

Principle of Resistance to Mildew in Barley Can Be Transferred to Other Plants

Institute of Biochemical Plant Pathology

In a joint project of Stanford University, the Institute of Biochemical Plant Pathology and the Cologne Max-Planck-Institute for Plant Breeding Research we could show that a mechanism existing in barley for the resistance to mildew may also be functional in other crop plants.

Mildew fungi are economically relevant plant pathogens causing enormous crop losses throughout the world every year. Interestingly enough, conventionally grown mutants of barley with a defect in a particular gene, which, therefore, do not have a functional so-called Mlo protein, are completely resistant to the attacks of the barley mildew. Although this type of mildew resistance of barley was described more than 60 years ago and has been used intensively for 25 years (currently more than 50 % of the

barley grown in Germany is of the Mlo type), no other plant species or mutant with a similarly effective immunity to mildew was known until recently. This led to the conclusion that Mlo resistance is a barley-specific phenomenon.

Now, genetic studies with the model plant thale cress, or mouse-ear cress, (*Arabidopsis thaliana*) showed that due to the absence of 3 different Mlo genes the mildew resistance also works against an *Arabidopsis*-specific mildew in this case.

The significance of this result is that the immunity caused by the absence of Mlo, therefore, must have been conserved at least since the phylogenetic split of monocotyledonous and diploblastic plants (approx. 200 million years ago). Thus, it should also basically be possible to produce mildew-resistant mutants of any higher plant species.



Mildew-affected barley



The genetically fully decoded wild field herb *Arabidopsis thaliana* is often used as a model to understand processes or mechanisms in crop plants.



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Literature:

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The mildew fungus can also grow on the model plant *Arabidopsis thaliana* (leaf on the right). On the left a leaf of an *Arabidopsis* mutant resistant to mildew.