



# MASTER & MASTER OF SCIENCE PROGRAMMES IN “INNOVATIVE APPROACHES TO IPM OF MEDITERRANEAN FRUIT AND VEGETABLE CROPS” ACADEMIC YEAR 2021-2022

## DESCRIPTION

The Master of Science Programme provides a two-year curriculum whose main objective is to prepare a new generation of motivated students towards professional and academic careers that will promote integrated strategies for sustainable pest management of fruit and vegetable crops in the Mediterranean agroecosystems.

The Master course introduces the management of phytosanitary problems from an agroecological and food system perspective. Students will study the ecology and epidemiology of pests, their integrated management and preventive control measures, tools/products/interventions for diagnosis and monitoring. Academics and practitioners will bring students through the analysis and understanding of Integrated Pest Management (IPM) strategies for key pests of Mediterranean crops and on related policies, institutions, and services. A significant focus will be upon the management of emergent transboundary pests, and on measures for predicting, preventing and controlling their spread.

At the end of the course students will know:

- ✓ strategies to reduce the use of chemicals for crop protection, ensuring economic gaining while protecting the environment and human health;
- ✓ agroecological factors that influence the epidemiology of major phytosanitary problems and the range of preventative measures for their control;
- ✓ how to make early diagnosis and monitor outbreaks of pests through territorial surveillance, field inspections, use of field devices, lab tools and technologies;
- ✓ how to correctly plan treatments for pest control, and how to chose and manage products and control strategies;
- ✓ how to support, plan and implement solutions for reducing losses after harvest of crops;
- ✓ how to organize and manage key services to avoid the introduction and spread of pests and diseases.

The programme is carried out in collaboration with national and international Institutions and Universities.

International scientists and practitioners, with a consolidated knowledge on the covered topics, will give lectures. Students will also carry out several practical activities and assignments, aimed at developing their skills and competencies in the Master sector.

## ORGANIZATION

First Year: 60 ECTS

Diploma: Master of CIHEAM Bari

Duration: 9 months (Oct - Nov 2021 distance learning; Dec 2021 – Jun 2022 at CIHEAM Bari)

Second Year: 60 ECTS

Diploma: Master of Science

Duration: 12 months

## CANDIDATES' PROFILE

Courses are addressed to new graduate students and young professionals with a university background related to agronomic, horticultural and plant protection issues.

## Requirements:

- Holding a University degree awarding at least 180 ECTS;
- Having completed four out of five years of University studies, upon agreement between the sending University and CIHEAM Bari (the year attended at CIHEAM Bari is recognized as final year in order to graduate at the University of origin);
- Good knowledge of **spoken and written English**;
- Personal access to **computer facilities**.

## ADMISSION

Selection of students is based on:

1. Screening of documents sent online by candidates to support their application;
2. Online interview.

**Submission of applications through the online procedure**

**Deadline: 30 June 2021**

## COSTS

**Registration fee:** 200.00€/year;

**Tuition fee:** 500.00€/month (travel, accommodation and insurance expenses not included).

## BENEFICIARIES

Master and MSc Programmes are open to candidates of any nationality.

## SCHOLARSHIPS

CIHEAM Bari grants **full** or **partial scholarships** to candidates according to a ranking list. Priority is given to students coming from CIHEAM Member countries and other Mediterranean, Balkan and Middle Eastern Countries.

## LANGUAGE OF INSTRUCTION: English

For further information and application procedure:  
[www.iamb.ciheam.org](http://www.iamb.ciheam.org)

### Distance learning stage

The course will start with a 2-month distance learning phase with teaching units aimed at developing students' knowledge and mindsets on issues related to sustainability and resilience of agro-ecosystems.

Unit I - Sustainability in agriculture and food systems: it frames the concepts of sustainability applied to agriculture and food sectors. It provides elements for understanding the main agricultural challenges to design solutions and actions towards sustainable and resilient agri-food systems. The multi-dimensional nature of sustainability challenges will be analysed, getting students to reflect on processes for sustainability transitions in agri-food systems.

Unit II - Climate "smart" agroecology: agroecology is the discipline that studies the ecological processes at the basis of the functioning of agro-ecosystems. The course aims to provide a widely applicable knowledge base to increase the resilience and production of agro-ecosystems, in a changing climate scenario. Students will learn how to assess the complexities and challenges of agro-ecosystems, and ways for sustainable planning of actions to mitigate and adapt to climate change and other global drivers of change.

### Face-to-face stage

Students will attend courses and develop a project at CIHEAM Bari.

Unit III – Plant pests and IPM principles: the unit introduces the principles of IPM to prevent unacceptable levels of product losses and ensure the quality of pest control strategies in terms of human and environmental health. It also presents pest categories that affect Mediterranean fruit and vegetable crops, analysing their relevance, distribution, ecological features and epidemiological processes.

Unit IV – Diagnostics and Monitoring: the unit presents *modus operandi* for a timely detection of phytosanitary problems through on-farm field inspections and use of field and lab diagnostic tools and devices. It presents also the range of innovative technologies available at the farm and territorial level, for detecting and monitoring pest diffusion.

Unit V – Control strategies: the unit presents the available strategies for the control of phytosanitary problems at different stages of the production chain. It starts with preventative measures to avoid pest outbreaks, including skilful use of genetic resources, according to a modern concept of plant biotech resistance, and good agricultural practices. Then, the use of agrochemicals is treated according to IPM principles, illustrating possible alternatives including biological control. Finally, attention is also given to pest management strategies to extend the postharvest life of fruit commodities, by presenting solutions & regulations for food quality and safety.

Unit VI – IPM programs and Services: the unit will analyse IPM implementation from a practical point of view by taking into consideration case studies on plant crops typical of the Mediterranean environment. Students will analyse how farmers prevent, survey, and manage pests, understanding challenges and opportunities, and how private and public services support farmers in applying pest management strategies.

Unit VII – Quarantine, Surveillance & Risks assessment: the unit presents key services, such as quarantine, contingency plans of priority pests, monitoring and eradication of quarantine pests, certification of plant propagation materials, needed to avoid the entrance and diffusion of key pests and pathogens, referring to real cases and emergent transboundary phytosanitary problems.

Unit VIII – Smart tools for the management of natural resources in agriculture: it provides students with basic knowledge on the use of smart tools important for driving decisions towards more sustainable ways of natural resource management in agriculture, with specific focus on pest management. Specific focus will be on Remote Sensing, Geographic Information Systems, Global Positioning Systems tools for the acquisition, management, processing, analysis and display of spatial data and information. Multi-model mechanistic approaches and examples of multi-criteria Decision Supporting Systems will be also presented.

Project: through a work team, students will be engaged on a real project that, through literature review, field visits and contacts with stakeholders, will help them develop theoretical and practical skills on fruit tree crops IPM related issues.

## MASTER OF SCIENCE PROGRAMME

November 2021 – October 2022

Students, who successfully completed the first year and met all the prerequisites set by the Institute, are selected for the Master of Science level and carry out scientific research on an original topic related to a plant/food health challenge for fruit and vegetable crops.

Topics of MSc theses on pests of fruit and vegetable crops are to be chosen among the following research lines:

- Sampling methodology and technical protocols;
- Pest monitoring, identification and detection;
- Pest physico-chemical and molecular characterization;
- Pest epidemiology;
- Pest management and control;
- Remote sensing, GIS and information technology applications to plant health;
- Pest/disease forecasting models;
- Detection and control of mycotoxins and contaminants in agricultural products;
- Alternative control means to be applied before and after harvest.