



**International Atomic Energy Agency - Technical Cooperation Project
And NATIONAL AGRICULTURAL RESEARCH INSTITUTE
RAF/5/056 - Field evaluation and dissemination of improved crop varieties using
mutation breeding and biotechnology techniques**

Course on

Title:

**Regional Training Course on *Advanced molecular computational analysis
and Introduction to Bioinformatics.***

The NATIONAL AGRICULTURAL RESEARCH INSTITUTE (INRA Morocco) and the International Atomic Energy Agency (IAEA) wish to work on plant breeding resources allocation towards the strengthening sustainable use of plant genetic resources (PGR).

Under these terms of reference INRA Morocco and IAEA are inviting plant breeders from 20 countries to participate in the course.

BACKGROUND & OBJECTIVES OF THE COURSE

Plant breeding plays a key role in increasing crop yield and quality, by developing varieties that are adapted to the different environmental conditions, make better use of inputs and are integrated into environmentally and economically viable agricultural systems. This discipline has evolved to a complex science, integrating molecular cell biology informatics, statistical and bioinformatics tools into classical selection methods. Research in plant sciences increasingly involves the handling of genomic techniques that typically produce large amounts of data points. Examples of such data include molecular marker data, gene expression data, metabolite data, protein data, etc. To extract meaningful information from genomic data, special Bioinformatics methods are required.

The course aims at offering senior researchers responsible for national breeding programs on major food crops an opportunity to broaden and strengthen their understanding of recent scientific advances and new methodologies to improve the reliability of crop yields and the efficiency of resource allocation for selection programs.

Also The principle objectives of the course are to familiarize Breeders and biotechnologists with bioinformatics skills and to encourage multi-disciplinarily by introducing:

1- advanced fundamental algorithms in bioinformatics,

- 2- their application in genome analyses,
- 3- and recent knowledge acquired from genomes studies.

DIRECTION

Chawki FAIZ INRA Morocco

RESPONSABLE FOR PROGRAMM

Gaboun fatima

Amal maurady

LIST OF NON-LOCAL LECTURERS

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LIST OF LOCAL LECTURERS

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**International Atomic Energy Agency - Technical Cooperation Project
And Institut National de la Recherche Agronomique**

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Introduction to Bioinformatics.***

Place: Rabat, Morocco

Date: 23-27 February 2009

PROGRAMME

L = lecture; E = exercise;

Part I – Overview of the challenges of Molecular Biology Computing

Monday 23 February 2009

- 09:00 - 09:30:** Opening ceremony (**Prof. Mohamed Badraoui, Directeur de l'Institut National de la Recherche Agronomique**)
- 09:30 - 10:00:** Overview of the Project and the RTC (Dr. Choki Al Faiz, Course Director)
- 10:00 - 10:30:** Presentation of the participants (Dr. Choki Al Faiz, Course Director)
- 10:30 - 11:00:** **Coffee break**
- 11:00 - 12:30:** L1 – Introduction to Bioinformatics: population genetics and data analysis (Dr. Kamel Jebbari)
- 12:30 - 13:30:** **Lunch break**
- 13:30 - 15:00:** L2 – Sequencing plant genomes: What did we learn? (Dr. **Ahmed Rebai**)
- 15:00 - 15:30:** **Coffee Break**
- 15:30 - 17:00:** E1 – NCBI resources for plant genomes and the Grain Genes Database (**Dr. Fatima Gaboun, Dr. A Maurady**)

Tuesday 24 February 2009

- 09:00 - 10:30:** L3 - Bioinformatics tools for comparative genomics; -Nucleotide sequences signals;-Genome organization and evolution;-Genomic divergence; and -Gene prediction/annotation and genes repertoires (**Dr. Kamel Jebarri**)
- 10:30 - 11:00:** **Coffee Break**
- 11:00 - 12:30:** L4 – Sequence comparison and homology-search (**Dr. Ahmed Rebai**)

12:30 - 13:30: Lunch Break

13:30 - 15:00: E2: Sequence similarity search (BLAST) - Web Search for Molecular Data (**Dr. Fatima Gaboun, Dr. A Maurady**)

15:00 - 15:30: **Coffee Break**

15:30 - 17:00: E2: Sequence similarity search (BLAST) - Web Search for Molecular Data (**Dr. Fatima Gaboun, Dr. A Maurady**)

Wednesday 25 February 2009

09:00 - 10:30: L5 – Bioinformatics tools for functional genomics; -Interpro annotation; -Molecular divergence and function;-Gene Expression and function (**Dr. Kamel Jebbari**)

10:30 - 11:00: **Coffee Break**

11:00 - 12:30: L6 - From genome to phenotype: current approaches (**Dr. Dr. Ahmed Rebai**)

12:30 - 13:30: **Lunch break**

13:30 - 15:00: E3 - Multiple alignment and motif search (ClustalW, MEME) (**Dr. Fatima Gaboun, Dr. Ahmed Rebai, Dr. Kamel Jebbari**)

15:00 - 15:30: **Coffee Break**

15:30 - 17:00: E3 – Collecting and Setting Molecular Marker data **for analysis** (**Dr Ahmed Rebai**)

Thursday 26 February 2009

09:00 - 10:30: L7 – Molecular Phylogeny; - Measuring genetic change; - Inferring molecular phylogeny; - Models of molecular evolution; - Applications of molecular phylogeny (**Dr. Kamel Jebbari**)

10:30 - 11:00: **Coffee Break**

11:00 - 12:30: L8 – Evolutionary analysis of plant genomes and applications (**Dr. Ahmed Rebai**)

12:30 - 13:30: **Lunch Break**

13:30 - 15:00: E4 – Molecular Phylogeny (PHYLIP) (**Drs Kamel Jebbari and Ahmed Rebai**)

15:00 - 15:30: **Coffee Break**

15:30 - 17:00: E4 – Marker technology-based approaches and data analysis

(Dr **Ahmed Rebaï**)

Friday 27 February 2009

09:00 - 10:30: L9 – Structural bioinformatics; -Structural Genomics: a compositional view to rice proteomes (**Dr. Kamel Jebarri**)

10:30 - 11:00: Coffee Break

11:00 - 12:30: E5 – Structure databases and viewing tools (**Dr Amal Maurady, Dr Fatima Gaboun**)

12:30 - 13:30: Lunch Break

13:30 - 15:00: W – Conclusions, and course review

15:30 – 17:00: Course evaluation - Closing ceremony – ((**Prof. Mohamed Badraoui, Directeur de l'Institut National de la Recherche Agronomique**))