International Coffee Genomics Initiative (ICGI)

Concept Note

Goal and approach

ICGI ultimate goal is to decipher the genetic and molecular bases of important biological traits in coffee tree species that are relevant to the crop. This knowledge is fundamental to allow efficient use of coffee genetic resources for the development of improved cultivars in terms of quality and reduced economic and environmental costs.

ICGI represents an international commitment to work jointly for the development of common sets of genomic tools, plant populations and concepts. Specific objectives include the formulation of a global and co-ordinated strategy for coffee genomics, the enhancement of collaborations between research institutions worldwide, the prevention of duplicated efforts, the production of added value through complementary partnerships, and the promotion of opportunities to fund the common research.

Research objectives

After an evaluation of the current status of international coffee research, high-priority areas will be identified. Working groups for the following topics could be constituted:
1- Markers and genetic mapping
2- BAC libraries and physical mapping
3- ESTs and transcriptional profiling
4- Functional analysis
5- Bioinformatics
Special attention should be given to the development of common genetic and genomics resources (i.e. segregating plant populations, molecular marker sets, EST collections, BAC libraries, arrays...). The generated information will provide the basis for large-scale genome sequencing projects. As initial step, a "white paper" describing the goals, components and timetables for the ICGI would be developed. At least one operational project should be initiated as output of the first ICGI meeting.

Organisation and management

A structured co-ordination to manage and foster collaboration within the ICGI is required. A steering committee of expert scientists from each participating institutions/countries will be formed. Specific responsibilities of that committee could include: 1) Co-ordinate activities, 2) Facilitate exchange of information and collaboration, 3) Monitor and communicate activity progresses, 4) Help with fundraising for the identified priority research areas ...

A web site presenting the ICGI will be created. This site could also serve as single virtual entry point to display all data generated from around the world for facilitating their utilisation by the community. Mirrored informatics interfaces could also be developed in several participating countries. Co-ordination meetings would be organized, possibly in association with the ASIC conferences.

Social and legal issues

Success of ICGI strongly depends on the participant's agreement to share results of their individual efforts. The availability of public information as well as the benefits of sharing results will increase with the number of participants. Possibility of restrictions, which might potentially limit free exchange of ideas, information and materials would be discussed during the ICGI meeting.

Guidelines and applicable regulation of the country where the research activities are conducted should be followed.

Funding

Each country, or entity, should provide financial support to the activities of its own scientists involved in the agreed projects. However, additional funding from either ICGI members or external organizations will be necessary. In that way, ICGI could serve as umbrella/scientific caution when contacting national and international funding agencies.

WG1- Markers and genetic diversity
Coordinators : L. Johnson (CATIE), C. Agwanda (CORNET)

- Objectives
  - Define a common set of markers
  - Identify a common set of germplasm for ring test
  - Develop allele bins
  - Set up a central database

WG2 – Markers and genetic mapping
Coordinators : R. Ming (Univ. Hawaï), T. Leroy (CIRAD)

- Objectives :
  - Identify and/or develop segregating populations (diversity maximization, population size, possibility of using micro-propagation for distribution)
  - Select a common set of markers (accessible on the web), adopt common markers and chromosome nomenclature
  - Develop two common references maps. Integrate all genetic maps/density genetic map
  - ESTs, SNP* and relationship with physical mapping
  * SNP (Single Nucleotide Polymorphism)

WG3 - BAC Libraries & physical maps
Coordinators : Ph. Lashermes (IRD), J. Carlos Herrera (Cenicafé)

- Objectives :
  - Access to the available – Canephora and Arabica - BAC libraries
  - Define a common reference BAC library corresponding to one of the parent involved in the reference segregating population – high density map (see above)
  - Initiate the construction of a physical map based on BAC fingerprinting
  - Sequence BAC ends
  - Integrate the physical map with the reference genetic maps
- Long-term goals :
  - Construct BAC libraries with relative species
  - Sequence the complete coffee genome
  - Sequence homologous regions in different wild species

WG4 - EST & transcriptional profiling
Coordinators : A. Andrade (EMBRAPA), G. Graziosi (univ. Trieste)
Objectives :
  - Identify available ESTs
  - Pool the data and develop a framework for analyzing EST sequence information
  - Reduce duplication and increase EST coverage
  - Develop an EST UNIGENE set
  - Develop microarrays using UNIGENE for expression studies
  - Provide EST resource for genetic and physical mapping
  - Initiate comparative genomics (within and outside the genus e.g. SOL)
  - Identify key genes involved in different traits

WG5 – Tools for functional analysis
Coordinators : H. Etienne (CIRAD), HL. Sreenath (India)

- Objectives :
  - Develop tools for gene function validation :
    - Genetic transformation
    - Mutagenesis
  - Share the technology between ICGN members

WG6 - Bio-informatics
Coordinators to be identified.
Rajkumar (Unido), B. Courtois (Cirad), Da Silva (Embrapa), L. Mueller (Cornell)
Objectives :
  - Establish bio-informatics needs
  - Encourage submissions to public repositories
  - Identify informatics solution for global coffee data system
  - Initiate a web-based community forum
  - Integrate databases (including morpho-agronomical traits)
  Institutes considered for database management :
  Cornell Univ. (USA), Cirad (France), Embrapa (Brazil), Trieste Univ. (Italy)

WG coordinators

	WG Coordinators	Members of the Steering Committee
WG1	C. Agwanda L. Johnson	C. Agwanda *
WG2	T. Leroy R. Ming	T. Leroy **
WG3	C. Herrera P. Lashermes	P. Lashermes **
WG4	A. Andrade G. Graziosi	A. Andrade *
WG5	H. Etienne HL. Sreenath	HL. Sreenath *
WG6	B. Courtois Rajkumar L. Mueller Da Silva	L. Mueller **

* From producer country
** From consumer country

Upcoming announcements

- Internal communication
  - Diffusion of documents
- External communication
  - Announce the launching of ICGN on Websites (ASIC, ICGN)
  - Inform international organizations : ICO and others

By the secretariat supervised by the Network coordinator

Next ICGN meetings

- Trieste meeting (to be confirmed by September 2005)
  - Objective : to follow up on WG activities
  - Date and place : Early 2006 in Trieste (Italy)
  - Organizer : G. Graziosi and UNIDO (ICS)
- XXI ASIC meeting
  - Objective : to follow up on WG activities and network development
  - Date and place : September 2006 in Montpellier (France)

Opening session (A.Charrier)

First of all, I would like to thank you for your participation in this workshop. It is a great honour for me to welcome you in Paris.

I am strongly convinced that this workshop constitute an extremely worthwhile opportunity to set up an international research initiative in the field of coffee genomics.

Before to resent the tentative programme of this workshop, I would like to remind you of the genesis of this meeting:

As part of the last ASIC conference in Bangalore/India, a round table was organised at the initiative of Dr Naidu coffee board of India to discuss the possibility and interest of an international commitment to work jointly in the area of coffee genomics. About 50 scientists from 13 different countries attended the round table. There was a general consensus for initiating an international effort on coffee genomics.

In order to implement the proposed initiative, it was decided to have an interim working grou "coordinated by Agropolis, France and chaired by Prof. Andre Charrier" (myself)

The main mandate of this interim working group was to organise a first ICGI meeting within the next 6 months. Accordingly, the responsibility of the interim working group included the following aspects:

i)   To prepare a concept paper based on the deliberations of the Round Table; the minutes of the Round table being placed in the ASIC website for wide circulation of the information; these 2 documents were sent to the potential participants.

ii)   To contact the potentially interested groups like that of EMBRAPA & IAC, Brazil, and Cornell University that could not participate in the Round table;

iii)   To identify on contact person for each participating country/institute

iv)   To request from the identified contact persons a base paper for his/her country/institute detailing the current status, strengths, future interests and intended role in ICGI;

v)   To explore the possibility of holding and sponsoring the proposed ICGI meeting.

Initially, we were expected to have this meeting in Italy as proposed by Dr G. Graziosi Trieste University with a support form UNIDO. Unfortunately, it clearly appeared that the meeting under these conditions could not be organised before September 2005.

Consequently, and in order to respect our mandate, we decided to organise the ICGI meeting in Paris under the umbrella of ASIC.

The number of participants has increased significantly during the last few weeks. Since the limited space available at the ASIC office in Paris, we had to look for a nearby adequate meeting place at the last moment.

Furthermore, I would like to give thanks to USDA that supports (15000$) the participation of several (5+1) representatives from coffee producing countries and to my collegues C. Montagnon (CIRAD) and S. Hamon/A. de Kochko/Ph. Lashermes (IRD).

As mentioned in the minutes of the Bangalore Round Table, the main objective of this meeting is to discuss and agree scope, structure and modalities of implementation of the ICGI. Some of the most important issues have been also pointed out in the concept note. I wish free and constructive discussions and sincerely hope that the ICGI will move forward.

*Presentation of participants (see list of participants)
*Presentation of the workshop (see tentative programme)