



Fonio, a forgotten cereal from West Africa

Among the traditional cereals of West Africa, fonio (*Digitaria exilis*), is considered to be one of the most ancient. In a region that runs from Senegal to Chad it is the main food for several million people and therefore, as a food staple, has a strategic role in increasing the nutritional security of these populations. The cereal is mainly grown in Guinea Conakry where it accounts for more than 60% of cultivated land on the Fouta Djallon plateau. Its characteristics are the small size of its grain and its ability to adapt to extreme conditions, whether in terms of the availability of water or minerals. However, this small grain size means that post-harvesting tasks such as hulling, washing and bleaching are extremely tedious but although this is a brake on its expansion there is very real potential for improvement.

To increase fonio's potential the European Union is financing an international research project, FONIO, which is coordinated by CIRAD and has interdisciplinary teams from three European countries (France, Holland and Belgium) and four African countries (Mali, Guinea, Burkina Faso and Senegal).

The main objective of the project is to improve the quality and diversity of products derived from fonio to build up exports and so increase producers' and manufacturers' incomes. Increasing fonio's local competitiveness by improving the productivity of the material in different fields of activity is also one of the results anticipated from the project.

In order to achieve these objectives, the project partners are working both on research into suitable varieties, improvements in systems of cultivation, innovation in terms of post-harvest mechanisation and the organisation of related sectors.

The main objective of the WP6, to which the CRA-W contributes, is to acquire greater understanding of cropping systems based on fonio and to study possible improvements in terms of productivity.

Website: <http://inco-fonio.cirad.fr/>

**Contact : Brice Dupuis
dupuis@cra.wallonie.be**

In Vitro anniversary meeting in Gembloux

The Belgian Plant Tissue Culture Group (BPTCg) has chosen Gembloux to celebrate its 20th birthday. All the Belgian scientific community with an interest in the in vitro culture of plants and the companies that use in vitro technologies for the mass propagation of high quality plants or the creation of new varieties, had a date on the 26 October 2006, to celebrate 20 years of the group's existence.

Since 1985 the BPTCg has been developing exchanges of expertise between university teams, higher institutes and research centres in order to promote the development of new technologies at industrial level. Amongst the 100 delegates registered almost from Belgian institutions, some had come from the Netherlands, Germany, Bulgaria, Romania and Tunisia. They came to take part in a programme that consisted of a number of scientific papers, several posters and moreover to present their own original results.

This type of event provides an opportunity to make assessments of the progress and to share future prospects and indeed this aspect formed the keynote theme of the day. It was clear that the problems of physiological nature that were essential

when the BPTCg originated, had still not found clear explanations even though the know-how had allowed companies get round with relatively satisfactory effectiveness. Although a century has passed since Haberlandt 'prophesied' cellular totipotency in plants, knowledge about cellular determinism remains insufficient. The economically profitable development of certain techniques of plant propagation and the creation of genetically modified plants for agricultural use is held up by a bottleneck caused by lack of knowledge concerning plant regeneration. Tools for one-off or continuous measurement of plant behaviour are being developed in the areas of biochemistry, image analyses and molecular biology. They should provide regulations ways of culture conditions including the use of plant growth regulators. Even though the efficacy of genetic engineering techniques became more and more sophisticated and has been demonstrated on model plants, this still remains usable for a limited number of plants of economical interest.

2007 coincide with forty years of researches activities and of pre-industrial developments into in vitro culture by the CRA-W. Although the primary aim was virus eradication using meristem culture,



the "Plant Propagation Unit" very quickly investigated in perfecting new and high performing propagation techniques that preserve the genetic conformity. Fruit, vegetable, forest and ornamental plant species from both tropical and temperate regions were concerned. At present, some research is exploring widening genetic diversity and better controlling regeneration including at cellular level.

Contact : Philippe Druart,
druart@cra.wallonie.be

A quarantine laboratory (L2Q) for the handling of regulated fungi at the CRA-W

Since 2002, the Mycology Laboratory of the CRA-W has been developing research activities on *Phytophthora ramorum*, a quarantine pathogen that mainly infects woody ornamental plants in nurseries. It has also taken part to the survey set up by the Belgian Plant Protection Service (AFSCA) for the detection of different quarantine pests. To meet European and regional bio-security requirements, the CRA-W acquired a quarantine laboratory in 2006. This laboratory complies with the requirements of the Regional legislation (directive from the Walloon Government of the 18 April 2002). Among other things it comprises:

- An air lock that separates the quarantine organism's handling areas from the outside area. The air lock allows staff to change (overalls and shoes that are used only for handling organisms in the L2Q)
- A work area that has interconnected air intake and extraction systems
- A waste water decontamination system that treats the water before it reaches the drains

- A system for the collection of waste and/or waste biological materials before their inactivation.

- Equipment required for microbiological work (microscope, vertical laminar flow cabinet with ULPA filter) and molecular biological work (nucleic acid extraction).

Following an AFSCA inspection of the laboratory in July 2006, the Mycology Laboratory received approval for research dealing with regulated fungi pathogenic on plants. It is also part, as the Virology Laboratory of the CRA-W, of the consortium of AFSCA approved laboratories for the detection of quarantine pests that infect plants.



The quarantine laboratory (L2Q)

Contact: Anne Chandelier,
chandelier@cra.wallonie.be

Biotechnology in the land of black gold



On the 24 April last, the CRA-W was visited by

His Excellency Sheikh Abdulrahman Bin Khalifa Al-Thani, the Qatari Minister of Municipal Affairs and Agriculture who was accompanied by several members of his administration as well as His Excellency Abdulla Falah Abdulla Al-Dosari, the Qatari Ambassador to Belgium and Head of the Diplomatic Mission to the European Union.

The visit of this official delegation, which was in Belgium from 22 to 26 April 2007, was part of continued programme of contacts begun by the Qatari authorities and Belgis Biotech, a spin off company that has recently been formed and which has its headquarters in the CRA-W's Biotechnology Department.

The creation of Belgis Biotech was to satisfy the need for a company to develop the results of the work on which the CRA-W and Glorier Seeds were collaborating on. This work mainly

concerned the design and implementation of an innovative method for the unequalled control of the conditions of *in vitro* growth of plant tissues, Biorak, and the use of this system for the production of genetically identical plants such as date palms. The partnership agreement signed between the parties gives Belgis Biotech the rights to use these results commercially while at the same time giving the CRA-W a financial reward on the profits obtained from the spin-off.



Contacts: Sergio Mauro, mauro@cra.wallonie.be,

Bernard Watillon, watillon@cra.wallonie.be

A win-win partnership between the plant and animal sectors

The half-day study programme that took place on the 23 May 2007, during the celebration of the 40 years of the Livre Blanc, looked at possible synergies between plant and animal fields of activity particularly as part of the development of the bio-fuel industry and the massive development of their co-products on the raw materials market for animal feeds.

For the production and animal feed sectors, which are the main clients of the large agricultural businesses this will involve changes in economic planning (flow changes and changes in the prices of raw materials) and feed preparation (quality and quantity of available co-products).

Up till now, says Olivier Lapierre, the Director of CEREOPA (Centre for Research on the Economics and Management of Animal Production in Paris), the animal and plants sectors have not concerted their strategies and it is market force that have usually made the choice of one or the other. In Wallonia, Silvina Dantas Pereira, the head of the large agricultural businesses consortium confirms that the two sectors do not work together and there is a lack of contractual agreements.

However, if the bio fuel sector wishes to become profitable, the animal sector will need to use its co-products as much as possible. Especially as the supply and price of cereals is bound to change because of competition between human foodstuffs, animal feeds and bio-energy. This all raises new questions for those producers that have distinctive quality products, who have promoted cereals as a major component of animal feeds, in part as a response to the wishes of consumers in terms of security, innocuity and traceability.

The traceability and innocuity of co-products are equally a constant worry for the manufacturers of foodstuffs who have put in place strategies for self-control and assessment of potential hazards. Yvan Dejaegher, the director of APFACA (Professional Association of Manufacturers of Animal Feed Concentrates) is concerned about the quality of the proteins (digestibility and amino acid composition) of the co-products.

In short there are still a great many questions to be answered. In the view of our colleague Yves Schenkel, the president of ERBE (Regional Biomass Energy Team), our society will need to

change in a hurry, given that climate change is accelerating, fossil fuels are running out and society is expecting more in terms of good quality, functional, healthy foods that do not damage the environment.

To illustrate his argument Yves Schenkel described bio-refineries that use not just part of the plant but all of it, which means that by 2020 they should be reaching, if not going beyond, the level of 10% of oil based fuels being replaced by bio-fuels.

40ans Livre blanc



Contact : Nicole Bartiaux-Thill, bartiaux@cra.wallonie.be

Keeping ware potatoes without sprout inhibitor is possible!

For the long term preservation of ware potatoes the use of sprout inhibitors is widespread both industrially and by the amateur gardener. There is a need to look for an alternative to conservation using sprout suppression products as the innocuousness if these products are not ensured when an overdose is given (which is frequently the case as applications are very mixed) and its effectiveness is impaired when there is under-dosing.

The keeping of tubers at low temperature (at about 4°C) seems to be a useful technique at least for a certain number of common potatoes as shown in the annual trials, undertaken by the CRA-W (Crop Production Department and Farming Systems Unit) and FIWAP, from October to May between 2000 and 2006 on 40 current varieties.

The usual temperature for long-term conservation of ware potatoes is 7-8°C and is combined with sprout inhibitors (CIPC). With lower temperatures, it has been shown that tubers undergo a process of rapid and widespread sugaring (consisting of an increase in saccharose or simple sugars following the hydrolysis of the starch) that lessens the quality of the batches of potatoes. Chips and crisps become browner and bitter (Maillard reaction), while potatoes eaten fresh have a much sweeter taste and are generally not liked.

Nevertheless the trials undertaken at the CRA-W showed that 13 varieties of the 40 tested were able to withstand keeping at 4°C without any loss of quality and, despite the absence of CIPC, without the appearance of sprouts until the end of March. Among the more well-known varieties there was, for example, Charlotte. These results show, therefore, that there is potential among the varieties for keeping at low temperature and that this will no doubt be exploited when different varieties are selected and indeed it has been, for some years now, one of the selection criteria with certain purchasers. There are

Variety showing bad quality aspect after storage at low temperature (4°C)

(French fries are clearly browner at 4°C comparatively to 7°C storage)



Storage at 7°C (2005 January)



Storage at 4°C (2005 January)

other advantages too to low temperatures: lessening of weight-loss, maintenance of the tuber's fresh appearance (tubers do not soften), reduced development of silver scab (*Helminthosporium solani*), dry rot (*Fusarium* spp), and some bacterial rots (*Erwinia* spp.).

Variety showing good quality aspect after storage at low temperature (4°C)

(French fries baking colours at 4°C and 7°C storage are similar)



Storage at 7°C (2006 May)



Storage at 4°C (2006 May)

Contacts : Jean-Pierre Goffart,
goffart@cra.wallonie.be
Alice Soete, soete@cra.wallonie.be

20 September 2007

12th annual day conference on forage

Fauvillers

Fertilisation and mineral supplements in stock-rearing

Contact: Didier Stilmant,
stilmant@cra.wallonie.be

23 September 2007

Discovering biodiversity

Gembloux

Open day - Department of Biological Control and Plant

Genetic Resources

Free entry from 11.00 to 17.00

Contact: Marc Lateur,
lateur@cra.wallonie.be

17 October 2007

Pig and poultry production

Gembloux

7th Day Conference on Pig and Poultry Production

Contact: Benoît Rixen,
rixen@cra.wallonie.be

8 November 2007

Multivariate analysis of images

Gembloux

An introduction to image analytical tools and chemometric methods

For more information:

<http://www.cra.wallonie.be/module/manifestations>

Contact: Juan Antonio Fernandez Pierna,
fernandez@cra.wallonie.be

27-28 November 2007

FEEDSAFETY International Conference 2007

Methods and Challenges

Namur

Organisation: CRA-W and Agrobiopôle wallon

For more information:

<http://safeedpap.feedersafety.org/fs2007/>

Contact: Juan Antonio Fernandez Pierna,
fernandez@cra.wallonie.be