



## HOW CAN WE BETTER USE FEED THAT IS RICH IN NITROGEN?

LEGUMINOUS PLANTS HAVE A NUMBER OF BENEFITS, INCLUDING A HIGH LEVEL OF PROTEIN, WHICH MAKES IT THE IDEAL FEED FOR IMPROVING LIVESTOCK'S PROTEIN AUTONOMY. HOWEVER, THE CONSERVATION OF THESE PLANTS IN THE FORM OF SILAGE IS NOT ALWAYS EASY.

In fact, leguminous silage, rich in soluble nitrogen, is used in a significantly inefficient manner by animals. Quickly available to rumen microorganisms, this type of nitrogen is often taken in excess and largely excreted in the form of urine. This arises not only from the presence of leguminous plants but also from the silage-making process, which causes a lysis of plant protein.

What makes the Autefel project unique is the search for a technical solution that could protect the proteins during fermentation in the silo as well as in the animal's rumen. In order to achieve this, several experiments were conducted by simulating the silage-making process in micro-silos, in the laboratory, in the presence of additives likely to limit the production of soluble nitrogen. Among these, tannins have shown promising results. These natural phenolic compounds,

co-products of the wood industry, form complexes with the proteins and make them less prone to degradation.

Furthermore, the feed value of leguminous silage for cattle is a key part of the problem. Now inevitable in certain conditions, catch crops are planted in the summer to avoid nitrate leaching of soil fertilisation. In the autumn, some catch crops, which are often made up of a mix of grasses and leguminous plants, can be harvested and fed to the herd. While fresh catch crops used as forage have a high feed value, particularly in terms of proteins, their quality once they are ensiled is rather poorly documented. Consequently, a survey of the quality of catch crop silages in Wallon farms was carried out.

The initial results revealed a huge variety of practices, in terms of both cultivation and

preservation, and also therefore in the quality of forage attained. With judicious planting, and careful crop harvesting and preservation these silages can, when managed well, provide a good protein supplement in livestock rations. In general, good catch crop silage is as good as grass silage (750 to 900 VEM/kg DM and 40 to 80g of DVE/kg DM).

In the future the Autefel project should facilitate the establishment of good practice with the aim of better using the feed potential of plants that are rich in nitrogen and thereby helping livestock farmers to manage feed costs linked to dairy production.

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*Photo legend: A combination of ryegrass and crimson clover; example of a catch crop used as forage.*

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## IN SEARCH OF FOOD AUTONOMY FOR ORGANIC PIGS IN WALLONIA

THE USE OF RAW MATERIALS GROWN ON THE FARM IN THE FEEDING OF ORGANIC PIGS ENABLES FARMERS TO ACHIEVE A SIGNIFICANT LEVEL OF FOOD AUTONOMY AND TO FREE THEMSELVES AS BEST THEY CAN FROM AN ECONOMIC SITUATION THAT IS OFTEN DIFFICULT.



To answer these questions, farm-produced feeds and compare this to traditional commercial feed. The farm-produced feeds had to include a reduced number of raw materials to facilitate the conception on farm (in the purchase of raw materials and the manufacture of feed). Likewise the farm-produced feeds had to include a maximum amount of locally produced crops (between 84 and 97%): barley, triticale, horse bean, mixes of triticale, oats and peas or triticale and horse bean.

The impact on zootechnical and economic performance was assessed in the growth, fattening and finishing stages for 18 pens of 6 pigs ranging from 27 to 125 kg (live weight). The compared feeds exhibited nutritional values that were as close as possible to the accepted recommendations for each of these stages. The price of the farm-produced feed was calculated using the market price of organic feed materials (opportunity cost) and grinding and mixing costs estimated at €20/ton. The price of the commercial feed was based on the delivery costs for 10 tons in bulk. The farm-produced feed was 25% cheaper than the commercial feed.

As for the zootechnical performance, the farm-produced feed reduced the consumption index by 12% during the growth stage (27 to 39 kg). The effect was more significant with the farm-produced feed including fewer raw materials and the highest incorporation rate of locally produced raw materials. Comparatively, this feed exhibited nutritional values that were the furthest from the recommendations. However, the farm-produced feed had no effect on the consumption index over the course of the next two stages for which the feeding cost was also lower. In terms of returns, the lean meat content of the carcasses was markedly higher for pigs fed on the farm-produced feed, without any upward change in rating or sale price.

The results confirm therefore the possibilities of formulating effective farm-produced feeds for the production of organic pigs in Wallonia.

It is important, however, to adhere to the basic rules of feeding: knowledge of feed value of raw materials used, nutritional needs of animals according to stages and categories, feed manufacture and appropriate distribution.

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## ORIGINAL MANAGEMENT OF LONG INTERCROPPING FOR THE PRODUCTION OF ORGANIC VEGETABLES

AFTER A CEREAL HARVEST, THE PLANTING OF A SPRING VEGETABLE (IN MAY) ENTAILS A PARTICULARLY LONG INTERCROPPING MANAGEMENT (9 MONTHS) PROCESS. THE SOILVEG PROJECT AIMS TO ANSWER THE QUESTION OF HOW TO ADD VALUE TO THE LAND DURING THIS PERIOD, AND WITHIN THE FRAMEWORK OF ORGANIC FARMING.



crimper roller

The SoilVeg project consists of finalising and assessing a practical, original solution that could offer the farmer the opportunity to protect his land, improve its fertility and perhaps even improve on vegetable-growing performance. The initiative brings together 14 partners spread across 8 European countries. It is based on the assumption that the destruction of cover crops with a roller crimper preserves the yield and quality of the vegetable crops, improves soil quality, lowers fossil fuel energy consumption and reduces the negative effects of pests, diseases and weeds.

One of the key arguments in favour of this technique in organic farming is that the management system and termination of the cover crops would help to keep weeds under control during the intercropping (elimination of harrowing or stale seedbeds) and vegetable cultivation (elimination of hoeing) stages. The technique does require the planting of a non-frost cover crop which should, as well as greatly preventing the spread of weeds, play the role of an organic soil-enriching agent and serve as mulching (which offers better soil protection against soil sealing, run-off and erosion).

There is a great interest, therefore, in preserving the cover crops throughout the intercropping process and destroying them with a roller before planting, from an agronomic, economic and environmental viewpoint. A significant amount of knowledge is required and the challenges that must be overcome are many, but they are far from being insurmountable. The trials run by the CRA-W aim to pinpoint the problems and find concrete solutions.

*The SoilVeg project is financed by the CORE Organic Plus European fund and the Wallon Strategic Plan for the Development of Organic Farming.*

For more information: <http://www.cra.wallonie.be/img/page/bio2020/activite/AB-SOILVEG.pdf>

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## CATTLE FEED FOR BETTER HERD FERTILITY

FERTIWALIM, SUPPORTED BY THE COMPETITIVENESS CLUSTER WAGRALIM, FOCUSES ON THE FERTILITY OF THE TWO PREDOMINANT BOVINE BREEDS IN WALLONIA, NAMELY BELGIAN BLUE FOR MEAT PRODUCTION AND HOLSTEIN FRIESAN FOR DAIRY PRODUCTION.

This new industrial research project aims to improve the fertility of Walloon cattle via the development of specific feed for bulls used for the insemination of both breeds, as well as to enhance the production technology of an insemination centre.

This original and targeted approach will benefit from the additional expertise of four partners: two companies (Association Wallonne de l'Élevage scrlfs and Dumoulin SA), a university body (UC Louvain – Life Sciences Institute) and CRA-W.

CRA-W will carry out follow-up testing of the cows in the experimental herd so as to finalise and validate monitoring indicators for their fertility. Additionally, it will take part in discussions related to refining the feed so that the animals' needs are satisfied and the cows' fertility is optimised while taking into account technical, economic and environmental constraints.

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CRA-W will contribute, through its expertise and rapid analysis methods, to the development of analytical and technical solutions based on mid-infrared spectroscopy (MIRS). The objectives of these techniques will be the quick and non-destructive testing of semen. The monitoring of their content in cells displaying oxidation activity will be conducted via fluorescence microscopy. Finally, new chemometric models correlating near-infrared spectroscopy (NIRS) data with the feed's intrinsic quality will be developed. Aside from this analytical component, the zootechnical aspect will also be covered by this project. As part of this framework,



## AN ACCURATE DIAGNOSIS: A FIRST STEP TOWARDS MANAGING PHYTOSANITARY PROBLEMS

THE *GUICHET CONSULTATION* OF THE WALLOON AGRICULTURAL RESEARCH CENTRE (CRA-W), A DEDICATED PHYTOPATHOLOGY DIAGNOSIS SERVICE, IS AVAILABLE TO FARMERS, HORTICULTURALISTS, GREEN-SPACE MANAGERS AND FORESTERS TO HELP THEM IDENTIFY THE CAUSE OF THE DAMAGE TO PLANT LIFE.

Cultivating crops and plants also entails dealing with the large variety of pests and physiological disorders that can be harmful to the health of plants. Fungi, insects, acaridae, viruses, bacteria, rodents and roundworms all represent potential enemies to crops and, when a phytosanitary problem is reported, producers can find themselves defenceless against symptoms the cause of which cannot always be determined by the naked eye alone. However, obtaining an accurate diagnosis is the first essential step towards combatting such problems. Using representative samples, the *Guichet Consultation* attempts to identify the cause of the observed symptoms. To achieve this, it relies on traditional techniques such as microscopic observation and binocular magnification, as well as the cultivation or inoculation of test plants. The laboratory can also offer molecular analysis. In addition, field visits may be required to arrive at a diagnosis.

Once identified, the problem can be in a way that takes account of the cycle of the pests concerned. When dealing with pests and pathogens that are likely to persist at affected sites from one year to the next, as is especially the case for perennial crops, the answers provided by these analyses allow farmers to meet the challenge of the subsequent growing season by putting in place specific measures that limit adverse effects on plants. Furthermore, the results of analyses specifically targeting certain pests and pathogens capable of surviving in the soil for long periods play an important part in the decision process when planting sensitive crops in a plot.

Beyond the individual assistance provided to each producer, the *Guichet Consultation* also helps to manage phytosanitary quality within production chains and contributes to their profitability. It encourages a more judicious use of environmentally friendly pesticides, which cannot be overlooked against a backdrop of reduced usage of plant protection products.



Complementary information related to the *Guichet Consultation* is available on the CRA-W website. (<http://www.cra.wallonie.be/fr/services/consultations-sur-les-maladies-et-les-ravageurs-des-plantes>).

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## INTEREST AND AGRONOMICS OF CEREAL AND PROTEIN INTERCROPPING

IN ORGANIC FARMING, THE CULTIVATION OF LEGUMES, FODDER PLANTS OR PROTEIN CROPS IS A KEY ELEMENT OF THE PRODUCTION SYSTEM. MIXING IT WITH A CEREAL CAN BRING SEVERAL ADVANTAGES UNDER CERTAIN CONDITIONS.

Protein crops (peas, horse beans, lupins) are particularly interesting, not just for their fertilising effect linked to the symbiotic nitrogen fixation from the air but also for the production of grains displaying high levels of protein and energy.

However, pure protein crops compete poorly with weeds and are regarded as to support weeds expansion. Moreover, some of them, like peas or lentils, are particularly prone to lodging. For that reason, in organic farming, protein crops are often cultivated in association with a cereal.

The agronomic advantages of such a pairing are numerous:

- As protein crops are autonomous in terms of the soil nitrogen, this last is available to the cereal in its entirety, which leads to a relative yield and higher level of protein content for the associated cereal
- The cereal, up taking the available soil nitrogen and filling the voids, increases the symbiotic fixation of the associated protein crop, increases the total photosynthetic area and in turn facilitates the management of weed invasions until harvest time
- For peas and lentils, the cereal plays the role of structural support, which reduces the risks of lodging and harvest losses

- Compared to corresponding pure crops, by strengthening the intra-plot biodiversity, the associated crops are more resilient vis-à-vis stress brought on by weather or pests

Intercropping is especially interesting under certain conditions. Plots with high potential yield (high nitrogen availability) are not as highly valued for intercropping and are therefore more likely to contain pure cereal crops or other species not part of the legume family. Intercropping, however, makes better use of plots with average or low potential, and with reduced nitrogen supply. In these conditions, the yield of these combinations, be it dry matter or protein, is generally superior on average than that produced by the corresponding pure crops. However, the choice of species and associated crop requires judicious consideration. Their composition must take into account the early ripening and relative aggressiveness of species and associated varieties in the agro-climatic conditions considered.

The complexity of interactions between associated species calls for specific research to which the CRA-W has committed itself, mainly in the area of organic farming. More recently, research institutions and operators have implemented development/research programmes related to these types of crops but applied to conventional farming.



For more information: <http://www.cra.wallonie.be/fr/nouvelles/agriculture-biologique-interet-et-agronomie-des-associations-cereales-proteagineux-de-printemps-a-moissonner>

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Photo legend: Intercropping combinations involving lupin in Ardennes: wheat/blue lupin in the centre, barley/yellow lupin on the left and oats/lupin blue on the right



## EURL-AP CELEBRATES 10 YEARS OF EXISTENCE



IT WAS ON 1 JULY 2006 THAT THE EUROPEAN UNION REFERENCE LABORATORY FOR ANIMAL PROTEINS IN FEEDINGSTUFFS (EURL-AP) STARTED OPERATING AT THE CRA-W.

Involved in the eradication of transmissible spongiform encephalopathies such as mad cow disease, its mission focuses on the detection and identification of prohibited animal proteins in livestock feed. To celebrate its 10th anniversary, a day dedicated to the topic of "Animal protein in feed, a solution towards autonomy and sustainability?" was organised on 22 September at the Palais des Congrès in Namur. This event provided the opportunity to evaluate the activities of the EURLAP but also to bring up the challenges and

possibilities in this area. Various first-hand accounts helped to illustrate the interactions between the EURL-AP and the European Commission and the 27 national reference laboratories, and with other stakeholders, particularly the agro-food industry, in order to achieve harmonious and effective monitoring of legislation. The presentations delivered that day can be viewed at the following address: <http://eurl.craw.eu/en/22/events>

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In collaboration with the APPO, CRA-W has published two booklets presenting the advantages of field peas and field beans in Wallonia. The management of these crops (choice of variety, fertilisation, weed control, crop protection and harvesting), which qualify farmland as ecological focus areas (EFAs), their environmental advantages and the main ways of commercialising them are covered in detail in these booklets.

The booklets, which are intended for producers and agronomists, may be downloaded free of charge from [cra.wallonie.be](http://cra.wallonie.be)