

Marker-assisted selection for WDV tolerance in wheat (*Triticum aestivum*)

Anne-Kathrin Pfrieme, Torsten Will, Antje Habekuß and Frank Ordon
Julius Kühn-Institut, Institute for Resistance Research and Stress Tolerance, Quedlinburg

Wheat dwarf virus (WDV)

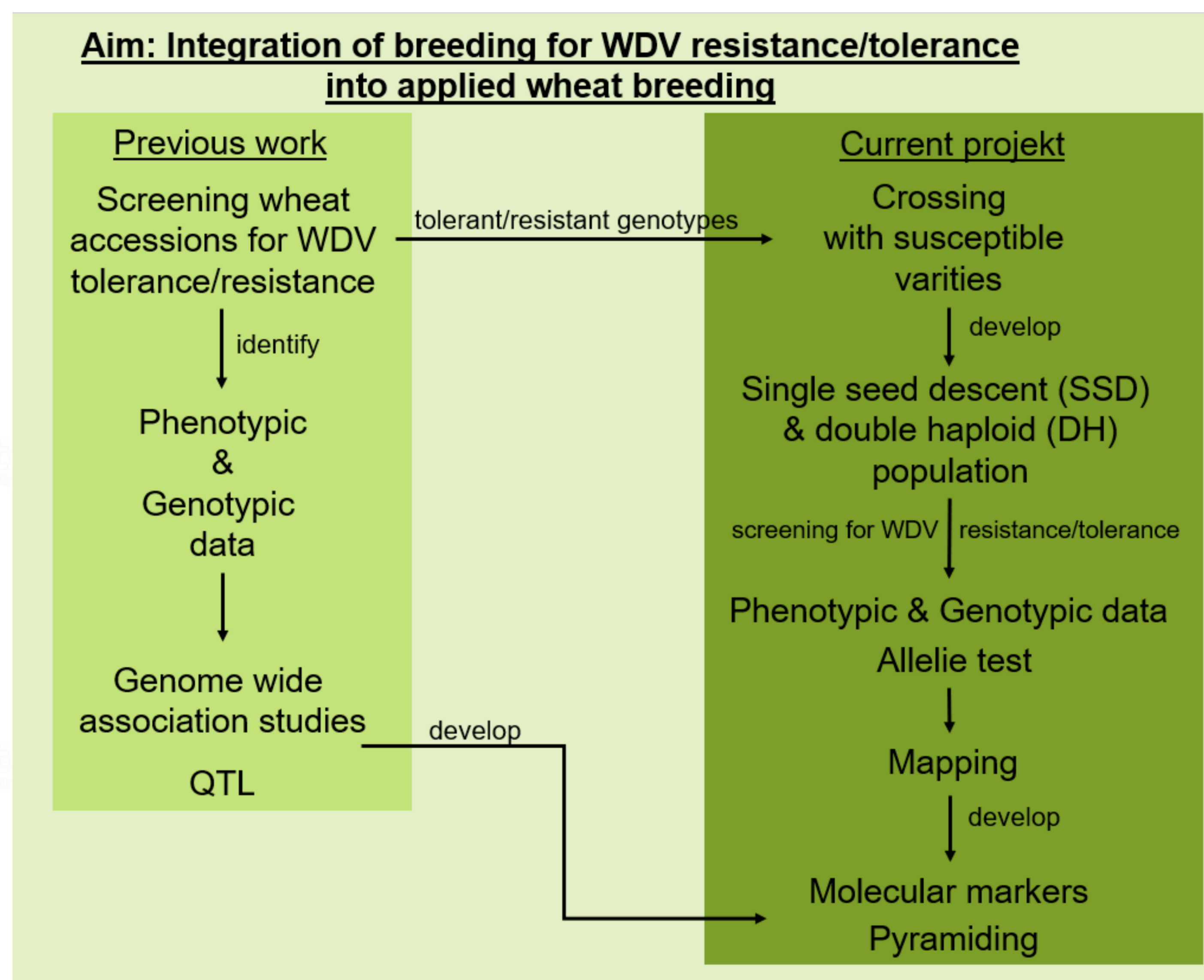
WDV is an important pathogen in many European countries and causes severe damage in plants of the family Poaceae, e.g. wheat. Due to climate change, the incidence of insect-transmitted viruses will become more important worldwide because of the increased occurrence and longer activity of the transmitting vectors in autumn.



The absence of approved insecticides against *P. alienus* renders growing of WDV resistant/tolerant varieties the only effective way to control WDV. However, no such varieties are available yet. Based upon a previous project, doubled haploid (DH) and single-seed descent (SSD) lines will be used to develop molecular markers based on genome wide association studies suited for future marker-based selection.

Experimental concept

The SSD and DH population will be tested for WDV resistance/tolerance by artificial infection with viruliferous leafhoppers in gauze and greenhouses and under field conditions in Zabcice (CZ). Additionally, the most promising genotypes will be tested again in the 2nd year.



The material will be phenotyped for WDV titre by ELISA and agronomical traits like heading date, plant height, number of ears per plant, TKW and yield per plant. The genotyping will be performed by using the 20K Illumina Infinium Chip (Trait genetics, Gatersleben). Based on the obtained data the WDV resistance/tolerance will be mapped and molecular markers (KASP/CAPS) will be developed.

Results

So far, the evaluation of the 1st year gauze house test identified resistant/tolerant SSD and DH lines, which are retested in 2019/2020.

Perspective

Additional information on tolerant genotypes will be available after harvesting in 2020. In the next step the WDV tolerance/resistance associated SNP markers will be converted into Caps or KASPar markers and verified in the phenotyped SSD and DH population from the 1st year.

Acknowledgment: We thank the Federal Ministry of Food and Agriculture for financial and Gudrun Meißner for the technician assistance.
Literature: Benkovic AH, Vida G, Nelson D, Veisz O, Bedford I, Silhavy D, Boulton MI (2010). Partial resistance to Wheat dwarf virus in winter wheat cultivars. Plant Pathology 59(6):1144-1151.



This work is licensed under a creative commons attribution 4.0 license.



<https://doi.org/10.5073/20191018-081440>

