



First calving: a tricky time for the dairy heifer in welfare terms

As far as welfare is concerned, cattle farming, often associated with grazing, enjoys a better public image than off-land livestock farming. Few cattle welfare recommendations have in fact been made, apart from transport and slaughter. The Standing Committee of the European Convention for the Protection of Animals kept for farming purposes recently presented a draft recommendation on cattle to the Council of Europe. CRA-W is keen to become involved in such research into dairy cattle and eager to develop farming systems designed to take account of both animal welfare and convenience for the farmer. To this end, the experimental cowshed has been fitted with a number of high definition cameras in order to monitor animal behaviour round the clock.

The research has just begun and is looking at the dairy heifer's first calving. This is a very stressful time for the young cow as it experiences huge changes in its environment within only a few days. Apart from the stress of giving birth itself, the heifer also soon joins the herd of mature cows, where it finds itself in a subordinate position. The more limited the space in the cowshed, the greater the rivalry will be between individual animals in the herd. The type of litter and feed may also be different; sometimes, the animal has to get used to new equipment, such as automatic concentrate feeders, drinking bowls, etc. The heifer will be handled much more by the farmer than during her

non-productive life and will also experience milking for the first time. All these potential sources of stress occur in the space of a few days and, moreover, are also accompanied by significant physiological changes. The animal's needs are no longer confined to maintenance and growth, but now also include milk production. We believe limiting stress for the animal at such critical times will get lactation off to a good start and, consequently, will optimise the entire production during the first lactation.

To this end it is advisable to accustom heifers to the herd of mature cows slightly before calving. In the initial trials, this technique will be compared with conventional husbandry methods. Stress in the milking parlour will be assessed by measuring salivary cortisol, while stress due to farming conditions will be gauged from the milk cortisol level. The effects of management techniques on production and mobilisation of body reserves at the beginning of lactation will also be studied. Finally, the animals' behaviour, their place in the cowshed, periods of rest and periods of activity and quantities of concentrate consumed will also be examined as parameters for assessment of the relevance of a period of adaptation to the herd prior to first calving.

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Determining the fatty acid pattern of milk by mid infrared spectroscopy (MIR)

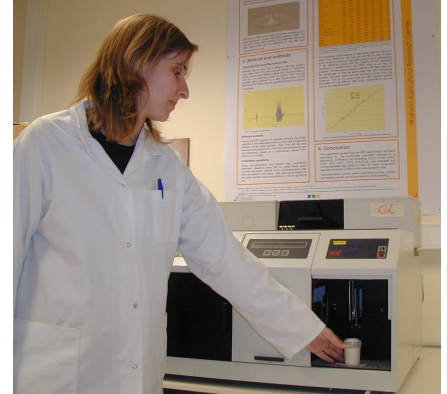
The growing interest generated by high nutritional quality products is increasingly prompting the dairy industry to look at various ways of altering the milk fat composition. Products rich in omega 3, omega 9 or conjugated linoleic acids have thus appeared on the market. Altering the fatty acid pattern also enables the physical properties of butterfat to be altered (as in the case of butter that spreads straight from the fridge). These products are obtained by adding synthetic fatty acids, by physical processes for splitting the fat or by natural enrichment (through animal feed, breeding techniques, etc.) In each case this involves analysis by gas chromatography (GC). This is the only method currently used to measure the fatty acid pattern. However, its use is limited by a number of major constraints: it is slow, it uses expensive, complex equipment and large quantities of organic solvents, and it requires skilled operators. For several reasons, in particular to reduce the costs and speed up the analyses, the possibility of

measuring the milk fat composition by an infrared method has been considered.

This work is the result of close cooperation between the Battice Milk Committee, Gembloux Agricultural University and the Walloon Agricultural Research Centre. Within this partnership the CRA-W team was specifically responsible for carrying out all the GC reference analyses and establishing the spectrometer calibration equations.

The results are very encouraging, enabling the fatty acid composition to be predicted from the MIR spectra of raw milk samples in more than 85% of cases. The MIR spectrometers currently used for routine milk analysis in order to determine the milk composition and basis of payment can be used without any need for adaptation. The MIR spectrometers can therefore be calibrated to study the fatty acid pattern of milk. This allows the possibility of larger-scale use of fatty acid pattern measurements in milk quality improvement

schemes, herd management and breeding programmes.



Milk sample analysed by mid infrared spectroscopy

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Obsolete pesticide stocks in Africa: the FAO has begun to defuse the bomb

Pests, in particular desert locusts, are a big threat to Africa's crops. Given the very real risk (threat of famine) associated with this problem, international solidarity has often been called into play. Insecticides have been donated both to the FAO and also to African countries, to assist with organising and implementing locust control. Unfortunately, some of the stockpiled pesticides are now obsolete. The FAO estimates the quantity concerned at 20,000 tonnes.

It has to be said that these pesticides are stored in less than ideal conditions and all too often are sold in the same place as food, thus endangering people's health. In most such cases the African countries concerned have no facilities for dealing with obsolete pesticides. The FAO is getting down to defusing this time bomb: the intention is to ship

out the obsolete products to approved firms in industrialised countries who will destroy them. First of all, though, the pesticides have to be checked to establish whether they are obsolete and recommendations made for the use of those that meet FAO specifications. Thanks to its formulation quality control expertise and in its capacity as an FAO reference laboratory, CRA-W has been appointed to check the conformity of pesticide stocks in thirteen African countries. This contract commenced in April 2007 and involves one engineer and one technician working full-time. We wish to emphasize the innovative nature of this approach, as obsolete pesticide stock quality control is an entirely new area.



Testing the physico-chemical properties (emulsion stability test) of obsolete FAO pesticide stocks in Africa

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Since 1994, the REQUASUD network has had at its disposal a centralised database into which the results of the analyses performed by the laboratories are fed each year. This database is managed by CRA-W. The database is used in order to summarise product or environmental quality at regional level. In the case of the soil sample database, for example, a brochure (http://www.requasud.be/broch_milieu.htm) has been published which gives reference values by agricultural region for physico-chemical soil characteristics such as pH_{KCl} , total organic carbon, available phosphorus, and so on.

In order to provide robust, reliable reference values, the first step has to be data validation and detection of outliers, that is, identification of values that appear to deviate unusually from the remainder of the set of data.

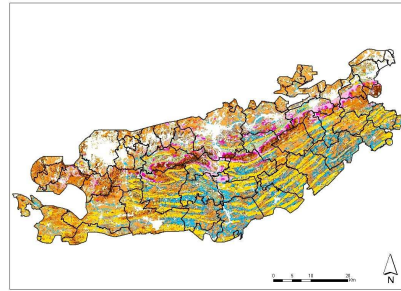
Outliers may be due to sampling quality or analysis quality or perhaps to errors in transcription of the results.

Detecting outliers is particularly relevant in soil chemical analysis, due to the frequent occurrence of extreme values associated with the high spatial variability of the pedological parameters and failure to pinpoint the sampling locations. One such example is the levels of available calcium in the Condroz region, which may vary considerably according to the nature of the soil substrate. Some high values for calcium may be considered normal in some areas, but discarded in others.

A comparison of soil analytical results with limit values estimated for homogeneous geographical areas thus offers a means of controlling whether the soil

analytical results are plausible.

From the SOILS database of REQUASUD, it was noted that in the case of some elements (e.g. calcium and magnesium) the frequency distributions of the soil analytical results are very dissymmetrical. Moreover, a mixture of distributions within a single geographical entity, due to the presence of various types of soil, occurs very frequently (Figure 1).

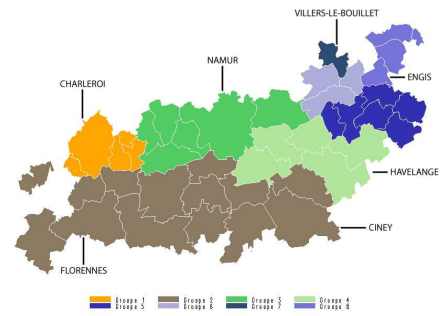


Communes (outlined in black) and main soil types in an agricultural region of Wallonia (Condroz). The spatial heterogeneity of soil types can increase the risk of outliers due to failure to pinpoint the sampling locations.

In this context, an original method for detecting outliers applicable to geographical databases has been developed by CRA-W and is described in a thesis (Planchon, V. 2007). On line at <http://bictel-fusagx.ulg.ac.be/>. This method allows limits of detection to be set for outliers based on an estimate of the extreme quantiles above and below which values are deemed to be outliers.

An initial estimate of limits of detection by elementary geographical entity is made in order to establish the optimum number of observations to be taken into account. Spatial classification then allows grouping of contiguous homoge-

nous entities in order to establish limit values that can be considered reliable (Figure 2).



Limits of detection of outliers: formation of 8 groups of homogenous spatial entities for carbon in the Condroz region.

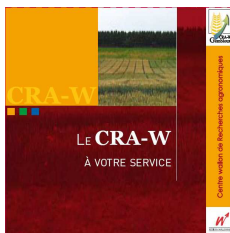
Potential applications for the method developed lie in the fields of management and quality monitoring of spatially referenced databases. Specifically, in the context of setting up laboratory quality systems (ISO 17025), it might be advantageous for the laboratories to have limits of detection at their disposal from which it can be determined, at the laboratory itself, whether a value is consistent in relation to the sampling environment.

Doctoral These

Planchon, V. 2007. *Détection de valeurs aberrantes dans des mélanges de distributions dissymétriques pour des ensembles de données avec contraintes spatiales*. Gembloux, Belgium, Gembloux Agricultural University, 237 pp.

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CRA-W at your service



In parallel to its scientific research activities, CRA-W has for a long time provided a range of services and advice for the industry and for the general public. These services cover various areas

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Management and development of Franco-Walloon fruit tree biodiversity



INTERREG III “Cross-border fruit tree genetic resources and biodiversity” is a Community initiative under the European Regional Development Fund (ERDF). This programme aims to promote cooperation and strengthen economic and social cohesion between the regions of the European Union. In this context CRA-W and the Regional Genetic Resources Centre of the Nord-Pas de Calais Regional Nature Reserve at Villeneuve d’Ascq have been working together on a joint project for three years now.

The fruit tree collections of old varieties of apple, pear, plum, cherry, peach and grape held at Villeneuve d’Ascq and Gembloux are among the richest in Europe, in terms of both the impressive number of introductions and the often “peasant farm” origin of the accessions. Moreover, the old variety assessment and valorisation methods employed by the two organisations are currently regarded as a benchmark at European level.

As the sphere of influence of domestic species extends well beyond political frontiers, some varieties clearly share common features on both sides of the border.

Under the impetus of INTERREG, cross-border cooperative links thus began to be forged, based on exchanges of information and the search for complementary technical and operational features. The main fruits concerned are apples and pears.

The project objectives are arranged into two main directions of work. The first of these aims to bring the two institutions structurally closer with a view to merging the two collections in the medium term. Work undertaken to this end involves harmonising

working methods, comparing the material in the respective collections in order to validate the identity of the varieties and identify duplicates and creating a common database structure to serve as a collection management and rationalisation tool.

The second line of work is concerned with the economic and educational development of fruit tree genetic resources by promoting new activities: development of quality products grown in cross-border areas, development of quality fruit trees that are hardy, with very low disease susceptibility, joint organisation of training (pruning, grafting, etc.), production of cross-border teaching materials, setting up of experimental plots and introduction of a cross-border programme for the breeding of new pear varieties.

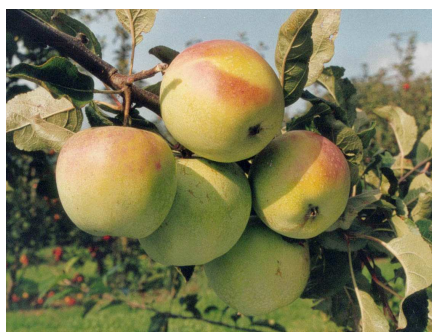
The results of this project (due to end on 31st December 2007) are:

- Harmonisation of working methods (assessment and description of old varieties) and first stages in common management of the two regional fruit tree genetic resource institutions with a view to future merger
- Gradual pooling of cross-border fruit tree genetic resources
- Gradual rationalisation of the collections and scheduling of variety identification seminars
- Creation of a common database structure and incorporation of a photo library of varieties from the two partners (more than 1,300 laboratory pictures of apples, pears, plums and cherries as well as a large series of orchard fruits)

- Extension of cross-border partnerships with economic players
- More varieties available for nurserymen and fruit growers seeking to diversify
- Stimulation of the rural environment
- Establishment of two cross-border pilot experimental plots to support the opening up of new commercial outlets to promote fruit diversity
- Joint undertaking of more than 100 pear crosses and creation of nearly 5,000 pear tree hybrids analysed for their disease resistance
- Cross-border events for the general public (such as POMEXPO), technical seminars for the industry (nurserymen, processors and gardening contractors) and demonstrations fronted by cross-border players
- Joint analyses of the ploidy of pear varieties and total polyphenol content.

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‘Président Henry Van Dievoet’^{RGF}, –
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Laboratory picture of ‘Beurre Superfin’



Cross-border seminar on the description of fruit tree architecture

23-25 January 2008, AGROSTAT 2008, 10th European Symposium on Statistical Methods for the Food Industry

Louvain-la-Neuve

http://www.stat.ucl.ac.be/Agrostat2008/index_eng.html

23 January 2008, 13th Animal Production Forum
Question mark over ruminant farming: truths and untruths

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