UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

COURSE SYLLABUS

Plant Physiology

2324-3-E1301Q055

Aims

Aim of the course is to familiarize students with the main aspects of plant physiology and biochemistry.

1. Knowledge and understanding: by the end of the course students will have acquired knowledge of the main physiological and biochemical processes of plants;
2. Applying knowledge and understanding: the learned concepts will providing an understanding of the fundamental role of plants in the environment and to envisage their possible applications within different fields of biology;
3. Critical thinking: by the end of the course students will be able to understand physiological mechanisms of plants and their biochemical processes and be able to correctly identify relationships between these two aspects;
4. Communication skills: at the end of the course students wil have acquired an adequate scientific language and will be able to properly explain the treated topics.
5. Communication skills: at the end of the course students will be able to read the scientific literature and will have the capacity to pursue further personal studies.

Contents

Aspects of plant physiology and biochemistry, which will include the the uptake and movement of water at the cellular and tissue level, transport and assimilation of essential nutrients, photosynthesis and cellular respiration and metabolism, the assimilation of nitrogen and sulfur, phytohormones, and the biochemistry of seed germination and seedling orientation in response to environmental signals.

Detailed program

Uptake and translocation. Plant water relations - Soil and water potential. Water movement. Transpiration and stomata regulation. Ion and solute uptake at the cell level. Phloem translocation. Nutrient uptake.
Photosynthesis: Photochemistry, Calvin cycle and photorespiration. Regulation of Calvin cycle. CO2 concentrating mechanisms (pumps, C4 and CAM plants).
Nitrogen (nitrate, ammonium, symbiosis) and sulfur assimilation .
Plant hormones: general aspects. Auxin: Structure, biosynthesis, catabolism and transport, physiological effects, molecular mechamism of cell enlargement and tropisms; gibberellins, cytokinins, abscisic acid, ethylene, brassinosteroids.
Seed germination. Plant orientation.

Prerequisites

No prerequisites. Useful background: botany, biological chemistry

Teaching form

Lectures (6 CFU).

Textbook and teaching resource

L. Taiz, E. Zeiger, Fisiologia Vegetale, IV Italian Edition, Piccin Editore

Mauseth J.D. "Botanica. Fondamenti di biologia delle piante" - Idelson-Gnocchi, 2020

Semester

First

Assessment method

Written
The written portion of the exam will consist of 6 questions: 2 concentrating on the first part of the course (asorption and translocation of water and nutrients) and 4 on the second part of the course (photosynthesis, plant hormones).

Office hours

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Sustainable Development Goals

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