Project no. PL019122

Project acronym
MolConnect

Project title
Integration of genomics and biodiversity research:
Implementation of an international platform

Instrument: Specific Support Action

Thematic Priority: Priority 1 - Life sciences, genomics and biotechnology for health

Title of report

Final report on the project
"MolConnect - Integration of genomics and biodiversity research:
Implementation of an international platform

Period covered: 01 November 2005 to 31 October 2006

Date of preparation: 12 December 2006

Start date of project: 01 November 2005
Duration: 12 months

Project coordinator name: Prof. Dr. Bernd Mueller-Roeber
Project coordinator organisation name: Universitaet Potsdam
Revision [draft, 1, 2, …]: none

MolConnect

SIXTH FRAMEWORK PROGRAMME PRIORITY 1

PRIORITY TITLE:
LIFE SCIENCES, GENOMICS AND BIOTECHNOLOGY FOR HEALTH

SPECIFIC SUPPORT ACTION

Integration of genomics and biodiversity research: implementation of an international platform

- MolConnect -

1. PROJECT SUMMARY

We proposed to establish an international cooperation and information platform aiming at the application of cutting-edge genomics technologies in biodiversity and ecosystems research. The establishment of a network was planned to be the first step in a process to discuss and develop research at the interface between genomics and biodiversity research on an international level. The high-throughput analytical genomic tools have so far extensively been used to study developmental and physiological processes in bacteria, unicellular eukaryotes, animal model systems, humans, and higher plants. A new field employing functional genomics for biodiversity and ecosystems research is currently emerging. The understanding of ecosystems requires a careful survey not only of abiotic factors of the environment, but also biotic factors contributing to the performance and development of organisms in a certain environment. In biodiversity and ecological research, many data have been acquired from field observations and experiments to describe phenomena and characteristics of defined ecosystems including their inhabitants. The next, essential step for a better understanding of terrestrial biodiversity, genetic resources, ecosystem structures and dynamics will be the integration of functional genomics to allow a more complete understanding of performance under specific environmental conditions.

The consortium was aiming at the establishment of a new scientific information and communication platform to discuss potential applications of cutting-edge genomics tools for high throughput and multiparallel analysis in biodiversity and ecosystems research. Partners from two research fields will be assembled: (a) those that are experts in biodiversity and ecosystems research; and (b) those that have a strong knowledge base in the field of genomics research.

Through the workshop the opportunity was given to researchers to meet and implement the first ideas for projects or programmes with potential in the future.

The activities at the interface between genomics and biodiversity research focused on researchers from Europe in cooperation with experts from Latin America. Expertise in biodiversity research in Latin America has a very high level based on the hot spots of biodiversity in some countries like Costa Rica, Colombia or Brasil. The integration of this knowledge with the expertise from Europe was expected to result in the generation of completely new approaches with benefits for European and Latin American researchers.

2. PROJECT REPORT

The proposed MolConnect workshop represents an important initiative to integrate European activities in the area of genomics for biodiversity and ecosystems research, but also to integrate complementary third country expertise to increase the impact on innovation.

2.1 OBJECTIVES AND ACHIEVEMENTS

The following **results were** e**xpected** from the MolConnect initiative:
a) an interface and communication platform joining molecular biology/genome researchers and biodiversity/ecological researchers via a homepage with information database
b) stimulation of future joint research activites, e.g. development and adaptation of functional genomics tools for the application for biodiversity and ecosystems research
c) development of ideas for joint teaching and training initiatives to facilitate bidirectional transfer of knowledge
d) establishment of a discussion platform for issues addressing exploitation of results and IPR important for the realisation of joint activities
e) establishment of scientific and technological cooperation network to address specific world problems in the field of biodiversity and ecosystems as well as sustainable development within the environment and to contribute to a fair and sustainable development and socio-economic progress of all partners.

To develop new projects and initiatives at the interface between functional genomics and ecology/biodiversity research it was needed to integrate the two research fields that are in the current state not closely linked. Cooperation started in some groups, but these are initiatives based on bilateral cooperation rather than including a broader perspective. To achieve a discussion on a broader level and to integrate as much as possible whole research communities it was necessary as a first step to collect information about ongoing research in both fields to achieve a principle understanding of the state-of-the-art.
In the frame of the project we started with inquiries in Germany and Europe. The next important step was the collection of information about Latin American initiatives and researchers in both, functional genomics and biodiversity research. During the process of data collection we realised that information flow between Europe and Latin America is scarce. Hence, one important issue to be discussed is how the flow of information between Europe and Latin America can be improved in general.
A workshop was planned as the one essential element to initiate the discussion and develop new ideas at the interface between both research fields. Because this emerging research field at the interface needs innovative thinking strategies it was absolutely essential that the researchers could meet and discuss directly. The best way to achieve this is via personal contacts, and via the workshop we could initiate these contacts and promote a “snowball-system” that will help to distribute information and integrate more persons in the future. The program for the workshop provided a mixture of information and discussion forum with space for personal contacts.
Based on the information collection and the discussions from the workshop specific needs, interests and gaps (e.g. in information, in technology) were identified. Follow-up activities were planned for the future.

2.2 ADVISORY BOARD

The project coordinators established an advisory board to support the activities of the project. The three members of the advisory board are:

Dr. Ana Sittenfeld
Director of the Office of International Affairs and External Cooperation (OAICE)
University of Costa Rica
Costa Rica

Dr. Jorge Mayer
Golden Rice Project Manager
University of Freiburg
Germany

Dr. Joe Tohme
Senior Research
AgroBiodiversity and Biotechnology Project
Centro Internacional de Agricultural Tropical (CIAT)
Colombia

2.3 PARTNER INSTITUTIONS

University of Potsdam and Universidad Nacional de Colombia

Initiator and coordinator of the project MolConnect was Prof. Dr. Bernd Mueller-Roeber together with Dr. Babette Regierer from the University of Potsdam (Germany). He was supported by the German Organising Committee including colleagues from the University of Postdam. The planning and management of the platform and the workshop was organised by the contracting institution, the University of Potsdam (Germany) in cooperation with a partner in Colombia, the Facultad de Agronomía of the Universidad Nacional de Colombia located in Bogotá. The partner at the University of Potsdam is already very experienced in management of scientific projects, especially of European joint initiatives, is involved in many national and international (genome) research programs, has experience in public-private partnerships and has the infrastructure and expertise to organise events and meetings on an international standard.
As the project was aiming at the improvement of cooperation between European and Latin American researchers it was necessary to identify a partner in Latin America to build a bridge between the two continents and to complement the Organising Committee. Contact to Universidad Nacional de Colombia (UNAL) in Bogotá was already established in 2001 when two Colombian students were invited to make their PhD at the University of Potsdam. Contacts were intensified in 2005, especially with Dr. Esperanza Torres who was nominated to become professor at the UNAL in the beginning of 2006. The UNAL is known as the best University in whole Colombia and has also a very high reputation in the North of Latin America. Based on these excellent contacts and the support from the UNAL as an institution, especially from the Vicerectoría de Investigación, the Agronomic Faculty, and the Instituto de Biotecnologia IBUN it was decided to invite the UNAL as partner for the MolConnect project. Besides the excellence of the UNAL as a partner for the project the decision to cooperate with a Colombian institution for the MolConnect project was also encouraged by the great support from the Colombian Embassador in Germany, Victoriana Mejia Marulanda, who was discussing and supporting our efforts within this project from the beginning. The interest and support from the Embassador was encouraging very much and new contacts could be made

on the basis of her activities. Also after finalisation of the project her support is continuing. Also from the UNAL an Organising Committee was established comprising eight persons.

Organising Committee

GERMANY

Prof. Dr. Bernd Müller-Röber
Institute of Biochemistry and Biology
Universität Potsdam

Babette Regierer, PhD
Center for Advance Protein Technologies - APT
Universität Potsdam

Heike Küchmeister, PhD
International PhD Program - Integrative Plant Sciences
Universität Potsdam

Fernando Arana Ceballos, BSc
Institute of Biochemistry and Biology
Universität Potsdam

Judith Gómez Porras, PhD
Institute of Biochemistry and Biology
Universität Potsdam

Luiz Guedes Correa, MSc
Institute of Biochemistry and Biology
Universität Potsdam

Karina Schulze
Institute of Biochemistry and Biology
Universität Potsdam

Roswitha Deichsel
Center for Advance Protein Technologies - APT
Universität Potsdam

Oliver Reimann
Center for Advance Protein Technologies - APT
Universität Potsdam

Carmen Sabernak
Center for Advance Protein Technologies - APT
Universität Potsdam

COLOMBIA

Esperanza Torres Rojas, PhD
Faculty of Agronomy
Universidad Nacional de Colombia

Dolly Montoya Castaño, PhD
Instituto de Biotecnología - IBUN
Universidad Nacional de Colombia

Gustavo Buitrago Hurtado, MSc
Instituto de Biotecnología - IBUN
Universidad Nacional de Colombia

María Isabel Chacón Sánchez, PhD
Faculty of Agronomy
Universidad Nacional de Colombia

Favio González Garavito, PhD
Instituto de Ciencias Naturales - ICN
Universidad Nacional de Colombia

Martha Rincón Garcia, MSc
Public Relations

Alejandro Ulloa Gómez, MSc
MadreTierra Conservacion

Silvia L. Bustamante Rodríguez, MSc
Instituto de Biotecnología - IBUN
Universidad Nacional de Colombia

2.4 RESULTS

2.4.1 Creation of an interface and communication platform between molecular biology/genome research and biodiversity/ecological research via a homepage with information database

The homepage www.molconnect.org was created with a database connecting researchers across disciplines and continents.
The homepage is based on a Content Management System INDOLE (www.indole.de) that is extremely easy to handle and maintain. It was constructed as a system that can be easily updated and expanded. We decided to provide three languages: English, Spanish and Portuguese to achieve an optimal forum and dissemination in Latin America and Europe.

Links to the webpage:
A link to the homepage was set on the following webpages:
http://cordis.europa.eu/fetch?CALLER=FP6_PROJ&ACTION=D&RCN=78579&DOC=1873&CAT=PROJ&QUERY=1162415281448
http://www.epsoweb.org/Catalog/projects/priority1.htm
www.GABI.de
http://www.botschaft-kolumbien.de
http://www.agdev.de/2006/einladung
http://www.sbg.org.br/
http://www.uni-potsdam.de/apt
http://www.ciat.cgiar.org/biotechnology/index.htm
http://zulia.colciencias.gov.co
http://www.eurobiotechnews.eu
http://www.humboldt.org.co/
www.cyted.org
http://www.scopios.unal.edu.co/eventos/eventos_058_20060707.htm
http://www.factbites.com/topics/Golm-b-Potsdam
http://www.conesup.net/anoticias_afondo.php?id=4012

Database

A database was created to achieve a better linking of the researchers interested in a cooperation between genomics and biodiversity research. To enter a profile in the database the following information is required:

MolConnect

Integration of genomics and biodiversity research:
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About the Project
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Meeting
Database & Resource
Registration
Search a member
My Profile
News and Events
Sponsors

Registration

To access the MolConnect database please register as a member. Please complete the questions in the form and submit (via the Submit button at the end of the page). You will receive an eMail with your password to log in via www.molconnect.org.

* = *Fields marked with an asterisk are obligatory*

Title*

Mr./Mrs.* Mr.

Name* First Name*

Name of Institution*

Street Name and Number*

Postal Code* City*

Country* Albania

Phone Fax

Internet Homepage

eMail*

Your Thematic Area

☐ Biodiversity ☐ Genomics ☐ Cyberinfrastructure ☐ Other

Partner Type

☐ Research ☐ Company ☐ Other

Own Research Topics (max. 250 characters)

Cooperation Interest (max. 250 characters)

Submit

The intention of MolConnect is to create an information platform to connect researchers worldwide.
Your information will be submitted to a database.
Only registered users of MolConnect will have permission to search the database.

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Universidad Nacional de Colombia

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regierer@uni-potsdam.de

After entering the data the system gives a password via email within 24 hours. The entries are password-protected, only persons registered via the system are allowed to have access and study the data.
Based on legal requirements the database does not contain the information that has been collected in the starting phase of the project. It is necessary that persons have to agree upon that their information appears in the database. As a consequence we decided to inform the scientists about the possibility to share their information via the MolConnect database, and enter their own profile.
Nearly 120 persons are registered in the system until today (11 December 2006). But we realised that as an example most of the participants on the MolConnect workshop are not yet registered. Therefore, as a follow-up activity in 2007 we will undertake efforts to acquire more registrations.

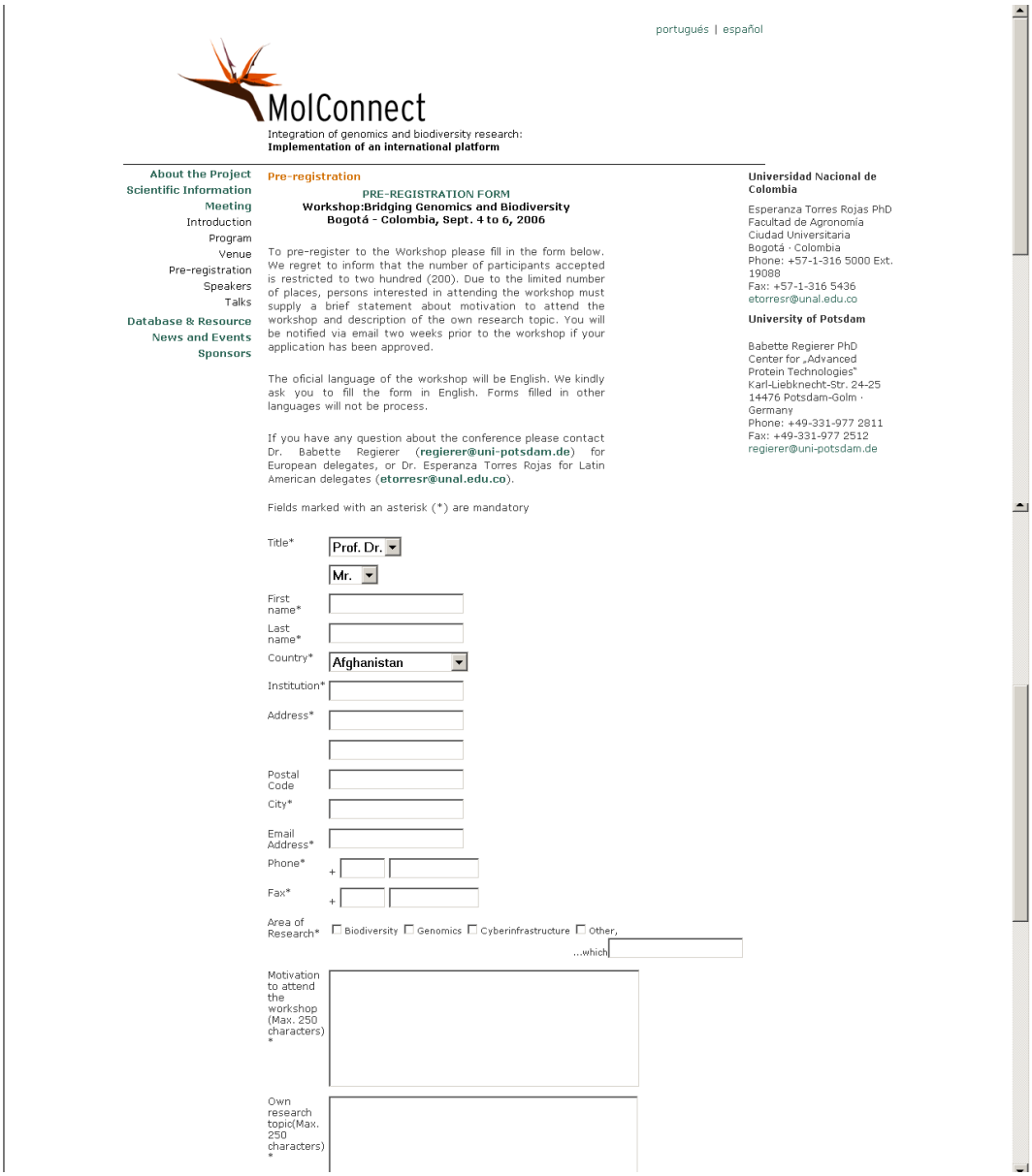
Linking initiatives via "News and events"

Via the homepage we provide also a forum for information about other initiatives, events etc. News and events can be entered directly via a form on the homepage:

Registration for the workshop via the webpage

The webpage was also used for the participant's registration. A MySQL database was used as a background system to administer the registrations, hotel information and the information about the research area and interest. This package with a form sheet was integrated in the CMS system:

Preregistration form



portugués | español

MolConnect

Integration of genomics and biodiversity research:
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Pre-registration

PRE-REGISTRATION FORM
Workshop:Bridging Genomics and Biodiversity
Bogotá - Colombia, Sept. 4 to 6, 2006

To pre-register to the Workshop please fill in the form below. We regret to inform that the number of participants accepted is restricted to two hundred (200). Due to the limited number of places, persons interested in attending the workshop must supply a brief statement about motivation to attend the workshop and description of the own research topic. You will be notified via email two weeks prior to the workshop if your application has been approved.

The oficial language of the workshop will be English. We kindly ask you to fill the form in English. Forms filled in other languages will not be process.

If you have any question about the conference please contact Dr. Babette Regierer (**regierer@uni-potsdam.de**) for European delegates, or Dr. Esperanza Torres Rojas for Latin American delegates (**etorresr@unal.edu.co**).

Fields marked with an asterisk (*) are mandatory

Title* Prof. Dr. / Mr.
First name*
Last name*
Country* Afghanistan
Institution*
Address*
Postal Code
City*
Email Address*
Phone* +
Fax* +
Area of Research* Biodiversity Genomics Cyberinfrastructure Other, ...which
Motivation to attend the workshop (Max. 250 characters) *
Own research topic(Max. 250 characters) *

Universidad Nacional de Colombia

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regierer@uni-potsdam.de

ACCOMMODATION

The **Hotel Capital** is our recommended choice for accomodation. The Hotel offers special rates for delegates attending the MolConnect Workshop. Accommodation fee includes: transport to the Workshop Venue and from/to the airport, breakfast, health insurance and taxes.

Rates per night:
Single room 58 EUR (185.500 Colombian Pesos) per person
Double room 35 EUR (111.250 Colombian Pesos) per person

Would you like to reserve a:

○ **Single room**

Arriving Date 1 August
Departure Date 1 August

○ **Double room**

Arriving Date 1 August
Departure Date 1 August

Room shared with (if known):

If reserving a shared room, please let us know with whom you will be sharing (if you know in advance). The organizing committee will do its best to provide roommates for participants wishing to share a room. If a roommate cannot be found, the participant will be informed by email to check other options of accommodation.

SUBMIT

Registration page

MolConnect

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Registration

REGISTRATION FORM
Workshop:Bridging Genomics and Biodiversity
Bogotá - Colombia, Sept. 4 to 6, 2006

The MolConnect consortium is pleased to invite you to join our Platform. The aim of MolConnect is to reinforce links between European and Latin American researchers in the areas of Functional Genomics and Biodiversity, and Ecological Research. A Workshop will be held in Bogotá - Colombia (Sept. 4 - 6, 2006) to support the interaction. The activity is divided in morning conference sessions and afternoon Round Table discussions.
To Register to the Workshop please fill in the form below. Should you have any problem with your online registration, please download the **registration form** and send it back via e-mail to **regierer@uni-potsdam.de** .

Fields marked with an asterisk (*) are mandatory

Title* Prof. Dr. / Mr.
First Name*
Last Name*
Country* Angola
Institution*
Address*
Postal Code
City*
Email address*
Phone* +
Fax* +
Area of Research* ☐ Biodiversity ☐ Genomics ☐ Cyberinfrastructure ☐ Other, ...which
Own Research Topic (max. 250 characters)*

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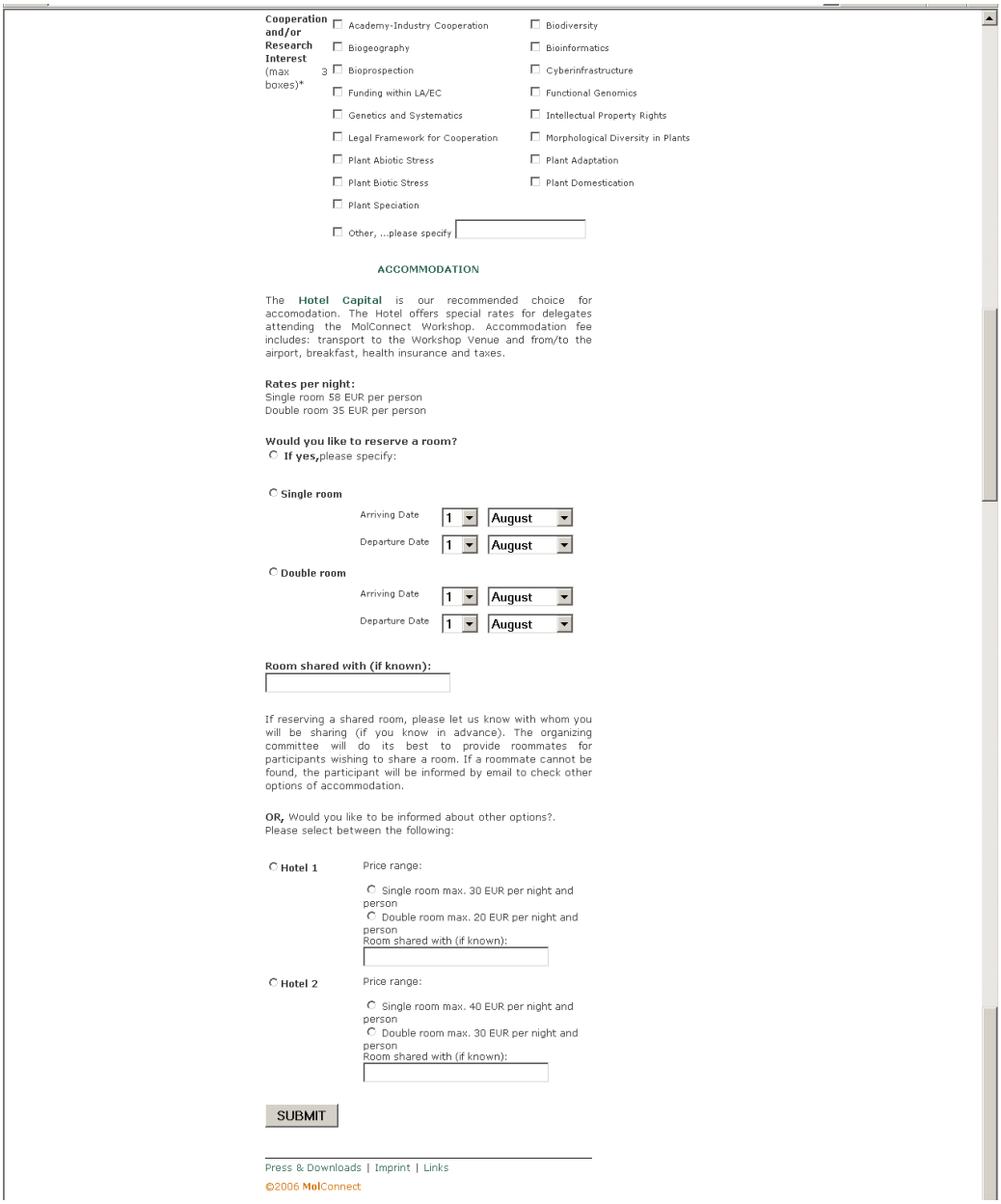

Information about the meeting

On the homepage we presented also the program of the workshop, information about the venue and hotel facilities, and presentations of the workshop speakers to make them available to all interested persons. The results of the Round Table discussions were shared within the groups of experts participating in the Round Table discussions, but will not be made available via the homepage because they contain confidential information.

Strategic considerations about database and homepage

We will maintain the webpage over the next year 2007 and develop a strategy for sustainability of the information. One possibility could be the fusion with the REDBIO network in Latin America (http://www.redbio.org/). This initiative is very active in both fields, molecular biology/genomics and biodiversity/ecology research and supports and initiates networking activities within Latin America. REDBIO also provides an excellent database with a huge amount of valuable information. One major limitation of the REDBIO network is the restriction to only one language Spanish. For the combination of Latin American and European

initiatives it will be essential to discuss the language problem. All information must at least be available in two languages, English and Spanish. As MolConnect already provides the information in both languages, it might be developed as an outreach activity in the future to provide an English translation of the REDBIO information.
Contact to Dr. Juan Izquierdo, coordinator of REDBIO in Chile, was already achieved during a meeting organised by BioEuroLatina in April 2006 in Bogotá. The idea was strongly supported by Dr. Carlos Malpica (BioEuroLatina) and Dr. Jorge Mayer (Coordinator of the Golden Rice Project, University of Freiburg, Germany). This will be decided latest until end 2007.

Information collection about scientific community

To avoid redundancies and to gain an overview about research topics, groups, networks, initiatives, research institutions possibly interested in discussions about bridging genomics and biodiversity research we had to screen the available information. This information was essential for the implementation of the project and represents the basis for building the information platform. The collection and sorting of information was therefore the first main part of the project. As the spectrum and type of information was very broad the time segment for this investigation had to be large. We collected more than 500 names and institutions that we later on informed about MolConnect and the up-coming workshop in Bogotá.
We are aware that the collection is not complete, but we expect that due to the future activities step by step we will fill gaps and achieve a more complete overview.

2.4.2 Stimulation of future joint research activities via organisation of a workshop

To stimulate the development of new joint research ideas and initiatives a workshop was organised to provide the opportunity for researchers from different disciplines and continents to meet. With the workshop we wanted to achieve different levels of integration:

- Integrate researchers from genomics and biodiversity/ecology research
- Integrate bioinformatics/cyberinfrastructure research into biological topics
- Integrate researchers from Europe and Latin America
- Integrate stakeholders in the discussion process
- Integrate academia and industry

The organisation of the workshop was the ideal tool to address the different levels of integration and explore the future possibilities of cooperation.

Elements of the workshop

The workshop was planned for three complete days, including afternoon and evening activities to provide a maximum of time for discussions between the experts. Three different activities were integrated to support the discussions and the integration process:

- presentations: overview about the different topics related to genomics and biodiversity research to provide a common basis for the Round Table discussions (“morning lectures”)
- Round Table discussions: selected topics proposed by the organising committee, but also by the experts were offered to the participants (afternoon Round Tables)
- Training courses: provided by UNAL and CIAT to participants not eligible as experts, in most cases young researchers and students

Presentations of experts were planned for the morning sessions. The topics were chosen as representative for the most recent and most interesting research fields with high potential for integration of genomics and biodiversity research. The morning lectures were agreed upon to

be open for a broader audience. Prerequisite for participation was a short statement of interest and a good command of the English language.

The afternoons were dedicated to the Round Table discussions. We intended to achieve a good mixture of experts from genomis and biodiversity research, but also of European and Latin American representation. The topics for the Round Tables had different sources: Some topics have been proposed by the Organising Committee, some topics were proposed by the participants and experts. The choice for the workshop was made on the basis of the highest interest of the participants. A report on the minutes of the Round Tables is given as Annex 1 to this document.

Alternative to the afternoon Round Tables partners from CIAT and UNAL offered a training course for the participants of the workshop who had no function as experts in the Round Table discussions.

Organisation of the workshop

Based on the collection of information about relevant institutions, research groups, initiatives, networks and ongoing projects the specific topics for the workshop were discussed and fixed. Possible speakers were invited, whereas it was agreed by the Organising Committee to achieve also a good balance between European and Latin American representatives for the presentations. This process appeared to be very difficult and time consuming because we had to make the compromise between excellence and geographical origin. The program with the final list of invited speakers and their topics are presented on the following pages.
Invitations for participants were sent in June and continued until August. In total we sent invitations to 715 researchers. The countries of origin of the 715 researchers are listed in the statistics part (Annex 2). Also the geographical origin of the registered participants as well as the information about their institutions are given in Annex 2.
Representatives from companies were also invited but we had only a few registrations for participation.
To increase the chance for discussions between the participants we included in the program also “Social Events” in the weekend and for the evenings, e.g. visits in the Botanical Garden in Bogotá, visit in a Natural Resort close to Bogotá, and also the Science Museum. To involve and inform also stakeholders in the MolConnect activities we organised an event on September 4th 2006 for which we welcomed e.g. representatives from the German Academic Exchange Service, the Ministry of Science and Education and the Agricultural Ministry of Colombia, as well as representatives from institutions like Embassies and foundations.
A questionnaire was given to the participants to give a feedback on perspectives and follow-up activities for the future. Questionnaire full text is given in Annex 3.

Program of the workshop

Sept. 4 2006

07:00-08:30	Registration
08:30-09:00	Welcome
09:00-09:30	General scope on the state of the art in biodiversity
09:30-10:00	General scope on the state of the art in plant functional genomics
10:30-11:00	Cyberinfrastructure: Biodiversity Information Systems
11:00-11:30	It is **Bio**informatics, not Bio**informatics**!
11:30-12:00	Access regimens in Latin America
12:00-12:30	Legal framework on international cooperation in biodiversity

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08:30-09:00	Population genetics of speciation in wild tomatoes
09:00-09:30	Evolutionary functional genomics of Arabidopsis relatives: adaptive evolution of selfing and speciation
09:30-10:00	Genetics of plant domestication: the basket and clay pot challenging the PCR
10:30-11:00	High Level Systematics and Molecular Data
11:00-11:30	Aspects of applied biodiversity research
11:30-12:00	Biodiversity, Genomics and Intellectual Property Rights – Experiences from Brazil

Sept. 6 2006

08:30-09:00	Understanding the origin of the vast array of morphological types in plants
09:00-09:30	Nitrogen signalling and root development in Arabidopsis
09:30-10:00	Unravelling the molecular mechanisms of qualitative resistance to *Phytophthora infestans* and *Globodera pallida* in potato
10:30-11:00	Trends in biodiversity research in botany
11:00-11:30	Technological innovation for the industrial valorisation of biodiversity
11:30-12:00	Aspects of academia-industry cooperation in biodiversity research

Titles of the talks

Perspectives of Research Funded by the European Commission
Dr. Indridi Benediktsson
BELGIUM
Europen Commission DG XII

General scope on the state of the art in biodiversity
Dr. Oliver Schweiger
GERMANY
UFZ Centre for Environmental Research, Department of Community Ecology

General scope on the state of the art in plant functional genomics
Dr. Marc Zabeau
BELGIUM
Department of Plant Systems Biology, Ghent University
President of EPSO, European Plant Science Organisation

Cyberinfrastructure: Biodiversity Information Systems
Dr. Ivan Valdespino
PANAMA
Inter-American Biodiversity Information Network (IABIN)

It is Bioinformatics, not Bioinformatics!
Dr. Felipe Rodrigues da Silva
BRASIL
Genetic Resources and Biotechnology, EMBRAPA

Access regimens in Latin America
Dr. Gabriel Nemogá
COLOMBIA
Faculty of Law, Universidad Nacional de Colombia

Legal framework on international cooperation in biodiversity
Mr. Ricardo Torres
COLOMBIA
Dirección de Desarrollo Rural Sostenible, Departamento Nacional de Planeación, Bogotá D.C.

Population genetics of speciation in wild tomatoes
Dr. Wolfgang Stephan
GERMANY
Evolutionary Biology, Biocenter, Ludwig-Maximilians-Universität

Evolutionary functional genomics of Arabidopsis relatives: adaptive evolution of selfing and speciation
Dr. Kentaro Shimizu
Department of Evolutionary Functional Genomics, Institute of Plant Biology, University of Zurich

Genetics of plant domestication: the basket and clay pot challenging the PCR
Dr. Daniel Debouck
COLOMBIA
Genetic Resources Unit, Centro Internacional de Agricultura Trópical, CIAT

High Level Systematics and Molecular Data
Dr. Dolores Lledó
UK
Molecular Systematics, Jodrell Laboratory, Royal Botanic Gardens

Aspects of applied biodiversity research
Mrs. Ana Sylvia Huertas
COSTA RICA
INBio

Biodiversity, Genomics and Intellectual Property Rights – Experiences from Brazil
Dr. Mauricio Lopes
BRASIL
Genetic Resources and Biotechnology Center
Brazilian Agricultural Research Corporation - Embrapa

Understanding the origin of the vast array of morphological types in plants
Dr. Lucia Lohmann
BRASIL
Universidade de São Paulo, Instituto de Biociências, Departamento de Botânica, IB - USP

Nitrogen signalling and root development in Arabidopsis
Dr. Brian Forde
UK
Environmental Plant Biotechnology, Lancaster Environment Centre
Department of Biological Sciences, Lancaster University

Unravelling the molecular mechanisms of qualitative resistance to Phytophthora infestans and Globodera pallida in potato
Dr. Agim Ballvora
GERMANY
Max-Planck-Institute for Plant Breeding Research

Trends in biodiversity research in botany
Dr. Stefan Porembski
GERMANY
Institute for Biodiversity Research, Dep. of Botany, Universität Rostock

Technological innovation for the industrial valorisation of biodiversity
Dr. Carlos Malpica
SPAIN
Asociación Bioeurolatina

Aspects of academia-industry cooperation in biodiversity research
Dr. Felipe Garcia
COLOMBIA
General Director, COLCIENCIAS

Topics of the Round Table discussions

For the Round Table discussions we offered the following topics:

- DNA Barcoding
- Regulatory Framework in Respect to Biodiversity
- Population Genetics of Domestication
- Speciation and Adaptation
- Biotic Stress
- Abiotic Stress
- Food, Nutrition and Health
- Systematics and Biogeography
- Identification of Model Taxa
- Plant Microbe Interactions
- Biodiversity Information Systems and Cyber-Infrastructure
- Solanaceae
- Tropical Trees - Palm Trees
- Access to Genetic Resources
- Speciation

The results and minutes of the Round Table discussions as given by the participants are listed in Annex 1.

Training course in Biodiversity and Genomics

Over the three days we offered as part of the program training courses given by members of the UNAL and CIAT. The following topics were included in the program:

Lectures on Biodiversity and Genomics:
From Gene Discovery to Gene Delivery

Monday, 4 September (Gene Discovery)

2:30-3:00	Introduction	Joe Tohme
3:00-3:40	Marker assisted selection: Following QTLs in rice interspecific crosses	Olga Giraldo
3:40-4:20	Exploring cassava's genetic potential for breeding higher nutritional quality	Alba L. Chavez
4:20-5:30	Statistical analysis as a support to genomics and biodiversity research	Myriam C. Duque

Tuesday, 5 September (Gene Function)

2:30-3:30	Functional genomics for the sutdy of plant-insect interactions	Adriana Bohórquez
3:30-4:30	Cloning useful plant genes: Integrating functional genomics studies	Diana Bernal
4:30-5:30	Bioinformatics: Exploring the genome of tropical crops	Fausto Rodríguez

Wednesday, 6 September (Gene Delivery)

2:30-3:30	Use of tissue culture techniques for propagation and conservation of plant germplasm	Roosevelt Escobar
3:30-4:30	Non-conventional breeding of higher nutritional quality in crops: Perspectives for cassava	Paul Chavarriaga
4:30-5:30	Molecular assessment of cassava (*Manihot esculenta* Crantz) transgenic plants by means of real time PCR	Jesús Beltrán

Training course on Grant Writing

As an outreach activity we integrated a training course on grant writing offered to the partner institution Universidad Nacional de Colombia. It was organised by members of the IBUN (Biotechnological Institute) and members of the Interdisciplinary Center "Advanced Protein Technologies". The course with the title "Funding opportunities in Europe" was scheduled to August 30, 2006 from 10 a.m. until 5 p.m.
The workshop covered the following topics:

- How to write a proposal to apply for funding?
- Framework program 7
- European funding policy
- Funding in Germany (DFG, DAAD)

Target groups were professors and researchers from the Universidad Nacional de Colombia, from the faculties of Ciencias, Agronomía, Medicina Veterinaria y Zootecnia. The number of participants was 18.

Support from other institutions

For the project in general, but also for the organisation of the workshop in specific the Organising Committee got support from the partner institutions, in particular:

- Universitaet Potsdam (Germany)
  Institute for Biochemistry and Biology
  Interdisciplinary Center “Advanced Protein Technologies”
  International PhD Programme “Integrative Plant Science”

- Universidad Nacional de Colombia (Colombia)
  Vicerectoría de Investigación
  Agronomical Faculty
  IBUN

The project was also supported by other institutions and also companies:

Support from public and private institutions:

- European Commission (Belgium)
- Center for Functional Genomics Berlin-Brandenburg (Germany)
- CIER – Centro de Investigación y Extensión Rural (Colombia)
- CIAT – Centro Internacional de Agricultura Tropical (Colombia)
- Max Planck Institute for Molecular Genetics (Germany)
- COLCIENCIAS (Colombia)
- Instituto Alexander von Humboldt (Colombia)
- Corpoica – Corporación Colombiana de Investigación Agropecuaria (Colombia)
- DNP – Depertamento Nacional de Planeación (Colombia)
- RZPD – German Resource Center for Genome Research (Germany)
- Embajada de la Republica de Colombia (Germany)

Support from companies:

- Agro-Bio
- AVIANCA
- Invitrogen
- Biodiagnostica Ltda.
- Merck

3. GENERAL ACHIEVEMENTS AND CONCLUSIONS

The initiative of MolConnect achieved its principle project aims and the specific objectives during the funding period. Besides the development of new ideas and initiatives at the interface between genomics and biodiversity research we achieved another very important aim, and that is the improvement of the interaction and communication between European and Latin America researchers. It was very positively appraised by the participants that we were managing the discussions across the continents. Via the MolConnect project we could, therefore, not only raise awareness and interest for the respective new research perspectives, but could also raise awareness and interest in the research going on in Europe and Latin America. It became obvious that one future activity line must be the improvement of information flow between the continents.

In the beginning of the project we anticipated results that we expected as an outcome of the project activities. Most of the points we addressed during the 12 months of the project:

a) *create an interface and communication platform between molecular biology/genome research and biodiversity/ecological research via a homepage with information database*

We achieved the creation of a joint communication and information platform at the interface between genomics and biodiversity research. Via the homepage and the database we created a tool that helps the maintenance of contacts and the flow of information. The dissemination of information about the initiative MolConnect raised awareness among the research communities and also raised curiosity in many researchers. Selected topics that have been discussed during the project and in detail during the workshop are valuable for specific follow-up activities in the future.

b) *stimulation of future joint research activities, e.g. development and adaptation of functional genomics tools for the application for biodiversity and ecosystems research*

Via the MolConnect initiative, and specifically via the workshop interest was raised for the research at the interface between genomics and biodiversity research. Discussions between the representatives of the different research areas have been initiated by MolConnect. Because the connection between the two research fields has been missing in the past no or only very little interaction was present. Based on the opportunity of the MolConnect activities – and specifically via the workshop – the invited experts have been discussing very lively and created innovative ideas. The results of the discussions can be seen in detail in Annex 1.

c) *development of ideas for joint teaching and training initiatives to facilitate bidirectional transfer of knowledge*

From the discussions during the workshop and the two training activities connected to the MolConnect workshop it was very obvious that exchange of information and transfer of knowledge must be one of the major activities in the near future. Especially we have to address the topic of capacity building together with partners from Latin America and open more possibilities for participation of Latin American researchers in Europe in the future. The strategy has not yet been developed but has to be part of the future activities.

A first approach in capacity building to achieve a more successful participation of Centro American researchers in European (and specifically German) research landscape was made by the Universidad de Costa Rica (UCR) with financial support from the German Academic Exchange Service (DAAD) and in cooperation with the University of Potsdam (UP). Experts from Germany were invited to train Alumni of the DAAD in grant writing, acquisition of information, marketing of scientific results, management of projects, IP issues etc. In four workshops this program provided training and a consultancy for specific projects in the end of the initiative. A special benefit was the cooperation between the administration of UCR and UP to exchange the knowledge on how administration can support the scientists in a

better way. The institutional cooperation could be a very specific new approach in the area of capacity building and should be intensified. Although this program was a very successful approach these activities have to be expanded and maintained to achieve an improvement for a broader community. Considerations about capacity building will be integrated in the future discussions.

d) discussion platform for issues addressing exploitation of results and IPR important for the realisation of joint activities

In the workshop topics we integrated the issues of exploitation of scientific results, academia-industry cooperation and IP. The integration of these issues was very much welcomed by the experts of the workshop because of their high relevance. During the discussion about the specific Round Table topics we realised that another issue related to these topics is the problem of how to manage the sharing of knowledge and the access to genetic resources. In some of the participating countries the limitations in the access to the genetic resources even for fundamental science are enormous, e.g. in Colombia the researchers have to wait 39 months for a permission to work with DNA of native species. The presentations of Lopes and Huertas were reflecting the state of the art in that field. Therefore, a large group of experts were happy to join a Round Table on these issues and pointed out the high relevance for future cooperation between Europe and Latin America.
The integration of industry in the MolConnect activities was not very broad so far. The Organisation Committee decided to bring up that topic in later stages in the future. We integrated already two different levels of complexity, that means scientific and geographical level; by addressing at the same time also academia-industry cooperation and how to improve this relationship would have risked the possibility to explore the great opportunities of genomics-biodiversity cooperation.

e) establishment of scientific and technological cooperation network to address specific world problems in the field of biodiversity and ecosystems as well as sustainable development within the environment and to contribute to a fair and sustainable development and socio-economic progress of all partners

We implemented the Round Table discussions in the workshop organisation to ask the experts for their opinion about potentially relevant topics. Based on the topics discussed during the workshop some ideas with high potential for future realisation have been identified that address global aspects. Conservation was not a specific topic but was part in most of the Round Table discussions. A sustainable use of biodiversity was also part of some Round Tables, but will be an important subject for future discussion in the frame of academia-industry cooperation. InBIO, an NGO funded in Costa Rica, is a very promising example of concepts for sustainable use of knowledge and resources. The concept of InBIO integrates cooperation with partners also from other countries – also industry – but demands a certain percentage as refund from the cooperation partners if they were successful in creating an income on the basis of the cooperation with InBIO. These refunds are directed to the Costa Rican Ministry of Environment e.g. for conservation projects.

4. POSSIBLE FUTURE ACTIVITIES

Based on the MolConnect activities we realised that

- We have already an excellent basis of know-how in genomics and biodiversity existing on both continents
- We have already existing institutions, networks, projects in EU and LA
- We have already joint initiatives between EU and LA

In the future we have to develop strategies to integrate knowledge and information and achieve dissemination of the information in a more efficient way (e.g. via REDBIO, MolConnect or similar). Furthermore, more joint meetings of the partners across the continents are needed. It would be possible to combine some activities with outreach and training. It might be advantageous to address stakeholders and decision makers to support the future activities.

What could be promising future joint initiatives?

- Capacity building (for improvement of international cooperation and acquisition of funding)
- Development of dedicated training activities (e.g. exchange of knowledge, development of innovative programs combining training in genomics and biodiversity research)
- Improvement and use of Human Mobility Programs (in particular integrating young researchers e.g. via EU Marie Curie activities or through the DAAD). Improvement of dissemination of information. A large scale meeting on genomics and biodiversity research in 2008 as a follow-up in Potsdam

Remarks from participants on the questionnaires:
A questionnaire was given to the participants to give a feedback on perspectives and follow-up activities for the future. Questionnaire full text is given in Annex 3.

"Which topics were missing in MolConnect?"

- Sustainable uses of Biodiversity, and a more extensive explanation about MolConnect
- Conservation issues
- Natural variation from the genetic and molecular biology of view
- Development of taxonomic knowledge in LA and the Caribbean
- Evolutionary biology and climate/ecology
- Genomics was only partially cover
- Less emphasis in Agricultural applications, more in Ecosystem stability, Secondary metabolism, etc
- Modelling, methods of data analysis

"Which topics should be addressed in your opinion in a follow-up meeting?"

- Access regimes & their progress, microorganisms and plants, advances/updates on projects and ideas
- Priority areas identified in the RT
- Genomics and biodiversity in LA species
- Those with more probability to be successful in the next round of the FP7
- Biodiversity Conservation, Taxonomic Knowledge Creation, Biodiversity Information Systems (BIS)
- emphasis on those that have led to further contacts after MolConnect 1
- Functional genomics, metabolomics and bioinformatics in a LA context

- Support in grant and proposal writing according to EU guidelines
- Move beyond reviews to specific studies & technical approaches for tangible outcome
- Modelling, methods of data analysis

"Which topics do you see for the future development of joint projects between genomics, biodiversity and informatics?"

- Bar coding, induced resistance workshop
- Some, however invited experts were very much involved in basic research, yet much of the research in Latin America is of a more applied nature so it was difficult in some cases to develop joint research ideas that were mutually beneficial.
- Root architecture in response to different abiotic stresses, functional genomics and adaptive evolution in Arabidopsis relatives
- Self incompatibility in obligate pollinated flower (i.e. orchids or figs)
- Taxonomic knowledge creation, Knowledge Management, BIS, Biodiversity Conservation
- Study of plants in different ecological conditions
- Biodiversity -> bioprospection -> metabolomics, biodiversity -> systematics, and biodiversity -> genomics -> agriculture
- Identification of plant taxa of common interest that could be used for further projects for sustainable biodiversity
- Genomic studies beyond model species and crops
- Adaptation and speciation in plant groups, including field work in LA

"Where do you see new challenges in European-Latin American cooperation?"

- Change the mentality of LA as biodiversity providers to partners
- Join understanding of research priorities, especially in terms of applied research
- Identify common interests besides crops. More emphasis in less known/important species for the agriculture
- Soil microorganisms and fishery
- Establishment of a common interest agenda
- Find common interests that can be transformed in joint projects, use and conservation of biodiversity
- Partner finding for joint projects and proposals
- Ensure Marie Curie initiative support to wider training in LA
- Training of students in both continents, exchange of researchers

5. DISSEMINATION AND EXPLOITATION ACTIVITIES

In the frame of the project no intellectual property was generated.

The Organising Committee was active to disseminate information about the project, the workshop and the initiative in general. We adressed and used different media and tools for dissemination. In this chapter we present the activities and documents produced and published during the funding period of the MolConnect project.

Overview Table

No.	Actual dates	Type	Type of audience	Countries addressed	Size of audience	Partner responsible
General results						
1	15/05/ 2006	Flyer	Researchers, Institutions	**12 Latin American countries**	> 200 addresses	UP[1], UNAL[2]
2	15/05/ 2006	Poster	Researchers, Institutions	**12 Latin American countries**	> 200 addresses	UP[1], UNAL[2]
3	June until August 2006	Direct Mailing	Researchers, Institutions	**42 European and Latin American countries**	715 addresses	UP[1], UNAL[2]
4	04-06/09/ 2006	Conference – Workshop (abstract book)	Research	**16 European and Latin American countries**	~ 300 participants	UP[1], UNAL[2]
5	04/09/ 2006	Reception	Stakeholders, Industry, Research	**16 European and Latin American countries**	~ 200 participants	UP[1], UNAL[2]
6	July 2006	Project web-site	Stakeholders, Industry, Research, General Public	**Open to all countries inside and outside Europe**	unknown	UP[1], UNAL[2]
Press releases						
7	09/2006	Article European Biotechnology News	Stakeholders, Industry, Research, General Public	**Europe**	unknown	UP[1]
8	03/09/ 2006	Article El Tiempo (biggest Colombian newspaper)	General Public	**Colombia**	unknown	UP[1]
9	20/09/ 2006	Article/Interview NOTICyT[3]	General Public, Researchers	**Colombia**	unknown	UP[1]
10	25/10/ 2006	Article/Interview NOTICyT[3]	General Public, Researchers	**Colombia**	unknown	UP[1]
11	August 2006	Text publication on webpage of the Colombian Embassy in Germany	Stakeholders, Industry, Research, General Public	**Germany, Colombia**	unknown	UP[1]

No.	Actual dates	Type	Type of audience	Countries addressed	Size of audience	Partner responsible
12	04/09/ 2006	Article at CONESUP (online)	Research, General Public	**Colombia**	unknown	UP[1]
Presentations						
13	16/03/ 2006	Abstract and Presentation "Dialogue Froum Biotechnology"	Stakeholders, Industry, Research	**EC (Brussels), Germany**	30 participants	UP[1]
14	26/04/ 2006	Presentation in the meeting "Workshop for cooperation between Andean Comunity and EU in food, agriculture and Biotechnology in FP7" organised by BioEuroLatina	Stakeholders, Industry, Research	**Andean countries, European countries**	60 participants	UP[1]
15	June and Novembe r 2006	Presentation in the frame of DAAD Alumni workshops	Research	**Centro American countries, Germany**	100 and 80 participants	UP[1]

1 UP = University of Potsdam
2 UNAL = Universidad Nacional de Colombia
3 NOTICyT = Agencia Noticias de Ciencia y Technologia de Colombia, online publication

1. **Flyer**
   A flyer was produced as broad information for the scientific community. It was sent together with the poster via mail to different institutions in Colombia, but also to other addresses in Latin America. Main distribution of flyer and poster was via email to other addresses also in Europe. Both media are available as downloads via the webpage. Original as Annex in the report.

2. **Poster**
   See explanation for 1: Flyer

3. **Direct Mailing**
   Information about the MolConnect project, the initiative and the workshop was distributed via email together with the flyer attached as pdf to a broad community (715 addresses were selected). We offered a registration in the database located on the webpage www.molconnect.org.

4. **Conference – Workshop**
   The organisation of a workshop in Bogotá (Colombia) was one of the main objectives in the project. Detailed information is given in part 2. RESULTS of this report. The abstract booklet from ther workshop is given as annex for the report.

5. **Reception**
   In the frame of the workshop (see 4.) we organised a reception to address, inform and involve stakeholders in the MolConnect initiative. For future activities it will be very important to raise awareness also among the stakeholders and inform them about relevance and importance of the joint initiative. Support from stakeholders could be helpful for official cooperation agreements to facilitate exchange of

information, of researchers, of meetings. Also contacts e.g. to industry could be improved based on the support from stakeholders.
For the reception we invited around 200 persons from different areas. For the welcome we had three talks from representatives of the organising committee (Martha Isabel Rincon, Joe Tohme, Babette Regierer) to present the project and the initiative.

6. **Project website**
The webpage is located at the following domain: www.molconnect.org. We offer information in three languages: English, Spanish and Portuguese. A link and information about the project was presented on the following webpages:
http://cordis.europa.eu/fetch?CALLER=FP6_PROJ&ACTION=D&RCN=78579&DOC=1873&CAT=PROJ&QUERY=1162415281448
http://www.epsoweb.org/Catalog/projects/priority1.htm
http://www.gabi.de
http://www.botschaft-kolumbien.de
http://www.agdev.de/2006/einladung
http://www.sbg.org.br/
http://www.uni-potsdam.de/apt
http://www.ciat.cgiar.org/biotechnology/index.htm
http://zulia.colciencias.gov.co
http://www.eurobiotechnews.eu
http://www.humboldt.org.co/
http://www.cyted.org
http://www.scopios.unal.edu.co/eventos/eventos_058_20060707.htm
http://www.factbites.com/topics/Golm-b-Potsdam
http://www.conesup.net/anoticias_afondo.php?id=4012
More information about the webpage under 2.4.1 in this report.

7. **Article European Biotechnology News**
A short note was presented in the "European Biotechnology News", No. 9-10, Vol. 5, 2006, produced by the BIOCOM AG. Full information was sent to the editors who produced and published the note about the project. The intention is to publish about the project in more detail in the future when single initiatives become visible.
Full article is given at the end of this chapter.

8. **Article El Tiempo**
An article about the MolConnect initiative was published in the biggest Colombian newspaper, El Tiempo. The article was written based on intensive interviews with members of the organising committee. The article is still available online at: http://www.eltiempo.com/vidadehoy/educacion/home/ARTICULO-WEB-NOTA_INTERIOR-3229178.html
Full article is given at the end of this chapter.

9. **NOTICyT Article/Interview**
Based on interviews during the workshop in Bogotá two articles have been published by NOTICyT - Agencia Noticias de Ciencia y Technologia de Colombia, an online publication medium.
Full article is given at the end of this chapter.

10. **NOTICyT Article/Interview**
See information given for no. 9.
Full article is given at the end of this chapter.

11. **Text publication on webpage of the Colombian Embassy in Germany**
From the beginnin gof the project we established an the excellent and very helpful contact with the Embassador of the Colombian Embassy in Germany. We were given

the opportunity to publish an information about MolConnect on their webpage in Spanish and German.
Text is given at the end of this chapter.

12. Article CONESUP online

CONESUP - Consejo Nacional de Educatión Superior is an online magazine for Higher Education in Colombia. The article was written by the publishers.
Full article is given at the end of this chapter.

13. Abstract and Presentation "Dialogue Froum Biotechnology"

The Berlin-Brandenburg agency for biotechnology organised a meeting in Brussels providing the opportunity to meet with members of the European Commission to discuss research dieas for FP7. We had the great chance to contribute an abstract for the preparation of the meeting and could present a 15 minutes talk about the project MolConnect (abstract is given at the end of this chapter). Based on this event we were invited to participate as experts in a workshop organised by BioEuroLatina: "Workshop for cooperation between Andean Comunity and EU in food, agriculture and Biotechnology in FP7" (see No. 14).

14. Presentation in the meeting "Workshop for cooperation between Andean Comunity and EU in food, agriculture and Biotechnology in FP7" organised by BioEuroLatina

Based on the meeting held in Brussels 16 March 2006 the coordinators of the MolConnect project were invited by BioEuroLatina to participate as experts in the workshop "Workshop for cooperation between Andean Comunity and EU in food, agriculture and Biotechnology in FP7". Participants from the Andean region were invited to discuss research opoortunities in the upcoming framework program. Four experts from Europe were invited to participate and support the discussion process based on their experience with European funding system. We had the chance to present the initiaitve MolConnect during that meeting in Bogotá 23-26 April 2006.

15. Presentation in the frame of DAAD Alumni workshops

Since 2005 the University of Potsdam is partner of the Universidad de Costa Rica (San José) in a capacity building program initiated by DAAD alumni and supported by the German Academic Exchange Service (DAAD). In the frame of this cooperation that started 2005, we presented also information about the MolConnect program in the workshops (November 2005, June 2006 and November 2006) and discussed with participants and other researchers about cooperation possibilities. Based on this cooperation a close contact was established to INBio, an NGO with focus of Biosprospecting and sustainable use of biodiversity.

No. 7: Article European Biotechnology News
No. 9-10, Vol. 5, 2006

FP6

Brussels – Scientists from Europe, Africa and Latin America have kicked-off an initiative funded with €155,000 from the European Union, to examine biodiversity by the means of genomics. 'Molconnect' is aimed at pooling biodiversity and genomics experts to cooperate in projects such as the analysis of tropical medicinal plants.

No. 8: Article in El Tiempo 3 September 2006
Published online and in the print version

03 de Septiembre de 2006

Bogotá será sede de importante congreso científico que unirá a Colombia y Alemania

A través de la U. Nacional se realizará el primer Taller y Encuentro Internacional de investigadores europeos y latinoamericanos, y de expertos en genómica y biodiversidad.

Científicos alemanes valoran el nivel investigativo del país.

Fernando Arana y Judith Gómez, dos jóvenes científicos que cursan doctorado y posdoctorado en biología molecular en la U. de Potsdam (Alemania), fueron quienes lograron unir la academia germana y la colombiana.

Este evento, que se realizará entre el 4 y el 6 de septiembre en Compensar, reunirá a 18 conferencistas internacionales y a 100 investigadores de ambas regiones para intercambiar información especializada y desarrollar una nueva plataforma de estudio de la biodiversidad vegetal mediante la genómica.

La genómica es un conjunto de herramientas que emplea técnicas de la biología molecular y la bioquímica, entre otras, para estudiar los genes, que a su vez, son la unidad básica de herencia de los seres vivos y sus funciones. Esta técnica, desarrollada en Europa y Estados Unidos, ha permitido adelantos en la tarea de decodificación de diferentes genomas.

A su vez, la biodiversidad estudia la variedad y la complejidad de las formas de vida y los ecosistemas.

Aunque son disciplinas complementarias, su estudio y desarrollo se han efectuado de forma independiente. Por eso, desde hace más de dos años, el director y la gerente científica del Instituto de Bioquímica y Biología de la Universidad de Potsdam, Bernd Mueller-Roeber y Babette Regierer, presentaron a la Unión Europea un proyecto de acercamiento e intercambio de información entre expertos en las dos disciplinas.

América Latina fue escogida por ser una de las regiones con mayor disponibilidad de diversidad biológica y por el alto nivel de sus investigadores en la materia.

Información adicional: www.molconnect.org

PATRICIA SALAZAR
PARA EL TIEMPO DESDE BERLÍN

No. 9 and 10
Articles in NOTICyT – Agencia Noticias de Ciencia y Technologia de Colombia

No. 9

Genómica y Biodiversidad

Un puente entre Colombia y Alemania

La genética y la biodiversidad ya no van a ser ciencias independientes. La Universidad Nacional de Colombia y la Universidad de Potsdam de Alemania se unieron para hacer un puente entre las investigaciones y los científicos que exploran estas dos áreas.

No. 10

PERFIL

Fernando Arana Ceballos, constructor de puentes entre Colombia y Alemania

EL biólogo Fernando Arana Ceballos es el coordinador de la Plataforma de Comunicación de Genómica y Biodiversidad, Molconnect, la cual busca establecer contactos de cooperación entre universidades e institutos de investigación de Colombia, Latinoamérica y Europa. Llegó a la Universidad de Potsdam, Alemania, a realizar sus estudios de doctorado y desde allí impulsa la cooperación internacional con su país.

No. 9
NOTICyT
Boletín Número 20, Semana del 20 al 26 Septiembre de 2006

Genómica y Biodiversidad

Un puente entre Colombia y Alemania

Por Alejandra Gómez Mendoza
NOTICyT

La biodiversidad colombiana no se restringe únicamente a la conservación. En el país se adelantan investigaciones acerca de recursos genéticos y ADN humano, también se viene profundizado en organismos como plantas y caracterizando los recursos genéticos.

"Colombia es un país con mucha biodiversidad que se ha venido estudiando desde la taxonomía, fisiología y ecología; sin embargo, entender la biodiversidad desde el punto de vista de los genes, especies y ecosistemas será un potencial económico para el país", afirmó Esperanza Torres, profesora de la Facultad de Agronomía de la Universidad Nacional de Colombia.

La biodiversidad estudia la variedad de especies animales y vegetales. Por su parte, la genómica comprende las técnicas desarrolladas para secuenciar el genoma humano y permite analizar el ADN que tiene cualquier organismo vivo. Estas dos áreas del conocimiento deben ser abarcadas en conjunto, estudiadas al mismo tiempo, una en relación con la otra porque las dos se sirven mutuamente. La biodiversidad es el material de estudio de la genómica.

Esta fue la razón para que se realizara el taller "Un puente entre genómica y biodiversidad", coordinado por la Universidad Nacional de Colombia y la Universidad de Potsdam (Alemania). El evento se llevó a cabo en Bogotá, reunió a científicos e investigadores nacionales e internacionales, expertos en las dos áreas, con el objetivo de establecer un espacio para discutir sobre las investigaciones que se están desarrollando en los países europeos y latinoamericanos.

"Esta reunión nos permitirá crear lazos muchos más fuertes entre este tipo de comunidades científicas, producir colaboración internacional hacia el futuro y, si es posible, crear redes de trabajo y de comunicación para el avance de la investigación", afirmó el genetista colombiano Fernando Arana, estudiante de doctorado de la Universidad de Potsdam y organizador del evento.

La integración de las investigaciones colombianas sobre genómica y biodiversidad, se insertarán en una plataforma internacional conocida como *MolConnect*, la cual ayudará a mejorar la comunicación entre los diferentes países y personas que estudian estos temas. "Lo importante de establecer este tipo de relaciones es el intercambio de conocimiento entre las dos partes", indicó Babette Regierer, gerente científica del centro interdisciplinar *Advanced Protein Technologies*, de la Universidad de Potsdam.

Por su parte, Indridi Benediktsson, director general de investigaciones de la Comisión Europea, comentó que "Colombia tiene mucho potencial y alto nivel. La Comisión Europea tiene muchas posibilidades de colaboraciones entre países europeos y países latinoamericanos como éste, esto ha llegado a ser muy importante por eso crecerán las oportunidades a futuro".

La cuota colombiana

De manera conjunta la Universidad Nacional de Colombia y la Universidad de Potsdam aplicaron ante la comunidad europea para el patrocinio del proyecto. En esta iniciativa Colombia representa a los países latinoamericanos.

"A nivel de Colombia tenemos la fuente de biodiversidad, el conocimiento, la capacidad y el personal, lo que nos falta es infraestructura por la poca capacidad económica que tenemos para adquirir los grandes equipos, pero bajo ningún punto de vista somos inferiores en cuanto a calidad científica o al nivel de los investigadores", agregó Arana.

"Necesitamos fortalecernos en infraestructura; pero hay una buena oportunidad. Colciencias dijo dentro del taller que va a promover una plataforma genómica dentro del país tanto en microorganismos como en plantas y animales y se va a entrar a concurso para formar consorcios en temas de investigación. Cada institución debe trabajar en forma conjunta y no aislada para que esta infraestructura se use a nivel nacional, la idea es fortalecernos en conjunto para un bien común", complementó Esperanza Torres.

No. 10
NOTICyT
Boletín Número 25, Semana del 25 al 31 Octubre de 2006

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PERFIL

Fernando Arana Ceballos, constructor de puentes entre Colombia y Alemania

Por Camilo Calderón Acero
NOTICyT

Fernando Alberto Arana Ceballos, biólogo colombiano radicado en Alemania, es el coordinador de la Plataforma de Comunicación de Genómica y Biodiversidad, Molconnect, quien se ha convertido en un puente para la ciencia y con su labor espera establecer importantes contactos de cooperación internacional entre universidades e institutos de investigación del país, de Latinoamérica y Europa.

"Me gusta mucho que mi trabajo pueda conectar a personas que trabajan en campos de investigación disímiles, pero que pueden complementarse y llevar a cabo proyectos de investigación", señaló el investigador.

Arana Ceballos es de origen vallecaucano y viajó a Alemania en el 2002, gracias a una beca del Consejo Alemán de Investigaciones (DFG-Deutsche Forschungsgemeinschaft) y está terminando de escribir su tesis de doctorado en Biología Molecular de Plantas, en el grupo del Profesor Dr. Bernd Müller-Röber de la Universidad de Potsdam y del Instituto Max Planck. "Mi trabajo está centrado en la caracterización de un gen que se traduce en una proteína que origina una molécula importante; a su vez, esta molécula es clave, pues activa a otras en una ruta metabólica a nivel celular en la planta modelo *Arabidopsis thaliana*", una planta que por su pequeño tamaño y su corto ciclo de vida, permite su fácil manipulación en laboratorio, indicó.

Biólogo con énfasis en Genética de la Universidad del Valle, Arana Ceballos se vinculó al Departamento de Microbiología de la misma universidad en trabajos de investigación en patogenésis molecular de virus humanos, es decir, mecanismo molecular que da origen a estas enfermedades. Allí colaboró con el actual director de Colciencias, Felipe García Vallejo, quien a su vez lo recomendó para trabajar en el Centro Internacional de Agricultura Tropical, CIAT, en la unidad de Biotecnología. Luego, sus pasos lo llevaron a la industria dónde le dio identidad molecular a microorganismos para ser usados comercialmente como productos biológicos. Durante el 2001 estuvo vinculado al Instituto Amazónico de Investigaciones, SINCHI, como coordinador de Recursos Genéticos para la Amazonia y de allí partió para Alemania.

En sus ratos libres practica fútbol dos veces por semana, alternando con otras actividades culturales. Sus amigos lo conocen como un apasionado del baile, especialmente de la salsa. Aunque la vida en Potsdam difiere mucho de su Buga natal, tiene la ventaja de disfrutar de la variada oferta cultural de esta ciudad que se encuentra distante 20 minutos, hacia el suroeste de Berlín.

El biólogo bugueño explicó: "La posibilidad de conocer otra cultura, de hablar y pensar en otro idioma, en este caso inglés ya que no hablo alemán, de interactuar día a día con investigadores de alto nivel y de discutir acerca de lo que me gusta con colegas provenientes de diferentes partes del mundo es una maravillosa y enriquecedora experiencia. En el día de hoy no sé si soy un mejor investigador. Pero si sé que soy un mejor ser humano y eso se lo debo a esta oportunidad en Alemania, aunque eso no signifique que es necesario salir del país para ser mejor persona".

Así las cosas, su trabajo en Alemania es más un lazo de unión que una separación de la realidad colombiana. Un lugar, una música y un sentimiento que lo acompañan día a día. "No hay un lugar específico en el mundo para ser feliz o estar triste o vivir decepcionado. Lógico que se extraña a la familia, los amigos y la dieta de champús y pandebono. Tal vez en Alemania la vida es más tranquila, pero no por eso me olvido de la problemática y también de las buenas cosas y de la gente fantástica que tenemos en nuestro país. Todavía no he hecho mi mayor contribución al país como para sentirme satisfecho del todo", concluyó Arana Ceballos.

No. 11: Text for the presentation of MolConnect for webpage of the Colombian Embassy in Germany (Berlin)

MolConnect: Eine Initiative an der Schnittstelle zwischen Genom- und Biodiversitätsforschung

Die Entwicklung von sogenannten Hochdurchsatz-Technologien in der modernen Biologie hat es in der jüngsten Vergangenheit möglich gemacht, dass die Struktur und Funktion einer sehr großen Anzahl von Genen, Proteinen (den Genprodukten) bis hin zu ganzen Stoffwechselwegen gleichzeitig untersucht werden können. Um die großen Mengen an Daten bearbeiten und verstehen zu können, hat sich die Bioinformatik als neues Wissenschaftsgebiet entwickelt. Der Einsatz der neuen Technologien der funktionellen Genomforschung sowie der Bioinformatik kennzeichnet eine Revolution in der biologischen Forschung. Basierte die Genomforschung bisher hauptsächlich auf Untersuchungen an wenigen Modellorganismen, bieten die modernen Technologien nun auch Ansatzpunkte für die Untersuchung der natürlich vorkommenden Artenvielfalt (Biodiversität). Die Artenvielfalt der Erde ist nicht nur Indikator für den Zustand unseres Planeten, sondern repräsentiert auch unsere Lebensgrundlage. Die Untersuchung der Artenvielfalt trägt nicht nur zum Verständnis des Lebens auf der Erde bei, sondern stellt auch notwendiges Wissen für unser eigenes Überleben bereit. Die Einbindung der funktionellen Genomforschung in die Erforschung der Artenvielfalt wird es ermöglichen, das Wissen auf der Ebene von Genen, Arten und Ökosystemen zu vertiefen und zu völlig neuen Erkenntnissen zu gelangen. Das Potential einer Zusammenarbeit an der Schnittstelle zwischen Genomforschung und Biodiversitätsforschung diskutieren Wissenschaftler auf dem Workshop „MolConnect - Bridging Genomics and Biodiversity“ am 4.-6. September 2006 in Bogotá, D.C. (Kolumbien). Der Kongress wird gemeinsam organisiert von der Universidad Nacional de Colombia (Kolumbien) und der Universität Potsdam (Deutschland) und steht unter der Schirmherrschaft der Europäischen Kommission, der Vicerrectoría de Investigaciones der University Nacional sowie von Colciencias. Für die Etablierung dieses neuen Forschungsgebietes an der Schnittstelle zwischen Genom- und Biodiversitätsforschung ist vor allem die Zusammenarbeit zwischen Wissenschaftlern aus Lateinamerika und Europa notwendig, um neue gemeinsame Projektideen zu entwickeln. Mehr Informationen zum Projekt sowie zur Tagung finden Sie auf www.molconnect.org.

SEMINARIO TALLER: GENOMICA Y BIODIVERSIDAD - Evento Colombo-Alemán

En la actualidad se presenta un enorme desarrollo de métodos de alto rendimiento para el procesamiento de datos, permitiendo la investigación simultánea de la estructura y función de una gran cantidad de genes, de las proteínas que son sus productos derivados y de las interacciones metabólicas entre las mismas, dentro y fuera de la célula. En este contexto, la genómica estructural-funcional y la bioinformática constituyen una revolución para la investigación básica y aplicada en vegetales.
En el mismo sentido, es cada vez mas importante la investigación en biodiversidad, principal indicador de la salud del planeta, y el aprovechamiento racional de sus resultados.
Para articular la discusión sobre innovaciones en la investigación en biodiversidad a nivel de genes, especies y ecosistemas se realizará el Congreso-Taller “Un Puente entre Genómica y Biodiversidad / Bridging Genomics and Biodiversity”, en la ciudad de Bogotá, D.C. entre el 4 y 6 de septiembre de 2006.
Este evento es organizado por la Universidad Nacional de Colombia y la Universidad de Potsdam en Alemania, bajo el auspicio de la Comunidad Europea, la Vicerrectoría de Investigaciones de la Universidad Nacional y Colciencias.
El Congreso-Taller esta dirigido a investigadores europeos y latinoamericanos.
Para poder participar de este evento es indispensable realizar una inscripción previa; para mayor información favor consultar en www.molconnect.org.

No. 12
CONESUP – Consejo Nacional de Educatión Superior

http://www.conesup.net/anoticias_afondo.php?id=4012

Bogotá, sede de importante congreso científico

Científicos alemanes valoran el nivel investigativo del país. Fernando Arana y Judith Gómez, dos jóvenes científicos que cursan doctorado y posdoctorado en biología molecular en la U. de Potsdam (Alemania), lograron unir la academia germana y la colombiana a través de la U. Nacional para realizar en Bogotá el primer Taller y Encuentro Internacional de investigadores europeos y latinoamericanos, y de expertos en genómica y biodiversidad.

Este evento, que se realizará entre el 4 y el 6 de septiembre en Compensar, reunirá a 18 conferencistas internacionales y a 100 investigadores de ambas regiones para intercambiar información especializada y desarrollar una nueva plataforma de estudio de la biodiversidad vegetal mediante la genómica.

La genómica es un conjunto de herramientas que emplea técnicas de la biología molecular y la bioquímica, entre otras, para estudiar los genes, que a su vez, son la unidad básica de herencia de los seres vivos y sus funciones. Esta técnica, desarrollada en Europa y Estados Unidos, ha permitido adelantos en la tarea de decodificación de diferentes genomas.

A su vez, la biodiversidad estudia la variedad y la complejidad de las formas de vida y los ecosistemas.

Aunque son disciplinas complementarias, su estudio y desarrollo se han efectuado de forma independiente. Por eso, desde hace más de dos años, el director y la gerente científica del Instituto de Bioquímica y Biología de la Universidad de Potsdam, Bernd Mueller-Roeber y Babette Regierer, presentaron a la Unión Europea un proyecto de acercamiento e intercambio de información entre expertos en las dos disciplinas.

América Latina fue escogida por ser una de las regiones con mayor disponibilidad de diversidad biológica y por el alto nivel de sus investigadores en la materia.

Información adicional: www.molconnect.org

No. 13

Dialogue Forum Biotechnology

Capital Region Berlin-Brandenburg
Brussels, 16 March 2006

Round table Biotechnology

Title

Genomics for Terrestrial Biodiversity Research

Organisation – Contact Person

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Project - abstract

The understanding of ecosystems requires a careful survey not only of abiotic factors of the environment, but also of biotic factors contributing to the performance and development of organisms in a given environment. In biodiversity and ecological research, large data sets have been acquired though field observations and experiments. Such data reflect phenomena and characteristics of defined ecosystems including their inhabitants. The next important step for a knowledge-based understanding of terrestrial biodiversity and its underlying genetic resources as well as ecosystem structures and dynamics will be the integration of functional genomics. Currently, genomics tools such as comprehensive gene expression profiling, protein profiling, metabolome analysis and bioinformatics are almost exclusively applied to model organisms such as *Arabidopsis thaliana* and crops. It is almost certain that by extending genomics tools to non-model species that are, however, eminently relevant to ecosystem dynamics, our understanding of the performance of organisms under specific environmental conditions and of ecosystem behaviour will largely increase and strongly contribute to our understanding of how genomes interact in nature. The underlying research and organisational agenda is multi-layered and demands expertise from various biological fields, including genomics, technology development, ecology, and bioinformatics.
The overall concept planned here aims at the establishment of an Integrated Project addressing "Genomics for Terrestrial Biodiversity Research" with a main focus on plants (and their interacting partners). Within this IP, genomic tools will be developed for the specific needs and purposes of biodiversity and ecosystems research. The knowledge generated will be applied in subsequent complementary activities (e.g. STREPs). To maintain and intensify the networking activities and connect to existing initiatives worldwide it would be of high importance to establish also an NoE.

Reference 7. RP - European Dimension

The topic is located at the interface between Thematic Priority TP1 (*Health)*, TP2 (*Food, Agriculture and Biotechnology),* as well as TP6 (*Environment*). If possible we will integrate also the Social and Political Sciences and Economics represented in TP8 (*Socio-economic Sciences and the Humanties*).

Implementation Plan

"Genomics for Terrestrial Biodiversity Research" will be initiated through an ongoing EU SSA (MolConnect, see below) which specifically aims at connecting researchers from the fields of plant genomics and ecology, facilitated by setting up a web-based information platform. Subsequent steps involve the identification of suitable "anchor species" that will serve to efficiently implement genomics tools to non-model species of ecological relevance, the development of tools for genomics-type studies in ecologically relevant plant species, and the building of a new bioinformatics platform for inter-species analyses with relevance to ecological research.
The EU SSA „Integration of genomics and biodiversity research: implementation of an international platform – MolConnect" (PL019122) provides an excellent basis to integrate the efforts of both research fields and to generate a new understanding of the importance of joint research. The project started in Nov 2005 and has a duration of 12 months. The initiative will provide information via a web-based platform and will organise a joint European-Latin American meeting in September 2006 in Colombia where a unique opportunity is provided for interested researchers to meet and develop joint activities. The MolConnect activity will not only integrate genomics and biodiversity research, but will also intensify interactions between Europe and Latin America.
The internationality of the initiative will guarantee

- the most efficient transfer of know-how
- the alliance of different activities to achieve complementarity and overcome fragmentation
- provide the basis to address issues on a global scale and with global importance

"Genomics for Terrestrial Biodiversity Research" will also assist in identifying, with enhanced throughput, novel genes in non-model plant species that could have important implications for plant breeding and biotechnology.
The MolConnect platform is the first step into the development of a "Functional Genomics Toolbox" for biodiversity and ecosystem research in the frame of an IP and the subsequent initiation of specifically targeted scientific projects (e.g. STREPs) under FP7. Existing initiatives (IPs, NoEs) funded under FP6 will be integrated in the activities wherever possible.

Information under: www.uni-potsdam.de/apt/molconnect; soon at: www.molconnect.de

Estimated Budget and Partners

Partners: Researchers and SMEs
Regional: University of Potsdam, Max-Planck Institute (MPI) for Molecular Genetics, MPI of Molecular Plant Physiology, Charité Berlin
European: IP "MolTools", Switzerland, Israel, UK, The Netherlands, Spain
Non-European: Colombia, Brasil, Mexico, Costa Rica, Nicaragua, Peru, Panamá, USA

ANNEX 1

REPORT ON ROUND TABLES

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DNA BARCODING

MODERATOR: SANTIAGO MADRIÑAN (UNIVERSIDAD DE LOS ANDES, COLOMBIA)

WRITER: LÚCIA G. LOHMANN (UNIVERSIDADE DE SÃO PAULO, BRAZIL)

- **History**: There are 1,7 million species known, nearly 8,300 remaining to be described. Yet, there are very few people with sufficient knowledge to describe the remaining species and to identify the species that have already been described.

- **Consortium for the BarCoding of life** (www.barcodinglife.com; www.barcoding.si.edu). The idea behind it is that you sequence a bunch of species within a particular group, produce a neighbour-joining tree that can be used as basis to identify all species sampled.

- **The CoBD has different phases**:

(1) Study the variation, come up with standard protocols for amplifications and sequencing, and chose regions of interest (5 were chosen);

(2) Produce Barcodes. Since Barcodes need to be tested, here is were we can all give the best contribution. For example, The Flora of Colombia could be a test case where we could add another column with Barcode numbers within the checklist.

- **Two step approach**:

(1) Use one marker that would place the organism within some broad area within the phylogeny;

(2) Use a second marker that would help resolve finer scale relationships.

- **Networks available**:

(1) BarCoding of Life;

(2) Plant DNA Working Group;

(3) DNA BarCode at Kew.

- Markers proposed for plants:

(1) Kress *et al.* (ITS + *trn*H-*psb*A);

(2) Newmaster *et al.* (*rbc*L + ??);

(3) CoBL Plant working Group (Plastid Genome).

- **Markers should be**:

(1) Short (up to 600bp) so that even herbarium materials can be amplified;

(2) Easily alignable across different plant groups;

(3) Easily amplified.

- **Limiting factors of the current approach**:

(1) Young species (low levels of variation);

(2) Species with low evolutionary rates;

(3) Lack of variation;

(4) Technical problems such as contamination;

(5) Hybrids and reticulation within the tree.

- **Choice of study group**:

(1) Do we want to focus on particular plant/animal groups? Or, do we want to focus on particular regions (Amazon)?

(2) Some plant groups might be more difficult to work with than others, so we might want to focus on "easy" groups first. For example, some species might have horrible secondary compounds that might make DNA amplification a lot more complicated.

(3) Amazon region is too big so we would probably not get funding for that; might be best to focus on particular species.

(4) Focus should be taxonomical. However, plants have broad distribution ranges and so, collaborations are highly needed because it is impossible for one person to sequence from all different parts in the world. This is the ideal kind of project for collaborative networks.

(5) Find plants with economical importance and search for markers focusing on these species. Should we limit the study to those?

(6) Not focus on plants exclusively but include animals as well. In this case, we would need to look for partners focused on other taxa.

- **Concerns**:

(1) Aren't these markers more variable within a single individual? In plants, this is not a concern, unless you have a mosaic. You can probably find mutants but we are sequencing genes that are really important for the biology of plants and so, these mutants would probably not be a problem.

(2) The genes that are being sequenced. If we pick up the wrong gene, we might go into the wrong track.

(3) There are only a few plant groups that are now being studied. We need a lot more model plant groups.

(4) Are the markers giving us the information that we need?

- **Suggestions**:

(1) **Use natural history collections as basis for DNA collections**. This would allows us to investigate variation within and across species and particular markers. It is important to establish protocols as to how the materials would be collected/stored.

(2) **Use Germplasm Banks as a starting point.** Might be a good place to start because they include a start up collection for initial sequencing. In addition, this would also represent a good way to merge people from different areas.

(3) **Amplify all 5 regions through 1 PCR reaction**. The more, the merrier. However, this initiative aims to produce an easy amplification/sequencing protocol so that any user (non-biologists) can get the species name as fast as possible. This is why we want an easily amplifiable region.

- Network:

(1) The idea is to have two or more Institutions in Europe/Latin America that would be interested in writing an FP7 proposal to get involved in this initiative. The countries that we had in the round-table were: Brazil, Colombia, UK, Peru, and Panama.

(2) The network would allow Latin Americans to be sent to Europe and Europeans to be sent to Latin America for training.

(3) **Aim of the Network**: (1) Develop a new group to develop BarCoding studies; (2) Use the BarCoding Initiative as basis to advance research relating to systematics in general; (3) Promote collaborative research.

- **Why are Latin Americans and Europeans in a good position to collaborate on this initiative?**

(1) Because Latin Americans have the biodiversity, while the Europeans have the technology;

(2) The project can be placed within the context of other projects and could also help accelerate networking and research in Latin America in general.

- **Applications/Results**:

(1) Identification of species. It democratizes access to species names (and a name is tied up to a lot of other types of information);

(2) The sequences generated will be useful for phylogenetic purposes;

(3) We would learn more about the variation within species boundaries;

(4) We would be able to learn more about the genome of these species;

(5) Control the boundaries of countries;

(6) Control epidemics;

(7) Training of people: We would need extensive training so that everyone is able to use the proposed technology;

(8) Interactions between people in different areas (e.g., molecular biologists, taxonomists and bioinformatics).

- **Which expertise is missing?** None. We actually have the expertise between Latin America and the European Partners.

- **Limitations and Bottlenecks**;

(1) Money;

(2) Legal aspects to the access to biodiversity;

(3) There are many more natural history Museums vs. Molecular labs. One possibility would be to send all materials to be sequenced in one place. But, brings back problems related to legal aspects;

(4) There is no real technological bottleneck. However, development of faster sequencers are always welcome;

(5) Capacity building;

- **Infrastructure Needed**:

(1) **Easy Access to Natural History Collections**. We need to communicate in terms of the organisms that we have. Hence, we need our databases current and in a good shape. For Colombia, there is now the checklist of Colombia which can serve as basis for the BarCoding initiative in this country. GBIF and IABIN are other examples of initiatives along those lines.

(2) **High through-put sequencing facilities;**

(3) **Training**;

- **Conclusions**:

(1) Network would be the first aim of the project;

(2) We are all interested in research, training, and network;

(3) Once consensus groups are chosen, this leads to the training of the next generation;

(4) Group choice needs a focus. First, it should be on particular plant groups in which people within the Network are interested. Second possible criteria for choice could be on groups that have particular concern, which would allow the barcoding project to be inserted in other ongoing initiatives. However, these would need to be better defined once the general aim of the project is more clear.

(5) Barcoding is only a part of studying biodiversity and genetic variation across organisms as a whole.

REGULATORY FRAMEWORK (IN RESPECT OF BIODIVERSITY)

MODERATOR: JORGE MAYER (CAMPUS TECHNOLOGIES, FREIBURG, GERMANY)
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Discussion and Conclusions

A number of participants at the discussion reported about their frustrating experiences with accessing genetic resources. This is a problem that seems to be affecting most countries in the region. Most frustrating is the fact that even government agencies, like the Ministry of Agriculture and the Ministry of Science and Education (Colciencias) are affected by a lack of definition in the execution of existing legislation.

While legislation has been developed to protect biodiversity and to promote its sustainable use, the laws are often achieving the opposite. While legal access to genetic resources is made very difficult if not impossible, more and more people are opting for illegal access to those resources.

Everybody at the table agreed that the laws as they stand are acceptable and something scientists and industry can live with. What is turning out to be the stepping stone is the implementation of the laws, i.e. the regulations and their interpretation. A lack of definition creates confusion among regulators and applicants. Applicants are often required to provide information repeatedly, a process that may take several years to reach conclusion. This delay is unbearable in most contexts, industrial and academic.

Positive and negative experiences with the existing system should be documented and the information shared. It could be very useful to have specialised offices managing the access process for scientists, who are often ill-prepared to deal with these issues. Scientists can be trained in the handling of these issues as part of a project. Documented cases can be used as training materials. This would be also useful for regulators, who are often overburdened with work and ill-prepared to deal with the applications.

There was discussion about the use of standard access agreements and also about centralising the management of those agreements by an entity such as Colciencias. This is probably not a workable solution because it would cause an interruption in the chain of liability. The liability cannot be taken away from the project owners and passed on to an entity like Colciencias. Further, in many cases the researcher cannot provide information on future applications of the materials received. In such cases the agreement could envisage a duty by the researcher to report on the development of commercial applications of the materials. The consequences of such a finding should be clearly formulated from the onset to avoid finding out after years of work that the material cannot be used as intended.

There is a need to map out our options: which resources (biological materials, genetic resources, information, etc) can be shared under what conditions in the present situation? How could procedural matters be improved, e.g. by training the applicants?

As suggested by the representative of the Ministry of Agriculture, that agency could make a case before the government based on well-documented cases sent to them by affected institutions.

The main point of the discussion then is, how could the handling of access to genetic resources under the present regulatory framework (or the lack of existence thereof) be incorporated into a project proposal presented within the FP7 by a MolConnect partner.

It is proposed by this roundtable that we should create a MolConnect [Genetic Resources Access] Network (GRAN) to give support to projects arising from this initiative. In a first phase GRAN would accompany the process of presenting projects requiring access to genetic resources to FP7. It is expected that a number of questions about such access will need to be addressed in the proposal.

In a second phase a subset of GRAN would be part of a sub-project to assist funded MolConnect projects. GRAN would have the potential to also assist other projects funded by FP7 in LAC countries. GRAN will not be generating proprietary information, thus this information could be made widely available, e.g. as training materials for many scientists in LAC. This would probably be well received by the EC, who is aware of the problem and would expectedly welcome a program that tried to avoid duplication of efforts while ensuring that access to genetic resources is handled in the most efficient way. As the EC is a party of the CBD there is no doubt that the EC will be acting within the ABS principles of the convention, including respect for traditional knowledge.

While it is recognised that legislations may vary from country to country, they all share a common denominator. Further, positive or negative experiences made in one country may be conveyed to regulators in other countries. A well-designed GRAN may even gain some political clout to be used in negotiations with countries. After all, these legislations have been made not only to protect genetic resources from indiscriminate access but to promote the sustainable and equitable use of those resources, thus governments *should* be willing to listen to proposals that are expected to revert into benefits to the country. As discussed earlier, it's not about changing the legislation but creating a transparent and efficient regulatory framework. There should be no room for murky interpretations of the law. Regulators as well as researchers need clear rules to follow.
One of the main problem of regulators is the attachment of a realistic monetary value to the genetic resources being released. Costa Rica (INBIO) seems to have a useful working model that should be analysed and adapted for other countries for lobbying among policymakers. Politicians need to be educated constantly, for legislation often ignores biology, which is part of the reality of the materials and the research being done on those materials. For example, it is quite different to request an organism whose characteristics are already known or a large collection of organisms that still need to be characterised. Regulations should clearly distinguish between these different uses of the materials.

There are models that should be watched carefully, e.g. the ITPGRFA. While governments may handle defined materials more strictly than this treaty does, it may consider the use of standard terms. The parties to the treaty have now agreed to a standard agreement between the donor and the recipient whereby the recipient agrees to pay 1.1% of any commercial gains derived from the materials. This is a realistic number which is in line with industrial practice and competition on the marketplace. Those royalties are to be reinvested into conservation programs.

We believe that the Colombian and other governments are genuinely searching for opportunities to promote innovation, as witnessed by the signing of FTAs recently. Policymakers are in need of guidance and information of how the restricted access to genetic resources is seriously preventing such innovation.

6 Sept 2006

Continuation of Legal Framework Roundtable (4 Sept 2006):
Access to Genetic Resources

Additional participants:

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Deliberations and Conclusions

The report on the first discussion round (Legal Framework) was read to all participants and approved.

The time between the first roundtable and the second round of discussions was used to obtain some feedback as to whether the outcome of this roundtable should be part of one or more projects presented within FP7 or a stand-alone project. Because it is not known how many projects will be presented by MolConnect participants, how many of those will be funded, and how many will require assistance to access genetic resources, the going opinion is that it should be a stand-alone project. Furthermore, such a support project could assist projects that do not arise from the MolConnect initiative.

Discussion focused on how the project should be designed and about its timing.

Revise existing legislation for comparative studies. FP7 projects must involve different countries, thus we will have to deal with differing legislations and regulations.

Initially, a network will be constituted which will comprise the roundtable participants and any MolConnect participant who want to become part of it (Genetic Resources Access Network, GRAN).

A project to solve the impasse with access to genetic resources should start at the earliest possible date. It is expected that the EC will be very interested in such a proposal, as it is widely recognized that without a practicable solution to this problem most project proposals would not get off the ground. It remains to be found out whether this project will be funded through FP7 money or other sources. Any information generated through the project should be made widely available and be used as training materials for institutions considering projects that include genetic resources from Latin America.

The ideas discussed here need to be developed further to generate a project proposal. Three participants of the roundtable will take the lead to move the project forward. These are Dolly Montoya (IBUN, Univ Nacional, Colombia), with the help of Patricia del Portillo (Corpogen) and Pedro Rocha (Cenipalma). The network will try to meet in Chile during the next MolConnect/REDBIO meeting (Oct 2007). Nevertheless, the proposal should already be very advanced by that time, given the priority of this issue.

Proposed institutional participation: IBUN and Law Faculty (Univ Nacional de Colombia); Cenipalma (private corporation, Colombia); Corpogen (private corporation, Colombia); Colciencias; MinAgricultura; Univ Peruana Cayetano Heredia (Peru); Sinchi (Colombia); HumBoldt (Colombia); Fedecafe (Colombia); EuroBioLatina; Univ of Potsdam (Germany); Kew Gardens (UK); Max-Planck Institute (Germany); institutions from Ecuador, France, Costa Rica (INBio?) (?). This list is open to further proposals.

It is not envisaged that the GRAN will provide a service to projects to gain access to genetic resources. During the lifetime of the project, it will accompany one or two projects along the process. This experience will be passed on to new projects. One proposal is to accompany a Cenipalma project. Access to palm germplasm seems easier than to other germplasm as it is non-native, even though Colombia treats introduced germplasm as its own once local variability starts developing. A second project could come out of a MolConnect proposal to be determined. It should be a project to be presented early in the competitive FP7 process.

The actors in GRAN will also play a political role, which has to be discussed in detail. It is important to make concerted efforts, rather than scientists fighting individually and negotiating exceptions rather than practicable rules that can be applied widely (as is being done by INBio in Costa Rica.

POPULATION GENETICS OF DOMESTICATION

MODERATOR: DANIEL DEBOUCK (CIAT, COLOMBIA)

Members:
Maria Isabel Chacon Sanchez, Universidad Nacional de Colombia, Colombia
Daniel Debouck, Centro Internacional de Agricultura Tropical, Colombia
Nicola Flanagan, Centro Internacional de Agricultura Tropical, Colombia
Juan Diego Palacios, Instituto Alexander von Humboldt, Colombia
Alexandra Marmolejo, Universidad del Choco, Colombia
Bogdan Wolko, Institute for Plant Genetics, Poland
Maria de Lourdes Torres (Universidad San Franciscio de Quito)
Federico Albertazzi, Universidad de Costa Rica

Project idea: Title: Underutilized crops of the Andes in the Solanaceae

Aims:

- Comparative genomics studies of domestication QTL: domesticated vs. underutilized crops
- Screening of collections for important traits to add value to collections
- Comparative studies of domestication candidate loci between crop model plants and underutilized crops for specific traits

Relevance:

- Exploitation of genomic resources developed for model plants to be applied to underutilized crops
- Generation of knowledge about LA biodiversity to promote use, conservation and increase of nutritional value in rural communities

Impact:

- Improvement of scientific knowledge of plant material
- Reciprocal benefits for the study of major crop models
- Promotion of underutilized crops
- Improvement of nutrition
- Study of patterns of diversification in LA
- Knowledge about genomic regulation in domestication
- Agronomic diversification

SPECIATION AND ADAPTATION

MODERATOR: CARLOS MACHADO (UNIVERSITY OF ARIZONA, USA)

WRITER: KENTARO SHIMIZU (UNIVERSITY OF ZURICH, SWITZERLAND)

Participants

Nelson Toro-Perea, Universidad del Valle
Clara Ines Orozco, University Nacional de Colombia
Richard Reinhardt, MPI for Molecular Genetics, Berlin, Germany
Heike Küchmeister, University of Potsdam, Germany
Gordon Allison, IPGRI , UK
Laura Scott, Morales, Universidad Autonoma de Nuevo Leon Mexico
Oliver Schweiger, UFZ Center for Environmental Research, Germany
Andy Jarvis, CIAT, Colombia
Fernando Gust: Humboldt institute, Colombia
Favio Gonzalez, University Nacional de Colombia
Marc Zabeau, University of Gent, Belgium
Wolfgang Stephan, University of Munich, Germany

Summary

Project ideas
- assessment of genetic variability in target taxa under condition of global change

Thematic Areas:
- generation of genetic markers
- modeling of environmental change
- analysis of candidate genes under selection
- monitoring phenotypic variation
  wild and /or experiments
- genome association mapping

Criteria for target taxa
- annual vs perennial
- environmental range
- taxonomic diversity
- historical distribution
- indicator species
- endemic species
- conservation target
- socio-ecological importance

Memo from the discussion

We have different levels of expertise: taxonomy to systematic (relationships), molecular phylogenetics, population genetics

Lack of infrastructure to collect genetic data
good taxonomists in Colombia
How to move from pattern to understand processes?

Model organisms: Drosophila, Arabidopsis
How to move to others?

Ficus (Fig) and fig wasp is a model to study coevolution, which is ecologically interesting.

>100 species

Phylogenetic research and molecular systematics
to compare reproductive systems

A possibility is to choose one system to study, ecology to phylogeny in different time scales

How to identify interesting questions?
- There are so many questions in the field of speciation, as described in the book 'Speciation' by Coyne and Orr. We do not need to be afraid of the lack of the questions.

Conservation can be a goal
key issue: gene adaptations facing fast environmental changes
Interesting question is that how quick the adaptation can be. Genetics is too slow, meaning that the accumulation of new mutations takes time. Standing variation must be important.

Can we find candidate genes? Is it difficult?
The genes responsible for metabolites are good candidates.
From the study of Arabidopsis, genes responsible for flowering time or sexual reproduction are good candidates.

In addition to standing variation, gene disruptive mutations can be another major mode of rapid evolution (e.g. Arabidopsis flowering time and selfing)

Carlos
One of the main criticisms of model species is that they tend to have old divergence date.
- The divergence of Arabidopsis thaliana from other species was 5-6 million years ago, which is similar to the split between humans and chimpanzees, which is not too old. Moreover, other Arabidopsis relatives diverged quite recently.

The speciation of some species in Colombia (including Paramo) diverged in 8-3 million years ago, which is also not too old.

How easy to find hybrid outside? It depends.

Ka/Ks ration is not giving much.

What gene to choose?
mitochondrial gene is not useful in plants

Initially, to make a mapping population may be a good idea.

Needless to say, speciation and adaptation are not necessarily the same.
The role of adaptation in speciation will be interesting.
What is species?
grade of speciation may be an interesting theme
Is the mode of speciation different in tropics and outside of tropics?

To choose a species is a difficult task
In terms of Brassicaceae, Draba and Cardamine are living in mountains
rate of speciation is interesting
time may be a critical issue here

Why do different species have different level of polymorphism?
What is the relationship between high level of polymorphism and region?
tremendous variation within species

thaliana less SNP
maize: much SNP
tomato: even higher

Colombia has wide range of environment, from amazon to alpine tundra
climatic changes

One idea to cover the interest of the participants is assessment of genetic variability in several taxa living in contrasting environment
For taxa with phylogenetic interest, a few genes will give a good phylogeny.
For taxa with interest in speciation and adaptation, 50 random genes and 50 candidate genes will reveal the population structure, history, and molecular adaptation.

Pollination difference can be included
Paramo is most endangered environment in Colombia

EST is a good tool to produce markers
500-700 ESTs, and then, markers
This method worked in Ficus

Too big project is difficult to organise and run.

BIOTIC STRESS

MODERATOR: AGIM BALLVORA (MPI-COLOGNE, GERMANY)

Participants
Silvia Restrepo (UNIANDES, Colombia)
Adriana Bohórquez (CIAT, Colombia)
Nancy Arciniegas (USDA-USA)
Agim Ballvora (Max Planck Inst Plant Breeding Research, Germany)
Camilo Lopez (UNAL-Bogota, Colombia)
Martha Marulanda (UTP, Colombia)
Jershon Lopez (CENICANA, Colombia)
Rafael Arango (CIB-UNAL-Medellin, Colombia)
Ricardo Oliva (CIP, Peru)
John Hernandez (ICA, Colombia)
Paul Chavarriaga (CIAT, Colombia)
Jesús Beltrán (CIAT, Colombia)
Esperanza Torres Rojas (UNAL, Colombia)

Crops:
Cassava, solanaceous species, horticultural (flowers), sugar cane, banana.

Identify :
1) Strengths and weaknesses of each partner.
- *Colombia*: Has diversity,
- *EU*: Has genes available, freedom to operate (clear IP issues)
2) Treaties, how do they help/impede collaboration with Colombia and the EU.
3) How can the EU help?
    Involving PhD students
    Technology transfer

Objectives:

1) Quantitative resistance (fungi; insects); identify quantitative, horizontal, durable type of resistance in specific crops.
2) High throughput detection systems of pathogens.
3) Screening methods to detect pathogen diversity.

1) Quantitative resistance

Relevance Reducing yield lost. Reducing use of pesticides (ecological and health impact). Maintaining diversity.
Impact. Reducing cost production, sustainable production and management of biological resources. Improving life of farmers. Understanding better the molecular mechanisms of resistance
Funding Program: EU Food Agriculture and Biotechnology
Partnership--expertise missing
Limitations: Funding, training,
Infrastructure: Genomics platform
Resources:
Mutual interest for cooperation: Food security, sustainable agriculture.

2) High throughput detection systems of pathogens

Relevance Reinforce quarantine measures for import-export.
Impact. Easy the access of agricultural products to new markets; secure the phyto-sanitary status of agricultural products in EU and Colombia
Funding Program: EU Food Agriculture and Biotechnology
Partnership--expertise missing **Detection methods**
Limitations: Funding, training, human capacity
Infrastructure: High throughput genomics and bioinformatics platform; pathogen collection; storage-facilities
Resources:
Mutual interest for cooperation: High quality food production; food security; bilateral agreements.

3) Functional diversity studies of agricultural important pathogens

Relevance Reducing yield lost; reducing use of pesticides (ecological and health impact); maintaining diversity; identification of new pathogenic variants
Impact. Reducing cost production, sustainable production and management of biological resources; Improving life of farmers; understanding better the population structure of the pathogen
Funding Program: EU Food Agriculture and Biotechnology
Partnership--expertise missing Wageningen University
Limitations: Funding, training, human capacity
Infrastructure: High throughput genotyping platforms and methodologies
Resources:
Mutual interest for cooperation: Securing food production; High quality food production.

ABIOTIC STRESS

MODERATOR: BRIAN FORDE (LANCASTER UNIVERSITY, U.K.)

Participants:
Roland Schafleitner (CIP, Peru)
Zsofia Banfalvi (Agric. Biology Center, Hungary)
Enrico Martinoia (Zurich, Switzerland)
Joe Tohme (CIAT)
Gerardo Gallego + 1 (CIAT, Colombia)
Berenica Garcia Ponce de Leon (UNAM, Mexico)
Brian Forde (Lancaster University, UK)

Initial introductions identified a number of areas of potential common interest, namely Al tolerance, drought tolerance, root architecture and plant nutrition. After much discussion the group focused on the idea of a cooperative project on drought tolerance in potato. A key aspect to this proposal would be the enormous genetic resource held by CIP, which consists of 7000 potato genotypes and includes a number of wild Andean potato species with a high level of drought tolerance. Dr Schafleitner informed us that there was no significant drought tolerance within the *S. tuberosum* genotypes available in Europe.

Potential collaborators in such a proposal would include Banfalvi (transgenic lines, microarrays, metabolite analysis), Martinoia (Petunia transposon mutagenesis, nutrient uptake studies), Schafleitner (potato genotypes, microarrays), Tohme (root architecture, phosphate nutrition, Phaseolus mapping population), Forde (plant nutrition, root architecture).

Opportunities justifying Latin American involvement: the drought-tolerant Andean potato species are a resource that apparently could not be obtained elsewhere and so would provide something unique for this collaboration.

Possible hurdles: restrictions on availability of the Andean potato species material outside Peru.

Relevance: Sustainability, water use efficiency, food security.

Missing: other partners in EU/Latin America working on drought tolerance/root architecture. SCRI and Wageningen were suggested as potential partners. Need to identify a coordinator who could take this forward.

FOOD NUTRITION AND HEALTH

MODERATOR: BODGAN WOLKO (INSTITUTE FOR PLANT GENETICS, POLAND)

Participants:
Mauricio Lopes, Embrapa, Brasil
Gabriel Nemoga, UNAL, Colombia
Daniel Debouck, CIAT, Colombia
Myriam Sanchez, Universidad del Valle, Colombia
Carlos Malpica, BioEuroLatina, Spain/Peru
Jorge Mayer, CTF, Germany
Natalia Palacios, CIMMYT, Mexico
Joe Tohme, CIAT, Colombia

Bogdan Wolko, Institute of Plant Genetics, Poland

Proposed Title: Native legumes for sustainable agriculture and healthy food (lupines – EU, legumes – LA)

Topics:
1. Genomics and breeding
- phenotypic and genotypic evolution of genetic resources
- Crop genetics (genetic and physical mapping, gene tagging, QTLs)
- comparative genomics (input from model species Medicago, Lotus)
- tools for breeding

2. Environment impact and plant health
- crop physiology
- biotic and abiotic stress
- Plant architecture
- Symbiosis
- tools for breeding and agronomic production

3. Animal feed and human nutrition
- nutritional properties
- functional properties
- GL in human diet and feed
- dissemination of knowledge on potential health benefits in human diet
- publishing GL use in animal feed

Impact:
- reducing the negative impacts from intensive agriculture on the environment (reduced fertility and pesticide use)
- maintaining the fertility of soils and biodiversity of agricultural landscapes
- securing local, safe and healthy food production
- stabilizing the profitability of farm systems and enhancing its sustainability

Proposal Funding:
The EU project, local funds

Probable partners:
EU: Poland, Germany, Portugal, Switzerland, France, UK
LA: Colombia, Chile, Brazil, Mexico, Honduras, Salvador, Guatemala
Ass. Partner: Australia

Resources needed:
?

Infrastructure: laboratory equipment

Mutual interest for cooperation EU-LA:
1. exploiting existing gene resources in both areas
2. cutting the import of GL for food and soybean as a component for feed
3. improving the proportions of GL use
- increasing the GL use in LA

increasing the GL use for human consumption in EU

SYSTEMATICS AND BIOGEOGRAPHY

MODERATOR: LOLA LLEDO (KEW GARDENS, UK)

WRITER: LÚCIA G. LOHMANN (UNIVERSIDADE DE SÃO PAULO, BRAZIL)

- **Background**: "Phylogenetic trees: What, When, Why, and How?" What are phylogenies for? A sound systematic framework is relevant to any other discipline.

- **Examples of phylogenetic webpages available**:

(1) **Biodiversity**: http://www.treebase.org/treebase

http://www.mobot.org/MOBOT/Research/APweb/welcome

http://www.flmnh.ufl.edu/deeptime

http://www.plantsystematics.org/, http://tolweb.org/tree/phylogeny

(2) **Funding**: http://www.kew.org/scihort/tropamerica/fellowships.htm

http://www.darwin.gov.uk

- Participant Countries in the RoundTable: Mexico, Colombia, Brasil, and England

- **Needs**:

(1) Even though there is lots of phylogenetic data already available, this data is very difficult to access. We need better ways to find/use what is already available.

(2) There are very few people that are actually able to read phylogenies and train students to analyze this kind of data and to use the phylogenies already available. We need courses in phylogenetic theory for students working in this topic and courses that would allow non-phylogeneticists and potential users of phylogenies to understand and read phylogenies so that this powerful tool can be even more useful to the general community. Example of useful courses: (1) Systematics for different major groups (e.g., plants, insects, etc…); (2) Tree reconstruction and phylogenetic theory.

(3) Networking.

- **Topic:** This topic addresses the use of genomic tools for phylogenetic reconstruction and for the study of the origin and processes that gave rise to the current geographic distribution of living organisms.

- **Which kind of project/cooperation is aimed for?** Training, human mobility and networking.

- Principle aim of the project: Integrate and train researchers in biodiversity, systematics, phylogenetics, and uses of phylogenies.

- **Context of research at the interface:** Systematics + Genomics + Bioinformatics + EvoDevo + Population Genetics

- **Relevance**: Studies on Biodiversity include a wide variety of techniques. This leads to an extreme need for collaborations and easy mobility of researchers for training/collaborations

on particular techniques. Yet, there is not a program that allows this kind of interactions between European and Latin American scientists.

- **Impact**: Improve training in Latin America, as well as facilitate integration in a way that would allow different researchers to stay updated in terms of methods of analysis. It would be extremely important for students of biodiversity to be able to have easy access to different labs so they can learn particular aspects that are relevant for their research. In addition, it is common that graduate students do not have the appropriate courses on their own Institutions and this training program would allow them to take relevant courses in different parts of the world. In cases in which there is a large number of students/researchers that are interested in particular courses at a single state or institution, it would also be possible for the courses to be taught at the interested Institution. Lastly, researchers that work in any area related to biodiversity could be educated in phylogenetic methods/theory as to incorporate phylogenies into their research. There is an extreme lack of people that are able to teach students/researchers on data analyses ranging from phylogenetic reconstruction to using phylogenies, especially in Latin America.

- **Partnership. Which Partner/expertise is missing?** Specialists trained in analyzing phylogenetic data in detail.

- **Limitations/Bottlenecks (technological, other)**:

(1) The diversity of interests and lack of a network;

(2) Need of primers that are useful for phylogenetic reconstruction at species-level and below;

(3) Need of researchers that are able to analyze phylogenetic data properly;

(4) Lack of communication;

(5) Appropriate computers for the analyses of phylogenetic data.

- **Resources/Infrastructure needed**: Trained people, good computers and software.

- **Mutual interest for cooperation**: Co-advising students, development of joint projects in phylogenetics, collaboration in terms of different techniques/activities.

- **Proposed Funding Program**: A series of fellowships that would allow researchers and student to visit different Institutions for short to medium term periods (1-6 months) to network, learn particular techniques relevant for their research, and to develop more integrative research. These fellowships could also be used for teaching classes or human mobility. A key point to this fellowship program is that the projects should be judged in a short time so that students/researchers could have particular aspects of their research addressed in a short period of time.

IDENTIFICATION OF MODEL TAXA

MODERATOR – WRITER: MARC ZABEAU (UNIVERSITY OF GENT, BELGIUM)

BERND MUELLER-ROEBER (UNIVERSITY OF POTSDAM, GERMANY)

Participants:
Richard Reinhard (Germany)
Jesus Vicente-Carbajosa (Spain)
Enrico Martinoia (Switzerland)
Kentaro Shimizu (Switzerland)
Oliver Schweiger (Germany)
Carlos A. Machado (USA)
Felipe Rodrigues da Silva (Brasil)
Berenice Garcia (Colombia)

The discussion of this group started out from the view that future research in plant science should try to identify new model species that are (i) suitable for molecular-genetic technologies (including genomics) and (ii) that cover an ecologically broad perspective. Two possible approaches were discussed:

1. To identify one or two unique plant species that could serve as good model systems to address ecological questions; the participants of the round table came to the conclusion that this approach would most likely not be feasible with a limited amount of financial resources. Namely, the adoption of a new model plant species for genomics-type research would e.g. require to sequence the plant´s genome, to develop suitable tools for transformation (to allow functional assays to be performed for ecologically relevant genes via the generation of transgenic lines), and to establish a large and long-lasting research consortium that would be able to orchestrate the work to be done on a new model species. Sequencing the genomes of various plant species – some of which being ecological model systems – is currently ongoing in the United States. The participants agreed that starting with a completely novel plant species (not yet studied from a molecular point of view and not being closely related to any of the molecularly established species) would currently be out of scope for any European or EU-Latin American initiative.
2. As an alternative to the above it was suggested to select new potential model species from tribes and families that are phylogenetically relatively closely related to already well established model species of molecular / genomics type research. An obvious reference species would be *Arabidopsis thaliana* from the Brassicaceae family. This family encompasses a large number of species (more than 4.000) belonging to different tribes and including species growing in a diverse range of environments. A genus of particular interest is Cardamine (bitter cress), which contains more than 150 species of annuals and perennials colonising essentially all continents (with the exception of the Antarctic) and growing in altitudes from sea level to more than 3.000 m in mountainous regions. Cardamine species cover a wide range of ecological niches and – importantly – also include perennial species (potentially relevant for biomass research) and species that exist in various ploidy levels (e.g. *Cardamine pratensis*, which usually has n = 8 chromosomes, but for which populations with chromosome numbers of up to 32 or even higher are known).

The participants of this round table concluded that the latter approach is far better suited than the former one for a joint biodiversity – genomics research project. The close phylogenetic relationship of Cardamine to *Arabidopsis thaliana* would overall facilitate the molecular analysis of Cardamine genes. The participants agreed to have a follow-up meeting in Europe to discuss further details of a potential Cardamine research initiative.

PLANT MICROBE INTERACTIONS

MODERATOR: PHILIPP FRANKEN (IGZ, GERMANY)

The topic had to be omitted because Philipp Franken, who wanted to take responsibility for the topic, was ill and could not participate.

BIODIVERSITY INFORMATION SYSTEMS AND CYBER-INFRASTRUCTURE

MODERATOR: JOSE LUIS SEGOVIA (UNIVERSIDAD PERUANA CAYETANO HEREDIA, PERU)

Participants:
Lucía Atehortúa,Universidad de Antioquia, Colombia
Ivan Valdespino, IABIN/UniPanama, Panama
Laura Scott Morales, RED – MEX LTER/Uni Autonoma de Nuevo Leon, Mexico
Julia Benavides, Instituto Alexander von Humboldt, Colombia
Fernando Barraza, Parquesoft, Colombia
Emiliano Barreto Hernandez, IBUN/UNAL, Colombia
Diego Mauricio Riaño Pachón, UniPotsdam, Germany
Maria Consuelo Páez, INVEMAR, Colombia
Ximena Franco Villegas, Instituto Alexander von Humboldt – SIB, Colombia
Andy Jarvis, CIAT, Colombia

TITLE: “Strengthening Biodiversity Information System”

Under general framework of collaborative research, the goal is to provide researches and the general public up today information (processed data) of biological resources (biodiversity) that will improve the rate of knowledge generation, information products for decision making and for biodiversity management and use.

The project is formulated thinking in a future sustainable use of biodiversity. Information is the first step to different kind of uses, including commercial.

OBJETIVES:

1. Strengthening biodiversity information systems in Latin American and the Caribbean
2. Work towards the reorganization of internet publications
3. Digitize local publication of biodiversity
4. Developer modified standard for data storing, analysis and sharing to promote interoperability, access to data and development and information products for decisions making
5. Maintain minimum standard on the access speed, information contain, system management, web services.
6. Enhance and promote interoperability between existing biodiversity information systems
7. Make tools available and visible
8. Make information available to research and the general public
9. Design and produce information services to be accessed for a fee.

The revenues will be used to maintain the information systems in the long run.

Produce information products and services for decision-making that will guarantee sustainability.

This project is envisioned as a way to establish collaboration among european centers working in cyberinfrastructure development and those involved in designing biodiversity information systems and Latin American and Caribbean organization, Centers and biodiversity information networks.

Currently, there are some national biodiversity information systems in some countries that need to be straighten in various ways:

a). Enhance their capacity to exchange information in a regional local (interoperability, minimal standards)

b) To generate and analyze information data (digitalization of collections/images)
c) Develop information products for decision making (e.g. Biodiversity management and use)
d) To develop adequate connectivity

e) Research/application capacities in the area of biodiversity in informatics.

The project should take advantages of current national activities (e.g. Colombian, Panama, Mexico, Costa Rica), regional ones with similar aims (e.g. Inter-American Biodiversity Networks ,IABIN) and global ones (e.g. GBIF).

Possible funding parties:
IABIN, CAF, local funding agencies

Partners:

University of Panama
University of Antioquia
Universidad Nacional de Colombia
Universidad San Marcos (Peru)
Universidad Peruana Cayetano Heredia (Peru)
INVEMAR Colombia
SIB Colombia
CONABIO (Mexico)
Red Mexicana de Estudios Ecologicos a largo Plazo (Mexico)
Inter-American Biodiversity Information Network (IABIN)

Types of data to be integrated:
Species, specimens, ecosystems, genomics, phylogenetics, pollination biology,
Protected areas, invasive species, geo-spatial.

Bottlenecks:
-Connectivity
-Communication
-Appropriate software
-Training
-Protocols for data management
-Infrastructure (hardware).

Infrastructure needed:
-Connectivity
-Servers
-Software

-Tools to process and capture data
-Training

Resources for:
-Data entry and analysis personnel
-GIS personnel for integration of geo-spatial and biodiversity information
-Management of the interconnected biodiversity information systems
-Development of thematic networks of working groups (e.g. specimens, pollinators, etc)

Resources needed:
-Human resources
-Training for software development
-Training for systems administration

Software developers
Resources for diffusion and dissemination
Coordination and training

Contact persons:

- Ivan A. Valdespino, IABIN ivaldespino@iabin.net (507) 317-1994 (ext 105)
- Jose L. Segovia UNIV. Peruana Cayetano Heredia jlsj@umich.edu
- Ximena Franco, IAVH, Colombia

Possible EU Partners:

- GBIF-Several EU members
- Kew Garden, Jodrell lab, England
- Madrid, Real Jardin Botanico de Madrid, Lab de Biología Molecular, CSIC. Pablo Vargas.
- Germany?

SOLANACEAE

MODERATOR: ROLAND SCHAFLEITNER (CIP, PERU)

Participants
Maria de Lourdes Torres (Universidad San Franciscio de Quito, Ecuador)
Maria Isabel Chacon (UNAL, Colombia)
Agim Ballvora (Max Planck Institute Plant Breeding Research, Germany)
Wolfgang Stephan (MUL Munich, Germany)
Luz Stella Barrero (Corpoica, Colombia)
Clara Ines Orozco (UNAL, Colombia)
Lorena Quintero (Sinchi, Colombia)
Zsofia Banfalvi (ABC, Hungary)
Esperanza Torres Rojas (UNAL, Colombia)

Crops:
Physalis, Lulo, tree-tomato, potato, tomato, capsicum
Type of the Project:

1. Biotic Stress: Solanaceae Resistant to P. ssp

Relevance Reducing yield lost; reducing use of pesticides (ecological and health impact); maintaining diversity.

Impact. Reducing cost production, sustainable production and management oab intraf biological resources; improving life of farmers; understanding better the molecular mechanisms of resistance
Funding Program: EU Food Agriculture and Biotechnology
Partnership--expertise missing
Limitations: Funding, training,
Infrastructure: Collections, lab infrastructure
Resources:
Mutual interest for cooperation:

2) Abiotic Stress

Crops: Potato, tomato, lulo

Relevance Reduce water use, increase yields
Impact. Sustainable agriculture
Funding Program: EU Food Agriculture and Biotechnology
Partnership--expertise missing Plant physiology
Limitations: Funding, training, human capacity
Infrastructure: phenotyping facilities
Resources:
Mutual interest for cooperation: Enhanced production means

3) Bioprospection for secondary metabolites in solanaceae for medical use
Crops: physalis, capsicum, tree tomato

Relevance valorise natural compounds for pharmaceutical use (antioxidants)
Impact: added value to solanaceae species, new market opportunities
Funding Program: EU Food Agriculture and Biotechnology
Partnership--expertise missing Industrial partner, metabolomics
Limitations: Legal issues, infrastructure
Infrastructure: metabolomics
Resources:
Mutual interest for cooperation: Added value products, capacitating, infrastructure building

4) Conservation

Crops: S. quitoense, S. betasium, Physalis sp.

Not yet developed project goals

Relevance: conservation of biodiversity, inventory, diversity analysis

Impact: conserve biodiversity

PALM TREES

MODERATOR: HEIKE KUECHMEISTER (UNIERSITY OF POTSDAM, GERMANY)

WRITER: FEDERICO ALBERTAZZI (UNIERSIDAD DE COSTA RICA, COSTA RICA)

Participants:
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Pedro Rocha pedro.rocha@cenipalma.org, pedrojrocha@yahoo.com

Suggestion of a project proposal
Running Name: “Naturally Golden Palms”

Importance:
Proposed project meant for finding alternative sources of oil for food security.

Taxa to be studied:
Attalea (approx. 32 spp.)
Oenocarpus (approx. 8-9 spp.)
Bactris (approx. 80 spp.)

Key species to be studied in detail:
Attalea butiracea, *A. cohune*
Oenocarpus mapora/*minor*, *O. bataua*
Bactris gasipaes and its relatives

Thematic areas:
1.-Taxonomic/Systematic revision of the genera
- 1.1.-Field collection
- 1.2.-Establishment of a germplasm collection based on oil producing species as a way to protect those species (*ex situ* conservation); e.g. CENIPALMA as a bussiness partner could offer land for germplasm collection

2.-Ecology
- 2.1.-Pollination studies and reproductive biology
- 2.2.-Mycorrhiza studies

3.-Population genetics
- 3.1.-Studies of the genetic structure of different populations
- 3.2.-Abiotic studies involving local adaptations
- 3.3.-Study of the history of anthropogenic effects (domestication)

4.-Genomics
- 4.1.-Chloroplast studies involving sequencing a key genome
- 4.2.-Expression of enzymes related with oil production (e.g. metabolic and proteomic studies focused on desaturases)

5.-Chemical analysis
- 5.1.-Study the oil components in native and cultivated environment

6.-Social and economic studies
- 6.1.-Use of agroforestry systems to involve rural communities
- 6.2.-Save rural enterprises
- 6.3.-Promote *in situ* conservation

Potential partners: Colombia, Costa Rica, Ecuador, Brazil, Ireland, Denmark and Germany

ANNEX 2

Statistics for Participation

The information about the MolConnect project was sent to representatives of the following countries:

Argentina	17
Australia	1
Austria	10
Belgium	40
Brasil	15
Bulgaria	3
Chile	16
Colombia	50
Costa Rica	4
Czech Republic	7
Denmark	18
Ecuador	1
Estonia	4
Finland	17
France	48
Germany	105
Greece	5
Guatemala	1
Hungary	33
Iceland	1
Ireland	7
Israel	8
Italy	29
Lithuania	2
Mexico	31
Netherlands	38
Nicaragua	3
Norway	24
Panama	4
Peru	12
Poland	5
Portugal	6
Puerto Rico	1
Slovakia	2
Slovenia	5
Spain	34
Sweden	19
Switzerland	23
UK	56
USA	2
Venezuela	8

For the Round Table discussion the representation of experts was from the following countries:

Belgium	1
Brazil	3
Colombia	39

Costa Rica	2
Ecuador	1
Germany	10
Hungary	1
Ireland	1
Mexico	3
Panama	1
Peru	3
Poland	1
Spain	2
Switzerland	2
UK	3
USA	1

The Participating Institutions:

The following Latin American and European Institutions where in the Workshop

Agricultural Biotechnology Center	1
Bioeurolatina	1
CENICAFE	1
CENICAÑA	2
Cenipalma	1
Centro Internacional de la Papa	2
CIAT	6
Colciencias	3
Corpoica	1
Corporacion Biotec/Universidad del Valle	1
Corporación CorpoGen	1
DNP	2
EMBRAPA	2
European Commission	1
IABIN /U. de Panama	1
Instituto Alexander von Humboldt	5
ICA	1
ICN	5
IIAP	1
INBio	1
Institute of Grassland and Environmental Research	1
Institute of Plant Genetics	1
Instituto de Biotecnología - Universidad Nacional de Colombia	2
Instituto de Ecologia, UNAM	1
International Center for Maize and Wheat improvement	1
INVEMAR	1
Kew Gardens	1
Lancaster University	1
LMU	1
Madre Tierra Conservacion	1
MinAmbiente	4
Ministerio de Agricultura	1
MPI for Molecular Genetics	1
MPI for Plant Breeding Research	1
ParqueSoft	1
Technological University of Pereira	1

UNAL – CIB	1
UniPotsdam	5
UniRostock	1
Universidad Autonoma de Nuevo Leon	1
Universidad de Antioquia	1
Universidad de Costa Rica	1
Universidad de los Andes	2
Universidad del Valle	2
Universidad Industrial del Satander	2
Universidad Javeriana	1
Universidad Nacional de Colombia	9
Universidad Nacional de Colombia, Herbario Nacional de Colombia	1
Universidad Peruana Cayetano Heredia	1
Universidad Politecnica Madrid	1
Universidad San Francisco de Quito	1
Universidad Santiago de Cali	1
University College Cork	1
University of Arizona	1
University of Freiburg	1
University of Zurich	2
USP	1

The following Colombian institutions where represented in the Workshop:

CENICAFE	1
CENICAÑA	2
Cenipalma	1
CIAT	6
Colciencias	3
Corpoica	1
Corporacion Biotec/Universidad del Valle	1
Corporación CorpoGen	1
DNP	2
Instituto Alexander von Humboldt	5
ICA	1
ICN	5
IIAP	1
Instituto de Biotecnología - Universidad Nacional de Colombia	2
INVEMAR	1
MinAmbiente	4
Ministerio de Agricultura	1
ParqueSoft	1
UNAL - CIB	1
Universidad de Antioquia	1
Universidad de los Andes	2
Universidad del Valle	2
Universidad Industrial del Satander	2
Universidad Javeriana	1
Universidad Nacional de Colombia	9
Universidad Nacional de Colombia, Herbario Nacional de Colombia	1
Universidad Santiago de Cali	1
Technological University of Pereira	1

The following international institutions where represented in the Workshop:

Agricultural Biotechnology Center	1
Bioeurolatina	1
Centro Internacional de la Papa	2

EMBRAPA	2
European Commission	1
IABIN /U. de Panama	1
INBio	1
Institute of Grassland and Environmental Research	1
Institute of Plant Genetics	1
Instituto de Ecologia, UNAM	1
International Center for Maize and Wheat improvement	1
Kew Gardens	1
Lancaster University	1
LMU	1
Madre Tierra Conservacion	1
MPI for Molecular Genetics	1
MPI for Plant Breeding Research	1
UniPotsdam	5
UniRostock	1
Universidad Autonoma de Nuevo Leon	1
Universidad de Costa Rica	1
Universidad Peruana Cayetano Heredia	1
Universidad Politecnica Madrid	1
Universidad San Francisco de Quito	1
University College Cork	1
University of Arizona	1
University of Freiburg	1
University of Zurich	2
USP	1

ANNEX 3

Questionnaire full text

MolConnect

Bridging Genomics and Biodiversity

Taller *Workshop* 4-6 September 2006
Bogotá, Colombia

QUESTIONNAIRE

MolConnect is an initiative to develop research at the interface between genomics and biodiversity including informatics. This workshop is a strategic event intended to highlight areas of mutual interest and complementarities between the different research fields. To develop research at the interface together in the future, we would like to ask your participation in the questionnaire.

Thank you for your participation in the meeting and your help!

1. Did the presented talks cover the research field in an appropriate way?
   Yes ☐ Partly ☐ No ☐

2. Did you find the structure of the talks appropriate?
   Yes ☐ No ☐

3. Which topics were missing in your opinion?

4. Was the event appropriate to establish contacts and develop ideas?
   Yes ☐ No ☐

5. If there would be a follow-up event, would you like to participate?
   Yes ☐ No ☐

6. Which topics should be addressed in your opinion in a follow-up meeting?

7. Did the workshop open new perspectives for joint research ideas? If yes, which topics would be interesting for you specifically?

8. Which other research topics do you think need to be developed in the future in terms of general interest?

9. Do you see any bottlenecks for the future development of joint projects between genomics, biodiversity and informatics

   - in the technological field?
   - in communication/networking?
   - in training of researchers?

- in infrastructure?

- in resources?

10. Please provide us with your suggestions to improve the organization of a possible future follow-up meeting:

11. Please provide us with information about institutions, organizations, research groups that should be informed about the MolConnect initiative (please give the full name and email address and/or internet webpage):

12. Where do you see new challenges in European-Latin American cooperation?

13. Which activities are needed improve European-Latin American interaction?

Via the address database you can search and find information about researchers interested in the development of joint research. To search the database, please register on **www.molconnect.org**!

Please provide us with your own full name and address that we can get in contact with you for further questions and activities according to this questionnaire:

First and Last Name(s):

_____