

Environmental Physiology of Plants

Special Subjects
Elective 2 credit

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1. Course Description

We will highlight certain aspects of how plants adapt and respond to fluctuating environmental factors such as light intensity and quality, temperature, water availability, air quality, mineral nutrient and trace element concentrations, salinity, and soil chemical environment. We will also assess the consequences, which include the control of growth and development, cytoplasmic movement, stress-stimulated responses, cell signaling processes, and plant-pathogen interactions.

2. Course Objectives

The goal of Environmental Physiology of Plants is to acquire an understanding of key concepts of the growth and differentiations of the plants at the molecular level responding to the fluctuating environmental factors.

3. Grading Policy

The learning results are evaluated with academic performance of the review (70%) and discussion(30%).

4. Textbook and Reference

Textbook

Edited by Lincoln Taiz and Eduardo Zeiger (2018) Plant Physiology and Development, 6th Revised edition

Sinauer Associates Inc., Product Code: 9781605357454

5. Requirements(Assignments)

A discussion leader is appointed each session, and is required to prepare for the next lecture to discuss in the lecture.

6. Note

7. Schedule

- [1] Introduction to the Course and plant cell structure
- [2] Water balance of plants
- [3] Mineral nutrition
- [4] Photosynthesis - The light reactions
- [5] Photosynthesis - The carbon reactions
- [6] Photosynthesis - The physiological and ecological reactions
- [7] Translocation in the phloem
- [8] Respiration and lipid metabolism
- [9] Gene expression and signal transduction in plants
- [10] Structure and function of cell walls
- [11] Growth and development
- [12] Phytochrome and light control of plant development
- [13] Blue-light responses - Morphogenesis and stomatal movement
- [14] Control of flowering
- [15] Responses and adaptations to abiotic stresses
The subjects and schedule may be adjusted as the course progresses depending on the needs and interests of the students.