

RESEARCH ON DOWNY MILDEW RESISTANCE
| TECHNICAL SUPPORT |

Downy mildew in hops, usually called peronospora, is caused by *Pseudoperonospora humuli* and can lead to considerable losses in quality and yield due to weather conditions. For this reason, Dr. Alexander Feiner conducted a study on resistance to downy mildew in hops as part of his doctoral thesis in cooperation with the IPB in Halle (Saale) and the IPK in Gatersleben.

To identify the molecular processes of natural resistance as well as genetic and metabolic markers for hop breeding, a metabolome-genome-wide association study was carried out on 192 genotypes. The researchers found out that some hop metabolites, especially phenylpropanoids, are correlated with resistance to downy mildew. In an independent validation experiment, a mixture of three putative prophylactic phenylpropanoids was applied on susceptible genotypes together with fungal spores. This external application of the substances, which are overrepresented in resistant genotypes, resulted in a reduced leaf infection. This confirmed their protective activity either directly or as precursors of active compounds.

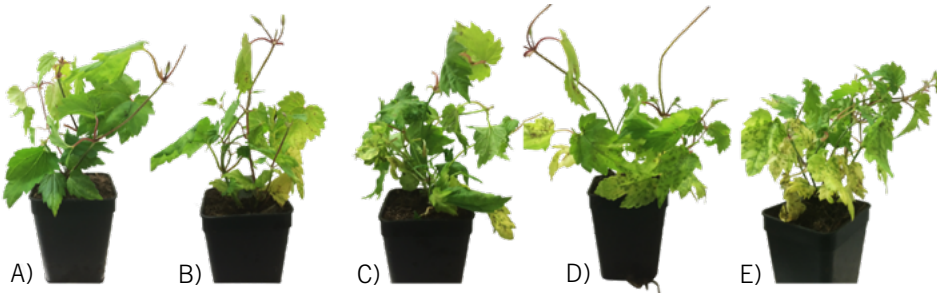


Figure: Different degrees of downy mildew seven days after infection. A) resistant, B) tolerant, C) slightly susceptible, D) susceptible, E) highly susceptible.

The metabolic and genetic markers obtained through this study provide a better understanding of the underlying resistance to downy mildew. In the future, this will allow a more precise selection of breeding partners and offsprings in hop breeding.

The new Hopsteiner varieties Akoya and Solero have already been selected using these markers and therefore carry a very good downy mildew resistance.

Click here for the original publication:

Feiner A, Pitra N, Matthews P, Pillen K, Wessjohann LA, Riewe D. Downy mildew resistance is genetically mediated by prophylactic production of phenylpropanoids in hop. *Plant Cell Environ.* 2020;1–16. <https://doi.org/10.1111/pce.13906>

If you need any further information, please contact us. (info@hopsteiner.de).

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