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NEW EUROPEAN ANIMAL FEED REGULATION

CRA-W's role in the controlled reintroduction of animal proteins in farming

Regulation (EU) No. 51/2013 describing the methods of analysis for the determination of constituents of animal origin for the official control of feed was published in the Official Journal of the European Union on 23 January 2013. Annex VI to the Regulation was drafted in consultation with the European Union Reference Laboratory for Animal Proteins in feedingstuffs (EURL-AP) operated by CRA-W. It is the result of the work begun in 2008 by CRA-W and its European partners, the national reference laboratories, after inter-laboratory studies had established the limits of light microscopy.

The Regulation requires a revised, improved, standardised light microscopy method and the use of PCR to identify the species origin of animal proteins. The European Commission has gone for a regulation which is readily adaptable to the phased reintroduction of animal proteins and market circumstances. The Regulation refers to Standard Operating Procedures (SOP) published on the EURL-AP site (http://eurl.craw.eu). These SOP provide the control laboratories with information about the analytical protocols in force. The microscopy – PCR combination will be used according to the end-use of the components or compound feed (ruminants, pigs, poultry or farmed fish) and the analysis will be targeted and more reliable than in the past.

From 1 June 2013 the implementation of this Regulation will support the scheduled reintroduction by the European authorities of processed animal proteins into farmed fish feed. This is in no way an obligation, but merely the option of using such proteins. The possibility of using this alternative to plant and fish proteins has been positively assessed by the European Food Safety Authority (EFSA). However, reliable analytical methods were a prerequisite for such a decision in order, in particular, to prevent adulteration. The methods having been validated by the EURL-AP, the requirements are thus fulfilled. The new Regulation will therefore facilitate detection and accurate identification of constituents of animal origin for the industry while at the same time promoting farm animal health and consumer health. As a side-effect it should also make the European Union more independent as regards proteins.

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WEED CONTROL: IS A LOWER SPRAY RATE COMPATIBLE WITH EFFECTIVE TREATMENT?

Although the average volume (applied to field crops) in Belgium stands at 150 to 200 litres/hectare, the trend is a downward one. Reduction in fact improves the work output and application speed. That makes it easier for the operator to treat at the right time, which may be a deciding factor in the success of a treatment.

However, this reduction of the volume per hectare is altering the quality of the spray deposits, which could impair their biological effectiveness. Since 2010 CRA-W has been experimenting with reducing the volume per hectare in cereal weed control (from 200 to 100 or 50 l/ha) with the aim of determining the limits according to the mode of action of the plant protection product (contact or systemic), the nozzle type (conventional flat-fan or anti-drift air induced) and the weather conditions (relative humidity and temperature). A secondary aim of the study was to determine the necessary and sufficient characteristics of the spray deposit for satisfactory biological effectiveness.

When spraying a systemic product the biological effectiveness is more or less independent of the volume applied per hectare or the nozzle type. With this kind of product the spray rate can therefore be brought down to 100 l/ha or even lower without too many problems. It should be noted, however, that the effectiveness drops by 95 to 89% when the volume/hectare is only 50 l/ha.

The results clearly showed a sharp reduction for the contact treatment at the lowest volume. It was shown that no matter what type of nozzle was used, applying a contact product at 50 l/ha did not result in high biological effectiveness. Using conventional flat-fan nozzles can partly counteract this drawback, increasing the average effectiveness to 93% at 100 l/ha.

As regards the deposit characteristics, the coverage (%) is a direct function of the volume per hectare applied. The density and size of the impacting droplets, on the other hand, depend more on the nozzle type and size. The two types of nozzle studied responded quite differently to a lower volume per hectare. Whereas the size of the impacting droplets delivered by the air induced nozzle remained constant and the density decreased with the volume/hectare, the conventional flat-fan nozzle produced more droplets but of smaller size. This difference in behaviour has implications for the biological effectiveness of the product and accounts for the fact that the conventional nozzle maintains contact treatment effectiveness at volumes of 100 l/ha, in contrast to the air induced nozzle.

Finally, the study showed that temperature and relative humidity do not impact significantly on the coverage, but they do affect the droplet size.

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THE ORANGE WHEAT BLOSSOM MIDGE: A BIOLOGICAL MODEL FOR STUDYING OTHER PEST MIDGES

Of two pest midges studied, one follows and the other deviates from the emergence model developed for the orange wheat blossom midge.

The orange wheat blossom midge is a cereal pest which CRA-W has been studying since 2005. The larvae feed on the grain and can cause severe yield and quality loss. The extent of the damage depends on the intensity of the flights and their coincidence with the sensitive stages of the cereals. Both factors vary greatly from year to year and from one variety to another. A predictive model for the adult emergence period, a key factor in defining the risk to agriculture, has been built and has been used to limit both the risk and systematic insecticide treatments. This model is considered valid not only for the orange wheat blossom midge but also for its main natural enemy, Macroglenes penetrans, a parasitic wasp which plays a key role in the natural control of this pest.

Research in the spring of 2012 tested the model for the orange wheat blossom midge and its parasitoids on two other midges that are field crop pests: the saddle gall midge, which has ravaged cereal crops in the polders since 2010, and the brassica pod midge, which caused serious damage in oilseed rape in 2011. This showed that the two test subjects behaved in very different ways, with the saddle gall midge emerging in accordance with the same type of model as the orange wheat blossom midge, whereas brassica pod midge emergence appears to follow quite a different model.

Developing such models for predicting the emergence of gall midge pests is a vital weapon in integrated pest management as farmers can thus be specifically alerted. These recommendations by CADCO, the cereal and oilseed crop development centre, and LCG (Landbouwcentrum Granen Vlaanderen) may take the form of warnings or agricultural advice for managing the gall midge risk.

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ONE SUGAR LUMP IN 10 OLYMPIC SWIMMING POOLS...

Detecting 5 grams of substance dissolved in more than 30 million liters ! The latest chromatography coupled with mass spectrometry techniques enable the CRA-W laboratories to quantify pesticides and their metabolites at trace level.

Pesticide determination by gas chromatography coupled with tandem mass spectrometry (MS/MS).

Progress in pesticide determination is associated with the development of chromatographic and detection techniques. In the nineteen-nineties, coupling of mass spectrometry to gas and liquid chromatography revolutionised analysis and became the method of choice for laboratories.

With such a system the substance of interest is first ionised (charged) after chromatographic separation. The ion or ions produced is/are then selected on the basis of their mass/charge ratio in an analyser before detection in the form of a signal, the intensity of which is proportional to the number of ions. Detection by mass spectrometry is almost universal and its ability to isolate and/or separate the ions gives it a unique specificity and sensitivity. Tandem mass detectors (MS/MS, MSn) combine successive fragmentations and selections, and that considerably increases the specificity, a crucial factor when analysing complex samples.

At the CRA-W laboratories this technology is coupled to gas chromatography (GC-MS/MS) and to ultra high performance liquid chromatography (UHPLC-MS/MS, MSn). These tools are used in work aimed at underpinning the development of sustainable agriculture and reducing the risks of pesticide use for human health and the environment. The analyses support research in such areas as using innovative formulations as a way of reducing pesticides or qualitative differentiation between conventional and organic farming. As part of its service activities CRA-W also performs pesticide analyses for the purpose of determining maximum residue limits (MRLs) in crops and, in cooperation with the vegetable growing sector, developing plant protection strategies that generate fewer pesticide residues in order to comply with baby food standards. These analytical methods are also used in research aimed at preventing surface water pollution by pesticides. An emerging area where these analytical tools are proving valuable is the analysis of toxic impurities in pesticide formulations.

In the hands of CRA-W's highly skilled staff these advanced techniques enable the Centre's laboratories to do their work and to be geared up for the many challenges ahead, in particular the new requirements concerning pesticide residues and including potentially toxic metabolites in health risk management. Environmental analyses (soil, water and air) and alternatives to synthetic pesticides (biomolecules) are other topics on which the teams are hard at work.

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19TH CARREFOUR DES PRODUCTIONS ANIMALES : SUCCESSFUL

How can our dairy farms be optimised? What fresh approaches can be developed to ensure their sustainability in an economic context characterised by extremely volatile prices? These were the questions asked at this day which was attended by more than 180 people in February 2013.

Research may not have all the answers, but it can open up avenues, especially since farm surveys have shown that there is room for progress in terms of managing input (fertilizer, feed, etc.) and herd management. Several ways of increasing dairy farm income can be explored, bearing in mind that together they generally improve the farms' environmental impact.

Making better use of pasture as a feed source, either in extensive systems with mixed cattle or in more intensive systems using a milking robot on grazing cows, is a priority in Wallonia where about half of the utilised agricultural area is grassland.

More effective utilisation of locally produced high-protein feed (cereals, oilseed plants, various co-products) and fodder is also essential or even a must in organic farming in order to increase feed self-sufficiency and system performance.

Cost management also means promoting early calving and shortening the heifers' non-productive period as well as managing the use of cattle pesticides correctly.

Other factors that contribute to making a farm more profitable are environmental protection, minimising nitrogen excretions and greenhouse gas emission (including methane), and precise management of farmyard manure (cutting fertilisation costs).

Milk processing, either on the farm or at an industrial dairy, is also critical to boosting farm profitability. The milk therefore has to be of the best possible quality and this has to be evidence-based using analytical tools (rapid near and mid infrared spectrometry techniques). Such tools are also useful for assessing animal performance and the efficiency of feeding methods, even online.

The data generated by these tools and from milk recording will be used to create databases for identification of interesting genetics and the most efficient herd management methods. This is a major step towards precision dairy farming.

Finally, the hard work that a dairy farm demands is still a critical factor for sustainability, as our farmers have attested. It needs to be clearly understood that the more milking is automated and the more data have to be processed and applied, the more supervision is required and that calls for brainwork, which may in fact be more stressful than physical work.

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VEGETABLE GROWING FOR THE FRESH MARKET STILL HAS A GOOD FUTURE IN WALLONIA!

CRA-W's work on managing nitrogen fertilization of vegetables for the fresh market in Wallonia has thrown up some interesting pointers for growers with a view to productivity and environmental soundness.

Lettuce growing, showing the diversity often found within a single plot

Curly endive production

Carrot growing

The lessons learned from research carried on at CRA-W from 2005 to 2010 to matchnitrogen fertilization to the N requirements of vegetable crops for the fresh market revealed a need for an in-depth review of nitrogen fertilization in this sector generally. A complementary approach was therefore introduced with the following two-pronged objective:

1) describing the sector in relation to all aspects related to nitrogen fertilization and its environmental impacts (in particular, the risks of water pollution by nitrate);
2) identifying and recommending good practices enabling market gardeners to hit the lowest possible mineral nitrogen residue levels in autumn after harvesting.

This project was supported by all the sector supervisory organisations in Wallonia.

After making an inventory of all the market gardens in Wallonia (237) and selecting a representative group (37), a soil sampling and analysis campaign was carried out from November 2011 to March 2012 on 51 market garden plots to determine the mineral nitrogen content of the post-harvest soil profile. This approach was supplemented by very detailed surveys in 2009, 2010 and 2011 of the soil, agricultural and crop characteristics on the sample farms and plots in order to identify variables to account for the measured mineral nitrogen content.

The mineral nitrogen residues measured in the 51 plots varied from 10 kg mineral nitrogenha-1to 352 kg ha-1 over a depth of 0 to 90 cm. This very wide spread of mineral nitrogen content within the group of plots concerned formed an ideal basis for the study aims.

It was found that the species grown did not explain the residue levels. On the other hand, the residues increased markedly with the total synthetic mineral nitrogen fertilizer applied in the last two years. The market gardens that only applied mineral fertilizers had the highest values, whereas those that used only farmyard manure showed perceptibly lower values. In particular, the exclusive use of organic compound fertilizers resulted in very low residue levels. Along with this finding, those market gardens certified as practising organic farming, and those using short marketing channels, had the lowest residue values comparatively with conventional enterprises. Among the latter, those that were Global GAP and IQM certified nevertheless had lower residues than the others.

With regard to other cultural methods, factors promoting low residue levels were found to be: no-till compared with annual tillage, multiple pass rather than single pass mechanical weed control, not splitting mineral fertilizer applications, maximum soil cover during the growing year, and not irrigated crops.

This set of findings opens up interesting ways forward for both growers and researchers, looking at combinations of cultural practices for managing nitrogen fertilization in vegetables for the fresh market in Wallonia, via organic farming in particular but also in conventional production.

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AGENDA

1 Juin – 26 Juillet

26 - 29 July 2013
LIBRAMONT AGRICULTURAL FAIR
CRA-W will be at Libramont Fair with the Mechanical Show, the CRA-W stand and the third Farm of the Future conference.
On Friday 26 July at 13.30, 'Ecologically Intensive Orchard Management'.