**Functional characterization of the wheat Lr34/Yr18/Sr57/Pm38 multi-pathogen resistance gene**

**Summary / Zusammenfassung**
Fungal plant diseases are a serious threat to cereal production. Breeding for effective and durable field resistance is the most sustainable strategy to reduce yield losses caused by pathogenic fungi. The wheat gene Lr34 confers durable and partial field resistance against the obligate biotrophic, pathogenic rust fungi and powdery mildew in adult wheat plants. The resistant Lr34 allele evolved after wheat domestication through two gain-of-function mutations in a single ABC transporter gene. Interestingly, an Lr34-like fungal disease resistance with a similar broad-spectrum specificity and durability has not been described in other globally important cereals such as maize, rice or barley. Lr34 is functionally transferrable into barley and rice where the gene confers increased resistance against barley- and rice-specific fungal diseases, respectively. Lr34-containing barley plants were more resistant to barley rust and barley powdery mildew. In rice, Lr34 resulted in increased resistance against rice blast caused by the fungus Magnaporthe oryzae, the most destructive rice disease worldwide. Transcriptome analysis revealed that the introduction of Lr34 into barley resulted in extensive reprogramming of gene expression and in constitutive induction of multiple defense pathways. Current efforts focus on a detailed molecular understanding of the Lr34-mediated resistance mechanism.

**Publications / Publikationen**


**Keywords / Suchbegriffe**
Lr34, durable disease resistance, ABC transporter, functional transfer

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Funding Source(s) / Unterstützt durch
SNF (Personen- und Projektförderung)

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Duration of Project / Projektdauer
Jul 2010 to Dec 2020