

Code: 1330 Biology of Biotic Stress**Degree:** 2nd cycle - Functional Biology**Curricular Year:** 1st**Credits:** 6 ECTS**Semester Course:** 2nd**Compulsory****Language:** Portuguese/English**Responsible:** Maria Helena Mendes da Costa Ferreira Correia de Oliveira**Other lecture(s):** Arlindo Lima and Ricardo Manuel Seixas Boavida Ferreira**Web Site:** <http://www.isa.utl.pt/home/node/3770>**1. Contact hours:****Lectures 28 Practicals/Laboratory 42 Others 14 Total 84****2. Objectives:**

- to provide the students with fundamental concepts and current status of knowledge on the physiology, biochemistry and molecular biology of host-pathogen interactions during biotic stress.
- to give practical experience with the most common experimental methods on the plant-pathogen interaction studies
- to train the students in the understanding and evaluation of the pertaining literature
- to promote independent thought, and develop communication skills (oral and written).

3. Programme:

BIOTIC STRESSORS, HOSTS AND ENVIRONMENT. Types of plant pathogens (virus, prokaryotes, fungi, fungi-like organisms, nematodes). Plant disease concept, host and nonhost plant, host range of pathogens. Parasitism and pathogenicity. Types of parasites: biotrophs, necrotrophs and hemibiotrophs. Disease cycle. The infection process and disease. Representative disease cycles. Other biotic stressors (insects and similar organisms, the insect-pathogen connection).

PLANT-PATHOGEN INTERACTIONS. Pathogen attack strategies (mechanical forces and chemical weapons). Disruption of plant functions (photosynthesis, respiration, absorption and translocation, alteration of cell permeability, transcription and translation). Plant defense response: Genetic basis of plant-pathogen interactions: nonhost resistance; horizontal and vertical resistance; the gene-for-gene concept, avirulence (*avr*) vs resistance (*R*) genes. Preformed defenses, and pathogen-induced defenses (non-specific and race-specific elicitors, the elicitor-receptor model; signal transduction pathways). Hypersensitive response (HR) and programmed cell death. Induced resistance (defense pathways dependent on SA, JA, ET, NO, cross talk).

CASE-STUDIES: Seminars on specific interactions of plant-bacteria, plant-fungi, plant-viruses, plant-arthropodes.

4. Bibliography:**Main Bibliography**Agrios, G. 2005. Plant Pathology. 5th Ed. Elsevier-Academic Press, San Diego, 922 pp.

Trigiano, R. N., Windham, M.T. and Windham, A.S.(Eds). 2007. Plant Pathology: Concepts and Laboratory Exercises, 2nd Ed, CRC Press LLC, Boca Raton, FL.

Other Bibliography

Articles on selected subjects.

5. Assessment:**Frequency:** presence in 75% of the classes**Grading**

a. Lecture exams: 50%:

Laboratory Report: 25%

Seminar: 20%

Active participation in classes: 5%

b. Final Exam: students must have frequency to apply

Final grade: students with a minimal grade of 10 (in 20) will be approved; it is obligatory to obtain a minimal grade of 10 (in 20) in the Lecture exams.**6. Estimated Workload:**

168 Hours

7. Last Update:

14/7/2010

