

Mediterranean Agronomic Institute of Chania

MASTER OF SCIENCE IN

2022 / 2023

HORTICULTURAL GENETICS AND BIOTECHNOLOGY

Aims: The major aim of the Horticultural Genetics & Biotechnology programme (**120 ECTS**) is to provide students with a thorough grounding in the mechanisms, capabilities, uses and limitations of plant biotechnological methods and available technological platforms so that they will be able to apply them to problems related to horticultural production and product quality. MSc graduates can pursue an academic career in biotechnology, genetics and/or molecular biology, or they can choose to work in agribusiness or in agricultural governmental bodies.

REQUIREMENTS

Applicants must have the academic level that qualifies them to undertake postgraduate level studies in their home country or equivalent to a minimum of four years undergraduate studies. Their degree must also be in a discipline compatible with the area of specialization requested. Additional conditions may be required for certain programmes.

The working language of MAICH is English. Selection is made on the basis of the files submitted by applicants – priority being given to applicants from CIHEAM member countries, and takes account of their academic results, professional experience acquired in the chosen field of specialization, reference letters and their competence in English.

The documentation required by CIHEAM MAICH includes:

- ▶ Academic records and transcripts
- ▶ Graduation degree
- ▶ Proof of English language competence
- ▶ Two letters of recommendation.

SCHOLARSHIPS

Qualified candidates may be eligible for scholarship covering fully or partly: tuition, teaching material, board, lodging, health insurance and compensation.

Objectives: The students shall:

- acquire specific technical skills in plant biotechnology and genetics;
- develop conceptual knowledge and critical thinking skills and learn to design and test hypotheses related to horticultural research on plant biology and physiology;
- learn to clearly communicate research outputs and the rationale and knowledge underpinning these outputs;
- demonstrate an understanding of the advantages and limitations of –omics technological platforms (genomics, metabolomics) and how they are used to solve problems;
- learn how to find and cite sources;
- learn how to use knowledge acquired from model plants such as Arabidopsis to formulate research approaches for their horticultural crops of interest.

RESEARCH INTERESTS

Plant Molecular Physiology

- ▶ Molecular mechanisms of fruit ripening
- ▶ Regulation of abscission in tomato
- ▶ Adaptation to climate change and omics in olive
- ▶ Low oxygen sensing in plants

Agrofood Forensics

- ▶ Authentication and adulteration of olive oil

Plant Phenomics

- ▶ Identification of varietal origin of plant organs

INFORMATION

For more information, visit our website at: www.iamc.ciheam.org or send inquiries to panagiot@maich.gr



HOW TO APPLY

Applications to study at CIHEAM MAICH must be made through the online application form that can be accessed by this link: <http://apply.maich.gr/>

EDUCATIONAL SEQUENCE

First-year Studies Programme

The first-year Studies Program of the Curriculum is organised in 5 Units (60 ECTS).

SEMESTER I (October 2023 – February 2023)

HOB510.22114.0 - INTRODUCTION TO ADVANCED BIOLOGY AND BIOTECHNOLOGICAL TOOLS (21 ECTS)

- ▶ Biochemistry (3 credits)
- ▶ Cell Biology (3 credits)
- ▶ Genetics (3 credits)
- ▶ Molecular Biology (4 credits)
- ▶ Plant Phenomics (4 credits)
- ▶ Introduction to Bioinformatics and Systems Biology (4 credits)

HOB520.1913.0 - APPLIED GENETICS (9 ECTS)

- ▶ Molecular Breeding (3 credits)
- ▶ DNA methods for Authentication and Traceability of Agricultural and Food products (3 credits)
- ▶ Genetic association studies (3 credits)

SEMESTER II (February 2023 – June 2023)

HOB530.1904.0 - ARABIDOPSIS GENETICS (9 ECTS)

- ▶ Principles of Arabidopsis Genetics (3 credits)
- ▶ Mutant Analysis of Arabidopsis (3 credits)
- ▶ Arabidopsis Transformation and Analysis of Transgenic Plants (3 credits)

HOB540.21813.0 - HORTICULTURAL BIOTECHNOLOGY (18 ECTS)

- ▶ Molecular Biology of Ethylene (3 credits)
- ▶ Molecular Biology of Fruit Ripening (3 credits)
- ▶ Phytonutrients: Production/regulation and human health (4 credits)
- ▶ Nutritional Genomics (3 credits)
- ▶ CA Storage and Molecular Basis of Hypoxia and Laboratory (5 credits)

HOB500.1312.0 - EXTENDED ESSAY (3 ECTS)

Second year - The Master of Science Programme

Project - 9 months duration, (60 ECTS)

Students develop the ability to design hypotheses and test them through experimentation, to clearly communicate research outputs and ideas, and to write scientific English. In addition, they become competent in a wide range of plant molecular biology and biotechnology techniques, such as plant nucleic acid extractions, gene expression analysis, transgenic plant analysis, and the use of basic bioinformatics tools, cloning techniques, and genetic concepts for mutants.



FACILITIES

Laboratory of Plant Molecular Biology & Biotechnology

The aim of the Plant Molecular Biology & Biotechnology laboratory is to provide the infrastructure for training students and support the research interests of the Horticultural Genetics & Biotechnology Department.

The lab infrastructure is comprised of: Laminar flow hood, chemical fume hood, real-time PCR cyclers, incubators, fridges-refrigerators-deep freezers, abiotic stress tolerance evaluation, Gas chromatographer, water filtration, and purification systems, autoclave machines, centrifuges, spectrophotometer, Nanodrop, precision balances, pH and ion meters, plant growth chamber.

Laboratory of Plant Molecular Histology

Part of the Plant Biotechnology & GMO Testing Laboratory, this facility contains the infrastructure necessary for histochemical staining of plant tissues, in-situ hybridization and in-situ PCR experiments. The equipment includes a state of the art LEICA RM2155 microtome, an Applied Biosystems in-situ PCR, a LEICA EG1140H paraffin embedding station, a LEICA EG1140C cooling plate and a LEICA TP1020 automatic tissue processor.

Laboratory of Horticultural Products Quality

Part of the Plant Biotechnology Laboratory, this facility comprises infrastructure necessary for the post-harvest quality assessment of fruits and vegetables. The equipment includes a gas-chromatograph, a facility for controlled atmosphere experiments, an oxygen/CO₂ analyzer and the equipment necessary for assessing the physicochemical properties of horticultural products.



**CIHEAM
MAI CHANIA**

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