

Module Name Molecular Plant-Microbe Interactions						
Type of Module ○ Advanced Module				Module Code Molecular Plant-Microbe Interactions		
Identification Number MN-B-SM (P 4)	Workload 360 h	Credit Points 12 CP	Term 2 nd term of studying	Offered Every Summer term	Start summer term only	Duration 7 weeks
1	Course Types a) Lectures b) Practical/Lab c) Seminar		Contact Time 12 h 162 h 6 h	Private Study 24 h 132 h 24 h	Planned Group Size max. 12 max. 4 max. 3	
2	Module Objectives and Skills to be Acquired Students who successfully completed this module <ul style="list-style-type: none"> • have gained in-depth knowledge of state-of-the-art technology for plant-microbe interaction research particularly on plant immune response and its evasion by plant associated microbes as well as different approaches for localization and functional characterization of fungal effector-proteins. • are able to use modern techniques in advanced molecular mycology, biochemistry, basic bioinformatic and genetics (see contents of the module). • can independently carry out small scientific projects related to the topic of the module. • have learned how to present research results in oral and written form and to critically discuss scientific publications related to the topic of the module on a professional level. • are able to transfer skills acquired in this module to other fields of biology. 					
3	Module Content <ul style="list-style-type: none"> • Modern concepts and methods in molecular plant-microbe interactions (also used in other sciences) • Bioinformatic analysis of gene expression data • Bioinformatic analysis/prediction of protein function and structure • Advanced techniques of fluorescence microscopy (confocal microscopy with different staining methods, life-cell-imaging, 3-dimensional projection) including sample preparation • Plant colonization and disease or growth promotion scoring • Expression and purification of recombinant proteins • Biochemical analyses of beneficial and pathogen-effector proteins • <i>In-vivo</i> detection of plant immune responses and their inhibition by effectors • Basic techniques of molecular cloning (DNA preparation, transformation, ligation, RNA synthesis) • Basic protein techniques (PAGE, Western blotting) 					
4	Teaching Methods Lectures; Practical/Lab (Project work); Seminar; Guidance to independent research; Training on presentation techniques in oral and written form					

5	<p>Prerequisites (for the Module) Enrollment in the Master´s degree course “Biological Sciences”</p> <p>Additional academic requirements Previous attendance of the lecture module “Molecular Plant and Microbial Sciences (P)”.</p>
6	<p>Type of Examination The final examination consists of two parts: written examination on topics of lectures, seminars and the practical/lab part (1 hour; 50 % of the total module mark), oral presentation (20-30 min; 50 % of the total module mark)</p>
7	<p>Credits Awarded Regular and active participation Each examination part at least “sufficient” (see appendix of the examination regulations for details)</p>
8	<p>Compatibility with other Curricula None</p>
9	<p>Proportion of Final Grade 15 % of the overall grade (see also appendix of the examination regulations)</p>
10	<p>Module Coordinator Prof. Dr. Alga Zuccaro, phone 470-7170, e-mail: azuccaro@uni-koeln.de</p>
11	<p>Further Information</p> <p>Subject module of the Master´s degree course “Biological Sciences”, Specialization: (P) Molecular Plant and Microbial Sciences</p> <p>Participating faculty: Prof. Dr. G. Döhlemann, Dr. G. Langen, Dr. J. Misas-Villamil, Prof. Dr. A. Zuccaro</p> <p>Literature:</p> <ul style="list-style-type: none"> • Information about textbooks and other reading material will be given on the ILIAS representation of the course (https://www.ilias.uni-koeln.de/ilias/goto_uk_cat_2815610.html) <p>General time schedule: Week 1-5 (Mon.-Fri.): Lectures, 4 weeks of practical/lab, 1 week of bioinformatics and preparation for the seminar talk; Week 6 (Mon.-Fri): Writing seminar paper; Week 7 (Mon.-Fri): Preparation for the written examination; The seminar talks will be held in Week 5 or 6 – the precise date will be communicated during the introduction to the module.</p> <p>Note: The module contains hand-on laboratory work conducted by small groups of students and is taught in course rooms or research laboratories depending on the number of students. The module does not contain computer-based practicals/research as a main component.</p> <p>Introduction to the module: May 22, 2023 at 09:00 a.m., Cologne Biocenter, room 4.002 (fourth floor); for preparation to the module before this introduction see ILIAS link under literature.</p> <p>Written examination: July 14, 2023, second/supplementary examination August 25, 2023; the latter date may vary if students and module coordinator agree. More details will be given at the beginning of the module.</p>