UNIVERSITÀ CATTOLICA del Sacro Cuore

IHG908 – Disease and Pest Management towards sustainable Viticulture

Prof. Vittorio Rossi

COURSE DESCRIPTION

Students will acquire the necessary elements to understand the development of grapevine plant diseases and for applying this knowledge in the sustainable vineyard management. Different aspects will be addressed: i) epidemiological aspects of diseases; ii) interaction between plant disease epidemics, the environment, and crop management; iii) mathematical models and decision support system for crop protection; iv) crop protection in integrated and organic viticulture.

COURSE CONTENTS

Bases of plant-pathogen-environment interactions: life cycle of pathogens from an epidemiological point of view; infection, infection chains, and epidemiological parameters; influence of the host plant (growth and development, receptivity and resistance) on epidemiological parameters of plant diseases; the vineyard's environment (biotic and abiotic components and their measurement).

Biology and epidemiology of grape pathogens: overview of the recent findings on biology, epidemiology and population dynamics of the main pathogens, including oomycetes, fungi, phytoplasmas, fastidious bacteria and viruses.

Methods for sustainable grape protection: concepts in sustainable grape protection; principles of Integrated Pest Management according to Directive 128/2009 EC; a framework for IPM implementation; new tools and methods for IPM, including resistant varieties, sanitation, vineyard monitoring and scouting, modelling, monitoring of resistant populations and anti-resistance strategies, biocontrol agents and other non-chemical methods for disease control; precision crop-protection.

Mathematical models for grape disease and protection: insights on plant disease modelling; empirical versus mechanistic models; principles of model validation and use in scheduling fungicide applications; strengths and weaknesses of model's use. Practical examples of models for downy and powdery mildews, Botrytis bunch rot and Black-rot.

Decision support tools for sustainable grape protection: tools for supporting grape growers in practical implementation of IPM; on-site devices, warning systems, and decision support systems (DSSs); strengths and weaknesses of the different tools; the DSS vite.net as a successful case-study.

SCHEDULE

Spring Semester

PREREQUISITES

None.

METHOD OF TEACHING

35 teaching hours (indoor) + 12 hours (practices). Lectures, tutorial sessions, seminars, technical field trips.

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COURSE REQUIREMENTS

It is strongly recommended to attend classes. The teacher will provide didactic materials in class.

CREDITS

6 ECTS

GRADING

Final oral examination. The test consists of two parts:
- In the first part the student will have to give written answers to 30 questions in a maximum of 60 minutes;
- In the second part the commission will assign a score from zero to one to each of the written replies given by the student, also in relation to specific questions designed to clarify the written answers provided by the student, to deepen specific topics and assess the capacity of reasoning and analysis on the course topics, as well as the properties of language and communication skills.

Prof. Vittorio Rossi is available to meet with students after class at the Institute of Entomology and plant pathology.

COURSE READINGS AND MATERIALS

References and reading materials will be set during the course.

E-MAIL ADDRESS

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UNIVERSITÀ CATTOLICA del Sacro Cuore

IHG908 – Disease and Pest Management toward a sustainable Viticulture – Entomology

Dr. Emanuele Mazzoni

COURSE DESCRIPTION

Students will acquire the basic elements of general entomology and defense, and learn about the most important grapes parasites, to gain an understanding of the best protection strategies, in particular considering integrated production and organic agriculture.

COURSE CONTENTS

Bases of entomology. Arthropods: mites and insects. The meaning of pest morphology, anatomy, and physiology with regard to their mode of attack and vine damages. Development and ethology towards possible manipulation to achieve control. Taxonomy: old and new techniques for species identification and its importance for defense management.

Grape pests. Notes on pests harmful to the grapevine (mites, nematodes, vertebrates). Orders, families and the principal vine insects species. Recent vine cultivation changes and their influence on endemic and recently introduced species. Biotic potential in relation to environmental conditions. Transmission of pathogens.

Defense strategies. Grapevine agro-system and its possible balance in relation to pest infestations. Knowledge of biological, biotechnical, agronomic, physical, mechanical, and chemical control methods and their efficacy in relation with the environment and their contemporary use. Environmental impact of defense actions. What to consider for an IPM program which takes into account the needed protection actions against grapevine pests and diseases. Legally mandated crop protection actions. Monitoring methods and thresholds. European legislation and Italian regulations for the development of integrated farming systems.

SCHEDULE

Spring Semester

PREREQUISITES

None.

METHOD OF TEACHING

21 teaching hours (indoor)

COURSE REQUIREMENTS

It is strongly recommended to attend classes. The teacher will provide didactic materials in class. Students should register at the course on the Blackboard platform, and check it regularly for further information or updates.

CREDITS

3 ECTS

GRADING

Final oral examination. The evaluation will consider the question comprehension and the pertinence of the answer to the question, the organization of the answer, the use and mastery of the scientific language, the proficiency in the subject, and the student ability to make use of the knowledge acquired.

COURSE READINGS AND MATERIALS

Reading lists will be provided during the course.

INSTRUCTOR BIO

Dr. Emanuele Mazzoni
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