

Agricultural eco-physiology (1st YEAR, 2nd SEMESTER)

Credit value (ECTS) 5

Course category

Domain (Imposed)

Course holder:

PhD, Lecturer Cristina SLABU

Discipline objectives (course and practical works)

The aim of the course is students' acquisition of the theoretical basis of knowledge in the domain of agricultural eco-physiological, knowing and understanding the role of abiotic environmental factors in the development of fundamental physiological processes in the plants: nutrition, water regime, growth and development and the resistance mechanisms at the abiotic stress.

Practical training aims are to teach the students how to implement the scientific research in the field and laboratory and to correctly use the laboratory equipment for analyses or measurements.

Also, it is considered, that the students will acquire the ability to correctly and conclusively interpret the scientific results and to displaying them in eloquent form, in PowerPoint or other presentations programs.

Contents (syllabus)

Course (chapters/subchapters)
Introduction in the ecophysiology of crop plants: definition, aims and research methodology.
Eco-physiological role of water in the plant life: water as environmental factor; physiological functions of water in the plants; osmotic behaviour of plant cell; influence of environmental factors on the physiological processes of absorption, transport and eliminating of water in and out of the plants.
The plants and the environmental carbon balance: C3, C4 and CAM pathways in the photosynthetic carbon assimilation; photosynthesis under effect of the environmental factors; photorespiration
The environment and the mineral nutrition of plants: physiological role of mineral nutrients in plants; mineral nutrient absorption and circulation under effect of environmental condition; plant growth on infertile soils; the excessive fertilizers utilization and that physiological and environmental impacts.
Plant growth under effect of different environmental conditions: cells and plant organs growth; growth regulators.
Plants development effect of the environmental factors: flowering and fruition; vernalization; photoperiodicity.
Plants and abiotic environmental factors: physiology of stress resistance; physiological reaction of plants to extreme temperatures, drought, soil salinity, air and soil pollution.
Practical works
Laboratory presentation: safety rules; laboratory equipment and utensils; fair practices in laboratory work; techniques of field and controlled-condition experiments.

The photosynthesis of the agricultural plants under water and saline stress: determination of photosynthetically activity, analyse of chlorophyll concentration in the leaves, determination of stomatal conductance.

Physiological reaction of plants under drought stress: microscopic observation of stomata; determination of foliar dehydration rate, determination of the osmotic pressure of cellular juice.

Physiological reaction of plants under saline stress: proline analysis in the different plants tissue, analysis of total chlorophyll concentration.

Final colloquium for knowledge evaluation. Presentation and discussions of the experimental results.

Bibliography

1. Atanasiu L. – *Ecofiziologia plantelor*. Ed. Științifică și Enciclopedică, București, 1984.
2. Bergman W. – *Nutritional disorders of plants. Development visual and analytical diagnosis*. Ed. Gustav Fischer Jena, 1992.
3. Burzo, I.; Dobrescu, Aurelia. *Fiziologia plantelor de cultură*, Vol. II: Fiziologia culturilor de câmp. Ed. Știința, Chișinău, 2005.
4. Jenks M. A., Hasegawa P. M. (Eds.) – *Plant abiotic stress*. Ed. John Wiley & Sons, 2008.
5. Jitoreanu Carmenica Doina – *Fiziologia plantelor*. Ed. "Ion Ionescu de la Brad", Iași, 2007.
6. Jitoreanu Carmenica Doina, Slabu Cristina, Marta Alina Elena – *Bazele practice ale fiziologiei vegetale*, USAMV Iași, 2014.
7. Jones H. G. – *Plants and microclimate: a quantitative approach to environmental plant physiology*. Ed. Cambridge University, 2013.
8. Larcher W. – *Physiological plant ecology: ecophysiology and stress physiology of functional groups*. Ed. Springer Science & Business Media, 2003.
9. Marschner P. – *Marschner's mineral nutrition of higher plants*. Academic press., 2011.
- 10 Schubert, S., Horst, W., Schenk, M. K. (Eds.), 2006 – *Plant Nutrition: Food security and sustainability of agro-ecosystems through basic and applied research* (Vol. 92). Springer Science & Business Media.
11. Șumălan R. – *Fiziologie vegetală*. Ed. Eurobit, Timișoara, 2006.

Evaluation

Evaluation form	Evaluation methods	Percentage of the final grade
Exam	Oral examination	60%
Appreciation of the activity during the semester	Oral assessment during the semester, verification tests and final laboratory colloquium.	40%

Contact

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