Sveučilište u Zagrebu Agronomski fakultet
Svetošimunska cesta 25, 10000 Zagreb
Telefon: +385 (0)1 2393 777
E-mail: dekanat@agr.hr
Web: www.agr.unizg.hr

Plant ecophysiology (146050)

Nositelj predmeta

prof. dr. sc. Milan Poljak

Opis predmeta

Plant ecophysiology views changes in fundamental physiological processes in plant which are provoked by change of external influence in all aspects of organisation. Ecophysiological directs must take in consider both structural and functional difference. Ecophysiological researches give informations which are basic for understanding the mechanisms responsible for adjustment. Researches connect with physiological processes which influence of growth, reproduction, survival, evolution and plant adjustment will be viewed. Physiological processes which will be viewed include regime of water, mineral nutrition, transport of substance and energetic (photosynthesis and respiration). During the class, aspects of plant physiology and plant ecology will be compared. At the beginning the basic physiological processes will be given and their basic meaning for plant and relevant mechanisms as well. After that the influence of some processes to growth of plant, development, survival and adjustment will be viewed. The influence of biotic and abiotic factors will also be included in context of conversation about physiology stress and its ecological circumstances for evolution and adjustment.

ECTS: **3.00**

Sati nastave: 30
Predavanja: 25
Seminar: 5

Izvođač predavanja

- prof. dr. sc. Milan Poljak
- izv. prof. dr. sc. Ante Biško

Izvođač seminara

- prof. dr. sc. Milan Poljak
- izv. prof. dr. sc. Ante Biško

Ocjenjivanje

Dovoljan (2): 60-70%
Dobar (3): 71-80%
Vrlo dobar (4): 81-90%
Izvrstan (5): 91-100%

Vrsta predmeta

- Graduate studies / Environment, agriculture and resource management (Obvezni predmet, 2. semestar, 1. godina)

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Opće kompetencije

At the end of this course the student is expected to be able to:
- understand the consequences of short- and long-term changes in environment on the growth, morphology and metabolism of plants
- obtain an advanced understanding of plant adaptation to adverse environments;
- obtain key competences within nature management and will be able to evaluate the conditions for plant growth in natural ecosystems;
- gain competences to evaluate and suggest strategies for improved plant tolerance towards adverse environmental and climatic conditions.
- assess the impact of changes in the environment on plant growth;
- use the concepts of plant stress responses to understand the mechanisms involved in plant adaptation and acclimation to adverse environmental conditions.

Oblici nastave

- Lectures
- Seminars
  Groups (2-3 students) independently prepare and present the lecture using recent scientific and professional literature related to the topic of rhizosphere ecology.

Ishodi učenja i način provjere

Ishod učenja	Način provjere
Understand which underlying factors determine rates of growth in plants.	Participating in the discussions, work tasks during classes - analysis of case studies, seminars, written exam
Understanding the complex interaction of plants with other organisms in the ecosystem	Participating in the discussions, work tasks during classes - analysis of case studies, seminars, written exam
Understand the key features of the soil environment as they affect the nutrient supply to plants.	Participating in the discussions, work tasks during classes - analysis of case studies, seminars, written exam
Be familiar with a range of experimental approaches used to investigate the impact of changes in environment on the growth and physiology of plants.	Participating in the discussions, work tasks during classes - analysis of case studies, seminars, written exam
Be familiar with the physiological and/or morphological characteristics of plants adapted to stressful habitats.	Participating in the discussions, work tasks during classes - analysis of case studies, seminars, written exam
Understanding the impact of stress on plant growth and development and on crop production.	Participating in the discussions, work tasks during classes - analysis of case studies, seminars, written exam

Način rada

Obveze nastavnika

Teaching (lectures and seminars), maintaining consultation, provision of teaching materials; help with creating seminars; organization and conduct examinations

Obveze studenta

Class attendance; writing essays; literature search and interpretation of scientific papers; presentation of seminar papers; exam

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Polaganje ispita

Elementi praćenja	Maksimalno bodova ili udio u ocjeni	Bodovna skala ocjena	Ocjena	Broj sati izravne nastave	Ukupni broj sati rada prosječnog studenta	ECTS bodovi
Attending classes				25	30	1
Seminar work	25			5	30	1
Written exam	75	<60% 60-70% 71-80% 81-90% 91-100%	Nedovoljan (1) Dovoljan (2) Dobar (3) Vrlo dobar (4) Izvrstan (5)		30	1
Total	100			30	90	3

Elementi praćenja	Opis	Rok	Nadoknada
Seminar work	The structure and content of the written work 50% of the knowledge of matter and the quality of presentations 50%		

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Tjedni plan nastave

1. Introduction and energy transformation L - Introduction. Aims of plant ecophysiology. Main principles of plant ecophysiology. Interactions. Solar radiation. Radiation, environment temperature and leaf temperature.
2. Dry matter production and utilization of carbon L - Review of photosynthesis. Photosynthesis and environment. The impact of stressors on the photosynthetic system. Phloem transport.
3. Dry matter production and utilization of carbon L - Review of photosynthesis. Photosynthesis and environment. The impact of stressors on the photosynthetic system. Phloem transport. Water stress.
4. Plant productivity and water use efficiency L - Respiration-review. Respiration and influence of environmental factors. Water regime-review. The role of root system in water uptake. Water regime and influence of environmental factors. Water stress.
5. Plant productivity and water use efficiency L - Respiration-review. Respiration and influence of environmental factors. Water regime-review. The role of root system in water uptake. Water regime and influence of environmental factors. Water stress.
6. Plant productivity and mineral nutrition L - Mineral nutrition - review. Mechanism of nutrient uptake and nutrient deficit. Nutrient toxicity.
7. Plant productivity and mineral nutrition L - Mineral nutrition - review. Mechanism of nutrient uptake and nutrient deficit. Nutrient toxicity.
8. Growth regulation L - Plant growth. Role of phytohormones in plant growth. Regulation of plant growth and development. Influence of environmental factors on plant growth. Growth stages. Vegetative and reproductive stage. Influence of environmental factors on plant life cycle.
9. Growth regulation L - Plant growth. Role of phytohormones in plant growth. Regulation of plant growth and development. Influence of environmental factors on plant growth. Growth stages. Vegetative and reproductive stage. Influence of environmental factors on plant life cycle.
10. Plants in stress conditions L - Definition of stress. Symptoms and disorders. Natural causes of stress (radiation, extreme temperature, lack of water, salts). Anthropogenic stressors.
11. Plants in stress conditions L - Definition of stress. Symptoms and disorders. Natural causes of stress (radiation, extreme temperature, lack of water, salts). Anthropogenic stressors.
12. Plants in stress conditions, Biotic interactions L - Definition of stress. Symptoms and disorders. Natural causes of stress (radiation, extreme temperature, lack of water, salts). Anthropogenic stressors. Plant interactions. Allelopathy, competition. Symbionts, pathogens, parasites. Ecosystems and ecophysiology.
13. Biotic interactions, Seminars L+S - Plant interactions. Allelopathy, competition. Symbionts, pathogens, parasites. Ecosystems and ecophysiology; Oral/written
14. Seminars S - Oral/written
15. Seminars S - Oral/written

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Obvezna literatura

1. Larcher, W. (1995) Physiological Plant Ecology. Third edition. Springer-Verlag Berlin Heidelberg New York
2. Taiz, L. and Ziger, E. (1991) Plant Physiology. Benjamin/Cummings, Redwood City, California, U.S.A.
3. Park, N.S. (1999) Physicochemical and Environmental Plant Physiology. Second edition. Academic Press.
4. Penning de Vries, F.W.T, Jansen, D.M., H.F.M ten Berge and A. Bakema. (1989) Simulation of ecophysiological processes of growth in several annual crops. Pudoc. Wgeningen.

Preporučena literatura

1. Poljak, M. (2002): Fiziologija bilja, Interna skripta. 1-178. Zagreb
2. Lange, O.L., Kappen, L. Schulze, E.D. (1976) Water and Plant Life. (Ecological Studies, v.19). Springer-Verlag Berlin Heidelberg New York.

Sličan predmet na srodnim sveučilištima

- Ekofiziologija in mineralna prehrana hortikulturnih rastlin, Univerza v Ljubljani, Biotehniška fakulteta. □ □
- Crop - Environment Interactions (3703-430), University of Hohenheim
- Agroecology, BOKU

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