



The 20th International Reinhardsbrunn Symposium: Modern Fungicides and Antifungal Compounds

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The Reinhardsbrunn Symposium series has been initiated in 1966 by Prof. Dr. Horst Lyr, Kleinmachnow, GDR, and thus has a tradition standing for more than 50 years. On the world-wide scale, the Reinhardsbrunn Symposium is the most important international meeting with focus on fungicide science today.

The 20th Reinhardsbrunn Symposium was held at Friedrichroda in Thuringia, Germany, with a one-year delay in regard to the former 3-year rhythm of the symposium, caused by the Covid-19 pandemic. All participants enjoyed meeting colleagues from all over the world face-to-face again after the years of the pandemic and expressed their appreciation for this opportunity.

The symposium started on April 23 and ended on April 27, 2023. More than 130 scientists from 18 nations, including Australia, Belgium, Brazil, Canada, China, Denmark, France, Germany, Greece, Ireland, Italy, Japan, Poland, Spain, Sweden, Switzerland, UK, and the USA, participated. While 43 participants were German, 87 were non-German participants. Forty-eight participants were female, and 82 were male participants. Excitingly, 66 oral presentations including 6 keynote talks were given, and 25 posters have been presented. The large number of participants from many nations and the large number of oral presentations are a clear indication of the attractiveness of this international scientific meeting focusing on fungicide research.

The six key-note lectures provided an excellent overview on the latest developments and highlights in the field of fungicide research.

The first keynote lecture, presented by Andreas von Tiedemann, University of Göttingen, Germany, gave an excellent perspective into the future of fungicides and fungicide research by answering the question, if we will still need, have and use fungicides in twenty years. He clearly indicated that—at least currently—no alternatives to fungicide use are available.

As second key-note lecture, Lise Jørgensen from the Department of Agroecology, Aarhus University, Flakkebjerg, Slagelse, Denmark, started her presentation with a historic view on practical disease management in cereals. She highlighted problems based on the development of fungicide-resistant pathogen populations, suggested to apply Integrated Pest Management (IPM) in a more specific manner and discussed the increasing need for supporting plant health by plant breeders. Finally, Lise Jørgensen discussed new options in plant protection, such as biological control agents and biopesticides.

The third key-note lecturer, Nick Talbot, from The Sainsbury Laboratory at Norwich, UK, addressed the question, if molecular approaches can be developed into novel disease control strategies in the field. The presentation impressively demonstrated how a combination of molecular biology and cell biology can improve understanding of the role of septins in the appressorium-mediated infection process of the rice blast fungus *Magnaporthe oryzae*. The speaker extensively discussed how this information might be harnessed for disease control.

The fourth keynote presented by Jianqiang Miao from Northwest A&F University at Shaanxi, China, highlighted the risk of resistance development against the fungicide Fluoxapiprolin acting as an oxysterol-binding protein inhibitor (OSBPI). Studying 103 *Phytophthora infestans* and 130 *Phytophthora capsici* isolates, Jianqiang Miao demonstrated that 14 types of point mutations in the target protein

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of OSBPI fungicides can cause high levels of resistance to these fungicides.

One of the most relevant questions in plant disease control is whether or not fungicide resistance development can be predicted. This question was addressed by Gabriel Scalliet of Syngenta Crop Protection AG at Stein, Switzerland, as fifth keynote speaker. He explained options for improvements of resistance prediction by combining field assessments with technical improvements to mutate mitochondrial genes. Studies employing model pathogens such as *Botrytis cinerea*, *Zymoseptoria tritici* and *Phakopsora pachyrizi* demonstrated strong progress in predicting fungicide resistance in pathogen populations.

Eckhard Thines of the Institute of Biotechnology and Drug Research (IBWF), which is associated with Johannes Gutenberg-Universität at Mainz, Germany, gave an overview of natural chemistries to be used as lead compounds for plant protection. Of great interest was the view on the enormous complexity of chemistries existing in microorganisms that may be expected to strongly support the development novel synthetic plant protection chemistries. As most secondary metabolism (SM) gene clusters are silent in microorganisms in solo-culture, one strategy to identify new chemistries may be to employ co-cultures, in which silent SM clusters are supposedly activated and so far unknown chemistries may thus be identified. This strategy, as demonstrated by Eckhard Thines, may dramatically expand the range of natural products as lead structures for agrochemicals.

The oral presentations of the Reinhardsbrunn Symposium were organized into 12 sessions entitled New Fungicides; New Fungicides—New Tools for Disease Control; Molecular Mechanisms of Fungicide Resistance; Fungicide Resistance: Mechanisms and Diagnosis; Fungicide Resistance: Mechanisms, Diagnosis, Predictions; Resistance Monitoring; Fungicide Resistance Risk Assessment and Management; Fungicide Resistance Modelling; and Bio-Rational Fungicides/Biocontrol. The session chairs were recruited from the board of the organizing committee, i.e. Bart Fraaije, NL; Andreas Mehl, Germany; Gerd Stammler, Germany; Helge Sierotzki, Switzerland; Erich C. Oerke, Germany, and Holger B. Deising, Germany. The details of the excellent science presented at the 20th International Reinhardsbrunn

Symposium are summarized in the publications of this current topic issue of the *Journal of Plant Diseases and Protection*.

Not only the outstanding science, but also the excursion to the historic city of Weimar in Thuringia was a highlight, with walks through the historic old town of Weimar, highlighting sites of the classic period like the residences of Goethe and Schiller. In addition, a visit to the Bauhaus University highlighted the history of the university, with special emphasis on the world famous Bauhaus tradition of art and design.

A conference can only be as successful as the participants and the organizing committee make it. I would like to acknowledge the outstanding organizing skills of the DPG-team (Deutsche Phytomedizinische Gesellschaft; German Society of Plant Diseases and Plant Health) led by Christian Carstensen and supported by Noemi Meßmer. Their help made this conference a great success. In addition, I thank the program committee: Baart Fraaije, Andreas Mehl, Erich-Christian Oerke, Helge Sierotzki, and Gerd Stammler. I am proud and happy that I was allowed to chair this committee. The financial support by the German Research Foundation (DFG) has allowed the Reinhardsbrunn Symposium to take place in 2023 again. This support is highly appreciated.

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