

<b>Module Name</b> Molecular Plant-Microbe Interactions						
<b>Type of Module</b> ○ Advanced Module				<b>Module Code</b> Molecular Plant-Microbe Interactions		
<b>Identification Number</b> MN-B-SM (P 4)	<b>Workload</b> 360 h	<b>Credit Points</b> 12 CP	<b>Term</b> 2 <sup>nd</sup> term of studying	<b>Offered Every</b> Summer term, 2 <sup>nd</sup> half	<b>Start</b> Summer term only	<b>Duration</b> 7 weeks
<b>1</b>	<b>Course Types</b> a) Lectures b) Practical/Lab c) Seminar		<b>Contact Time</b> 12 h 162 h 6 h		<b>Private Study</b> 24 h 132 h 24 h	
<b>2</b>	<b>Module Objectives and Skills to be Acquired</b> Students who successfully completed this module <ul style="list-style-type: none"> <li>• 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.</li> <li>• are able to use modern techniques in advanced molecular mycology, biochemistry, basic bioinformatic and genetics (see contents of the module).</li> <li>• can independently carry out small scientific projects related to the topic of the module.</li> <li>• 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.</li> <li>• are able to transfer skills acquired in this module to other fields of biology.</li> </ul>					
<b>3</b>	<b>Module Content</b> <ul style="list-style-type: none"> <li>• Modern concepts and methods in molecular plant-microbe interactions (also used in other sciences)</li> <li>• Bioinformatic analysis of gene expression data</li> <li>• Bioinformatic analysis/prediction of protein function and structure</li> <li>• Advanced techniques of fluorescence microscopy (confocal microscopy with different staining methods, life-cell-imaging, 3-dimensional projection) including sample preparation</li> <li>• Plant colonization and disease or growth promotion scoring</li> <li>• Expression and purification of recombinant proteins</li> <li>• Biochemical analyses of beneficial and pathogen-effector proteins</li> <li>• <i>In-vivo</i> detection of plant immune responses and their inhibition by effectors</li> <li>• Basic techniques of molecular cloning (DNA preparation, transformation, ligation, RNA synthesis)</li> <li>• Basic protein techniques (PAGE, Western blotting)</li> </ul>					

4	<p><b>Teaching Methods</b></p> <ul style="list-style-type: none"> <li>Lectures; Practical/Lab; Seminar; Guidance to independent research; Training on writing and presentation techniques in oral and written forms</li> </ul>
5	<p><b>Prerequisites (for the Module)</b></p> <p>Enrollment in the Master's of Science degree course "Molecular Plant and Microbial Sciences"</p> <p><b>Additional academic requirements</b></p> <p>Previous attendance of the lecture module Molecular Plant and Microbial Sciences</p>
6	<p><b>Type of Examination</b></p> <p>The final examination consists of two parts: Two hour written examination on topics of lectures, seminars and the practical/lab part (50 % of the total module mark), oral presentation (20-30 min; 50 % of the total module mark)</p>
7	<p><b>Credits Awarded</b></p> <p>Regular and active participation; Each examination part at least "sufficient" (see appendix of the examination regulations for details)</p>
8	<p><b>Compatibility with other Curricula</b></p> <p>None</p>
9	<p><b>Proportion of Final Grade</b></p> <p>12.0 %</p>
10	<p><b>Module Coordinator</b></p> <p>Prof. Dr. Alga Zuccaro, phone 470 7170, e-mail: <a href="mailto:azuccaro@uni-koeln.de">azuccaro@uni-koeln.de</a></p>
11	<p><b>Further Information</b></p> <p><b>Participating faculty:</b> Prof. Dr. G. Döhlemann, Dr. G. Langen, Dr. J. Misas-Villamil, Prof. Dr. A. Zuccaro, Dr. N. Dunken</p> <p><b>Literature:</b></p> <ul style="list-style-type: none"> <li>Information about textbooks and other reading material will be given on the ILIAS representation of the course (see <a href="https://www.ilias.uni-koeln.de/ilias/goto_uk_cat_2815610.html">https://www.ilias.uni-koeln.de/ilias/goto_uk_cat_2815610.html</a>)</li> </ul> <p><b>General time schedule:</b> Week 1-6 (Mon.-Fri.): Lectures, practical/lab and preparation for the seminar talk (seminar presentation will be held in week 2); Week 7 (Mon.-Fri.): Preparation for the written examination</p> <p><b>Note:</b> 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><b>Introduction to and start of the module:</b> June 8th 2026 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><b>Written examination:</b> July 24, 2026, second/supplementary examination August 28, 2026; the latter date may vary if students and module coordinator agree. More details will be given at the beginning of the module.</p>