

## Background

- Italy currently invests ~ **0.6 %** of the GDP in research.
- Between 1987 and 1998 the Italian government has supported research in plant biology/biotechnology under different programmes for a total of ~ **35 M€**.
- Between 1998 and 2001 most plant biology/biotechnology programmes have been discontinued.
- In 2001 the programme **FIRB** (Investment Fund for Basic Research) has been launched, covering all areas of research including functional genomics.
- In 2002, within the **FIRB**, plant functional genomics has been supported for a total of **9.2 M€ / 3 yrs.**

## PROJECTS IN PLANT FUNCTIONAL GENOMICS SUPPORTED WITHIN THE FIRB (2002-2004)

- Projects have been evaluated by international peer reviewing and approved by an *ad hoc* national committee appointed by MIUR.
- 6 plant genomics network projects have been approved.
- Budgets have been severely cut down (to 50% of the request in some cases).
- No coordination between projects is envisaged in the FIRB programme.
- No continuation of the FIRB is currently foreseen.

# **1. From Arabidopsis to Tomato: a Scientific Network and a Technological Platform for the Functional Genomics of Plant Development**

**2.1 M<sup>□</sup>**

*Species: Arabidopsis, Tomato*

**Coordinator:** Paolo COSTANTINO, University "La Sapienza", Rome  
Felice CERVONE, University "La Sapienza", Rome  
Francesco CELLINI, Metapontum Agrobios, Matera  
Chris BOWLER, Stazione Zoologica, Naples  
Chiara TONELLI, University of Milan  
Lucia COLOMBO, University of Milan  
Ida RUBERTI, CAN (CNR), Rome  
Patrizia ADUCCI, University "Tor Vergata", Rome  
Mauro CRESTI, University of Siena  
Giorgio MORELLI, INRAN (MIPAF), Rome  
Eugenio BENVENUTO, ENEA, S. Maria di Galeria, Rome  
(Giovanni GIULIANO, ENEA, S. Maria di Galeria, Rome)  
(Mario TAVAZZA, ENEA, S. Maria di Galeria, Rome)

# **2. Molecular Diagnostic Systems for the Identification and the Analysis of Genetic Determinants of Agricultural, Zootechnical and Environmental Importance**

**1.93 M<sup>□</sup> / 3 yrs**

*Species: peach, apple, grapevine, rosaceae, cow, pig, chicken etc.*

**Coordinator:** Francesco SALAMINI, University of Milan  
Paola Ornella Mariani, CERSA, Lodi (Milan)  
Angelo Ramina, University of Padua  
Silviero Sansavini, University of Bologna  
Giovanni Battista FERRARA, University of Genova  
Daniele BASSI, University of Milan

### **3. Genomics and Gene Functions of Plant Stress Response**

*2.02 M<sup>2</sup>*

*Species: Cereals (wheat, barley, maize), Solanaceae (tomato, potato)*

Coordinator: Luigi MONTI, IGV (CNR), Portici (Naples)

Roberto BASSI, University of Verona

Giovanni GIULIANO, ENEA, S. Maria di Galeria (Rome)

Luigi CATTIVELLI, MIPAF, Fiorenzuola d'Arda

Immacolata CORAGGIO, IBBA (CNR) Milan

Mirella SARI-GORLA, University of Milan

Roberto TUBEROSA, University of Bologna

Gian Tommaso SCARASCIA MUGNOZZA, Agrital, Maccarese (Rome)

### **4. Functional Genomics of the Interaction between Plants and Micro-Organisms: Factors Involved in Agricultural Production and Environmental Protection.**

*1.050 M<sup>2</sup>*

*Species: Lotus japonicus, tobacco, Arabidopsis, wheat, beans, potato.*

Coordinator: Maurizio IACCARINO, IIGB (CNR), Naples

Maurizio CHIURAZZI, IIGB (CNR), Naples

Eduardo J. PATRIARCA, IIGB (CNR), Naples

Paola BONFANTE, CSMT(CNR), Torino

Giulia DE LORENZO, University "La Sapienza", Rome

Angelo BOLCHI, University of Parma

Matteo LORITO, University of Naples

Felice SCALA, University of Naples

## 5. Post Genomics of Forage Legumes

1.05 M<sup>2</sup>

*Species: Medicago truncatula*

Coordinator: Sergio ARCIONI, IRMGPF (CNR), Perugia

Marco BAZZICALUPO, University of Florence

Mario TERZI, University of Padua

Alessandro VITALE, IBV (CNR), Milan

Angelo SPENA, University of Verona

Efisio PIANO, IRSA (MIPAF), Lodi

Domenico MARIOTTI, IBEV (CNR), Monterotondo (Rome)

Roberto DEFEZ, IIGB (CNR), Naples

## 6. Gene Expression and Accumulation of Agriculturally Important Proteins in the Plant Cell: Transcriptional and Post-Transcriptional Mechanisms

1.05 M<sup>2</sup>

*Species: mostly Maize, Arabidopsis*

Coordinator: Angelo VIOTTI, IBV (CNR), Milan

Marcello DURANTI, University of Milan

Letizia PITTO, IFC (CNR), Pisa

Rino CELLA, University of Pavia

Mario CIAFFI, University La Tuscia, Viterbo

Mario MOTTO, ISC, MIRAF, Bergamo

Stefania MASCI, University La Tuscia, Viterbo

Francesco PAOLOCCI, IGV (CNR), Perugia

## MIUR/CNR "Functional genomics"

### Functional Analysis of Arabidopsis Transcription Factors

100 K€ / 1yr

Coordinator: Giorgio MORELLI, INRAN, Rome

Lucia COLOMBO, University of Milan

Paolo COSTANTINO, University La Sapienza, Rome

Ida RUBERTI, CAN – CNR, Rome

Chiara TONELLI, University of Milan

## GENOMICS AND FUNCTIONAL GENOMICS OF GRAPEVINE

(Still to be funded)

Coordinator: Mario Enrico Pè, University of Milan

Chiara Tonelli, University of Milan

Graziano Pesole, University of Milan

Attilio Scienza, University of Milan

Michele Morgante, University of Udine

Raffaele Testolin, University of Udine

Eugenio Benvenuto, ENEA, Rome

Gaetano Perrotta, ENEA, Matera

Carlo Rosati, ENEA, Matera

Riccardo Velasco, Agronomic Institute San Michele all'Adige, Trento

Maria Stella Grando, Agronomic Institute SanMichele all'Adige,  
Trento

Giorgio Valle, University of Padua

Sabino Liuni, CNR, Bari,

Mauro Cresti, University of Siena

Mario Pezzotti, University of Verona

Massimo Delle Donne, University of Verona

Claudio Schneider, CIB, AREA Science Park, Trieste

Chris Bowler, BIOGEM, Ariano Irpino, AV

Francesco Cellini, Metapontum Agrobios, Metaponto, MT

Chiara Liberati, Axxam Srl, Biomed Science Park, Milano

Massimiliano Pagani, Primm Srl, Biomed Science Park, Milano

# **Proposal of a National Programme on Plant Genomics**

**MIUR**

## **Actions**

- Support functional genomics on model species (Arabidopsis, rice)
- Support structural genomics on species of national agronomic interest (tomato, grapevine, durum wheat, peach)
- Creation of centres of excellence
- Creation of a National Plant Bioinformatic Centre
- Training of scientific and technical personnel

## **Thematic Areas**

### ***Tools for the analysis of the plant genome***

- Sequencing and development of arrays
- Development of high-density SNP maps
- Studies of macro and micro syntheny
- Databases of sequences annotated with information from array analysis
- Production of collections of mutants (gene inactivation) with different approaches (chemical mutagenesis and TILLING, insertional mutagenesis, gene silencing etc.)
- Characterization of cellular and subcellular protein expression patterns via bidimensional electrophoresis - mass spectrometry - microsequencing
- Development of bioinformatic systems

### ***Understanding gene function***

- genes that control plant development
- genes that control qualitative traits in crops and agricultural products
- genes that confer resistance to biotic and abiotic stresses
- genes involved in metabolic pathways (biofarming)

### ***Identification of useful genes/traits and marker-assisted breeding***

- Characterization of genetic variability and of the phylogenetic relationship between cultivated and wild species
- Identification of resistance and adaptability traits and their utilization in breeding programmes

### ***In vivo gene function assays in cultivated species***

- evaluation of genetic modifications in cultivated species
- development of novel procedures for the production of marker-free GMOs and for the control of transgene transmission via pollen