Management of Animal Resources and Pests

Code: 100843
ECTS Credits: 6

2024/2025

Degree	Type	Year
2500251 Environmental Biology	OB	3

Contact

Name: Fernando Garcia del Pino

Email: fernando.garcia@uab.cat

Teachers

Anna Soler Membrives

Teaching groups languages

You can view this information at the end of this document.

Prerequisites

Although there are no specific prerequisites, it is advisable that students have passed the Zoology subjects.

Objectives and Contextualisation

The student must acquire the theoretical-practical knowledge that allows him/her to know and understand the effect that the exploitations of animal resources and animal pests have on the environment.

The student who has taken this course must have the training to analyze farms of renewable animal resources, and diagnose and manage the potential impacts generated. Likewise, the student must be able to participate in teams that implement strategies and pest management programs to reduce or suppress their populations, diagnosing the impact of these strategies on the human being and the environment.

The specific training objectives are:

- To understand the importance of the renewable resources that are exploited and its reality, as well as to assess the environmental impact of its exploitation, and to know the tools for its sustainable management.

- To know the problems of the cultivation and exploitation of certain animal resources and the importance of optimizing the conditions of growth, nutrition, reproduction and productive performance (with a special emphasis on aquaculture) for sustainable production and respectful of the environment.

- To know the ecological and biological bases of the origin of animal pests and their problems, as well as to have a current vision of the different strategies that are currently available for their control.

- To recognize the factors to consider designing a management strategy of a determined pest, with an environmental vision, that is respectful with humans and the environment.

Competences

- Act with ethical responsibility and respect for fundamental rights and duties, diversity and democratic values.
- Communicate efficiently, orally and in writing.
- Develop and apply biological control techniques.
- Develop planning and organisation skills.
- Focus on quality.
- Introduce changes in the methods and processes of the field of knowledge to provide innovative responses to the needs and demands of society.
- Make decisions.
- Perform studies on animal and plant production and improvement.
- Take account of social, economic and environmental impacts when operating within one's own area of knowledge.
- Take sex- or gender-based inequalities into consideration when operating within one's own area of knowledge.

Learning Outcomes

1. Act with ethical responsibility and respect for fundamental rights and duties, diversity and democratic values.
2. Actuar en l'àmbit de coneixement propi avaluant les desigualtats per raó de sexe/gènere.
3. Communicate efficiently, orally and in writing.
4. Develop planning and organisation skills.
5. Diagnose and solve environmental problems related to animal resources (fishing and hunting) and pests.
6. Establish strategies for pest management.
7. Focus on quality.
8. Identify the problems caused by pests and the production and exploitation of certain natural animal resources (fishing and hunting).
9. Introduce changes in the methods and processes of the field of knowledge to provide innovative responses to the needs and demands of society.
10. Make decisions.
11. Take account of social, economic and environmental impacts when operating within one's own area of knowledge.

Content

THEORETICAL PROGRAM

INTRODUCTION

Unit 0.- Presentation of the subject. (0.5 hr)

Unit 1.- Introduction. The animals and the humans. Applications of the fauna. Animal resources and the environment. (0.5 hr)

PART I: PROBLEMATICS OF THE EXPLOITATION OF ANIMAL RESOURCES

I.1. Fishing resources and its management

Unit 2.- Fishing resources and fishing intensity: Definition of fishing resource. Fishing gears: types, classification and effects on the ecosystem. Fisheries intensity and resource depletion: basic strategies of exploitation, bio-economic models and programs of simulation of fishing intensity. (1 hr)

Unit 3.- Fisheries management. The three actors: administration, technicians or scientists and the fishermen. Technical and monitoring measures: regulation of capture, effort and selectivity. Monitoring and evaluation. (1 hr)

Unit 4.- Coastal fishing in the Mediterranean. Fishing within the framework of the European Union: the common fisheries policy. International fisheries: the case of the bluefin tuna. (1.5 hr).

Seminar 1.- Study case of fisheries co-management. (1 hr)

I.2. Aquaculture

Unit 5.- Introduction. Aquaculture past and present. Main systems of aquaculture production. Mollusks, crustaceans and fish production: main species of interest. (1 hr)

Unit 6.- An option for fishing? Research lines. Feeding: nutritional requirements, feeding in the different phases of production. Reproduction and growth. Pathological aspects. Ecological and environmental impacts. The problem of closing of life cycles. (1 hr)

Unit 7.- Sustainable aquaculture. (1 hr)

I.3. Hunting

Unit 8.- Hunting: exploitation of a natural resource? Major and minor hunting species. Hunting reserves, a form of protection? Hunting production (birds, mammals) for repopulation. Hunting activity in Catalonia and Spain. (1 hr)

Seminar 2.- Case studies: situation and problems of hunting in Catalonia. (1.5 hr)

PART II: URBAN AND PERI-URBAN ANIMAL PESTS: PROBLEMATICS AND MANAGEMENT

II.1.- Introduction:

Unit 9.- The concept of animal pest, with a biological, ecological and anthropic perspective. (0.5 hr)

Unit 10.- Ecological bases that determine the occurrence of pests in urban and peri-urban environments. Disturbances that have generated pests. Invasive species triggering pests. Emerging pests. Globalization and pests. Global climate change and pests. (1 hr)

II.2.- Protocols for urban pest control programs

Unit 11.- Inspection and monitoring. Planning of the proceedings. Delivery to the user of the program proposal. Development of the actions. Delivery to the user of the performance report. Evaluation of the performances. Monitoring and continuous inspection. (1.5 hr)

II.3.- Strategies of pest management

Unit 12.- Preventive pest control strategies: Use of the environmental conditions that determine the appearance of animal pests in order to determine management practices that allow the implementation of preventive measures to control their populations. Examples of habitat management (removal of breeding sites, management of temperature and humidity, etc.). (1 hr)

Unit 13.- Active strategies: Mechanical and physical methods. (1 hr)

Unit 14.- Definition of pesticides and types according to their use. Pesticides of natural origin (botanists). Inorganic pesticides (minerals). Organic pesticides of synthesis (conventional chemical pesticides). Types of formulations. Problems and limitations of chemical pesticides of synthesis in pest control. Legal measures that regulate its use. Pesticides, health and the environment. (3 h)

Unit 15.- Biorational Pesticides: Insect growth regulators (IGRs) (hormones, inhibitors of the formation of the cuticle, etc.), food inhibitors. Use of pheromones: monitoring the density of the plague, mass capture and sexual confusion. Environmental implications of biorational pesticides. (1 hr)

Unit 16.- Equipment, techniques of application and types of treatments with pest control pesticides. (1h)

Unit 17.- Biological control agents: pathogens, predators and parasitoids. Types, characteristics and biological cycles (2 h)

Unit 18.- Biological control: Use of the ecological bases of predator / prey relations, parasitoid / host, pathogen / host for the use of natural enemies in pest control. Strategies for the use of natural enemies: classic biological control programs, augmentative strategies (inoculative and inundative biological control). Conservation biological control: strategies for the conservation of natural enemies. (1.5 hr)

Unit 19.- Integrated Pest Management (IPM). Principles: an ecological perspective to improve pest management. Towards a management strategy, that respects human health and the environment. (1.5 hr)

Conference 1.- Conference about the urban pest control sector to be determined (1 h)

Seminar 3.- Biology of pests studied in field practices (1 h)

Seminars 4 - 7.- Seminars on the work carried out in practical studies of practical cases of pests. (4 h)

PRACTICAL PROGRAM

- EXPLOITATION OF ANIMAL RESOURCES:

Field Practice:

Practice 1: Visit to a research center in aquatic living resources (4 h)

Lab practice:

Practice 2: Assessment of a fish population of fishing interest and management measures. (4 h)

Students, in pairs, will develop a study of a fish population (*Micromessistius potassiumou* or a similar species of fishing interest), in order to assess the state of fishing pressure, and discuss the appropriate management measures to improve it.

- PEST MANAGEMENT:

Field and laboratory practices:

Practice 3: Study of practical cases of pest (14 h)

The students, in groups of 3-4 people, will develop the study of a case related to one of the pests proposed (for example: tiger mosquito (*Aedes albopictus*), termite (*Reticulitermes banyulensis*), cockroaches (*Blattella germanica*, *Periplaneta Americana*, *Blatta orientalis*), pests of libraries, birds (pigeons, parrots, gulls), rodents (*Rattus norvergicus*, *Rattus rattus*, *Mus musculus*), Asian hornet (*Vespa velutina*), etc.

Activities and Methodology

Title	Hours	ECTS	Learning Outcomes
Type: Directed			
Conference	1	0.04	1, 2, 11, 4, 5, 6, 7, 8, 9
Field work	17	0.68	1, 2, 11, 3, 4, 5, 6, 7, 8, 9, 10
Laboratory work	5	0.2	3, 4, 5, 6, 7, 8, 10
Lectures	23	0.92	5, 6, 7, 8
Seminars	7	0.28	1, 2, 11, 3, 4, 5, 6, 7, 8, 9, 10
Type: Supervised			
Tutorials	6	0.24	3, 4, 5, 6, 7, 8
Type: Autonomous			
Prepare individual work and solving questions	51	2.04	3, 4, 5, 6, 7, 8, 10
Studing and solving problems	32	1.28	1, 11, 3, 4, 5, 6, 7, 8, 9, 10

The methodology used in this subject to achieve the learning process is based on making the student work the information that is put to his/her reach. The function of the teacher is to give the information or to indicate where the student can get it and help the student so that the learning process can be carried out effectively.

Within the framework of the course, Service-Learning (S-L) can be developed. Through this approach, students learn by participating in a project aimed at addressing a real need in a community, thus improving people's living conditions or the quality of the environment.

To achieve the course objectives, the following activities are undertaken:

Theoretical lectures:

With these classes the student acquires the basic scientific-technical knowledge of the subject that must complement with the personal study of the explained issues.

Conference:

Topics on the urban pest control sector to be determined each year, taught by a professional in the sector.

Seminars:

The seminars work on the scientific-technical knowledge exposed on the theoretical lecturers to complete their comprehension and deepen them. It is characterized by the active work of the student. Practices recommended by the teacher are worked out, such as: analysis and discussion of videos and articles on issues related to the management of animal resources and pests, resolution of issues related to the topics covered, analysis of information on zoological management, etc.

The mission of the seminars is to promote the capacity for analysis and synthesis, critical reasoning and the ability to solve problems.

Practices:

The objective of the practical classes is to complete and reinforce the knowledge acquired in the theoretical classes and seminars. Practical sessions will be stimulated and developed in the student empirical skills such as the ability to observe, analyze and recognize problems related to the management of animal resources and pests.

The practices of management of animal resources will be dealt with the study of a population of fish undergoing overexploitation. The final product that the proposed study seeks to resolveis a technical report, which follows the guidelines of any professional report in the field of environmental biology, with the results of the study andmanagement measures. To complete this block, students will visit a fish market and landing fishing port as well as a research center specialized in aquatic resources.

During the practices of pest management the students will approach the study of the case of a certain pest. The student must identify and recognize one of the proposed pests, conduct an inspection to locate individuals and / or their evidences, establish mechanisms to evaluate their density, analyze the causes of their origin, evaluate their problems (damages caused) and design an integrated control strategy.

The practices have a professional profile where the student will work in direct contact with companies and professionals in the pest control sector.

In order to develop the study, a series of field and laboratory practices will be carried out.

Field practices will consist of practical activities of observation, inspection, diagnosis, sample collection, etc. That can be done inside or outside the campus (may require journeys to facilities or external fields). They can be both supervised and targeted and are geared towards the development of the case study.

Laboratory practices are a complement to the field practices and will consist of the observation and diagnosis of material collected in field practices. Laboratory practices can also be supervised.

The results of the study of the case will lead to the elaboration of a work that will be presented in the form of seminars. The work must have a field component (to do an inspection and to sample individuals found there by causing a pest), laboratory (analyze identifying the individuals and / or evidences collected) and theoretical (use the concepts studied in theory to design the strategy of integrated control).

Tutorials:

The purpose of these sessionsis to solve doubts, to review basic concepts not explained in class and to guide the sources consulted by the students. Similarly, these tutorials allowthe orientation of the work of the study of the case that will be carried out by the students. The tutorial hours will be specified with the teacher through the virtual campus.

Annotation: Within the schedule set by the centre or degree programme, 15 minutes of one class will be reserved for students to evaluate their lecturers and their courses or modules through questionnaires.

Assessment

Continous Assessment Activities

Title	Weighting	Hours	ECTS	Learning Outcomes
First exam	15%	1.5	0.06	3, 4, 5, 7, 8, 10
Practices assessment	50%	3	0.12	1, 2, 11, 3, 4, 5, 6, 7, 8, 9, 10
Second exam	30%	2	0.08	3, 4, 5, 6, 7, 8, 10

Seminars assessment	5%	1.5	0.06	1, 2, 11, 3, 4, 5, 6, 7, 8, 9, 10

Evaluation of seminars (Pest Manegement):

All the small issues that will be developed throughout the seminar will be evaluated.

The note corresponding to the seminars has a global weight of 5% of the final grade.

Evaluation of the exams:

Partial exams:

In these parts, the students' knowledge in the subject, as well as their capacity for analysis and synthesis, and critical reasoning, will be evaluated individually. The exam will have a part of test questions and another of conceptual questions, schemes, etc.

There will be 2 eliminatory partial examinations, the first partial (Management of animal resources) will have a weight of 15% and the second partial (Pest Management) 30% of the global note.

Final exam:

Students who do not pass one of the two partial examinations (minimum grade: 5 out of 10) can retrieve the exam not passed to the final exam. Likewise, the students who wish to improve the grade of one or both of the parts can do it by presenting themselves to the final exam, but the previously obtained note will be lost.

The mark corresponding to the two exams has a global weight of 50% of the final mark. However, in order to be able to do the average with the rest of the evaluable activities, it is necessary to obtain a final minimum mark of the exams of 4.

Evaluation of the practices:

Animal Resource Management:

The students, in pairs, will make a technical report that will respond to the achievement of the knowledge acquired on the part of fisheries management (theory, practices and seminars). The report will be evaluated taking into account the evaluation criteria presented in advance.

This assessment has an overall weight of 20% of the final grade. This evaluation, due to itseminently practical nature, doesnot allow its recovery.

Pest Management:

Thepractices will be taken into account in a case study that will lead to the elaboration of a work that will bepresented and will defend orally in the form of seminars. Both oral presentation and written work will be assessed.

This evaluation has a global weight of 30% of the final mark. This activity, due to its eminently practical nature, does not allow its recovery.

Student observation guide (add a value between -0.5 and 0.5 points)

Given the professional nature of the subject, it creates an ideal space to work on the transversal skills already described. During the different activities of the subject (field trips, external visits, seminars, debates,…) the students skills, attitudes and abilities acquired will be evaluated. A negative scale can be applied, according to the criteria of the teaching staff, in those cases where the student has a passive attitude or when it interferes negatively with the proper functioning of the subject.

Final Considerations:

The minimum global qualification required to pass the subject will be 5 out of 10.

To be eligible for the retake process, the student should have been previously evaluated in a set of activities equaling at least two thirds of the final score of the course or module. Thus, the student will be graded as "No Avaluable" if the weighthin of all conducted evaluation activities is less than 67% of the final score.

Single assessment:

The single assessment consists of a single summary test in which the contents of the entire theory program of the subject will be assessed. The single assessment test will coincide with the same date fixed in the calendar for the last continuous assessment test and the same recovery system will be applied as for the continuous assessment.

Students who take the single assessment must do the field and laboratory practices in face-to-face sessions and it is a requirement to have them approved. Attendance at the oral defence session of the practices and the seminars will also be compulsory.

The assessment of PLAB, PCAM, PAUL SEM and VTEX will follow the same procedure as the continuous assessment.

The evaluation of this subject is carried out throughout the course:

Bibliography

Belles, X. 1988. Insecticidas Biorracionales. Consejo Superior de Investigaciones Científicas, Madrid .

Bonnefoy X., Kamper H. i Sweeney K. 2008. Public Helath Significance of Urban Pests. WHO. https://www.euro.who.int/__data/assets/pdf_file/0011/98426/E91435.pdf

Demestre, M., Lleonart, J., Martin, P., Peitx, J.A. y Sardà, F. 1986. L'Oceanografia. II. Recursos pesquers de la mar catalana. Diputació de Barcelona, Barcelona.

Gabarra R.i Avilla, J. 2011. Guia dels enemigs naturals en diferents cultius a Catalunya. Departament d'Agricultura Generalitat de Catalunya. Versió online: http://www20.gencat.cat/docs/DAR/AL_Alimentacio/AL01_PAE/08_Publicacions_material_referencia/Fitxers_esta .

Garcia del Pino, F. i Franco S. 2002.- Manual d'actuació de control integrat de plagues urbanes adreçat a les empreses usuàries dels serveis de control de plagues. Fundación Para la Prevención de Riesgos Laborales Ed. Barcelona. 226 pp. online: http://www.gencat.cat/salut/ctrlplagues/Du13/html/ca/dir1326/dn1326/manual%20usuaris%20control%20integrat.

Hajek, A. 2007.- Natural enemies: An introduction to Biological Control. Cambridge University Press. London. 378 pp.

Hokkanen H. M. T. & Lynch J.M. (eds). 1995.- Biological Control: Benefits and Risks. Cambridge University Press. 304 pp.

Jacas, J.; Caballero, P. i Avilla, J. (eds). 2005.- El control biológico de plagas y enfermedades : la sostenibilidad de la agricultura mediterránea. Castelló de la Plana Publicacions de la Universitat Jaume I. 223 pp.

Jacas, J. i Urbaneja,A. (eds). 2008.- Control biológico de plagas. Phytoma Ed. Valencia. 496 pp.

Robinson, W.H. 1996.- Urban entomology: Insect and mite pest in thehuman environment. Chapman&Hall. London. 430 pp.

Stickney, R. R. i McVey, J. P. (eds). 2002. Responsible marine aquaculture. England, CABI, 391 pp.

Vincent, C., M. Goettel and G. Lazarovits. (eds) 2007. Biological control, a global perspective. England, CABI, 440 pp.

Web sites:

Control Integrat de Plagues Urbanes. Generalitat de Catalunya: http://www.gencat.cat/salut/ctrlplagues/Du13/html/ca/Du13/index.html

International Organisation for Biological Control: http://www.iobc-wprs.org/index.html

https://ec.europa.eu/fisheries/cfp/ Política pesquera comuna.Unió Europea.

http://agricultura.gencat.cat/ca/departament/dar_plans_programes_sectorials/politica-maritima/programa-accio-m Estratègia Marítima 2018-2021.Departament d'Agricultura, Ramaderia, Pesca i Alimentació. Generalitat de Catalunya

https://www.observatorio-acuicultura.es/recursos/publicaciones/manual-de-acuicultura-sostenible. Manual de Acuicultura Sostenible. 2009. SustainAqua handbook - A handbook for sustainable aquaculture.

Software

R software

Language list

Name	Group	Language	Semester	Turn
(PAUL) Classroom practices	231	Catalan	second semester	morning-mixed
(PAUL) Classroom practices	232	Catalan	second semester	morning-mixed
(PCAM) Field practices	231	Catalan	second semester	afternoon
(PCAM) Field practices	232	Catalan	second semester	afternoon
(PCAM) Field practices	233	Catalan	second semester	afternoon
(PLAB) Practical laboratories	231	Catalan	second semester	afternoon
(PLAB) Practical laboratories	232	Catalan	second semester	afternoon
(PLAB) Practical laboratories	233	Catalan	second semester	afternoon
(TE) Theory	23	Catalan	second semester	morning-mixed