

Flash-chromatography system for fractionation of plant extracts

Head: Prof. Dr. Johannes Jehle  
Deputy: Dr. Annette Herz

Julius Kühn Institute (JKI) · Federal Research Centre for Cultivated Plants · Institute for Biological Control

Schwabenheimer Straße 101  
69221 Dossenheim, Germany  
Phone: +49 (0)3946 47-4900  
bi@julius-kuehn.de

## New Challenges

The increasing demand of consumers for organic products and food with minimum residues of chemicals calls for efficient biological control methods, to be used as stand-alone or in combination with chemical control agents in the frame-work of integrated pest management. We aim at an improved integration of biological control methods in crop protection practice. Based on our research and advisory activities, we are involved in EU-wide programs towards the reduction of application and risks of chemical plant protection products, such as the farm-to-fork strategy.

Climate change and international trade of plants or plant-based products are sources of new, invasive plant pathogens or insect pests. This is a particular challenge for biological control. Climate change may also drive the change of ecological parameters defining the interaction between plant pathogens or pests and their natural antagonists, and may thus promote the occurrence of harmful species.

Also in developing countries, there is an increasing demand for non-chemical crop protection and biological control. To provide transfer of our knowledge and know-how, we participate in international, co-operative projects worldwide.



Chromosome mapping of codling moth

## Working Groups

- Diagnosis and Histopathology  
Dr. Regina Kleespies
- Insect Virology  
Prof. Dr. Johannes Jehle
- Microbiology and Bioengineering  
Dr. Dietrich Stephan
- Molecular Insect Pathology and Bioinformatics  
Dr. Jörg Wennmann
- Natural Substances  
Dr. Annegret Schmitt
- Beneficial Arthropods and Functional Biodiversity  
Dr. Annette Herz
- Phytopathology  
Dr. Ada Linkies

## Dossenheim

### Travelling by car

Motorway A5 (Frankfurt - Heidelberg), take exit Dossenheim and head for Dossenheim, after about 300 m turn left in direction Schwabenheimer Hof

### Travelling by train

Heidelberg Main Station (Hauptbahnhof), take a taxi or we meet you if it is arranged with us ahead

### Travelling by plane

Rhein-Main Airport Frankfurt; from long-distance train station airport via Mannheim main station to Heidelberg main station.

### Editorial and Layout:

Dr. Regina Kleespies und Anja Wolck (JKI)

The Julius Kühn Institute is an institution subordinated to the Federal Ministry of Food and Agriculture (BMEL)

[www.julius-kuehn.de](http://www.julius-kuehn.de)

June 2023

DOI 10.5073/20230425-082156-0





Institute's site in Dossenheim



Electron micrograph of a blastospore of *Metarhizium* sp.



Fluorescently labeled fungus (image with laser-scanning microscope)

## Partner of Competence in Biological Control

The Institute for Biological Control is one of 18 specialized research institutes of the Federal Research Centre for Cultivated Plants (Julius Kühn Institute). Our scientific activities cover the full spectrum of biological control of plant diseases and pests in crop protection. The Institute for Biological Control thus plays a key role in research, development and implementation of biological control measures based on the use of beneficial organisms, such as micro-organisms, viruses, insects, mites and entomopathogenic nematodes. We also investigate natural substances used for plant protection and plant strengtheners that activate the plant's self defense. Hence, our research strengthens non-chemical plant protection in organic farming and integrated production. The Institute is involved in the evaluation of biological control agents in the framework of the registration of plant protection products.

Our research aims to implement biological control methods as reliable components of plant protection practice. To utilize the potential of biological control, we improve existing techniques and explore advanced approaches in biological crop protection. We address new problems, such as the increasing resistance of plant pathogens and pests against chemical control agents, climate change or the occurrence of invasive species. To meet these challenges, we develop and use novel scientific methods in microscopy, entomology, microbiology, biochemistry and molecular biology.

To achieve our mission, we closely collaborate and exchange information with other institutes of the Julius Kühn Institute, as well as with national and international research institutions and universities, plant protection services, biocontrol manufacturers and other stakeholders. The Institute, founded in Darmstadt in 1948, moved to Dossenheim in spring 2022. In the new building with modern equipment, research into biological control is being continued with a significantly improved infrastructure.

## Our Tasks and Research Aims

### Interactions and mode of action in biological control

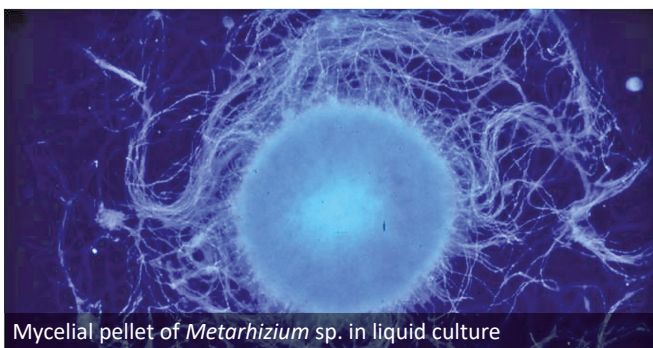
- Research on mode of action of biological control agents
- Diagnosis and histopathology of insect diseases
- Biological and molecular effects of insect viruses
- Endophytes in biological control
- Mode of action of natural substances
- Mode of action of beneficial organisms

### Biological control of plant pathogens and insect pests

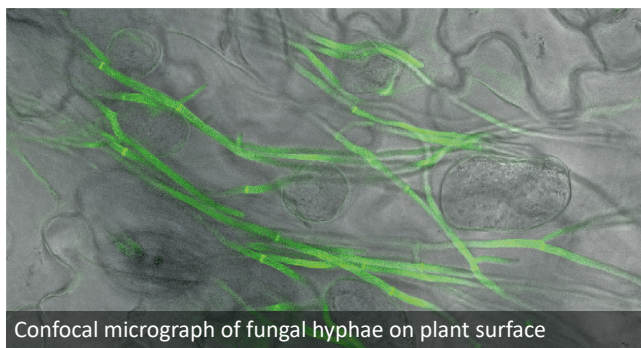
- Biological control of invasive species
- Biological control of soil-borne pests
- Potential of antagonistic microorganisms of plant pathogens
- Biological techniques to reduce copper use
- Impact of biological control on the environment
- Analysis of the applicability of biological control in a changing climate

### Functional biodiversity

- Development of molecular methods for identification and characterization of micro- und macro-biological antagonists
- Recording of changes in natural regulation processes of agricultural ecosystems due to climate change
- Biological diversity of potential natural antagonists
- Ecosystem services of natural antagonists



Mycelial pellet of *Metarhizium* sp. in liquid culture



Confocal micrograph of fungal hyphae on plant surface



Powdery mildew on barley