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Edito

Since its inception, Agropolis Fondation has always been open to forge linkages with partners who are also committed to sustainable development, capacity building and knowledge-sharing.

Mid-September, we signed a Partnership Agreement with Fondazione Cariplo heralding the start of our international collaboration in the field of agriculture and food. Our first joint venture will focus on rice given its centrality in both the economy and nutrition in most of the developing world where the availability of this staple crop is often equated with food security. This is expected to be in full synergy with and complement major international initiatives such as the Global Rice Science Partnership (GRISP) of the Consultative Group on International Agricultural Research (CGIAR).

We are also reinforcing our partnership with the AWARD (African Women in Agricultural Research and Development) programme, particularly in the expansion of the programme to Francophone Africa building on the historically strong relationship between France and Francophone Africa and tap on the wealth partners (e.g., national research institutions, NGOs, farmers/producers organizations, etc.). Together, we are exploring potential involvement and support of other key players in France and in Europe.

Agropolis Fondation has supported the establishment of the UNESCO Chair on World Food Systems (*"Alimentations du Monde"*) and the on-going dialogue on Access and Benefit Sharing (ABS) on genetic resources for food and agriculture (GRFA) under the auspices of the Inter-governmental Commission on Genetic Resources for Food and Agriculture of the UN Food and Agriculture Organization.

Finally, we are pleased to announce that the Foundation received its ISO 9001 (International standard for Quality Management Systems) certification in June for its whole range of activities. We hope that this will further boost the confidence of current and future partners in collaborating with us.

*Henri Carsalade, Agropolis Fondation Chairman of the Board
and Anne-Lucie Wack, Agropolis Fondation Director*

News digest



Agropolis Fondation is ISO 9001 certified

Agropolis Fondation received its ISO 9001 (International standard for Quality Management Systems) certification on 01 June.

The ISO certification demonstrates the Foundation's commitment to quality and professionalism thus ensuring the transparency, reliability, efficiency, effectiveness and reactivity of its actions. The quality certification covers all of the Foundation's activities, i.e., Calls for Proposals; selection, funding and monitoring of international high-level scientific projects and fellowship programmes in the field of agricultural sciences and sustainable development as well as management of the Foundation's resources, including its financial assets.

The Foundation's ISO audit was carried out by Bureau Veritas.

[Click here to read Agropolis Fondation's Quality Policy >](#)

Agropolis Fondation and Fondazione Cariplo sign Partnership Agreement

Agropolis Fondation and Fondazione Cariplo signed, on 16 September, a Partnership Agreement that heralds the start of international collaboration in the field of agriculture and food between the two European foundations. Their first joint action focuses on rice research.

Product of an intensive negotiation process, the Partnership Agreement signed today by Giuseppe Guzzetti, President of Fondazione Cariplo and Anne-Lucie Wack, Director of Agropolis Fondation, aims to support the research activities in Lombardy and Montpellier, two European poles of excellence in agriculture and agri-food research.

The Signing Ceremony heralds the start of collaboration between the two Foundations, both with long-standing commitment in the promotion of research in the field of agricultural sciences.

The two foundations decided to focus their initial collaboration on rice given its centrality in both the economy and nutrition in most of the developing world where the availability of this staple crop is often equated with food security.

With each foundation contributing €1 million, the two foundations launched FIRST (French-Italian Rice Science and Technology) Initiative which is aimed at developing and supporting scientific research in the agri-food sector as well as in facilitating the emergence of excellent, innovative and potentially high-impact research on rice. It also aims to support and complement international initiatives on rice such as the Global Rice Science Partnership (GRiSP) which involves global research players such as the International Rice Research Institute (IRRI), AfricaRice and the International Center for Tropical Agriculture (CIAT).

The FIRST Initiative will promote common actions between Agropolis Fondation and Cariplo involving scientists and researchers from France, Italy and developing countries in a joint effort to contribute to knowledge sharing and scientific capacity building. The two entities will build on their respective strengths, including their network of stakeholders and capacity to leverage funding in order to foster synergy in promoting scientific excellence and relevance while maximizing impact.

The collaboration between the two foundations will be anchored on original scientific approaches privileging integration (from genes to systems, up to the final use of products) and interdisciplinary approach (biological sciences, engineering and social sciences).

This joint initiative will fund development-oriented rice research as well as the mobility and exchange of professors, scientists, researchers and students from France, Italy and rice-producing developing countries.

Fondazione Cariplo (www.fondazione-cariplo.it) is an Italian private and not-for-profit grant making foundation. Cariplo's mission, role and operational strategy is to act as an entity that anticipates emerging needs - or selects deep-seated yet still unmet needs - tries new solutions to respond more effectively and less costly to them, and ultimately makes its best endeavors to disseminate successful solutions. Among others, Cariplo funds a number of research and technology transfer projects in agriculture and agro-food sector. It supports research projects with the potential to yield major innovative applications, mainly in terms of improving production processes and developing innovative technology.

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Fondazione Cariplo President Giuseppe Guzzetti and Agropolis Fondation Director Anne-Lucie Wack sign the Partnership Agreement in a ceremony held on 16 September 2011 in Milan, Italy

Why FIRST (French-Italian Rice Science & Technology) Initiative?

More than 3.5 billion people worldwide depend on rice for more than 20% of their daily calories. More than a billion people depend on rice cultivation for their livelihoods. About 90% of rice is grown in Asia's 200 million rice farms, most of which are smaller than 1 hectare. Rice-growing is the main economic activity of millions of rural poor in this region. Rice is the fastest growing staple in Africa with this region contributing to about 3.4% of the world's production as is the case in South America.

Although not a major food crop in the region, rice consumption is slowly but steadily increasing in Europe. Not only the cost of rice production remains relatively high in this part of the world, there are a number of constraints associated in producing it, e.g., low temperature, water scarcity and biotic stresses. These are similar to the limitations facing the rice producing countries in Asia and other parts of the world.

One of the main challenges is therefore to ensure rice supply by boosting its production with less land, water, labor and other inputs, in more efficient, environmentally-friendly production systems.

To be able to contribute in responding to this challenge, Fondazione Cariplo and Agropolis Fondation are joining forces to develop and support scientific research in the agri-food sector focusing on rice.



Agropolis Fondation supports the creation of UNESCO Chair in World Food Systems

A partnership to create a Chair in World Food Systems ("Alimentations du Monde, ADM") in Montpellier was created at the initiative of Montpellier SupAgro, one of Agropolis Fondation's charter members, and several members of Agropolis International. Approved by the United Nations Education,

Scientific and Cultural Organization (UNESCO) in May 2011, the activities associated with this chair starts in autumn 2011 with the financial support of Agropolis Fondation.

It is through the active support of the French National Commission for UNESCO and of the members of

Agropolis International, foreign universities, the Regional Council of Languedoc-Roussillon and the association Terroirs & Cultures, that the ADM Chair has obtained UNESCO endorsement.

The UNESCO/UNITWIN (University Twinning and Networking Programme) Chairs are intended to contribute to the development of education, research, and the transfer of knowledge, to which UNESCO adds a "Think Tank" role that generates ideas for debate. The objective is to create an international structure of centers of expertise. In September 2011, 715 UNESCO Chairs and 69 UNITWIN Networks had been established in over 830 institutions in 131 countries.

Montpellier currently has 30 training programmes and research laboratories working in the field of food systems that will be able to work with the UNESCO Chair in World Food Systems, in partnership with a dozen foreign universities.

Coordination is planned with the UNESCO Chairs on "Preservation and Development of Food Heritage and Culture" at the University François Rabelais at Tours, and on "Wine Culture and Traditions" that was created in 2007 in Dijon.

The objective of the Chair is to contribute to the construction of more sustainable food systems in the world. The Chair will develop a knowledge base by mobilizing research in biotechnical science laboratories and in social sciences in the UNITWIN network. The activities programmed for the ADM Chair include: establishment of educational courses on the basis of European credits (ECTS) at Montpellier SupAgro and the French and foreign institutions in the UNITWIN network; launch of a travelling international training module on strategic approaches to food security; creation of an Award for students' work; organization of an annual international seminar on current topics in world food systems; hosting of foreign teachers and researchers; and creation of a website dedicated to the UNESCO ADM Chair.

Using these tools, the goal of the UNESCO ADM Chair is to increase and disseminate academic and empirical knowledge of **food systems in the world, their diversity, their dynamics and their human and environmental impact from a sustainable development perspective**, through a multidisciplinary approach applied at different levels of governance (local, national, and international).

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Feedback from the Seminar Workshop on the expansion of the AWARD Programme in francophone Africa

Agropolis Fondation forges new partnership with AWARD

In Francophone Africa, women perform 47 per cent of the agricultural labor, but only 16 per cent of the agricultural research labor force is female, according to a recent FAO study.

To address that imbalance, Agropolis Fondation and African Women in Agricultural Research and Development (AWARD) have forged a new partnership to explore ways to build science and leadership capacity among Francophone African women scientists involved in agricultural research.

Agropolis Fondation hosted a two-day workshop (June 8-9) in Montpellier, France, to discuss feasibility plans for AWARD's expansion. AWARD currently serves African women agricultural scientists from one Lusophone and 10 Anglophone countries. Funded by the Bill & Melinda Gates Foundation (BMGF) and the United States Agency for International Development (USAID), AWARD is seeking additional partners to support its expansion to up to 11 francophone countries. Representatives from 10 international institutions, including USAID and BMGF, attended the meeting, as well as Steering Committee, Board, and staff members from AWARD and Agropolis Fondation.

Participants at the workshop discussed an in-depth feasibility study, sponsored by USAID and conducted by Dalberg Global Development Advisors on behalf of AWARD, which looked at ways to strengthen the current pool of Francophone women agricultural scientists and encourage more women to consider a career in agricultural research. AWARD is a professional development program that strengthens the research and leadership skills of African women in agricultural science, empowering them to contribute more effectively to poverty alleviation and food security in sub-Saharan Africa. Launched in 2008, AWARD has provided two-year career-development fellowships to 250 African women scientists.

"We are extremely grateful for the outstanding support that we have received from USAID that enabled us to conduct this study, and to Agropolis Fondation's vision in bringing together key stakeholders from across Europe to look at how we can make this dream a reality..."

Women from Francophone African countries are not part of AWARD and there is a need to include them, according to the study. The Dalberg team conducted 110 interviews about the current status of women in agricultural research with government officials, research and academic institutions, and non-governmental organizations in eight Francophone countries.

"We are extremely grateful for the outstanding support that we have received from USAID that enabled us to conduct this study, and to Agropolis Fondation's vision in bringing together key stakeholders from across Europe to look at how we can make this dream a reality," said Vicki Wilde, director of the Consultative Group on International Agricultural Research's Gender & Diversity Program, of which AWARD is a project. *"We plan to continue our discussions, and we welcome queries from potential funding partners,"* she added.

"I am very pleased to see that the initial discussion we started last year on how we, Agropolis Fondation and the AWARD Programme, can work together in supporting scientific capacity building of African women, is coming into fruition. We are cognizant of the initial efforts and early success of the AWARD



From L to R: Representatives from the Bill & Melinda Gates Foundation, CGIAR Consortium, Agropolis Fondation (President and its Director) and USAID during the Francophone AWARD Seminar held in June 2011 in Montpellier

programme in Anglophone Africa and we are particularly keen on seeing the programme expanded to Francophone Africa," said Anne-Lucie Wack, Director of Agropolis Fondation.

Article contributed by Karen Homer, AWARD Communications Manager.

Featured Project



Tunisian PhD student
Rania Ben Saad spent a total
of 9 months at the REFUGE
Platform © R. Ben Saad

Southern France offers REFUGE to plant scientists

REFUGE (RiCE Functional GENomics), an international scientific platform for the elucidation of gene function using rice as a model species, was unveiled in Montpellier in March 2009. The platform offers plant scientists an access to know-how, bioinformatic, biological, and molecular resources.

With the aim of becoming an experience-sharing site for plant scientists from the North and the South, REFUGE provides access for short research stays in any of its participating laboratories. During their visit, scientists (mainly PhD and postdoctoral researchers, notably

from the South) can carry out functional analysis of genes of agronomic importance, using rice as a model system, with a focus on plant development and stress resistance genes. They can carry out one or several visits lasting from one to three months at a time with REFUGE staff taking care of the materials produced in between their stay. Visiting scientists gain access to expertise and know-how, including bioinformatic searches, preparation of T-DNA vectors, high-throughput production of rice transformants, molecular characterization of the transformants, genotyping of insertion lines from local and international collections; growth, crossing and phenotyping in containment greenhouse; and access to cell imaging and genotyping platforms.

"At the REFUGE platform I have access to all the equipment and the high-level supervision necessary to do my research. The whole staff is very helpful and accommodating..... I have learned many techniques in molecular biology, physiology of rice, imaging and histology. This has helped me to achieve my research objectives in optimal conditions and to publish papers in international scientific journals..."

Miss Rania Ben Saad, a PhD student from the Centre of Biotechnology of Sfax (Tunisia) who works on improving abiotic stress tolerance in cereals, is among the 17 scientists who have been hosted at the platform between March 2009 and July 2010. She spent a total of nine months (spread into three visits of three months each) in Montpellier.

"At the REFUGE platform I have access to all the equipment and the high-level supervision necessary to do my research. The whole staff is very helpful and accommodating. Working at the platform is also a great opportunity to meet colleagues of different nationalities who are working on many different subjects. This is a very good opportunity for rich exchanges," says Ben Saad.

One of the objectives of the REFUGE platform is to enable the visiting scientists to produce high quality publications and further access to funding sources.

"I have learned many techniques in molecular biology, physiology of rice, imaging and histology. This has helped me to achieve my research objectives in optimal conditions and to publish papers in international scientific journals. My first visit at the platform helped me to publish my first paper in Plant Molecular Biology. I have also submitted two other papers which are the results of the work performed during my last two trainings," claims Ben Saad.

Funded by Agropolis Fondation, REFUGE is a collaborative venture between the joint research unit 'Plant development and genetic improvement' – regrouping laboratories from Inra, Cirad and Montpellier University and Agronomy School– and the 'Plant Genome and Development' laboratory at IRD and Perpignan University .

Further details about the REFUGE Platform

<http://www.refuge-platform.org>

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Featured Fellow



AWARD-Agropolis Fondation
Fellow Bolanle Otegbayo with her
French research supervisor in
Montpellier. Dr. Olivier Gibert.
©K. Homer.

Yen for yams: Nigerian scientist works to improve the king of crops

Dr. Bolanle Otegbayo has a yen for yams. This researcher is determined to help farmers capitalize on "the king of crops" as *Dioscorea* is known in her native Nigeria, which produces 68 per cent of the world's yam harvest (50 million tonnes). The QualiSud Joint Research Unit hosted by Cirad, one of Agropolis Fondation's research units, is helping her do just that.

Yams are more than a mere tuber to Nigerians, says Otegbayo. *"Yams are intimately linked to our economic, social, and cultural life. For instance, a man must give yams as part of a bride's dowry. And no ceremony is complete without a dish of pounded yams. Every farmer grows them,"* explains

Otegbayo, a lecturer at Bowen University in Nigeria, who recently completed a three-month research attachment with QualiSud.

Yam is the second most important root/tuber crop in Africa with production reaching just under one third the level of cassava. More than 95 per cent (2.8 million ha) of the current global area under yam cultivation is in sub-Saharan Africa, where mean gross yields are 10 tons/hectare. Yams are consumed by 60 million people daily in Africa alone, but production of this traditional crop is threatened.

Otegbayo wants to break that unprofitable cycle by developing new yam products. *"My current research is focused on determining the food quality and industrial potential of Nigerian yams that will contribute to expansion and diversification of their use," she explains. "I'm looking at how to make yam starch that could be used as a commercial thickener. I want to determine the molecular composition of yam starches and understand their functional properties. I believe this will have a lasting impact on the nutritional and food security status in my country,"* adds Otegbayo.

"Farmers are investing their small capital, but they aren't making a profit because they can't get their produce to market before its spoils," said Otegbayo. "They can lose up to 30 or even 40 per cent of their yam crops annually because they lack storage. We could be commercially producing and processing yams for export, but so little of that is happening."

In her university lab in Nigeria, Otegbayo lacked the equipment needed to investigate yam starches properly. She hoped to obtain a research grant to purchase equipment, but winning such funding is rare in developing countries.

In 2009, Otegbayo applied for a fellowship from African Women in Agricultural Research and Development (AWARD). She successfully competed with 785 fellow researchers from 10 African countries for one of 60 coveted places. Funded by the Bill & Melinda Gates Foundation and USAID, AWARD is a professional development program that strengthens the research and leadership skills of African women in agricultural science, empowering them to contribute more effectively to poverty alleviation and food security. Launched in 2008, AWARD now has 250 African women scientists who have benefited from its program.

"Working in Montpellier has been a tremendous opportunity to improve my technical skills... I've learned so much that I will apply these in my lab at home—from lab procedures to using technical equipment. The scientists here have been so open and supportive..."

Working in partnership with AWARD, Agropolis Fondation is providing research attachments for AWARD Fellows. Otegbayo is the first AWARD-Agropolis Fondation Fellow—and the first Nigerian—in the program. She worked at the QualiSud Joint Research Unit from May to July 2011, under the supervision of Dr. Olivier Gibert of CIRAD's Food Technology Department.

"Working in Montpellier has been a tremendous opportunity to improve my technical skills," said Otegbayo. *"I've learned so much that I will apply in my lab at home—from lab procedures to using technical equipment. The scientists here have been so open and supportive,"* said Otegbayo, who spoke little French when she arrived, but soon mastered the basics.

"Bolanle contributed greatly to QualiSud as one of the world's leading scientists in yam and cassava research," said Gibert. *"She shared her networks and linked us to food researchers across Africa. We have profited from her presence."*

Otegbayo's fruitful experience in Montpellier has prompted Agropolis Fondation to host four AWARD Fellows for research attachments in 2012.

Article contributed by Karen Homer, AWARD Communications Manager.

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[Click here to learn more about our Agropolis Fellows](#)

Flagship Programmes



The experts dialogue gathered together around 30 experts from various sectors who are users of genetic resources in agriculture sector (plants, farm animals, aquaculture, forest, microbes, invertebrates). © S. Louafi

Multi-stakeholder experts' dialogue on Access and Benefit Sharing (ABS) on genetic resources for food and agriculture

ARCAD, short for Agropolis Resource Center for Crop Conservation, Adaptation and Diversity, is aimed at setting up a an open multi-function (conservation, research and training) platform devoted to the assessment and better use of plant agro biodiversity in Mediterranean and tropical regions. Its focus is on the relationship between crop diversity and the processes of domestication and adaptation to the agricultural environment. The issue of access and benefit sharing is among the issues importance to this undertaking.

A multi-stakeholder experts' dialogue on Access and Benefit Sharing (ABS) on genetic resources for food and agriculture (GRFA) was organized in Montpellier in April 2011.

Supported by Agropolis Fondation, the event gathered together around 30 experts from various sectors who are users of genetic resources in agriculture sector (plants, farm animals, aquaculture, forest, microbes, invertebrates).

Despite different perspectives, the event allowed for informed discussions that emphasized specificities common across the different sub-sectors in the field of food and agriculture, particularly those relating

to modes of conservation, use and exchange of the genetic resources. These meetings thus concluded with the need to better take into account these specificities for the development and implementation of a legal and administrative framework on the access and benefit sharing both at the national (within the framework of the Convention on Biological Diversity's Nagoya Protocol) and international levels.

This strong message, coming from agricultural users of genetic resources from around the world, was conveyed, through a Report of Experts, during the 13th Session of the Inter-governmental Commission on Genetic Resources for Food and Agriculture held at the UN Food and Agriculture Organization last July in Rome. (Click here to access the full report: <http://www.fao.org/docrep/meeting/023/mb720e.pdf>).

A parallel workshop was also organized during this same session. On the basis of these initial results, the FAO Commission agreed to establish an ad hoc Working Group mandated to identify various methods of access and benefit sharing that is likely to address the specific issues confronting use of genetic diversity for food safety.

Agropolis Fondation's support complements that of the University of Louvain-la-Neuve (Belgium) which funded and hosted a prior workshop held on 25-26 January 2011.

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PI@ntNet: Modernizing plant identification

PI@ntNet is a web-oriented scientific, informative and educational network and software platform dedicated to the collaborative gathering, sharing and use of large, multi-disciplinary datasets on tropical and Mediterranean plants.

This initiative includes, among others, new easy-access tools dedicated to automated plant identification, to the establishment of potential distribution maps of useful or key plant species and plant communities, and to the search and exploitation of internal as well as external knowledge banks on plant uses and production.

Since the project launch in October 2009, PI@ntNet scientists have published several datasets in leading scientific journals and online. They are also active in the international landscape in order to share results being achieved and to explore potential collaboration.

For instance, PI@ntNet has also been presented in various international congresses including at the Institute of Electrical & Electronics Engineers (IEEE) Computer Vision and Pattern Recognition Conference (June 2011 in Colorado Springs, USA) and at the International Botanical Congress (July 2011 in Melbourne, Australia).

Some of the project's case studies are in a relatively advanced stage. The PI@ntScan case study, initiated last year, has produced a large image bank of tree leaves, with important contributions from Tela Botanica members. Interesting results in plant leaves description and analyses were obtained from this dataset and will be presented at the Cross-Language Evaluation Forum (CLEF) Conference in September in Amsterdam, the Netherlands. Further results from this case study will also be shared at the ACM Multimedia Conference in Arizona in November 2011.

The PI@ntGrape case study has been completed recently. An official online catalogue of French vine varieties and clones, richly illustrated and documented, supplemented with a free graphic identification tool based on the IDAO technology, interactive open source software for graphical identification will be launched soon following the successful completion of the case study.

The project web site (<http://www.plantnet-project.org>) has likewise been updated and enriched with a social network.



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Grand Federative Projects

Towards the end of 2010, the Foundation's Board has approved funding support for three major initiatives which aimed at reinforcing the Foundation's focus towards interdisciplinary approach, innovation, integration and international partnerships.

These programmes are development- and innovation-oriented research activities which are expected to result into a real scientific breakthrough while addressing issues and challenges at the interface with upstream research disciplines or other scientific domains. Each of the projects received €1 million from Agropolis Fondation. The succeeding articles are brief updates on these three new programmes.



BIOFIS: Understanding the evolutionary processes implied in the establishment and spread of invasive pests

BIOFIS aims to develop, coordinate and communicate research actions on bioaggressors (insects, mites, trees, fungi and virus) in Europe and on their associated natural enemies.

The kick-off meeting of the BIOFIS (Bioaggressors and invasive species: from individual to population to species) project was held on 7 April 2011 at the Center for Biology and Management of Populations (CBGP) in Montpellier.

BIOFIS aims to develop, coordinate and communicate research actions on bioaggressors (insects, mites, trees, fungi and virus) in Europe and on their associated natural enemies. Among others, it will develop an accurate tool for the identification and characterization of potential invasive species, emergent pests and their natural enemies. This initiative is expected to contribute to better understand the evolutionary processes implied in the establishment (and spread) of invasive pests.

During the kick-off meeting, participants discussed modalities to better coordinate the various research actions of the project, namely (1) detection and characterization of present and potential bioaggressors at the species level; (2) key evolutionary questions associated to the emergence of invasive populations (experimental and theoretical approaches); and (3) specification and formalisation of recommendations for management practices against bioaggressors and invasive species.

Likewise, a discussion on the new legislation regarding the requirements in authorizing the introduction to the environment of non-indigenous macro organisms beneficial for plants particularly for biological control purposes was organized by the project team on 11 May 2011 at Inra Sophia Antipolis.

Attended by researchers and engineers involved in the BIOFIS project and representatives of government agencies, e.g., Ministry of Ecology and of Agriculture, the meeting aimed at motivating the involvement in the project of representatives of public bodies dealing with the formulation and implementation of norms and regulations. It was also organized to strengthen linkages between applied and academic sciences.



Mycosphaerella fijiensis
fungi in banana leaves
Photo © INRA

Aside from building on the expertise on the subject available in Montpellier, BIOFIS invites and hosts leading specialists from around the world to work with the team on specific topics. Such is the case of Professors Troy Day (Canada Research Chair in Mathematical Biology, Queen's University) and David Waxman (University of Sussex), both renowned experts in the field of evolutionary biology who have started their regular visits in Montpellier in early 2011. The two are involved in research actions addressing theoretical questions associated to the emergence of invasive populations.

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Rhizopolis: Addresses key challenges at the frontier of root biology

Rhizopolis, a federative project for plant root research, addresses several key challenges at the frontier of root biology. It aims to address the need to use nutrient and water resources more efficiently in producing crops, and in other human-influenced ecosystems.

It thus deals with important scientific challenges with direct relevance to pressing human concerns such as global food security, climate change and agricultural sustainability.

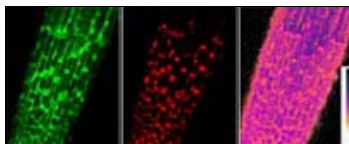


Fig. 2 (From left to right: Exc-405nm Exc-488nm Log ratio 405/488) Example of local pH imaging with the cytosolic pH sensor PtGFP in *Arabidopsis* root – Local pH value is determined ratiometrically by combining GFP signals obtained with excitation at 405 and 488 nm. Microscope Zeiss LSM 780 - Image J Software. N. Paris, unpublished results.

The Project Kick-Off meeting took place on 26 May 2011. The recruitment of six of the seven Research Fellows planned under the project has already been completed. Among the projects involving the fellows, two have already started in September, which focus on imaging techniques at microscopic and macroscopic levels for unravelling changes in pH within the rhizosphere. At the microscopic scale, transgenic plants of *Arabidopsis thaliana* will be produced that express a ratiometric pH nanosensor at the plasma membrane (See Figure 2 for an example with cytoplasmic pH nanosensor).

This will allow to assay the local pH values in the external medium at the immediate vicinity of the root cells. At the macroscopic scale, specific optodes sensitive to pH will be used to determine the spatial heterogeneity of the rhizosphere pH along the root system (Figure1). This will help identifying the various portions of the root system active in ion transport, in order to refine the functional models of nutrient acquisition by plants.

In October, a meeting of the Rhizopolis Model Integration Working Group will be organized in order to define a common strategy and common software facilities to coordinate the various modelling approaches planned in the project.

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Fig. 1 Optode-based device for imaging pH gradients in the rhizosphere of Durum wheat seedlings. Upon excitation with light, the pH-responsive optode (white rectangle in contact with the roots in the rhizotron) delivers a fluorescent signal correlated with the pH value. P. Hinsinger, unpublished results.



Faba bean-durum wheat association © E. Justes

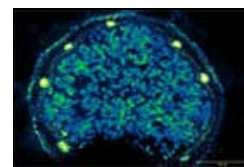
Fabatropimed: Promoting nutrient use efficiency through legumes

Faba bean-durum wheat association © E. Justes FABATROPIMED aims to address an issue of strategic importance: nutrient use efficiency, interaction between Nitrogen and Phosphorus; with legumes as tools to produce high protein content feed/food with much lower input; and biodiversity of soil bacteria and mycorrhizae.

Launched in December 2010 in Bamako (Mali) right after the African Association on Biological Nitrogen Fixation (AABNF) Conference, this project is

expected to contribute in enhancing the benefit of pulses for cereal cropping systems and the environment by (1) reducing the use of mineral-based fertilizers and increasing carbon-dioxide sequestration, and by (2) promoting the interaction between soil micro-organisms for plants to acquire and use nitrogen and phosphorus.

Fabatropimed is carrying out cooperative research in six agro-ecosystems using agricultural and environmental diagnostics. It also entails a sustainability and innovation survey which includes an interdisciplinary approach in monitoring the C, N and P soil cycles and the atmosphere. This links with the characterization of the microbial, symbiotic and rhizospheric functional diversity (i.e. in the soil areas influenced by roots) and the research of genes for the effective acquisition and use of phosphorus for the symbiotic fixation of nitrogen.



Phospho-enol pyruvate phosphatase (PEPase) localized in common bean nodules of P efficient (115) Photo © A Bargaz.

The research work is carried out by 12 PhD students who are jointly mentored by a French and an African researcher. Multi-locational field observations are being carried out within the framework of these doctoral studies, e.g., wheat cropping systems with faba beans (Morocco and Tunisia), with common beans, either as monocrop or in association with corn (Algeria), with cowpea for the zai cropping system (Burkina Faso) and with common bean, in monocrop or association with corn as well as in rotation with rice (Madagascar).

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About Agropolis Fondation



Quick facts

- Since its inception in 2007 with a €20M initial endowment, Agropolis Fondation has received €35 M complementary resources and pledges
- €14,5 M combined research funding commitment since inception
- Supported more than 100 projects involving about 300 partners from around the world and 175 international Fellows
- Supports five major projects (€9M total) :
 - Pl@ntNet, a collaborative database on Plants (crops, invasive species, weeds ...)
 - ArCaD, Agropolis Resource Center for Crop Conservation, Adaptation and Diversity
 - Biofis, Bioaggressors and invasive species: from individual to population to species
 - Rhizopolis, a federative project for plant root research
 - Fabatropimed, Ecological services of legumes for nitrogen and phosphorus biogeochemical cycles and C sequestration in cereal cropping systems in Africa & the mediterranean basin
- On-going partnerships and co-funding activities with the AWARD Programme (CGIAR), CAPES (Brazil), Fondazione Cariplo (Italy), and Inria (France)
- Created the Louis Malassis International Scientific Prize for Food and Agriculture
- Sponsor of the 2010 Global Conference on Agricultural Research for Development (GCARD)
- ISO 9001 certified for its whole range of activities

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What's on your mind?

Agropolis Fondation Newsletter is meant to serve as a tool to disseminate information on our and our partners' goings-on. But since we would like this Newsletter to be of service to you, we would like to receive your feedback and know what you think.

So, send us your comments and suggestions at agropolis-fondation@agropolis.fr
We are just a click away!

Agropolis Fondation supports and promotes high level research and higher education in agricultural sciences that address the main challenges related to sustainable agricultural development in temperate, tropical and Mediterranean regions. The Foundation's office is located at the heart of Agropolis International complex in Montpellier, home to one of the world's largest concentration of skills and expertise in Agriculture, Food Biodiversity and Environment.