***TEMATICA PENTRU EXAMEN***

***PENTRU POSTUL NR.10, CONFERENȚIAR,***

***din statul de funcțiuni al Departamentului de Horticultură***

***pe anul universitar 2020-2021***

**1. Plant physiology**

1. Fundamental characteristics of the plants’ life: autotrophy, onmipotency, reproduction cycle, metabolic self-regulation, adaptability to environmental conditions.
2. Water relations of plants. Absorption and xylem transport of water, regulation of stomatal transpiration. Osmoregulation and the physiological background of drought resistance and tolerance.
3. Photosynthesis: its role in the global energetics of the living world and in the primary production of organic nutrients. The main phases of photosynthesis: the light reactions and the assimilation of carbon dioxide. Mechanisms of harvesting and conversion of light energy by photosynthetic pigments, regulation of photochemical processes under varying light conditions.
4. Functional characteristics of the photosystems, generation of reducing power and of chemical energy storage. Photosynthetic electron transport pathways and the photophosphorylation.
5. Photosynthetic carbon metabolism. Biosynthesis of new organic compounds in the Calvin cycle. Photorespiration. Adaptive roles of the C4 and CAM carbon assimilation pathways. Influence of environmental factors on photosynthesis.
6. Translocation and storage of organic nutrients in plants, intermediary metabolism of carbohydrates and lipids in crop plants.
7. Secondary metabolism of plants and the physiological functions of active compounds. Plant terpenoids, phenolics and secondary nitrogen compounds.
8. The mineral nutrition of plants. Physiological functions of essential macro- and microelements. Physiological background of hydroponic cultures, aeroponic cultures and of the administration of fertilizers.
9. Nitrogen metabolism in plants. Nitrate reduction, assimilation of ammonium, simbyosis with nitrogen-fixing bacteria, intermediary metabolism of amino acids and storage of plant proteins, nitrogen mixotrophy and the internal nitrogen cycle of plants.
10. The main developmental phases in the life cycle of vascular plants. Asexual and sexual reproduction. Sporogenesis, gametogenesis, pollination and fecundation in flowering plants. Embryogenesis and endospermatogenesis during seed development.

**Sources of documentation:**

1. Barker, A.V., Pilbeam, D.J. (2015): Handbook of Plant Nutrition, CRC Press, Boca Raton
2. Burzo, I., Toma, S., Crăciun, C., Voican, V., Dobrescu, A., Delian, E. (1999): Fiziologia Plantelor de Cultură, Întreprinderea Editorial-Poligrafică Știința, Chișinău
3. Dobrotă, C. (2010): Fiziologia Plantelor, Editura Risoprint, Cluj-Napoca
4. Durner, E.F. (2013): Principles of Horticultural Physiology, CABI, Oxfordshire
5. Erdei L. (2004): Növényélettan II. Növekedés- és Fejlődésélettan, Editura JATEPress, Szeged
6. Fodorpataki L. (2004): A Növények Fotoszintézise, Editura Kriterion, Cluj-Napoca
7. Fodorpataki L., Szigyártó L. (2013): A Növények Ökofiziológiájának Alapjai, Editura Kriterion, Cluj-Napoca
8. Fodorpataki L., Szigyártó L. (2008): A Növények Szaporodása és a Mesterséges Növényszaporítás Biotechnológiai Alkalmazásai, Editura Universitară Clujeană, Cluj-Napoca
9. Fodorpataki L., Szigyártó L., Bartha Cs. (2009): Növénytani Ismeretek, Editura Scientia, Cluj-Napoca
10. Láng F. (2000): Növényélettan I. A Növényi Anyagcsere, Editura ELTE Eötvös Kiadó, Budapesta
11. Raven, P.H., Evert, R.F., Eichhorn, S.E. (1999): Biology of Plants, Freeman Publ., New York
12. Scott, P. (2008): Physiology and Behaviour of Plants, Editura Wiley, Sussex
13. Taiz, L., Zeiger, E., Moller, I.M., Murphy, A. (2018): Fundamentals of Plant Physiology, Oxford University Press, New York

**2. Effects of abiotic stress factors on plants**

1. The role of antistress metabolites in optimization of plant production.
2. Physiological markers of the influence of abiotic stress factors which alter plant production
3. Post-translational processes of environmental stress tolerance: ubiquitination, sumoylation, glutathionylation
4. Phases of the antistress reaction in physiological processes of plants, resistance and tolerance against abiotic stress factors, the roles of priming and of hardening in the creation of crop plant varieties with enhanced stress tolerance
5. Mechanisms of tolerance of photo-oxidative stress associated with photosynthesis
6. Molecular processes in plants during acclimation to hypoxic stress caused by flooding
7. Salt stress and salinity tolerance in crop plants
8. Basic mechanisms of drought tolerance in plants, selection markers for drought tolerant cultivars
9. Stress reactions in plants caused by extreme temperatures
10. Mechanisms of plant defense against the toxicity of heavy metals and herbicides

**Sources of documentation:**

1. Ahmad, P., Prasad, M.N.V. (2012): Abiotic Stress Responses in Plants. Metabolism, Productivity and Sustainability, Springer, New York
2. Fodorpataki L., Szigyártó L. (2013): A Növények Ökofiziológiájának Alapjai, Kriterion, Cluj-Napoca, pp. 329-446
3. Gaur, R.K., Sharma, P. (2014): Molecular Approaches in Plant Abiotic Stress, CRC Press, Boca Raton
4. Jenks, M.A., Hasegawa, P.M. (2014): Plant Abiotic Stress, Wiley Blackwell, Ames
5. Kanayama, Y., Kochetov, A. (2015): Abiotic Stress Biology in Horticultural Plants, Springer, Tokyo
6. Pareek, A., Sopory, S.K., Bohnert, H., Govindjee (2010): Abiotic Stress Adaptation in Plants, Springer, Dordrecht
7. Rout, G.R., Das, A.B. (2013): Molecular Stress Physiology of Plants, Springer, New Delhi
8. Shanker, A.K., Venkateswarlu, B. (2011): Abiotic Stress Response in Plants – Physiological, Biochemical and Genetic Perspectives, InTech, Rijeka
9. Tuteja, N., Gill, S.S. (2014): Climate Change and Plant Abiotic Stress Tolerance, Wiley Blackwell, Weinheim