

Towards a fifth year of spectroscopy and chemometrics training at CRA-W

As part of the TRACE project on food product origin traceability and notably the development of authentication methods, in 2007, 2008 and 2009 CRA-W arranged a week's training in vibrational spectroscopy and chemometrics. Encouraged by the success of these training courses CRA-W continued along the same lines, without the support of TRACE, by holding a training course in March 2010 for the fourth consecutive year. The aim of this annual training course is to provide a complete description of the theoretical and practical aspects of these techniques. Over the four years more than 60 participants from different European countries who work in various research fields have attended the courses. The annual post-training assessments showed that the information provided at the sessions is relevant and useful for the participants' needs, either for their research work or for routine analyses. Positive ratings for the organisation, the trainers' knowledge-imparting skills and the quality of the resources used and the laboratory facilities

have resulted in an annual increase in participant numbers. Consequently, CRA-W will hold another week's training in February 2011.

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My name is Tamara[®], I'm from the Czech Republic and I want to try my luck in Belgium ...



14 new cherry variety data sheets have been published this spring. These varieties come from different breeders in Europe (France, Italy, Czech Republic, Hungary) and North America (Canada).

They either already have a name, some protected and some not (Justyna[®], FerminaCOV, Sweet Early[®], Horka[®], Tamara[®],

Staccato[®], SovereignTM, Adelka, Margit), or are still known by their accession number (13S-51-14, S 54-16, Vc 16/126, Vc 21/47, SPC 104).

For at least three years of fruit production CRA-W has observed these new varieties from an identification and classification and a taste point of view in order to identify the ones that suit our pedoclimatic conditions and meet Belgian commercial requirements.

Despite pronounced susceptibility to fruit cracking, some of these varieties have interesting characteristics. Adelka, for instance, is a very early maturing variety (10 days before Burlat) but the fruit is small and lacks firmness. Staccato[®] and SovereignTM on the other hand ripen very late (45 days after Burlat, i.e. early August), but the fruit is thus vulnerable to wasp attack. Their slow growth also makes them highly susceptible to rot. Tamara[®] produces big dark fruit weighing 12 grams which is very firm but at the same time has a cracking susceptibility rate of nearly 80%.

These data sheets are added to the published list ('The Cherry in Intensive Orchards', 147 data sheets) and sent out to the holders of earlier lists. For details of how to order this list go to <http://www.cra.wallonie.be/index.php?page=52&id=5>. See also: <http://www.cra.wallonie.be/index.php?page=19&id=200>

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CRA-W AGENDA

19 - 22 June 2010

Feeding the World in a Sustainable Way
Informative exhibition in cooperation with Gembloux Agro Bio Tech
Contact : Communications Service, communication@cra.wallonie.be

27 July 2010

Grass Seminar
In cooperation with Libramont Agricultural Fair
Contact : Olivier Miserque, miserque@cra.wallonie.be

13 October 2010

Pork and Poultry Products Seminar
Tenth seminar in the series
Contact : Communications Service, communication@cra.wallonie.be

CRA-W INFO

PERIODICAL PUBLISHED BY THE WALLOON AGRICULTURAL RESEARCH CENTER

Chlorophyll fluorescence: a plant health indicator



In an increasingly restrictive environmental, economic and technical context it is essential to contribute to making nitrogen mineral fertilizers more efficient by matching applications more precisely to the crops' actual needs as assessed during the season. In practice, excess nitrogen fertilizer application makes the crop less profitable. It also leads to environmentally detrimental nitrogen losses by run-off or leaching in the form of nitrate (NO₃ in water), volatilisation in the form of ammonia (NH₃, an acidifying gas) and/or denitrification in the form of nitrogen protoxide (N₂O, a greenhouse gas). To attain the aim of balancing nitrogen demand and supply, various tools for diagnosing the crop nitrogen status during the growing season have been developed or are under study.

Among these tools, leaf chlorophyll fluorescence measurement has been developed in the past ten years to provide earlier and more detailed information on crop health in particular. Fluorescence permits an indirect estimate of leaf polyphenol content. Polyphenols are secondary metabolites that occur naturally in concentrations varying in response to plant stresses.

The specific polyphenols involved in assessing a crop's nitrogen status are flavonoids. Their concentration in the leaves increases with plant nitrogen deficiency. Compared with the long-established method of measuring leaf chlorophyll concentration, which is also proportional and very closely linked to the nitrogen concentration, estimating the flavonoid concentration is an earlier and more sensitive nitrogen stress indicator which can be used even

before the photosynthesis has been affected by nitrogen deficiency. Two new, easy to use instruments for non-destructive, direct field measurement of chlorophyll fluorescence in crops have been developed and marketed by Force A, a University of Paris-Orsay spin-off (Paris, France): Dualex and Multiplex.

Work on a doctoral thesis on this topic began at CRA-W in the spring of 2009. The main aim of this research is to assess the potential of the two machines for determining the nitrogen status of potato crops. The new tools will be compared with other optical tools for the same purpose already examined at CRA-W, such as the chlorophyll meter, the portable radiometer or data obtained from satellite images at agricultural parcel level.

The practical aim of the research is to integrate these optical data into decision support systems used to assess the need for nitrogen supplementation during the growing season. Ultimately, split nitrogen application management should make the mineral nitrogen fertilizers applied to the crop more efficient and thus minimise their potential adverse effect on the environment.



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Faecal analysis by NIRS, a tool for managing grazing dairy cows' feed*



Dairy farming remains economically significant. Its sustainability depends on better control of production costs, including feed. Although grass is cheap, few milk is produced from grazing in Wallonia nowadays. One reason for this under-use of pasture could be the difficulty of quantifying both the nutritional value and the quantities of grass consumed. The available methods for estimating these parameters are often difficult to apply to grazing. While some of them are based on measuring the amount of grass consumed during grazing and can be used at herd level only, other methods estimate intake using parameters such as animal performance (potential milk production) and the characteristics of the diet, or assess digestibility and/or intake either from animal behaviour studies or from analysis of a faecal component (nitrogen, indigestible markers, etc.). These methods provide an estimate at animal level. Near infrared spectrometry (NIRS) has developed considerably in the last twenty years. In particular, NIRS analysis of forage enables the nutritional value of grazed grass to be rapidly characterised. More recently, several studies have confirmed the

potential of NIRS analysis of faeces for estimating digestibility and the intake of grass-fed ruminants. In most cases the NIRS databases are composed of faeces from exclusively grass-fed animals and little is available in the way of data on supplemented grazing dairy cattle.

The study set out to confirm the potential of NIRS faecal analysis for estimating the in vivo digestibility of organic matter (G-OMD) and quantities of grass dry matter (G-DMI) consumed by supplemented grazing dairy cattle. In this context the NIRS estimates were compared with the results produced by other estimating methods.

The G-OMD varied according to the estimating method from 0.76 (faecal nitrogen index method) to 0.69 (faecal NIRS), whereas the G-DMI ranged from 10.36 to 16.45 kg DM / cow / day. The G-DMI estimates obtained by faecal NIRS analysis and those based on animal performance were comparable. In contrast, the G-DMI estimates obtained by the ratio method were significantly higher by 3 kg DM / cow / day. In all cases the inter-animal variation was around 4% for G-OMD and about 10% for G-DMI. As the models based on faecal NIRS analysis are more accurate than the inter-animal variation we may assume that NIRS applied to faeces could be used for rapid monitoring of the grass digestibility trend and grass intake by grazing dairy cows.

**This study has been submitted to Animal Feed Science and Technology (Elsevier) for publication.*

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Tractor bench test summary

At the request of users CRA-W measures the performance and consumption of agricultural and forestry tractors on a test bench. These measurements determine engine efficiency with a high degree of accuracy and allow comparison with reference values from official testing, notably according to the OECD Code.

Based on data gathered over the last ten years it has been observed that on average, tractors develop higher than standard power with virtually unchanged specific consumption. The differences between the different tractor makes' specific consumption are very slight and less than the differences between different models within the same make. Likewise, the type of transmission (powershift or continuously variable) has relatively little influence.

Quite often, the tractors that do not develop the expected power also have higher specific consumption than the reference value, indicating a mechanical problem. On the other hand, more than 20% of tractors have power more than 15% higher than the reference value for specific consumption which is generally unchanged and sometimes lower. This is the result of modifications made to the fuel injection system and engine tuning. We cannot condone these modifications which, on the one hand, probably affect the exhaust pollution level and, on the other hand, are likely to cause mechanical problems with the vehicle. Lastly, the need to comply with ever more stringent antipollution standards has imposed engine design and tuning constraints resulting in a perceptible rise in specific consumption, despite the developments in fuel injection systems.



View of test bench and setting up a tractor test.

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The solution for more reproductive sows and stronger piglets!

Pig farming production has improved its performance by increasing the number of piglets born in the last few years. However, one-quarter of the additional piglets do not reach weaning age. How can the desired prolificacy be achieved while avoiding the damaging effects of hyperprolificacy and countering society's negative image of the rising production levels?

The route explored by CRA-W, in cooperation with the Animal and Microbial Biology Unit (Gembloux Agro-BioTech), Ardol BV and Huvepharma NV, involves feeding the sows a fermented potato protein (FPP, Lianol Solapros®) based feed. This product promotes the metabolic activity of animals that have a negative energy balance.

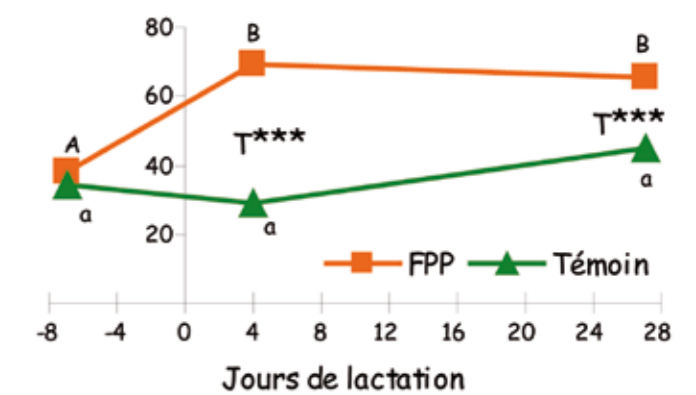
An initial study involved 40 sows half of which were given the product at a rate of 10 g per day as top feeding from entering the farrowing unit until three days after farrowing. Thereafter it was added to the lactation feed at a rate of 1‰.

In the first 24 hours of life the piglets born of FPP sows consumed more colostrum (P<0.05) and gained more weight (P<0.05). Colostrum production by FPP sows was also higher by 20% (P<0.01). At the end of lactation the negative energy balance was greater in the FPP sows (P=0.06) because of the greater expenditure for milk production.



The FPP sows had significantly higher plasma IGF-I levels (cf. graph) at day 4 of lactation and at weaning (P<0.001) compared with the control. Although colostrum and milk IGF-I levels were unaffected by the treatment, the piglets from FPP sows had higher plasma IGF-I levels at age 4 and 24 days (P<0.001). Their daily weight gain was 22% greater in the first four days of life (P<0.05). Moreover, the colostrum IgG concentration was undiminished following the higher colostrum production level, but the IgG rate was 30% higher in piglets from FPP sows (P<0.05).

Taux d'IGF-I (ng/mL) chez les truies



After weaning, when the greater nutritional deficit in lactation tends to adversely affect reproductive performance, the FPP sows came into heat at an undiminished rate (17/18 vs 19/22), with a similar weaning-mating interval (4.7 days) and a higher parturition rate (17/18 vs. 16/22). In the next cycle the survival rate at age 4 days was higher (91% vs 83%, P<0.05) and the intra-litter variance of weight was lower (P<0.05): 85 g vs 108 g (s.e. intra-litter).

These results will be presented at the 21st International Pig Veterinary Society Congress in July.

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CRA-W has the most beautiful Adenium

Congratulations to Belgis Biotech s.a., a company which works with CRA-W, on winning the prize for the most beautiful Adenium at the 2010 Ghent Flower Show. Belgis was exhibiting at the show on the Walloon Horticultural Federation (FWH) stand in a joint promotion with other growers and nurseries in Wallonia.

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