



UNIVERSITÀ DI PISA

BOTANY

IDUNA ARDUINI

Anno accademico
CdS

2018/19
ANIMAL PRODUCTION SCIENCE AND
TECHNOLOGY
059EE
6

Moduli BOTANICA	Settore/i BIO/03	Tipo LEZIONI	Ore 66	Docente/i IDUNA ARDUINI
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Learning outcomes

Knowledge

The aims of the course are:

- to demonstrate the interdependence of the plant and animal kingdoms beyond the principal similarities and differences in structure and function;
- to gain knowledge about the structure and diversity of terrestrial plants with a particular focus on Angiosperms
- to illustrate the importance of plants in the nutrition of domestic animals, classifying the major plant families and species;
- to illustrate the origin, diffusion and threats of plant toxicity;
- to teach students to recognise plants through use of analytical keys.

Assessment criteria of knowledge

The student will be assessed on his/her demonstrated ability to discuss the main course contents using the appropriate terminology.

Methods:

- Final oral exam
- Continuous assessment through problem solving during lessons and practical work

Further information:

During the oral exam the student must be able to demonstrate his/her knowledge of the course material and a basic knowledge on the structure, composition and functioning of vascular plants, and the characteristics and a detailed description of the genera and species used for animal nutrition, which supplies an essential prerequisite for the studies on cultivation of forage crops and the utilization of plants for animal nutrition.

Skills

At the end of the course the student will have risen her/his skill in:

- recognising the diversity of plants in relation to systematic groups and environmental conditions
- recognising most common forage and toxic plants
- the use of analytical keys for the identification of plant taxa

Assessment criteria of skills

Skills will be verified:

- at the final oral examination
- during laboratory and practical work

Behaviors

At the end of the course the student will have risen his perception in:

- the interdependence of plants and animals



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- ecological approach in crop management
- the plants and plant parts more adapt to feed animals
- recognising and analysing critically the diversity of plants

Assessment criteria of behaviors

Students behaviour will be checked through her/his:

- participation in problem solving during lessons
- interest in observing and rising questions during practical work

Prerequisites

To better understand the contents of the course of botany students should possess knowledge on the fundamentals of:

- cell biology (structure of eucaryotic and procaryotic cells, properties of biological membranes, basic cell processes, general features of mitosis and meiosis, meaning of autotrophy and eterotrophy)
- biochemistry (composition, structure and properties of lipids, carbohydrates and proteins)
- physics and chemistry (notion of gradient and osmosis)

Teaching methods

Theoric lessons (40 h) will be delivered face to face with the help of screened images.

Lessons will be supplemented with:

- Work in groups: solution of quizzes based on the course content (4 h)
- Practical work: observation and description of fresh and exiccated plants and plant parts at difefrent growth stages (14 h)
- Laboratory/Field work: training in recognising and describing plant species (8 h)

Attendance: Advised

Syllabus

Lectures (40 h)

- General characteristics of the plant kingdom and main differences with animals (2 h).
- Concepts of ecology and main interactions between plants and animals (2 h).
- The evolution of terrestrial plants: main features of Bryophyta, Pteridophyta, Gymnosperms and Angyosperms (2 h).
- Features of plant cells: walls, vacuoles and plastids (4 h).
- Plant tissues; parallels between definitive tissues of plants and animals (4 h).
- Tracheophyte organs (roots, stems and leaves): morphology, anatomy and functions; metamorphosis and storage organs (3 h).
- Photosynthesis and transpiration (1 h).
- Chemical composition of plants and their importance in animal nutrition (2 h).
- Sexual and asexual reproduction of plants (2 h).
- Flowers, fruits and seeds (3 h).
- The life cycle of plants: duration and phases. The classification of life forms according to Raunkiaer (2 h).
- Criteria of Angiosperm nomenclature and systematic (1 h).
- General characteristics and distribution of the Angyosperm families of forage and environmental value (Fagaceae, Ranunculaceae, Brassicaceae, Caryophyllaceae, Rosaceae, Fabaceae, Apiaceae, Solanaceae, Asteraceae, Gramineae, Liliaceae, Araceae) (4 h).
- Morphological and reproductive features, nutritional importance and utilization of the main forage genera and species (genera Beta, Brassica, Helianthus, Trifolium, Medicago, Vicia, Hedysarum, Onobrychis, Lotus, Glycine, Lupinus, Triticum, Hordeum, Secale, Lolium, Avena, Festuca, Dactylis, Phleum, Sorghum, Zea) (8 h).

Practical work (26 h)

- observation and description of plants and plant parts with the use of fresh and exiccata plant samples, and plant models (6 h)
- training on images of plant anatomy and hystology (6 h).
- training on the leaf and flower features and terms used in plant systematic (6 h)
- training in the identification of plants species by means of plant identification keys (8 h)

Bibliography

Recommended reading includes the following:

- PASQUA G., ABBATE G., FORNI C. 2011. Botanica generale e Diversità vegetale. Ed. Piccin
- VENTURELLI F. e VIRLI L. 1995. Invito alla Botanica. Zanichelli, Bologna
- MASONI A., ERCOLI L., BONARI E. 1995. Coltivazioni foraggere. SEU, Pisa. (for the description of forage species).



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- CERUTI A., CERUTI M., VIGOLO G. 1993. Botanica medica, farmaceutica e veterinaria con elementi di botanica generale. Zanichelli, Bologna
- SMITH A.M., COUPLAND G., DOLAN L., HARBERD N., JONES J., MARTIN C., SABLOWSKI R., AMEY A. 2011. Biologia delle piante. I – Evoluzione, sviluppo, metabolismo. Zanichelli, Bologna

Additional learning material:

- Material projected during lectures is visible to enrolled students on the e-learning web page of the course
- Exsiccata of the main forage and toxic species are available at the Department Library
- A training meadow and a living collection of the principal crop and forage species are also available for observation and training

Further lectures:

- PANCALDI S., BALDISSEROTTO C., FERRONI L., PANTALEONI L., 2011. Fondamenti di Botanica generale – Teoria e pratica. Mc Graw Hill.
- SPERANZA A., CALZONI G. L., 1997. Struttura delle piante in immagini. Zanichelli Ed., Bologna. (per una migliore comprensione dell'anatomia vegetale).
- PURVES W.K., SADAVA D., ORIANI G.H., HELLER H.C., 2001. Biologia (La biologia delle piante, L'ecologia e la biogeografia). Zanichelli Ed., Bologna.
- VIEGI L. e ARDUINI I. 2003. Appunti di Etnobotanica Veterinaria. SEU, Pisa.

Web sites:

<http://www.whfreeman.com/raven/> <http://www.cornell.edu/> <http://www.dipbot.unict.it/frame/botgenit.htm>;
<http://www.dipbot.unict.it/frame/botsistit.htm>

Non-attending students info

Enrol in the course on the e-learning web page and follow the same instructions for attending students.

Assessment methods

Oral examination dealing with the topics listed in the program and discussed during lectures and laboratory work.
Part of the examination consists in the description of fresh and exsiccata plant material and images of plant sections.
The marks are out of 30. Minimum threshold 18/30.

Additional web pages

List of topics dealt in lessons on the teacher web page of unimap (University of Pisa web site).

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