



TOWARDS A 100% ROBUST ORGANIC POTATO CROP

WHAT VARIETIES OF POTATOES SHOULD BE USED TO REDUCE AND EVENTUALLY ELIMINATE THE USE OF COPPER AS A PROTECTIVE AGENT AGAINST LATE BLIGHT?

To answer this question a three-year varietal trial was set up within the CRA-W, in collaboration with the Fiwap and Biowallonie.

Despite the implementation of effective warning systems for the control of late blight (*Phytophthora infestans*), management of late blight remains a major problem in both organic and conventional potato cultivation. The specifications for organic farming only allows the use of copper products to fight this disease. However, the organic potato sector wishes to free itself from its use. Like their Dutch counterparts in 2017 and Flemish in July 2018, the Walloon stakeholders in the sector signed an agreement in November 2018 aimed at only using robust varieties by 2021.

The CRA-W is a signatory to the convention as a research and extension partner. Thanks to the close collaboration between four research units of the CRA-W, a three-year trial was set up and integrated into the BIO2020 programme (thanks to the CRA-W's own funds and the support of the potato pilot

centre). Since 2019, the trial has included 20 varieties selected on the basis of their resistance to late blight, according to the results of the MilVar trials carried out by the CRA-W and the CARAH.

Resistance to late blight is the main criterion for defining a robust variety, but it is not the only one. Indeed, in the current context of climate change, the concept of robustness is more global. It concerns other diseases and pests, the ability of the crop to be less or little sensitive to water stress and high temperatures, or to be more efficient in making use of nutrients such as nitrogen. This is, if possible, by combining it with the earliness of the crop to quickly achieve tubers sufficient in weight and quality before the development of late blight. This last aspect is particularly important in organic farming. The concept of robust varieties therefore aims to guarantee organic producers a correct yield with an acceptable quality.

The publications (Fiwap-Info, Itinéraires bio, etc.) and the annual online publication of a

test report provide communication of the characteristics of each variety tested. The criteria of robustness are emphasised, but also the quality (taste and culinary) and yields, which are essential information for farmers, traders, preparers and processors as part of their varietal choices.

More information :

<http://www.cra.wallonie.be/fr/pdt-robustes-bio>



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TRAJECTORIES OF WALLOON DAIRY FARMERS TOWARDS BETTER USE OF FORAGE RESOURCES

IMPROVING THE USE OF FORAGE RESOURCES IS AN IMPORTANT LEVER TO REDUCING COSTS IN CATTLE BREEDING. VARIOUS POSSIBILITIES ARE AVAILABLE TO DAIRY FARMERS AND INVOLVE CHANGES WITHIN THE FARM.



Among the practices identified are optimisation of grazing (in particular through dynamic rotational grazing), evolution towards more robust cows and therefore more able to add value to a diet based mainly on grass, and finally improvement of forage conservation techniques.

The change in practices remains a source of hesitations and questions, however, because it generates changes in behaviour and organisation in the face of which farmers may feel disadvantaged. The objective here is to study

the trajectories of Walloon dairy farms that have evolved towards one of these practices, and to identify the impediments encountered by farmers, as well as the levers used to overcome them, and finally the impacts on their production system. Qualitative surveys are then conducted with Walloon dairy farmers, making it possible to understand how farms are resisting, transforming and becoming part of long-term dynamics in the face of a fluctuating environment.

Generational conflict, lack of information, uncertainty about choosing a more robust breed, the high level of investment and the additional workload due to a new facility are examples of impediments encountered in the twenty farms visited. Exchanges between farmers to benefit from each other's experiences are an example of the levers that can be mobilised. Other technical levers are the early grazing of heifers for a better adaptation to grazing, the practice of "topping", mowing before grazing, to anticipate the appearance of rejection areas in rotational

grazing systems, or points for attention when choosing a bull adapted to the robustness desired by the farmer. In addition to the economic impact, simplified management of the work, the positive image perceived by consumers and professional development are examples of elements felt by farmers in the face of change.

It is of interest for the CRA-W to build knowledge on the processes of change, in order to help livestock stakeholders in current or future transitions. The collection of ideas will ultimately allow farmers who so wish to have avenues for reflection to secure their future.

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More information:

<https://www.cra.wallonie.be/fr/effort>



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THE CRA-W GOES TO HIGH-THROUGHPUT TECHNOLOGIES

DNA CAN INFORM US ABOUT THE COMPOSITION OF PRODUCTS AND ECOSYSTEMS. THE CRA-W MAKES IT TALK BY USING HIGH-THROUGHPUT SEQUENCING.

For many years, the CRA-W has been developing detection and identification methods based on the amplification of specific DNA sequences, mainly via the PCR technique. These PCR methods are generally targeted, i.e., only the sequence (and therefore possibly the organism) for which the test has been developed is detected. It is therefore interesting to be able to have non-targeted methods that allow us to have a more global view of the organisms present in a specimen or an ecosystem.



Analysis of the microbiome of cereal plants (Antagonist Project)

It is with this in mind that the CRA-W has been interested in new methodologies using high-throughput sequencing. The CRA-W has already distinguished itself by proposing innovative approaches using enrichment techniques combined with high-throughput sequencing for GMO detection. This brings together the equivalent of 146 tests in a single analysis.

Metabarcoding processes are also being developed. They consist of targeting universal sequences, short sequences shared by a group of species, to perform a taxonomic classification of organisms and thereby simultaneously identify all the species contained in a specimen. The tens of thousands of sequences obtained have to be sorted and assigned as correctly as possible in order to identify the different organisms that can match. This technique is used in the **FARMYNG project**, in order to authenticate insect meal, in the context of GMO analyses, to detect the plant species present in food products, and also pollen or bee bread (**POLBEEs project**). Metabarcoding is also used to identify fungal pathogens that

attack our forests and which are collected via spore traps (**RESIPATH project**), or to determine the structure of microbial consortia of soils, the rhizosphere and the phyllosphere through, for example, activities for monitoring the biological fertility of soils or also for research for micro-organisms that can hinder the growth of apathogens in cereals (**Antagonist project**).

The quantity of data generated by high-throughput sequencing is such that it can no longer be managed without bioinformatic tools and high-powered computers.

The CRA-W is therefore simultaneously developing its skills in bioinformatic analyses and programming in order to provide an opinion on existing solutions and to develop new and ever more effective ones.



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BUILDING THE FUTURE OF CATTLE BREEDING (MILK AND MEAT) IN WALLONIA

THE PROBOV PROJECT PROPOSES SCENARIOS, BY 2040, RELATING TO THE TWO MOST IMPORTANT WALLOON AGRICULTURAL PRODUCTIONS, MILK AND BEEF, WHICH FACE UNPRECEDENTED CHALLENGES.



Cattle productions, such as milk and meat, are especially important in Walloon agriculture, and have been for decades. But what will it be tomorrow or in twenty years from now? Cattle productions are going through difficult times all over the world. The increasing liberalization of international trade since the 1990s, as well as the abolition of

the milk quota system, which guaranteed a minimum price for milk in limited quantities, has resulted in increased price volatility, which in turn causes great variability in breeders' income. Epidemics regularly rage in the herds. In addition, consumers/citizens have new concerns: animal welfare, respect for the environment, the impact of the consumption of animal products on human health, the organoleptic quality of products, the preservation of landscapes, preservation of cultural heritage, biodiversity, social relations between breeders and citizens, etc. Movements are even appearing to advocate the reduction, or even the elimination of meat consumption.

In the face of so many questions, the future looks uncertain. Should productivity and the use of new technologies be further strengthened? Should the focus be on

product quality? Favour forage autonomy, on-farm processing, the establishment of breeder cooperatives? To try to see things more clearly, the CRA-W, in close collaboration with the Walloon Institute for Evaluation, Planning and Statistics, is working on building a few contrasting scenarios that are possible by 2040, using strategic planning methods, based in particular on the experience of experts and stakeholders in the sector, in order to identify the key factors that will shape the future and their possible developments. These scenarios will help to enrich the thinking and guide the choices of economic actors such as breeders and processors, as well as policy makers.



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THE CATCHMENT PESTICIDE DIAGNOSIS UNIT: A TOOL FOR PROTECTION OF DRINKING WATER CATCHMENTS

THE PROTECTION OF GROUNDWATER FROM HUMAN ACTIVITIES IS A HOT TOPIC. DRINKING WATER STANDARDS ARE SEEN TO BE EXCEEDED BY PLANT PROTECTION PRODUCTS (PPP) IN SOME WALLOON CATCHMENTS.

In this context, the Catchment Pesticide Diagnosis Unit (CDPC) is working to determine the possible origins of the PPPs transfer to water resources.

The CDPC was set up in 2005, as part of a collaboration between the Public Water Management Corporation (SPGE) and the CRA-W, in order to provide to the water producers a concrete assistance in contamination of catchments by PPPs. Since 2018, the CDPC has been part of the PROTECT'eau framework whose mission is to ensure sustainable management of nitrogen (PGDA) and PPPs (PWRP) in the agricultural sector in order to preserve water quality.

The goal of the CDPC is to find the source of contamination of a catchment by PPPs in order to better target solutions at the fieldscale. This level of accuracy is necessary to ensure a good management of the contamination risk in the catchment supply area (ZAC).

The diagnosis of contamination is done in 3 stages:

- First, documentary work is carried out in order to gather relevant information related to the study site. This important step makes it possible to make assumptions on the routes

of contamination. This important step allows to make assumptions on contamination paths.

- Then, field visits as well as a survey of PPP users is performed to validate the first assumptions.
- Finally, the diagnosis is analysed and proposals for solutions are issued. For example, the use of mechanical weeding can be proposed on plots where there is a significant risk of PPP infiltration.

Since its beginning, the CDPC has handled some thirty cases. The majority of studied cases (80%) are characterised by a contamination peak. This type of case often involves spot contamination by a well or a karst fault in direct hydrogeological connection with the catchment. The source of contamination is generally close to the catchment and the soils are often thin or sandy. The rest of the cases show a gradual increase in PPP concentrations. The contamination has then more diffuse or distant origins.

Root acting herbicides are the most commonly found. However, some contact products, such as bentazone, are also found. The latter is particularly problematic.



At the end of the process, the file is sent to PROTECT'eau which sets up a "catchment contract". This aims to implement, at the level of the **catchment supply area (ZAC)**, actions that promote water quality with concerned farmers, over a three-year period. This collaborative method allows farmers to be supported in their process of implementing measures as well as to be aware of the pressures exerted by agriculture on water resources.



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EO4AGRI PREPARES A EUROPEAN CAPACITY FOR IMPROVING OPERATIONAL AGRICULTURE MONITORING

THE CRA-W IS INVOLVED IN THE PROCESS OF REFLECTION ON THE IMPROVEMENT OF AGRICULTURAL MONITORING CAPABILITIES OF THE EUROPEAN SYSTEM FOR MONITORING THE EARTH- "COPERNICUS".

"Copernicus" is the European Union's (EU) Earth Observation Programme. It provides near real-time global data, also used for local and regional needs, helping to understand our planet better and establish strategies for sustainable management of our environment. Access to «Copernicus» data and information is open and free.

Agricultural areas represents around 40% of the total area of the EU and 43.5% of Wallonia. It is therefore one of the main applications of the "Copernicus" Land Monitoring Service.

EO4AGRI, a project financed by the European H2020 programme, brings together several active partners recognised at the European and global level (<http://eo4agri.eu/>). This project's objectives are:

- summarise the current operational capabilities of "Copernicus" in agriculture for farmers and agricultural entrepreneurs, insurance companies, the Common Agricultural Policy (CAP) at the EU level and in terms of food security at the global level;
- analyse the needs in terms of spatial imagery and field data at the local, regional and global scales;
- propose solutions to improve the agricultural monitoring capabilities of "Copernicus".



In this project, the CRA-W is responsible for action on **"the estimation and forecasting of agricultural yields"** and participates in actions relating to **"precision agriculture, food security and the CAP"**. This involvement is related to other CRA-W research projects that use satellite data: SAGRIWASENT, CAR-TOFOR, BCGMS, BELCAM, UAVSOIL, etc.

The need for field data to calibrate and validate the different models and/or satellite images is considered a priority for the majority

of applications in agriculture, from the local to the global scale. Finally, among the other possibilities to improve the agricultural monitoring capabilities of "Copernicus", we find: higher spatial resolution for meteorological satellites and better interoperability with terrestrial weather stations, availability of thermal imagery and better use of radar and hyperspectral images.



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THE CRA-W LAUNCHES ITS "DUCASSE"

IN MAY 2020, THE CRA-W RECEIVED A "COMMUNITY PLANT VARIETY PROTECTION CERTIFICATE" ISSUED BY THE COMMUNITY PLANT VARIETY OFFICE (CPVO/OCW) FOR A SECOND APPLE VARIETY RESULTING FROM THE CRA-W IMPROVEMENT PROGRAMME.

This programme is based on the dynamic enhancement of old Walloon varieties used as parents because of their characteristics of tolerance to diseases, robustness and, finally, taste and nutritional qualities. This is a selection, resulting from the cross between the old Walloon variety 'Reinette Libotte' – a subtype of the 'Reine des Reinettes' and the 'Rubinola' variety, a complex hybrid – possessing the *Vf* gene of resistance to common strains of scab.

It was selected through a participatory selection process, both cross-border with arborists in Organic Agriculture, in partnership with the Hauts-de-France Regional Centre for Genetic Resources (CRRG) and with the

Association of Arborists practising Integrated Techniques in Wallonia (GAWI). Distribution in Belgium and France of this new variety is done exclusively through the regional producer groups: the 'GAWI' (PFI) and 'NOVAFRUITS' (BIO).

'Ducasse' represents all the joviality after the hard work, friendliness, spirit of collaboration and rich flavours of Wallonia.

In addition to its disease tolerance and its regular production, it particularly excels by its taste qualities which combine aromas, good acid/sweet balance, and above all, very high ability to maintain its organoleptic qualities after many months of preservation.



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