



THE COLORADO POTATO BEETLE: MORE FEAR THAN HARM?

The Colorado Beetle, a major leaf eater, is familiar to all potato lovers. Having sneaked in among potato cargoes imported from the United States at the end of the First World War, it rapidly infested Europe and became a significant pest, gaining a reputation for the spectacular damage it caused. Since then, control methods, mainly using insecticides, have checked this pest. Although not rare, this beetle is nowadays no more than an occasional potato pest. Nevertheless, past damage remains engraved in the collective memory and a number of insecticide treatments are often carried out immediately the insect is detected. Are they really necessary?

Experiments were conducted in 2009 and 2010 to assess the possible effects of Colorado Beetle defoliation on potato yield and quality, with an attempt to determine an economic treatment threshold suited to current Belgian conditions and varieties. -

In 2009, when neither temperatures nor rainfall were excessive and potato growing conditions were normal, the treatment threshold was fixed at 6% of leaf damage in a whole plot, corresponding in practice to one plant out of eight with a 50% leaf loss over the plot as a whole, or one plant out of four with 25% damage. Below that threshold the cost of insecticide treatment outweighs the negligible yield gain.

2010 was characterised by a long period of drought in June and July, when potato growth slowed down markedly. In those conditions each leaf counted for production purposes and the estimated treatment threshold was, understandably, lower than in 2009 at 2% defoliation over a whole plot. In practice that corresponds on average to one plant out of 25 with a 50% leaf loss or one out of 12 with a 25% leaf loss.

These results were for the Charlotte variety, a potato considered potentially more susceptible to the Colorado Beetle than others that are harvested later and thus have time to replace the lost foliage. For varieties like Bintje the nuisance thresholds ought to be very much higher, especially since the selling price of these industrial varieties is often much lower than is the case with earlier varieties mostly sold on the fresh market.

In conclusion, the results of this study indicate that Colorado Potato Beetle damage usually has a very limited effect on yield. Whereas this pest should not be disregarded in the case of very significant attacks affecting an entire plot, systematic insecticide treatment to protect a small number of plants is simply a waste of time and resources.

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CEREAL VARIETIES UNDER THE MICROSCOPE ...



The range of cereal varieties available to farmers is wide and highly differentiated. It is also constantly evolving as the result of ongoing breeding work. There is a pressing need for both farmers and the collecting and processing industry to know about the characteristics of the different varieties.

In an endeavour to meet that need CRA-W conducts a series of varietal trials annually in the various agricultural

areas of Wallonia with winter rape, winter barley, winter wheat and spelt.

The research aims to determine the yield potential (based on results for several years) and also yield stability factors such as winter resistance, earliness, lodging resistance and resistance to the foliar and ear disease complex. Knowledge of all these parameters enables farmers to exploit the varieties' strengths while at the same time mini-

minising the expression of their weaknesses by consistently matching varieties to their cultural practices and their farm's soil and weather conditions.

These experiments also serve to determine the quality criteria that will guarantee outlets for the crops (hectolitre weight and protein content of cereals, breadmaking quality of wheat, glucosinolate content of rape, and so on).

All the trials take place with the full cooperation of the Development and Extension Section of Service Public de Wallonie. Knowledge is rapidly and effectively disseminated to farmers by means of tours of trial sites, seminars organised by agricultural associations or local CETAs, and articles in the White Book or the agricultural press.

For information, the 2011-2012 post-registration trials concern 55 varieties of winter rape, 33 varieties of winter barley and 103 varieties of winter wheat.

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ORGANIC OR OUTDOOR PORK; SETTING UP YOUR PROJECT WITH INVESTPORC®



CRA-W has developed the INVESTPORC computer module to meet the needs of would-be pig breeders as regards the investment needed and the return to be expected from an organic or outdoor pig diversification project. The aim is to provide a user-friendly simulation tool that enables all would-be pig farmers to work out the initial feasibility of a diversification project.

Using a web interface, the farmer can create a simulation directly with just a few clicks. Calculations are performed according to choices made by the user

and default encoded variables which may, or may not, be editable. All the variables change with time in line with changing conditions. The user can make alterations to the simulation and vary a particular parameter in order to refine the project, or may simply want to quantify the effects of proposed changes.

The tool is designed to handle most of the specific features of development projects:

- Access to grassland
- Use of existing or new buildings
- Price of feed
- Particular level of production performance
- Financing, ...

INVESTPORC has been developed from CRA-W's research into outdoor pig rearing, a number of farm visits, and data obtained from the outdoor pork production Reference and Experimental Centres (CRE) subsidised by the Department of Agriculture,

Natural Resources and the Environment (DGRNE).

On completion of the simulations the software displays the results, which are arranged in three sections:

- List of the main encoded data
- Two graphs illustrating the investment and costs
- Two tables showing the running costs, income and the return on the investment

The project characteristics and the computer results then provide useful material to back up subsequent talks with production technicians, industry players and banks.

The software will be adapted to provide more detailed answers and keep pace with developments in stockfarming methods and the economic context.

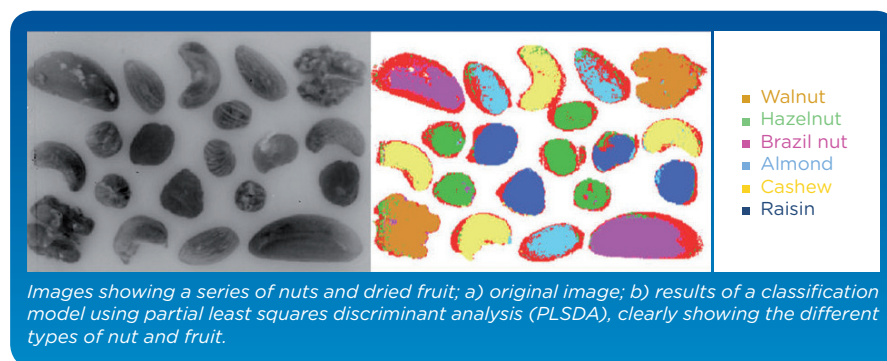
The calculation module is available now via this link:
<http://investporc.cra.wallonie.be>

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CHEMOMETRICS SERVING A MULTIVARIATE WORLD

We live in a multivariate world. Data from different fields of research, such as agronomy, food or the environment, have to undergo multivariate analysis to be significant. Multivariate analysis is a branch of chemometrics that consists of extracting as much information as possible from the data. Chemometrics can be defined as a discipline of chemistry that uses mathematics and statistics to design or select optimal experimental procedures, to supply as much relevant chemical information as possible via the analytical data, and to gain knowledge of chemical systems (Professor D. Luc Massart). Chemometrics as thus defined plays several different roles in the world of science. For example, it can help a chemist to select the appropriate analytical method, including all the stages from sampling to data collection. It can also be used to improve and validate methods and to interpret data in order to translate them into a result which is readily understandable to the client. Chemometrics is useful at all stages of the analytical procedure, from establishing an experimental design through to the ultimate conclusion.

Chemometrics has developed remarkably in the last few years. The initial stages essentially comprised laying the foundations of the main princi-



Images showing a series of nuts and dried fruit; a) original image; b) results of a classification model using partial least squares discriminant analysis (PLSDA), clearly showing the different types of nut and fruit.

ples/concepts of chemometrics (e.g., experimental designs, sampling theory, data mining and modelling tools) and distributing them. Nowadays chemometrics is increasingly recognized as a necessary step in the various analytical processes that produce huge data series from different techniques and experimental designs. The future of chemometrics will involve devising effective treatments for large series of complex data and developing efficient and more robust methodologies including determining outliers, error measurement and merging data from different analytical techniques (data fusion). But the main challenge remains the full integration of knowledge obtained from analytical data including, among other things, complex relations and correlation problems.

CRA-W has a large chemometrics experience and uses it in various areas of the multivariate agricultural world (e.g., quality control, detecting adulteration or contamination) on all kinds of agricultural produce (soils, cereals, milk, fruit, meat, animal feed, and so on), applying various analytical methods such as vibrational spectroscopy, microscopy or hyperspectral imaging (as in the illustration above), generating a large body of data in a very short time. CRA-W regularly carries out various research assignments and holds chemometrics training courses or seminars in order to fully study the complexity and variability of this multivariate world.

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DETECTING METABOLIC DISORDERS IN DAIRY COWS (COMPOMILK)

Computer progress in recent years has led to the development of powerful mathematical tools that can process the entire mid infrared (MIR) spectrum. We have moved on from using filters measuring absorbance at three or four different wavelengths to Fourier transform spectrometers that can simultaneously measure absorbance for several hundred MIR spectrum wavelengths. Now, the MIR spectrum of milk is crammed with useful information.

Apart from the components traditionally predicted by filter technology (fat and proteins) it is in fact now possible to determine other components by this method. For instance, recent studies show that lactose, casein, -hydroxybutyrate, acetone, lactoferrine, fatty acids and mineral salts can all be determined. Many of these milk components (acetone, -hydroxybutyrate, lactofer-

rine, oleic acid, etc.) are known to be associated with one or more metabolic disorders in the dairy cow, such as acidosis, ketosis, mastitis and others.

COMPOMILK is a joint project between the ULg's Animal Science Unit - GxABT and CRA-W which aims mainly to develop practical tools to help livestock farmers detect metabolic disorders in dairy cows. It is funded by the FNRS via the Collective Fundamental Research Fund (FRFC). The first phase of the project will be based on developing calibration models for assessing, with the aid of MIR spectrometry, milk components selected for their potential for reflecting a metabolic disorder.

To achieve that aim CRA-W has just invested in a brand-new continuous flow analyser which will allow new benchmark analyses to be performed.

The second phase of the project will consider the genetic and non-genetic variability of these different components and their relationships with metabolic disorders and with the other known components of milk (fat, protein, lactose, urea, fatty acid, etc.).



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TOWARDS POTATO VARIETIES OF BELGIAN ORIGIN



A potato breeding program kicked off at CRA-W in 2005. This is a two-part program. The first line of research involves improving resistance to late blight (*Phytophthora infestans*) and is a joint venture with, notably, the Potato and Sugarbeet Research and Development Institute in Brasov, Romania. The other aspect of the work is a cooperative undertaking with the Bologna Industrial Crop Research Centre (CRA-CIN, Italy) and Euroseeds (Sombrefe, Belgium), a private company which is very active in producing and exporting seed potatoes.

Since 2005, 175,000 clones obtained from 160 crossings have been assessed. For the first four years of the program the selection principle essentially consists of observing the plants and their tuber formation (growth vigour and

shape, colour and uniformity of the tubers). Later, once a sufficient quantity of seed potatoes had been obtained, assessment of the agricultural behaviour of the selected clones got under way, at the Libramont site to begin with and then via remote trials (Gembloux, Bologna, Brasov), when yield, quality according to end use and disease resistance are specifically studied. These trials are repeated for three years.

Not only is breeding a long-term undertaking, it also requires cooperation with potential users such as seed potato producers, traders and industry. This is the essential challenge we are going to tackle in the next few years, by holding informative events and demonstration trials, notably with the assistance of the Walloon Association

of Seed Potato Producers, the Potato Pilot Centre and APAQW. With the sole exception of the Gasoré variety, a CRA-W accession registered in 1996, there are no 'Belgian' varieties. That undermines the efforts of seed potato producers who either have to produce free varieties or depend on breeders in neighbouring countries for protected varieties. Surely a typically Belgian or Walloon product would be a sales argument as regards the supermarkets?

The following developments are scheduled for future years: increasing the quantity of seeds produced, widening the germplasm base for crossing purposes, carrying out a prebreeding program and developing the principle of marker-assisted breeding, notably for early detection of late blight resistance genes.

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DIARY

27 - 30 July 2012

LIBRAMONT AGRICULTURAL FAIR

Visit the CRA-W stand: lots of activities, presentation of projects, competition

► Friday 27 July 2012 at 13.30: CRA-W round table on the topic of 'The Farm of the Future' to be held in the context of the Libramont Fair.

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