



# UNIVERSITÀ DEGLI STUDI DI PALERMO

DEPARTMENT	Scienze Agrarie, Alimentari e Forestali		
ACADEMIC YEAR	2022/2023		
MASTER'S DEGREE (MSC)	AGRICULTURAL PRODUCTIONS AND TECHNOLOGIES		
INTEGRATED COURSE	URBAN GREEN PROTECTION - INTEGRATED COURSE		
CODE	21868		
MODULES	Yes		
NUMBER OF MODULES	2		
SCIENTIFIC SECTOR(S)	AGR/12, AGR/11		
HEAD PROFESSOR(S)			
OTHER PROFESSOR(S)	BELLA PATRIZIA	Professore Associato	Univ. di PALERMO
	MANACHINI BARBARA	Professore Associato	Univ. di PALERMO
	ROSY INES		
CREDITS	9		
PROPAEDEUTICAL SUBJECTS			
MUTUALIZATION			
YEAR	2		
TERM (SEMESTER)	2° semester		
ATTENDANCE	Not mandatory		
EVALUATION	Out of 30		
TEACHER OFFICE HOURS	<p><b>BELLA PATRIZIA</b></p> <p>Tuesday 09:00 10:00 Stanza del docente - Dipartimento di Scienze Agrarie, Alimentari e Forestali. Edificio 5 - Palermo</p> <p>Friday 11:00 12:00 Sede del CdL "Palazzo Principe di Napoli" - Trapani o via applicativo Teams</p> <p><b>MANACHINI BARBARA</b></p> <p><b>ROSY INES</b></p> <p>Wednesday 08:00 15:00 Ricevimento SOLAMENTE per gli studenti del corso di studi a ciclo unico in CONSERVAZIONE E RESTAURO DEI BBCC DEL IV ANNO 2023/2024.</p> <p>Thursday 12:00 13:00 Ricevimento c/o la sede del polo di Trapani, del principe di Napoli e on line</p>		

**DOCENTE:**

<b>PREREQUISITES</b>	Basic knowledge of Entomology and Plant pathology
<b>LEARNING OUTCOMES</b>	<p>Knowledge and ability to understand - Acquisition of advanced tools for the understanding and evaluating of infestation and infection by parasites of ornamental plants. The ability to use the specific language in such specialized disciplines.</p> <p>Applying knowledge and understanding - Ability to identify and apply the most appropriate methods of control of pests and pathogens of ornamental plants.</p> <p>Making judgements - To be able to evaluate the implications and results of the entomological, microbiological and mycological studies performed. Being able to evaluate the implications and results of entomological and phytopathological studies. To define, in the light of the acquired knowledge, the causes of infestations and infections from parasites of ornamental plants.</p> <p>Communication abilities - Ability to expose the mechanisms of infections and infestations from pests and plant pathogens both technical that a non-expert public. Being able to select a suitable synthetic and technical language for communication problems and to suggest useful solutions. Learning ability. To acquire the ability to identify agents of infestations and infections in ornamental plants in order to define the most rational methods both for their control and for management of the health of plants in ornamental field.</p>
<b>ASSESSMENT METHODS</b>	<p>The final grade is expressed in thirtieths and is the weighted mean of the scores attributed to the single courses.</p> <p>For the course "Controllo integrato delle malattie delle piante ornamentali", an oral exam in which the examinees must answer at least two / three questions posed orally, on all topics covered in class, with reference to the recommended text books and available class material. Final assessment aims to evaluate whether the student has knowledge and understanding of the topics, has acquired interpretative skills and independence of judgment in real cases. Evaluation is presented in scores out of 30 with a minimum score of 18 for passing, according to the following table:</p> <ul style="list-style-type: none"><li>- sufficient/basic knowledge and ability to connect, apply and analyze covered topics (score 18-21)</li><li>- fair/intermediate knowledge and ability to connect, apply and analyze covered topics (score 22-25)</li><li>- good/high knowledge and ability to connect, apply and analyze covered topics (score 26-28)</li><li>- excellent/advanced knowledge and ability to connect, apply and analyze covered topics (score 29-30L).</li></ul> <p>Concerning the course of "Artropodi delle Piante ornamentali" students may choose one of the following modalities:</p> <ol style="list-style-type: none"><li>1) An oral examination on all the topics. The grade is expressed in thirtieths.</li><li>2) Two written in progress evaluations and a final oral test, each about one-third of the course topics. A score in thirtieths is given for each evaluation. The final grade is the mean of the three scores.</li></ol>
<b>TEACHING METHODS</b>	Lessons, field and laboratory activity

## MODULE CONSERVATIVE BIOLOGICAL CONTROL

*Prof.ssa BARBARA ROSY INES MANACHINI*

### SUGGESTED BIBLIOGRAPHY

Di seguito sono riportati alcuni testi base che vengono considerati sostanzialmente equivalenti come supporto per la preparazione, tuttavia poiché alcuni argomenti trattati sono recenti il docente fornirà articoli scientifici e materiale didattico (ad esempio presentazioni PowerPoint), che verranno caricati sulla piattaforma Unipa, ad integrazione e come complemento del contenuto dei testi ed eventuale supporto alla preparazione. Verranno altresì forniti dei materiali per l'approfondimento di alcune tematiche (specifiche) ma che sono considerati facoltativi.

Books and alternative books are suggested in addition scientific papers and materials (PowerPoint presentations) provided by the teacher will be loaded on the platform Unipa. Other materials will be up-loaded for specific subjects but they are supporting materials not mandatory for the exam.

Pollini –Manuale di Entomologia applicata. Edagricole. EAN: 9788850653782. (Vanno comunque bene tutte le versioni)  
Tremblay – Entomologia applicata. Liguori Editore, Napoli EAN: 9788820706814, (Vanno comunque bene tutte le versioni)  
Ivan Ponti , Luigi Marchetti , Franco Laffi. Avversità delle piante ornamentali. Edizioni L'Informatore Agrario. ISBN-10: 8872200873  
David V Alford (Autore). Pests of Ornamental Trees, Shrubs and Flowers. Editore: CRC Press. A Colour Handbook, Second Edition ISBN-10: 1874545340.  
Butturini A., Galassi T., 2014 - Difesa fitosanitaria in produzione integrata. Edagricole. ISBN-13: 9788850654208

Inoltre a supporto verranno fornite indicazioni su materiale video ed internet da visionare insieme a lezione e come approfondimento.

<b>AMBIT</b>	50545-Discipline della difesa
<b>INDIVIDUAL STUDY (Hrs)</b>	90
<b>COURSE ACTIVITY (Hrs)</b>	60

### EDUCATIONAL OBJECTIVES OF THE MODULE

The environmental crisis that, year after year, is becoming increasingly evident has one of the greatest victims in the urban, peri-urban and multifunctional green environments, but also one of the sectors potentially richest in opportunities to promote eco-friendly methods of controlling harmful insects. The aim of the course is therefore to provide students with the necessary tools for a multifunctional green management in line with the principles of agroecology and which is able to fully grasp the opportunities of systemic knowledge that binds men to the other components of the biosphere and which makes it possible to respond to needs that are both productive, environmental and cultural. In their material and immaterial complexity, agroecology in this context will be fundamental not only in the management of phytophagous insects but also in the control of those harmful species or of sanitary importance that are often found in the same environments (eg mosquitoes and sand flies). The goal of the course is to delve into some topics concerning the main insect pest of ornamental plants in urban environments, such as parks and gardens, and to introduce students to the knowledge of the methodologies and innovative tools to develop efficient and sustainable strategies in these urban green areas. The main phytophagous species of ornamental plants and the strategies to control them will be treated. To make students develop their learning skills, critical analysis, and communication ability, case studies will be assigned that will be carried out individually or in groups and then presented in the classroom.

Final objectives of the course therefore foresee in a broader view of:

- to increase the knowledge and practices of Agroecology in the context of the management of pests harmful to ornamental and technical greenery, as well as the management and enhancement of ecosystem services provided by insects and nematodes.
- Promote innovation by disseminating good practices that are socially and ecologically sustainable,
- Promote knowledge in the European context of the strategies of the European Community (Green Deal) and the comparison with successful experiences in the management of pests and harmful insects also in the international context in the management of "multifunctional greens".

## SYLLABUS

Hrs	Frontal teaching
2	Introduction: overview and goals. Evaluation of basic knowledge.
4	Class of Insecta. Insect, post-embryonic stages, metamorphosis, and emergence. Trophic webs involving insects and plants. Systematic of insects.
10	Insect pests of ornamental and technical green, urban plants and rural landscape: Xylophagous, phytophagous sensu strictu and sap feeders, root feeders, etc. Particular attention will be paid to Pest species such as <i>Corythucha ciliata</i> , <i>Cameraria ohridella</i> , <i>Metcalfa pruinosa</i> , <i>Ceroptastes spp.</i> , <i>Eucallipterus tiliae</i> , <i>Patchiella reaumuri</i> , <i>Phylloxera spp.</i> , <i>Cinara spp.</i> , <i>Cedrobium spp.</i> , <i>Cossus cossus</i> , <i>Zeuzera pyrina</i> , <i>Thaumetopoea pityocampa</i> , <i>Tortrix viridana</i> , <i>Cydalima perspectalis</i> , <i>Ceramix cerdo</i> , <i>Saperda carcharias</i> , <i>Anoplophora chinensis</i> , <i>Rhynchophorus ferrugineus</i> , <i>Dryocosmus kuriphilus</i> , <i>Crisicoccus pini</i> . Other insects of green and landscape, including emerging pests. Other noxious insects such as mosquitos.

8	Types of damage caused by insect pests. Control methodologies of insect pests. Chemical, integrated and biological control. Mechanical, microbiologic and biotechnical tools. the concept of insect damage on urban plants, economic thresholds, insect damage evaluation, insect of urban plants and social interest, Integrated Pest Management (insect sampling, physical and mechanical control, biological control, mandatory measures, semiochemicals, chemical control, insecticide classification, non-target effects of insecticides, insecticide selectivity, endotherapy and esotherapy). Use of entomophagous in biological control.
4	Functional Biodiversity: ecological focus areas and insect conservation, flowering plants, and ecological networks for beneficial insect enhancement.
2	Genetically modified plants for urban and ornamental scopes. Risks and benefits.
2	Other problems linked to arthropods (e.g. vector insects, synanthropic insects) in ornamental and technical green (e.g. gardens, urban areas).
2	Palm insect pests or topics chosen by students or in relation to the actual phytosanitary situation.

Hrs	Practice
10	Identification of main insect pests of ornamental plants (laboratory and field exercises). Other noxious insects.
6	Case studies presented by the students, individual and/or group work
2	Risk assessment of the different control methods: Practical exercises and technical aspects

Hrs	Others
4	Insects and agroecology. Practical examples. Monitoring insect pollinators in green infrastructure. The pan-trap method attracts insect pollinators
4	Practical evaluation of entomological attacks and application of control methods.

## MODULE INTEGRATED PHYTOPATHIES CONTROL

*Prof.ssa PATRIZIA BELLA*

### SUGGESTED BIBLIOGRAPHY

- Vannacci G. Patologia vegetale. EdiSES. edizione 2021. ISBN: 9788836230419
- Lorenzini G., Principi di Fitoiatria. Edagricole Bologna. Edizione 2012. ISBN: 8850653883
- Chet I., Innovative Approaches to Plant Disease Control . John Wiley & Sons Inc., 1987. ISBN: 0-471-80962-4.
- Matta et al. Patron Editore, 2017. ISBN 9788855533829
- Materiale distribuito nel corso delle lezioni.

<b>AMBIT</b>	21005-Attività formative affini o integrative
<b>INDIVIDUAL STUDY (Hrs)</b>	45
<b>COURSE ACTIVITY (Hrs)</b>	30

### EDUCATIONAL OBJECTIVES OF THE MODULE

The main goal is to provide a review of the current trends towards sustainable plant protection with particular regard to the environmental impact, based on an the analysis of the evolutionary scenario of plant protection. On the basis of epidemiological knowledge will be examined modern intervention and containment strategies taking as a reference point an integrated and biological approach. The student will acquire sufficient skills to be able to relate critically to the problems of pest management and to the management of plant diseases.

## SYLLABUS

Hrs	Frontal teaching
1	Plant pathology related to crop management. Evolution of crop protection towards new sustainable models.
1	Introduction to Plant pathology diagnosis
4	traditional diagnostic tests, diagnostic tests through the use of biochemical markers, serological tests, nucleic acids detection, PCR, RFLP, SSCP, cloning and sequencing, phylogenetic analysis.
3	Epidemiology and study on previsional spread of diseases
4	Agrochemicals: Physical and chemical characteristics, classification, use, detention
9	Sustainable crop protection strategies
Hrs	Practice
2	decision support systems
Hrs	Workshops
6	DAS-ELISA test, nucleic acids extraction, PCR and Electrophoresis gel