

## NEWSLETTER of the LowInputBreeds project

Development of integrated livestock breeding and management strategies to improve animal health, product quality and performance in European organic and 'low input' milk, meat and egg production

### Editorial

Welcome to the first issue of the newsletter of the project LowInputBreeds "Development of integrated livestock breeding and management strategies to improve animal health, product quality and performance in European organic and 'low input' milk, meat and egg production". This newsletter aims to keep you up-to-date on progress of the LowInputBreeds project. In this issue we introduce the project, and we report on recent LowInputBreeds meetings and subproject activities.

For all those that attend BioFach, the World Organic Trade Fair in Nuremberg, Germany, we recommend that you come to the session 'Management and breeding for organic plant and livestock production systems', to take place on Friday, February 19, 2010. At this workshop, the EU projects QLIF, LowInputBreeds and NUE Crops will be presented and discussed with the audience.

Carlo Leifert  
Project Coordinator

Veronika Maurer  
Scientific Coordinator

## Introduction to the LowInputBreeds project

### The project

The LowInputBreeds project, which officially started in May 2009 unites 21 partners from Europe and further afield and will develop integrated breeding and management strategies to tackle the issue of improved animal health and food quality. It will run until 2014 and is funded by the European Union's Seventh Framework Programme for Research and Technological Development.

### Background

Recent studies have shown that livestock breeds developed for 'high input' production systems lack sufficient focus on traits like robustness, which are required for organic and 'low input' systems. There are currently only a few breeding concepts available which focus on the needs of 'low input' systems, such as extensive grazing or free range. An important project is to develop integrated livestock breeding and management strategies with the aim to improve animal health, product quality and performance in European organic and 'low input' milk, meat and egg production systems.

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### LowInputBreeds: Key facts and figures

- ◆ 5-year EU Collaborative Project
- ◆ Contract No. 222623
- ◆ 94 person-years of research
- ◆ Over 60 scientists
- ◆ 21 leading research and industrial organisations
- ◆ 15 countries
- ◆ 4 livestock species: cattle (dairy and beef), sheep (dairy and meat), pigs, poultry

### Objectives

The project has four main objectives:

- › To develop and evaluate innovative breeding concepts to deliver genotypes with 'robustness' and quality traits required under 'low input' conditions.
- › To integrate the use of improved genotypes with innovative management approaches. These will focus on issues where breeding or management innovations alone are unlikely to provide satisfactory solutions e.g. mastitis and parasite control.
- › To identify the potential economic, environmental and ethical impacts of the project's results. The project needs



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to ensure that the results are in line with society's different needs, priorities and consumer expectations.

- › To establish an efficient training and dissemination programme aimed at rapid application of project results in organic and 'low input' livestock farming.

LowInputBreeds focuses on six major livestock production systems: dairy and beef cattle, dairy and meat sheep, pigs and laying hens.

### Project officer

The project officer from the European Commission is Dr. Danièle Tissot, DG Research, Agriculture, Forestry, Fisheries, Aquaculture, B-1049 Brussels.

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### Project partners

The project consortium includes 15 academic centres of excellence and six industrial partners in 15 countries in Europe and also Brazil, Canada, New Zealand and Tunisia. It is coordinated by Newcastle University in the UK (overall coordination) in collaboration with the Swiss Research Institute of Organic Agriculture FiBL (scientific coordination).

- › Partner 1: Newcastle University UNEW, UK, Coordinator
- › Partner 2: Research Institute of Organic Agriculture FiBL, Switzerland, Scientific coordinator
- › Partner 3: National Institute for Agricultural Research INRA, France
- › Partner 4: Wageningen UR, Livestock Research, The Netherlands
- › Partner 5: University of Göttingen / Georg-August-University Göttingen UGöt, Animal Breeding and Genetics Group, Germany
- › Partner 6: University of Catania UCat, Department of Animal Sciences, Italy
- › Partner 7: National Agricultural Research Foundation NAGREF, Greece
- › Partner 8: Federal Research Institute for Rural Areas, Forestry and Fisheries vTI, Institute of Organic Farming, Germany
- › Partner 9: Danish Centre for Bioethics and Risk Assessment, University of Copenhagen, UCPH-CeBRA, Denmark
- › Partner 10: University of Ljubljana ULju, Animal Science Department, Slovenia

- › Partner 11: University of Louvain UCLou, Centre for Philosophy of Law, Belgium
- › Partner 12: Swissgenetics, Switzerland
- › Partner 13: Swiss Brown Cattle Breeders' Federation SBZV, Switzerland
- › Partner 14: Applied Genetics Network agn, Switzerland
- › Partner 15: Institute for Pig Genetics IPG, The Netherlands
- › Partner 16: TOPIGS Iberica / Pigure Ibérica, Spain
- › Partner 17: Institut de Sélection Animale BV ISA, a Hendrix Genetics company, The Netherlands
- › Partner 18: Institut National de la Recherche Agronomique de Tunisie INRAT, Tunisia
- › Partner 19: Lincoln University UL-NZ, Faculty of Agriculture and Life Sciences, New Zealand
- › Partner 20: University of Guelph UG-CAN, Centre for Genetic Improvement of Livestock, Canada
- › Partner 21: Federal University of Vicosa UVF, Animal Science Department, Brazil

Links to the partners' homepages as well descriptions of all partner institutions are available at [www.lowinputbreeds.org](http://www.lowinputbreeds.org).

### Subprojects and work packages

The project work is organised in four subprojects: Dairy cows and cattle, sheep, pigs, laying hens. Each has several work packages. Furthermore there are four horizontal activities (subproject 5). More details about the subprojects and the work packages (including their full titles) are available at the project website at [www.lowinputbreeds.org](http://www.lowinputbreeds.org) > research.

#### Subproject 1: Dairy cows and beef cattle: Improving organic and 'low input' dairy cows and beef cattle production systems

- › Work package 1.1: Within breed selection systems
- › Work package 1.2: Cross breeding strategies
- › Work package 1.3: Multi-criteria evaluation

Subproject manager

- › Prof. Dr. Henner Simianer, University of Göttingen, Animal Breeding and Genetics, Göttingen, Germany, e-mail [hsimian@gwdg.de](mailto:hsimian@gwdg.de)

#### Subproject 2: Sheep: Improving organic and 'low input' sheep production systems

- › Work package 2.1: Within breed selection systems
- › Work package 2.2: Endoparasite management strategies
- › Work package 2.3: Lamb meat quality

Subproject manager

- › Dr. Hervé Hoste, INRA, France, e-mail [h.hoste@envt](mailto:h.hoste@envt)

#### Subproject 3: Pigs: Improving organic and 'low input' pig production systems

- › Work package 3.1: Development of a flower breeding system

- › Work package 3.2: Management innovations
- › Work package 3.3: Genotypes & feeding regimes

Subproject manager

- › Dr. Jan Merks, IPG, The Netherlands, e-mail Jan.Merks@ipg.nl

### Subproject 4: Laying hens: Improving organic and 'low input' laying hen production systems

- › Work package 4.1: Participatory breeding program
- › Work package 4.2: Interactions of genotype, nutrition and prolonged laying period
- › Work package 4.3: Egg quality

Subproject manager

- › Dr. Ferry Leenstra, Wageningen University and Research Centre WUR, Livestock Research, The Netherlands, e-mail ferry.leenstra@wur.nl

### Subproject 5: Horizontal activities

#### Work package 5.1: Economic and multi-criteria (e.g. environmental and food quality) impact assessment

Work package manager

- › Prof. Dr. Tom Dedeurwaerdere, University of Louvain, Centre for Philosophy of Law, Belgium, e-mail dedeurwaerdere@cpdr.ucl.ac.be

#### Work package 5.2: Ethical impact assessments

Work package manager

- › Dr. Karsten Klint Jensen, Danish Centre for Bioethics and Risk Assessment (CeBRA), University of Copenhagen, Denmark, e-mail kkje@life.ku.dk

#### Work package 5.3: Training of early stage researchers and agricultural advisors/technologists

Work package manager

- › Prof. Dr. Carlo Leifert, Newcastle University, e-mail c.leifert@ncl.ac.uk

#### Work package 5.4: Dissemination and technology transfer to stakeholder communities

Work package manager

- › Dr. Helga Willer, FiBL, Switzerland, e-mail helga.willer@fibl.org

## Project conferences

Four project conferences will be held. The first conference will take place in 2011 in The Netherlands, organised by Wageningen University and Research Centre WUR.

The second one in 2012 in Tunisia, organised by the National Research Institute for Agriculture INRAT. Further conferences will take place in 2013 and 2014.

More information will be made available at the project homepage [www.lowinputbreeds.org](http://www.lowinputbreeds.org).

## Website [www.lowinputbreeds.org](http://www.lowinputbreeds.org)

The project homepage informs about the project's progress. It offers news and event information as well as background information.



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## Reports on project activities

### Report from the LowInputBreeds start-up meeting, May 11-13, 2009

by Gillian Butler, Newcastle University

The project's scientific coordinator Veronika Maurer of FiBL welcomed over 30 researchers to the start-up meeting held in lovely surroundings at Nafferton Farm (University of Newcastle, UK). Although the project was only in its 1<sup>st</sup> month (with another 59 to follow) the agenda opened with discussions on report coordination and the consequences of non compliance. We were privileged to have our EU Project Officer, Dr Danièle Tissot, present leaving us in no doubt about reporting procedures within the current FP7<sup>1</sup> projects, reiterated by the project coordinator, Carlo Leifert who outlined the responsibilities of all contributors along with the mechanisms and timetable necessary.

The bulk of the meeting was spent on the technical content of LowInputBreeds, summarised in five subproject sessions, chaired by the subproject SP managers, aiming to give everybody good grasp of the project beyond the detail of their own involvement. A brief ten-minute outline for each of the 16 work packages, discussions on co-ordination and questions

<sup>1</sup> FP7 = Seventh Framework Programme of the European Community (EC) for research and technological development for the period 2007 to 2013, see <http://cordis.europa.eu/fp7/>

raised took the timetable through to lunchtime on the 2<sup>nd</sup> day. A number of subproject and work package specific issues emerged which could be resolved then and there in useful WP breakout meetings later.

While managers and SP leaders held the inaugural LowInputBreeds board meeting, others had the opportunity to see the research facilities developed on the 300-hectares Nafferton Farm, which has been managed as two parallel *farmlets* (each with 75 to 80 dairy cows) since 2001, comparing conventional and organic management.

The meeting came full circle with a final day's training session for financial managers at partner organisations, outlining financial reporting and payment procedures – assuming we comply with expectation on the technical reports.



Picture: Participants at the first meeting at Nafferton Farm of Newcastle University

### Report from Subproject 1, Dairy cows and cattle: Genomic tools to improve production and fitness of cows in 'low input' breeding systems

By Henner Simianer and Anna Bieber

So far, activities in subproject 1 on dairy cows and cattle have focussed on work package 1.1 'Development of within breed selection systems to improve animal health, product quality and performance traits; comparing genome-wide and traditional quantitative-genetic selection'.

Animal breeding assumes that each animal has a genetic potential for each type of traits, including primary traits like milk yield or growth, and functional traits related to fitness, health, and reproduction. It is a major objective to

- (i) estimate the individual genetic potential, called breeding value, and
- (ii) to select those animals with the best breeding values according to the mixture of traits reflecting the breeding objective.

When two animals are mated, the breeding value of the offspring on average equals the mean breeding values of the parents. However, there is a variance around this mean, so that some offspring are better and some are worse than the parent average. New genomic tools may enable the identification of offspring with highest within family breeding value and thus allow greater genetic progress than it was possible in the pre-genomic era. Originally genomic selection was designed for highly heritable traits, mostly performance traits. Theoretical investigations and simulation studies show, that the relative gain in accuracy of breeding values and thus genetic progress is maybe even higher for functional traits of typically low heritability. Therefore it appears promising to develop and implement genomic tools to improve traits related to disease resistance, resource efficiency, and product quality, all of which are highly relevant in low input production systems in dairy cattle.

In the first project period we established a network of around 40 dairy farms with a total of approximately 1200 Brown Swiss dairy cows.

A protocol of phenotypic characteristics relevant for fitness and fertility traits in dairy cattle has been agreed on by the consortium of subproject 1. A data transfer routine between the subproject partners has been established especially with the industrial partners. An individual training for the persons carrying out the data collection on farm has taken place. Currently the first out of six data sampling tours on farm is carried out, including recording of a set of phenotypic characteristics as well as taking blood samples from each animal in order to get the genetic information.

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### Report from Subproject 2: Improving organic and 'low input' sheep production systems

By Hervé Hoste

Activities so far were mainly dedicated at organizing the experiments, which are planned in the various work packages. Partner 3 (INRA) started a preliminary experiment within WP 2.3, ending in November 2009. In the stables of Partner 2



With the BovineSNP50 BeadChip it is possible to assess the genotype of 12 individuals at 54'001 single nucleotide polymorphisms each.

(FiBL) 400 lambs for a large grazing experiment within work package 2.2 will be born in January 2010.

The planning of work has been performed through bilateral discussions. One meeting took place in Thessaloniki, Greece, (1<sup>st</sup> meeting of the CAPARA COST Action<sup>2</sup>) and was about work package 2.1 'Within breed selection to improve abiotic and biotic stress resistance'. A second meeting took place in Leon, Spain (13<sup>th</sup> meeting of the FAO CIHEAM sub network on nutrition) for work package 2.2 ('Management strategies for integrated control of endoparasites'). In particular, the general frame and research directions of two PhDs were defined. The first is carried out in the framework of a collaboration between NAGREF and Newcastle University (Mr Ilias Chaligiannis); on the second one the Research Institute of Organic Agriculture FiBL and the French National Institute of Agricultural Research INRA (Mr Steffen Werne) are collaborating.

An overall phone discussion is scheduled to harmonise methodologies and to explore complementary objectives for work package 2.3 ('Development of strategies to improve lamb meat quality').

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### Report from subproject 3: Pig production systems

By Jascha Leenhouders

In September 2009, the first meeting of subproject 3 – pigs – was organised in Amsterdam, The Netherlands. The three work package managers were present. During this meeting, the achieved progress and future activities were presented, and potential subjects for interaction and collaboration were discussed.

The first work package focuses on the design of breeding programmes for the organic pig sector, including selection of robust animals that thrive well in harsher environments. Based on an earlier study in the Netherlands it appeared that rotational crossbreeding using breeds that are ranked according to an organic selection index is the best for Dutch organic sow farms. LowInputBreeds will investigate whether this is also the case in other countries and/or (non-organic) circumstances. The genetic background of heat stress resistance is currently under investigation and the partners IPG (The Netherlands) and TOPIGS Iberica (Spain) are collaborating in the data collection. The first results clearly show that there are large genetic differences in the thermo-neutral zone of sows, especially with regard to reproductive performance. This means that some breeds are much more suitable than other breeds with regard to hot/tropical climatic and/or low input conditions.

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<sup>2</sup> Food and Agriculture (FA) Action FA0805 (Cost Action) Goat-parasite interactions: from knowledge to control (CAPARA). Homepage [www.cost.esf.org/domains\\_actions/fa/Actions/goat-parasite\\_interactions](http://www.cost.esf.org/domains_actions/fa/Actions/goat-parasite_interactions)

Regarding the work package on management innovations, trials are being designed that investigate the effects of various gilt rearing and lactation systems on subsequent pig survival. The third work package focuses on improving product quality by comparing different breeds and feeding regimes. A large scale survey is planned in which fat samples are going to be collected, originating from various countries, feeding regimes and breeds.

During the meeting, the partners discussed links and interactions, both between the work packages of subproject 3, as well as across all subprojects (i.e. across animal species). This resulted in the planning of workshops to exchange ideas and disseminate the knowledge obtained.

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### Report from Subproject 4: Breeding laying hens for free range systems

By Ferry Leenstra

Free range systems require laying hens that can perform in a large group and that have good nesting and ranging behaviour. Not all genotypes are suited for free range systems. Worldwide free range systems have a low market share, but this is growing in Europe. Consequently, demand for genotypes specifically suited for free range systems will increase.

As first step for developing breeding strategies for laying hens for free range systems (organic and conventional) we gather experiences with different commercial genotypes in France, The Netherlands and Switzerland. We developed a protocol to collect information on 100 farms in each of the three countries. This will be done late 2009 and early 2010. With this information we try to quantify the magnitude of genotype x environment interactions and to identify factors important in the performance of laying hens in free range systems. The information is also used to interest 40 farm(er)s per country for further exploring the ideal hen and how to get it.

In the enquiry we focus on the most recent completed flock record. We gather information on why a specific commercial cross was chosen, how it performed and if specific problems were experienced. We are also collecting information on the genotype of the previous flock and if the next flock will be the same or another genotype than the current flock.

The work package on laying hens is carried out by FiBL (Switzerland), Institut de Sélection Animale (ISA, France), Wageningen UR Livestock Research and Louis Bolk Institute (The Netherlands).

#### Contact

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## Project events

**February 19, 2010, 11 am to 12.30 pm, BioFach Congress, Nürnberg, Germany: Management and breeding for organic plant and livestock production systems**

Results of the European QLIF project and outlook on the new projects NUE-CROPS and LowInputBreeds will be presented at this session of the BioFach Congress. BioFach is the world's largest organic trade fair and takes place annually in Nürnberg, Germany. At the BioFach Congress numerous lectures, forums, workshops and panel discussions related to the development of the organic sector are presented. In recent years the BioFach Congress has also been used as forum to present and discuss results of European research projects.

Programme

- › Prof. Dr. Carlo Leifert, Newcastle University, UK: Effect of organic, low input and conventional production measures on crop quality: a summary of results of the QLIF project.
- › Dr. Veronika Maurer, FiBL, Switzerland: The need to breed robust livestock for organic and 'low input' production systems.
- › Dr. Monika Messmer, FiBL, Switzerland: First results from the European project NUE Crops - Improving nutrient use efficiency in major European food, feed and biofuel crops to reduce negative environmental impacts of crop production.

Chair: Dr. Danièle Tissot, European Commission, DG Research

More information/ links

- › [www.lowinputbreeds.org](http://www.lowinputbreeds.org)
- › [www.qlif.org](http://www.qlif.org)
- › [www.biofach.de](http://www.biofach.de)

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## Other events

**November 30, 2009: COST Exploratory Workshop on Low Input/Organic Agriculture: The Farm of Tomorrow? in Brussels, Belgium**

A workshop of the European Cooperation in Science and Technology COST on low-input and organic agriculture will take place on November 30, 2009, in Brussels.

Workshop website

- › <http://www.cost.esf.org/events/lowinputagriculture>

**August 23-27, 2010: 61st Annual Meeting of the European Association for Animal Production in Crete**

The 61st Annual Meeting of the European Association for Animal Production in Crete will take place in Heraklion, Crete Island, Greece.

- › Conference homepage: [http://www.erasmus.gr/en/congresses/athens/2010/eaap\\_2010/invitation/](http://www.erasmus.gr/en/congresses/athens/2010/eaap_2010/invitation/)

## News & info

**EAAP Conference in Barcelona: Book of Abstracts now available**

The 60th Annual Meeting of the European Federation of Animal Science took place in Barcelona from 24 to 27 of August 2009. The book of abstracts can now be downloaded from the meeting homepage.

The title of the meeting was 'Biodiversity and Sustainable Animal Production Systems' which is a hot topic in Europe and a very appropriate subject in view of the current worldwide demands for both human society and livestock industry. Many partners of the LowInputBreeds project participated in the conference.

The European Federation of Animal Production EAAP is an international federation of national member

organisations from 40 countries in Europe and the Mediterranean area.

The programme of the 60th Annual Meeting of the EAAP 2009 in Barcelona with all abstracts of the accepted contributions can be downloaded as an e-book (pdf, 656 pages; 6.95 MB) from the Wageningen Academic Publishers website.

More information

- › Meeting homepage with all documents: [www.eaap2009.org/](http://www.eaap2009.org/)

## Imprint

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This newsletter is available at project website [www.lowinputbreeds.org](http://www.lowinputbreeds.org). The newsletter is published every six months.

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