

<b>Module Name</b> Ecology and Invasion Biology of Freshwater Fish						
<b>Type of Module</b> ○ Advanced Module				<b>Module Code</b> Ecology of Freshwater Fish		
<b>Identification Number</b> MN-B-SM (E 1)	<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. 2nd 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> 21 h 155 h 5 h	<b>Private Study</b> 42 h 113 h 24 h	<b>Planned Group Size</b> max. 12 max. 12 max. 12	
<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 acquired detailed knowledge regarding the ecology of freshwater fish with special emphasis on fishing methods, spatial and temporal aspects of population dynamics in relation to their ecological community, impact of invasive species in the native fish community, as well as first experiences on conducting and analyzing experiments in the field.</li> <li>• have acquired skills to assess biodiversity through classical and genetic approaches and estimate the invasive/native species ratio.</li> <li>• have been trained in molecular methods to prepare, sequence and analyse metabarcoding data and have gained initial experience in the population genomic analysis of fish genome scans</li> <li>• are able to use a variety of different fishing and sampling methods that are needed for ecological and biodiversity research in the field.</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>• Current topics in ecology and invasion biology of freshwater fish (esp. spatial and temporal aspects of ecology; incl. excursions)</li> <li>• Variety of fishing and biodiversity assessment methods</li> <li>• Methods for field experiments including on-site and real-time DNA metabarcoding (Nanopore sequencing)</li> <li>• Accomplishment and analysis of field data, species diversity and abundance data, molecular metabarcoding data</li> </ul>					
<b>4</b>	<b>Teaching Methods</b> Lectures; Practical/Lab; Seminar; Excursions/Field work; Guidance to independent research; Training on presentation techniques in oral and written form					

<b>5</b>	<b>Prerequisites (for the Module)</b> Enrollment in the Master's degree course "Biological Sciences" with Specialization "Ecology, Evolution, and Environment" <b>Additional academic requirements</b> Previous attendance of the lecture module "Ecology, Evolution, and Environment (E)". Participation in the tutorial module "Ecology, Evolution, and Environment (E)" is an advantage. Knowledge on fundamental ecological principles is indispensable to participate in this module. In cases of doubt, please contact the module coordinator (see 10) before choosing this subject module.
<b>6</b>	<b>Type of Examination</b> The final examination consists of two parts: written examination on topics of lectures (1 hour; 50 % of the total module mark), oral presentation (20 min; 50 % of the total module mark)
<b>7</b>	<b>Credits Awarded</b> Regular and active participation; Passed seminar; Each examination part at least "sufficient" (see appendix of the examination regulations for details)
<b>8</b>	<b>Compatibility with other Curricula*</b> None
<b>9</b>	<b>Proportion of Final Grade</b> 12 % of the overall grade (see also appendix of the examination regulations)
<b>10</b>	<b>Module Coordinator</b> Prof. Dr. A.-M. Waldvogel, phone 470-5294, e-mail: a.waldvogel@uni-koeln.de; Prof. Dr. J. Borchering, phone 470-4249, e-mail: Jost.Borchering@uni-koeln.de

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**Further Information**

**Subject module** of the Master's degree course "Biological Sciences",  
**Specialization:** (E) Ecology, Evolution, and Environment

**Participating faculty:** Prof. Dr. A.-M. Waldvogel, Prof. Dr. J. Borchering, Dr. L. Heermann, Dr. Sven Matern

**Literature:** Information about textbooks and other reading material will be given on the ILIAS representation of the course

**General time schedule:**

Week 1 (22.-26.5.23): Field work at Ecological Research Station Rees (including accommodation), Dores-Albrecht-Str., 46459 Rees-Bienen

Week 2 (29.5.-2.6.23): Whitsun break (Pfingstferien)

Week 3 (5.-7.6.23): Lectures, analysis and experiments at Ecological Research Station Rees

Week 4 (12.-16.6.23): Lectures and experiments at Ecological Research Station Rees.

Week 5 (19.-23.6.23): Lectures and data analysis at Biocenter in Cologne (-1.004/-1.005)

Week 6 (26.-30.6.23): Preparation of seminar talks and written exam

Week 7 (3.-7.7.23): Preparation of seminar talks and written exam, seminar 5.7.23 (10 am – 2 pm, Biocenter -1.004)

**Note:** The module contains hands-on laboratory and field work conducted in small groups and is taught in the field, in course rooms and in research laboratories.

**Introduction to the module:** 17.05.2023, 11 am, Biocenter -1.004

**Written examination:** July, 14th, 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.