Sektion 25
Mykologie II

25-1 - Untersuchungen zur Infektion von Weizenähren mit *Magnaporthe oryzae* Pathotyp *Triticum*

Studies on wheat ear infection by Magnaporthe oryzae pathotype Triticum

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Wheat blast is a devastating disease of wheat, caused by *Magnaporthe oryzae* pathotype *Triticum* (MoT). This disease first appeared in Brazil and then spread to other Latin American countries, until it recently emerged in Bangladesh and Zambia, outside of Latin America. It may cause yield losses up to 100%. Consequently, it is posing a serious threat to food security around the globe. To control this pathogen it is important to explore the manner of its epidemic spread. Wheat grains have been suggested to be important units to transmit the disease. Therefore, this study aims at identifying the vulnerable stage of wheat for ear infection with MoT and the potential of seed transmission. For this study, one susceptible (Sumai 3) and one resistant (Milan) wheat cultivar were used as plant material and MoT isolates from Brazil and Bangladesh were used as fungal inoculum. Spray inoculation was performed under greenhouse conditions in the ears at three different growth stages of wheat (GS 59, GS 61-65, and GS 69). The disease severity was scored at three different time points (7 dpi, 14 dpi, and 21 dpi). Characteristic blast symptoms were observed in both cultivars within 7dpi and progressed rapidly in Sumai 3, while disease progress was quite slow in Milan. Both fungal isolates induced similar levels of disease severity in both wheat cultivars. In case of Sumai 3, all three-plant stages were susceptible to MoT. Milan showed resistant reactions, and there were no significant differences observed in disease severity in all plant growth stages of Milan. MoT infection significantly reduced 1000-grain weight of Sumai 3 (up to 93%) at each time point of inoculation. No grain or shriveled grains with very little or no germination was recorded from infected ears of Sumai 3. Due to its higher resistance, there was only a reduction in 1000-grain weight of up to 36% recorded for Milan with both fungal isolates. However, a negative correlation between grain weight and disease severity was recorded for both cultivars. To confirm the presence of the fungus in the ear, infected material was analyzed by plating and with qPCR. Wheat ears were separated manually into three different parts (glumes, rachis, and grain) and plated on agar for initial confirmation of presence of the pathogen and then a qPCR was done to confirm the exact amount of fungal biomass accumulated in each part of the ear. Presence of fungal biomass was found in all three parts of the ears in both cultivars. Infection caused by MoT also modulated the protein content in wheat grains. Our results indicate that, MoT may cause an epidemic in each stage of ear development. However, the most sensitive stage for infection in the resistant cultivar was the early stage of ear emergence. Taken together, this disease significantly hampers grain yield, grain quality, and requires the further exploration of seed transmission mechanisms of MoT for understanding the epidemiology of wheat blast disease.

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