Breeding Strategies for Developing Disease-Resistant Wheat: Present, Past, and Future

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Abstract

Since its origin in Southeast Turkey, wheat (*Triticum aestivum* L. AABBDD; Family Poaceae) has been a prime dietary cultivated cereal that is consumed worldwide by nearly 20% of the world population. However, there are a wide plethora of biological variables that seriously threaten production around the world. Among the biological stresses, phytopathogens are considered the most serious threat to yield. This can be further elaborated by the fact that since the nineteenth century, more than 30 diseases have been reported to have had a drastic impact as epidemics, including karnal bunt, smut, mildew, blight, rust, etc. So far, in response, various landraces and several wild-related genera (such as *Thinopyrum*, *Triticum*, *Hordeum*, *Aegilopsis*, *Elymus*, and *Leymus*) represent the different gene pools that have been utilized in developing disease-resistant varieties. With the emergence of advanced molecular markers, whole genome sequences, and new genomic approaches, there are multiple ways and tools for researchers to enhance durability and wide-range disease resistance in a short period. The present documentation of trait introgression offers an effective option to narrow down the cost of unsustainable fungicides. Therefore, the current

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