



## SHOULD ENTIRE MALE PIGS BE HOUSED IN MIXED FATTENING STALLS?

**Live surgical castration of piglets is routinely carried out on European farms. It is a means of preventing undesirable boar taint in pork meat. However, the practice is now being questioned because of the pain caused to piglets.**

Producing entire males (uncastrated males) is an alternative which is investigated in the AICaPorc project conducted by CRA-W's experimental piggery between August 2011 and March 2014. The main objective of the project is to highlight production performances and economic benefits for farmers.

As mixing males and females in the same stall is of common practice, another objective is to investigate animal behavior management, performance levels and carcass and meat quality, including risk of boar taint.

The conducted experiment involves 264 pigs fattened in two successive groups. Each stall contains 8 animals which were either all male, all female, or equally mixed male and female. They are housed on straw and fed ad libitum. Each batch is slaughtered as a group, at a live weight of approximately 115 kg.

In the light of production performance, carcass and meat quality, behaviour and injuries, mixed housing appeared to essentially favour males. It limits the serial disturbance effect and reduces the instances of mounting and, thus, the injury scores that occur in all-male groups. In contrast, females appear to suffer somewhat from cohabiting presenting a higher injury scores. The slaughter of gestating females presents an ethical problem.

With regard to boar taint, mixed housing increased the risk of undesirable odour (measures of androsterone and skatole content by UPLC-MS/MS on fat samples). Carcasses containing these substances at such levels have to be removed from fresh consumption (content greater than 2,000 ppm and 200 ppb, respectively). These represent 12.5% for mixed males and females against 6.5% in males fattened alone. The fattening group effect is significant and the undesirable odour rate generally appears relatively

high compared with the average values of 3 to 5% usually quoted. When the human nose method at laboratory was applied with the aid of a trained panel, the boar taint rate rise to 21%; no significant effect of mixing. The specific nature of the answers reveals problems with the method since, on one hand, half of the samples that were positive in chromatography are considered acceptable by the panelists and, conversely, one sample out of five was rejected by the panelists despite being chromatographically negative. These results point up the need for further investigations into analytical methods and animal husbandry practices likely to limit the risk of boar taint.

*Project subsidised by the Department of Agriculture, Natural Resources and the Environment, (SPW/DGO3), agreement no. 2998.*

For more information visit:  
[http://ec.europa.eu/food/animal/welfare/farm/initiatives\\_fr.htm](http://ec.europa.eu/food/animal/welfare/farm/initiatives_fr.htm)

Contact: José Wavreille, [j.wavreille@cra.wallonie.be](mailto:j.wavreille@cra.wallonie.be)

## SUSTAINABLY REGREENING OUR RIVER BANKS AND MARGINALISED LANDS

Renaturation of cross-border ripisylvae with woody ecotypes is now possible following the -availability of valuable multiclonal alder and willow collections.



Hundreds of common alder and willow specimens have been collected on the banks of Wallonia's rivers forming part of the Rhine, Meuse and, to a lesser extent, Escaut basins to form multiclonal collections. In the case of the black alder, the campaign extended to French Lorraine and the Grand-Duchy of Luxembourg through Interreg Greater Region projects (Ecoliri and Ecolirimed successively) financed by the ERDF and the regions concerned.

The origin of the clones is certified and alders traceability can be ensured with molecular markers tools. Although their genetic quality has not been investigated, the phenotypical value

(habit, vigour) of the clones is known. On the basis of in situ studies and tests, some alders clones have been identified for their better tolerance to their decline caused by *Phytophthora alni*, whereas other alders and willows assessed specifically for their tolerance to metal trace elements have been noted. Several black alders obtained from seeds collected from sites infected by *P. alni* or produced *in vitro* by somaclonal variation for phytoremediation have been included in the collections.

As a result of this multidisciplinary work, a young plant supply process has been established. These woody ecotypes are planted together into nuclear stock orchards that give cuttings for the **renaturation** programmes of river and stream bank and to cover **poorly drained areas, wetlands** or occasional **flooding areas** as well. They are also suitable for planting in areas with ecological constraints or for restoring shrubby landscapes on **lands marginalised** by industrial activities or given over to biomass production as a potential source of renewable energy.

The young plants originate from optimised production conditions and are distributed in accordance with the rules applied to forest multiclonal varieties. Information is provided on general behaviour or specific behaviour with respect to disease caused by *Phytophthora alni* in the alder, adaptation to hydrosystems in the willow and behaviour with respect to accidental heavy metal pollution.

It is therefore anticipated that the plant material will adapt naturally to the foreseeable biological risks. While remaining subject to development and preserving existing diversity, it ensures the sustainability of the bioengineering methods applied. It contributes to improving the quality of surface water and groundwater and improving soil quality and ecosystem balance according to the nature of the sites to be revegetated.

The strategies developed in the course of these Interreg projects could be applied to greening other sites requiring woody species. If extended to the other European Union countries they should enable the collections to be linked up.

Contact: Philippe Druart, [ecoliri@cra.wallonie.be](mailto:ecoliri@cra.wallonie.be)

## RED CLOVER, A HEALTH BENEFIT IN MILK!

Increasing the milk equol content by feeding silage rich in red clover significantly improves milk quality.



Equol occurs naturally in cows' milk. It is synthesised in the animal's digestive tract from precursors (phytoestrogens) found in some forage plants (legumes). Equol is thought to have

beneficial properties for human health: anticarcinogen, antioxidant, cholesterol-lowering and a thyroid regulator.

The aim of the trial, conducted in winter 2013-2014 as part of the GrassMilk project, was to increase the milk equol content by feeding silage rich in red clover in order to obtain milk of specific nutritional quality all year round.

Six dairy cows (average production: 24 litres) were evenly distributed according to a crossover experimental design. Two feeding systems were compared: one ration based on silage containing red clover and another

based on grass silage. Three weeks of adaptation were followed by one week of collection. The cows were milked and fed twice a day and water was freely available.

The results show that the trial diets had no effect on production performance. On the other hand, the milk sampled (night and morning) was systematically and significantly ( $p < 0.001$ ) richer in equol in the case of the red clover based ration, at 12,879  $\mu\text{g}$  excreted per cow per day on average (i.e. 644.6  $\mu\text{g}/\text{l}$ ) as against 273  $\mu\text{g}$  (i.e. 14.29  $\mu\text{g}/\text{l}$ ) in the case of the grass-based ration.

Contact: Delphine Franckson, [d.franckson@cra.wallonie.be](mailto:d.franckson@cra.wallonie.be)

## INFRARED SPECTROMETRY IN ANIMAL FEED TESTING

The diversity of plant protein supply sources available to our farms necessitates faster, cheaper tools to prevent contamination and detect fraud.



In cattle farming, good health depends greatly on the use of wholesome, good quality feed. The rising cost of most raw materials in current use has prompted a search for new raw material sources for animal feed. Such new sources may be new raw materials and/or existing raw materials obtained from new geographical areas. One of the aims of the QSAFFE project, funded by the European Commission's 7th Framework Pro-

gramme, is to provide better tools for testing these new feed sources and detecting any fraud or contamination.

CRA-W has contributed by developing infrared spectroscopic methods for detecting contaminants and ensuring the traceability of raw materials. Two sets of problems were studied. The first of these concerned detecting soya flour adulterated with melamine to increase the protein content. Soya contamination simulations with incoming lorries were performed in cooperation with PROVIMI, a partner on the project. The research showed the ability of near infrared spectroscopy to detect soya contamination by melamine and its derivatives such as cyanuric acid. These methods have the advantage of being rapid, non-destructive, easy to use and environmentally sound. In addition, they permit on-line application and simul-

taneous detection of several contaminants and/or additives, either known or unknown. The second case concerned authenticating the botanical and industrial origin of wheat or maize draff from bioethanol production, used as an alternative protein source. The aim was to be able to rapidly trace the origin of the draff supply. This work showed the potential of mid-infrared spectrometry in distinguishing draff sources based on the fatty acid composition after in situ extraction of the fat.

As part of this project CRA-W has thus contributed to devising new strategies for guaranteeing the quality of the various plant protein supply sources and controlling the risks of deliberate or inadvertent contamination of the animal feed chain, both at laboratory level and at arrival of raw materials at ports and at processors.

Contact: Philippe Vermeulen, [p.vermeulen@cra.wallonie.be](mailto:p.vermeulen@cra.wallonie.be)

## A NEW STRESS FACTOR IN HONEY BEES

Within the framework of the Maya Plan, a study was conducted by CRA-W and CARI (Centre Apicole de Recherche et d'Information) at Walloon apiaries to investigate two potential factors in the decline of bee colonies: pesticides and viruses.



In this study more than one hundred colonies were monitored before and after the 2011-2012 winter period. Honey, comb and beeswax samples were taken on different occasions in order to analyse the pesticide residues and bee samples were taken for virological analysis. By the end of winter several colonies were showing symptoms of

decline (mortality, disappearance, loss of the queen, brood comb problems) that could not be attributed to known factors. These colonies were all placed together in a group named the 'group in decline'. The viral analyses showed no significant difference between either the load or the number of viruses in that group compared with the unaffected colony group. The residue analyses, meanwhile, indicated that the colonies were contaminated not only by acaricides and insecticides but also by a number of fungicides. In the case of both acaricides and insecticides, no significant difference in residue levels per colony was observed between the two groups, in contrast to the fungicides. The latter were twice as prevalent in the group in decline compared with the unaffected group. Moreover, on assessing the weight of the viruses and the acaricide-insecticide and fungicide residues,

the fungicides clearly emerged as the only factor that could account for the declines observed in our study. However, the mechanism behind these effects still remains to be discovered. To supplement these results, a soil use analysis clearly indicated that the likelihood of decline increases with the area under crops around the apiaries, whereas the opposite is the case with grassland. One particular reason for this difference could be that plant protection treatments are carried out more frequently in crops than in meadows. These results raise questions about the adverse effects of fungicides on bee colonies and, more generally, the compatibility of the intensive farming model with preserving pollinators.

*Project subsidised by the Department of Agriculture, Natural Resources and the Environment, (SPW/DGO3), agreement no. D32-0075.*

Contact: Louis Hautier, [l.hautier@cra.wallonie.be](mailto:l.hautier@cra.wallonie.be)

## FOREST SOIL *PHYTOPHTHORA*, A WORLD TO BE EXPLORED

For a long time considered to be fungi because of morphological similarities, *Phytophthora* nevertheless have a very different biology with an as yet relatively unknown diversity, particularly in forest environments.



The genus *Phytophthora* mainly comprises soil pathogens that attack their hosts' fine roots, growing preferably in wet environments and likely to infect a wide range of plants. Some *Phytophthora* that affect woody species, such as *Phytophthora alni*, the causal agent in common alder blight, *P. cambivora*, associated with beech blight, or *P. ramorum*, responsible for sudden larch death, have been the subject of specific research at CRA-W for several years.

However, various studies show that the diversity of forest *Phytophthora* is still little known and that ignorance is due in particular to the difficulty of detecting these pathogens from complex matrices like soil or water. One detection method involving trapping makes use of *Phytophthora*'s ability to move through water with the aid of bi-flagellated spores. If a quantity of soil

is placed in contact with water and rhododendron leaves, a plant species susceptible to many *Phytophthora*, for several days, any mobile *Phytophthora* spores in the soil will swim up to the leaves and infect them. The pathogen can then be isolated from cultures on a selective medium using small necroses that have subsequently formed on the leaf traps. Similarly, the presence of *Phytophthora* in river water can be revealed by floating little bags containing rhododendron leaves in the rivers concerned for several days.

Trapping is useful for researchers in that it enables live strains of *Phytophthora* from the soil or river to be captured. The method is currently being optimised at CRA-W but nevertheless remains heavily dependent on various criteria such as competition with other organisms occurring in the soil or river water and whether the time of year is favourable for trapping *Phytophthora*. However, the method is regularly applied in epidemiological studies of *Phytophthora* already identified in Wallonia. It is also currently being used in the context of the European RESIPATH project which CRA-W is participating in with the aim of studying the diversity of the *Phytophthora* occurring in the region's forest soil and watercourses.

Contacts: Sophie Schmitz, [s.schmitz@cra.wallonie.be](mailto:s.schmitz@cra.wallonie.be) et  
Anne Chandelier, [a.chandelier@cra.wallonie.be](mailto:a.chandelier@cra.wallonie.be)

## 19<sup>TH</sup> EAPR (European Association for Potato Research) TRIENNIAL CONFERENCE

On the initiative of CRA-W, the 19<sup>th</sup> Triennial Conference of the European Association for Research on Potato was held in Brussels from 6 to 11 July 2014, and was a successful international meeting with more than 400 participants coming from 56 different countries all over the world. Under the presidency of Jean-Pierre Goffart (CRA-W), it was organised by a Belgian Committee constituted from the scientific agricultural research centres (CRA-W, ILVO), universities (UCL, UGent, Gbx-ULg, KUL / BDB), technical centres (FIWAP, CARAH, PCA, INAGRO), administration (Vlaamse Gewest) and the Belgian potato industry (Belgapom). The main theme of this conference was the sustainability of the potato crop and its industry, an essential dimension, like economic and environmental point of view than food security worldwide. The industrial potato processing sector is highly developed in Western Europe, especially in Belgium, the country currently holding the world leadership in the export of potato based frozen products. The scientific topics of the Conference covered all aspects of the production and marketing of potatoes, with a focus on the most recent advances on sustainable and innovative techniques. More information are available on [http://www.eapr.net/wp-content/uploads/2008/11/EAPR\\_newsletter\\_2\\_2014.pdf](http://www.eapr.net/wp-content/uploads/2008/11/EAPR_newsletter_2_2014.pdf) and on the website [www.eapr2014.be](http://www.eapr2014.be).

Contact: Jean-Pierre Goffart,  
[j.goffart@cra.wallonie.be](mailto:j.goffart@cra.wallonie.be)

## DIARY



**11 February 2015**

**THE WALLOON DAIRY FARM OF TOMORROW:  
FROM THE PLAYERS' POINT OF VIEW  
TO PROPOSALS FOR RESEARCH**

20<sup>th</sup> Carrefour des Productions Animales  
Espace Senghor, Gembloux

Contact: [communication@cra.wallonie.be](mailto:communication@cra.wallonie.be)

**23-27 February 2015**

**TRAINING IN VIBRATIONAL SPECTROSCOPY AND  
CHEMOMETRICS**

CRA-W Henseval Building, Gembloux  
Contact: Juan Antonio Fernandez Pierna,  
[j.fernandez@cra.wallonie.be](mailto:j.fernandez@cra.wallonie.be)