Research for the future

Ministry of Food, Agriculture and Fisheries
Danish Institute of Agricultural Sciences

Welcome to DIAS

The Danish Institute of Agricultural Sciences, DIAS, is the largest research institute within the area of agriculture and food production in the country.

DIAS belongs under the Ministry of Food, Agriculture and Fisheries and has research centres located in Foulum near Viborg, Bygholm in Horsens, Årslev near Odense, Flakkebjerg near Slagelse, and Sorgenfri near Kgs. Lyngby.

DIAS also has several research stations and a department for testing new agricultural plant varieties.

The nearly 1000 employees at DIAS have excellent support facilities at their disposal: modern laboratories and experimental facilities, animal houses, a research abattoir, a feed factory, greenhouses, and 1300 ha farmland allocated to field trials and animal feed production.

Sustainability

Sustainability is a fundamental principle in all research at DIAS. The institute therefore develops solutions that contribute to an environmentally and economically sustainable development of agriculture and the food industry.

There is increasing pressure from consumers for high quality food products and for production methods that are acceptable in terms of environmental impact, animal welfare and ethics. Both products and production methods must be acceptable to consumers. DIAS therefore contributes to a development of the industry that is acceptable to consumers, and its research and development of new technologies is at the leading edge of science.

FACTS

Annual turnover

The Danish Institute of Agricultural Sciences has an annual budget of 72 m EUR.
The 31 m are directly financed by government grant through the Finance Act, while the remainder must be obtained through other sources.

The present agricultural and food industry sector is very complex and one research institute alone cannot lift the research burden required in this area.

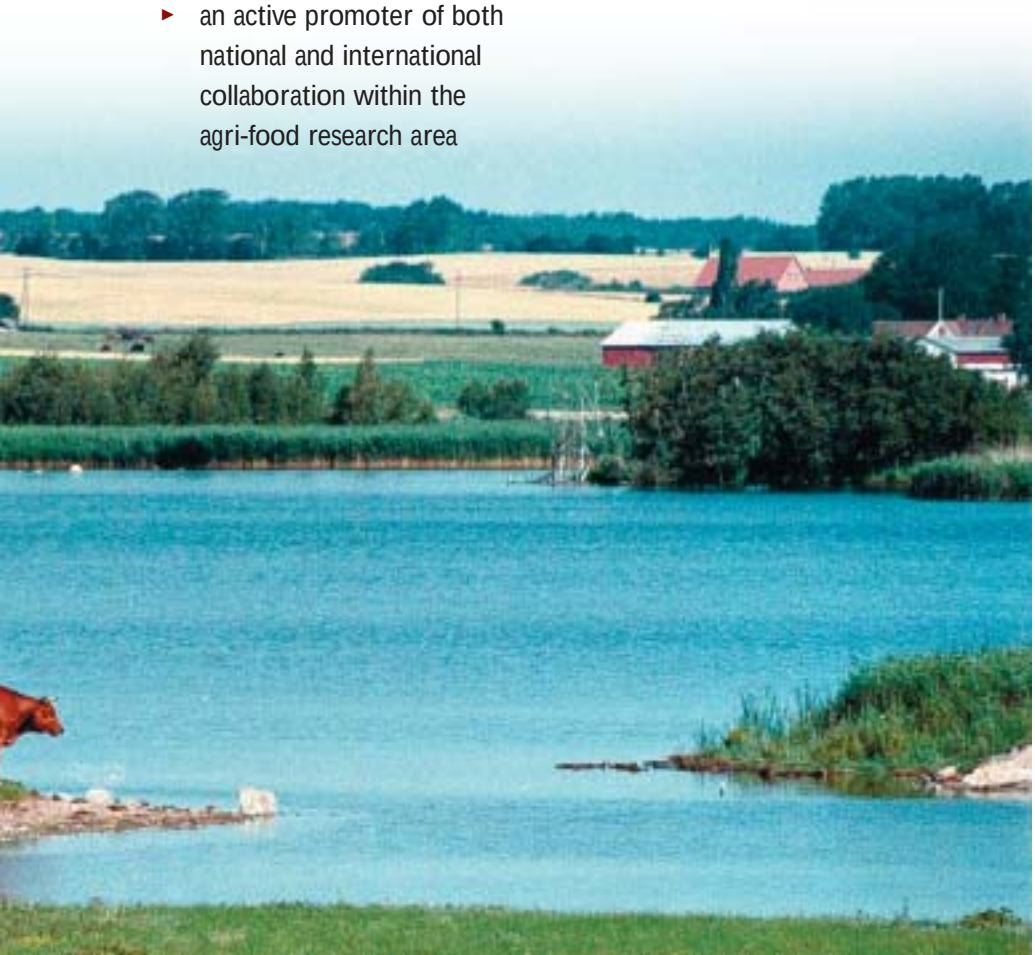
DIAS is therefore currently seeking to strengthen its research effort through collaboration with partners within all the relevant research areas.

DIAS aims to be:

- internationally leading within the main areas of agricultural research
- the primary supplier of knowledge and solutions within its area
- acknowledged by authorities, the industry and society as a qualified, impartial and effective partner
- an active promoter of both national and international collaboration within the agri-food research area

The research at DIAS is based on a set of important core values that convey the relations to DIAS' employees and collaborators, and to society as a whole. These core values are:

- Expertise
- Commitment
- Responsibility
- Openness
- Job satisfaction
- Consideration
- Creativity
- Innovation
- Professionalism
- Impartiality



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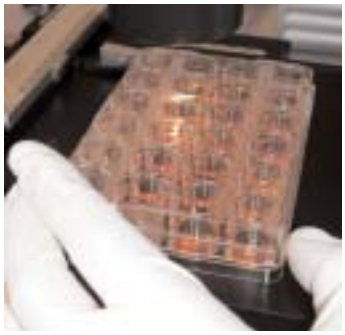


Using the cell as a "guinea pig"

Scientists at the Danish Institute of Agricultural Sciences are developing a method that can reveal ingredients, for example in milk, that are important for the health of humans and animals and in the curing of illnesses.

Scientist Stig Purup has a great deal of experience in cell cultivation. His experimental equipment consists of e.g. small plastic trays with cavities, so-called wells. To each well is added a solution containing living cells, such as intestinal tissue from an animal or human cancerous tissue. He then adds different ingredients to the wells from, for example, whey and studies whether they promote the growth and migration of cells, the death of cells, or whether they have no effect at all.

The cells are very sensitive to external inputs and with the new technique, information is quickly gathered about the effect of the different chemicals on the cells of animals and humans. The laboratory experiments can, however, only give an indication of which chemicals are worth having a closer look at. The ingredients always have to be finally tested in animals.

An exciting job as a scientist

Hisamitsu Takai is a senior scientist at DIAS, Bygholm.

Improving feed quality

Scientists at DIAS are working on achieving a better understanding of the genetic and molecular mechanisms that control the feed quality and yield of barley, wheat, ryegrass and maize.

Cereals and grasses are in many ways excellent animal feeds. However, in order to meet their feed requirements, a number of nutrients such as phosphate, soya protein and amino acids have to be added. Enzymes are also added to aid the digestibility of the feed.

Genetic engineering and traditional breeding techniques are used to help scientists produce new varieties that are better able to meet animal requirements whilst also being less harmful to the environment.

Hisamitsu Takai studies odour emissions from animal houses. He is Japanese and qualified in Japan as a mechanical engineer. He was urged to go to Denmark by his father, who was interested in the Danish cooperative movement. Hisamitsu Takai thus initially went to a high school of physical education in Denmark, where he met his wife. He later had the opportunity to study at The Royal Veterinary and Agricultural University in Copenhagen and has now lived in Denmark for 30 years.

– It was a bit of a coincidence that I became a scientist, but I cannot imagine a better job. To start with, I can spend my working time on something that really interests me. And I have the freedom to organize my own work. My work consists largely of generating ideas and then trying to raise the funds to realize them, says Hisamitsu Takai.

He has spent most of his research career studying the work environment and the relation between production and people. He spends most days at his office at Research Centre Bygholm, while other days are spent visiting farms or at meetings and conferences. He is often in the laboratories where skilled technicians construct experimental setups to enable Takai's theories to be tested in practice.

A bright idea

Hisamitsu Takai has had many good ideas in his time. He had one of his best ideas in the 1980s when he was working on dust abatement in pig housing, where the dust made many farmers ill. He conceived the idea of using colza oil to reduce the problem. Today, this innovation has been commercialized by companies in Europe, USA and Canada.

– There were many people working on it, because others took the idea further. It is such a wonderful feeling when something you are so enthusiastic about actually succeeds. Most scientists only experience this once in a lifetime – maybe twice if you are really smart, and I cannot promise that I will have any more bright ideas.

The Danish Institute of Agricultural Sciences has benefited from Takai's close links with his home country. Japanese scientists have studied odour emissions from livestock production for the last 30 years, and Japan has had legislation on these emissions for the last 20 years.

According to Hisamitsu Takai, there is no manual on how to be a scientist, but he sees it as his mission to develop technical solutions that are of benefit to society.

– If farming is to remain a large exporting industry with the ability to attract employees, the problems that arise will have to be solved and I am very happy to be able to contribute, says Hisamitsu Takai.

An expert with many tasks

Senior scientist Lise Nistrup Jørgensen is well known in Denmark. Every year she gives many lectures to agricultural advisors and farmers. And they are very attentive when she speaks – not just because she is a good speaker, but because she often brings news that could be very valuable to farmers.

Lise Nistrup Jørgensen has studied fungal diseases in cereals for nearly 20 years and follows them closely, both in Denmark and in our neighbouring countries. She is often the first to know when new strains are on their way to Denmark, when new effective pesticides become available, or when fungi appear to be developing a resistance to chemicals, rendering the chemicals unsuitable for use.

– I think it is exciting to give lectures and to talk to farmers. However, to be able to give a good lecture it is crucial for me to see things with my own eyes. That is why I spend a lot of time in the field every summer in order to record the prevalence of fungal disease in cereal myself.

One aim of Lise Nistrup Jørgensen's work has been to determine the minimum dosage of pesticide required for farmers to achieve the desired effect. Most of the chemicals she works with are traditional fungicides, but now and again there are also studies on organic 'pesticides', such as garlic extracts. Many projects are moreover linked to varieties that have different degrees of resistance and therefore also different treatment requirements.

Lise Nistrup Jørgensen has studied fungal diseases for nearly 20 years.

Frequent traveller

Lise Nistrup Jørgensen acquires her knowledge from many different sources. Not least the 70 or so different cereal field trials that she and her colleagues at Research Centre Flakkebjerg are in charge of. She also has contact to a large network of plant pathologists in other countries. Since fungi know no borders, it is important to follow the movement of the fungi in neighbouring countries.

– I am still fascinated by fungi, as there is always something new happening. And although the pivot in my job is fungi in cereals, I am also involved in many other things. I am a member of several boards and councils and I frequently travel abroad to conferences and meetings and to give lectures, says Lise Nistrup Jørgensen.

Resistant poppies

"New test results indicate that some common poppies in Denmark have become resistant to sulphonyl-urea herbicides. A screening has shown that there is a markedly lower effect of the herbicide agents Express and Hussar on a common poppy biotype found on Djursland than on the standard biotype."

This is how it many sound when scientists at the Department of Crop Protection inform farmers of their newest observations.

If farmers use the same herbicides for prolonged periods, weeds may adapt so that the chemical agents in the herbicide become ineffective. This is why scientists monitor whether herbicides are starting to lose their effect.

Animal behaviour studies

Scientist Merete Studnitz studies pig behaviour at DIAS in Foulum.

– I would like to be a veterinary psychologist, said 16-year-old Merete, when she was working at a veterinary surgery during her vocational training at school.

Here, many years later, her dreams have been fulfilled. Today Merete Studnitz is a scientist at the Danish Institute of Agricultural Sciences in Foulum, where she studies pig behaviour.

After completing her natural science-based baccalaureate, Merete Studnitz sought the open spaces. She worked as a shepherd before applying for admission to The Royal Veterinary and Agricultural University the following year.

Early on in her university studies she took the subject on animal welfare (ethology) that had her overriding interest on the course. After studying for two years, she needed the contact with animals again and therefore first spent six months looking after pigs and then six months in England working on a livestock farm.

– After I finished my agricultural studies, I became a teacher at Tønder Agricultural College. Later we moved away from South Jutland, and I was lucky to get a job up here. I even had the opportunity to do a PhD on the nose-ringing of outdoor sows. When the sows are let outside, their noses are ringed to moderate their rooting behaviour. I chose this subject because we here have a dilemma between animal welfare and environmental considerations, says Merete Studnitz.

No similar job anywhere else in Denmark

– The job I have here I would not be able to find anywhere else in Denmark. If I wanted something similar, I would have to go abroad, so it is a question of getting your teeth stuck in and not letting go, says Merete Studnitz with a smile.

Merete is working on four research projects – all dealing with the behaviour of pigs. The most comprehensive one is a project that tries to find the rooting materials preferred by pigs. Danish legislation stipulates that pigs must have permanent access to straw or other rooting material.

Methods used by animal welfare scientists can benefit people suffering from senile dementia

The Research Group for Behaviour and Stress Biology at DIAS is one of the largest in the world and has built up considerable expertise in behavioural studies. That is why the group was contacted when a senile dementia researcher needed a systematic design for conducting behavioural studies in elderly senile patients.

Senile patients cannot clearly tell us what they would like, but systematic, behavioural observations can give us a good indication of when the patients are thriving. With this knowledge, the activities at residential homes can be targeted, ensuring that the residents get the best out of the available resources.

Rooting material

The first batch of pigs has so far been presented with 18 different kinds of rooting material, and scientists have chosen the six most popular ones to continue their studies on. Later in the project, two materials will be chosen for practical testing.

– I like to design experiments and plans so that I can get the animals to answer the questions, says Merete Studnitz, who emphasizes that she is not able to do it on her own.

– We have some very skilled technicians, who construct the experimental facilities and conduct most of the behavioural observations, and I can also get help with the administration. I spend most of my time in the office, although I also like to be outdoors observing the animals, says Merete Studnitz.

In most of the projects she works alongside other scientists. Amongst others, she participates in projects on outdoor pigs, where she observes their behaviour, while colleagues from other departments work on different areas, such as the production aspects, the leaching of nutrients to ground water, and the quality of the meat finally delivered by the pigs.

The greening of the planet

During the last 20 years the total number of green plants on our planet has increased. This is due chiefly to the high atmospheric concentration of CO_2 and other greenhouse gases, as shown by senior scientist Keith R. McCloy at the Danish Institute of Agricultural Sciences.

Plants are doing well, particularly in the Northern hemisphere and the largest increase is found in deciduous forests, grasslands and on cultivated land.

The increase in plant growth is most likely due to the increased atmospheric concentration of CO_2, and a consequence of this can be rising temperatures and changes in the rainfall pattern.

Claus Haagensen, Chili

Purple cauliflowers and red carrots

Gitte Kjeldsen Bjørn graduated from The Royal Veterinary and Agricultural University as a horticulturist.

There may be both purple cauliflowers and red carrots in her basket when Gitte Kjeldsen Bjørn harvests her crops. She is a senior advisor at the Danish Institute of Agricultural Sciences in Årslev, where she is in charge of the testing of field-grown vegetable varieties.

– The unusually coloured carrots are very popular in other countries, such as England, but have not really gained foothold in Denmark, because Danes are very conservative, says Gitte Kjeldsen Bjørn.

She adds that the red carrot is not really suitable for eating raw. It has to be fried – then it both looks and tastes good.

Gitte Kjeldsen Bjørn graduated from The Royal Veterinary and Agricultural University as a horticulturist.

– Just because a type of leek can be grown in Holland or Germany, it does not mean that it is necessarily suitable for Danish conditions. DIAS therefore tests the vegetables, since it is important that the authority doing the testing of the varieties is objective and can determine what is suitable for growing under Danish conditions, says Gitte Kjeldsen Bjørn, who plans the tests and processes the results.

– The testing is carried out in close collaboration with the commercial growers, the seed industry and the advisory service within that area. We plan which vegetable species are to be tested. We have five main vegetable groups that we test every year. One is the carrot, which we grow at two different locations on completely different soil types.

Some varieties of carrot grow better on a silty soil while others are better suited to a sandy soil. The results can therefore be very different, says Gitte Kjeldsen Bjørn.

Contact is important

– Until a few years ago, the size of the yield was the most important aspect. Today we focus more on how the plants cope with disease as there are many restrictions on the use of pesticides. I think there will be more focus on taste and quality in the future, so that consumers will have information available on the taste of the different varieties and what they are best suited for. This is not available to consumers today, but would be a great help to them.

Gitte Kjeldsen Bjørn is very pleased to have a job where something new happens all the time and where she has many contacts to people outside the institute.

– Contact to the trade is very important in my job as I need to have a feel for what is going on in my line of work. My job involves several projects with colleagues including one on organic vegetable production. We also have a collection of old vegetable varietres – a living gene bank – of old Danish biannual vegetable. We have, for example, 72 different varieties of rhubarb.

We also have different varieties of horseradish, Jerusalem artichoke, lettuce, hops and shallots, reveals Gitte Kjeldsen Bjørn, who is in the process of constructing a database with information on the different varieties in the collection.

Hønvig Lørs

New method can predict the occurrence of bubonic plague

The bubonic plague is a bacterial infection in rodents that is transmitted by flees. Many rodents are able to survive the disease, but it can be very dangerous for humans to get bitten by infected flees. The plague has not been documented in Europe for over 100 years, but can still be found in Africa, Asia and America.

Scientists at DIAS have contributed to the development of a method for predicting outbreaks of the disease in Central Asia. By analysing thousands of data from the last 50 years, scientists have shown that bubonic plague only appears if the number of desert rats has been high for a period of two years. This means that it is now possible to predict whether there is a real risk of an outbreak of bubonic plague.

From idea to result

The yolk in an egg
The size of the yolk does not necessarily follow the size of the egg, and the yolk is not simply round as in a fried egg. But perhaps the size of the yolk could affect the hatching time or the robustness of chickens.

This is what scientists at DIAS are trying to find out. If there turns out to be a connection between the size of the yolk and the robustness of the chickens, this information can then be used in breeding programmes to enable more robust chickens to be bred.

When a project idea is first born at DIAS, it may be the result of an interest expressed by farmers, advisors or food companies for further knowledge in certain areas. It can also be due to new regulations being introduced – for example the stipulation that pigs should have access to rooting material, but no-one knew what kind. Many new ideas are, however, formed from the more basic research carried out at DIAS that addresses plant or animal physiology, this enabling DIAS to solve more short-term research requests. Before scientists start a new project, the idea is turned over and discussed thoroughly with close colleagues and frequently also with other colleagues who could have an interest in exploring other aspects of the problem.

Finance

A project description has to be produced and the scientist will have to find a source of funding. About 40% of DIAS' expenses are met by government core funding through the Finance Act. The remainder has to be funded by other sources, such as trusts, funds, private firms, or through public research programmes, Research Council grants or the Innovation Law.

If finance is granted, the project can then be started.

Experiments

In the case of the project on pig rooting material, the first step is to study the relevant literature and then to plan in detail each of the experiments throughout the course of the project.

The first practical experiment with rooting materials lasts 12 weeks and takes place in a specially built area where the pigs can choose between different kinds of rooting material. These experiments require the assistance of technicians who deal with many of the practical tasks. The experiment is followed by a period spent processing the collected data. The second set of practical experiments takes place over a period of 22-24 weeks, this time using pens, again followed by a period of data-processing. There are finally several practical experiments both in DIAS' own facilities and on private farms.

The project is divided into several phases and has a time frame of four years starting with literature studies and ending when the final results have been published. Research projects often have a time frame of 2-3 years.

Results from the project are published along the way, for example as articles in scientific journals and in DIAS' own publications.

Research results must be communicated to the users

Research results must be mediated to the users – such as the agri-food industry and the public in general.

DIAS constantly endeavours to ensure that the communication and dissemination of results to end-users is fast and efficient, to enable the results to be utilized and to advance DIAS' standing.

Several groups of people visit the research centres every day, such as college students, various associations or farmers. Many of the visitors come from abroad. DIAS also holds several arrangements, for example open-house days, field days, and seminars.

Scientists have the use of many different channels to mediate their results. They write articles for Danish and international trade journals and for scientific journals. They also participate in international conferences and seminars, where they have the opportunity to present their research results.

Publishing results internationally also serves as an advertisement for the institute (and the scientists!) and helps to establish contact with international research communities.

Results are also published in DIAS' own publications, such as the Grøn Viden leaflet series and DIAS Reports. Apart from the printed publications, DIAS publishes the electronic newsletter *Danmarks JordbrugsForskning*. Articles can also be found on the home page *www.agrsci.dk*, and press releases on research activities are also issued.

There is increasing pressure from the public to have research results published very early on in the project period. There is mostly no problem with this, although experiments and the processing of the results do take time. Exceptions to this are when one of the participants in a project is a commercial enterprise that does not wish to have their results published before the end of the project period for reasons of competition, or when scientists are seeking to patent a new invention.

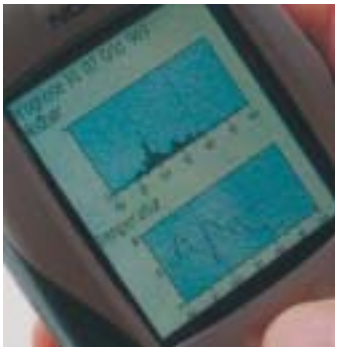
FACTS

Newsletter

The newsletter *Danmarks JordbrugsForskning* reports on new and future research projects and their significance for consumers, business and society.

The newsletter is published electronically. You can subscribe to this free of charge on www.agrsci.dk.

A PhD qualification opens doors



Mobile phones will ease the working day for market gardeners

Producers of fruit and vegetables can look forward to having their burden of paperwork reduced by using mobile phones that act as mini-computers with internet access.

Scientists at DIAS are developing a system that will enable gardeners to key information into the phone while they are outside working. If, for example, they are applying manure, they will be able to enter the amount and time of the application, and this information subsequently becomes available in an internet-based program.

– It is exciting to be able to spend three years immersing yourself in a particular area, says Jakob Hedegaard, who is a PhD student at the Danish Institute of Agricultural Sciences.

He is one of about 80 PhD students, who at any point in time may be studying at one of the Institute's five research centres, just as there each year may be as many as 40 students at DIAS writing a thesis for a higher degree.

Jakob Hedegaard studies at the University of Aarhus, where he took his MSc in chemical biotechnology.

– I started as a research assistant at DIAS, but I chose to do a PhD because it is so scientifically challenging and jobwise I will be better equipped. Many job advertisements stipulate that you have a PhD – it opens doors, says Jakob Hedegaard, who shares an office with Wang Xuegang – a Chinese colleague.

Genetic research

Jakob Hedegaard and Wang Xuegang both take part in a large project, which investigates the genetic material of pigs by mapping the pig genome. The genes determine, for example, whether one pig contracts a lung disease, while another goes free.

– Virulent lung diseases are very contagious and can kill. We are therefore trying to find pig families with genes that confer a better resistance to lung disease.

It is difficult to find the right combination that improves resistance to lung disease, but we are trying, says Jakob Hedegaard, who works regularly with the computer, but who is also often in the laboratory working with very advanced equipment.

– As part of your PhD study you are encouraged to spend a longer term studying abroad, but there are only few other places in the world where they have techniques for mapping the pig genome that are as good as ours. So going abroad would probably delay my studies. However, there are many other areas where I would benefit from a visit abroad, says Jakob Hedegaard, who exchanges information with colleagues in contact groups over the internet.

Clear purpose

Jakob Hedegaard likes that the research carried out at DIAS is very focused and has close links to the industry that also contributes to the funding of the research.

– It is also nice that I can see the purpose of what I am doing and

Anne Mette Kristoffersen

– It is exciting to be able to spend three years immersing yourself in a particular area, says Jakob Hedegaard, who is a PhD student at the Danish Institute of Agricultural Sciences.

know that it will be used. It is moreover an advantage that there are many of us working within the same area, because that ensures there is an active, qualified exchange of knowledge, says Jakob Hedegaard.

He would like to remain at DIAS when he has finished his PhD, as he believes genetic research will be in focus in the future.

FACTS

Foulum:	513 ha
Rugballegaard:	170 ha
Flakkebjerg:	186 ha
Foulumgaard:	90 ha
Jyndevad:	90 ha
Aarslev:	80 ha
Tystofte:	72 ha
Askov:	26 ha

An international environment

English is the working language for many of the foreign scientists and PhD students who visit the Danish Institute of Agricultural Sciences for shorter or longer periods.

That is also the case for the young Polish PhD student Damian Jósefiak. He is in Denmark for four months in order to process a large data material on the feeding and growing of chickens.

– I chose DIAS because it is the best place in Europe for working with poultry and pigs, says Damian Jósefiak.

– DIAS has all the necessary experimental facilities with laboratories, animal houses and offices in one place. I could also have studied in Poland, but it would have been much more difficult, he says.

Damian Jósefiak is one of about 20-30 foreign visiting scientists and PhD students working at DIAS at any one time.

Many Danish scientists likewise spend longer periods at research institutes abroad. The exchange helps establish closer relationships between scientists from different countries. Nearly all scientists attend conferences and meetings abroad. This is where they get

The effect of plant growth inhibitors on seed quality

There is growing concern that residues from growth inhibitors could have a detrimental effect on the human reproductive ability. DIAS is collaborating with Rigshospitalet and The Danish Veterinary and Food Administration in an investigation on the effect on animal reproductive ability. Growth inhibitors are sprayed on wheat in what is regarded as acceptable doses. The semen quality of boars fed on the wheat is subsequently tested. The focus is expressly on the male side as they are thought to be more sensitive to the chemicals than the females.

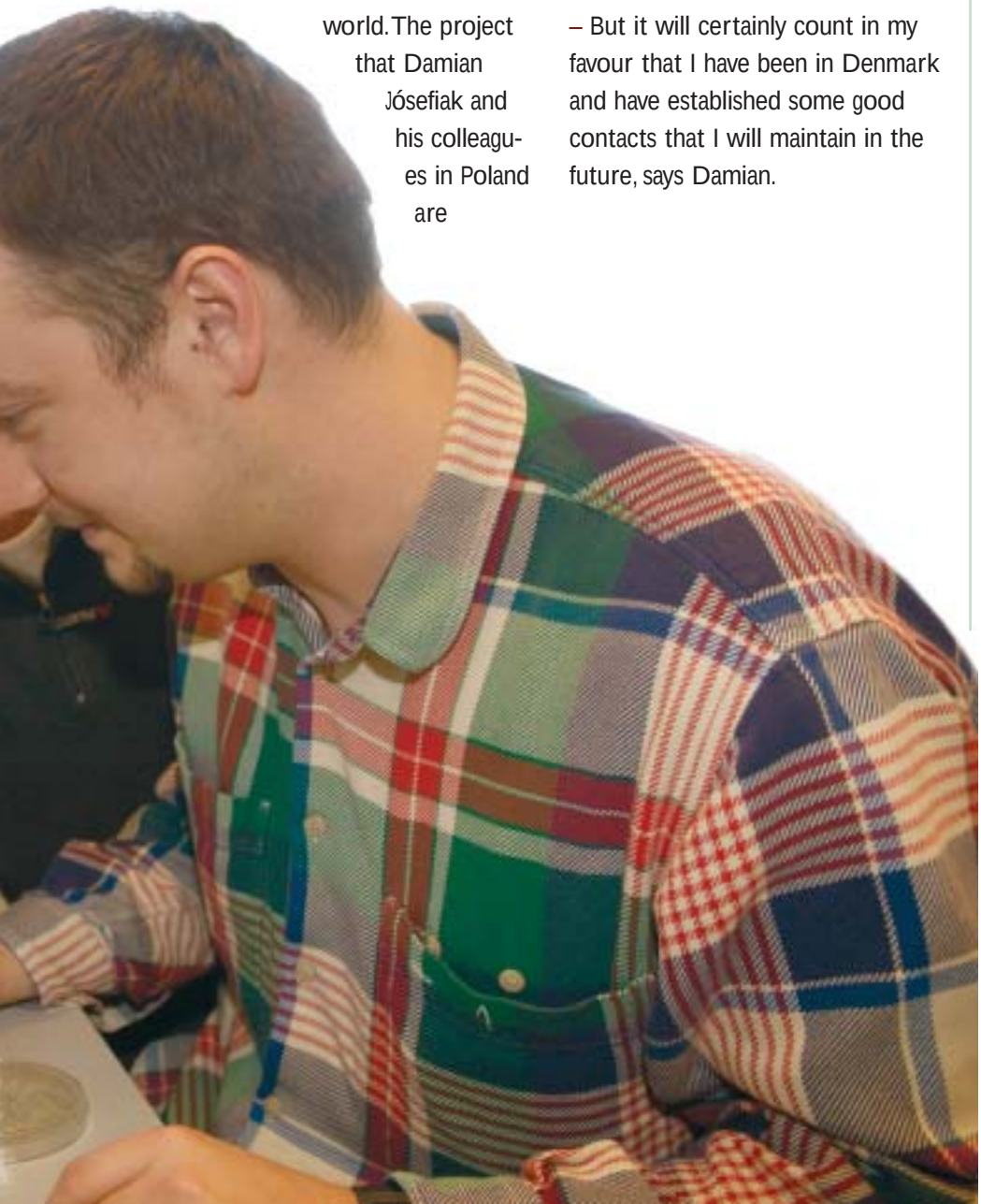
inspiration and establish and maintain the networks that they use in their daily work.

High quality research

International collaboration helps establish a high research quality and safeguards the development of individual research areas. The Danish Institute of Agricultural Sciences collaborates with research institutes all over the world. The project that Damian Jósefiak and his colleagues in Poland are involved in is an EU project with participants from 12 countries. DIAS participates with both poultry and pigs.

When Damian returns to Poland, he only has a few months left before he has finished his PhD. He hopes to be able to get a job at the university in Poznan, where he is doing his PhD. If he does not succeed, he will seek a job in private business.

– But it will certainly count in my favour that I have been in Denmark and have established some good contacts that I will maintain in the future, says Damian.



Anne Mette Kristoffersen

FACTS

Animals

Research Centre Foulum
Facilities for 225 dairy cattle including breeding stock. Facilities for 150 cows in cubicle housing; additional tied stalls.

Pig housing facilities for 300 sows, piglets and fattening pigs, respectively.

Poultry housing facilities for broiler and laying hens. Fur farming facilities for 2000 female mink and 10,000 kits.

Rugballegaard
Organic dairy facilities with cubicle housing for 60 cows and deep straw housing for 30 cows.

Organic pig herd with 50 free-range sows with housing for 1000 fattening pigs.

A dynamic workplace

DIAS is a dynamic workplace and employs a variety of people with very diverse skills. For research to be carried out at DIAS it is crucial to have committed and skilled staff. It is therefore important for DIAS to be an attractive workplace that will be able to attract employees, also in the future.

An increasing number of research projects are based on interdisciplinary collaboration between different research groups. This is because research at DIAS forms part of a larger social framework, and this requires good internal networking.

Interdisciplinary projects

Although employees are attached to individual departments at DIAS, they are often involved in a number of cross-disciplinary projects. These projects can involve collaborators from other research institutes, businesses, counties and municipalities, universities, and international research organisations.

Competence development

There are good opportunities within DIAS to develop your skills and competences with programmes tailored to individual requirements.

Many scientists increase their knowledge by utilizing the option to spend time abroad and by participating in new, cross-disciplinary collaborations.

Employees with technical or administrative functions likewise have the opportunity to pursue a relevant, professional development of their competences. DIAS arranges many courses and establishes development projects for the various staff groups.

The competences of DIAS managers are also being developed according to need through courses for both project leaders and research group leaders. The management of DIAS additionally undergoing a continuous evaluation process.

FACTS

Employees

At the start of 2004, the Danish Institute of Agricultural Sciences had nearly 1,000 employees, distributed as follows:

Research Centre Foulum (including three experimental stations):	601
Research Centre Bygholm (including Rugballegaard):	66
Research Centre Aarslev:	84
Research Centre Flakkebjerg (including research groups at The Royal Veterinary and Agricultural University, Copenhagen):	170
Department of Variety Testing, Tystofte:	24
Danish Pest Infestation Laboratory, Sorgenfri:	44

Patenting new inventions

If a scientist at the Danish Institute of Agricultural Sciences comes up with a new invention, its potential marketability and patentability will be evaluated by DIAS in consultation with the inventor. So far, DIAS has had 30 patenting cases that have resulted in two patents and 15 licensing agreements with businesses wishing to make use of the patents.

– There is a considerable amount of work involved in the preparation of a patent application. But it is an area that has future perspectives, because it helps to promote DIAS as a serious collaborator in projects and establishes closer cooperation with other companies, says Michael P. Junker, who is employed by DIAS as a lawyer. Patents can earn money and a patent set up at DIAS splits the money evenly between the inventor, the relevant department, and DIAS.

– We do not really expect to make much money on patents. Patents and licensing agreements are tools to attract more funding to be used on research, says Michael P. Junker.

When a patent has been applied for, it can either be sold for commercial use, or the scientists involved can choose to establish their own company and use the patent themselves.

However, I think it is healthy that scientists get used to the process of reflecting on what their work can be used for. DIAS is ready to support scientists who wish to start their own businesses based on a patent, says Michael P. Junker.

Own business

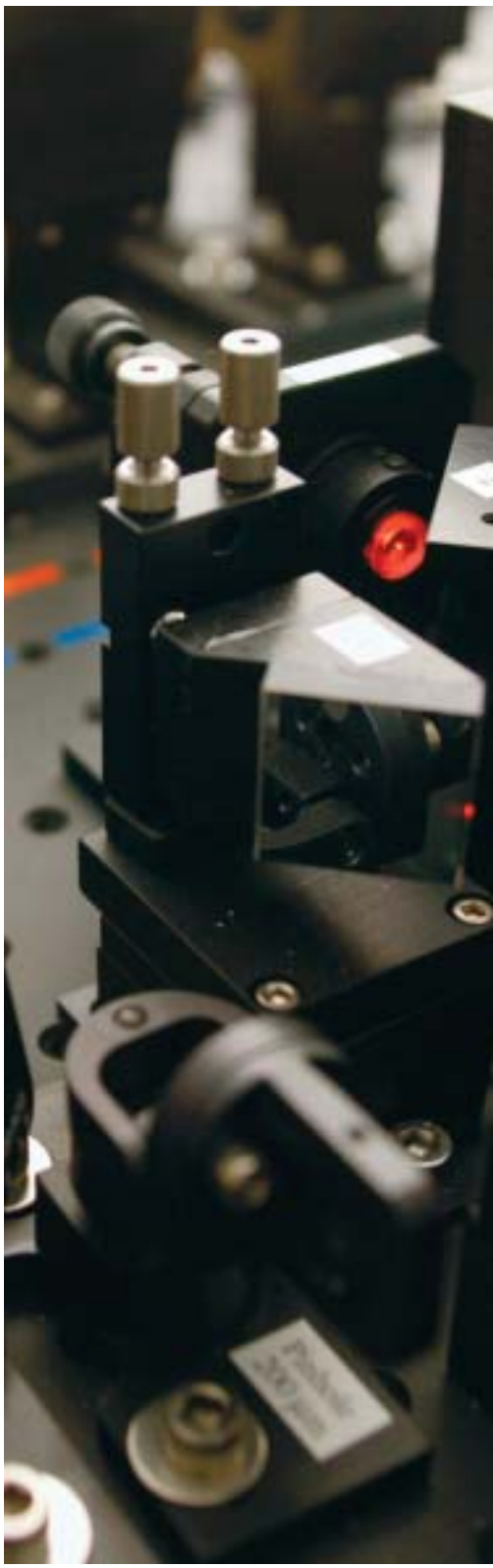
One of the scientists who has become self-employed is Holger Nehmdahl. In 2002, he moved from his job as a scientist at DIAS to his own company at the nearby Agro Business Park.

He started his own business with three colleagues, two of whom are active in the business today. The decision to establish the company was not taken until after their research results had been published, which meant they could not seek a patent.

They have nevertheless managed to start a business on the basis of their research, because their business, ConTerra, is based on the knowledge they acquired as scientists.

ConTerra Aps constructs maps that are used for detailed calculations of nitrate leaching. The business also develops GIS tools – Geographical Information Systems – for handling some agricultural databases that are used by the counties.

The business now employs five people.



Anne Mette Kristoffersen

Authorities seek expert advice

Focus on healthy cows

A Danish dairy cow yields c. 8000 kg milk per year, corresponding to about 22 kg per day. The yield has been increasing strongly since 1980. More than 50 percent of this improvement is due to selective breeding. The strong focus on yield has, however, had some downside effects, such as a reduction in fertility.

Research at the Danish Institute of Agricultural Sciences is therefore very focused on preventing the negative effects of a high yield. This is of benefit both to the welfare of the cattle and the economy of the farmer.

"Could you please tell us how…"

This is – in simplified language – the preamble when politicians, administrators, etc, in the ministries contact the Danish Institute of Agricultural Sciences with an enquiry on a technical matter.

Several hundred questions each year land on the table of Villy Jørgensen, who is the coordinator of the urgent policy advice cases at the Danish Institute of Agricultural Sciences.

– When authorities and politicians seek an unbiased, professional answer to a question, they approach us. We cover a wide area, so the topics can be anything from soil cropping and environmental aspects to animal health and welfare, says Villy Jørgensen, who answers some of the questions himself, but passes most of them on to other scientists within DIAS.

– If a politician poses a question to a minister, the question can end up here. I find out who is able to answer it. It may be that several scientists are needed in order to approach the question from several angles. When I receive the answers, I edit them to reduce the length of the answer. The minister can then choose to use it directly or attach it as an appendix to his answer, says Villy Jørgensen.

Influence on new laws and regulations

Other questions may originate from the Justice Department when new laws and regulations on animal welfare are being prepared.

– In this way we can provide the appropriate, expert basis on which new laws, orders and regulations can be drafted, says Villy Jørgensen, who often has only a few days to collect and process an answer.

Sometimes scientists are not able to look up the answer directly, but have to make a statement based on their background knowledge. In any case, much effort goes into quality controlling the answers to avoid any misunderstandings. The answers are therefore always checked by a colleague to ensure there is agreement on the reply.

Other tasks relating to policy advice include contributing to the drafting of, for example, new EU directives, and participating in technical working groups formed by the ministry in connection with larger projects. These tasks take typically several weeks to complete.

Anne Mette Kristoffersen

IntelliGrow – a new form of climate control

It is possible to reduce energy consumption by 25-35% in the production of pot plants. This has been shown by some practical nursery experiments carried out by the Danish Institute of Agricultural Sciences in collaboration with the Royal Veterinary and Agricultural University.

The reduction in energy consumption is achieved by a newly developed climate control system – IntelliGrow – a system that is based on the knowledge of the plants' reaction to climate. At the same time, the possibility of reducing the use of crop sprays – pesticides and growth regulators – is also being researched. A reduction of 20-30% is deemed to be realistic.

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Bring the pests to DPIL's consultancy service

The "Mousehouse" at Research Centre Sorgenfri (the Danish Pest Infestation Laboratory) is filled with mice and rats. Some belong to special strains and spend all their life in the mousehouse. Others are brought in from different parts of Denmark. They have been caught to enable scientists to monitor where rats are becoming resistant to rat poisons. A map of Denmark with the plotted results shows where the different poisons available can be used most effectively.

Several thousand people a year contact the research centre when they receive unwelcome guests in their barns, fields, business premises, gardens, woodwork, bathrooms, skin or hair.

Both research and consultancy

The scientists at the Pest Infestation Laboratory are not just doing research. They take it in turns to man the consultancy, where they are faced with many challenges that often require quick answers and some detective work.

The centre deals with all pests that occur in private homes, business premises, grain stores and animal houses, as well as on people and animals. These are e.g. ticks, stable flies, flour moths, head lice, cocoa moths, cockroaches, mice, rats and voles.

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