

# **Integrated Pest Management (IPM) of Mediterranean Fruit Tree Species**

organized by

Mediterranean Agronomic Institute of Bari

# Integrated Pest Management of Mediterranean Fruit Tree Species

MAI coordinator: Anna Maria D'Onghia

**Aims:** The Master of Science in IPM of Mediterranean Fruit Tree Species has been designed to train graduate agronomists, biologists and biotechnologists in modern and sustainable integrated management in the Mediterranean basin of economically important pests and pathogens affecting olive, citrus, pome and stone fruits, grapevine and palm species. Such approach is aimed at preventing pests and pathogens from reaching unacceptable infection levels, reducing existing pest populations to acceptable levels in the respect of food safety and food security and guaranteeing a long-lasting preservation of the environment and of natural resources.

**Objectives:** During the first part, the main objective of the course is to prepare experts in IPM of Mediterranean fruit tree species in order to apply and transfer:

- basic principles of IPM with emphasis on the bio-intensive strategy for an effective management of undesirable pests and pathogens present in the Mediterranean;
- pest risk analysis and control measures for preventing entrance and dissemination of quarantine pests and pathogens;
- technical protocols for the use of certified propagating material, produced in the framework of clonal and sanitary selection;
- techniques for monitoring, identification and diagnosis of key pests and pathogens;- sound management of biotic and abiotic disorders through the application of environmentally and human friendly means of control;
- IPM strategy in the context of each specific Mediterranean fruit tree species;

During the second part, the main objective is to:

- deepen particular phytosanitary topics through the setting up of a research activity with the collaboration of Mediterranean scientific institutions;
- acquire and transfer methodologies and knowledge through research work in different Mediterranean countries, strengthen the scientific collaboration for the improvement of the fruit tree local industry.
- know the main epidemiological and pathogenicity factors in order to determine proper IPM tools.

The scientific outcome resulting from research work is usually announced on the occasion of International Conferences and/or published in scientific journals.

# Part 1

## Post graduate specialization programme

**The programme is organized in 11 units (60 ECTS)**

It includes a diploming MAIB-Croplife North Africa-Middle East course on Training of IPM Trainers.

**Duration: 8 months** from November 2010 to June 2011

### Unit I

02-12 Nov 2010

### INTRODUCTORY DISCIPLINES (5 ECTS)

**Content:**

Scenarios of shared knowledge, techniques and technology of search. English language and IPM general concepts.

**Learning outcome:**

Harmonization of student technical background on general topics to support lectures understanding and bibliographic research.

### Unit II

15 Nov.- 17 Dec. 2010

### IDENTIFICATION AND CONTROL OF PATHOGENS (10 ECTS)

**Content:**

Introduction to the study of bacteria, fungi, viruses, virus-like agents, nematodes. Morphology, physiology, life cycle, multiplication, taxonomy, diagnosis/ identification of pathogens using classical and molecular methods. Pest risk analysis. Conventional and non conventional control techniques. Plant tolerance and resistance to pathogens.

**Learning outcome :**

Harmonization of student technical knowledge on the main pathogens and their control, based on a modern and sustainable IPM approach.

### Unit III

20 Dec. 2010 – 23 Jan. 2011

### IDENTIFICATION AND CONTROL OF PESTS, WEEDS AND ABIOTIC DISORDERS (6 ECTS)

Introduction to the study of insects, mites, weeds and physiological disorders. Morphology, physiology, life cycle, multiplication, taxonomy, diagnosis of pests using classical and molecular methods, Weeds classification and ecology. Identification of physiological disorders.

Pest risk analysis. Conventional and non conventional control techniques. Plant tolerance and resistance to pests and abiotic disorders .

**Learning outcome :**

Harmonization of student technical knowledge on pests, weeds and abiotic disorders and their control, based on a modern and sustainable IPM approach.

**Unit IV**  
26 Jan. - 11 Feb. 2011

#### **QUALITY AND SAFETY (4 ECTS)**

**Contents:**

International quality award systems, cost-effective quality management, quality improvement, environmental management system, food safety and Hazard Analysis Critical Control Points (HACCP). European regulations on plant protection products, the significance and definition of maximum residue allowed and minimum safety interval. Official guidelines on IPM. Systems for the quality certification in the agri-food sector.

**Learning outcome:**

Knowledge on the implementation of food quality control systems and HACCP food safety issues. Safe and efficient use of pesticides  
Basic knowledge on the application of GAP regulations in the international market regulations

14-18 Feb. 2011

#### **CROP LIFE DIPLOMING COURSE (2 ECTS)**

**Contents:**

Training model; approaches to training; circle of competence; learning theory; key processing styles; brain power; key learning styles; facilitating rainbow; facilitating feedback; audiovisual support; flip tips; performance; body language; preparation to train; seating patterns; spot checks; evaluation; follow-up; training administration.

**Learning outcome:**

Acquisition of communication tools for transferring the IPM knowledge in the framework of extension programmes.

**Unit V**  
21 Feb. - 04 Mar.  
2011

#### **INTEGRATED PEST MANAGEMENT OF OLIVE (4 ECTS)**

**Unit VI**  
9 -25 Mar 2011

#### **INTEGRATED PEST MANAGEMENT OF CITRUS (5 ECTS)**

**Unit VII**  
30 Mar.- 15 Apr 2011

#### **INTEGRATED PEST MANAGEMENT OF POME AND STONE FRUITS (5 ECTS)**

**Unit VIII**  
19 Apr. -13 May 2011

#### **INTEGRATED PEST MANAGEMENT OF GRAPEVINE (5 ECTS)**

**Unit IX**  
18 -22 May 2011

#### **INTEGRATED PEST MANAGEMENT OF PALM TREE SPECIES (2 ECTS)**

**Content:**

Morphological, ecological, epidemiological characteristics of key pests and pathogens affecting the species included in each unit. Pest/pathogen monitoring, identification and IPM control in accordance with the specific regulations.

**Learning outcome:**

Deepening students knowledge on the main phytosanitary problems affecting the Mediterranean fruit tree species and providing them with useful tools (different practices) for a sustainable IPM approach.

**Unit X**  
30 May-07 Jun 2011

**APPLICATION OF IPM PROCEDURES, QUARANTINE AND CERTIFICATION PROGRAMMES (5 ECTS)**

**Content:**

Application of IPM guidelines in commercial orchards of each fruit tree species. Quarantine principles and international regulations of plant pests. Main quarantine pests affecting fruit tree species of Mediterranean importance and control programs. Principles and international regulations of clonal and sanitary selection and certification of propagating material.

**Learning outcome:**

Providing students with regulatory basis on quarantine and certification procedures for a practical application in IPM production.

**Unit XI**  
Jan – Jun 2011

**INDIVIDUAL PROJECT (7 ECTS)**

**Content:**

Implementation of the IPM data base designed for the course with bibliographic review, relatively to a specific phytosanitary problem affecting the studied fruit tree species. Preparation of a brief presentation of the individual project.

**Learning outcome:**

Enhancing the students' ability to integrate course information and additional literature through the implementation of the IPM database and the preparation of a brief technical presentation for extension purposes.

20-24 Jun 2011

**FINAL EXAMS**

**EXAMINATIONS**

Participants take an examination at the end of each subunit. Examinations are in the form of oral or written exams, including problems, sets of questions, exercises, or multiple-choice test. Questions can also cover seminars topics, field lectures and technical visits. Evaluation is made by the lecturers or by the scientific tutor of the course.

Participants may retake failed exams once, and up to 8 ECTS credits.

The individual project (Unit IX) will be evaluated by the supervisor and by the IPM Scientific Staff.

At the end of the course, participants take a final comprehensive oral exam in front of an International Jury.

**Language of instruction:** ENGLISH.

**ACADEMIC STAFF**

In the Postgraduate specialization programme, instruction is given by MAIB internal staff, and by prestigious visiting professors from all over the world, coming from universities, higher institutions, international organizations and research centres.

In the Master of Science programme, the students' research theses are supervised by MAIB researchers or by external professors in collaboration with MAIB staff.



## Research activities: topics generally available for Master of Science theses

- **Viruses, viroids, phytoplasmas and virus-like agents** of Mediterranean fruit tree species: characterization (biological, physico-chemical and molecular), epidemiology, diagnosis (biological, serological and molecular), distribution and incidence in Mediterranean countries, sanitation.
- **Fungal and bacterial diseases** of Mediterranean fruit tree species: characterization, epidemiology, diagnosis (biological, serological and molecular). Prevention and biological control. Toxins of fungal origin. Assessing damage and losses.
- **Nematodes and insects**; Surveys, Characterization (biological, and molecular). Damage. Epidemiology, role in virus transmission in Mediterranean fruit tree species.

## INDICATIVE MASTER THESES REALIZED WITHIN THE AREA

- 1. Title:** An Integrated molecular and morphological study to design a DNA barcode discrimination protocol for *Fusarium* species involved in dry root rot disease of citrus (2008).  
**Author:** Bachir Balech (Lebanon)  
**Place of Implementation:** CNR, Bari - IAM-Bari, Italy  
**Thesis directors:** Cecilia Saccone, Anna Maria D'Onghia
- 2. Title:** Management of the Red Palm Weevil, *Rhynchophorus ferrugineus*, in Italy as an introduction to its control in Iraq (2008).  
**Author:** Hasanein Yousif Abdul Raheem (Iraq)  
**Place of Implementation:** IAM-Bari, Italy  
**Thesis director:** Francesco Porcelli, Ibrahim Al Jboory, Anna Maria D'Onghia
- 3. Title:** Interaction between wild plants, arthropods and their natural enemies in citrus orchards in Morocco (2007).  
**Author:** Kaoutar Karori (Morocco)  
**Place of Implementation:** DPVCTRF Morocco– IAM-Bari, Italy.  
**Thesis director:** Jamila Wadjiny, Paolo Bàrberi, Jenny Calabrese, Smaili Moulay Chrif
- 4. Title:** The olive knot disease in Morocco: Economic importance and distribution, characterisation of the bacterial strains and cultivars susceptibility. (2006)  
**Author:** Taha Hosni (Morocco)  
**Place of Implementation:** IAV Hassan II Agadir – IAM-Bari, Italy.  
**Thesis director:** Mbarek Fatmi, Roberto Buonauro
- 5. Title:** Incidence of olive *Verticillium* wilt and molecular characterisation of *Verticillium dahliae* isolates within the Maltese archipelago (2005)  
**Author:** Timothy Pace Lupi (Malta)  
**Place of Implementation:** University of Bari - IAM-Bari, Italy  
**Thesis director:** Antonio Ippolito, Franco Nigro
- 6 Title:** Sanitary status of stone fruit trees and typing of Plum pox virus isolates in Bosnia and Herzegovina (2004)  
**Author:** Slavica Matic (Bosnia and Herzegovina)  
**Place of Implementation:** IAM-Bari, Italy  
**Thesis director:** Arben Myrta

Detailed additional information is available at <http://www.iamb.it>