



DIVERSIFIED FODDER FOR HIGH QUALITY EWE'S MILK!

GIVING EWES A DIVERSITY OF FODDER THAT COMBINES GRASSES AND LEGUMINOUS PLANTS IMPROVES THE QUALITY OF MILK AND CHEESE AND SAFEGUARDS THE HEALTH OF CONSUMERS!



A study was carried out on a dairy farm belonging to a farmer who wished to determine the impact of his feed ration practices on the quality of milk in order to communicate transparently with his customers. The study took place over a year and a half in order to determine the relationship between data on the production and quality of milk and the succession of feeding practices dictated by the seasons (grazed grass, stored feed). The sampling days were adjusted to correspond to changes in practice arising over a year of production (grazing, changes in grassland or type of fodder).

The total diet was characterised throughout the monitoring period by keeping a register to provide information on the nature of the concentrates and fodder used, their dietary contributions and dietary values determined by NIR spectroscopy analysis. The product characterisation concerned both milk and cheese. The quality of the milk was assessed by analysing the fatty acid (FA) profile, the concentration of equol (a microbial metabolite with health benefits), and the vitamin E and B12 content. In addition to this, the cheese resulting from a «lactic curd» type production (fromage frais) was sampled in order to ensure that the FA profile of the milk was not affected by the cheesemaking process. Finally, data were also collected on the production of milk, protein and fat content in the milk and the yield of cheese.

The FA profile of milk is generally better when the animals are grazing (summer period), with a significant increase in conjugated linoleic acid content (CLA), a lower saturated fatty acid content, and a tendency to be enriched in vitamin E. Milk produced when the animals are fed hay (winter period) also shows an interesting FA profile, with a notable improvement in linoleic and α -linolenic acid content. As for the equol content in the milk, observations show a very marked increase when red clover is included in the fodder consumed, this increase being even more pronounced when grazing.

Thus, the quality of the diversified fodder fed to ewes, combining grasses and leguminous plants, is reflected in the fine composition of the milk, which is preserved during the cheesemaking process. This information is extremely important because it guarantees consistent quality for consumers from the milk to the finished product.

Funding: The study was conducted under the auspices of a Reference and Experimentation Centre funded by the SPW, DGO3.

WHAT METHODS CAN BE USED TO CONTROL EROSION-INDUCED RUN-OFF?

Mudslides are a recurrent problem in certain rural areas of Wallonia. How can we improve decision-making in terms of the practices and provisions to be adopted to limit the risk?

The ultimate goal of the Intell'eau project is to develop a cartographic decision support tool (DST) for the implementation of water and soil conservation measures, for both agricultural plots and transitions between plots. The aim is therefore to optimise the use of these techniques by taking into account their combined effects in limiting the risk of run-off and loss of soil and pesticide residues on the scale of small agricultural drainage areas. This tool will be made available to agricultural advisers and farmers. The ULiège - Gembloux Agro-BioTech, the UCLouvain and the CIPF are project partners working alongside the CRA-W.

The priority of the first stage of the project (2021-2023) is to quantify the impact of measures taken to reduce erosion-induced run-off. Some techniques, for example sodded bands or no-till farming techniques, have already been extensively studied. Other, more innovative techniques require measures to be taken at ground level, such as miscanthus strips, under-sowing with corn or summer pre-beds in potatoes. The project therefore relies on a bibliographical review to gather all existing relevant data, and in situ measurements for the less well-documented techniques.

To name but a few of the innovative developments assessed on the ground in 2021, the miscanthus strip and the very short rotation coppice of willow appear to be effective inter-plot developments for retaining the flow of muddy water, in addition to their productive function (mainly in biomass). In terms of agricultural practice, the strip-till method (digging the seeding line only) is still not commonly adopted in our regions, but it shows great potential when growing a crop of corn in a simplified tillage system.

Several innovative methods of reducing erosion already appear to represent a promising addition to existing measures. Others are still under study. The decision support tool to be developed on completion of the Intell'eau project should make it possible to better quantify the impact of the various measures taken in isolation or in combination, and thus identify the most effective action to be taken according to individual requirements.

Funding: Project subsidised by the SPW-ARNE

For further information: www.cra.wallonie.be/fr/intelleau
<https://intelleau.wixsite.com/projet>



Plot for measuring run-off, sediment and pesticide flows, used in the Intell'eau project trials

Contacts: Bruno Huyghebaert • b.huyghebaert@cra.wallonie.be & Alodie Blondel • a.blondel@cra.wallonie.be

ASSESSMENT OF THE CONTRIBUTION THAT DAIRY FARMS MAKE TO FOOD SECURITY

Improving production on available surfaces while avoiding competition with human food: the AUTOPROT project is studying the prospects for dairy farms in the Grande Région.

One of the aims of this INTERREG project was to study the contribution to food security from two angles:

(1) the competition between livestock and humans for food resources, by means of the net efficiency indicator which represents the ratio between production (milk and meat) and the food edible to humans consumed by livestock,

(2) the use of arable and total land (arable + permanent grassland) per unit of food produced. The unit chosen is protein, a key component of animal production for human food.

We began by estimating the proportion of edible protein and the use of land associated with the production of concentrated compound feed used in the Grande Région. Based on 210 commercial recipes, we showed that concentrates contain, on average, 20% protein that could be directly integrated into our diet and, on average, they use up 1 m²/kg for production concentrates and 1.2 m²/kg for protein concentrates. According to these estimates, the dairy farms studied have a net efficiency of 2.5 (± 1.1), which shows that they produce on average 2.5 times more protein that can be used by humans than is consumed by the herd. Moreover, the average dairy farm uses 37 ± 15 m² of land, including 9.0 ± 5.2 m² of arable land, to produce 1 kg of protein for human consumption.

Grassland farms use less arable land per kg of milk overall, and have better net efficiency due to the extensive use of grass and a lower use of concentrates. In general, farms with a high net efficiency are also associated with better profitability per kg of milk and good environmental performance (in terms of nitrogen balance and greenhouse gases). On the other hand, the link between autonomy and the contribution to food security is not unequivocal. While grass production on a farm improves the two factors mentioned above, the production of certain concentrates (cereals) or corn silage improves autonomy but compromises the contribution to food security because these foods are in competition with human food and use arable land.

The dairy sector is affected by pedo-climatic conditions, legislation and the availability of resources. It is therefore important that local production potential is taken into account when comparing farms and their practices. This factor is being studied as part of the doctoral thesis of C. Battheu-Noirfalise (FRIA).

Funding: Interreg V programme and the Walloon Region.

For further information: www.cra.wallonie.be/fr/autoprot

Contact: Alexandre Mertens
a.mertens@cra.wallonie.be



FROM EFFORT TO SUNSHINE: WORKING TOWARDS THE PARTICIPATION OF BREEDERS IN THE CONSTRUCTION OF ADAPTED AND... ADOPTED TOOLS



Thanks to workshops with breeders, we will identify their expectations regarding the content and ergonomics of a good pasture management tool.

As part of the **EFFORT** project, which is focused on the transition of dairy farms to an efficient use of fodder resources, we investigated tools designed for this purpose.

We also looked into the relationship that users have with these tools or the ideas they underpin, and in doing so we observed a certain reluctance. There are multiple reasons for this reluctance, such as cost, accessibility, support or appropriation. We explored this last factor, the appropriation of tools by users, in discussion groups.

What this means is that, while the tools have been conceived and built by designers, they are not always suitable for their target users and are therefore not widely adopted. Taking one measurement instrument and associated computer programme as a case study, the Rising Plate Meter and Pâtur'plan, we organised meetings with a

group of farmers and a group of advisers, in order to examine their relationship with the tools.

We found that it can be difficult to make use of the opportunities offered by devices, whether simple or more advanced technologies, which do not fit into the daily lives of farmers or are not in line with their practical knowledge. It is therefore essential that their perspective and practices are taken into account when designing a tool, whose objective would then be to support this practice rather than imposing a fresh approach. Based on these conclusions, we have begun to develop a new project: **Sunshine**.

In conducting this new project, we will be working on a new grassland management tool with the clear intention of taking into consideration the needs and expertise of



farmers in its development through preliminary work, and then continue this process towards participation.

For further information:

www.cra.wallonie.be/fr/effort
www.cra.wallonie.be/fr/sunshine

Contact: Caroline battheu-Noirfalise
c.battheu@cra.wallonie.be



BIOINFORMATICS FOR TAXONOMIC IDENTIFICATION

The CRA-W has developed expertise in the field of bioinformatics and has acquired computers with high processing power to make use of these new technologies.

In recent years, life sciences have witnessed the advent of new high-throughput sequencing technologies. These generate vast quantities of data that cannot be processed manually. The CRA-W has therefore acquired human and technological resources in bioinformatics.

Bioinformatics can be applied to various areas of life sciences, including genomics (the study of DNA), transcriptomics (the study of expressed genetic information) and proteomics (the study of proteins) to name but a few. However, the basic principle in these different approaches is quite similar: starting from complex raw data and applying a series of commands to process them (cleaning, sequence alignment, taxonomic assignment, etc.), thus enabling conclusions to be drawn. Bioinformaticians are regularly required to write scripts, i.e. a set of commands dedicated to a section of the bioinformatics pipeline. These scripts are written in various programming languages (e.g. R, bash, python, etc.) and it is not uncommon for scripts written in different languages to be used within the same pipeline.

One of the most important applications associated with bioinformatics is the study of samples by metabarcoding. Through the



New generation portable sequencer acquired by several CRA-W teams.

massive amplification of certain genomic sequences of interest, bioinformatics can be used to determine the taxonomic composition of samples that may be very different: fungal spores collected in the air, pollen, soil, plants, faeces, food products and many others. The number of possibilities has expanded with the arrival of a new generation of sequencers (e.g. sequencing by nanopores

on a portable MinION-type device), which means that much longer fragments can be sequenced. These possibilities include better identification of the organisms present in a sample, or the sequencing of complete genomes. Several CRA-W teams have recently acquired this type of sequencers.

A number of high-throughput sequencing activities are taking place in several CRA-W units to study a wide range of organisms: plants, animals (including insects), bacteria, fungi, viruses, etc.

These bioinformatics skills are offered to various CRA-W units or other research institutions to meet the demands associated with identifying the species present in a sample or characterising microbial communities. The CRA-W thus hopes to position itself as a leading player in the analysis of data obtained by high-throughput sequencing in connection with agronomic and environmental research.

Funding: projet Moerman, CRA-W

Contact: Benjamin Dubois
b.dubois@cra.wallonie.be

BELCAM, THE SATELLITE-BASED AGRICULTURAL PLOT MONITORING PLATFORM

The BELCAM webplatform provides a series of products obtained from satellite information to improve the management of agricultural plots.

The BELCAM webplatform was officially launched in August 2019. It offers free access to various products and services obtained mainly from satellite imagery. These products and services have been developed in partnership with farmers and support services (pilot and technical centres). They enable farmers or breeders to monitor the growth and development of their winter wheat, maize and potato fields or grasslands throughout the growing season and support them in their decision-making, particularly in relation to the management of nitrogen inputs and of risks. Among the available products, the prediction of nitrogen balance and evolution of nitrogen status during the season, the evolution of leaf development (using the LAI «leaf area index») and the possibility of comparing the growth of a field with that of its neighbours, and estimating the final yield, are particularly worth mentioning. The platform

can also be used to view data for each plot obtained from the CRA-W Agromet webplatform. All available products are regularly reassessed and constantly improved on the basis of fresh field data. For example, an intensive campaign is currently being carried out with a view to further improving the assessment of nitrogen status and the estimation of potato yields.

The BELCAM agricultural advisory webplatform therefore plays a part in responsible agriculture concerned with reducing, through optimisation, the use of inputs (primarily nitrogen) and limiting their negative impact on the environment (for example groundwater pollution). For this purpose it relies on the new generation of European satellites with high spatial and temporal resolution (for example Sentinel missions), which enable characterisation on the scale of individual fields or even within fields. It also has

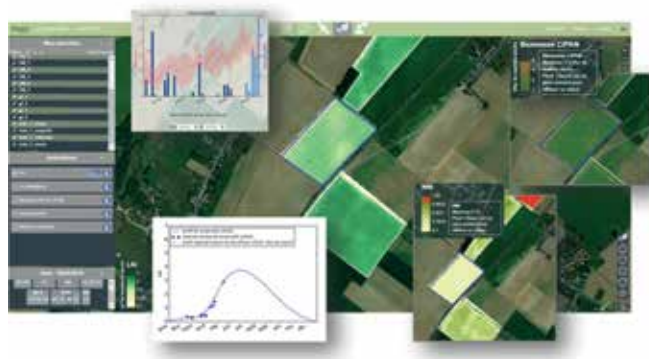
Subscribe to our newsletter
www.cra.wallonie.be/en/newsletter

🏠 Centre wallon de Recherches agronomiques
Bâtiment Lacroix • rue de Liroux, 9 • B-5030 Gembloux

☎ Tel : +32 81 87 40 01 • Fax : +32 81 87 40 11

🌐 www.cra.wallonie.be

📷 *The photographs of this number are the property of CRA-W.*



the advantage of offering evolutionary products that meet the expectations of farmers and are adapted to the conditions in Wallonia.

Funding: Initially developed as part of a STEREO III project funded by BELSPO (www.belspo.be) (partners: UCLouvain (sponsor), CRA-W, VITO and ULg-Arlon), the BELCAM platform has been exclusively managed and improved by a UCLouvain and CRA-W partnership since October 2019.

Creation of the platform would not have been possible without the help of farmers and partner support services (FIWAP, CIPF, CePICOP, CARAH, VEGEMAR, PCA, INAGRO, Hooibeekhoeve, LCG), not forgetting the non-profit association REQUASUD.

For further information:
www.cra.wallonie.be/en/belcam

Contact: Yannick Curnel
y.curnel@cra.wallonie.be

150 ANS

Presentations and tours throughout 2022



📅 **10/11**



📅 **24/11**



📅 **29/11**

Receive the full programme by subscribing to
www.cra.wallonie.be/en/newsletter