

GENTORE

NEWSLETTER

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About GenTORE

GenTORE – “GENomic management Tools to Optimize Resilience and Efficiency” - is a European Union funded project within the Research and Innovation Program H2020.

GenTORE will develop innovative genome-enabled selection and management tools to empower farmers to optimize cattle resilience and efficiency (R&E) in different and changing environments. The combined research and outreach program of GenTORE will make a contribution to addressing the challenges facing farming in a changing and volatile world.

ANNOUNCEMENTS

Speed-dating with stakeholders: great success!

To maximize stakeholder inclusion during [GenTORE's first Annual Meeting](#) a speed dating took place. Stakeholders had the opportunity to learn about the different work packages and how they could potentially contribute, whereas work package leaders gained ideas on how to optimize their work within GenTORE. Time was flying by during the 10-minute sessions! Stakeholders and Work Package participants are encouraged to continue discussions on the Stakeholders E-Platform, reachable through GenTORE's official website. If you did not register for the E-Platform yet, please [click here](#).



What the hell is resilience and efficiency, actually?



On **28th of August 2018** GenTORE is organizing a special session during the EAAP Annual meeting in Dubrovnik, Croatia, in collaboration with projects Feed-a-Gene and GplusE: ***"What the hell is resilience and efficiency, actually?"***

The session will take place from **14:00 - 18:00h at room Elafiti 1**. The meeting will focus on how breeding and management can improve R&E, balancing R&E for different needs in different environments, and achieving operational measures of efficiency. There will be presentations and discussions with world experts.





SAVE THE DATE

GenTORE session EAAP 2018

In collaboration with Feed-a-Gene and GplusE

August 28th, Dubrovnik, Croatia



What the Hell is Resilience and Efficiency, actually?

DON'T MISS IT!

Presentations and discussions with world experts covering:

- Balancing resilience and efficiency
- How fast can we change
- Opportunities and limitations of large scale R&E
- Real-world goals

Check out our website for more information

www.gentore.eu



GenTORE is a [Horizon 2020 project](#) running from 1 June 2017 to 31 May 2022. This research received funding from the European Union's H2020 Research and Innovation Program under agreement No. 727213.

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breeding, etc. WP6 takes this predictive approach a step further to ask the “what if” questions, e.g. what are the economic consequences at herd level of a given cross-breeding strategy, and how would they play out across different local production environments?

Given the central role of developing tools for end-users, a key criterion for the success of GenTORE is a continuing exchange with, and dissemination to, a broad range of stakeholders. WP7 is dedicated to this important task.

NEWS



GenTORE shines in Edinburgh!

On 15-16th of May GenTORE's first Annual Meeting took place in sunny Edinburgh hosted by SRUC. As stakeholder involvement is crucial to make GenTORE a success, the main focus was on explaining outreach and dissemination in regards to stakeholder inclusion and building up synergy and interaction between the different work packages and stakeholders. In total about 60 people were attending the meeting, from which 10 were representing a stakeholder group and 50 were consortium members.

The meeting was opened by project manager Nicolas Friggens, followed by a presentation about 'Resilience and Efficiency in cows in the Global South' by Alan Duncan from ILRI/University of Edinburgh. It was highlighted that livestock has multiple roles (traction, dowry, milk and manure) and that there's no culture of culling in these countries, which limits the opportunities for decision making around breeding. Hereafter the attendees discussed about the potential need to consider broader livestock outputs in the European context.

In the afternoon there were several sessions in which work packages discussed their planned activities

throughout the duration of the project. Stakeholders were also invited to these sessions and could give feedback to the expected output.



The perfect matches between stakeholders and work package leaders were explored during a speed-dating on the second day. There was lots of input for further discussions. For a continuation of these discussions the [Stakeholders E-Platform](#), which is accessible on the GenTORE website, can be used. Through this platform we hope to receive as much suggestions and feedback as possible regarding the project from a broad range of stakeholders. If you did not register yet as a stakeholder but are interested to join the discussions, please subscribe. We are keen to hear your suggestions!



NEWS

GenTORE at Dublin International Animal Science Conference

GenTORE coordinator Nicolas Friggens gave the Sir John Hammond Lecture on 'Precision agriculture meets the genomics revolution' at the British Society of Animal Science annual conference in Dublin in early April. This attracted 450 scientists from across the globe and was an excellent opportunity to explain the GenTORE project in simple terms to an audience of scientists from many different backgrounds and disciplines. It generated a lively discussion!

Nic covered the background to genomic selection with a specific focus on dairying, the limitations and difficulties of selection for complex traits like resilience. He

examined the concept of efficiency and how farmers and scientists might characterise and exploit opportunities for resilience. He highlighted the need for precision monitoring so that animals with, as an example, health problems could be tracked and thus herd disease issues fine-tuned to optimise long-term efficiency. He covered the need to consider farmer perceptions and ease of use of new technologies but concluded that genomics and precision farming had many synergies that would ultimately be of benefit to future animal science and production

[Click here](#) to view the video of the lecture.

GenTORE meets Italian Cattle Breeders

One of the unique aspects of the GenTORE project is the inclusive stakeholder involvement from the beginning of the project. With this approach, GenTORE can collect many ideas and views, and moreover be able to better suit the project outcomes for purpose and relevance in daily practice on both beef and dairy farms. Finally, it will allow outcomes to be more user-friendly and thus adopted rapidly and seamlessly by farmers and breeders, also on the long term. Stakeholders include breeding associations, trans-national organizations, farm management and veterinary advisory services and farm technology companies.

INTERMIZOO, NUTRISTAR), which immediately demonstrated a strong interest in the project.

"Communicating with farmers should be seen as strategy to disseminate the importance of rearing more R&E animals."

Moreover, they underlined how direct communication with the farmers should be seen as a strategy to disseminate the importance of rearing more Resilient and Efficient animals, which cannot always be identified with the most productive ones in absolute terms.

"Stakeholder involvement to collect ideas and views, and to fit outputs for purpose and to ensure relevance in daily practice."

Last November the first meeting with Italian stakeholders took place at the Agripolis campus (Legnaro – PD – Italy), in order to discuss objectives and structure of the project. Some of the most important Breed and Trade Associations were represented (ANAFI, ANARB, ANAPRI, ANABIC, ARAV, AIA, UNICARVE, AZOVE) together with several members of the livestock industrial sector (Consorzio Tutela Formaggio Asiago,



GenTORE LEADS COMMON DISSEMINATION BOOSTER

Together with European projects GplusE, Feed-a-Gene, IMAGE and SAPHIR, GenTORE applied for the Common Dissemination Booster (CDB) last November. The CDB is a new service from the European commission that encourages projects to come together in order to identify a common portfolio of results and shows what the best way is to disseminate project outcomes to the end-users.

GplusE, Feed-a-Gene, IMAGE, SAPHIR and GenTORE are all complementary and have common objectives like enhancing the use of genetic collections to develop genomic methodologies in livestock (beef & dairy cattle, pigs and poultry), in order to improve the sustainability, resilience and efficiency of the European Livestock sector and genetic resources. In addition, they have common target audiences as researchers, breeding companies, nutrition companies, farm technology companies, precision farming companies, extension workers, veterinarians, farm managers, processing industry, retailers, policy makers and consumers.



GplusE

GplusE stands for Genotype plus Environment. It is designed to

optimise production efficiency, environmental footprint, health and welfare of dairy cows through a holistic approach that considers both genomic selection and management strategies. The linking of genomic data with phenotypic information will allow development of novel traits and systems that can focus on herd and cow management on key time points in dairy production that have a major effect on efficiency, environment, health and welfare of cows.

Feed-a-Gene

Feed-a-Gene



Feed-a-Gene aims to better adapt different components of monogastric livestock

production systems (i.e., pigs, poultry and rabbits) to improve the overall efficiency and to reduce the environmental impact. This involves the development of new and alternative feed resources and feed technologies, the identification and selection of robust animals that are better adapted to fluctuating conditions, and the development of feeding techniques that allow optimizing the potential of the feed and the animal.



IMAGE

Innovative Management of Animal Genetic Resources (IMAGE) aims to enhance the use of genetic collections

and to upgrade animal gene bank management. Genomic methodologies, biotechnologies and bioinformatics will be further developed for a better knowledge and exploitation of animal genetic resources.

SAPHIR



The SAPHIR project (Strengthening Animal Production and Health

through the Immune Response) aims to develop innovative, safe, affordable and effective vaccine strategies effective against endemic pathogens responsible for high economic losses in livestock. By generating vaccine strategies for these pathogens in pigs, poultry and ruminants, SAPHIR will aid in strengthening the profitability of food animal systems, improve animal welfare and reduce xenobiotic usage in farming with a 'One Health' perspective.

Service 1
Portfolio Identification
Service



Service 2
Stakeholder/End-user
mapping



Service 3
Portfolio Dissemination
Plan Development



Service 4
Portfolio Dissemination
Capacity building

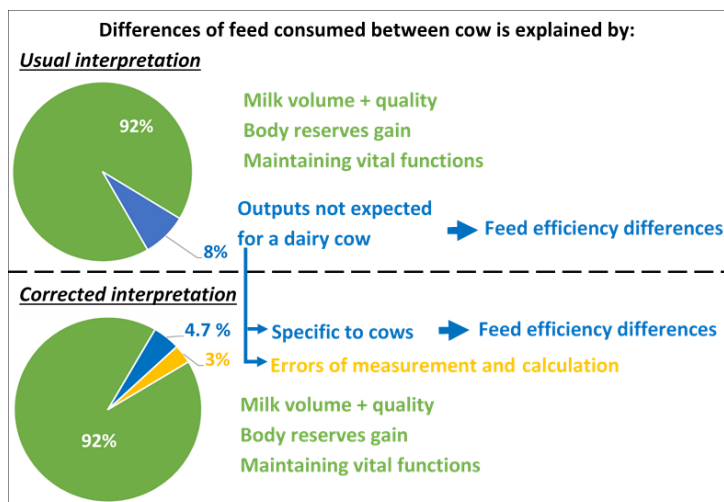


Service 5
Dissemination
Campaign in Practice



IMPROVING CATTLE FEED EFFICIENCY

Improving feed efficiency is essential for sustainable livestock farming: it is expected to reduce feed resources use and to decrease waste and environmental impacts. Ruminants are key players because they transform resources, which are non-edible for human consumption, such as grass, into edible resources for human consumption, such as milk or meat. Improving the use of land and feeds by animals is important because arable land availability decreases and because feed accounts for the largest part of production cost.



Improving feed efficiency can be done by selecting the most efficient animals. This selection requires an estimation of feed efficiency variability to estimate the genetic progress, which is potentially reachable. Feed efficiency estimation requires measurements of individual animal feed consumption and what we expect the animal to do with this feed. For example, a dairy cow will usually use the feed to maintain her vital functions, to produce milk in volume and quality, but also to gain body reserves, which are an essential resource after calving. To determine feed efficiency, a cow is always compared to other cows sharing the same environment. A cow is efficient if she produces as much as the average of the group of cows, but eats less feed than the group average (or eats the average but produces more). The difference between the actual feed consumed and the feed that she should have consumed given her productive outputs is called residual feed consumption. This residual feed consumption encompasses differences in efficiency but also errors, such as measurement errors or errors in the calculation of expected feed consumption

from measured outputs, which are not interpretable as feed efficiency - even if this is often done in practice.

The current paper tackles this issue in dairy cows by proposing a method to isolate the feed efficiency part of residual feed consumption from the error part. The main interest in livestock farming is to have cows, which are repeatably efficient over time. The feed efficiency part of residual feed consumption was therefore defined as the repeatable part of residual feed consumption specific to cows, and the error part as the random non-repeatable part of residual feed consumption.

A usual interpretation of residual feed consumption would conclude that in our study, feed efficiency differences account for 8% of the actual variation in feed consumption. In fact, our study shows that only 4.7% (59% of the 8%) of the measured feed consumption variation was repeatable and specific to cows, therefore interpretable as feed efficiency. When the goal is to estimate the variability of feed efficiency using the residual feed consumption method, attention has to be paid to its interpretation because only 59% of the observed variability might really be associated with feed efficiency and not with errors.



Credit: Luc Delaby

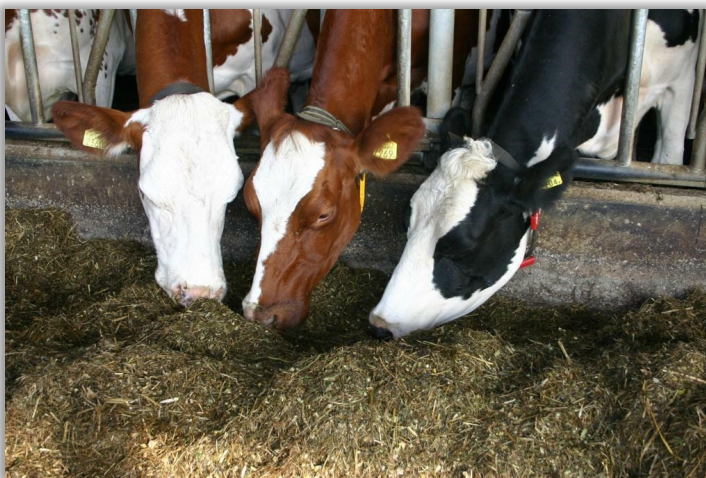
Title: Isolating the cow-specific part of residual energy intake in lactating dairy cows using random regressions

By: Amélie Fischer, Philippe Faverdin and Nicolas Friggens

Fortunately, this paper has been selected as **"Article of the Month"** in the June issue of *Animal*. The Article of the Month is granted free access for one month, starting at the publication of the issue. [Click here](#) to access the article.

RESILIENCE AND EFFICIENCY IN A COMMERCIAL AI COMPANY

Viking Genetics, an AI-company owned by farmers in Denmark, Sweden and Finland, is a commercial partner in the GenTORE project. The project covers numerous aspects of improving resilience and efficiency. We have a specific interest in improving these traits from a genetics perspective through selection. Within the genetics part of the project there are many subjects that are very important in order to understand the biology around the complex traits and also how we can handle them and select for or against them in short and long run.



In the future we should expect more farmers to use intentional crossbreeding. The GenTORE project will work on both better prediction models for crossbreed animals and on how to make best use of crossbreeding for the farmer. Viking Genetics sees a high potential in this area.

"In the future we expect more farmers to use intentional crossbreeding."

GenTORE also examines genotype by environmental interactions. These are expected to be substantial for traits like resilience and efficiency.

Most larger AI companies export semen from bulls in one environment to another, and we need to be better in handling G*E. Therefore, the work to be done in GenTORE in this area is also welcomed.

Biology of efficiency

Many research groups are working on making genetic analysis on feed efficiency from local research farms. In GenTORE data is gathered from several stations and there will be input from nutritionists on how to use this data. This will be an additional help to getting a better understanding of the biology behind feed efficiency.

"There are traits that we select for that kind of mimic resilience in health, reproduction and longevity traits that are associated with resilience, with GenTORE we might be able to improve that."

Biology of resilience

Resilience is a new trait in animal genetics. We hope to learn more about this trait and look into how to define the trait and if it should be a part of the future selection program. For now, there are traits that we select for that kind of mimic resilience in the health, reproduction and longevity traits that are associated with resilience. With GenTORE we might be able to improve that.

By: Jan Lassen, Viking Genetics

www.vikinggenetics.com





MEET GENTORE



Agathe Renard (INRA Transfert)

Project Manager; WP8 Associate leader - Project management and consortium coordination

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After a Master's degree in European Affairs and in project management, Agathe Renard has become a European project manager at INRA Transfert (IT) in 2016. At IT, she has managed the French project AMAIZING and the EC funded projects AnaEE, Optifel and currently GenTORE. In GenTORE she is the associate leader of WP8 – project management (together with coordinator Nicolas Friggens) and ensures the good running of the project through administrative and financial management, internal communication and EC requirements advising. She is also involved in WP7 for dissemination and project website. Agathe her hobbies are travelling, outdoor activities, photography and live music.



Dr. Florian Leiber (FiBL)

WP1 Leader—Production system metrics: Assessing the systems context

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Florian Leiber holds a PhD from ETH Zurich in Ruminant Nutrition since 2005. He worked in sustainable Livestock Nutrition at ETH Zurich since 2001 and at FiBL (Research Institute of Organic Agriculture) since 2013. Since 2016, he is head of the FiBL Department of Livestock Sciences. His main research and development aim is to approach a sustainable and animal friendly production at the same time. This in particular related to pasture-based production, which gives him opportunity to travel a lot in central and east Asian countries. Travelling, and in particular to the East (former Soviet countries and Asia) is Florian's passion. In GenTORE he is leader of the WP1 (together with Simon Moakes), which is dedicated to model the environmental factors (regional, climatic, economic, social) that determine the conditions under which cows have to develop resilience and to perform efficiently. These data will be later joined with the genomic datasets from WP 4 and 5, in order to calculate G x E interactions. Further, Florian supervises the FiBL activities in WP2 and WP3, aiming at sensor-based assessment of resilience and efficiency proxies in cows.

RECENTLY PUBLISHED

- [GenTORE: Genomic Management Tools to Optimise Resilience and Efficiency](#) - N. Friggens, C. Kaya and A.W.M. Roozen, *INTERBULL Bulletin*, August 2017.
- [Precision phenotyping for efficient animal agriculture](#) (page 226 - 227) - N. Friggens, *Open Access Government*, August 2017.

Visit the GenTORE website to stay up-to-date on the newest publications:

www.gentore.eu





GenTORE TV

GenTORE has its own [YouTube channel](#) where explanatory videos, presentations, interviews and other GenTORE related videos are being published. With the channel, GenTORE aims to reach the wider public to inform them about the project. In the video on the right Nicolas Friggens, Project Coordinator, explains the goals of the GenTORE project. Subscribe yourself to GenTORE H2020 on YouTube to see all videos. The videos are also accessible from the GenTORE website under '[MEDIA](#)'.



Nicolas Friggens, Project Coordinator

UPCOMING EVENTS

- | | | |
|-----------------|---|--------------------------|
| 27 August | "What the hell is resilience and efficiency, actually?"
GenTORE session at EAAP 2018 | Dubrovnik, Croatia |
| 27 - 31 August | 69th Annual Meeting of European Federation of Animal Science (EAAP) | Dubrovnik, Croatia |
| 2 - 6 September | 10th International Symposium on the Nutrition of Herbivores | Clermont-Ferrand, France |

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