variation in the bee, the impact of the varroa mite, the use of pesticides and the way knowledge is shared, since the death rate seems to be far higher for some beekeepers than for others.

Neonicotinoids have been in the limelight recently, with some researchers claiming that this group of insecticides is the main reason for the rising bee death rate. Some neonicotinoids are certainly highly toxic to bees. The danger in the wild lies in the combination of toxicity and exposure. As a precaution, a number of European countries have banned the use of this substance in sunflowers, for example, because this crop attracts large numbers of bees. And yet it is far from conclusively proven that these are the culprits, as was clear in a United Nations report of March 2011 which pointed to a complex of possible factors. So let us not jump to premature conclusions or start sketching disaster scenarios. Instead, let us really find out how things stand. The Ministry of Economic Affairs, Agriculture and Innovation will probably facilitate a thorough analysis of the situation, under the guidance of a broad steering committee. We shall use this knowledge to turn the tide.

Piet Boonekamp, manager of Biointeractions and Plant Health at Plant Research International, part of Wageningen UR.

RIKILT monitors nuclear fallout

Since the disaster at the nuclear power station at Fukushima in Japan, RIKILT, part of Wageningen UR, has been extra alert to traces of radioactivity in the food chain. This institute for food safety checks Dutch crops and animal feeds for the presence of radioisotopes, particularly those of iodine and caesium. Products imported from Japan are being scrutinized carefully too. In the Netherlands, a national network of 55 radioactivity detectors continuously monitors the levels of radioactivity that end up in grass (and therefore in the food chain). In grass samples tested at the end of March and mid-April there were no radioisotopes from Japan.

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METEOROLOGY

New automatic weather station

A new atmospheric weather station was officially opened in Wageningen in April: De Veenkampen. The Meteorology and Air Quality chair group at Wageningen University, part of Wageningen UR, uses the station for monitoring and for experiments for education and research purposes. The weather station is also available for use by third parties. Both current weather data and the observation records are accessible to all at www.maq.wur.nl. Info: bert.holtslag@wur.nl



Frans Kok

PHOTO: SUERO SUSMA

Smarter diet with Professor Kok

'Just eat healthily', advises professor of Nutrition Frans Kok in his new book, *Gezond Eten, gewoon doen*. Switching to a healthy lifestyle once and for all works better than a crash diet.

Many diets, including the latest fad in the Netherlands, Dr Frank's diet, provide too few calories. 'On a crash diet of this kind, people lose a lot of kilos fast, but afterwards they fall back into their old eating habits.' Kok's book, written together with science journalist Broer Scholtens and published in April, takes apart several popular diets and explains the latest nutritional insights. 'It was time for a popular book about nutrition, based on science', says Kok. 'In the media, it is mainly the

scientific disagreements that get aired, whereas there is considerable consensus about what makes a healthy diet. And that message does not get enough attention.' Kok was his own test subject for the book: he ate unhealthily for one month and then switched to a healthy lifestyle for the next month. In the unhealthy month he gained more than two kilos and his blood pressure went up. Everything went back to normal in the course of the healthy month. Info: frans.kok@wur.nl

FOOD TECHNOLOGY

New gluten-free bread tastes 'real'

Food technologist Lieke van Riemsdijk has good news for people with a gluten intolerance. She replaced the gluten in bread with tiny globules of whey protein. With spectacular results: the gluten-free bread that was the end product is light, crusty and indistinguishable from 'the real thing'. A far cry from most gluten-free bread, which tends to be dry and crumbly. There is still some work to be done on the taste and structure of the bread before it is ready to go on the supermarket shelves.

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FOOD PRODUCTION

Timely sowing increases rice yields

Senegalese rice farmers can increase their yields tremendously by sowing at the right moment, preferably in February and August. This finding emerged from field tests by Michiel de Vries, a PhD researcher at Wageningen University, part of Wageningen UR. Rice is very sensitive to the climate in the Sahel, which is subject to big fluctuations in temperature. The Senegalese agricultural extension services are using the results to provide farmers with better advice. Info: michiel.devries@wur.nl



GEO-INFORMATION

Alterra helps aid workers

About forty students and staff of Alterra, part of Wageningen UR, have been spending their spare time updating the map of Japan. Since the recent earthquake and tsunami, the maps of Japan on Google Maps have been out of date: there are roads on them that have become impassable and buildings which no longer exist. 'As a result, emergency workers cannot get their bearings', says Lieke Verhelst, a researcher at Alterra's Centre for Geo-information. An up-to-date and detailed map is vital for rescue operations, but local organizations

cannot spare the staff to update the maps quickly. The Alterra staff and students adjusted the maps on Open Street Map, a sort of Wikipedia for maps. To do this, they used satellite photos of the new situation. Emergency aid workers can upload the new maps onto their GPS receivers. 'Open Street Map is being used a lot in the field', explains Verhelst. This humanitarian contribution was proposed by Ecuadorian PhD student Daniel Orellana, who had already gained some experience of humanitarian mapping. Info: lieke.verhelst@wur.nl



PHOTO ANP

DAIRY



PHOTO NATIONALE BEELDANK

Dairy institute launched

A new 'Dairy Campus' has been launched in Leeuwarden in the north of the Netherlands. The initiators, the province of Friesland, Leeuwarden municipal council, Wageningen UR Livestock Research and Van Hall Larenstein University of Applied Sciences, signed a declaration of intent at the end of January. The Dairy Campus will provide a facility where researchers, students, teachers and dairy farmers can collaborate on forward-thinking innovations for creating a sustainable dairy sector.

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Which gut flora type are you?

Human beings can be divided into three groups, according to the combination of bacteria in their intestines. Just like blood groups, these three groups are found all over the world, irrespective of age, eating habits or race. This claim was made in *Nature* on 20 April by a group of researchers including four Wageningen scientists. 'On the basis of all the DNA sequences in intestinal samples from people in Europe, the US and Japan, we could distinguish three main groups, each with their own typical bacteria populations', says Willem de Vos, professor of Microbiology at Wageningen University, part of Wageningen UR, and one of the co-authors. 'This could explain why the absorption of food and medicines in the intestines varies from person to person.' These 'enterotypes', as the gut flora groups are called, and the species they include, could be used to target individual needs more effectively with diet and medication. Info: willem.devos@wur.nl

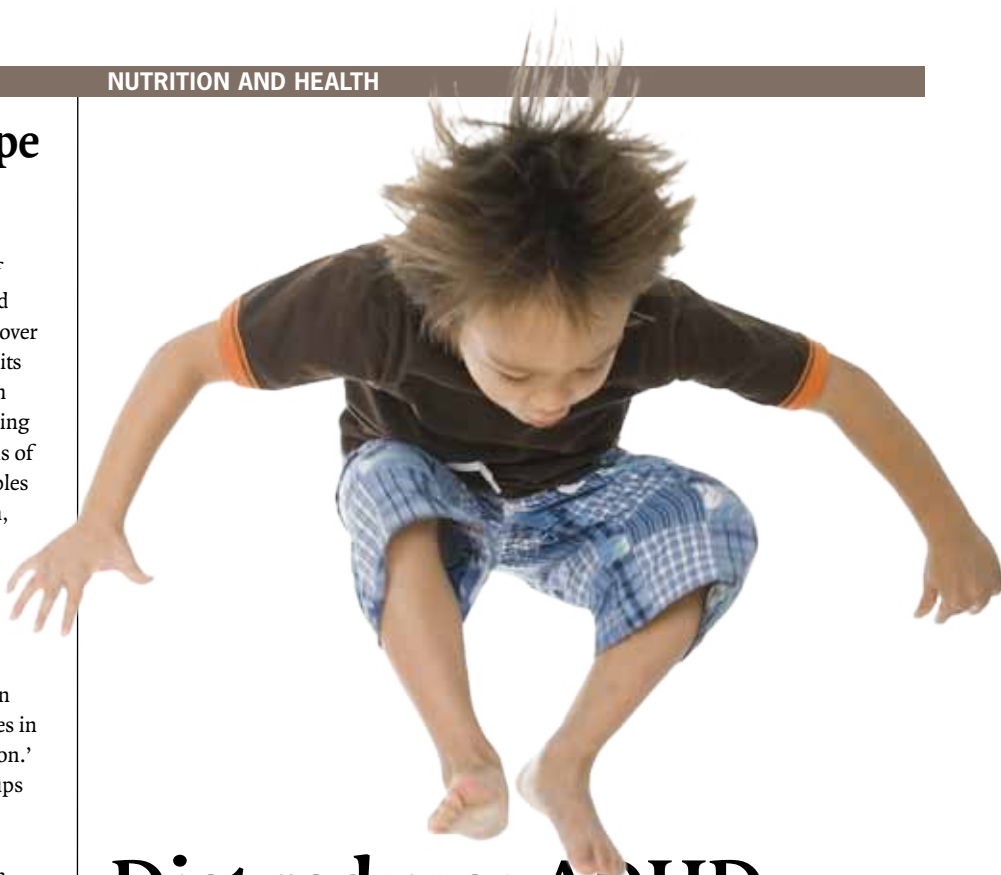
NUTRITION AND HEALTH



Elise apple hypoallergenic

Apples of the Elise variety are suitable for people with a mild apple allergy, it appears from European research in which Wageningen UR was involved. The sweet, crunchy Elise apples have a longer shelf life than the Santana, the other hypoallergenic apple variety. This makes it possible for people with a mild apple allergy – and there are more than 300,000 sufferers in the Netherlands – to buy apples over a longer period of the year.

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Diet reduces ADHD

Children with ADHD can benefit from a special hypoallergenic diet. If they stick to the diet for five weeks, two thirds of them no longer have any symptoms of the condition.

A research group including immunologist Huub Savelkoul and veterinary epidemiologist Klaas Frankena, both at Wageningen University, part of Wageningen UR, put a group of children on the 'RED diet' for five weeks. The Restricted Elimination Diet excludes all products which can cause a food allergy, such as milk, peanuts, nuts, fish, wheat, soya and apples. The behaviour of the ADHD sufferers was monitored at the start and at the end of the test, enabling the researchers to establish that you can influence behaviour with food. Savelkoul: 'This has never been so precisely established for ADHD.'

The research team, which included the AMC St Radboud teaching hospital in Nijmegen and a child psychiatry organization, studied 100 ADHD children, who were divided into a diet group and a control group. After the test, no difference was observed in the behaviour of the children

in the control group. In the diet group, by contrast, the number of children showing ADHD symptoms dropped by 64 percent. Savelkoul is enthusiastic about the research results, which he and his colleagues published in *The Lancet*. 'It is good news for the children, because at present doctors routinely prescribe Ritalin, which loses its effectiveness if it is used over a long time, and can have severe side effects. This research opens up the possibility of health insurers covering nutritional interventions for children with ADHD.' Meanwhile, Savelkoul first wants to use immune profiles to establish whether children have ADHD and whether treatment has any immunological effects as well. Almost eight percent of children aged between 4 and 17 in the Netherlands suffer from ADHD. Info: huub.savelkoul@wur.nl

ENVIRONMENT

Biobased products are more sustainable

Bioplastics and biofuels score higher on sustainability than comparable products from the petrochemical industry. Their manufacture generates smaller volumes of greenhouse gases and uses less fossil energy.

Bioplastics score particularly highly. Making biodegradable PLA plastic from sugar beets, for example, saves 65 percent on fossil fuels. This is reported in a Green Resources booklet on *The Sustainability of Biobased Products* published by Wageningen UR Food and Biobased Research. Together with colleagues from the University of Utrecht, Wageningen researchers studied the sustainability aspects of bioplastics and bio-ethanol made from five different crops: Dutch wheat, maize, sugar beet and *Miscanthus* grass, a sugar cane from Brazil. They compared the bioplastics and biofuels with similar products from the petrochemical industry, using a life cycle analysis to

calculate the greenhouse gas emissions and fossil energy consumption.

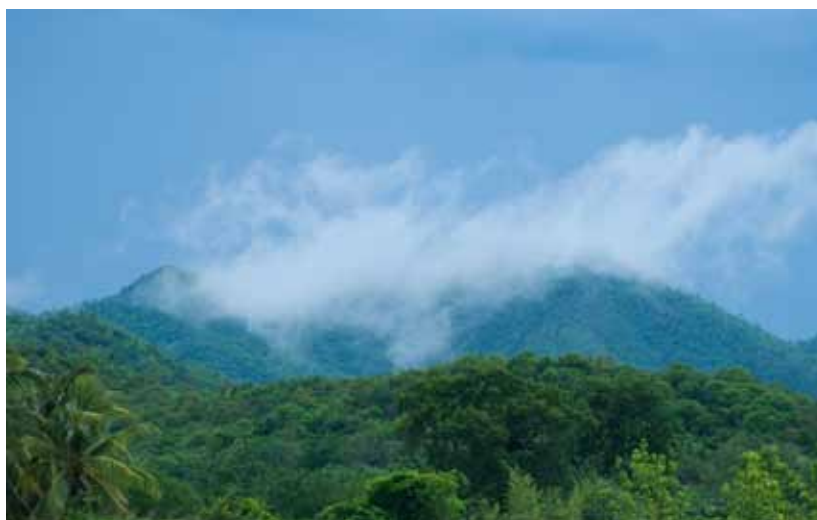
These calculations included the entire production process, from sowing the crop through transport and processing to the production of biomaterial and biofuels. They also took into account whether waste flows such as wheat straw and beet pulp were used as an energy source. This research is the first time that authentic data on the cultivation of crops has been compared with data on chemical production. The researchers did not, however, consider any possible change in land use in this study.

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PHOTO IQ IMAGES

CLIMATE



Tropical forest in growth spurt

Carbon storage in tropical forests has increased over recent decades, tempering the effects of climate change a little. Pieter Zuidema of the Forest Ecology and Forest Management chair group at Wageningen University, part of Wageningen UR, is working on explaining the recent growth spurt in tropical forests by reconstructing the historical growth of the trees. These insights should lead to more precise predictions about how tropical forests react to climate change. Info: pieter.zuidema@wur.nl

AGROFOOD

Organic egg comes out top

An organic egg does not look any different to a battery egg, but it fetches 7 euros more on the market. That can make fraud lucrative. In order to nip fraudulent practices in the bud, RIKILT, part of Wageningen UR, has developed a method of distinguishing organic eggs from the rest. The test measures the levels of carotenoids (yellow pigments) in the egg, as well as certain fatty acids and nitrogen isotopes.

Because organic chickens get different feed, grown without artificial fertilizer, there are different levels of these substances in organic and non-organic eggs. Testing organizations in a number of countries, including the Netherlands, have already shown interest in the new method. Info: saskia.vanRuth@wur.nl



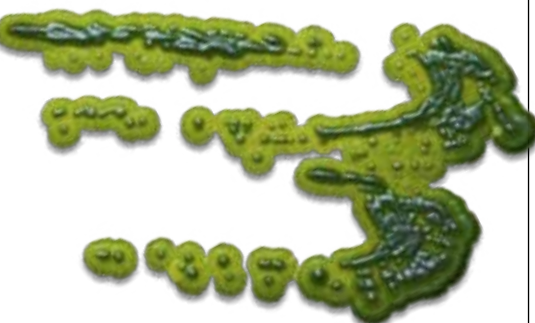
Horticulture centre in China

On 8 April the Sino Europe Agricultural Development Centre opened in Zhangzhou, in the Chinese province of Fujian. This horticultural training centre will provide practical training and research on breeding and marketing flowers, vegetables and fruit. Professor Evert Jacobsen of Wageningen UR's corporate staff will be the academic coordinator of the new centre, which grew out of collaboration between the Netherlands and China. Dutch horticultural businesses in China are participating in the centre along with Wageningen UR.

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www.seadc.com

BIOBASED



Breeding algae on waste

At Wageningen UR's research station in Lelystad, on the shores of the IJsselmeer, a greenhouse is planned in which algae will be bred day and night using sunlight and led lamps. The algae will make use of three different waste flows from a biogas plant: CO₂, residue heat from the combined heat and power plant, and manure from the fermenter. If it is upscaled, this process could provide an alternative to underground storage of CO₂ in depleted gas fields. The biogas installation is located on the site of ACRRES, the Application Centre for Renewable Resources jointly set up by Wageningen UR and energy provider Eneco. Info: www.acrres.nl



PHOTO HOLLANDE HOOGTE

Hospital food gets top marks

If hospital patients can decide at mealtimes what they feel like eating, and how much, far less food ends up in the rubbish bin. This approach cuts costs as well as leading to happier patients who eat better.

The Máxima Medical Centre in Eindhoven and Veldhoven has been working since 2009 on an approach to meals in which patients can put together their meals themselves. Research by Wageningen UR Food & Biobased Research showed that this approach scored well in terms of food wastage. Previously, 42 percent of hospital food ended up in the rubbish bin, and now that figure is 2.2 percent. The meal components are delivered by an external caterer and served to the patients by professional dietetic assistants. The meals are put together and served attractively at the patients' beds, and according to their individual preferences. This 'bed service' proved to enhance patients' experience of the meal and to stimulate their appetites. Besides these positive effects, the system also

has financial advantages. Service costs have gone down and savings are made on catering through lower prices per meal and less food wastage. At the same time, the rating of the food has gone up. Patients now give the food 8 out of 10, whereas it used to get 6 out of 10. There is no evidence yet on the extent to which the new approach to meals promotes the patients' recovery and thereby cuts treatment costs. 'But considering we can see that patients eat earlier in their recovery period and eat more and a greater variety, I would imagine that this would eventually cut treatment costs', says Joost Snels, a researcher at Wageningen UR Food & Biobased Research. The research was commissioned by the Ministry of EL&I.

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TRADE

Dutch imports destroy biodiversity

The Netherlands is a big importer of tropical products such as soya, wood and palm oil, for the production of which large tracts of forest are turned into plantations. This means a direct loss of biodiversity in the area as well as fragmentation of the remaining forest and nature areas, concluded researchers from Alterra and the LEI, both part of Wageningen UR, in a report called *Dutch Trade and Biodiversity*.

The development of large-scale companies in Brazil, Indonesia and Malaysia creates jobs for the local population, but also has negative socio-economic effects. The report advises the Dutch government and business sector to take steps to limit the negative impact of imports, for example by aiming for sustainable intensification and higher yields per hectare.

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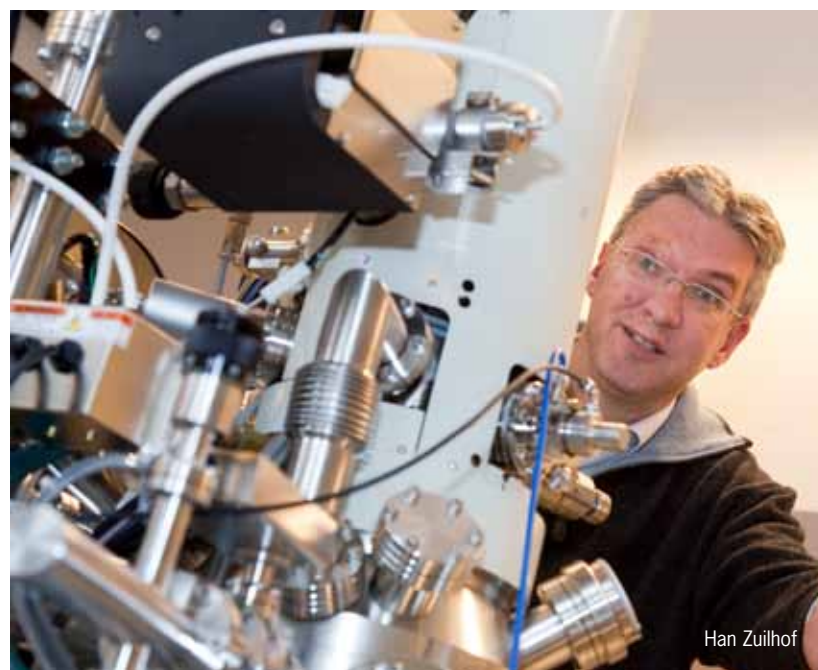
INNOVATION

Boost for bionanotechnology

Wageningen UR has been promised 19.6 million euros for work on innovations in the field of bionanotechnology. The funding comes from the NanoNextNL programme, in which companies and research institutes develop new products and processes to improve nutrition, health and living environments. There is a role for micro and nano technology in the creation of tasty healthy food, such as products that taste and feel fatty but are actually low-fat. Secondly, Wageningen researchers working on the

theme of Nanomedicine are developing a test for spotting diseases fast and reliably. A third track of the research is concerned with the precise detection of small particles. Using modern techniques, researchers can study the toxicity of new nanoparticles, for example, as well as find out what effect naturally occurring nanoparticles have on our foods. NanoNextNL is a collaboration between more than 100 Dutch companies, universities and research institutes.

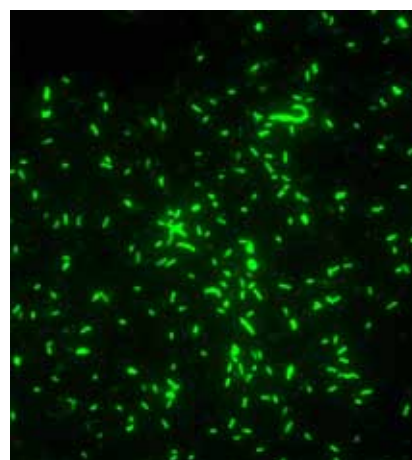
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Han Zuilhof

PHOTO GUY ACKERMANS

TOXICOLOGY



Bacteria light the way in drug-testing

Medical drugs under development can be tested for toxic side effects at an earlier stage, thanks to a method developed by Wageningen PhD holder Walter Westerink. Eventually, this can cut the amount of animal testing needed.

Toxic side effects from potentially useful drugs are often only discovered at a late stage in the development process, when sufficient quantities of the drug have been produced to run a testing programme. By this time, years of investment have gone into the substance. The method developed by molecular biologist Walter Westerink makes it possible to run tests at an earlier stage, using just a few milligrams of the substance. Westerink, who works for MSD (formerly Organon) in the Dutch town of Oss, received his PhD from toxicologist Ivonne Rietjens at Wageningen University, part of Wageningen UR.

The most common side effect of new drugs is gene toxicity, or damage to DNA. Westerink looked for faster testing methods for quickly testing large numbers of potential drugs. Westerink: 'The big advantage of early testing is that you still have a chance to adjust the chemical structure to make a substance less toxic and more effective.'

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The eel is slipping away

It is now or never for the eel. Catches are falling and only small numbers of young eels are trickling into the Netherlands, while locks and pumping stations prevent the adults from reaching the sea. Will a fishing ban save the eel?

TEXT HANS WOLKERS PHOTOGRAPHY HOLLANDSE HOOGTE AND GETTY IMAGES ILLUSTRATION SCHWANDT INFOGRAPHIC

Aren't they beautiful, they swim so gracefully!' Researcher Christian Tudorache gazes enthralled at a fat eel in a plexiglass tank full of water. The creature is a picture of grace and elegance as, fins rippling, it swims in practically perfect S formations. The eel researcher, based at the University of Leiden, is trying to solve one of the many mysteries surrounding this fish. 'According to biomechanical calculations, eels are incredibly inefficient swimmers', says Tudorache. 'It seems impossible that they could make the journey to their breeding grounds, about 6,000 kilometres away, without eating and simply by living off their fat reserves.' But when the researchers got their eels to swim this astonishing distance in the tunnels, they turned out to use at least five or six times less energy than trout do. 'Nobody knows how they do it; that is what we are trying to find out.' The eel is an enigmatic creature at the best of times. In spite of all our technological expertise, the life cycle of the eel remains shrouded in mystery. Young eels, known as glass eels, migrate from the sea into the inland waters

of Europe and stay there for about fifteen years, until they reach adulthood. Then they return to the sea to breed. And that is as far as our knowledge of their life cycle takes us. We are not even sure about the location of the eels' breeding grounds. It is thought to be somewhere in the Sargasso sea, where eel larvae have been spotted (see text box).

EEL CRISIS

The eel is in trouble. Big trouble. The numbers of eels migrating into Europe have reached an all-time low. According to researcher Martin de Graaf of IMARES, part of Wageningen UR, they are now at about one percent of the numbers of thirty years ago. Eel catches have also fallen dramatically. Catches by a group of fishers selected for a study dropped steadily from 1994, going down to 30 percent of the starting levels. And the numbers of eels sold at the fish markets around the IJsselmeer lake dropped by more than 90 percent in ten years. And the European eel is not the only problem case. The American and Japanese >

eel populations are in sharp decline too.

The European eel crisis started more than a century ago, but the decline went almost unnoticed at the time. Not least because key episodes in the life cycle of the eel, its migration and reproduction, are not visible to us. It was only in the nineteen eighties, when the migration of glass eels into Europe took a dive, that alarm bells began to ring. Scientists and fishers urged governments to take action, but to no avail, at least until quite recently. It was only in 2009 that government bodies took up the cudgels: the EU insisted on its member states coming up with concrete 'eel management plans'. At this point the norm was adopted that at least 40 percent of the adult eels should be able to migrate to the sea to breed.

SAVING SILVER EELS

So the Dutch government, too, was forced to take the eel problem seriously. Given that the Dutch eel fisheries are by far the largest in Europe, with 200 companies netting 920 tons of eel per year, a seasonal fishing ban seemed an obvious option. The then minister of Agriculture, Nature and Food Quality did indeed impose a ban on eel fishing from September to November. The ban is on the agenda for this year again. These months are the period when the adult eels, known as silver eels, migrate from the freshwater rivers out to sea and on to their breeding grounds. And it is saving these fish that can be effective. The trouble is that these are precisely the three months in which fishers can net 70 percent of their annual catch. Arjan Heinen, advisor on fisheries management at the Combinatie van Beroepsvissers, an umbrella organization for professional groups in the sector, is doubtful about the effectiveness of a fishing ban. 'The river eel in particular is so badly polluted with chemicals that it is very doubtful whether it is able to breed successfully', he says. 'Eels in the polders are much cleaner, but they cannot get away into the sea because of the countless weirs and pumping stations.'

Some scientists are sceptical too. 'The main reason for the fishing ban is that people are walking around with blinkers on and do not see that there are several reasons for the decline of the eel', claims eel expert Guido van den Thillart, from the University of Leiden, who thinks it is therefore pointless to target the fishers alone. He sees urbanization and the destruction of eel habitats that go

with it as a major factor in the eel problem: migration routes get closed off, water meadows are flooded less often, and canalizing rivers makes them flow faster, washing away nutrients, which is bad for eels. 'It is no coincidence that the three eel species which have suffered the biggest decline are the ones that come from the most urbanized areas', he states. 'Break down the Afsluitdijk and return the IJsselmeer lake to the sea, and you would do more to help restore eel stocks.' According to Johan Verreth, professor of Aquaculture and Fisheries at Wageningen University, part of Wageningen UR, the eel debate is not being conducted very rationally, and too many assumptions are being made about the fish. Besides factors related to the inland waterways, such as locks and pump houses which stop the eel from migrating, there could be factors in the sea that play a role. Hardly anything is known about what goes on there. Are ocean currents or water temperatures altered by climate change? We are still only guessing. Verreth too is convinced that there are multiple factors involved in the decline of eel populations. 'Politicians are passing a disproportional amount of the blame on to the eel fisheries', he says. 'I am not against a temporary ban on fishing silver eel, but it might be far more effective to solve the problems surrounding migration.'

VALUABLE FISH

IMARES researcher Stijn Bierman thinks there is something to be said for a temporary ban on fishing eels that are on their way to their breeding grounds. 'The migrating silver eels are very valuable fish; they are the survivors', says the population ecologist. 'You can assume that the fishing ban will contribute to an increase in the numbers of migrating silver eels.' The Dutch eel management plan is based on scientific calculations that show that in the long term, limiting eel fishing is an effective measure for making sure that larger numbers of the fish reach the sea. A Europe-wide fishing ban would mean that about 320 tons of silver eel would reach the sea in 2012. The figure would eventually reach almost 2,000 tons, albeit only in 2090. On the basis of these figures, the Worldwide Fund for Nature (WWF) is a strong supporter of the fishing ban. In fact, the organization would like to see eel fisheries closed down for good. 'It is irresponsible to go on fishing a species that is as seriously threatened as this one', says Carel Drijver, head of the Oceans and Coasts programme at the Dutch branch of WWF. He points to findings by scientists from IMARES: more than 60 percent of the adult eel deaths, well over 900 tons per year, can be put down to fishing. And that is without counting the unbridled fishing of glass eels in France and Spain. Until recently as much as 97 percent of the glass eels there were caught for consumption or for fattening up in fish farms. A large number were exported to China as well. This is banned from 2012. ➤

'Politicians are putting too much of the blame on the eel fisheries'

THE EUROPEAN EEL

The European eel is found in large areas of Europe and North Africa in all kinds of waters. Eels have a preference for water with muddy beds and plenty of hiding places. They are largely nocturnal and hunt riverbed creatures. During wet weather, eels can cross land barriers.

The eel has a flexible body and a slimy skin, and is usually brown in colour



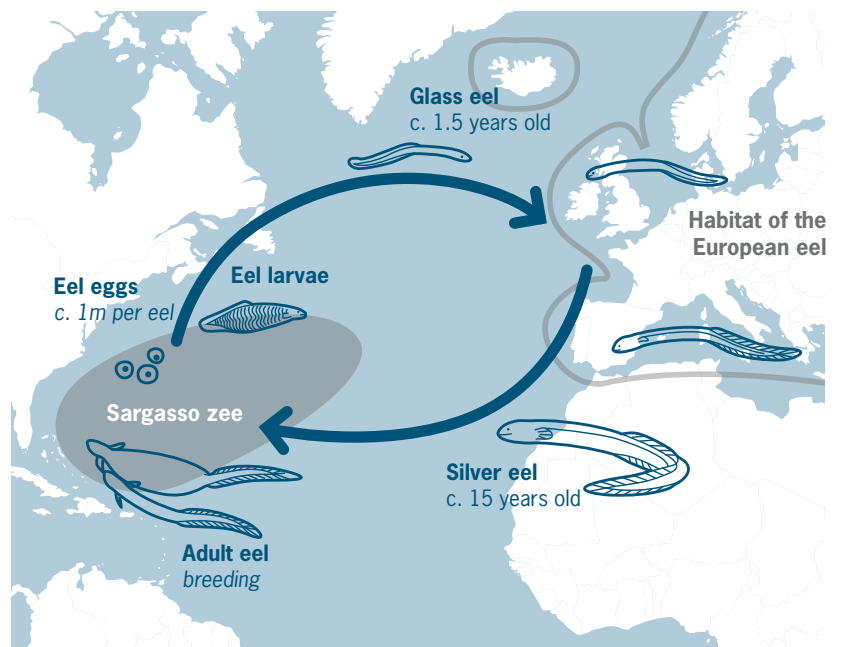
← The eel can reach lengths of more than 1 metre →

Life cycle

It is assumed that at some point between the ages of ten and twenty years, European eels trek from the fresh waters of Europe to the Sargasso Sea to breed. This means swimming more than 6,000 kilometres on an empty stomach. The trek takes six months, and the fish live off their fat reserves.

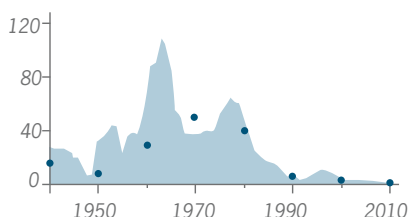


There is no hard evidence for the Sargasso Sea scenario: neither adult eels nor eggs have ever been spotted in the Sargasso Sea, only eel larvae, which could have been carried there on ocean currents. The eel larvae drift for one and a half years on the ocean currents in the direction of European coasts, where they develop into glass eels and swim upriver. There they grow into adult eels.



Eel stocks

Declining influx into IJsselmeer



- Number of eels per sample
- Running average (5 years)

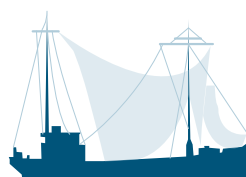
The influx of eels into the IJsselmeer in recent years has been a small percentage of the average between 1950 and 1980. This reflects a decline across Europe.

Threats

Fisheries in the Netherlands

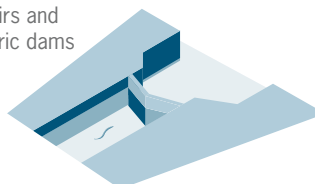
Commercial catch
920 tons per year

Amateur catch
200 tons per year

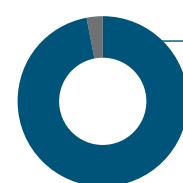


Closed-off migration routes

Pumps, weirs and hydro-electric dams



Glass eel catch



97%

Percentage of the total glass eel population. Glass eels are mainly bred for consumption.

Other threats

Diseases, water pollution, cormorants



MEASURES TO RESTORE EEL STOCKS

Europe

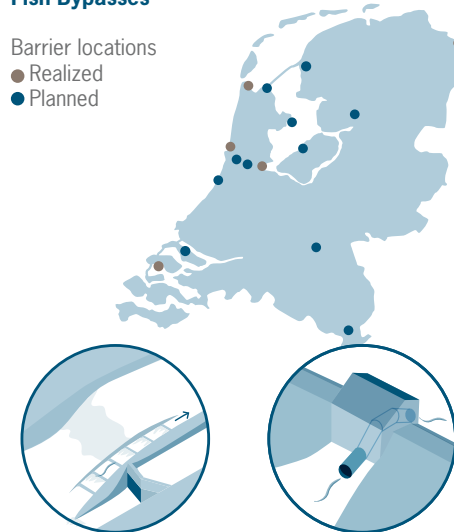
In 2007, the EU introduced legislation to protect the eel. Aim: 40% of silver eels reach the sea. EU countries each made their own eel management plan. In 2009, the eel was included in the CITES treaty on international trade in threatened species. Exports of glass eel from Europe have been banned since then.

Dutch eel management plan

1. Fishing ban from September to November
2. Removal or bypassing of 30 major migration barriers by 2027
3. Reducing eel deaths in three hydro-electric power plants on the major rivers by 35 percent
4. Releasing glass eels

Fish Bypasses

Barrier locations
● Realized
● Planned

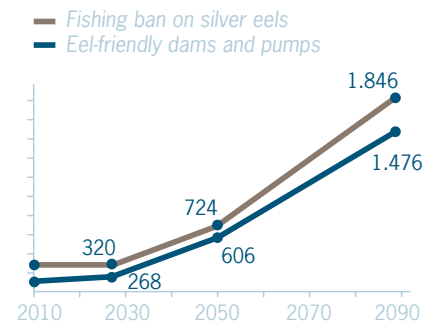


A fish staircase for getting past a dam or weir or bridging a difference in water levels

Special facilities to help eels get past power stations or pumps

Goals

The goal of efforts to restore eel stocks is an increase in numbers of out-migrating silver eels from the present 400 tons per year to 5,200 tons per year. Expected by 2090.



The effect of 2008 measures to improve eel stocks, expressed in tons of eels reaching the sea.

The idea of a total fishing ban in the Netherlands, such as the WWF proposes, does not go down well in all quarters. Van den Thillart and Verreth, and IMARES researchers De Graaf and Bierman, think it is necessary to restrict eel fishing but do not think an all-out ban would be sensible. They see the survival of the sector as important for monitoring eel stocks and as an economic incentive to maintain them. William Swinkels, board member at the Sustainable Eel Foundation (Dupan), a coalition of fishers, fish farmers and smokers, is even willing to have the costs of restoring eel stocks covered by the sector. 'Our right to exist stands or falls with the health of the eel stocks', he reckons. 'As a precaution you should allow the sector to continue as long as it helps restore the eel stocks.'

'You don't eat panda meat sandwiches and then donate the proceeds to panda conservation', says Drijver of the WWF, referring to a campaign in which Dutch MPs were offered bread rolls with a toy panda head sticking out of them to make a point about the implications of eel consumption. The WWF thinks eel fisheries have a bright future in spite of the current ban. 'We must not lose their knowledge' says Drijver. 'The fishers can play a role in the management of the inland waterways and the re-establishment of the eel.'

However, a fishing ban only works effectively if the migrating fish can reach the sea, and that is a major challenge, in view of the numerous waterworks in the Netherlands. According to Marcel Klinge, fish migration expert at tech-

nical consultancy firm Witteveen+Bos, there are 10,000 weirs and almost 5,000 pumping stations on Dutch inland waterways. These barriers make it very difficult for glass eels to migrate up the rivers from the sea. But they are even more of a problem for adult eels on their way from the fresh water to the sea: the pumping stations then work like mincing machines if the eels risk swimming into them. 'Because eels are long fish, they do not stand much chance of getting through a pumping station alive', explains Klinge. According to Swinkels of Dupan, this is not the only problem. The pumping stations also make for an abrupt transition from fresh to salt water. Brackish water zones have therefore almost disappeared from most parts of the country. And these are precisely the zones in which the eel is at home. 'In areas where there are still some brackish zones, such as Zeeland, the eel is doing noticeably better', claims Swinkels, who says the eel habitat has shrunk over the years by 90 percent. He argues for a discussion that does not focus exclusively on the issue of overfishing. 'We want attention paid to improving the habitat and restoring migration routes.'

GETTING PAST THE PUMPS

The EU Framework Directive provides for such as approach, as it requires member states to take steps to open up their waterways for the fish so that they can get past the waterworks. The fish-friendly pumps developed by Klinge and his colleagues make this possible, but according to ex-

perts from Witteveen+Bos, things are moving too slowly. Between 2010 and 2015, the Netherlands needs to create 600 fish bypasses, but it is running behind schedule.

Action is especially slow in relation to the pumping stations. ‘The market needs time to accept innovations’, explains Klinge. ‘Which is particularly galling in this case because opting for fish-harming pumps now means the problem will still be with us for decades.’

A missed opportunity for the eel, because much can be gained by making the waterworks passable. According to the Dutch eel management plan, this measure would make a substantial contribution to increasing the numbers of silver eel that escape to the sea, so that it would reach about 1,500 tons in 2090. Together with a fishing ban, this would bring Dutch output to 3,500 tons in 2090. That is still not enough though. To keep the species going, researchers have calculated that it is necessary for about

5,000 to 6,000 silver eels to reach the breeding grounds. ‘But we don’t know for sure whether 5,000 to 6,000 is the sustainable level; the calculations are shot through with assumptions’, says IMARES researcher Martin de Graaf. One thing is certain: the restoration of the eel is a long-haul project. One of the complicating factors is that eels live so long. Bierman: ‘Because these fish need ten to fifteen years before they can reproduce, the effect of measures can only be worked out much later.’ Eel stocks have not reached an all-time low yet, either, according to Bierman.

RESCUE PLAN

For the time being there are only plans and good intentions. Only the Sustainable Eel Foundation Dupan is already actively working on saving the eel. Since 2010, the foundation has released millions of young eels after feeding them up in nurseries to increase their chances of survival. The funding for this will be raised by selling eels for consumption. ‘One out of four young eels that come into the nursery will be returned to the wild’, says Swinkels proudly. Dupan has now received a grant from the Ministry of Economic Affairs, Agriculture and Innovation for research on whether the young eels that are released really do survive their return to the wild.

Scientists are cautiously critical of this kind of release. ‘Are these semi-tame eels really going to migrate to the breeding grounds?’ wonders Professor Verreth. ‘You are transplanting the eels, and whether that will really help to boost the population is not certain.’ Precisely because of the many uncertainties surrounding the eel, he feels it is important to tackle the issue with a wide range of measures. ‘Things are looking absolutely grim for the eel’, claims Johan Verreth. ‘In the short term it is impossible to come up with a rescue plan that guarantees success.’ For this reason, he feels the best hope lies in a combination of different measures. Restricting fishing, releasing young eels, and breeding them in captivity look like the most promising options.

BREEDING LARVAE

And in the field of breeding eels, there is even some light on the horizon. Up to now, no one has succeeded in getting the fish to breed in captivity, which made fish farmers 100 percent dependent on catching wild glass eels. But in eel research in Leiden, new insights gained into the energy use of swimming eels led to a breakthrough in knowledge about their reproduction. The group in which Tudorache and Van den Thillart work implanted modified cells from zebra fish embryos, which produce sex hormones, into adult eels. The fish then went on to produce sperm and embryo cells and eventually the team was successful in breeding larvae. Van den Thillart: ‘The principle is there now. We still need to do some fine tuning, but I think the method will be viable in five years.’ ■



‘Break down the Afsluitdijk, and you would do more to help restore eel stocks’

Done to a turn in no time

Jeroen Knol had never dared to hope that the Nutri-Pulse e-Cooker would work as well as it does. This machine, developed by Wageningen researchers together with a company called IXL Netherlands, does meat and vegetables to a turn. In seconds.

TEXT KORNE VERSLUIS PHOTOGRAPHY IXL NETHERLANDS

The Nutri-pulse e-Cooker is faster than a microwave oven, uses less energy than a gas ring and enables even an amateur cook to produce perfectly cooked fish every time. This machine could be the next revolution in the kitchen, thinks Jeroen Knol, a researcher at Wageningen UR Food & Biobased Research who was involved in the development of the machine. Johan Verbon, chef at the Restaurant of the Future on the Wageningen campus, is enthusiastic too. 'You can dose the heating', explains Verbon, who has already experimented with the Nutri-Pulse at length. 'It is ideal for fish, for example, a pricy product that is only going to get more expensive in the future. So you want to take care with it. Fish shouldn't be allowed to get too hot, because it will dry out. You can set the Nutri-Pulse to heat the whole fish to 54 degrees. Then it will be done

to a T. Firm, flaky, juicy. And it's idiot-proof. Anyone can do it.'

PULSATING ELECTRIC FIELD

The technique that the machine is based on comes from research on mild conservation methods. One of the methods being researched in Wageningen is pasteurizing juice and other fluids using pulsating electric fields. The high tension and the fast alternation in the strength of the electric field damage the membranes of bacteria and fungi. The electric current warms up the juice, but not above 40 degrees, so that it keeps its flavour better than it does when it is pasteurized at high temperatures. What you get, says Knol, is 'orange juice that tastes as though it was freshly squeezed but can be kept for weeks.'

The idea of using the technique for some-

thing completely different came from the business world: Govert van Oord of OMVE Netherlands, a company that develops electrical equipment, made a suggestion. 'Van Oord had a brainwave. He wondered whether we would also be able to use the technique to actually cook food.'

This suggestion turned out to have hit the mark. Initial tests showed that food heats up very evenly and incredibly fast when exposed to electric pulses. Vegetables and most types of meat are done in seconds, while stringy meat that would have to simmer for a couple of hours in a braising pan is done in four minutes in this machine.

LESS ENERGY

According to Knol, then, the Nutri-Pulse delivers faster results, can be used by anyone, probably produces healthier food and,



The Nutri-Pulse e-Cooker plus pans.

as if all that were not enough, will require 80 percent less energy to run. Sounds too good to be true. Certainly considering that the technology it is based on is being researched in many places in the world. Knol: 'During a scientific conference at which we presented the Nutri-Pulse, many colleagues wondered why they hadn't come up with this idea themselves. But someone has to be the first, of course.'

IXL and OMVE built the e-Cooker in the form of a column for all the electronics with the cooking unit on the top, which consists of one or more quarter-litre pans. Johan Verbon hopes to have one in his kitchen soon. 'It is a beautiful gadget. It is safe, you don't have to heat the food to 100 degrees, you don't need an extractor fan, because it produces hardly any steam,

and anyone can operate it. If you buy one e-Cooker together with a couple of the pans that go with it and start a restaurant in your living room, you could earn yourself a star in a couple of years.'

Why the cooking process goes at such lightning speed is not entirely clear, says Knol. 'We know that the temperature rises very gradually; we also see that the electric field changes the proteins and membranes. But we do not yet understand quite what goes on inside the vegetables and meat. We also suspect that the machine helps make health-giving nutrients in vegetables more available, but we would very much like to do research on that using well-designed tests on volunteers. We hope to find partners so we can get more basic research done.'

Info: www.nutri-pulse.com ■

'We don't yet understand what goes on inside the meat'



Bubbles from the sea bed

Government plans for underground storage of the greenhouse gas CO₂ met with fierce local opposition in the Netherlands. The latest proposal is to make use of depleted oil and gas reservoirs under the North Sea. Is that a good idea?

TEXT RENÉ DIDDE ILLUSTRATION RHONALD BLOMMESTIJN PHOTOS GUY ACKERMANS

It all started with a Dutch government plan for a trial in which CO₂ would be stored in an empty gas field near Rotterdam and then another in the northern Dutch province of Groningen. At neither location were the local residents at all happy to have CO₂ stored in their 'back yard'. So the plan was ditched and Minister Verhagen of Economic Affairs, Agriculture and Innovation turned to the North Sea. Not a bad idea, says Chris Karman, researcher at IMARES, part of Wageningen UR, in the coastal town of Den Helder. 'If we want to store CO₂, then old natural gas reservoirs under the North Sea are not a bad option', thinks Karman. 'The chances of gas leaking from these age-old reservoirs are very slight.

And if it did happen, all the evidence up to now suggests that any damage would be very local. But the problem is that the data are not very widely available and are not described in clear-cut terms.'

'If the correct data are available, it is possible to indicate what the effect would be if CO₂ did unexpectedly escape from the reservoir. This could help the industry make the right decision about whether or not to store CO₂ in particular areas', says Karman. One of the potentially harmful effects would be acidification of the seawater due to leakage of CO₂ from the seabed. With this in mind, IMARES is currently conducting unique practical tests by imitating the North Sea ecosystem in large tanks in which the

effects of acidification due to escaping CO₂ can be pinpointed. 'By reducing the acidity of the seawater in the tanks, we hope that in a few months we will have a clear picture of the effects of any possible acidification.'

TOO FEW RESERVOIRS

Karman does emphasize, however, that the storage of this climate-warming gas, which is released by all burning processes, is no more than a temporary solution. 'Permanent storage of all the CO₂ is impossible, if only because there are too few safe reservoirs in the world which could serve as stores. What is more, at some point all these depots will be full', says Karman, who emphasizes that CO₂ storage is no more than an inter- ➤



JAN BROUWER,
TNO/CATO-2

'Whether people live above it or fish swim above it makes no difference to the suitability of the reservoir'



CHRIS KARMAN,
IMARES, part of Wageningen UR

'Old gas reservoirs are not a bad option for CO₂ storage'

imeasure. 'In the end we will have to turn to sustainable resources, such as sun, wind, tides and biomass, to meet our energy needs. And of course we shall need to save energy by developing more efficient processes.'

Director Elco Leemans of the North Sea Foundation does not have a good word for the idea of shifting the CO₂ storage from land to the seabed. 'A very bad idea of Minister Verhagen's', says Leemans. He is irritated by the underlying mentality. 'The sea is always suggested when a problem cannot be solved on land. Whether it's a matter of barrels of poison, plastic waste or other forms of dumping'. For many people, the slogan has always been 'dilution is the solution for pollution', says Leemans. 'You can see it again now in relation to the problem of the nuclear power station in Japan. Radioactive water needs to be dumped, because there are not enough storage facilities on land. So off they go, and dump it in the sea. And then you get experts on TV declaring that, after all, the oceans can ensure the pollution is diluted endlessly.'

And marine life cannot defend itself. The angry residents of Barendrecht, near Rotterdam, and of Groningen province, made their feelings known in public debates on the CO₂ plans, but fish and seals do not have a platform. 'That is why we are putting ourselves forward as the advocate of the sea', explains Leemans. He has very little faith that Chris Karman's research at IMARES will show that the dynamics of the ecosystem can withstand the severest of the blows it could be dealt. 'If CO₂ leaks from that kind of underground reservoir, there really could be some very serious acidification. Many marine creatures, such as shellfish, badly need the calcium in the seawater to build and maintain their skeletons. If CO₂ gas leaks out, whether directly from the pipes or from the injection well, these animals will definitely be in difficulties at

that location. And CO₂ is poisonous to fish as well', adds Leemans. He also points out that seabed life will be disturbed by the laying down of kilometres of pipes that will bring the unwanted gas from the land to the reservoir.

EXCUSE FOR COAL-FIRED POWER STATIONS

Besides his objections to storing CO₂ in the seabed, Leemans has fundamental criticisms. 'CO₂ storage is first and foremost an excuse for building coal-fired power stations', he believes. He also thinks that storing the CO₂ will absorb an extraordinary amount of government funds and – paradoxically – use a great deal of energy. 'One quarter of the energy generated by a coal-fired power station is required for CO₂ storage', says Leemans.

In other words: to transport and store the amount of CO₂ emitted by four power stations requires a fifth power station. 'That is right', confirms Jan Brouwer, the TNO programme manager, seconded for several years to the CATO-2 programme, a collaboration between government, the business world and research institutes. CATO-2 has been pondering the issues surrounding CO₂ capture, transport and storage since 2003. 'Just as you need energy to build wind turbines and, certainly until recently, you needed an awful lot of energy to make solar cells', says Brouwer. Unlike Karman and Leemans, Brouwer does believe CO₂ storage can provide one of the solutions to the climate problem. 'Switching to sustainable alternatives such as wind, sun and biomass, and making our use of energy more efficient and economical are also important and unquestionably necessary measures', says Brouwer.

So why not focus all efforts on those measures from the start? 'These techniques are not yet available on a large enough scale', Brouwer replies. 'With CO₂ storage you buy

time to arrive at real solutions. Compare it with a rowing boat that starts to leak when you are in the middle of a lake. Then you will have to start bailing out so as to get to the shore, where you can repair the leak. You shouldn't oppose bailing out the water, otherwise you will drown before you reach the shore.'

Brouwer recognizes that CO₂ storage demands a lot of energy. 'Even the disposal of gases such as SO₂ and NO_x from refineries, power stations and waste disposal plants carries a hefty price tag. But in the interests of combatting acidification, we have agreed that we will just have to pay that price. And that is what we should do with CO₂ storage too.' The CATO-2 programme manager believes that, technically speaking, there is no difference between storage on land and storage under the sea. 'Whether people live above it or fish swim above it makes no difference to the suitability of the reservoir', says Brouwer. 'We are talking about abandoned gas fields. We have selected the most suitable locations with great care. These gas fields have been gas-tight for a hundred million years. If they weren't, there wouldn't have been any natural gas in them.'

Someone else who thinks CO₂ storage in old gas fields is a perfectly sound idea is Professor Rik Leemans (no relation of the director of the North Sea Foundation) of the Environmental Systems Analysis chair group at Wageningen University, part of Wageningen UR. 'But of course it is not the

solution to the climate issue', says Leemans. Sustainable energy comes first, and energy saving comes second, but by the time these fundamental solutions are available on a large scale, we will be 40 years down the line, thinks Leemans. 'Meanwhile, forests and oceans are fixing about half the CO₂ emissions, and still far too much ends up in the atmosphere, so that the warming goes on.'

ARMED AGAINST NEXT ICE AGE

There is little danger of the acidification of the sea that the North Sea Foundation fears could happen if anything goes wrong during transportation, says the professor. It would be on a very limited scale, and besides, he says, 'capturing and storing CO₂ will actually combat the further acidification of the marine environment. Because CO₂ emissions in the air are buffered in the oceans, which definitely makes them more acid. A great deal of research has been done on that.' The parallel with the dilution of pollution, as with the radioactivity in Japan, does not hold, according to Leemans. 'In gas reservoirs the CO₂ is locked up for millions of years, in principle. You could – for the sake of argument – release it again when the earth cools down and we enter the next ice age. Do it, is Professor Leemans' conclusion on CO₂ storage. 'Of course it will cost a bit. But then cars would be a good deal cheaper if we left out the crumple zones and the airbags too. Safety is worth something to us, apparently.' ■

'Of course it is not the solution to the climate issue'



EELCO LEEMANS,
North Sea Foundation

'The sea is always suggested when a problem cannot be solved on land'



RIK LEEMANS,
Wageningen University, part of
Wageningen UR

'Capturing and storing CO₂ will actually combat the further acidification of the marine environment'

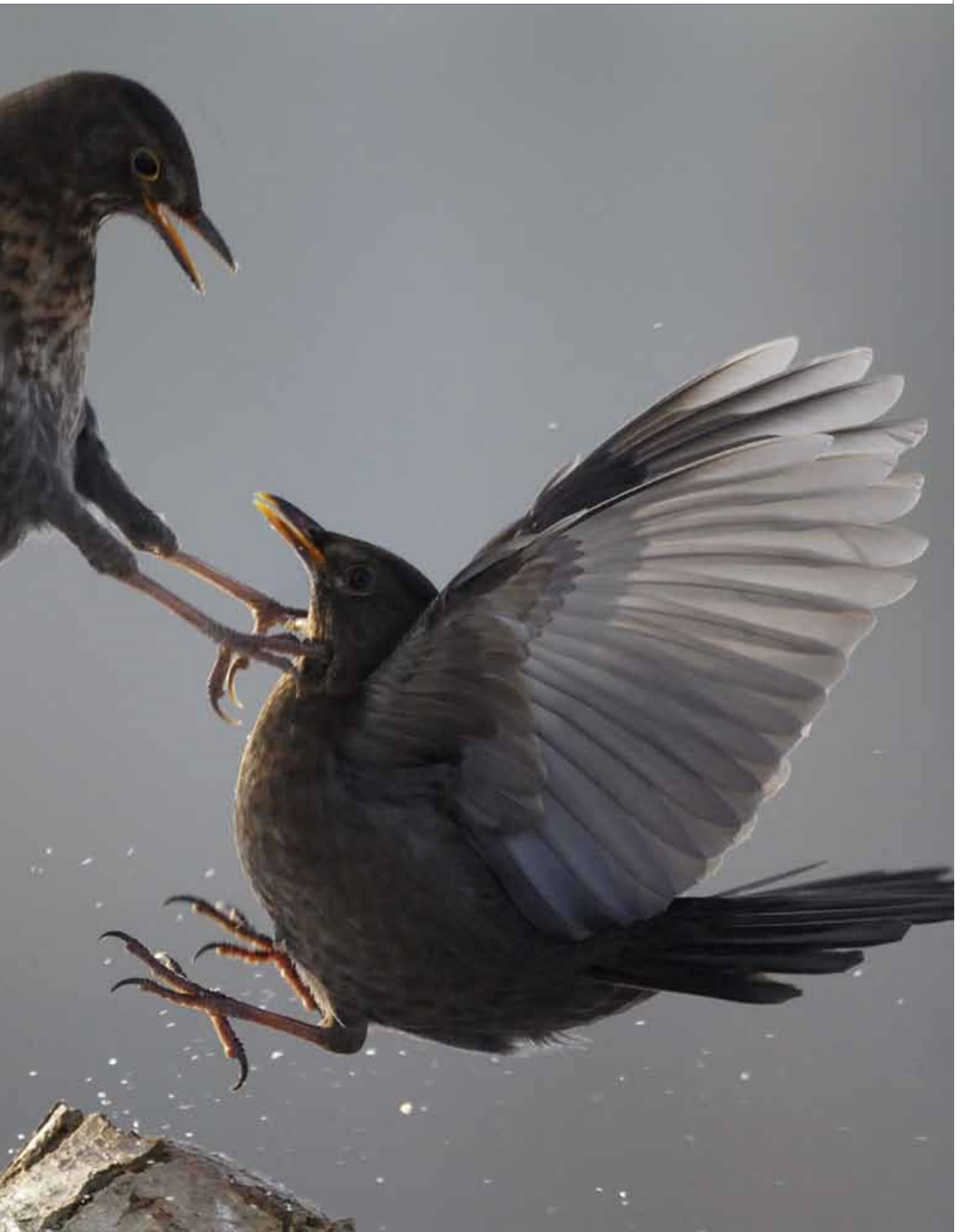


ON A FLIGHT ARTISTS FILM COURSE

Forty frames per wing beat

Several hundred people have been let loose in the Netherlands this year with high-speed cameras. They are helping with the Wageningen Flight Artists project by filming anything that flies, all in the cause of science. 'We are going to see things that have never been seen before.'

TEXT YVONNE DE HILSTER PHOTOGRAPHY FOTO NATURA





Arjan Verschoor is keen to film a mosquito the second before it is swatted with a newspaper. As a participant in the Wageningen UR Flight Artists project, he is consulting a colleague about how to go about it. Verschoor has come to Wageningen today to practise using the high-speed camera. He is one of 800 people who volunteered to film flight movements, to help scientists gain more insight into the flight behaviour of animals and seeds.

This involvement of the general public, by getting them to record flight behaviour on high-speed cameras, is another aim of the Flight Artists project, run by a team of Wageningen scientists and students led by David Lentink of the Experimental Zoology chair group at Wageningen University (part of Wageningen UR). At the end of last year, the Flight Artists received the Annual Academic Prize for the best idea for making scientific research accessible to a broader public. The prize money of 100,000 euros and funding from sponsors were used to buy cameras: 30 user-friendly high-speed colour cameras and one top-of-the-range Phantom camera. With this camera you can even record the wing beat of a fruit fly, with its five millimetre wingspan, on high definition film.

But filming with the cameras is not simple: before the participants can borrow the cameras for two days they have to attend a one-day course. This is partly to check that they handle the equipment carefully, but mainly because this kind of filming is quite different to using an ordinary video camera. 'With high-speed filming, it's not about composition', explains Lentink. 'Nor can you quickly switch on the camera or adjust it when something interesting happens, because by then you are too late. So you run the camera, adjust the settings and quickly press stop once the moment you wanted

to capture has passed. The camera keeps all the images in its working memory.' We are talking about enormous amounts of data. The smaller handy camera can take a maximum of 600 frames per second and up to five minutes of film; the top quality Phantom camera records up to 22,000 frames per second, and in no more than a few seconds its 16 gigabyte memory is full.

From April to early October, the members of the Flight Artists team are running courses every weekend in Wageningen and several rural locations in the Netherlands: the Nieuwkoopse plassen, the Brunsummerheide or the Boswachterij Hardenberg.

BLOOD AS BAIT

'The question is how to get the mosquito to sit on the spot I've got my camera trained on', says Verschoor. His course-mates advise him to use blood or a bare arm as bait. Meanwhile, participant Jeroen Voogd is not sure now to go about filming his moths. He makes regular evening trips into the countryside, armed with sheets and lamps with which to study moths. The chance to film them adds a new dimension to these activities. 'You have to decide to press stop after one or two seconds, otherwise the memory will be full again and you will lose the moment you were waiting for. It's a matter of setting up the lamps and hoping that something will fly in front of the camera.'

'Come on dear, fly up now', mutters Ton de Vaan a little further along in the Wageningen arboretum. Gaze fixed on the little screen on the back of his camera, he urges a chaffinch to go into action. After practising for an hour, he has already got the hang of his handy camera. It is obviously important to have patience. At one



High-speed camera images of the tropical butterfly *Idea leuconoe* (above) and the great tit (below).

rhododendron bush, he stands stock-still for a whole minute, his camera five centimetres from a leaf on which there is a tiny wasp or bee - the ex-sports teacher is not sure which. 'Doesn't matter. It's the film that matters, after all.' Then, abruptly, the insect flies off. De Vaan stops filming and examines the result. He deletes many frames on the spot, keeping only the moment of take-off. 'But it's fun that you can just do this straightaway on the camera' says De Vaan. 'Hey, look, it looks as if it pushes against the leaf just before taking off.'

HOW THE HOVERFLY ACCELERATES

Course participant Sita Wignand would very much like to film the golden hoverfly, which once hovered in front of her and then suddenly disappeared. 'It turned out to be watching me from behind, and when I turned around, it flew round to behind my back again. I am very interested in how it accelerates and stops. But before I can film that, I think I need to know more about the behaviour of hoverflies.' Wignand has been cultivating the necessary patience during the course. She waits beside a couple of little blue flowers just as long as it takes for a fly to come along. 'I hope the footage will be in focus.'

The film project attracted some youngsters too: 11-year-old Femke Gerritsen from Oosterbeek persuaded her father to take the Casio course with her. Femke likes taking nature photos with her single-lens reflex camera. She is standing in her miniskirt and colourful tights, checking on her camera screen whether she has a bumble bee in focus. Her best film of the day is some footage of a peacock butterfly in flight. The slow motion shots enable you to see that the butterfly first raises its wings and only takes off when they are

right back down again. What is Femke's reason for taking part in the project? 'Just because I really enjoy doing it.'

Lentink is satisfied with the success of the project. And no matter what the motives of the participants are, all the material will be special, he says. 'In many cases, we do not know what animals do when they fly. That is something we have simply never been able to watch. Now everyone can observe it from their own angle and make new discoveries. That gives the participants a new perspective on Dutch nature, and I benefit from it as well. The films will give us an overview of what is flying around in the Netherlands, and how it flies. I get images that I would never have got hold of otherwise. That will also inspire new research questions: about things like how a wing moves, as well as questions about social interaction. For example, we saw on a high-speed film how wasps bump into each other in the air, how hoverflies fight, and how bees look into the camera when they fly past. In science you need very many films of the same thing to be able to prove anything. The people who makes these short films for us get the fun side of making nice discoveries without the hard graft.'

Info: www.flightartists.com ■

'In science you need very many films of the same thing to prove anything'

Making the most of Turkish sunshine

A demonstration greenhouse is going up in Turkey to showcase Dutch horticultural expertise. Ton Schrover from the greenhouse construction company Dalsem and researcher Ruud Maaswinkel paid a working visit. 'If we were a bit younger, we would move to Turkey.'

TEXT KORNE VERSLUIS PHOTOGRAPHY DENIZ GUZEL/LINEAIR



Have you seen the photos? Little and Large in Turkey', says Ton Schrover at the door of the Bleiswijk office of Wageningen UR Greenhouse Horticulture, part of Wageningen UR. And here comes 'Little', Ruud Maaswinkel. He is not skinny either but it is true, he looks quite slender next to Schrover.

The pair joined a Dutch trade delegation to Turkey in April: Schrover as export manager for greenhouse constructor Dalsem, and Maaswinkel as a researcher at Bleiswijk. One of the aims of the trip was to visit a greenhouse being built at Aydin, part of which is being geared up as a demonstration centre for Dutch horticultural expertise. The design of the greenhouse is based on a collaboration entered into by Ruud

Maaswinkel and his colleague Silke Hemming of Wageningen UR Greenhouse Horticulture with Horti-X, an organization for greenhouse constructors and suppliers. Dalsem is building the 4.1 hectare greenhouse, which will be heated with geothermal heat.

FASTER GROWTH

At the site in Turkey, underground sources of hot water at 170 degrees Celsius provide a plentiful supply of heat. Some of it will be used to generate electricity, and the rest will heat the greenhouse. Schrover: 'The energy costs are next to nothing.' And as if that were not enough, the water pumped up from underground also contains a high concentration of CO₂, which can be used in the

greenhouse to get the tomatoes growing faster.

Schrover and Maaswinkel have known each other for about four years. Schrover: 'I was working on a subsidy programme for export to Turkey. The Ministry of Economic Affairs, Agriculture and Innovation thought the plan should be expanded to cover the whole sector. And that is how Wageningen UR got involved.' At the time, Schrover was not keen to have too many competitors hitching a ride on his initiative, but he is now very happy with the imposed collaboration with Wageningen UR Greenhouse Horticulture. 'Wageningen is a big name, and that helps tremendously. It is one thing for us to say that something works or doesn't work, but when a third party with a good reputation



Ton Schrover and Ruud Maaswinkel in front of the skeleton of the new demonstration greenhouse.

says it, you get accepted much more easily.' Greenhouse construction is a booming business in Turkey. Big investors hope to make fat profits out of it. Many of these investors are entrepreneurs who have made their money in other economic sectors such as construction or textiles. Schrover: 'If you do well, you can earn back your investment in four or five years.' This is partly to do with the conditions in Turkey. Maaswinkel: 'You have far more daylight hours there than in the Netherlands. Even in the winter there is quite a lot of light. So you can grow there all year round.'

GOOD HARVEST

But if you thought the Turkish sun could deliver a great tomato harvest even without the

aid of a high-tech greenhouse, you were wrong. Maaswinkel: 'Out of doors, you might get five kilos of tomatoes per square metre. A Dutch greenhouse produces fifteen times that amount. And a greenhouse tomato is cleaner because you use organic pest control instead of chemical pesticides.' In spite of the good conditions, Turkish growers do not manage the same sorts of harvests as their Dutch counterparts. This is probably because many of their greenhouses are not especially suitable for the climate. Maaswinkel: 'If you do it properly, you can make sure that it is hardly ever too hot.' If the temperature goes up too high, the plants close their pores and stop absorbing CO₂. And that is a day lost.' The greenhouse in Aydin features almost all

the techniques that enable Dutch horticulturalists to achieve their top harvests. Everything, that is, except the growth lamps, which are not cost-effective in sunny Turkey. Schrover: 'I think that they are going to do even better than Dutch horticulturalists.' Most Turkish investors in greenhouses are aiming at export, but Schrover thinks they should set their sights closer to home. 'The economy there is growing incredibly fast. Big supermarket chains such as Carrefour are opening new shops every week. They want good produce without chemical pesticides. Turkish growers get much better prices on the home market, and it is certainly still growing. If we were younger we would know what to do. We'd move to Turkey, wouldn't we Ruud?' ■



Agata van Oosten-Siedlecka collects samples in a stream.

Shade for creatures of the stream

Stream-dwelling animals are sensitive to rising temperatures and fluctuations in water flow. Alterra researchers are collecting data on this to help efforts to ward off the effects of climate change. An exploration of the Rovertse Ley stream with a fishing net. TEXT MARION DE BOO PHOTOGRAPHY THEO TANGELDER, BUITENBEELD, FOTO NATURA

Look, a dragonfly larva! Agata van Oosten-Siedlecka fishes a spindly creature out of her net and lets it crawl over her glove. The Alterra researcher – in green wading trousers and a red and black diving jacket – is up to her knees in the water of the Rovertse Ley, an idyllic little stream that winds its way through the Gorp and Roovert estate near Goirle in the south of the Netherlands. She has just fished a load of debris from the bottom of the stream. Between the twigs wriggle dozens of amphipods, little shrimp-like creatures that feed on leafy waste. The net also contains the larvae of the caddisfly, a moth-like insect which spins itself a protective casing camouflaged with leaf debris. 'In the lab we identify all the animals under a microscope. In a sample like this there are 18 to 25 different species, but they are camouflaged and keep out of sight.'

The Rovertse Ley, which flooded extensively last winter, is now surprisingly shallow, with no more than 20 centimetres of water. The sandy bed is visible through the clear water. There are rowan trees and young ferns

growing along the two-metre high steep banks. Sunlight glistens on the water, the birds are warbling away. Upstream the forest gets thicker and shadier. Downstream the landscape opens up and the stream winds its way through the fields towards Goirle.

COOLING EFFECT

'The variation between sun and shade makes this stream a very suitable model system for researching the influence of the water temperature on the ecosystem', says Agata van Oosten. The Polish researcher has been living in the Netherlands for four years and explains her work in fluent Dutch. 'We are researching how trees and shrubs beside the stream can mitigate the warming effects of climate change. Trees and shrubs provide shade, they keep the water cool, moderate temperature fluctuations and increase the stream's capacity to retain oxygen. We also want to know what influence the rising water temperature has on the species composition among the macro fauna.' The macro fauna include all the invertebrates that can be seen with the naked eye, such as beetles,

slugs, leeches, worms and dragonfly larvae. Van Oosten uses sieves with a mesh size of one millimetre to sort her catch. 'There are many hundreds of species of macro fauna. Sometimes a family can include as many as 20 closely related species that can only be told apart by miniscule differences in the length of their antennae, but which all have their own niche in the ecosystem. We would really like to know how they react to climate change.'

All these stream-dwellers are sensitive to climate change. 'They are cold-blooded creatures that cannot regulate their temperature themselves. That makes them extremely sensitive to temperature fluctuations in their environment', says project leader Piet Verdonschot of Alterra, part of Wageningen UR. 'As soon as the water becomes one degree too hot, their internal physiological processes are threatened with breakdown. Running-water species are more sensitive to this than still-water species: they can start dying off at temperatures above 16 degrees Celsius.' What is more, climate change is bringing with it drier summers and heavy



Caddisfly larva



Waterlouse



Amphipod



Dragonfly larva

‘As soon as the water becomes one degree too hot, internal physiological processes are threatened with breakdown’

rain showers, adds Verdonshot. ‘If streams dry up, aquatic animals die. And with peak runoff, they are washed out of their familiar stream habitat into rivers or the sea, where they do not survive.’

One possible approach to keeping streams cool is to plant their banks with trees that provide cooling shade. Trees not only offer a suitable habitat for animals and plants, they also help stabilize the banks of the stream with their roots. And these roots add to the variety in the flow of the stream, while leaves and wood increase the variety in both flow and habitats. What is more, the stream’s capacity to store water is increased, as is its sponge-like function, helping to maintain the height of the water table. ‘We want to study all this in the field’, says Verdonshot.

‘Water managers really need experimental results. Models have reached the limits of their usefulness. You can go on modelling for ever, but without reliable data you cannot work out what the water manager needs for the restoration of ecosystems. We have to get back to field work!’

CUTTING OFF

This summer Alterra will be doing research along the Groote Molenbeek, a stream in central Limburg in the south of the Netherlands, to learn more about how streams respond to summer droughts. The Peel and Maas Valley water board have built a construction for the field tests, with weirs and a specially created side stream. Van Oosten: ‘From July we shall cut off the

stream for ten weeks and make the water flow through the canal, to see how the ecosystem responds to a drought period and how the stream-dwellers survive.’

Alterra is also going to research how long a stream can dry up for without causing major problems, and what effect low runoff has.

One of the things the researchers want to know is whether little corners and pools of water remain in which stream-dwellers can survive the drought. The assumption is that a greater variety of habitats makes a stream more resilient to climate change, while in practice intensive management has done away with many of these little refuges.

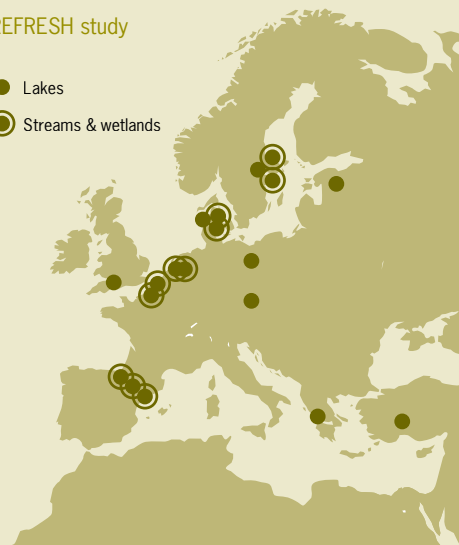
Back on the Gorp and Rovert estate, Van Oosten is driving the minibus full of lab equipment over rough sandy tracks towards a shady brook. Loaded down with buckets, nets and measuring equipment, we trudge into the woods. At the chosen location, there are large chunks of wood in the stream. The researcher chooses the places where she will take samples carefully. Preferably there should be lots of organic matter such as leaves and twigs, as food for the stream-dwellers. With her hand she gently stirs up

MAKING STREAMS CLIMATE-READY

Dozens of European research institutions are working together on REFRESH, a large-scale study of the impact of climate change on freshwater ecosystems commissioned by the European Commission. Obtaining more insight into how streams and lakes react to climate change is important for water managers. According to the European Water Framework Directive, water managers should ensure ecosystems stay healthy and protect threatened species from extinction. They are also expected to make freshwater areas more resilient to climate change. Which measures can do this effectively? That is what REFRESH is to provide guidelines on. Within this project, Alterra (part of Wageningen UR) is leading an international study on the impact of climate change on streams. In the summer, the stream water warms up, or the streambed can be dry for months. Peak runoff, which used to occur once a century, probably occurs more often nowadays. The stream research is being done in six countries on the Atlantic coast. In each country, researchers are going to take samples from twelve streams. In order to measure the effects of summer droughts, streams will be dammed during the summers of 2011 and 2012 and diverted with bypasses.

REFRESH study

- Lakes
- Streams & wetlands



the soft substratum just in front of the net. Creatures that were feeding on the leaf waste are startled and get washed into the net. Van Oosten drives a stick into the ground so that Victoria Silvestre Osuna, an intern from Valencia, knows exactly where to measure the speed of the stream's flow and its depth. The net is rinsed out in a plastic bucket. One bucket is filled with 3 nets' worth. A little further upstream they take three more samples, which go into a second bucket. 'If we don't have enough creatures, we cannot draw statistically significant conclusions about the influence of sun and shade on the ecosystem', says the researcher.

BRICKS HIDING

At various points on the streambed, bricks with holes in them have been placed with the idea of catching creatures that like to hide in holes. 'The organic material on the streambed varies, but these bricks are the same everywhere, which made it an interesting idea', says Van Oosten. But the bricks are not popular in this stream – thanks to the extremely high water that caused the stream to burst its banks last winter, the bricks are

now covered in sand and remain uninhabited. That is a downer for the researcher, but she cheers up again when she finds that the data logger – a gadget the size of a spectacles case – on the streambed is still intact. It takes the water temperature every 20 minutes. Across a distance of a few hundred metres there are often demonstrable differences in temperature in stream water that flows from shady to exposed patches, or vice versa. The instrument that measures the light intensity and the air temperature on the spot is also working well. 'Up to now, we have lost hardly any loggers, apart from one misunderstanding about the clearing of streams by the water board. In Germany more data loggers disappeared, especially during high water.' Minor mishaps are all part of the job. In Germany she once had to have her car pulled out of a swampy stream bank by a tractor, and on another occasion she lost a mobile phone when she fell flat in the stream. And just as she is telling the story with a laugh, Victoria stumbles on a stone in deeper water and her wading trousers fill with water. Luckily, the car keys are safe and dry in the front pocket. ■



Piet Verdonchot,
Aquatic Ecology researcher at
Alterra, part of Wageningen UR



Agata van Oosten-Siedlecka,
PhD researcher at Alterra, part of
Wageningen UR



New options for flexitarians

For millions of people in the Netherlands it has become perfectly normal to go without meat once a week. Meat consumption can be only reduced further by improving meat substitutes and changing the prevalent carnivorous mindset. TEXT ASTRID SMIT ILLUSTRATION IEN VAN LAANEN AND SCHWANDT INFOGRAPHIC

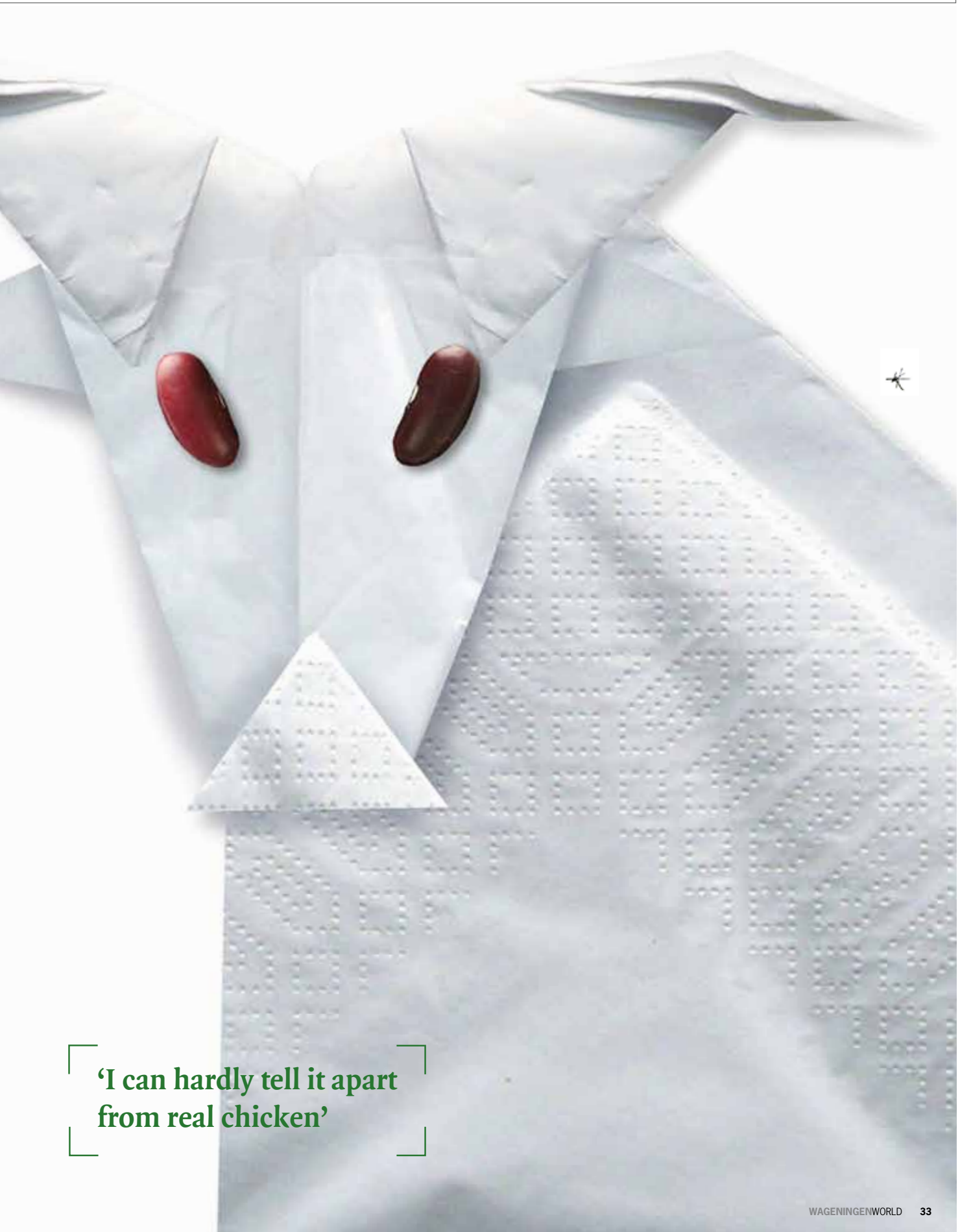
Stepping into the Vegetarian Butcher in The Hague, you feel as though you have entered a real butcher's shop. Complete with white tiles and a big mirror on the wall. The fridge is full of products that look exactly like meatballs, bacon or chicken. And behind the counter stand people in white jackets and blue and white striped aprons, at your service. A tall grey-haired man comes in, just out of interest. 'Um, what are you selling here, actually? It isn't really meat is it?' 'No sir, it's not. We only slaughter soya and lupin here', says shop manager Paul Bom jovially. A young woman who has just entered has been here before. She takes some yakitori out of the fridge and heads for the till. 'This stuff is delicious. I can hardly tell it apart from real chicken.' She calls herself a 'meat-reducer'. It was a film on the internet about how animals are treated in the bio-industry that led her to decide to reduce her meat consumption drastically. The Vegetarian Butcher, which opened in October 2010, caters mainly for this group of people. 'We particularly want to tempt meat eaters. That is why we try to make our

products look as much like meat as possible and the shop looks like a butcher's, says Bom. The formula seems to be a success. There is a constant coming and going of customers and curious passers-by on this ordinary Friday afternoon.

EXPANDING RANGE

The market for meat substitutes is small but growing. Between 2000 and 2009, the turnover in meat substitutes rose from 27 to 62 million euros, says the LEI, part of Wageningen UR, in a report published last year. Meat-lovers, meat-reducers and meat-avoiders. The range available in supermarkets and organic stores is expanding. You can choose from Tivall, Quorn, Vales, Alpro Soya, Vivera, GoodBite and numerous other brands with ever more varied assortments. 'The producers are very active', says Hans Dagevos, who wrote the LEI report together with Erik de Bakker. 'They see a future in this market.' According to the LEI researchers, there is indeed plenty of potential. Their research shows that there is a small group of vegetarians (4 percent), a much larger group of confirmed carnivores (27 percent) and a very big

group (69 percent) of people who choose to go without meat for at least one day a week. 'So for millions of people in the Netherlands it is already the most normal thing in the world to go without meat at least once a week', says Dagevos. And that is a development that is welcomed by the Ministry of Economic Affairs, Agriculture and Innovation (EL&I). The Ministry would like to see consumers eating more plant-based food and less animal protein by 2025, for the sake of the environment and the growing world population. Livestock farming already accounts for a huge proportion of human land use and eight percent of global water consumption (90 percent of which goes into the irrigation of livestock feed crops). It also causes deforestation and higher greenhouse gas emissions than the transport sector. And this consumption is only expected to increase. In 2030, the consumption of meat, fish and dairy in wealthy countries will have gone up by 10 percent, predicts the Netherlands Environmental Assessment Agency in its environmental audit report of 2009. And global consumption will have gone up by as much as 60 percent, thanks to the growth in the ➤



‘I can hardly tell it apart
from real chicken’

world population and the rising standard of living in countries such as China, India, Brazil and Russia. If the consumption of animal proteins in these countries rises to western levels, then an even greater demand for animal protein can be expected. A global 'protein transition' – from animal to plant sources – is therefore urgently needed. And the Netherlands wants to be in the lead. Sustainable food production is a big priority for the Ministry of EL&I.

But a lot has to happen before such a 'protein transition' will be achievable. Meat substitutes still have a miniscule share in the total market. It is true that the Dutch spent 62 million euros on meat substitutes in 2009. But they also spent five and a half billion euros on meat and fish. And the most striking thing is that the turnover in meat and fish has not diminished in recent years. Dagevos: 'Maybe people make up for their vegetarian day by eating even more meat the next day.'

CROSSING THE LINE

So the group of meat eaters must be tempted to cross the line too, if the Ministry of EL&I's wish is to come true. But how?

Certainly not by talking about the environment, doctoral research by Annet Hoek and Hanneke Elzerman made clear. They did research at Wageningen University (part of Wageningen UR) between 2001 and 2006, looking at consumer acceptance of meat substitutes. For meat eaters, they found, sustainability is no reason to forego their steaks. The taste and texture of meat substitutes did make a difference, however: they should resemble real meat as closely as possible if they are to get the meat eater on board. And meat substitutes do not manage that yet, according to consumers. They rated the products low on 'sensory appeal'. Moreover, meat eaters did not find the meat substitutes filling enough, which makes sense: the protein level, which is what gives a feeling of fullness, is much higher in meat than in meat substitutes.

When meat substitutes are mixed into a sauce or blend well into the rest of the meal, the taste does not matter quite so much. 'It is the meal as a whole that must taste nice', says Elzerman. 'Product developers should focus not just on meat substitutes in themselves, but on how they fit into

the whole meal. They can help consumers by developing ready meals based on meat substitutes or selling a sauce along with the product.'

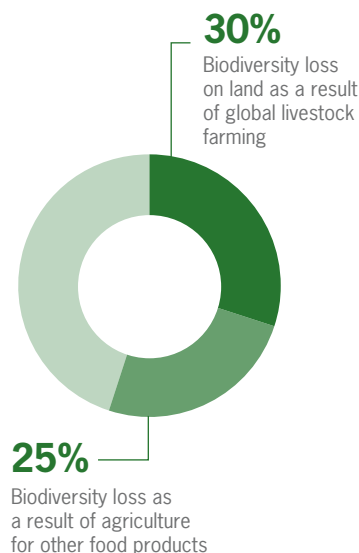
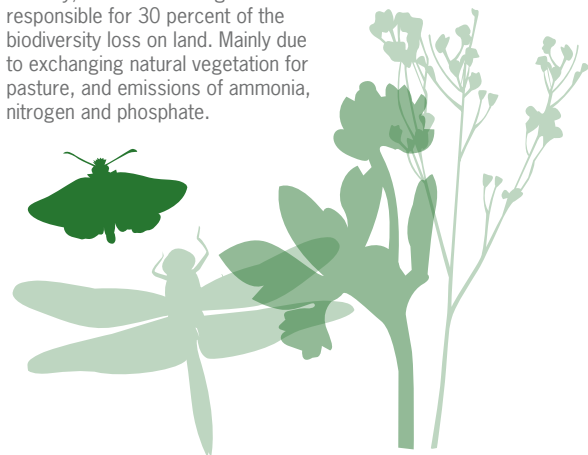
Hoek and Elzerman did their research more than five years ago and a lot has happened in the meat substitute market since then. The producers have improved their products and new producers are coming onto the scene. Currently they are forming a 'platform for alternative protein sources', which is to work in a similar way to the Dutch meat and eggs marketing board. Twenty five of the forty Dutch producers have already expressed their support for the new board.

Among them is the company Ojah, which was established by three ex-staff members at Wageningen UR Food & Biobased Research and the Wageningen innovation company TOP. Frank Giezen, director of Ojah, invented a 'smart' technique for giving plant-based proteins the fibrous structure of meat by mixing them with water at high pressure and temperature. Ojah calls its product Beeter and is marketing it as 'a plant-based delicacy with a strong 'bite''

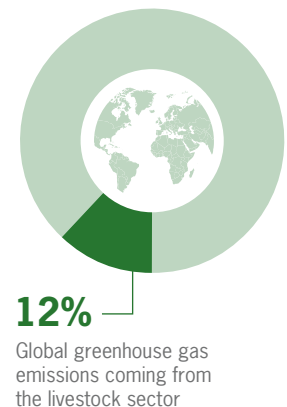
ENVIRONMENTAL IMPACT OF LIVESTOCK FARMING

Loss of biodiversity

Globally, livestock farming is responsible for 30 percent of the biodiversity loss on land. Mainly due to exchanging natural vegetation for pasture, and emissions of ammonia, nitrogen and phosphate.



Greenhouse gas emissions



MEAT FROM THE LAB

Meat can also be bred without involving any animals. Theoretically, if muscle stem cells get the right nutrients and the right growth environment, muscle tissue should grow. Meat professor Henk Haagsman at the University of Utrecht is researching this possibility. He wants to make meat out of these muscle fibres, but he would be content with minced meat, he told Resource, the magazine of Wageningen UR. Haagsman is doing his research in collaboration with Wageningen UR. Utrecht is looking into the technical feasibility

of the idea, while 'Wageningen', the coordinator of the projects, takes care of the social and ethical sides of the issue. Philosopher Cor van der Weele at the LEI, part of Wageningen UR, is examining the ethical issues. Sociologist Gerben Bekker at the Marketing and Consumer Behaviour chair group at Wageningen University, part of Wageningen UR, will do research on people's attitudes to cultured meat. Because however much more animal- and environment-friendly cultured meat may be than real meat, you won't get far with it without consumers who want and dare to eat lab-bred meat.

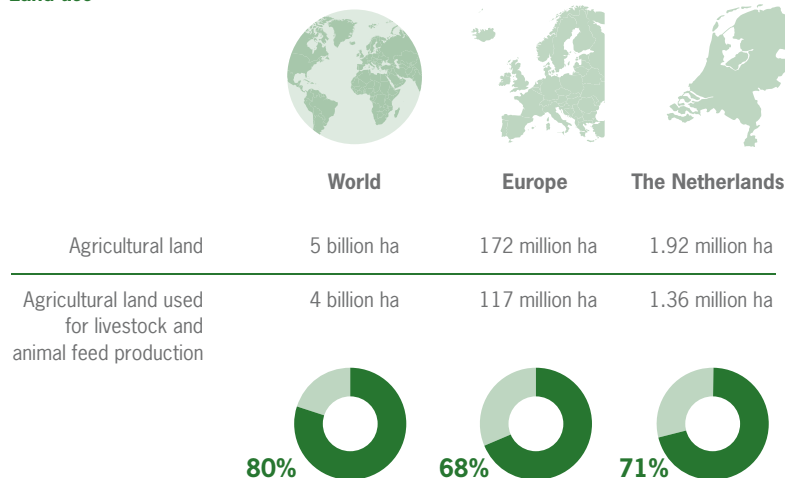
that reminds you of meat.' This meat substitute is currently only for sale at the Vegetarian Butcher but from the autumn it will be available at various outlets in the Netherlands, after Ojah opens its new factory in Ochten in Gelderland.

SPINNING FIBRES

We can expect more developments to come out of Wageningen. Process technologist Atze Jan van der Goot from the Food Process Engineering chair group at Wageningen University embarked this year on a project aiming to imitate the struc- ➤



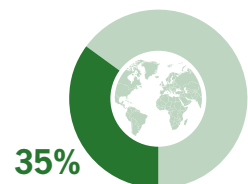
Land use



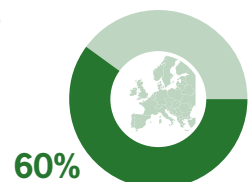
Grain production

Percentage of the grain production that is used for animal feeds

World



Europe

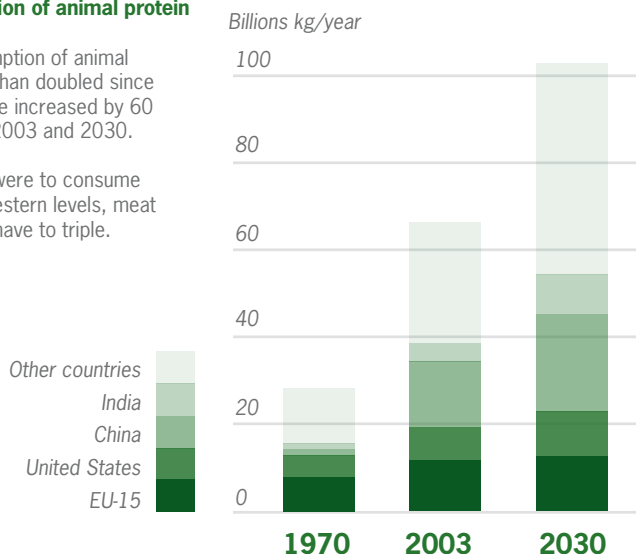


PROTEIN CONSUMPTION

Global consumption of animal protein

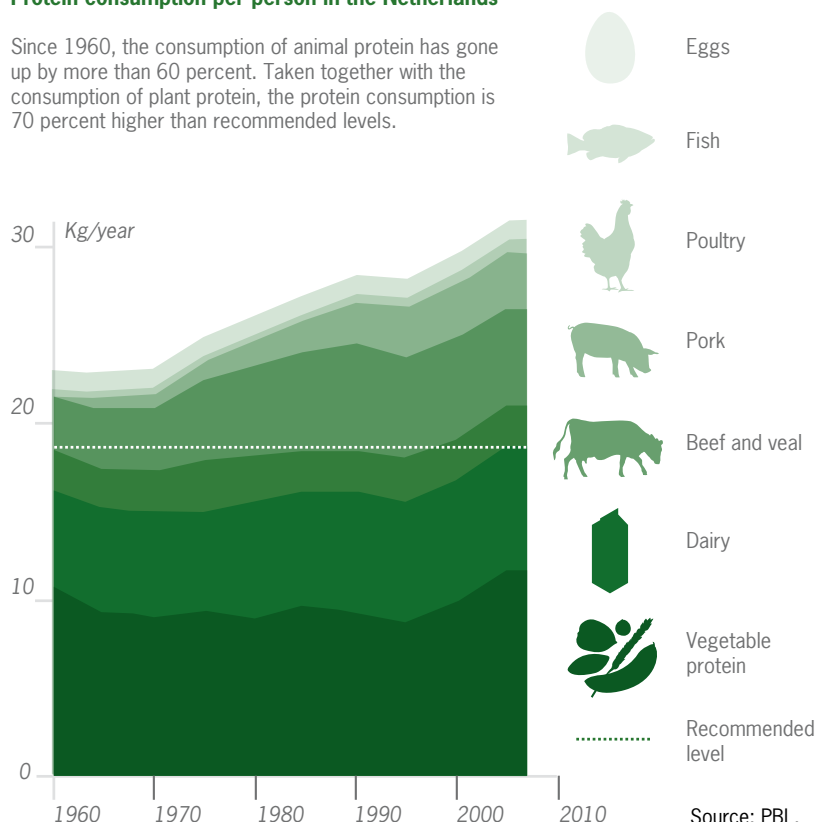
The global consumption of animal protein has more than doubled since 1970, and will have increased by 60 percent between 2003 and 2030.

If 9 billion people were to consume meat at current western levels, meat production would have to triple.



Protein consumption per person in the Netherlands

Since 1960, the consumption of animal protein has gone up by more than 60 percent. Taken together with the consumption of plant protein, the protein consumption is 70 percent higher than recommended levels.



Eggs

Fish

Poultry

Pork

Beef and veal

Dairy

Vegetable protein

Recommended level

Source: PBL.

ture of meat, with the aid of four doctoral researchers and funding to the tune of three million euros. He is using the 'shear cell', an apparatus with which separate proteins can be linked together with the help of enzymes, to form long fibres.

'With milk proteins, we succeeded several years ago in using this machine to make fibres of just 100 to 200 nanometres. That brings you very close to the size of the fibres from which muscle – the basic material of meat – is made', says Van der Groot. Now he wants to find out if you can do the same trick with proteins from soya and lupin; after all, milk protein is an animal product. 'It won't be easy; separating the plant proteins from the carbohydrates in the bean is especially tricky. But if we manage, we will have a product that is more similar to meat: in its structure, in its protein content and hopefully in its taste too.'

'Above all, we must have patience; replacing meat with meat substitutes is a slow process', says Annet Hoek, who now teaches at the University of South Australia in Adelaide. 'You can compare it with the development of margarine. The first margarine came onto the market in 1869. Nobody wanted to buy it then, and it was not very nice. Now margarine accounts for 95 percent of the butter market. In those 140 years, margarine has been continually developed to improve the texture and the composition, and our ideas about butter – what is healthy or unhealthy – have changed. You can expect to see similar developments in relation to meat substitutes.'

ADAPTING THE FOOD CULTURE

Dagevos and De Bakker, from the LEI, think that we should not be blinkered about meat substitutes. They think that to bring about change it is also important that the carnivorous Dutch food culture gradually changes. Dagevos: 'The holy trinity of the Dutch meal – meat, potatoes, and vegetables – promotes meat

'You don't have to hate meat to eat vegetarian'

consumption really. Replacing the meat with 'fake meat' is a logical solution but rather a primitive one. You could also opt for a more inventive approach and stimulate an eating culture in which meat plays a less prominent role and you can replace it or do without it more easily.' According to the LEI researchers, neither the Ministry of EL&I nor Wageningen UR have taken enough notice of the dominant eating culture. 'In Wageningen, hardly anyone is looking at this. Whereas there is a lot of scope here for finding ways to change patterns of protein consumption.'

Dagevos and De Bakker therefore advocate setting up an intervention group on 'eating culture and protein transition'. This would be a team of experts who would bring about changes in the eating culture in the Netherlands. The researchers are also in favour of solid information campaigns about the health benefits of eating less meat. 'Many consumers think that they will lack nutrients if they do not eat meat a couple of times a week', says Dagevos. The 'meat reducers' could do with a bit of a nudge in the right direction too. They have a role to play as front-runners. 'The meat reducers prove that you don't have to hate meat to eat vegetarian at times, and they can help a lot to normalize meat-free or low-meat eating habits', says Dagevos. The Vegetarian Butcher wants to lend the meat eater a helping hand too. Bom: 'In the long run we want to supply real butchers with our products. Not all butchers are very keen on that, but they can see it as a service product. So that a grandma can pick up something for her vegetarian granddaughter at the butcher's. Who knows, next time she might buy a meat substitute to try herself.' ■



CROWD FUNDING FOR CHAIR OF MEAT SUBSTITUTES

There is already a chair of dairy science funded by the dairy industry and a chair of wildlife management funded by the hunters' association. So why don't we try to fund a chair of meat substitutes, thought the members of The Peas Foundation, an organization that seeks to promote the consumption of plant protein. The foundation got in touch with Wageningen UR and the Technical University of Delft. And they were interested in such a chair. But the Peas Foundation first has to raise the money, and is doing that by means of 'crowd funding': people who sympathize with the research on meat substitutes can partially adopt the chair. The donors then have the right to comment once a year on the research of the Peas Professor. Not that the professor is obliged to take any notice, since it is vital that the research be entirely independent. Remco Boom, professor of Food Process Engineering at Wageningen UR, is holding the fort for the future professor for the time being.

Early warning system for greenhouse growers

In the past, a market gardener has always had to trust his own eyesight in order to know whether a plant is healthy or not. But now, in Dutch research greenhouses in Wageningen and Bleiswijk, high-tech machinery is taking over this job. TEXT RIK NIJLAND PHOTOGRAPHY WAGENINGEN UR

Have a look at this, it is really amazing,' Carolien Zijlstra shows pictures on her computer screen of a green pepper plant that has just been poisoned. On the left we see the plant by natural daylight, the way we would see it with the naked eye; on the right we see the images created by a fluorescence camera that is monitoring the plant's foliage. After 70 hours no change can be spotted with the naked eye, but the camera has unerringly detected a creeping deterioration: two leaves are gradually going black, a sign that photosynthesis, the plant's life-giving process, has ground to a halt. The lesson to be learned from these images is that a horticulturalist who wants an early warning that something is wrong with his plants should not rely exclusively on his own two eyes. Yet they are still the chief detection system for rooting out pests and diseases in greenhouses. In the early years of the twentieth century, agricultural extension services began to distribute booklets with drawings and watercolours to inform growers about threats to their crops such as fungal infections. And little has changed since then. The market gardener and his staff register whether there are insects sticking to the fly paper, or sound the alarm when they notice symptoms suggesting the presence of a mite, virus, worm or fungus on the plants. Systematically monitoring all the plants is a gargantuan task, certainly in the vast greenhouses of today. 'If a grower has to examine every leaf of every plant, it could take him two

weeks, by which time the disease will have overtaken him', says Zijlstra, a researcher at Plant Research International, part of Wageningen UR. 'Plant protection has not kept pace with the upscaling and innovation in greenhouse horticulture'. The result is that large-scale market gardeners are sometimes forced into preventive spraying to forestall problems.

NOSE SOUNDS THE ALARM

Meanwhile, new sensors have been installed in research greenhouses in Wageningen and Bleiswijk. So high-tech machinery is taking over – albeit still experimentally – the role of the eyes of the gardener or researcher in determining whether there are problems. One option is the fluorescence camera, but the researchers are also trying out another technology: the electronic nose, a machine that registers the volatile substances secreted by the plant. 'If the nose sounds the alarm, you still don't know exactly what the problem is', explains Zijlstra. 'The stress could be caused by a fungus infection, but it could also be caused by dehydration, for example.' Closer inspection, using a DNA test for example, can reveal within an hour or two whether an organism is the culprit. 'And then you can take steps at a very early stage, before there are any symptoms to be seen. For example, you can apply a plant protection product very locally.' Less pesticide use and therefore lower costs for the grower: it sounds great, but in practice there are some downsides, as became clear a

few years ago when sensitive detection tests were made available: when they detected pests and diseases early, market gardeners turned out to use more pesticides than ever, spraying at the slightest hint of a problem, perhaps needlessly.

To tackle this problem Zijlstra is leading a project called 'The Healthy Greenhouse', which started in April 2011 with funding of 10 million euros and 32 Dutch and German partners. Early detection is envisaged as one part of a comprehensive care system for plants. Zijlstra: 'Detection is not an isolated activity. As a grower you also need advice about what you should do with the information you get.' That is taken care of. 'I try to bring people together from a range of disciplines, and to forge the mix into a coherent whole.'

Zijlstra sketches a futuristic picture of what lies ahead: a robot that runs up and down between the rows of plants on a monorail. The robot is fitted with an electronic nose and/or a fluorescence metre, as well as a machine that can cut samples from the leaves, do a DNA test and send the results to the computer. If the computer decides on the basis of the data it receives that action is required, the precision sprinkler head on the robot is instructed to spray one or more plants, or perhaps even just a part of a plant. Zijlstra: 'The added value lies in this combination. Early detection is not worth anything if you don't know what to do with the knowledge it gives you.' ■

1934

These drawings of the Sclerotinia tomato fungus illustrated information for horticulturalists.



2011

Nowadays, high-tech apparatus monitors the health of greenhouse plants.



ANIMAL SCIENTISTS TWENTY YEARS LATER

Of feeds, hopes and loves

Farmer Gerjo Koskamp wants to keep his farm as natural as possible. His former fellow student Henk Oldenziel produces animal feeds and they have to be safe and as cheap as possible. Both a farm and the livestock feed industry offer varied work and attract considerable public interest.

TEXT ALEXANDRA BRANDERHORST PHOTOGRAPHY HARMEN DE JONG

The horned cows of Ruimzicht farm are grazing in the meadow. They are out to grass as much of the time as possible. 'They can be real cows here more than the ones on a conventional farm can. The differences in their characters come out much more clearly too', says biodynamic farmer Gerjo Koskamp. He represents the third generation of farmers in his family. In the old pig shed that has been converted into a social room, he explains: 'In the old days, I sat here sweating over cutting off pig's tusks and tails. I knew then already that it was not the system for me.' As an act of rebellion he started a degree in plant breeding but after a couple of months at Wageningen he switched to Animal Sciences after all. 'I had more of a feeling for animals.'

During his studies, Koskamp decided to take over the family farm, but as an organic farmer. 'My father found it especially hard

to take, that I wanted to make the switch', he recalls. After graduating he went into business with his parents, as well as becoming project leader at the Centre for Agriculture and Environment at the experimental dairy farm De Marke, now part of Wageningen UR. He worked there for nine years. Ruimzicht became an organic farm in 1998 and a biodynamic one in 2002.

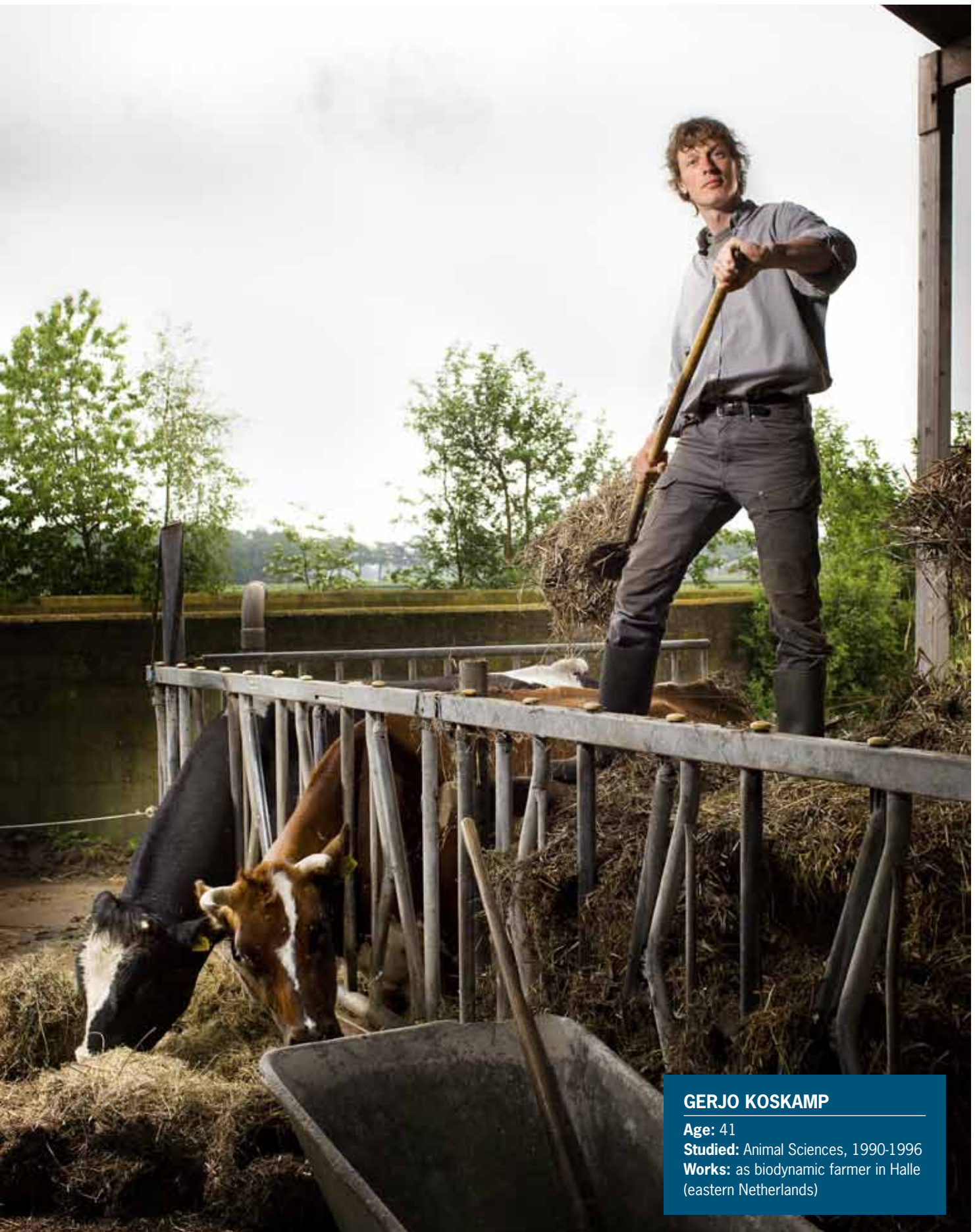
'That means it is totally in tune with nature. Animals are allowed to follow their true natures.' And all those stereotypes about farmers who sow at full moon after walking three times around the field? 'The phase of

**'In the old days
I sat here cutting
off pig's tails'**

the moon has an influence on the flow of the sap. For a long shelf life it is better to harvest when there is no moon and the sap flow is low. It is a quasi-science really, which with its basis in on-the-job research is gradually becoming more scientific. As for those circuits around the field – I throw them in anyway, it keeps you fit', he adds jokingly.

SWEET SMELL

Unlike the calves on biodynamic farms, which stay with their mothers until they are three months old, young animals on conventional farms have to make do with powdered milk. Henk Oldenziel, a contemporary of Koskamp, works for Sloten in Deventer, a company that produces animal feeds for calves, piglets, lambs and foals of up to ten weeks old. There is a sweetish smell at the factory, the smell of the milk powder that is fed to calves, >



GERJO KOSKAMP

Age: 41

Studied: Animal Sciences, 1990-1996

Works: as biodynamic farmer in Halle
(eastern Netherlands)



HENK OLDENZIEL

Age: 41

Studied: Agricultural College,
Animal Sciences, 1990-1993

Works: in quality control and re-
search for feed manufacturer Sloten

'We have to produce as cheaply as possible'

mixed with water. 'That smell is not there for the calves, but for the farmers. They are the ones who want it to smell nice', says Oldenziel.

Oldenziel, whose parents had an arable farm, wanted to study something to do with plants at first too. He changed his mind when he did an internship at a beef cattle farm during his time at the agricultural college in Groningen. Then he went on to do Animal Sciences at Wageningen. A few months after graduating in 1993, he got a job in quality control and research with Sloten. He had really written an application letter just for some practice. 'And then suddenly there I was with a job, even before finishing my degree. Jobs like that did not grow on trees in those days, for beginners.' He was taken on to set up an experimental farm with calves. That soon led to additional tasks working on the composition of the feed and on commercial support. 'Because it was a small company, the work was var-

ied, a bit of everything. Nutreco, which took over Sloten in 2006, has far more specialists on its staff.'

The best part of the job is the foreign travel, says Oldenziel. He has clients all over the world, from Scandinavia and Russia to Brazil and China. The company supports importers by showing how you give training in the use of animal feeds. 'You make a product here and then you see it six months later on a farm in Chili. I am quite proud of that', says Oldenziel. Six years ago he went to night school to do a Spanish course. Now he visits the Spanish-speaking countries. His knowledge of Spanish is also useful for making labels, as well as for studying regulations.

SOLAR PANELS AND ANTIBIOTICS

Koskamp's work is varied too. The main priority is the contact with the animals. 'Something always used to go wrong when I went on holiday. Nowadays I tell Lette, the cow who leads the herd, that someone else will be taking over for a while. That works. Everything just goes on as usual these days.' But Ruimzicht has a shop and a market garden as well as a dairy herd. It also provides facilities for people suffering from burnouts or going through a reintegration process. 'I recently came across a ten-year plan made in 1998. My wife and I could tick all the items on it. We would like to upscale some of our activities now.' For example, Koskamp would like to expand the 30 square metres of solar panels on the roofs to more than 600 square metres, through the *Boer zoekt Buur* ('Farmer seeks neighbour') project. In 2010, Ruimzicht won the Ekoland Innovation Prize. 'After a difficult start-up phase, we are now beginning to reap the harvest', says Koskamp. There were teething problems, some of which were caused by the fact that the cows were not dosed with antibiotics. 'We hardly see any hoof problems, twisted stomachs or mastitis here. Everything is treated with natural medicines. Only there are then more white blood cells in the

milk. Normally that would indicate infection, but in my cows it is because their immune systems are on alert', explains Koskamp. Sadly, the higher cell count, as it is called, lowers the price he gets. 'It has cost me thousands of euros and a lot of worry. By not using antibiotics, you are a pioneer in the Netherlands, and you are penalized for that, even though there is nothing wrong with the milk.'

LOCAL PRODUCE

The feed industry, like the use of antibiotics in conventional livestock farming, is the focus of quite some public debate, says Henk Oldenziel. Take the dioxin crisis in Belgium in 1999, or more recently in Germany. 'Food safety is becoming increasingly important. We keep track of where our ingredients come from. And beyond that, it is a case of logical thinking. Things like dioxins and heavy metals can lodge in fats, for example, so you have to check for that.' The feed industry is geared to maximum efficiency, emphasizes Oldenziel. 'We have to produce as cheaply as possible, otherwise you don't get anywhere. Follow the money, is the motto. If you use sustainably produced palm oil, your product will be more expensive than that of your competitor. You have to be able to justify that.' Oldenziel feels that both organic and conventional farming have their pros and cons. 'If all the animals in the Netherlands were free to roam in the fields, it would endanger exports.' He does think that eventually more food will be locally produced in China and Russia, where meat consumption is going up. 'Now we ship soya in from Brazil and send animal feeds back. That is not efficient. So, for instance, Nutreco is setting up a factory in Russia. The knowledge it is based on comes from here.'

According to Gerjo Koskamp the future for Dutch agriculture lies entirely with local produce. 'We should stop exporting and produce for ourselves. The cradle-to-cradle principle of a sustainable cycle should be implemented across the board in agriculture. Sustainability begins with food production. ■

WHERE DO ANIMAL SCIENTISTS END UP?

Of the 2621 animal scientists who have graduated since 1970, and of whom the career details are known (well over half), the biggest group (21 percent) work at a university or research institute. Another 18 percent work in the food industry and trade, and 9 percent work in another branch of industry and trade. No more than 8 percent work for an agrarian or breeding company, 8 percent are in education, 7 percent in consultancy work and another 7 percent in government.



GRANT FOR KENYAN FRIEND

A story of friendship and perseverance

Winnie Raey from Kenya studies Bioinformatics at Wageningen University. Something that would not have been possible without her friend, Madelon Lohbeck, and the Anne van den Ban Fund. The story of an unlikely friendship, shared ideals and perseverance. 'If we envision something, we go for it.'

TEXT ALEXANDRA BRANDERHORST

It was a miracle for Winnie Raey (30) when she landed at Schiphol in August 2009. After a two year quest for a scholarship, she was finally coming to study at Wageningen. Her friend Madelon Lohbeck (26) welcomed her at the airport. In Wageningen Winnie was to stay in the house where Madelon lived, just as Madelon had stayed with Winnie in Kenya two years earlier. A closet filled with warm clothes was waiting. 'When I brought Winnie an extra blanket, she had already put on everything, even the winter gloves and hat', Madelon laughs. 'It was August, but I felt so cold', Winnie remembers. When the two women first met, in July 2007 in Kenya, they were testing the viability of tree seed at the Kenya Forestry Research Institute (KEFRI) in Muguga. Winnie had just finished her BSc in Biochemistry and Molecular Biology. 'It is a rare thing for a girl from a rural environment to go to university', Winnie explains. 'But my mum supported me.' Her mother, a primary school teacher, would spend her last cents on the education of her children. Unfortunately, with her fees in arrears, Winnie did not receive her degree even though she had passed the exams. She then decided to volunteer at KEFRI to gain work experience.



Madelon Lohbeck and Winnie Raey in the Netherlands and in Kenya.

Madelon, who studied Biology in Wageningen, came there for an internship. As the only women at the seed centre, they immediately bonded. To start with, Madelon stayed in a backpackers' hostel in Nairobi and commuted daily to Muguga by bus. 'The owner of the hostel was a drunk who shouted at night. I felt unsafe', says Madelon. After one week Winnie invited Madelon to come and live with her near the institute. Winnie: 'I thought that wazungu, white people, needed expensive food and surroundings.' To her relief, Madelon did not need much.

WHY NOT WINNIE

Soon though, Winnie had to stop her volunteer work in order to make a living for herself and her younger brother who lived with her. She bought secondhand clothes at the market in Nairobi and sold them for 5 euro-cents more in Muguga. 'We had both just finished our Bachelor's. It was thought-provoking to see how different our lives were. Winnie is very strong and motivated', says Madelon. The girls started talking about the possibility of Winnie coming to Wageningen for a Master's degree. Madelon: 'Maybe it was a bit naive, but I thought it should be possible. I had seen so many nationalities in Wageningen, so why not Winnie?'

'It is important that Kenyan women reach the same educational level as men'

Madelon went back to Wageningen at the end of 2007. After six weeks of work as a student assistant, she could pay Winnie's overdue fees. Now that Winnie could show her degree certificate, the quest for a scholarship could really begin. But that search proved to be quite disheartening. 'Students who come to Wageningen already have jobs, money or connections. People who are really poor cannot come here', Madelon declares indignantly. Meanwhile, Winnie was still selling old clothes in Kenya. Then Madelon got in touch with the Anne van den Ban Scholarship Fund. The fund is named after a former Wageningen Professor of Communication, and enables promising students from developing countries to study at Wageningen. Winnie ap-

plied for a scholarship at the beginning of 2009. In the spring came the good news: Winnie had won a scholarship. Madelon's parents, who had followed their daughter's efforts with interest, had made a donation meant for Winnie. This 'earmarked donation' had been decisive in the granting of the scholarship.

MEET FOR COFFEE

Nowadays Winnie and Madelon, who is working on her PhD, meet for coffee every week. Madelon: 'In Kenya we had lots of time. Now both of us are very busy. Winnie is always studying.' Winnie will finish her MSc in Bioinformatics in August. 'I am interested in genetic research in animals and plants, and even more in engineering crops that tolerate drought and salinity, which have led to food shortages in developing countries', Winnie says.

After graduating she would like to do a PhD or to become an assistant lecturer at a university in Kenya and be a role model for female students in the male-dominated academic environment there. Winnie: 'It is important that ladies reach the same level of education as men'. Madelon: 'We are the same. If we envision something, we go for it.' www.fondsen.wur.nl/uk ■



WHAT DOES THE WORLD WANT TO EAT?

Anniversary conference in The Hague, 12 April 2011

For the first of the KLV125 Conferences in the Netherlands, the organisers in The Hague turned the jubilee theme of 'How to feed our world?' around and posed the question 'What does the world want to eat?' What do consumers want, both in the Netherlands and throughout the world, and to what extent should governments attempt to steer this through regulation and by influencing consumers? Thorny questions that led to a lively and sometimes heated discussion.

Hans Brug, professor of epidemiology at the VU University in Amsterdam, made the case for governmental intervention. "In the 19th century, the authorities laid water pipes and sewers, which improved public health enormously. The current trend towards increasing obesity and other conditions linked to good welfare mean that governments must act again. See it as the water supplies for the twenty-first century." A debate arose between proponents of a 'fat tax' and others who believed that the government should at the very most set out guidelines and frameworks to allow consumers to make informed choices.

Tiny van Boekel, vice-chairman of KLV, professor of agrotechnology and nutritional sciences at Wageningen University and in the chair for the day, said, "Personally, I'm against governmental intervention. Insights



into health do change. On top of that, food is only one aspect of a much larger lifestyle problem. We live in a society where food is available everywhere and in which we hardly have to take any exercise. We haven't resolved it yet, but then there aren't any ready-made solutions. The same applies for the other discussions, for instance about

more global consumer requirements and international trade barriers. It's interesting to bring all these various aspects together in a single discussion, though."

A few results that will be presented in November:

- The world food question has both technical and institutional aspects, but it is first and foremost an institutional. Extend overly restrictive legislation and trade barriers.
- It is important to include what people want in the food debate, but there are millions of consumers throughout the world with varying wishes. A worldwide awareness has to be created in which local eating habits are cherished as part of the cultural heritage. Governments can also help realise this.



Jeroen Naaijkens, originally a landscape architect and later with roles including general manager of HAS Den Bosch, participating because he is

currently working with food systems, said the following about the KLV125 "Food systems are structurally very complex. I don't believe in rapid and major changes, or that there is a single correct direction. A range of directions can be

considered, each with its own future scenario and its own raison d'être, from large-scale bulk production to local niche markets. I do think that you ought to connect the social and technological aspects. Questions about food systems are generally asked from a socio-political perspective: how would we want society to be organised? Whereas the answers are often technological. This will create a proper dialogue. Consider large-scale and intensive cattle farming - an excellent solution to high demand for meat and sustainable production, from the points of view of

both production and environment, but it's not what people want. I did see a useful dialogue created in The Hague. This conference showed that it is possible to listen to each other and make nuances clear, clarifying both technological and social viewpoints. I think it's very positive that a fairly random group of technical people from Wageningen already has the power to do this. This is Wageningen at its best! My compliments to KLV, for examining and tackling the broad discussion about food supplies, and leading the discussion so well!"

The presentations by the speakers Kees de Gooijer (Food & Nutrition Delta), Jan Burger (Coca Cola) and Hans Brug (VU University, Amsterdam) can be found on www.klv125.nl, along with some photos to give you an impression of the KLV125 Conference in The Hague. Any reactions can be sent in via the forum on the same website. The conference was sponsored by Schuttelaar & Partners and Food and Nutrition Delta.

What's new from KLV:
TWICE AS CLEAR
EXTRA CONCENTRATED

From this issue of Wageningen World onwards, you will find all the information about KLV's activities presented clearly on the same two pages, in a recognisable style!

Anniversary conference in São Paulo, Brazil:

BRAZIL COULD FEED THE WORLD, IF THERE IS A POLITICAL WILL



Photo: Shutterstock

How can Brazil feed the world? This was the central question at the KLV125 Conference on 24 March in Brazil. Paco van der Louw, chairman of the Brazilian chapter of the Wageningen Alumni and chair of the day at the KLV125 conference, looks back on it.

“Brazil’s potential is huge. The question is how we can utilise it successfully. Technologically there are no restrictions - you no longer have to talk about fertilisation schedules, for example. However, there is a problem in the port of Santos, for example, where ships have to wait days to get loaded, or with the road network creating stagnation in the supply. The real question is socio-political: how can we organise the chain better? And what are the roles of government and the private sector? Should we for example aim to organise family companies into cooper-

atives, making the quality of rural life more acceptable, or should we aim for large companies that can produce cheaply? Are we focusing too rigidly on Europe and the United States, when the question should really be how Brazil can feed China?

These questions are easier to ask than they are to answer. This was made clear by the contribution from the former minister of agriculture Roberto Rodriguez, a man with an excellent track record and detailed knowledge of the political background. He will be presenting the conclusions of the Brazilian sub-conference during the main conference in November. In short: Brazil could feed the world, if there is a political will to do so. That applies to the infrastructure and chain organisation at the national level, but also requires a readiness at the global level to look at trade barriers and import levies.”

The KLV125 Conference in Brazil was held on 24 March 2011 in Piracicaba (in the São Paulo region of Brazil) and was organised jointly with the Wageningen Alumni Chapter in Brazil and the Wageningen UR office for Latin America. The presentations given at the conference and photographs can be found on www.klv125.nl.

More KLV news you can read in the KLV Update. Check our website www.klv.nl/en for our online English version.

ACTIVITIES

Info: www.klv.nl/en
(unless indicated otherwise)

9 June 2011

Workshop - Interview Techniques
Young KLV Programme

25 June 2011

125 years of KLV - Conference China
亲爱的瓦赫宁根校友

On the occasion of the 125th anniversary of KLV, a Wageningen Alumni conference will take place (in English) in the Yuyang Hotel in Beijing on 25 June, 2011.

It is scheduled 15:00 to 20:00 p.m. (dinner included). This conference is co-organized by KLV and Wageningen UR China Office. Invited speakers are representatives from scientific and industrial to give speeches.

Info: www.klv125.nl

7 September 2011

Lecture - Guidelines for a job in the Netherlands
Young KLV Programme

23 September 2011

Course - CV Writing
Young KLV Programme

4 October 2011

Course - CV walk in session
Young KLV Programme

16 October 2011

125 years of KLV - World Food Event
Info: www.klv125.nl

20 October 2011

125 years of KLV - ELLS and Scientific Student Conference
Info: www.klv125.nl

10 November 2011

125 Years of KLV - Main Conference Wageningen
Info: www.klv125.nl

WANT TO BECOME A MEMBER?
Go to <http://bit.ly/fqfFPP>

5,000th PhD

Alireza Seifi's PhD ceremony on 18 March was especially festive. He was Wageningen University's 5,000th PhD graduate. Seifi, from Iran, received his PhD from Richard Visser, professor of Plant Breeding, for a study of the genes in tomatoes which provide resistance to mildew. After the festive gathering, Alireza Seifi thanked the university, ending his speech with: 'Wageningen, keep up the high standard of your research.'

Every year, more than 200 researchers receive PhDs from Wageningen University, part of Wageningen UR. It has not always been this way: for the first few decades, when the institution was an Agricultural College, a doctorate was a fairly rare phenomenon. The number of PhDs gradually went up, at a rate which sped up after the introduction of the AIO system for trainee research assistants. Over the past ten years the proportion of PhD scholars coming from overseas has grown to more than half the total.



PHOTO ERIK VAN LEEUWEN

Javelin thrower receives sports grant

On 11 April, Evelien Dekkers received the first sports grant to be awarded by the new Wageningen-based Niels Smith Fund. Dekkers, a student of Food Technology, is still recuperating after a shoulder operation, but hopes to be fit for the Olympic Games next year.

'Because of my injury, other sponsors dropped out', says Dekkers. So the support, to the tune of 1,500 euros, is more than welcome. 'At the end of this year I want to do a training internship abroad. I can make good use of the grant for sports shoes and for petrol for driving to training sessions.' Dekkers beat the Dutch record for under 23s with a throw of 58.99 metres. This makes her the number three in her age group in Europe. In 2010 she was student champion in the United States, where she

studied for four years. The Niels Smith Fund was established by the mother of Niels Smith, a talented young Wageningen footballer who died at the age of 15. The fund aims to support talented young sportpeople studying at Wageningen University or Van Hall Larenstein, who are not supported by the Dutch sports federation NOC*NSF. Donations to the fund are welcome.

Info: monique.montenarie@wur.nl
www.fondsen.wur.nl/NL/Fondsen

NETWORKING

LinkedIn Alumni group

The Wageningen University Alumni LinkedIn group welcomed its 5,000th member in April. 'You can see that the group is lively; calls are put out on it and discussions are initiated', says Brenda van der Zee, alumni officer for Wageningen UR. Besides this main alumni group, nearly thirty sub-networks are active on LinkedIn, most of them subject-based. 'On those you see the more content-oriented dis-

cussions, vacancies and announcements of doctorates.' The LinkedIn alumni group is still growing steadily, and most of the new members are Dutch. 'Foreign alumni are more geared towards Facebook', says Van der Zee. 'A Facebook page is still on our to-do list.' Info: www.linkedin.com



REUNION

'Friendships from your student days stay special'

'To me the most important thing is to meet up with people from my year again, and to hear how they have fared', says Frans Olieman, talking about the reunion for graduates of 50 years ago that will be held at Wageningen University this autumn. 'I am looking forward to being surprised by who turns up. Some of my contemporaries have always lived abroad, for example. This is a

nice opportunity to meet up again.' In Olieman's experience, 'friendships made during your student days stay special'. He does not worry about breaking the ice: 'You notice that you pick up the threads very easily when you meet again, even after a long time.' As Wageningen Ambassador and board chair at the Top Institute Food & Nutrition, Frans Olieman is closely involved

in Wageningen UR. 'Much has changed at the university in recent years. I think that others at the reunion will be interested to hear about developments too.'

Every year, Wageningen University invites the graduates of 25 and 50 years ago for a reunion. This year the reunions take place on 1 and 21 October.

Info: www.wageningenalumniportal.nl

DEVELOPMENT

Strategies for change in development

How do we know what works in development? What kinds of information are convincing and why? And when are we satisfied that we know enough to be able to make decisions and act? These questions lie at the heart of intense debates in recent years, as development effectiveness has come under ever closer scrutiny.

And these questions were the subject of a conference organized in Utrecht, the Netherlands, in 2010, by Wageningen UR Centre for Development Innovation (CDI), Learning by Design, and Context, international cooperation. More than 150 participants put their heads together to reflect on case studies and methods, and to debate issues related to rigour, quality standards,

values, and complexity.

These discussions are outlined in a new report 'Evaluation Revisited: Improving the Quality of Evaluative Practice by Embracing Complexity'. The report positions the discussions within international debates on measuring development results, adds insights from several key evaluations in 2010/2011, and comes up with a strategy for change. The report is available online at www.cdi.wur.nl.

Wageningen UR Centre for Development Innovation (CDI) works on processes of innovation and change in the areas of secure and healthy food, adaptive agriculture, sustainable markets and ecosystem governance.

WAGENINGEN WORLD



PHOTO JOSIE ZUIJBURGER

Wageningen in the world!

Wageningen World reaches the parts other magazines haven't even heard of, as you can see from this photo of Paco van der Louw, taken in Piracicaba, Brazil. Van der Louw is standing in front of the head office of the agricultural faculty at the University of Sao Paulo, where a conference was held to mark the 125th anniversary of the KLV alumni network, on 24 March. Are you reading this magazine a long way from Wageningen too? Send your photographic evidence to wageningen.world@wur.nl.



Storm-van der Chrijs stipends

Three talented Wageningen PhD researchers were awarded Storm-van der Chrijs stipends on 8 March 2011, for the quality of their work and to encourage them to pursue their academic careers further. The stipends, worth 1,500 euros, can be used to raise the researchers' international profiles. Two other researchers received an honourable mention.

WINNERS

Cathelijne Stoof, WU Soil, Water and Atmosphere 2006. Stoof is working on PhD research with the Land Degradation and Development chair group at Wageningen University, part of Wageningen UR. Her

interdisciplinary research is on the effect of fires on soil quality.

Marije Oostindjer, working on her PhD with the Adaptive Physiology chair group at Wageningen University, part of Wageningen UR, is researching animal welfare in relations to pigs, and is developing methods of replicating the way piglets' learning behaviour is influenced by the mother and natural gradual weaning processes.

Alessandra Galiè, a PhD researcher with the Crop and Weed Ecology chair group at Wageningen University, part of Wageningen UR. Galiè is doing participatory research in Syria to advance the integration

of women in plant breeding activities.

HONOURABLE MENTIONS

Purabi Bose, who is doing PhD research with the Forest and Nature Policy chair group at Wageningen University, part of Wageningen UR. Bose is researching forest use rights for indigenous people in Rajasthan in India. 8 March 2011.

Els Faassen, WU Environmental Hygiene 2003, who works on PhD research at the Aquatic Ecology and Water Quality Management chair group at Wageningen University, part of Wageningen UR. Faassen' research is on improving the quality of surface water. 8 March 2011.

IN MEMORIAM

M.H.C.M. Bakkeren, WU Crop Science 1949, passed away at the age of 87. 20 April 2011.

R.R.E.M. van den Berg, WU Agricultural Technology 1982, passed away at the age of 59. 21 December 2010.

Dr. G.C.A. Bruin, WU Plant Pathology 1977, passed away at the age of 63. 22 November 2010.

J.A. Draisma, WU Tropical Crop Science 1951, passed away at the age of 88. 12 April 2011.

J.A.P. Franke, WU Crop Science 1939, passed away at the age of 96. 15 February 2011.

Dr. B. Heemskerk, member of the supervisory board of Wageningen UR, passed away

at the age of 67. 23 March 2011.

Mrs. H.S. Hes-Swartenberg, WU Horticulture 1952, passed away at the age of 85. 2 January 2011.

D. Korstanje, BSc student WU Biotechnology, passed away at the age of 28. 10 February 2011.

H. Kroodsma MSc, WU Forest and Nature Conservation 2007, passed away at the age of 32. 7 March 2011.

Dr. C. Mastenbroek, WU Crop Science 1942, passed away at the age of 93. 9 February 2011.

M.T. Mekonnen, MSc student of Organic Agriculture at WU, passed away at the age of 29. 23 February 2011.

H.W. Middelwijk, WU Agricultural

Economics 1977, passed away at the age of 64. 9 April 2011.

D. Minkema, WU Animal Sciences 1959, passed away at the age of 79. 13 July 2010.

Dr. T. Schneider, WU Forestry 1963, passed away at the age of 75. 16 March 2011.

Mrs. I.V. Veerman, WU Plant Breeding 1981, passed away at the age of 56. 23 April 2011.

Ir. G. Voogt, WU Landscape Architecture 1966, passed away at the age of 76. 24 April 2011.

J.N. van der Zijpp, WU Forestry 1956, passed away at the age of 81. 15 February 2011.

TRACING ALUMNI

Wageningen University and alumni network KLV are keen to stay in touch with all our postgraduate alumni. Unfortunately, we are missing a few addresses. Do you have the address of any of the alumni listed below? If so, please send this information to alumni@wur.nl

M. Ndiaye PhD, 2007
M. A. Nematollahi PhD, 2008
K. R. Ng'habi PhD, 2010
F. N. Nguthi PhD, 2007
Nguyen Cong Khan PhD, 2006
I. Nhapi PhD, 2004
B. R. Nikku PhD, 2006
Dr. H. L. Njiforti, 1997
M. Nori PhD, 2010
I. A. Nougalli Tonac PhD, 2008

W. J. Ntow PhD, 2008
G. I. Nyadzi PhD, 2004
K. Nyombi PhD, 2010
O. O. Obembe PhD, 2006
D. M. W. Ochieno PhD, 2010
A. Oelofse MSc PhD, 2001
G. Ohayo-Mytoko MSc PhD, 1997
B. O. Oindo MSc PhD, 2001
F. E. O'Kane PhD, 2004
T. O. Okurut MSc PhD, 2000
M. Oliveira PhD, 2010

E. S. E. Omran PhD, 2007
W. Otieno MSc PhD, 2002
A. Otroshy PhD, 2006
E. Ouédraogo PhD, 2004
Dr. N. S. Outchkourov, 2003
Dr. G. C. Pacini, 2003
Dr. M. S. Paine, 1997
A. Pakdel PhD, 2004
Dr. P. G. N. Palomino, 1995
Dr. D. R. Pant, 2000
Dr. U. N. Parajuli-Nath, 1999
Dr. L. Parenicová, 2000

A. Parker PhD, 2009
B. Patil MSc PhD, 2006
K. P. Paudel PhD, 2010
D. Paudyal MSc PhD, 1994
P. L. Paulo MSc PhD, 2002
S. H. Peighambardoust PhD, 2006
Dr. Ir E Peters MSc PhD, 2003
Dr. R. Petruy, 1999
Pham Van Hoi PhD, 2010
Pham Xuan Tung PhD, 1992

Dr. H. S. J. Picavet, 2001
A. M. Piskiewicz PhD, 2007
Dr. R. J. Plant, 1999
Dr. J. Polling, 1999
Dr. H. E. Popeijus, 2002
L. A. M. Pouvreau PhD, 2004
E. J. Prado Cordero MSc PhD, 1997
A. Prakash PhD, 2005
S. Prigent PhD, 2005
A. Pukin PhD, 2010
Xiaoquan Qi PhD, 1998

PERSONALIA

Dr. Klaas Bouwemeester, MSc, PhD, WU Biotechnology 2002, received the Hugo de Vries Prize 2010 for the best thesis in the field of botany at a Dutch university/ 4 April 2011.

Prof. Cees Buisman, WU Environmental Hygiene 1985, co-founder and scientific director of Wetsus and professor of Environmental Technology, received the Entrepreneur Award from the Wageningen University Fund (WUF), during Wageningen University Founder's Day 2011, for his success in combining the pursuit of science with commercial applications. 9 March 2011.



Cees Buisman

Dr. Corneille Ewango, PhD WU 2010, won the Future for Nature prize for the protection of plants and animals, including the okapi, in the Ituri forest in the Congo. The Congolese ecologist got his PhD from the chair groups of Forest Ecology and Forest Management, and Biosystematics at Wageningen University, part of Wageningen UR. The prize consists of 50,000 euros. Ewango has already won the Goldman Environmental Prize and the National Geographic Emerging Explorers Award for Africa. 4 April 2011.



Corneille Ewango

Simon Jan de Hoop, WU Plant Breeding 1984, has received an honorary doctorate from Maejo University in Chiang Mai in Thailand. De Hoop was awarded the title in recognition of his years of work in the field of selective breeding of vegetable and flower seeds for East-West Seed in South-east and South Asia. 19 February 2011.

Henjo de Knecht, WU Forestry 2005, has received an NWO Rubicon grant, intended to enable highly promising postdocs at Dutch universities scientists to gain research experience at a foreign university. For De Knecht this is the University of Helsinki. 5 April 2011.

Prof. Han Lindeboom, PhD University of Groningen, professor of Marine Ecology at Wageningen University, part of Wageningen UR and board member for science at IMARES, part of Wageningen UR, has been decorated with the Medal for Arts and Sciences of the Order of Oranje by Queen Beatrix of the Netherlands, for his efforts for Antarctica. 6 April 2011.

Lucas Simons, MBA, WU Environmental Hygiene 1997, has been honoured by the World Economic Forum as Young Global Leader 2011, for his work on sustainable agriculture and trade. Simons is founder and director of two companies: New Foresight and ForeFinance. 9 March 2011.

Admasu Tesegaye, PhD WU 2002, has been appointed president of Addis Ababa University (AAU) in Ethiopia. 18 March 2011.



Han Lindeboom receives the medal for Arts and Sciences from Queen Beatrix.

PHOTO ANP



Sea bird research on Antarctica

'At the South Pole we find bits of plastic in the stomachs of at least three quarters of the dead chicks of the Wilson's storm-petrels, says Jan Andries van Franeker. 'And that is on the cleanest continent on earth.' The parent birds picked up the plastic long before the breeding season during their long migration across the oceans. During feeding, some of

the plastic ends up inside the chicks and some of it is eventually excreted by the bird. 'We think that several tons of plastic are brought to the breeding colonies on Antarctica every year', says Van Franeker, a researcher at IMARES, part of Wageningen UR. The sea bird research is in line with the international South Pole treaty, to which the Netherlands is

a signatory. Van Franeker is also conducting research on the contents of the stomachs of Northern fulmars on the North Sea. 'These birds may sometimes mistake the plastic for food, but there is no conclusive explanation for why they eat so much plastic.'

Info: www.imares.wur.nl/uk/research/dossiers/plastic/ ■