

Module Name Molecular Plant Physiology and Biochemistry of Plants and Associated Microbes						
Type of Module ○ Advanced Module				Module Code Molecular Plant Physiology		
Identification Number MN-B-SM (P 3)	Workload 360 h	Credit Points 12 CP	Term 2 nd term of studying	Offered Every Summer term, 2 nd half	Start Summer term only	Duration 7 weeks
1	Course Types a) Lectures b) Practical/Lab c) Seminar		Contact Time 5 h 160 h 10 h		Private Study 15 h 130 h 40 h	
2	Module Objectives and Skills to be Acquired Students who successfully completed this module <ul style="list-style-type: none"> • have acquired detailed knowledge about methods used in plant DNA technology and protein biochemistry as well as knowledge of principles and methods used in molecular plant physiology. • are trained in the use of transgenic approaches and methods to functionally analyze gene products and their impact on plant growth, development, and biotic interactions (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 communicate and discuss ongoing research projects with peers from different research backgrounds. • are able to transfer skills acquired in this module to other fields of biology. 					
3	Module Content <ul style="list-style-type: none"> • Identification and screening of T-DNA insertion lines (primer design, PCR, gDNA) • Generation of transgenic plants and fungi • Pathogenicity assays • Generation of RNAi or artificial micro-RNA constructs • Detection of reporter gene activity • Localization studies of transgenic products • Comparative characterization of mutant lines • Metabolite profiling • DNA-protein interaction studies • Protein-protein interaction studies (co-immunoprecipitation, yeast two hybrid, split YFP) • Nutrient transport studies • Production of recombinant protein in <i>E. coli</i> 					

3	<p>Module Content (continued)</p> <p><i>Explanatory note:</i> The list above comprises state-of-the art biochemical and molecular methods with emphasis on DNA technologies and protein biochemistry that are commonly used in the field of molecular plant physiology. Every student participating in this module will be confronted with a large subset of it. The exact content, however, will depend on the 4.5-week research project the student will work on (lab of Prof. Dr. M. Bucher: molecular physiology of plant-microbe interactions, lab of Prof. Dr. G. Döhlemann: plant immunity and microbial virulence, lab of Prof. Dr. U. Höcker: light signaling and developmental biology, lab of Prof. Dr. S. Kopriva: plant mineral nutrition, lab of Prof. Dr. B. Thomma: fungal pathogenicity, manipulation of host immunity and microbiome manipulation). In addition to individual project work conducted in different research laboratories, all students participate in a weekly research seminar aimed at fostering scientific exchange, interdisciplinary communication, peer feedback, and interaction among the module participants throughout the project phase.</p>
4	<p>Teaching Methods</p> <ul style="list-style-type: none"> Lectures; Practical/Lab (Project work); process-oriented research seminar; Guidance to independent research; Training in scientific communication and presentation techniques in oral and written form
5	<p>Prerequisites (for the Module)</p> <p>Enrollment in the Master's of Science degree course "Molecular Plant and Microbial Sciences"</p> <p>Additional academic requirements</p> <p>Previous attendance of the lecture module Molecular Plant and Microbial Sciences</p>
6	<p>Type of Examination</p> <p>The final examination consists of two parts: Oral presentation (20-30 min; 50 % of the total module mark), written report (50 % of the total module mark)</p>
7	<p>Credits Awarded</p> <p>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</p> <p>None</p>
9	<p>Proportion of Final Grade</p> <p>12.0 %</p>
10	<p>Module Coordinator</p> <p>Prof. Dr. Marcel Bucher, phone 470 2481, e-mail: m.bucher@uni-koeln.de</p>
11	<p>Further Information</p> <p>Participating faculty: Prof. Dr. M. Bucher, Prof. Dr. G. Döhlemann, Prof. Dr. U. Höcker, Prof. Dr. S. Kopriva, Prof. Dr. B. Thomma</p> <p>Literature:</p> <p>Will be provided by the individual supervisors.</p> <p>General time schedule: Week 1-4 (Mon.-Fri.) and Week 5 (Mon.-Wed.): Tutorials and practical/lab; Week 5 (Thu.-Fri.) and Weeks 6 and 7 (Mon.-Fri.): Preparation for the oral presentation (held in week 7) as well as completing the written report</p>

11	<p>Further Information (continued)</p> <p>Note: The module contains hand-on laboratory work conducted individually and is taught in research laboratories. The module does not contain computer-based practicals/research as a main component.</p> <p>Introduction to the module: Online, further information/link will be sent to your Smail-Account. Additional Information on the currently most relevant topics of the module will be send to the participants via e-mail about one week before the practical work starts.</p> <p>Oral examination: July 21 and/or July 22, 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>
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