



The Hebrew University of Jerusalem

Syllabus

AGING AND PROGRAMMED CELL DEATH IN PLANTS - 71917

Last update 02-05-2024

HU Credits: 2

Degree/Cycle: 2nd degree (Master)

Responsible Department: Plantsciences in Agriculture

Academic year: 0

Semester: 2nd Semester

Teaching Languages: English

Campus: Rehovot

Course/Module Coordinator: Dr. Dani Eshel

Coordinator Email: dani@agri.gov.il

Coordinator Office Hours: Tuesday 13:00-14:00

Teaching Staff:

Dr. Dani Eshel

Course/Module description:

In recent years, significant advances have been made in studying the biological basis for physiological maturation, aging, and programmed cell death processes and their importance for developing and surviving various organisms, including plants. The accumulated knowledge about the programmed cell death process and apoptosis across multiple animal systems indicates vital significance for organism development and significant involvement in developing various diseases such as cancer. Understanding the mechanisms underlying these processes is still limited in plants, relative to animal systems. With the advancement of research and a better understanding of maturation processes, programmed cell death and plant aging are becoming increasingly recognized for their involvement and importance in plant development and their response to environmental stress. Scientists active in this field believe that there is a direct connection of these issues to various agricultural aspects such as crop quality and yield.

Course/Module aims:

The general aim of this course is to study the biological processes associated with physiological maturation, aging, programmed cell death, and senescence in plants and their involvement with plant development and the ability to cope with environmental stresses, biotic and abiotic.

Learning outcomes - On successful completion of this module, students should be able to:

The course will include a comprehensive overview of the current knowledge and understanding of such processes at the physiological, biochemical, and molecular levels. The relationships to applied agricultural aspects will be discussed, including developing applied strategies designed to maintain the quality of fresh produce during growth or postharvest.

Attendance requirements(%):

85% attend classes or online classes.

Teaching arrangement and method of instruction: Encouragement for discussion and questions. Reference to current research approaches and research tools. Articles from the scientific field for reading and discussion.

Course/Module Content:

Introduction that includes field importance and defining terms.

The cell life cycle and cell death processes are programmed as developmental and controlled processes.

Types of cell death and their characterization: Recognition of various characteristics and research tools in the definition and study of programmed cell death processes in plants.

Protease involvement in programmed cell death processes.

The similarity/difference to apoptosis.

Oxidative stress and the antioxidant system in programmed cell death processes in plants.

Hormone involvement and hormonal balance in stress and programmed cell death in plants.

Dormancy as an escape strategy from death

Cell death involvement in plant development and its coping with abiotic stresses.

Programmed Cell death in plant-pathogen interaction.

Autophagy as a process of mortality or recycling in plant cells.

The role of cell death in biodegradable processes that occur postharvest.

The process of aging leaves and flowers in plants as a genetically active and controlled process.

Required Reading:

The lecture material is detailed on the course website and several recent articles from the field on the course website.

Additional Reading Material:

Grading Scheme:

Written / Oral / Practical Exam 100 %

Additional information: