

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

Sarah Trebing, Antje Habekuß and Frank Ordon

Julius Kühn Institute, Institute for Resistance Research and Stress Tolerance, Quedlinburg

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

Wheat dwarf virus (WDV), which is transmitted by the leafhopper *Psammotettix alienus*, causes high yield losses in barley. Due to global warming, insect-transmitted viruses, like WDV, will become more important in the future due to the extended survival time of the vector. Typical symptoms of virus infected barley plants are leaf yellowing, strong dwarfing and mostly dieback of the infected plants. This results in high to complete yield losses. The growing of resistant/tolerant varieties is an environmentally friendly way to avoid respective yield losses. 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).

The last two years (growing period 2016/2017 and 2017/2018) a total set of 500 barley accessions was tested by artificial inoculation using viruliferous leafhoppers in gauze house and greenhouse tests. Until now, half of the genotypes

also have been tested under natural infection in the U.K., the Czech Republic, France and Germany. Genotypic differences in the reaction to a WDV infection were observed.

Most barley accessions turned out to be highly susceptible. However, three barley accession showed no symptoms of infection and no virus was detected by DAS-ELISA. Furthermore, nine accessions had in spite of WDV infection still good field performances concerning yield/plant, thousand kernel weight (TKW), plant height and/or number of ears/plant. The promising barley accessions will be re-tested in 2018/2019. Based on these phenotypic results, a subset of 250 resistant/tolerant and susceptible barley accessions will be selected and genotyped by the 50k iSelect chip (TraitGenetics, Gatersleben). 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.