



CRA-W participation in European projects

In the last few years the Walloon Agricultural Research Centre has played an active part in various European initiatives within the framework of different research programmes. The Centre is, for example, a partner on some projects linked to the ALTENER programmes (programmes running over several years for the promotion of renewable energy sources within the Community), COST (European Co-operation in the field of Scientific and Technical Research), INTERREG (a Community initiative under the European Regional Development Fund (ERDF) to stimulate interregional cooperation in the EU) and the European Community Framework Programme (FP) covering research, technological development and demonstration activities.

Within the Sixth FP the CRA-W is now a partner on some Integrated Projects (IP), such as the TRACE pro-

ject which aims to develop traceability methods for food products; Specific Targeted Research Projects (STREP), e.g. the PORT CHECK project for the development of diagnostic methods for detecting quarantine organisms (viral and fungal); Coordination Actions (CA), e.g. the VIROTICA project on the co-ordination of research into genetic resistance to plant pathogenic viruses; and Specific Support Actions (SSA), e.g. the GeoTraceability Integrated System for the Common Agricultural Policy – CAP. This significant participation in the 6th FP is testimony to the expertise of the CRA-W researchers and their ability to play their part within the European Research Area (ERA).

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TOWARDS LATE BLIGHT CONTROL IN ORGANIC FARMING

Around 100 ha of potatoes are grown in accordance with the rules of organic farming in the Walloon Region. This represents 0.5% of the land under potatoes, whereas the area officially registered as practising organic farming, for all crops together, is over 3% of the useful agricultural land. Only copper-based products such as Bordeaux mixture are authorised in organic farming for prevention of the serious damage caused by late blight, namely early defoliation or tuber rot in storage. However, in view of copper's toxicity to some soil organisms, the European Union has decided to restrict the use of copper fungicides. From 2006 farmers will not be permitted to spray more than 6 kg of metal copper per hectare per season. The risk of damage would thus be very high in very wet weather conditions or in regions with numerous sources of late blight (volunteers, dump piles, etc.). This prospect is deterring many farmers who would otherwise grow "organic" potatoes.

The CRA-W has investigated various alternative control methods as part of an INTERREG programme financed by the European Union with partners from the Nord - Pas de Calais, Hainaut and Flanders.

Alternatives to copper fungicides?

Nearly 30 "natural" substances, most of them said to act as elicitors (activating the plant's natural defence mechanisms), were tested at the laboratory to assess their foliage protection effectiveness. Six of them produced good results at the laboratory except when the treated plants were subsequently subjected to

artificial rain, indicating a high level of susceptibility to leaching. The products also proved disappointing in field trials.

Using resistant or less susceptible varieties

Significant differences in behaviour were observed in the fifty or so varieties tested, ranging from very susceptible varieties (many of which are widely grown, such as Bintje, Charlotte, etc.), which were soon destroyed, to resistant varieties which can get through the growing season with no symptoms or with just slight necrosis (Gasore, Eden, etc.). It was noted, however, that the resistance of the latter declined from year to year, due to the emergence of virulent late blight strains. Such development is hard to predict, so that a farmer choosing these varieties is never safe from unpleasant surprises. Many varieties also have partial resistance (Désirée, Agria, etc.): they are affected by the disease, but its development is slower. Such varieties are therefore easier to protect and the risk of loss can be limited.

Pre-sprouting

This technique is used to encourage sprouting before planting the tubers. It shortens the growing cycle and speeds up tuberization, in order to produce a good production before late blight can destroy the foliage. We have increased the yield by over 25% with this method.

Reducing copper fungicide rates

Applying copper fungicides at reduced rates according to a timetable that takes account of weather conditions (temperature and humidity), thus enabling late blight epidemics to be predicted, improves crop protection while at the same time perceptibly reducing the quantities applied.

Results after three years of experiments are encouraging. Although late blight can rarely be avoided, the use of preventive methods together with managed fungicide application enables foliage destruction to be limited or delayed, thus ensuring the profitability of "organic" potato growing



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A CRA-W RESEARCHER RECEIVES AWARD FROM ROYAL ACADEMY OF BELGIUM'S DIVISION OF SCIENCES

A public meeting of the Division of Sciences of the Royal Academy of Science, Humanities and Fine Arts of Belgium was held in the Throne Room of the Palais des Académies, Brussels, on Saturday 11th December 2004. At this meeting Mr René Lefever, Director of the Division, officially announced and presented the prizes and grants awarded by the Division of Sciences. Mr Alain Bultreys, a researcher at the CRA-W, was awarded the Schepkens Prize for Phytopathology and Applied Entomology for the 2001-2003 period for his work on the phytopathology of cultivated plants. The award was made on the recommendation of the Jury, comprised of Messrs C. Sironval, G. Bernier, J. M. Pasteels, M. Boutry and H. Jijakli, responsible for judging the works submitted for the competition in the 25th three-year period (2001-2003). The rules provide for this prize to be awarded every three years to the Belgian author of the best work concerned with the study of plant diseases and parasites (animal and plant), specifically cultivated plants. Alain Bultreys has been on the CRA-W's contract staff for the past four-

teen years and is currently a Research Assistant within the Biotechnology Department. He started out working on *Fusarium* wilt of melon and *Botrytis cinerea* in strawberry plants. In the mid-nineties his work became increasingly focused on bacterial diseases caused by *Pseudomonas syringae* in orchards, improving techniques for identification and characterizing Belgian populations. This work led, in July 2001, to a Ph.D. thesis, the results of which were published on four occasions by the renowned American microbiology journal *Applied and Environmental Microbiology*, edited by the *American Society for Microbiology*, as well as in the proceedings of national and international conferences and in a more technical journal. His work has been extended to other plant pathogenic *Pseudomonas* species and to the quarantine bacteria *Xanthomonas fragariae* and *Erwinia amylovora*, notably with fundings from the Walloon Region.



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GOOD YEAR COMES TO CRA-W FOR TRAINING

On 15th, 16th and 17th November 2004 the CRA-W ran a training course for the multinational GoodYear, attended by twenty-one technical managers from fifteen European Union and former Soviet Union countries.

A number of theoretical lectures were given around the topic of the tyre as the soil-machine interface. Aspects developed included “tractors”, comprising power, transmission systems and fuel consumption; “tyres”, covering tractive power and rolling resistance; and “soil” aspects, such as compaction, infiltration rates and deformation.

The theoretical instruction was supplemented by a visit to the firm of Joskin, to enable the participants to see for themselves some of the technical developments that go into the design and manufacture of agricultural machinery. The subjects covered were also illustrated by demonstrations of experimental equipment designed and used by the CRA-W

- *the tyre test bench*, which measures traction and tyre slip under an applied load, torque and pressure;

- *the penetrometer*, which defines soil compaction levels by measuring the effort required to drive a rod with a cone on the end into the soil at a constant rate;

- *the profilometer*, which uses a laser sensor to plot the soil surface profile, by measuring the distance between the soil and a plane reference surface;

- *the brake*, which acts on the tractor power take-off and allows all the engine characteristic curves to be plotted for the parameters torque, power, hourly consumption and specific consumption.

Following this training course the Belgian, French and British delegates asked for a follow-up course to be arranged in 2005, for themselves and their sales representatives.

The company's Development Department also placed an order for some consumption and traction tests. Lastly, a general study is under preparation to investigate the impact at the farm's level of using “conventional” tyres as opposed to “low pressure” tyres, with the emphasis on soil, crop and yield aspects. .



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ANIMAL WELFARE : STRENGTHENING THE LINK BETWEEN CONSUMERS, FARMERS AND ANIMALS

.This project is part of the “Food for Discussion” programme run by the King Baudouin Foundation and is being carried out in partnership with the University of Liège, Department of Environmental Sciences and Management (SEED group, Claire Lamine and Pierre Stassart), Gembloux Agricultural University (Yves Beckers and André Théwis) and the Walloon Agricultural Research Centre (Didier Stilmant and José Wavreille).

The aim is reconcile animal welfare (animal rights) and consumer wellbeing (food rights) with farmers' welfare. Animal welfare is a topical issue in society. The opinions expressed to date are, in our view, too fragmented and often motivated by militant attitudes and powerful economic interests.

Fruitful debate should therefore be stimulated by bringing together the various players (farmers, consumers, economic players, scientists, and so forth), with their varied knowledge and skills. The public scientific institutions have a role to play here, especially in terms of passing on expertise and thus also mediating.

The first phase of the project (January-April 2004) enabled us, through individual interviews with a number of players in this field, to establish exploratory dialogue and thus create confidence at an individual level before moving on to any sort of collective ini-

tiative. It was also an opportunity to document and explore the arguments and stances of the various players with respect to animal welfare and the different methods of consultation. This work was undertaken and feedback supplied by an interdisciplinary expertise group of fifteen people drawn from the scientific community (zootechnicians, ethologists, agronomists, socioeconomists and philosophers), who worked on the definitions of animal welfare and related issues.

The intention is for the group to develop gradually within the framework of the project (June 2004 – May 2006), via the pooling and comparing of individual areas of expertise, towards a joint building up of collective expertise. To this end, the dialogue begun by a group of scientists will be widened and enriched by the creation of forums bringing in producers and consumers. Finally, the results generated by the group of experts and the different forums will be fed back and discussed with the consultative bodies in place: the sectoral councils (under the aegis of APAQ-W), the Animal Welfare Council (Federal Ministry of Health) and of course CRIOC (the Consumer Organisations' Research and Information Centre).

Also, the creation of an Internet forum for ‘virtual’ exchanges of information and views between the different project part-

ners and the sectors concerned should facilitate the expression and clearing away of barriers to comprehension and misunderstandings.

A progress report entitled “Strengthening the link between consumers, farmers and animals” is available on the King Baudouin Foundation site:
http://www.kbs-frb.be/files/db/FR/Alimenter_le_dialogue_Projet_ULg_Rapport1.pdf.



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PLANT PROTECTION PRODUCTS THAT ARE SAFE FOR USEFUL ARTHROPODS

In the Walloon Region as elsewhere, many crop pests are controlled naturally by various predatory and parasitic insects such as ladybirds, which attack aphid colonies. Such entomophagous predators and parasites, generally referred to as “useful arthropods”, “natural enemies” or “biological control agents”, are very active in certain crops. In winter wheat, for example, the activity of the aphids’ natural enemies keeps that particular pest below the economic nuisance threshold in two years out of three on average. In potatoes, seven out of eight plots needed no insecticide treatment for the last ten years.

Such insects occur naturally in the environment and allow farmers to considerably reduce the use of insecticides or even to do without them altogether in some crops. This is why preserving the natural potential for pest control by means of biological control agents, which is beneficial in both economic and environmental terms, has an obvious part to play in the development of sustainable agriculture.

Pests’ natural enemies are particularly vulnerable to the plant protection products used in agriculture, whether they be insecticides, fungicides or herbicides. Various studies carried out in the past have demonstrated the very harmful effects of using certain products that are highly toxic to useful insects. The prevailing pattern tends to be spectacular pest development following a treatment designed to control them (boomerang effect), with the emergence of new pests that had hitherto remained unobtrusive due to the control exercised by their natural enemies. The result is inevitably increased frequency of insecticide treatment and thus, also, the negative effect of production techniques on human health and the environment that could be avoided from the outset by using products selective to natural enemies.

To encourage farmers to take beneficials into consideration and to use products that are less harmful to them, various research programmes have been undertaken by the CRA-W to measure the impact of products authorised in Belgium on the commonest useful arthropods in different crops.

In cereals, the effects of fungicides and insecticides applied at times when beneficials are active were assessed with respect to the aphids’ main natural enemies, namely the Hymenoptera *Aphidiidae*, syrphids and ladybirds.

In ware potatoes, all the fungicides and insecticides used during the growing period were assessed for the same auxiliaries as in the case of cereals. The results were distributed to farmers in the form of easy-reference selectivity lists. These lists are now mandatory in the various quality specifications applicable to ware potatoes.

The results of these two programmes indicate that provided certain products are avoided at specific times, it is perfectly possible to combine cost-effective, good quality production with effective crop protection and safeguarding useful insect fauna.

A similar research programme is under way for field market garden crops such as carrots, peas and beans. The results are scheduled to be distributed in the form of selectivity lists in late 2005, once all the results are available.

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