

فسيولوجيا اجهادات متقدم
Advanced Stress Physiology
671 BOT

King Saud University
 Botany and Microbiology Department

Course Name: Advanced Stress Physiology

No. and Code: 671 Bot.

Credit hours: 2 (2+0)

Lecturer: Dr. Ahlam, A.Al Watban

Office room 295

First Term 1436/1437 H.

Grading and Schedule of Course

Lecture # 1: Environmental stress factors, Factors effect on plants growth,
 development and metabolism, stressing

Lecture # 2 and 3: Drought stress

Lecture # 4: Heat stress

Lecture # 5: week (#5) First Term Test (10 points)

Lecture # 6 and 7: Radiation stress

Lecture # 8 and 9: Salt Stress

Lecture # 10: Other stress factors

Lecture # 11 and 12: Discussion of term papers

Lecture # 13: week (#13) Second Term Test (10 points)

Topics:

- 1- Mechanism of physiological and metabolic adaptations
- 2- Improvement of growth and yield of crops under stress conditions
- 3- Desert and halophytes physiology
- 4- Free Reading assignments

These topics will be covered and discussed during the main Lectures.

Free Reading assignments: Posted in my site:

- a- light and UV radiation
- b- Visible light
- c- Plant heat-shock proteins
- d- Salinity and antioxidants
- e- Phenols and Oxidative Stresses

Term Paper* (30 points)

Translation assignment* (10 points)

*** Should be handed one week before University Lab exams.**

Final Exam covers all lectures and (Free reading) assignments (40 points)

References:

A--For basic information about Plant Stress Physiology.

- Al-Helal, A.A. (1420H). *Physiology of Plants under drought and salt stress*. Scientific Publications, KSU Press, Riyadh, (Arabic).
- Fitter, A.H. and Hay, R.K.M. 1981. *Environmental Physiology of Plants*. Academic Press. New York.
- Jenks, M. A., & Hasegawa, P. M. (Eds.). (2005). *Plant abiotic stress*. Blackwell publishing.
- Larcher, W. 1980. *Physiological Plant Ecology*. 2nd. Ed. Springer-Verlag Berlin.
- Levitt, J. 1980. *Responses of Plants to Environmental Stresses. Vol. II. Water, Radiation, Salt and Other Stresses*. 2nd Ed. Academic Press, Inc. New York and London.
- Nilsen, E.T. And Orcutt, D.M. 1996 *The Physiology of Plants Under Stress, Abiotic Factors (Physiology of Plants Under Stress Vol. 1)*. Wiley. ISBN: 0471031526
- Orcutt, D.M and Nilsen, E.T. 2000. *The Physiology of Plants Under Stress : Soil and Biotic Factors*. Wiley. ISBN: 0471170089

B--Periodicals for advanced readings:

Many organization (kacst), periodicals (am. J. botany), and libraries (bl) offer search capabilities and offer ABSTRACTS of the paper free.

Examples:

- Fernandez, O., Béthencourt, L., Quero, A., Sangwan, R. S., & Clément, C. (2010). Trehalose and plant stress responses: friend or foe?. *Trends in plant science*, 15(7), 409-417.
- Foyer, C. H., & Shigeoka, S. (2011). Understanding oxidative stress and antioxidant functions to enhance photosynthesis. *Plant physiology*, 155(1), 93-100.

- Gill, S. S., & Tuteja, N. (2010). Reactive oxygen species and antioxidant machinery in abiotic stress tolerance in crop plants. *Plant Physiology and Biochemistry*, 48(12), 909-930.
- Kosová, K., Vítámvás, P., Prášil, I. T., & Renaut, J. (2011). Plant proteome changes under abiotic stress—contribution of proteomics studies to understanding plant stress response. *Journal of Proteomics*, 74(8), 1301-1322.
- Peleg, Z., & Blumwald, E. (2011). Hormone balance and abiotic stress tolerance in crop plants. *Current opinion in plant biology*, 14(3), 290-295.
- Potters, G., Horemans, N., & Jansen, M. A. (2010). The cellular redox state in plant stress biology—a charging concept. *Plant Physiology and Biochemistry*, 48(5), 292-300.
- Suzuki, N., Koussevitzky, S. H. A. I., Mittler, R. O. N., & Miller, G. A. D. (2012). ROS and redox signalling in the response of plants to abiotic stress. *Plant, Cell & Environment*, 35(2), 259-270.
- Zinn, K. E., Tunc-Ozdemir, M., & Harper, J. F. (2010). Temperature stress and plant sexual reproduction: uncovering the weakest links. *Journal of Experimental Botany*, 61(7), 1959-1968.

C--Browse through internet many sites such as:

<http://cdroms.kacst.edu.sa/>

<http://www.amjbot.org/>

<http://www.bl.uk/>

<http://www.plantstress.com/>

<http://www.encyclopedia.com/doc/1O6-abioticfactor.html>