Universidad Zaragoza

Academic Year/course: 2024/25

28438 - Bee Production and Health

Syllabus Information

Academic year: 2024/25
Subject: 28438 - Bee Production and Health
Faculty / School: 105 - Facultad de Veterinaria
Degree: 451 - Degree in Veterinary Science
ECTS: 3.0
Year:
Semester: Second semester
Subject type: Optional
Module:

1. General information

The general objective of the subject is to enable students to learn about beekeeping management, production and health.

These approaches and objectives are aligned with the following Sustainable Development Goals (SDGs) of the United Nations 2030 Agenda (https://www.un.org/sustainabledevelopment/es/), in such a way that the acquisition of the learning results of the subject provides training and competence to contribute to some extent to their achievement: 2 (2.3, 2.4, 2.A), 3 (3.B, 3.D), 4 (4.3, 4.4, 4.5, 4.7), 8 (8.3, 8.4), 9 (9.4, 9.5), 11 (11.4, 11.A), 12 (12.2), 13 (13.3) and 15 (15.8,15.9).

The student should have taken Biology and Biochemistry, Economics and Business, Agronomy, Genetics, Microbiology, Parasitology and Pharmacology and Pharmacotherapy.

2. Learning results

The student, in order to pass this subject, must demonstrate the following results...

. Be able to know the population, behaviour and needs of bees. In addition, be able to inspect a hive, control defensive behaviour, assess the risk of stinging and overcome fear.
. Is able to know the main species, subspecies and breeds. Knows how to apply genetic improvement programs.
. Is capable of knowing the reproductive characteristics of the different individuals of the hive and the reproductive management procedures that allow the increase of the productivity and health of the hive, as well as to carry out the management for the rational breeding and exploitation of a hive.
. Is able to know the main types of hives and their components, as well as the complementary material. Knows the beekeeping calendar and the main management actions to be carried out in each season.
. Is able to differentiate the main plant groups and species of interest for beekeeping production, as well as to indicate their geographical distribution and the relationship between their phenology and the transhumance. In addition, is able to value in terms of honey, various types of vegetation and to describe the ecological services provided by beekeeping.
. Is able to know and recognize the different pathologies that affect bees and to perform the differential diagnosis of the different processes. Demonstrate that they have acquired the necessary skills to collect samples and perform certain diagnostic tests in order to identify the causal agent, as well as to apply therapeutic protocols and appropriate strategies for the prevention, control and/or eradication of the main diseases.
. Is able to know the hygienic, nutritional and pharmacological characteristics of beehive products, as well as their properties and quality indicators. Know their classification according to technological and legal criteria and know how to carry out an adequate quality control by means of appropriate analysis methods.
. Learn about the economic importance of the Spanish beekeeping sector. Understand and be able to explain the economic concepts of market failure and externality. Know the productive structures of Spanish beekeeping and its economic characteristics. Know the Spanish and EU foreign trade of apiculture products and the characteristics of the domestic market and consumption. Learn about the strengths and weaknesses of the Spanish beekeeping sector. Learn about the support systems implemented in Spain.
. Know and know how to interpret the legislation related to the beekeeping sector.

3. Syllabus

THEORY (19 hours)

POPULATION, BEHAVIOR, NEEDS AND MANAGEMENT OF THE HIVE (2h)

Topic 1. Introduction: historical and current importance of beekeeping. Anatomy, physiology and biology of the honeybee(Apis mellifera). Worker, queen, and drone. Biological cycle.

GENETICS AND BEE REPRODUCTION (3h)

Topic 2. Species and breeds. Concept of breed in beekeeping. The ideal breed. Main species. Main European and African breeds of Apis mellifera. Asian breeds. Practical crosses.
Topic 3. Queen and drone reproductive apparatus. Nuptial flight. Characteristics of the reproductive apparatus of workers.
Topic 4. Larval stages. Sex and caste determination. Parthenogenesis.

Topic 5. Swarming and artificial reproduction of hives.
Topic 6. Queen breeding and artificial insemination.

APICULTURAL PRODUCTION (2h)

Topic 7. The beehive. Introduction. Types of hives. General characteristics. Elements of a beehive. Beekeeping equipment and material. Material for the production of honey and other beehive products. General tooling.
Topic 8. General beekeeping management. Beekeeping calendar. Main activities before and during the honeydew. Preparation for off-peak periods.

FLORA AND MELIFEROUS VEGETATION (2h)

Topic 9. Melliferous flora and vegetation. Main products that bees take from plants: nectar, pollen, honeydew, juices, propolis. Geographic zones of beekeeping exploitation.
Topic 10. Phenology and Transhumance.
Topic 11. Ecosystem services of beekeeping: entomophilous pollination. Plant-bees co-evolution.
Topic 12. Melliferous valuation of vegetation. Regional honey valuation.

APICULTURAL PATHOLOGY (4h)

Topic 13. Factors influencing disease presentation and severity.
Topic 14. Fungal processes: Ascospheriosis(Ascosphaera). Aspergillosis(Aspergillus)
Topic 15. Bacterial processes: American and European Foulbrood Other bacterial processes.
Topic 16. Viral processes: Paralysis virus, Sacciformis brood virus. Other viral processes.
Topic 17. Parasitic processes: Varroosis, Nosemosis and Acarapisosis.
Topic 18. Hive depopulation syndrome. Other processes (biotic and abiotic) affecting the bee and the hive.

QUALITY CONTROL OF APICULTURAL PRODUCTS (2h)

Topic 19. Honey Quality. Definition. Types of honeys. Bromatological composition. Components of nutritional interest. Contaminants. Toxic honeys. Quality control.
Topic 20. Other hive products. Definition. Types of bee products. Bromatological composition. Components of nutritional interest. Contaminants. Quality control.

ECONOMICS AND MARKETING OF APICULTURAL PRODUCTS (2h)

Topic 21. Introduction to the Spanish beekeeping economy. Economic and environmental importance of the sector. Concept of market failure and externality.
Topic 22. Production structures, production, demand and marketing. Census, farms and regional distribution. Production costs. Volume and economic value of production. Consumption: differentiated products and quality figures. Foreign trade of Spain and the E.U.. Market perspectives and orientations.
Topic 23. Support systems. Strengths and weaknesses of the sector. Structural and quality measures. National beekeeping plans. Future prospects for the beekeeping sector. Strategic recommendations.

LEGISLATION (2h)

Topic 24. Legal regulations (horizontal and vertical) on beekeeping activity, production and health.

PRACTICAL (11 hours)

Laboratory practices (6 hours)

Practice 1. Anatomy of Apis mellifera (brood and adult). Laboratory diagnosis of infectious and parasitic processes (3h).
Practice 2. Demonstration of semen collection and queen insemination (1h).
Practice 3. Recognition of flora and melliferous vegetation (1h).
Practice 4. Sensory evaluation of honey. Honey quality (1h).

Field practices (5 hours)

Visit to an apiary: biology, management and beekeeping health Recognition of flora and melliferous vegetation Visit to industry and/or commerce in the sector: beekeeping production and hygienic-sanitary aspects of production and marketing of products.

4. Academic activities

Different types of teaching resources are combined for learning the subject:

Theoretical classes: 19 hours of theoretical activities, distributed into 8 thematic blocks and consisting of 24 topics.

Laboratory practices: 6 hours of practical laboratory activities, distributed in four sessions.

Field practices: 5 hours of field practice, consisting of supervised visits to beekeeping farms and industries and businesses in the sector.

5. Assessment system

The theoretical classes will be evaluated by means of a written test consisting of 50 multiple-choice questions (with 4 options), with an error penalty (value of the question divided by the number of options). The questions will be on the different thematic blocks. The grade will be from 0 to 10, and a 5 will be required to pass. The grade will account for 70% of the student's final grade in the subject, provided it has been passed.

In the practical classes, attendance, use and acquisition of skills and abilities in the execution of the different practices (laboratory and visits to farms and industries of the sector) will be valued. Failure to attend any of the practices will lead to the exam on the same in the official calls together with the theory exam. The grade will be from 0 to 10, and a 5 will be required to pass. The grade will represent 30% (15% laboratory practices + 15% field practices) of the student's final grade in the subject as long as it has been passed.

6. Sustainable Development Goals

11 - Sustainable Cities and Communities
13 - Climate Action
15 - Life on Land