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ANIMAL FEED AND THE CONCEPT OF "TECHNICAL ZERO"

SINCE THE "MAD COW DISEASE" CRISIS, THE CRA-W LABORATORIES HAVE BEEN HEAVILY INVOLVED IN THE DEVELOPMENT OF METHODS FOR DETECTING AND IDENTIFYING PROCESSED ANIMAL PROTEINS IN FOOD FOR FARM ANIMALS. ON 1 JANUARY, 2001, THE EUROPEAN UNION BANNED THE USE OF ANIMAL PROTEIN IN FEED FOR ANIMALS INTENDED FOR FOOD PRODUCTION.

In 2006, the CRA-W became the designated Reference Laboratory of the European Union for the detection of Animal Proteins in animal feed (EURL-AP).

At the request of the DG-SANTE service of the European Commission, a EURL-AP report was drafted on the concept of technical zero. It had two objectives:

1) To find out how a tolerance threshold (called "technical zero") for the occurrence of ruminant DNA can be implemented in practice, in the knowledge that, currently, even small traces are effectively prohibited;
2) To provide information to facilitate the work of EFSA (European Food Safety Authority) in its review of the risk analysis for bovine spongiform encephalopathy induced by processed animal proteins. However, this review of the EFSA will already have to incorporate the concept of technical zero, in the way the EURL-AP report defines its application (mission of the first objective).

The EURL-AP report was completed in July 2017 and is now available to the public on (http://eurl.craw.eu/img/page/publication/Technical_zero-final_version.pdf). It includes various possible thresholds to be submitted for risk analysis. One of the difficulties was to convert two types of units that were, at first glance, rather incompatible. To be specific, the tolerance threshold is defined in terms of the number of copies of the PCR target of the official "ruminant" method, whereas the risk analysis requires a mass content of processed ruminant animal proteins.

Meanwhile, the EFSA risk analysis update report was issued in July 2018 (http://www.efsa.europa.eu/en/efsajournal/pub/5314) and refers to the EURL-AP report.

In due course, the data included in these reports will enable adaptation of European legislation while ensuring that the safety of the food chain is maintained.

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THE APHID, *MYZUS PERSICAE*: MONITORING OF INSECTICIDE RESISTANCE IN WALLONIA, SOME CHALLENGING PRELIMINARY RESULTS

THE RESISTANCE OF *MYZUS PERSICAE* TO INSECTICIDES IS WIDESPREAD THROUGHOUT THE WORLD. AN INITIAL, DETAILED ANALYSIS HAS BEEN CONDUCTED IN WALLONIA.

Myzus persicae larvae on potatoes

Myzus persicae is one of the most pervasive aphids in the world. In Wallonia, it attacks, potatoes, rapeseed, beetroot and many other vegetables. It causes direct damage, and more importantly, transmits various viruses, which has considerable economic implications. These include potato virus Y and beet yellow virus.

This aphid is also known to have developed various mechanisms of resistance to the main insecticide families, including pyrethroids, carbamates, organophosphates and neonicotinoids, which form the vast majority of insecticides used.

Whilst resistance in Wallonia has long been suspected, its extent remains an unknown quantity. A monitoring programme was conducted by CRA-W in 2016 with the support of the Potato Pilot Centre. The DNA of approximately 200 aphids sampled from potatoes across Wallonia was analysed to detect the presence of specific mutations that conferred resistance to pyrethroids on its carrier (mutations L1014F, M918T and M918L, known as kdr and s- kdr), carbamates (MACE) and/or neonicotinoids (R81T).

The results indicate that less than 2% of the aphids tested show no resistance. A highly significant resistance to pyrethroids is demonstrated, with over 98% of the aphids carrying at least one of the three known mutations, and some aphids carrying several of these mutations at the same time. Carbamate resistance is also observed, with approximately 40% of the samples being positive. On the other hand, no aphids were found to be carriers of the mutation conferring resistance to neonicotinoids.

The frequency of pyrethroid resistance presents a challenge, especially when we consider that 25 of the 35 products used to control virus transmission in potatoes belong to this family, and that these insecticides are marketed as an alternative to neonicotinoids in beetroot to fight against transmission of yellow viruses.

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MANAGEMENT OF NITROGEN FERTILITY IN ORGANIC MARKET GARDENING FOLLOWING DESTRUCTION OF PERMANENT PASTURE

UNDER THE CURRENT VERSION OF THE SUSTAINABLE NITROGEN MANAGEMENT PROGRAMME (PGDA III), GROWING VEGETABLES IS PROHIBITED FOR A PERIOD OF TWO YEARS AFTER THE DESTRUCTION OF PERMANENT PASTURE. HOWEVER, MANY ORGANIC MARKET GARDENERS SET UP ON FORMER GRASSLANDS IN THE SEARCH FOR SOILS RICH IN ORGANIC MATTER AND FREE FROM PHYTOPHARMACEUTICAL PRODUCTS.

To assess the acceptability of this ban, which is considered a hindrance to the development of organic market gardening, the CRA-W cross-functional Research Cell in Organic Agriculture (CtRAb) monitored four neo-market gardening situations established on former permanent grasslands throughout the 2016 and 2017 growing seasons.

The study confirmed that destruction of former pasture releases significant amounts of mineral Nitrogen (N). In the first year after the destruction, the supply in N is of the order of 150 to 200 kg/ha for mown grassland, and 200 to 300 kg/ha for unmown grassland. Where there has been manure or extensive livestock presence in previous years, the supply can be as high as 500 kg/ha.

Due to this high N input, many of the crops monitored exceeded potentially leachable nitrogen (PLN) thresholds. The establishment of crops with a high affinity for N, and the maintenance of permanent soil cover, are the main guidelines for efficient management of nitrogen fertility in plots cultivated after grassland. With this in mind, the establishment of intercrops (CIPAN) and relay crops can take up mineralised N efficiently at the back end of the season.

In 2017, 130 of the 173 organic market gardeners listed in Wallonia cultivated an area less than 2 ha. Organic farming market gardening established on former grassland therefore covers a very small area. Moreover, the critical period for nitrate leaching is only a two-year transitional stage. It therefore seems appropriate to relax the legislation in this matter, while ensuring that restrictions still apply to the areas concerned and that market gardeners are guided by advisory bodies towards suitable technological pathways.

A results sheet and good agronomic practice leaflet are available on the site: www.cra.wallonie.be/fr/implantation-de-cultures-de-legumes-apres-prairie-permanente

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THE CRA-W, KEY PLAYER IN THE DEVELOPMENT OF GRASSLAND AGRO-ECOSYSTEMS

REGARDED AS THE GREEN GOLD OF THE WALLOON AREA, GRASSLAND HAS BEEN A MAJOR SUBJECT OF CRA-W RESEARCH FOR MANY YEARS. THIS IS UNDERSTANDABLE BECAUSE IT HOLDS A PRIME POSITION WITHIN OUR LIVESTOCK FARMING SYSTEMS. IN RECENT YEARS, A DIFFERENT PERSPECTIVE HAS EMERGED: IN ADDITION TO ITS USE FOR FEEDING LIVESTOCK, IT ALSO PROVIDES MANY VITAL SERVICES TO SOCIETY.

These aspects are understood through the concept of ecosystem services, which refers to the various services that an ecosystem such as grassland can deliver to ensure the well-being of society. These services are divided into three distinct groups, namely:

- **production services**, corresponding to potentially marketable products obtained from the ecosystem,
- **regulatory services**, which adjust or regulate natural phenomena,
- and **cultural services**, corresponding to the intangible benefits that communities obtain from ecosystems

Numerous services that grassland ecosystems provide to society are being studied by the CRA-W in its various projects and trials. The provision of fodder for livestock, which ensures the production of milk or meat, is quantitatively and qualitatively studied on a weekly and monthly basis, throughout the grazing season.

The CRA-W is also developing innovative meat production techniques, such as organic veal and beef productions, with a view to maximising the role of grass in cattle feeding. Animals performances such as, on the one hand, weight gain, slaughter yields and meat quality or, on the other hand, dairy production resulting from these productions, are studied in order to evaluate the final production service associated with this agro-ecosystem.

Grassland also has a part to play in cattle health, since the application of good management practice in grazing is one of the factors in limiting parasite pressure. Indeed, the CRA-W has confirmed the importance of rotational grazing, a moderate ruminant stocking rate and alternation between mowing and grazing grassland valorisation schemes in limiting parasite pressure and maintaining healthy growth in heifers.

The services regulating the quality of water and air, delivered by the grassland, are also studied. For example, porous probes are used to determine the impact of various types of grassland management, particularly in terms of vegetation cover renovation or grazing management, on the risk of nitrogen leaching into the groundwater.

At the same time, an experimental barn and mobile system are providing the means of measuring the greenhouse gases and ammonia produced by cattle in barns and on pasture, according to different feeding strategies based on a greater or lesser use of grassland resources.

All this expertise provides a global vision of the services delivered by grassland agro-ecosystems, from their management for the production of fodder to the production of animal products, whilst meeting current demands of society.

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DIVERSIFICATION OF CROPPING SYSTEMS, A VEHICLE FOR ECOLOGICAL INTENSIFICATION OF OUR AGRICULTURAL PRODUCTION?

DOWNSTREAM DEMAND AND THE PLANT PRODUCTION SCHEMES STANDARDISATION HAVE LED TO A SIMPLIFICATION OF CROPPING SYSTEMS. THIS RAISES MANY QUESTIONS, BOTH IN TERMS OF AGRONOMY AND OF THE COMPOSITION OF OUR DIET.

Some of the current plant production practices can effectively lead to (1) the persistence of a high disease incidence due to the return of species of the same family on the same field; (2) soils without permanent plant cover; (3) the development of certain weeds because there is no alternating of winter and spring crops; (4) a reduction in the occurrence of nitrogen-fixing legumes in rotation;... In the current systems, these constraints are offset by the use of numerous inputs (fertilisers, pesticides,...), which raises questions concerning their sustainability.

In this respect, the DiverIMPACTS project aims to bring all the benefits and potentialities offered by the diversification of cropping systems to the fore, for the farmers, for the supply chains, and for society. It is based on the support of 25 case studies set up by stakeholders, based on various crop diversification strategies. In Wallonia, these case studies concern (1) the identification and validation of techniques for reconciling organic and conservation agriculture, (2) the development of interculture areas grazed by sheep through collaboration between breeders and farmers and (3) the development of pea production sectors through cereal-associated crops.

By making use of results of long-term trials, including CRA-W's organic material platform, the project also aims to provide stakeholders with methods and innovations to overcome the barriers and obstacles identified.

A survey was also carried out on 128 European experiments that applied different diversification strategies to their cropping systems (intercropping, multiple cultures, longer rotations, ...). Analysis of the results identified the major role played by the mobilisation of a network of key stakeholders, thus ensuring the success of the project, because a network of this type makes it possible, among other things, to remove the agronomic and economic obstacles encountered when diversification involves marketing a new product or interaction between farmers.

DiverIMPACTS

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 727481 (DiverIMPACTS)

For further information: www.diverimpacts.net

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BRAINSTORMING THE OPTIMISATION OF DAIRY FARMING

PROTECOW AIMS TO HELP DAIRY PRODUCERS IN THE FRANCO-BELGIAN BORDER AREA TO IMPROVE THE RESULTS OF THEIR FARMING OPERATIONS. THE PROJECT IS STRUCTURED AROUND THREE CLOSELY RELATED CRITERIA: PROTEIN AUTONOMY, NITROGEN EFFICIENCY AND PROFITABILITY.

What practices will improve your protein autonomy?
Nine strategies for improving the protein autonomy of dairy farms have been detailed in technical data sheets. These present a summary of the facts and figures, the implementation rules and an analysis of their advantages/disadvantages.

A more detailed analysis of the technical and economic impact of replacing the soya meal included in the dairy cow diet was also carried out. Five different practices were assessed: the use of rapeseed meal, intercrops, the improvement in the quality of harvested grass, the self-consumption of faba beans, and also the conversion to organic farming. These are included in the technical data sheets.

What's happening in the field?
A cross-border club of 18 dairy farmers (6 French, 6 Flemish and 6 Walloon) has been set up. Valuable lessons can be learned from monitoring these farms and the resulting interaction. For example, analysis of their gross margins has led to two major observations. Marked differences in the prices paid for milk are observed in the revenues. These can be largely explained by the fat and protein content differences among farms. Between the 3 lowest and the 3 highest dairy farms, this variation is of the order of 4.5 and 1.5 (in g/kg). The difference in fat content is mainly due to the diet, and more specifically, the quality of the grass silage produced on the farms, and the extent to which it is incorporated into the cows' feeding rations. In terms of costs, farmers produce the same amount of milk in all 3 regions (≈ 30 kg/cow/day in the spring of 2018), but the amount of concentrates is very different. This varies between 1970 and 1400 kg/cow. On farms with good quality, plentiful fodder, producers must question their use of production concentrate and its marginal efficiency.

In the current context, judicious expenditure and optimisation of production are the main weapons available to farmers who must respond to the volatility of prices. But what solutions can be readily implemented in the Franco-Belgian region? What impact do they have on farming in terms of autonomy and/or profitability? Enriched by the cross-border experience, the PROTECOW project is providing answers to these questions and food for thought for dairy farmers.

Interreg France-Wallonie-Vlaanderen
PROTECOW

For further information:
www.interreg-protecow.eu

Five organisations, ACE and Idele (FR), Inagro and ILVO (FL) and CRA-W (W), are collaborating on this project. It is subsidised by European funding of the INTERREG V programme, the Walloon Region and the province of Western Flanders.

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THE CRA-W TELEPHONE NUMBERS HAVE CHANGED

The headquarters can now be reached on **+32 81 87 40 01**. To find the number of your contacts at CRA-W, please consult the online directory on **www.cra.wallonie.be/fr/annuaire**.

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