



UNIVERSITÀ DEGLI STUDI DI PALERMO

DEPARTMENT	Scienze Agrarie, Alimentari e Forestali		
ACADEMIC YEAR	2023/2024		
MASTER'S DEGREE (MSC)	AGROENGINEERING AND FORESTRY SCIENCES AND TECHNOLOGIES		
SUBJECT	FOREST ARTHROPODS CONTROL AND FAUNAL PLANNING		
TYPE OF EDUCATIONAL ACTIVITY	B		
AMBIT	50564-Discipline forestali ed ambientali		
CODE	21843		
SCIENTIFIC SECTOR(S)	AGR/11		
HEAD PROFESSOR(S)	CALECA VIRGILIO	Professore Associato	Univ. di PALERMO
OTHER PROFESSOR(S)			
CREDITS	6		
INDIVIDUAL STUDY (Hrs)	86		
COURSE ACTIVITY (Hrs)	64		
PROPAEDEUTICAL SUBJECTS			
MUTUALIZATION			
YEAR	1		
TERM (SEMESTER)	1° semester		
ATTENDANCE	Not mandatory		
EVALUATION	Out of 30		
TEACHER OFFICE HOURS	CALECA VIRGILIO Tuesday 9:00 11:00 Stanza del docente. Dipartimento di Scienze Agrarie, Alimentari e Forestali. Edificio 5. Ingresso A. Primo Piano. Stanza 05. Viale delle Scienze 90128 Palermo Wednesday 9:00 11:00 Stanza del docente. Dipartimento di Scienze Agrarie, Alimentari e Forestali. Edificio 5. Ingresso A. Primo Piano. Stanza 05. Viale delle Scienze 90128 Palermo Thursday 9:00 11:00 Stanza del docente. Dipartimento di Scienze Agrarie, Alimentari e Forestali. Edificio 5. Ingresso A. Primo Piano. Stanza 05. Viale delle Scienze 90128 Palermo		

PREREQUISITES	Basic knowledge of Entomology and Zoology. Nevertheless, to help students first lectures will remind basic concepts of the Bachelor degree.
LEARNING OUTCOMES	<p>Knowledge and understanding. Students through this modular subject must acquire scientific, technical and normative knowledge to manage the potentially harmful forest arthropods and vertebrate fauna in order to maintain a satisfactory habitat and species conservation. For this purpose students must acquire an adequate knowledge and understanding of legislation regarding habitats of European interest and rare, endemic, endangered animal species. Students will also acquire knowledge on faunistic indicators, main forest pests and useful arthropods. They will be driven to understand the complexity of environmental impact assessment by faunistic indicators and the control of phytophagous forest insects. • Applying knowledge and understanding. Students must be able to: - recognize the basic features of fauna and habitats of a Natura 2000 site to avoid the approval plans contrasting the conservation of habitats and species of European interest; - consult and understand scientific papers on environmental impact assessment, zoology, entomology and pest control, identifying useful contents for the professional activity; - plan fauna monitoring and management, and insect control in forest environment adopting sustainable methods. • Making judgements. Students will be able to: - analyse different ecological and anthropic features ruling Natura 2000 sites; - evaluate and choose the reliable methodology of monitoring fauna for the assigned ecological context; - forecast and evaluate potential results;- analyse obtained results in own studies and results of scientific studies on forest insects pests. • Communication skills. Skill in presenting reports and studies on forest pest control and faunistic management in habitats of Natura 2000 network. Skill in disseminating innovation, in expressing and talking about the importance of applying suggestions of environmental impact assessment and about concepts and technical contents on fauna, habitats, control of insects potentially harmful to forest plant both to an informed audience and wide dissemination. • Learning skills. Skill in learning by scientific papers linked to arguments included in the lectures (Faunistic management, faunistic indicators, Forest Entomology, Systematic Entomology, Pest Integrated Management, Biological Control, Zoology). Skill in utilising knowledge acquired along the course for subsequent masters, doctorates, specialistic seminars concerning Forest, Nature, Environment Sciences, Zoology, Entomology</p>
ASSESSMENT METHODS	<p>Student's skill will be assessed through an oral exam. The final evaluation, properly graduated, will be formulated on the basis of the following conditions:a) basic knowledge of forest arthropods control and faunistic management and limited capacity to apply the learned knowledge in new situations, sufficient capacity of analysis of the studied phenomena and exposure of the followed procedures (rating 18-21);b) good knowledge of forest arthropods control and faunistic management and ability to implement its content in situations similar to those studied, discrete capacity of analysis of the presented phenomena and exposure of the followed procedures (rating 22-25);c) in-depth knowledge of forest arthropods control and faunistic management studied and ability to apply it to the proposed biological phenomena, but not always promptly and following a linear approach, ability of identification of animals of the studied main families by the use of dichotomous keys, good capacity of analysis of presented phenomena and exposition of the followed procedures (rating 26-28);d) deep and widespread knowledge of forest arthropods control and faunistic management and ability to apply its concepts promptly and correctly, ability of identification of animals with the use of dichotomous keys, excellent capacity in plant biological phenomena analysis and excellent capacity of communication (rating 29-30 and praise).</p>
EDUCATIONAL OBJECTIVES	<p>• Knowledge and understanding. Students must acquire scientific, technical and normative knowledge to manage the impact evaluation of environmental modifications through faunistic studies and to manage the control of phytophagous species of forest plants, starting from the knowledge of biology of faunistic indicators, phytophagous arthropods and useful arthropods. • Applying knowledge and understanding. Students must be able to: - recognize the basic features of the fauna of the ecosystem; - monitor insects in the main kinds of forests and agroecosystems, evaluating local ecological conditions; - consult and understand scientific papers on zoology, entomology and pest control, identifying useful contents for the professional activity; - plan fauna monitoring and management, and insect control adopting sustainable methods. • Making judgements. Students will be able to: - evaluate and choose the reliable methodology of faunistic monitoring and management for the assigned ecological context; - analyse obtained results in own studies and results of scientific studies on forest insects pests to choose the more adequate operative tool. • Communication skills. Skill in presenting reports and studies on terrestrial and freshwater fauna, insects and arthropods of forest and natural environments. Skill in disseminating innovation, in expressing and talking about concepts and technical contents on the control of insects potentially harmful to plants both to an informed audience and for a wide dissemination. • Learning</p>

	skills. Skill in learning by scientific papers linked to arguments included in the lectures (Faunistic management, Forest Entomology, Systematic Entomology, Pest Integrated Management, Biological Control, Zoology). Skill in utilising knowledge acquired along the course for subsequent masters, doctorates, specialistic seminars concerning Forest, Nature, Environment Sciences, Zoology, Entomology
TEACHING METHODS	Lectures, laboratory and field exercises
SUGGESTED BIBLIOGRAPHY	<p>Battisti, De Battisti, Faccoli, Masutti, Paolucci e Stergulc, 2013 - Lineamenti di zoologia forestale. Padova University Press. ISBN 978-88-97385-58-5</p> <p>Viggiani G., 1997 – Lotta biologica e integrata nella difesa fitosanitaria – Liguori Ed., Napoli, 2 voll. ISBN vol1: 8820722399. ISBN vol2: 882072541X</p> <p>Tremblay E., 2003 – Entomologia applicata. Tutti i volumi pubblicati. – Liguori Editore. Napoli ISBN 88-207-0681-4</p> <p>Pollini A. – 2002 – Manuale di Entomologia applicata. – Edagricole Bologna ISBN: 8850639546</p> <p>AA.VV., 2008. Atlante della Biodiversita' della Sicilia: Vertebrati terrestri. Studi & Ricerche Arpa Sicilia, Palermo 6. ISBN 978-88-95813-02-8 http://www.ornitologiasiciliana.it/pdf/AtlasVertebrati2008.pdf</p> <p>Howe H.F. e Westley L.C., 1996 - Piante e animali: rapporti ecologici ed evolutivi. Muzzio ed., Padova. ISBN-13: 9788870217186</p> <p>Materiali didattici forniti dal docente.</p> <p>Testi per ulteriori approfondimenti: Matthey W., Della Santa E. & Wannenmacher C., 1997. Guida pratica all'ecologia. Zanichelli ed., Bologna. ISBN-10: 8808038661 Masutti L., Zangheri S., 2001- Entomologia generale ed applicata. CEDAM, Padova ISBN 8813231350</p>

SYLLABUS

Hrs	Frontal teaching
7	Mediterranean and Sicilian vertebrate fauna in brief. Biodiversity hot spots. Invertebrates listed in Natura 2000 recorded in Sicily
3	International conventions and directives, national and regional legislation on animal species and habitat conservation
3	Autochthonous and allochthonous species, fluctuations, diminution and extinction of species; laws governing the reintroduction of extinct species. The Red Lists
8	Introduction of allochthonous species, reintroductions, restocking and eradication of fauna
5	Techniques of census and faunistic monitoring; application to terrestrial vertebrates and invertebrates. Examples of census for insects of EU importance; examples of census for birds: mapping, listening points, methods of capture-mark-recapture
4	Useful arthropods: generalities on pollinators, predators and parasitoids of phytophagous arthropods
4	Biology and management of phytophagous Lepidoptera of oaks: Lepidoptera (<i>Tortrix viridana</i> , <i>Lymantria dispar</i> , <i>Euproctis chrysorrhoea</i> , <i>Malacosoma neustria</i> , <i>Thaumetopoea processionea</i>).
3	Biology and management of phytophagous insects of conifers. <i>Leptoglossus occidentalis</i> (Hemiptera Coreidae), <i>Thaumetopoea pityocampa</i> (Lep. Thaumetopoeidae), <i>Matsucoccus feytaudi</i> (Hem. Margarodidae).
3	Biology and management of chestnut phytophagous insects. <i>Dryocosmus kuriphilus</i> (Hymenoptera Cynipidae) and its specific parasitoid <i>Torymus sinensis</i> (Hym. Torymidae)
Hrs	Practice
4	Monitoring of alpha and beta diversity and calculation of indices and descriptors of habitats. The parameters N (No. of individuals), S (species richness or No. of species) and H' (diversity index of Shannon-Wiener and others). Difference between taxonomical diversity and biodiversity
6	Insects and vertebrates monitoring
6	Preparation and identification of main forest arthropods
8	Technical visit in nature reserve or wood with practice on monitoring of insect and vertebrate species