MAGIC-RESIST: Identification and mapping of effective resistance genes to rust diseases and Fusarium head blight in the MAGIC WHEAT population WM-800

Lars Böge[1], Leonhard Sommer[2], Wiebke Sannemann[2], Albrecht Serfling[1], Frank Ordon[1] and Klaus Pillen[2]

[1] Julius Kühn Institute, Institute for Resistance Research and Stress Tolerance,

[2] Martin Luther University Halle-Wittenberg (MLU)

E-mail of corresponding author: lars.boege@julius-kuehn.de

Basis of the MAGIC-RESIST project is the MAGIC WHEAT population WM-800 which is derived from eight elite wheat varieties (Patras, Meister, Linus, JB Asano, Tobak, Amber, Safari, Julius). The project aims at the identification of effective resistances against leaf rust and stripe rust and Fusarium head blight (FHB), followed by mapping resistance QTLs by genome wide association studies (GWAS). To achieve this, we conduct field tests at two locations in Quedlinburg and Halle over several years using artificial inoculation. Field test results are supplemented by hyperspectral image analyses and high-throughput studies of leaf segments of all genotypes after inoculation with differentiating leaf and yellow rust races. In order to analyze the toxin content of field-harvested grains and to correlate data with scoring results the Deoxynivalenol content will be determined by ELISA.

First analyses of the resistance against rusts and FHB showed large differences between the lines in greenhouse and field trials and rust resistant genotypes were detected. Due to the warm and dry weather FHB was difficult to detect in the field. However, it was possible to detect differences in field-harvested grains. Using a potato dextrose agar, *Fusarium* has been detected in suspicious grains and was confirmed by detecting conidiospores in the growing mycelia by microscopy.

Furthermore, morphological data such as plant height, thousand-grain weight, grains per ear and flowering time will be included into the investigations. In the future, genotypes that combine resistance QTLs with desired morphological properties will be included into the breeding programs of the cooperating wheat breeding companies.