FEED-A-GENE

Adapting feed, animals and feeding techniques for more efficient and sustainable monogastric livestock production systems

Deliverable D7.4

2nd annual newsletter

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Public - PU	**X**
Confidential, only for members of the consortium (including Commission Services) - CO	
Classified, as referred to in Commission Decision 2001/844/EC - Cl	

Table of contents

1. Summary

The second annual Feed-a-Gene newsletter aims at informing stakeholders about recent, on-going and planned events and activities, and about the progress made since the last annual meeting in April 2016. Progress reports were communicated by Work Package researchers during and after the second Feed-a-Gene annual meeting held in Spain in April 2017. The newsletter was disseminated by email to 329 stakeholders and is available as a PDF file on the website.

2. Introduction

The impact of the Feed-a-Gene project depends largely on the ability of its partners to disseminate information to stakeholders during all the phases of the project. The dissemination plan includes the publication of 5 annual newsletters.

The objective of this second newsletter is 1) to present recent, on-going and planned events activities related to Feed-a-Gene, 2) provide updated on the progress made in the project since the last annual meeting in April 2016, and 3) to make the project attractive to stakeholders, increase the target audience and maximise the impact of the project.

3. Methodology

The newsletter was designed and edited by the AFZ team using texts and photographs created by AFZ and the consortium partners. The Work Package leaders contributed to the newsletter by writing a short progress report.

4. Results

1. Delivery format

The second Feed-a-Gene newsletter is provided in three formats.

- As a printable PDF brochure in A4 format. The document is 11-page long, in colour and it uses the visual identity guidelines defined in Deliverable 7.1.
- As an email sent to stakeholders and partners with links to individual articles.
- As a page on the Feed-a-Gene website that links to individual articles.

The PDF and the page are available at http://www.feed-a-gene.eu/newsletter/feed-a-gene-newsletter-2.

The PDF is presented in the following pages:

Newsletter #2
May 2017

Adapting the feed, the animal and the feeding techniques to improve the efficiency and sustainability of monogastric livestock production systems

Editorial

Dear readers,

We are proud to present the second newsletter of the Feed-a-Gene project funded through the Horizon 2020 programme of the European Commission. As we have just finished our second year of the project, we are now at "cruising altitude". This newsletter summarizes the first – and already significant – results obtained so far, as they were presented at our 2nd annual meeting held on 26-27 April in Lleida, Spain.

A dedicated full-day Feed-a-Gene session will be organized on 30 August at the annual EAAP meeting in Tallinn, Estonia. A large number of Feed-a-Gene communications will be presented there as oral or poster presentations and there will be ample time for interactions with stakeholders. If you plan to attend the EAAP this year, please do not miss our session!

We hope that this newsletter will give you a good idea of the progress made in the past two years.

Jaap van Milgen (INRA)
Feed-a-Gene project coordinator

Extruder screw elements (Aarhus University)

2nd Feed-a-Gene Annual meeting
Lleida, Spain

The second annual meeting of the Feed-a-Gene project took place on 26-27 April 2017 in Lleida, Spain (Catalonia). It was hosted by Universitat de Lleida, one of the project partners. The meeting was attended by 72 people.

Universitat de Lleida

The 2-day meeting was the occasion for Feed-a-Gene partners to communicate on the progress made so far and to discuss about the state of advancement and future of the project. Attendees appreciated the excellent organization of the meeting by Dr. Jesús Pomar and his team at Universitat de Lleida (UdL). Feed-a-Gene project coordinator Jaap van Milgen and project manager Vincent Troillard would like to thank all the people at UdL who made this meeting possible and enjoyable.

A year of results

Researchers from Feed-a-Gene consortium partners presented 12 communications, showing the progress done in all work packages since the last meeting

in April 2016. The report on communication and dissemination activities showed a notable increase in the creation of dissemination materials (communications, peer-reviewed articles, etc.), with more than 40 communications and papers submitted or already available.

Saphir

Marie-Hélène Pinard-van der Laan (INRA) presented Saphir, a H2020 project that aims at strengthening animal production and health through the immune response. Many questions from Saphir are related to Feed-a-Gene's own topics. Possible synergies were discussed and Jaap van Milgen pointed out the importance of linking Feed-a-Gene with other European projects.

Lightweight data management

Project-wide data management remains an important issue for large research projects such as Feed-a-Gene. Following last year's presentation of the FAIR (Findable, Accessible, Interoperable, Reusable) concept by Richard Finkers (Wageningen University, WUR), François Moreews (INRA) presented the SEEK platform, a lightweight implementation of the ISA (Investigation, Study, Assay) framework for managing life science, environmental and biomedical experiments.

Demonstration of the precision feeding system

A demonstration of the precision feeding system for pigs developed by UdL and Exafan was organized at the Department of Agroforestry Engineering. The demonstration presented the intelligent feeders, the controlling module, the sensors and the Decision Support System.

Action plans for 2017-2018

The second day started with workshops dedicated to the preparation of activities for the next year within and between WP. In the afternoon, WP leaders presented their roadmaps for 2017 -2018. The members of the Stakeholder Advisory Board provided appreciated feedback at the end of the meeting.

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- Masoomeh Taghipoor (INRA)
- Miriam Piles (IRTA)
- Veronika Halas (Kaposvár University, KU), Jesús Pomar (UdL), Jesús Haro (Exafan)

Progress reports
for the Feed-a-Gene project

Alternative feed ingredients and real-time characterisation (WP1)

Novel feed-processing from rapeseed and European-grown soybeans

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Production of feed protein from green biomass

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plant. The two by-products from the extraction of protein from ryegrass were collected and dried (Aarhus University (AU), DuPont).

Novel feed-processing technology to upgrade alternative feed ingredients

6 non-pelleted rapeseed meals for lab-scale fractionation were collected from different European processing plants (IFIP). The processing plant for the delivery of larger quantities has also been identified (Bühler).

Nutritional evaluation of novel feed ingredients and improvements in nutritive value by use of novel enzymes

An animal experiment with ileal cannulated pigs fed the protein extracted from green biomass has been carried out (AU). Permission

for performing the animal study with the soybean meal expeller products has been obtained (Kaposvár University, KU). The non-upgraded and upgraded rapeseed meals and enzymes have been delivered for the experiment with pigs (IRTA). The by-products of the extraction of protein from green biomass have been delivered to IRTA. The planning of the broiler experiment at Newcastle University (UNEW) is in progress.

New methodologies for characterisation of nutrient composition and value

The NIRS scanning of the individual feedstuff samples has been completed and the first calibration models have been calculated. The scanning of feed mixtures is ongoing (AU).

Green protein production: from laboratory scale to pilot scale (Aarhus University)

Feed-a-Gene – H2020 n°633531

Input data: raw depth image from camera | Image with surface normals showing the discontinuity between touching animals | Output data: tracks of all animals

Tracking pig behaviour with 3D/depth cameras (University of Newcastle)

Identification of feed efficiency traits related to individual diversity (WP2)

Individual feed intake and feeding behaviour in broilers and rabbits

Hardware is being developed for the measurement of variation in individual feed intake in group-housed rabbits and broilers (INRA, IRTA, Claitec).

New traits and technologies for measuring and improving digestive efficiency and gut health in pigs, poultry and rabbits

Research has been initiated on:

▶ Variation in faecal nutrient digestibility in growing pigs using NIRS and a variety of markers in different breeds, at different ages and using different diets (INRA).

▶ Evaluation of feed efficiency through metagenomic approaches to assess the composition of gut microbiota in pigs, laying hens and rabbits (INRA, IRTA, China Agricultural University).

▶ Effect of the genetic type (Pietrain versus Duroc pigs) on digestion efficiency, hindgut fermentation and microbiome-metabolome relationship in growing and finishing pigs fed different levels of digestible protein (UdL).

▶ Effect of the genetic type (Pietrain versus Duroc pigs) and protein level on protein and fat degradation and synthesis (UdL).

▶ Short term changes in feed efficiency and energy metabolism in growing pigs induced by different challenges (heat stress, feed change, behavioural and sanitary challenges) (INRA, IRTA).

Nutrient metabolism-related traits to improve feed efficiency

Behaviour and welfare-related traits influencing feed efficiency

▶ Development of methodology and assessment of the connection between feeding behaviour and feed efficiency in pigs and welfare traits (INRA, IRTA, Topigs Norsvin).
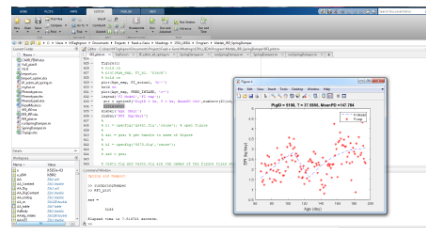
Metabolomics to identify new traits for improvement of feed efficiency

▶ Finding of molecular traits that are relevant indicators of feed efficiency in growing pigs using metabolomics and transcriptomics approaches (AU, INRA, UdL).

Modelling feed use mechanisms and animal response to nutrient supply and environmental challenges (WP3)

Digestive utilisation of feed and nutrients

A conceptual model has been developed to represent the transit of dry matter through the digestive tract and a database has been completed to calibrate and test the digestive model. Compartments of the model are anatomic sections of the digestive tract, inputs are feed intake and endogenous secretions while outputs are absorbed and excreted dry matter (INRA).

Screenshot of the perturbation module developed in Matlab (INRA)

Metabolic utilisation of feed and nutrients

InraPorc was used as a basis for metabolic model and it has been extended to simulate Ca and P metabolism. The InraPorc model was adopted for broilers to represent flows of absorbed nutrients to protein and fat accretion (KU, UNEW, INRA, IRTA).

Accounting for environmental variability, system disturbance and robustness

Pig response was characterized to an unknown perturbation based on spring and damper system. This new model provides a better prediction for the daily feed intake whenever a perturbation period is reported. Since the period of perturbation may vary based on user observation and interpretation, the team started to work on the determination of generic conditions that allow identifying perturbed periods (module for automatic detection of perturbation) (INRA, UNEW, KU).

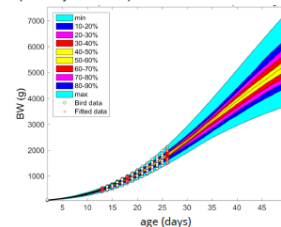Accounting for variation among individuals in nutrient utilization and growth performance

Animal performance traits, which are difficult to measure (age-specific protein and lipid content, and metabolic heat), were estimated from live-weight and feed intake in individual growing pigs and other monogastrics using a growth model. Predicted lipid content and metabolic heat in pigs were compared with backfat measures and literature values. Population variation during and

beyond the observed age range was predicted (INRA, UNEW).

Delivery of a Decision Support System (DSS)

In DSS development, implementation of the growing pig model calibration has been improved by handling missing measurements, the inhomogeneous variance of feed intake and body weight, experimenting with calibration strategies in R, Matlab and Delphi environments (INRA, UNEW, KU, Topigs Norsvin, Cobb).

Population distribution of fitted and predicted growth of high performing broilers (University of Newcastle)

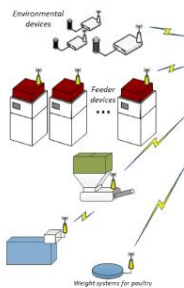Feed-a-Gene

Feed-a-Gene – H2020 n°633531

Management systems for precision feeding to increase resilience to fluctuating environments (WP4)

Decision Support System development for real-time determination of animal nutritional requirements

According to a modular DSS architecture designed for daily real-time determination of animal nutritional requirements, the main sub-modules were developed as:

- Data-checking process for historic consumption and raw weight data to build a consolidated DSS database.
- Implementation of real-time (RT) dynamic data analysis in DSS for individual prediction of intake and weight focused on RT-model input.
- Determination of nutritional requirements for real-time working from previous models for growing pigs.
- Data management component with database implementation and integration; proposal for a model and for DSS decision rules in poultry.

INRA, IFIP, ITAVI, and UdL contributed to this work.

Controlling module (software and hardware) development to support feeder control tasks, real-time measurements

Controlling module software was implemented. For integration with the DSS and feeder devices, a high level communication language was developed. A demonstration and test was carried out in the last WP4 meeting (UdL, Exafan).

Precision feeder device development

A precision feeding prototype for pigs was designed and implemented. This prototype is currently in a testing phase under continuous operation on a commercial farm to test structural and material robustness in farm environment (UdL, Exafan).

Precision feeding system: architecture and components (INRA)

Use of new traits in animal selection (WP5)

Genetics of components of feed efficiency and robustness indicators

Molecular data in layers were produced to understand the response to high dietary fibre / low energy diets (INRA). Trials on pig behaviour and robustness in relation with feed efficiency started being analysed (Topigs Norsvin, IRTA). Preliminary INRA results showed different activities of the HPA axis in response to selection for feed efficiency. In broilers, first association studies showed new genomic regions involved in feed intake and feed efficiency determinism (INRA).

Genetic relationships between gut microbiota and feed efficiency

Rabbit genotyping was completed and first analyses show good genotyping quality. Partial sequencing of gut microbiota in rabbits and pigs is nearly completed (INRA, IRTA).

Statistical-genetic modelling of feed efficiency and robustness features

Last year, the main activities were the testing and validating of the statistical models needed to improve the modelling of the genetics of feed efficiency and robustness on data related to feed intake and feed efficiency (INRA, IRTA, Topigs Norsvin).

Selection strategies to account for crossbred and genomic data for a sustainable selection for feed efficiency

A postdoc was hired at WUR and tests of new models started in 2016. Two physical meetings were organized to ensure a smooth and rapid start (WUR, INRA, IRTA, Topigs Norsvin, Cobb).

Demonstration of the value of social interactions and crossbred information in selection to improve feed efficiency

Preliminary steps were organized (population structure for the trials, pilot studies) (IRTA, Topigs Norsvin).

Sustainability assessment of production systems (WP6)

Identification of sustainability indicators for proposed production systems

Two rounds of the Delphi Questionnaire have been conducted in the UK, France, Netherlands, Hungary and Spain. Preliminary results of the Delphi analysis were presented at the second annual meeting (UNEW, WUR, IRTA, KU, AFZ).

Life Cycle Assessment

Work has begun on identifying the global innovative feeding strategies that will be the focus of the LCA work and the on-farm evaluation. Initial discussions have indicated that there are several innovations that could be analysed in a LCA study. Information is needed on the resource use associated with potential innovations (UNEW).

On-farm evaluation of proposed management systems

The market analysis was completed. Partners have been involved in discussions about data requirements for the forthcoming economic analysis of the global strategies to be studied (IRTA).

Evaluation of consumer and farmer attitudes

Preliminary discussions have been held over the design of the consumer study, particularly the choice experiment and explorations of consumer attitudes to innovations in livestock farming.

Dissemination, training and technology transfer (WP7)

Communication

- The first annual newsletter was uploaded on the website and disseminated to partners and stakeholders.
- Partners have presented Feed-a-Gene and distributed brochures during congresses.
- Information about Feed-a-Gene, or about research relevant to Feed-a-Gene activities has been posted on the website and on social media.
- A Feed-a-Gene Greeting card was sent to stakeholders in January 2017.

Stakeholder platform

The stakeholder platform is growing and 330 people have registered, either directly or through the WP6.

Feed-a-Gene was presented at the FEFAC annual meeting on 12 October 2016.
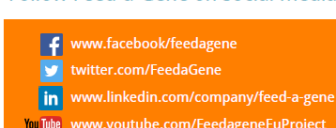
Dissemination of results

The following publications are now available in full or abstract form and have been uploaded on the website.

- Tran Huynh, V. H.; Gilbert, H.; David, L. 2017. How to improve breeding value prediction for feed conversion ratio in the case of incomplete longitudinal body weights, Journal of Animal Science, 95 (1): 39-48 (Scientific paper) Open Access DOI: 10.2527/jas.2016.0980
- Filipe, J. A. N.; Leinonen, I.; Kyriazakis, I. 2017. The quantitative principles of animal growth, in: Paul Moughan, Kees de Lange, Wouter Hendriks, ed. Feed Evaluation Science. Wageningen: Wageningen Academic Publishers (Book chapter)
- Halas, V. 2017. Application of models in precision livestock farming, PREGA 2017, 22 February 2017, Budapest, Hungary (communication)
- Taghipoor, M.; Brossard, L.; Van Milgen, J. 2017. Characterisation of growing pigs' adaptive response when faced with environmental perturbations, 49e Journées de la recherche porcine, 31 January - 1 February 2017, Paris, France (communication)
- Velasco, M.; Wias, M.; Piles, M.; Sánchez, J. P. 2016. Unravelling the effects of restricted and ad libitum diets on intestinal microbiota in rabbits, 4th World Congress on Targeting Microbiota, 17-19 October 2016, Pasteur Institute, Paris, France (communication)
- Tran Huynh, V. H.; Gilbert, H.; David, L. 2016. Gompertz model improves breeding value prediction for feed conversion ratio for incomplete weights, 67th European Association for Animal Production (EAAP) Annual meeting, 29 August-2 September 2016, Belfast, UK (communication)
- Ragab, M.; Piles, M.; Sánchez, J. P. 2016. Alternative consideration of social genetic effects models in Duroc pigs, 67th European Association for Animal Production (EAAP) Annual meeting, 29 August-2 September 2016, Belfast, UK (communication)
- Roger, S.; Narcy, A.; van Milgen, J.; Duclos, M. J. 2016. Conceptual model of digestion for pigs and poultry and its factors of variation, 67th European Association for Animal Production (EAAP) Annual meeting, 29 August-2 September, Belfast, UK (communication)
- Sánchez, J. P.; Ramon, J.; Rafel, O.; Ragab, M.; Piles, M. 2016. Using collective feed intake data to select for feed efficiency on full or restricted feeding regimen, 11th World Rabbit Congress, 15-18 June 2016, Qingdao, China (communication)
- Piles, M.; Ramon, J.; Rafel, O.; Ragab, M.; Sánchez, J. P. 2016. Mejora de la eficiencia alimentaria de gazapos criados en grupos e interacción entre el genotipo y el régimen alimentario en estas condiciones de alojamiento, XVIII Reunión Nacional Sobre Mejora Genética Animal, 2-3 June 2016, Valencia, Spain (communication)

These abstracts were published in book form in April 2017 (available at www.feed-a-gene.eu/media/feed-a-gene-book-abstracts-2016-2017).

In addition to these publications, 28 communications and 4 scientific papers have been submitted and will be presented or published in 2017.

Follow Feed-a-Gene on social media

- www.facebook/feedagene
- twitter.com/FeedaGene
- www.linkedin.com/company/feed-a-gene
- www.youtube.com/FeedageneEuProject

Lightweight implementation of data management for scientific research projects

Dr. François Moreews (INRA) was invited by the Feed-a-Gene project during the 2nd Feed-a-Gene Annual meeting.

The following text summarizes M. Moreews' presentation.

Data management is useful during the project life cycle

- Data management and sharing within the project
- Better efficiency during the project (provenance, quality management)
- A data-oriented public project view for the outside world
- Long term data preservation
- Enable Open Data (on demand) with secured data access

Metadata are necessary for structuring project data

- Descriptive metadata: for discovery and identification
- Structural metadata: indicates how compound objects are put together
- Administrative metadata: to help manage a resource

The ISA model: Investigation, Study, Assay

The open source ISA framework and tools help to manage life science, environmental and biomedical experiments. Built around the 'Investigation' (the project context), 'Study' (a unit of research) and 'Assay' (analytical measurement) data model and serializations, ISA helps to provide rich description of the metadata so that the resulting data and discoveries are reproducible and reusable.

Lightweight data management: the SEEK platform

SEEK is a web-based platform for sharing heterogeneous scientific datasets, models or simulations, processes and research outcomes. It preserves associations between them, along with information about people and organisations. Within SEEK, ISA has been extended and is configurable. SEEK incorporates semantic technology allowing sophisticated queries.

SEEK meets part of the FAIR objectives (Findable, Accessible, Interoperable, Reusable).

- Data managed with SEEK are findable and accessible.
- Interoperability can be achieved provided standard data formats are used.
- Data are reusable but the lack of provenance metadata may limit reusability.

2. Contents

The second Feed-a-Gene newsletter contains the following:

- Editorial by Project coordinator Jaap van Milgen (INRA)
- A short report about the 2nd Feed-a-Gene annual meeting in April 2017 in Lleida, Spain
- Progress reports for the Feed-a-Gene project (short reports about the progress made in the Work Packages during the second year of the project). It includes a list of the scientific communications and papers available on the website.
- Lightweight implementation of data management for scientific research projects (report of a presentation made during the annual meeting about the SEEK platform for data management)
- A demonstration video of the prototype for the precision feeding system
- Upcoming events

3. Dissemination

An email informing of the publication of the newsletter was sent to 329 registered stakeholders (including 131 consortium partners) in May 2017. The following graph shows the repartition of the stakeholders by sector of activity (as indicated by the stakeholder in the registration form):
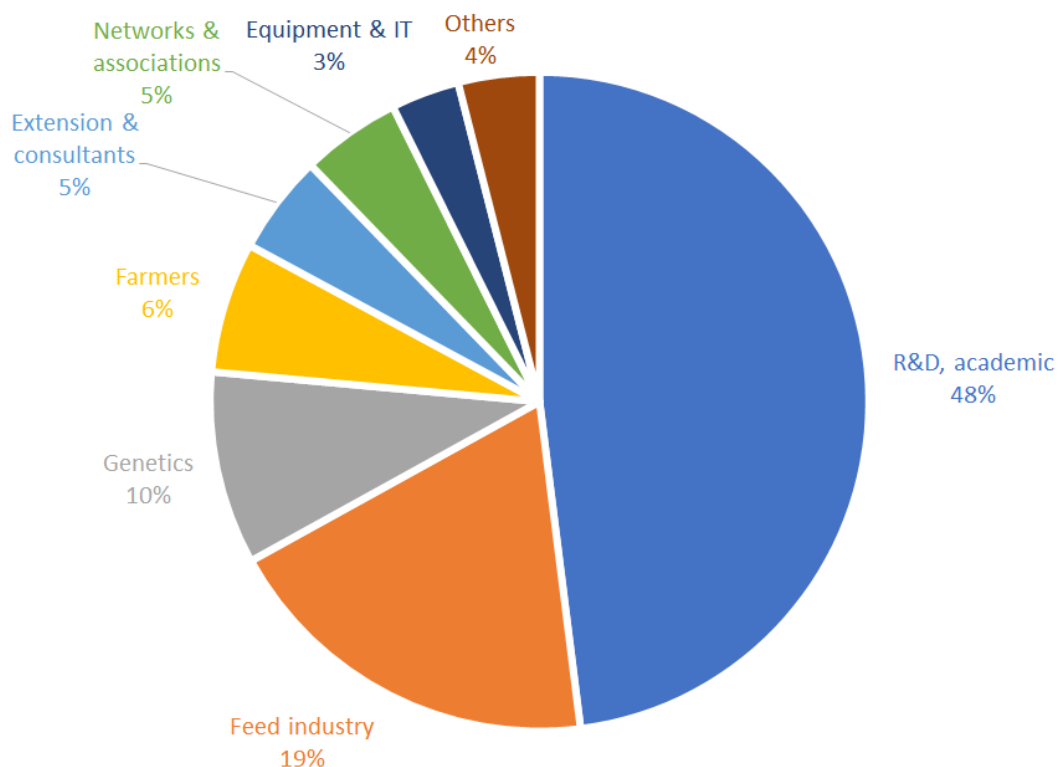
Like all other materials on the website, the PDF file and the newsletter page are available to all visitors. Information about the newsletter was disseminated on social media (Facebook, Twitter, and LinkedIn).

5. Conclusions

The second newsletter is a dissemination tool meant to inform stakeholders of the current state of the project and of the progress made so far. As the project is starting to produce results, the newsletter dedicates 6 pages (out of 11) to progress reports of the work packages, with short descriptions of ongoing experiments and links to published communications and papers, in order to increase the scientific impact of the project.

6. Partners involved in the work

AFZ, Aarhus University, INRA, Kaspovar University, Newcastle University, Universitat de Lleida, and Wageningen UR contributed to this deliverable.

7. Annexes

- Second Feed-a-Gene newsletter in PDF format.
- Second Feed-a-Gene newsletter in email format.

Feed-a-Gene

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◗ Short term changes in feed efficiency and energy metabolism in growing pigs induced by different challenges (heat stress, feed change, behavioural and sanitary challenges) (INRA, IRTA).

Nutrient metabolism-related traits to improve feed efficiency

◗ Effects of birth weight of piglets on N-metabolism and N-efficiency later in life (WUR).

Behaviour and welfare-related traits influencing feed efficiency

◗ Development of methodology and assessment of the connection between feeding behaviour and feed efficiency in pigs and welfare traits (INRA, IRTA, Topigs Norsvin).

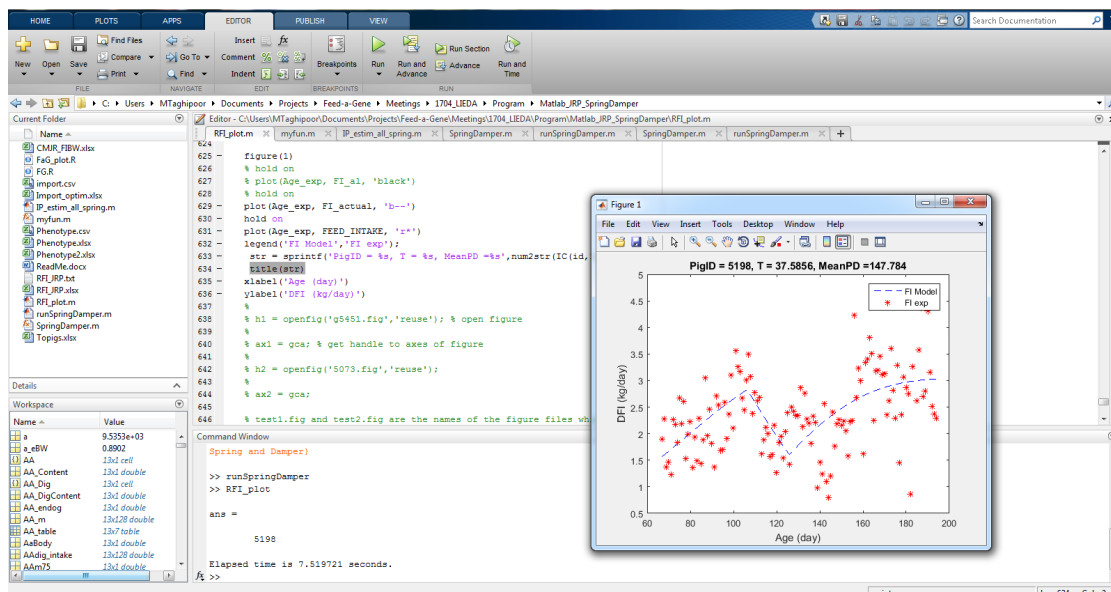Metabolomics to identify new traits for improvement of feed efficiency

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Modelling feed use mechanisms and animal response to nutrient supply and environmental challenges (WP3)

Digestive utilisation of feed and nutrients

A conceptual model has been developed to represent the transit of dry matter through the digestive tract and a database has been completed to calibrate and test the digestive model. Compartments of the model are anatomic sections of the digestive tract, inputs are feed intake and endogenous secretions while outputs are absorbed and excreted dry matter (INRA).

Feed-a-Gene

Screenshot of the perturbation module developed in Matlab (INRA)

Metabolic utilisation of feed and nutrients

InraPorc was used as a basis for metabolic model and it has been extended to simulate Ca and P metabolism. The InraPorc model was adopted for broilers to represent flows of absorbed nutrients to protein and fat accretion (KU, UNEW, INRA, IRTA).

Accounting for environmental variability, system disturbance and robustness

Pig response was characterized to an unknown perturbation based on spring and damper system. This new model provides a better prediction for the daily feed intake whenever a perturbation period is reported. Since the period of perturbation may vary based on user observation and interpretation, the team started to work on the determination of generic conditions that allow identifying perturbed periods (module for automatic detection of perturbation) (INRA, UNEW, KU).

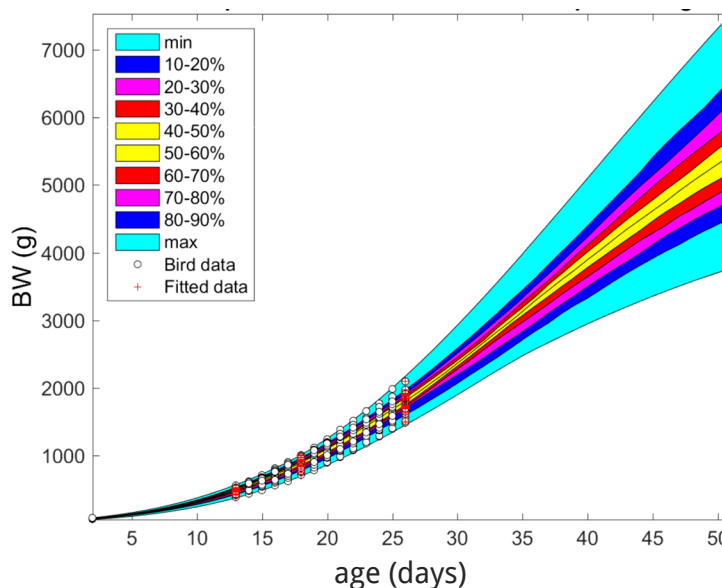## Accounting for variation among individuals in nutrient utilization and growth performance

Animal performance traits, which are difficult to measure (age-specific protein and lipid content, and metabolic heat), were estimated from live-weight and feed intake in individual growing pigs and other monogastrics using a growth model. Predicted lipid content and metabolic heat in pigs were compared with backfat measures and literature values. Population variation during and beyond the observed age range was predicted (INRA, UNEW).

Delivery of a Decision Support System (DSS)

In DSS development, implementation of the growing pig model calibration has been improved by handling missing measurements, the inhomogeneous variance of feed intake and body weight, experimenting with calibration strategies in R, Matlab and Delphi environments (INRA, UNEW, KU, Topigs Norsvin, Cobb).

Population distribution of fitted and predicted growth of high performing broilers (University of Newcastle)

Management systems for precision feeding to increase resilience to fluctuating environments (WP4)

Decision Support System development for real-time determination of animal nutritional requirements

According to a modular DSS architecture designed for daily real-time determination of animal nutritional requirements, the main sub-modules were developed as:

◗ Data-checking process for historic consumption and raw weight data to build a consolidated DSS database.

◗ Implementation of real-time (RT) dynamic data analysis in DSS for individual prediction of intake and weight focused on RT-model input.

◗ Determination of nutritional requirements for real-time working from previous models for growing pigs.

◗ Data management component with database implementation and integration; proposal for a model and for DSS decision rules in poultry.

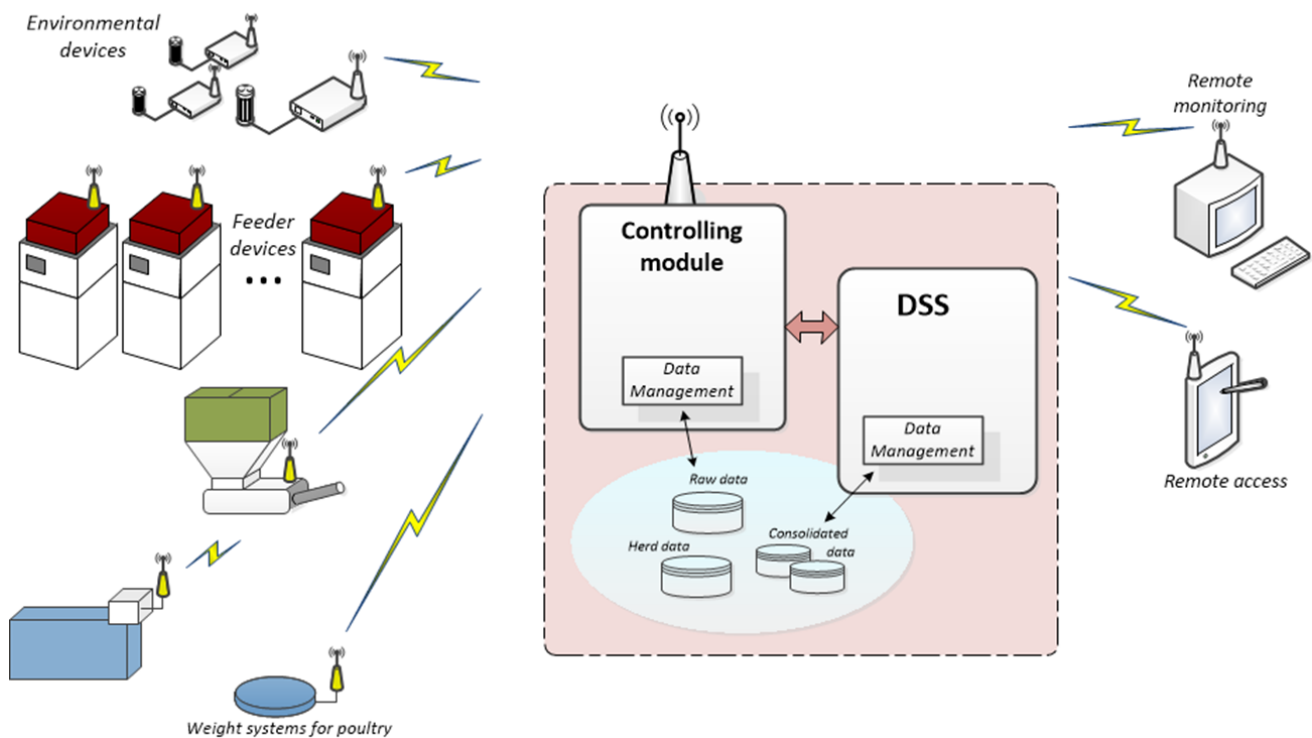INRA, IFIP, ITAVI, and UdL contributed to this work.

Controlling module (software and hardware) development to support feeder control tasks, real-time measurements

Controlling module software was implemented. For integration with the DSS and feeder devices, a high level communication language was developed. A demonstration and test was carried out in the last WP4 meeting (UdL, Exafan).

Precision feeder device development

A precision feeding prototype for pigs was designed and implemented. This prototype is currently in a testing phase under continuous operation in a commercial farm to test structural and material robustness in farm environment (UdL, Exafan).

Precision feeding system: architecture and components (INRA)

Use of new traits in animal selection (WP5)

Genetics of components of feed efficiency and robustness indicators

Molecular data in layers were produced to understand the response to high dietary fibre / low energy diets (INRA). Trials on pig behaviour and robustness in relation with feed efficiency started being analysed (Topigs Norsvin, IRTA). Preliminary INRA results showed different activities of the HPA axis in response to selection for feed efficiency. In broilers, first association studies showed new genomic regions involved in feed intake and feed efficiency determinism (INRA).

Genetic relationships between gut microbiota and feed efficiency

Rabbit genotyping was completed and first analyses show good genotyping quality. Partial sequencing of gut microbiota in rabbits and pigs is nearly completed (INRA, IRTA).

Statistical-genetic modelling of feed efficiency and robustness features

Last year, the main activities were the testing and validating of the statistical models needed to improve the modelling of the genetics of feed efficiency and robustness on data related to feed intake and feed efficiency (INRA, IRTA, Topigs Norsvin).

Selection strategies to account for crossbred and genomic data for a sustainable selection for feed efficiency

A postdoc was hired at WUR and tests of new models started in 2016. Two physical meetings were organized to ensure a smooth and rapid start (WUR, INRA, IRTA, Topigs Norsvin, Cobb).

Demonstration of the value of social interactions and crossbred information in selection to improve feed efficiency

Preliminary steps were organized (population structure for the trials, pilot studies) (IRTA, Topigs Norsvin).

Sustainability assessment of production systems (WP6)

Identification of sustainability indicators for proposed production systems

Two rounds of the Delphi Questionnaire have been conducted in the UK, France, Netherlands, Hungary and Spain. Preliminary results of the Delphi analysis were presented at the second annual meeting (UNEW, WUR, IRTA, KU, AFZ).

Life Cycle Assessment

Work has begun on identifying the global innovative feeding strategies that will be the focus of the LCA work and the on-farm evaluation. Initial discussions have indicated that there are several innovations that could be analysed in a LCA study. Information is needed on the resource use associated with potential innovations (UNEW).

On-farm evaluation of proposed management systems

The market analysis was completed. Partners have been involved in discussions about data requirements for the forthcoming economic analysis of the global strategies to be studied (IRTA).

Evaluation of consumer and farmer attitudes

Preliminary discussions have been held over the design of the consumer study, particularly the choice experiment and explorations of consumer attitudes to innovations in livestock farming.

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Dissemination, training and technology transfer (WP7)

Communication

◗ The first annual newsletter was uploaded on the website and disseminated to partners and stakeholders.

◗ Partners have presented Feed-a-Gene and distributed brochures during congresses.

◗ Information about Feed-a-Gene, or about research relevant to Feed-a-Gene activities has been posted on the website and on social media.

◗ A Feed-a-Gene Greeting card was sent to stakeholders in January 2017.

2017

Happy New Year ■
Godt Nytår ■ Feliz Año
Nuevo ■ Bonne Année
■ I Miglioni Auguri ■
新年好■ Boldog új
évet ■ Glückliches
Neues Jahr ■ Gelukkig
Nieuwjaar
Feed-a-Gene

Stakeholder platform

The stakeholder platform is growing and 330 people have registered, either directly or through the WP6.

Feed-a-Gene was presented at the FEFAC annual meeting on 12 October 2016.

Dissemination of results

The following publications are now available in full or abstract form and have been uploaded on the website.

◗ Tran-Huynh, V. H.; Gilbert, H.; David, I., 2017. How to improve breeding value prediction for feed conversion ratio in the case of incomplete longitudinal body weights, Journal of Animal Science, 95 (1): 39-48 (Scientific paper) Open Access DOI:10.2527/jas.2016.0980

◗ Filipe, J. A. N.; Leinonen, I.; Kyriazakis, I., 2017. The quantitative principles of animal growth, in: Paul Moughan, Kees de Lange, Wouter Hendriks, ed. Feed Evaluation Science. Wageningen: Wageningen Academic Publishers (Book chapter)

◗ Halas, V., 2017. Application of models in precision livestock farming, PREGA 2017, 22 February 2017, Budapest, Hungary (communication)

◗ Taghipoor, M.; Brossard, L.; Van Milgen, J., 2017. Characterization of growing pigs' adaptive response when faced with environmental perturbations, 49e Journées de la recherche porcine, 31 January -1 February 2017, Paris, France (communication)

◗ Velasco, M.; Viñas, M.; Piles, M.; Sánchez, J. P., 2016. Unravelling the effects of restricted and *ad libitum* diets on intestinal microbiota in rabbits, 4th World Congress on Targeting Microbiota, 17-19 October 2016, Pasteur Institute, Paris, France (communication)

◗ Tran-Huynh, V. H.; Gilbert, H.; David, I., 2016. Gompertz model improves breeding value prediction for feed conversion ratio for incomplete weights, 67th European Association for Animal Production (EAAP) Annual meeting , 29 August-2 September 2016, Belfast, UK (communication)

◗ Ragab, M.; Piles, M.; Sánchez, J. P., 2016. Alternative consideration of social genetic effects models in Duroc pigs, 67th European Association for Animal Production (EAAP) Annual meeting, 29 August-2 September 2016, Belfast, UK (communication)

◗ Roger, S.; Narcy, A.; van Milgen, J.; Duclos, M. J., 2016. Conceptual model of digestion for pigs and poultry and its factors of variation, 67th European Association for Animal Production (EAAP) Annual meeting, 29 August-2 September, Belfast, UK (communication)

◗ Sánchez, J. P.; Ramon, J.; Rafel, O.; Ragab, M.; Piles, M., 2016. Using collective feed intake data to select for feed efficiency on full or restricted feeding regimen, 11th World Rabbit Congress, 15-18 June 2016, Qingdao, China (communication)

◗ Piles, M.; Ramon, J.; Rafel, O.; Ragab, M.; Sánchez, J. P., 2016. Mejora de la eficiencia alimentaria de gazapos criados en grupos e interacción entre el genotipo y el régimen alimentario en estas condiciones de alojamiento, XVIII Reunión Nacional Sobre Mejora Genética Animal, 2-3 June 2016, Valencia, Spain (communication)

These abstracts were published in book form in April 2017 (available at www.feed-a-gene.eu/media/feed-a-gene-book-abstracts-2016-2017).

In addition to these publications, 28 communications and 4 scientific papers have been submitted and will be presented or published in 2017.

Follow Feed-a-Gene on social media

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You Tube www.youtube.com/FeedageneEuProject

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Lightweight implementation of data management for scientific research projects

Dr. François Moreews (INRA) was invited by the Feed-a-Gene project during the 2nd Feed-a-Gene Annual meeting.

The following text summarizes M. Moreews' presentation.

Data management is useful during the project life cycle

◗ Data management and sharing within the project

◗ Better efficiency during the project (provenance, quality management)

◗ A data-oriented public project view for the outside world

◗ Long term data preservation

◗ Enable Open Data (on demand) with secured data access

Metadata are necessary for structuring project data

◗ Descriptive metadata: for discovery and identification

◗ Structural metadata: indicates how compound objects are put together

◗ Administrative metadata: to help manage a resource

The ISA model: Investigation, Study, Assay

The open source ISA framework and tools help to manage life science, environmental and biomedical experiments. Built around the 'Investigation' (the project context), 'Study' (a unit of research) and 'Assay' (analytical measurement) data model and serializations, ISA helps to provide rich description of the metadata so that the resulting data and discoveries are reproducible and reusable.

Lightweight data management: the SEEK platform

SEEK is a web-based platform for sharing heterogeneous scientific datasets, models or simulations, processes and research outcomes. It preserves associations between them, along with information about people and organisations. Within SEEK, ISA has been extended and is configurable. SEEK incorporates semantic technology allowing sophisticated queries.

SEEK meets part of the FAIR objectives (Findable, Accessible, Interoperable, Reusable).

◗ Data managed with SEEK are findable and accessible.

◗ Interoperability can be achieved provided standard data formats are used.

◗ Data are reusable but the lack of provenance metadata may limit reusability.

Video: precision feeding system for pigs

Jesús Haro (Exafan) presents the precision feeding system for pigs developed through Feed-a-Gene

Universitat de Lleida and Exafan, partners in the Feed-a-Gene WP4 *Management systems for precision feeding*, have designed a precision feeding system for pigs that is currently being tested in a commercial farm. The system includes intelligent feeders able to weigh and recognize individual pigs, a controlling module, sensors (temperature, CO_2, humidity, fan speed) and a Decision Support System. During the annual meeting, Jesús Haro from Exafan gave a short demonstration of the system. The resulting video can be watched on Feed-a-Gene's YouTube channel at www.youtube.com/FeedageneEuProject

We're going to use those feeders in the Feed-a-Gene project

Feed-a-Gene: demonstration of the precision feeding system

Upcoming events

Feed-a-Gene researchers will present communications in the following congresses in 2017.

XVII Jornadas sobre producción animal

30-31 May 2017, Zaragoza, Spain

EAAP 2017

28 August to 1 September 2017, Tallinn, Estonia

- **Wednesday 30 August: full-day Feed-a-Gene session**
- This session will include 20 communications and posters and 2 panels for stakeholders

EC-PLF 8th European Conference on Precision Livestock Farming

12-14 September 2017, Nantes, France

IVBM 11th International Veterinary Behaviour Meeting

14-16 September 2017, Samorin, Slovakia

www.feed-a-gene.eu

Feed-a-Gene Newsletter #2

1 message

Feed-a-Gene <contact@feed-a-gene.eu>   31 mai 2017 à 17:23
À : gilles.tran@gmail.com, valerie.heuze@zootechnie.fr, helene.thiollet@zootechnie.fr

Feed-a-Gene Newsletter #2

Click here to download the PDF of the Feed-a-Gene newsletter #2

Welcome to the second Feed-a-Gene newsletter

We are proud to present the second newsletter of the Feed-a-Gene project funded through the Horizon 2020 programme of the European Commission. As we have just finished our second year of the project, we are now at "cruising altitude". This newsletter summarizes the first – and already significant – results obtained so far, as they were presented at our 2nd Annual meeting held on 26-27 April in Lleida, Spain. A dedicated full-day Feed-a-Gene session will be organized on Wednesday 30 August at the annual EAAP meeting in Tallinn, Estonia. Many Feed-a-Gene communications will be presented there as oral or poster presentations and there will be ample time for interactions with stakeholders. If you plan to attend the EAAP this year, please do not miss our session! We hope that this newsletter will give you a good idea of the progress made in the past two years.

Jaap van Milgen (INRA), Feed-a-Gene project coordinator

Second Feed-a-Gene Annual meeting, Lleida, Spain

The second annual meeting of the Feed-a-Gene project took place on 26-27 April 2017 in Lleida, Spain (Catalonia). It was hosted by Universitat de Lleida, one of the project partners. The meeting was attended by 72 people. The 2-day meeting was the occasion for Feed-a-Gene partners to communicate on the progress made so far and to discuss about the state of advancement and future of the project. Attendees appreciated the excellent organization of the meeting by Dr. Jesús Pomar and his team at Universitat de Lleida. Feed-a-Gene project coordinator Jaap van Milgen (INRA) and project manager Vincent Troillard (INRA Transfert) would like to thank all people at Universitat de Lleida who made this meeting possible and enjoyable.

- Read more

Progress reports for the Feed-a-Gene project

Much progress has been made in the second year of the Feed-a-Gene project. Click on the following links to read the progress reports for each work package.

- Alternative feed ingredients and real-time characterisation (WP1)
- Identification of feed efficiency traits related to individual diversity (WP2)
- Modelling feed use mechanisms and animal response to nutrient supply and environmental challenges (WP3)
- Management systems for precision feeding to increase resilience to fluctuating environments (WP4)
- Use of new traits in animal selection (WP5)
- Sustainability assessment of production systems (WP6)
- Dissemination, training and technology transfer (WP7)

Lightweight implementation of data management for scientific research projects

During the 2nd annual meeting, Dr François Moreews (INRA) presented the ISA model for managing manage life science, environmental and biomedical experiments, and the SEEK platform, a web-based platform for sharing heterogeneous scientific datasets, models or simulations, processes and research outcomes.

- Read more

Video: precision feeding system for pigs

Jesús Haro presented the precision feeding system for pigs developed through Feed-a-Gene by Universitat de Lleida and Exafan. The video is now available on Feed-a-Gene's YouTube channel.

- Read more

Upcoming events

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- EAAP 2017, 28 August to 1 September 2017, Tallinn, Estonia. **A full-day session will be dedicated to Feed-a-Gene on 30 August. This session will include 20 communications and posters and 2 panels for stakeholders**
- 8th European Conference on Precision Livestock Farming, 12-14 September 2017, Nantes, France
- 11th International Veterinary Behaviour Meeting, 14-16 September 2017, Samorin, Slovakia