REQUACARTO : an integrated analysis focus and soil condition monitoring system for Wallonia

Sustainable agricultural soil management depends upon continuous assessment of soil fertility and productive, or crop-growing, ability. Soil analysis contributes to this and forms the basis of the agricultural diagnosis of a plot of land. However, it is essential for the sample to be representative of the plot studied. Otherwise, any analytical result, no matter how accurate

At plot level, the main difficulty facing the sampler is to identify the pedological criteria which are, after all, essential in order to assess fertilisation recommendations.

At regional level the problem is to establish subregional specifications as an aid to agricultural diagnosis.

Accordingly, CRA-W has developed a spatial decision support system (sDSS) to facilitate quality sampling with a view to making customised fertilisation recommendations and monitoring the condition of agricultural soil. This tool is accessible via the REQUACARTO geoportal (http://requacarto.cra.wallonie.be).

REQUACARTO is part of a data processing infrastructure comprising a set of servers. Interactions take place and data are exchanged via services which comply with system interoperability standards. The functions associated with plot identification, interpreting soil abbreviations and determining sampling areas are accessible via Web-XML services according to W3C standards.

Some of the information, and consequently some of the associated services, are spatial. In this respect the tool is based on the recommendations of the Open Geospatial Consortium - OGC and implementation of the European INSPIRE Directive (2007/2/EC). Geographical information is distributed by WMS (Web Map Services) and WFS (Web Feature Service) services which provide dynamic mapping in the form of georeferenced images or vector files. A geocoding service has also been implemented to enable a user to locate a plot from an address, district or geographical coordinates.

The REQUACARTO sDSS has been operational since March 2009. It was designed in close cooperation with the REQUASUD network laboratories to facilitate routine use. It enables the sampler to comply with standard recommendations, perform representative sampling and obtain relevant information for fertilisation advice. Lastly, it enables information held in the REQUASUD databases to be utilised to monitor agricultural soil fertility in Wallonia.

This project is financed by SPW, REQUASUD and CRA-W

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ASBL REQUAUSD

Open day at the Production and Sectors Department's experimental farm

On 13 March 2011 CRA-W's Production and Sectors Department threw open its doors to the general public. More than 1,500 people, from laymen to professional breeders and including representatives of the regional administration and local politics, were eager to see round the Department's showcase workshops and tour the experimental facilities. The event was aimed at extending topics like sustainability and environmental impacts, farming's image, herd and pasture performance and management, food composition, maintaining biodiversity and animal welfare and agricultural mechanisation. Apart from the 'exploration' aspect, games and a children's workshop were laid on to entertain visiting families. On this occasion the Director-General of CRA-W and faculty colleagues paid tribute to the brilliant career and professionalism of Ms Nicole Bartiaux-Thill, Head of Department, who retired on 28 February 2011.

CRA-W AGENDA

22 – 25 July 2011
LIBRAMONT AGRICULTURAL FAIR
Come and see the CRA-W stand at Walexpo :
lots of activities, presentation of CRA-W's work, competition
Contact : Geneviève Minne,
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30 November 2011
11th PORK AND POULTRY PRODUCTS SEMINAR
Espace Senghor, Gembloux
Contact : Geneviève Minne,
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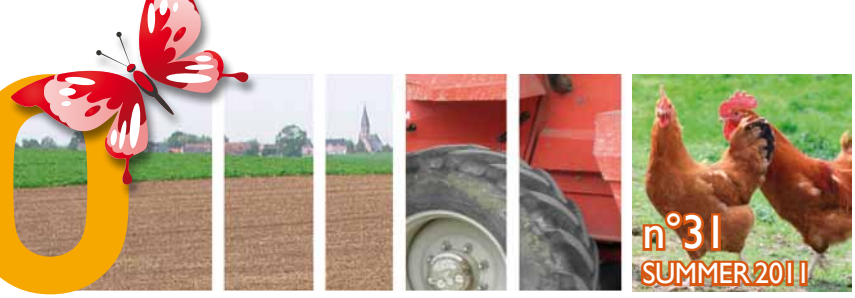
CRA-W INFO



PERIODICAL PUBLISHED BY THE WALLOON AGRICULTURAL RESEARCH CENTER

First calving at 24 months on our dairy farms : win-win situation for the farmer !

The main aim of the research was to identify the effects of early first calving on cows' lifetime milk production. The study examined a database supplied by the Walloon Livestock Farming Association containing data on more than 400,000 cows that first calved between 1990 and 2010. The analysis showed that animals which calved at between 22 and 26 months achieved the best milk production, both at the first and second lactation and in terms of lifetime performance. Calving before 22 months led to a drop in production of about 700 l at the first lactation, whereas later calving steadily reduced lifetime production, resulting in a milk loss of up to 6,000 litres in the case of heifers first calving at between 38 and 42 months. The number of days' lactation was maximised in those that calved before 26 months (1287 days), whereas the age at culling rose with the first calving age. Early calvers therefore produce more milk in a shorter time, and that has a significant impact in economic terms for the farmer. In the rearing phase alone, calving at 24 months rather than the regional average of 30 months results in a saving of Đ 150/head, not counting the working time.

The study also showed that only 74% of the animals reared reached a second lactation. This is a critical point which will need to be improved in future. Milk production is higher with summer and autumn calving, no doubt because winter feed is better controlled during the productive phase. Finally, the cows that first calved between 2000 and 2004 produced 10,000 litres more milk in their lifetimes than those which calved between 1990 and 1994. This difference points up the considerable genetic and technical improvements of the last few years.

Research subsidised by SPW, Department of Agriculture, Natural Resources and the Environment, Development and Extension Section.

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Cutting-edge technologies for pesticide impurity analysis

CRA-W was certified GLP (Good Laboratory Practice) in 1994 for physico-chemical studies of plant protection products and biocides. Among other things, such studies include determining the impurity content of technical compounds and formulations. There are two kinds of impurity: firstly, by-products from the manufacture of the active substance or deriving from the active substance during formulation or storage and, secondly, derivatives of formulation additives such as solvents (methanol, toluene, and so forth,...).

Identifying and analysing impurities is sometimes a bit of a headache, as there can be as many impurities as there are ingredients in a formulation and manufacturing processes. Impurities therefore vary from one formulation to another, and they are also subject to confidentiality.

All impurities occurring at contents greater than 1 g/kg of active substance and all relevant impurities irrespective of content need to be determined. Relevant impurities are those that are more toxic from a health and/or environmental point of view than the active substance or that affect the stability of the formulated product. Water, for instance, may be considered an impurity in some products. The FAO (Food and Agriculture Organization of the United Nations) and/or WHO (World Health Organization) specifications and the European authorities establish legal limits and list the impurities that must be determined.

An analytical method has to be developed and validated for the purpose. The validation parameters are defined, in particular, at European level by the Directorate General for Health and Consumer Policy (SANCO Directive 3030/99). These parameters are specificity and non-interference, linearity, limit of quantification (LOQ), accuracy (recovery at different levels) and repeatability.

Liquid or gas chromatography methods coupled with conventional detectors (UV, UV/DAD or FID, ECD, NPD, respectively) are still routinely used. However, new cutting-edge techniques using mass spectrometry for detection (GC-MS, GC-MS/MS and UHPLC-MS, UHPLC-MS/MS) are frequently used to back up non-specific detectors in confirming the identity of the substances determined. They also have the advantage of achieving very low sensitivity levels (traces). They thus reveal previously undetectable impurities. Accordingly, in order to ensure that plant protection products are safe, CRA-W has recently invested in latest generation equipment.

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Vegetable crops and nitrogen fertilizers can live in harmony... if the will is there !

Due to their special features (short cycle, shallow root systems), field market garden crops tend to receive excessive nitrogen fertilisation. This practice, together with frequent application of organic matter, enriches the soil with mineral nitrogen in market garden rotations and increases the risk of nitrate pollution of ground and surface water. Product quality may also be affected, with vegetables having a high nitrate content.

Under the project 'Producing fresh vegetables of specific quality (differentiated or undifferentiated) in the context of sustainable agriculture in Wallonia', in order to provide market gardeners with solutions, several approaches to nitrogen management were tested between 2005 and 2010 in a number of trials involving four market garden crops (carrots, escarole, fine curly endive and Welsh onions).

Manually harvesting Welsh onions.

The first approach aimed to provide plot-specific nitrogen fertilisation recommendations with the aid of the Azobil software (INRA, Laon, France), based on the nitrogen balance method. Azobil proved effective in Wallonia in determining nitrogen fertilizer rates in field crops. However, the results with market garden crops showed that using Azobil on its own is not sufficient to solve the excess nitrogen problem in market garden rotations stricto sensu (several successive vegetable crops in the same year). The net mineralisation estimated by the software in fact differed considerably from that assessed subsequently. Sizeable quantities of organic matter entering the soil via livestock farming effluents and incomplete harvesting, where a large number of unmarketable plants are often left in the field and ploughed back into

This indicates a need for more sophisticated nitrogen management strategies, such as split applications, when nitrogen fertilizer is applied at a lower rate at sowing or planting followed by one or more further applications later in the growing season. Kinetic plant nitrogen uptake measurements in these four crops enabled the periods of intense uptake which are most propitious for such additional applications to be targeted. Following arbitrary nitrogen supplementation a slight positive effect on crop yield was noted in the case of fine curly endive and Welsh onion. The usefulness of plant (chlorophyll meter and nitrate content) and soil (Zenit® system) nitrogen status assessment tools was studied with a view to adapting the timing of the supplementary applications. Limits were thus established below which supplementation is necessary.

In the context of a rotation-level approach, field intercrop management trials were also conducted for vegetable crops in mixed rotations with field crops. Introducing rye (before Welsh onion) or winter wheat (before escarole) as a nitrogen catch crop

In conclusion, managing nitrogen fertilisation in market garden crops requires a total crop approach combining several complementary practices in order to effectively combine their individual effects.

For further details see the project sheet :
http ://www.cra.wallonie.be/index.php?page=19&id=134

Project subsidised by the Regional Government of Wallonia, Department of Agriculture, Natural Resources and the Environment, Research Department (D31), agreement D31/1194

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A joint, voluntary initiative to improve farm management

Europe's farmers need to assess and improve their practices if they are to develop in line with society's many and various expectations and ensure their own survival. Against that background, the Interreg DurAgr'ISO14001 project aims to put in place a transregional farm sustainability management initiative, based on environmental certification.

This three-year project got under way in March 2009 and covers three regions of France and Belgium: Picardy, Wallonia and Western Flanders.

The first step was to assess tools available to support farmers in this context. As regards environmental certification, the Terr'Avenir scheme, launched in Picardy and resulting in the certification of an association of French farms, appears the most appropriate in that it was conceived by farmers looking for communication tools and also in view of its successful development. The scheme is based, firstly, on the use of computer tools accessible via a common portal, with a reliable data processing architecture including, in particular, the immediate production of a personal plan of action based on an environmental diagnosis and assessment of compliance with the regulations, which is a requirement for certification, and, secondly, on ongoing training enabling farmers to take the scheme forward.

Adaptation of this scheme to the Belgian context and translation of the tools into Dutch is currently in progress, with Walloon and Flemish pilot groups of about ten farmers per group.

Another reason for taking a group approach is to try to 'resocialise' farmers whose work takes up so much of their time and energy that they often lose touch with the rest of society. As well as pooling costs, group working enables all the farmers to benefit from one another's input.

As part of the adaptation process, a regulations monitoring scheme has also been set up in step with changing local administrative requirements.

In terms of sustainability, various methods have been assessed, including IDEA and MOTIFS (tools based on recognised indicator calculators). However, assessing sustainability via indicators produces a picture of a farm at a given time, with the choice of indicators depending either on the photographer or on the aim pursued. That choice is therefore always slanted, sometimes aiming to quantify mastery of technical practices and sometimes, an overall assessment of the farm. When designing the scheme it is important to have access to a database of recognised indicators, but it appears difficult to establish these without defining aims. That being so, understanding both the environmental and the economic and social aspects (pillars of sustainability) may require a new way of quantifying and managing them. Accordingly,

The first pilot group of Walloon farmers tours an ISO14001 certified French farm

the project partners have chosen the ISO26000 standard, which provides guidance to organisations on social responsibility, as a basis for developing the methodology most suited to sustainability. A cross-border think tank was set up in 2010 with workshops bringing together representatives of the partners from the three participating regions and a pilot group of farmers already ISO14001 certified, with the necessary objectivity to take part in defining this notion of social responsibility in agriculture before integrating it in order to improve their own practices.

Within the framework of this project a seminar entitled 'Farming practices with a high ecological value: Dialogue between farmers and researchers' was held on 9 June to give farmers and researchers the opportunity to meet on the ground and share their respective expertise in order to plan the more environmentally friendly agriculture of the future.

This project is coordinated by CRA-W and draws on the expertise of Proclam and PIVAL in Flanders, FUGEA and PNPC in Wallonia, and PeriG and Terr'Avenir Picardie in France. It is funded under the INTERREG IV France-Wallonie-Vlaanderen programme by the European Union (ERDF), the Regional Government of Wallonia, the Province of Western Flanders, ADEME and the Picardy Region.

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CRA-W comes to the aid of traditional Walloon poultry breeds

Belgium is one of the most diversified countries in Europe in terms of traditional poultry breeds. There are currently 39. According to the 2005 FAO classification, 65% of those breeds are under a critical status, 31% are endangered. 4% are out of danger.

Figures published by FACW, the Walloon poultry and rabbit industry association, show that Wallonia's poultry production currently represents 18% of the Belgian total, namely around 20 million chickens, 2 million of which are produced by the four differentiated production methods. And demand is increasing.

Against this background, in March 2011 CRA-W launched a project supported by the Regional Government of Wallonia entitled 'Developing traditional poultry breeds by genetic restoration with the aim of supplying the market with a typical product'. The objectives of the project are:

- To maintain Wallonia's traditional poultry breeds;
- To develop production methods aimed at marketing typical products.

In the first year of the project the breed inventory will be updated so that current data are available. Surveys will be conducted with breeders' associations and with amateur and professional breeders.

Based on the inventory, short-term (controlled reproduction by breeders and at reference farms) and long-term (cryobank) conservation measures will be established and production methods developed. CRA-W's role as a research center will be to coordinate the breed conservation's activities and valuing activities of these breeds.

Besides maintaining genetic diversity, this project is a secondary agricultural development and can contribute to an added value to tourism.

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