

Identifying resistance/tolerance for *Wheat dwarf virus* (WDV) in barley

Sarah Trebing, Antje Habekuß and Frank Ordon

Julius Kuehn-Institut, Institute for Resistance Research and Stress Tolerance, Quedlinburg

E-mail of corresponding author: sarah.trebing@julius-kuehn.de

Due to global warming, insect-transmitted viruses, like the leafhopper transmitted *Wheat dwarf virus* (WDV), will become more important in barley and other cereals in the future. Typical symptoms of virus infected barley plants are leaf yellowing and strong dwarfing, which in most cases result in high yield losses. Growing of resistant/tolerant cultivars is an environmentally friendly way to control WDV. However, up to now little is known about genotypic differences concerning resistance/tolerance to WDV. Therefore, the project aims at the identification of resistant/tolerant genotypes by screening the primary gene pool of barley and to identify quantitative trait loci (QTL) by genome-wide association studies (GWAS).

In 2016/2017, a set of 260 barley accessions was tested by artificial inoculation using viruliferous leafhoppers of the species *Psammotettix alienus* in gauze house and greenhouse tests. Genotypic differences in the reaction to a WDV infection were observed.

Most barley accessions turned out to be highly susceptible. However, 13 barley accession showed no or low infection rates (0 to 29 %) and/or a low virus titer. Furthermore, 20 accessions showed, despite a high virus titre, a high level of tolerance, i.e. good performance concerning yield/plant, TKW, plant height and/or number of ears/plant relative to the non-infected control variant. The promising barley accessions will be re-tested in 2017/2018 and in addition 240 accessions selected from different gene banks will be tested. On the basis of these phenotypic results, a subset of 250 resistant/tolerant and susceptible barley accessions will be selected and genotyped by the 50k iSelect chip (TraitGenetics). The identification of QTL for WDV resistance and the development of molecular markers are essential to replace the laborious and time consuming resistance tests with WDV-bearing leafhoppers. This will facilitate the integration of breeding for WDV resistance/tolerance into applied barley breeding.