

Module Name	Module Code
Biocontrol Biotechnology	AEF-agrig014
Module Coordinator	
apl.-Prof. Dr. Ralf-Udo Ehlers	
Organizer	
Institute of Phytopathology - Plant Diseases and Crop Protection	
Faculty	
Faculty of Agricultural and Nutritional Sciences	
Examination Office	
Faculty of Agricultural and Nutritional Sciences - Examination Office	

ECTS Credits	6
Evaluation	Graded
Duration	one semester
Frequency	Only takes place during winter semesters
Workload per ECTS Credit	30 hours
Total Workload	180 hours
Contact Time	60 hours
Independent Study	120 hours
Teaching Language	English

Recommended Requirements			
Fundamental knowledge in plant protection, pests and diseases in agriculture and horticulture, zoology, microbiology			
Module Courses			
Course Type	Course Name	Compulsory/Optional	SWS
Internship	Projects in Biological Control	Compulsory	2
Lecture	Biotechnology in Biological Control	Compulsory	1
Lecture	Biology of Antagonists	Compulsory	1

Examination(s)				
Examination Name	Type of Examination	Evaluation	Compulsory / Optional	Weighting
Oral Examination: Biocontrol Biotechnology	Oral Examination	Graded	Compulsory	100
Further Information on the Examination(s)				
1.+2. period in winter semester 1. period in summer semester examiner: Prof. Dr. Ehlers QIS: 91702 with number of Examination 91710				

Course Content
<p>Successful completion of this module will help you to understand the principles of biological control and its application in agri- and horticulture. It enables you to plan and execute biocontrol concepts including selection of biocontrol agents, mass production, downstream processing and formulation. Teaching at a company facility provides you with an insight into technical and social aspect of technology transfer and economies of scale. You will learn to use molecular tools for genetic improvement of biocontrol traits and application of biocontrol genes in transgenic plants. The module is a unique opportunity to experience exploitation of biodiversity for plant protection by fusing biology with classical and molecular biotechnological tools for development and production of environmentally friendly biocontrol products.</p>
Learning Outcome
<p>Microbial and macrobial biological biocontrol agents, biology, genetics, mass production, formulation, application, ecology, use of genes from biocontrol agents in transgenic crops, genetic improvement of marker-supported breeding of entomopathogenic nematodes, safety, registration, laboratory demonstrations in classic biotechnology up- and downstream processing, commercial aspects of biological control production and marketing, projects in biocontrol</p>
Reading List
<p>Ehlers, R.-U. 2001. Mass production of entomopathogenic nematodes for plant protection. Applied Microbiology & Biotechnology 56, 623-633. Sumaya, N. H., Gohil, R., Okolo, C., Addis, T., Doerfler, V., Ehlers, R.-U. & Molina, C. (2018) Applying inbreeding, hybridization and mutagenesis to improve oxidative stress tolerance and longevity of the entomopathogenic nematode Heterorhabditis bacteriophora. Journal of Invertebrate Pathology 151, 50-58. https://en.wikipedia.org/wiki/Biological_pest_control</p>
Additional Information
<p>course blocked Maximum number of participants: 10 Enrollment by E-Mail to ehlers@e-nema.de within workdays Monday through Friday in the 1nd week of the 2. audit period of the preceding semester. Following information are necessary: matriculation number last name first name degree study program stu-Email</p> <p>The allocation of the places takes place in the 2nd week of the 2. audit period of the preceding semester. Acceptance of the place by students only through participation at the first day of the course. Students without a place can get a place at the first day of the course by move-up procedure.</p>

Use	Compulsory / Optional	Semester
Master, 1-Subject, Agricultural Sciences, Specialisation Agricultural Economics, (Version 2017)	Optional	-
Master, 1-Subject, Agricultural Sciences, Specialisation Agricultural Economics, (Version 2013)	Optional	-
Master, 1-Subject, Agricultural Sciences, Specialisation Agribusiness, (Version 2017)	Optional	-
Master, 1-Subject, Agricultural Sciences, Specialisation Agribusiness, (Version 2013)	Optional	-
Master, 1-Subject, Agricultural Sciences, Specialisation Crop Sciences, (Version 2017)	Optional	-
Master, 1-Subject, Agricultural Sciences, Specialisation Crop Sciences, (Version 2013)	Optional	-
Master, 1-Subject, Agricultural Sciences, Specialisation Animal Sciences, (Version 2017)	Optional	-
Master, 1-Subject, Agricultural Sciences, Specialisation Animal Sciences, (Version 2013)	Optional	-
Master, 1-Subject, Agricultural Sciences, Specialisation Environmental Sciences, (Version 2017)	Optional	-
Master, 1-Subject, Agricultural Sciences, Specialisation Environmental Sciences, (Version 2013)	Optional	-
Master, 1-Subject, AgriGenomics, (Version 2017)	Optional	-
Master, 1-Subject, AgriGenomics, (Version 2010)	Optional	-
Master, 1-Subject, Dairy Science, (Version 2017)	Optional	-
Master, 1-Subject, Nutritional and Food Science, (Version 2013)	Optional	-
Master, 1-Subject, Nutritional and Consumer Economics, (Version 2017)	Optional	-
Master, 1-Subject, Nutritional and Consumer Economics, (Version 2013)	Optional	-