Virulence Structure of the *Magnaporthe grisea* Rice Population from the Northwestern Himalayas

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The virulence structure of the *Magnaporthe grisea* rice population from the northwestern Himalayan region of India was deciphered on 24 rice genotypes harboring different blast resistance genes. Matching virulences appropriate to all the rice genotypes, except Fukunishiki (*Pi-z, Pi-sh*) and Zenith (*Pi-z, Pi-a, Pi-i*), were present in the pathogen population. Moreover, a very low percentage of isolates were virulent on Tetep (*Pi-ta*, *Pi-k*^{h}, *Pi-4*^{b}) and Tadukan (*Pi-ta/Pi-ta*^{2}). Although virulence was recorded on most of the lines tested, none was susceptible to all of the isolates. Three pairs of genotypes, namely, C101LAC : C101A51; K-1 : Dular; and Dular : HPU-741, exhibited complementary resistance spectra as no isolate combined virulence to both the members of each of the three pairs of genotypes despite the fact that individual members were susceptible to a major portion of the pathogen population. The blast resistance genes *Pi-z*, *Pi-k*^{h}, *Pi-1* and *Pi-2* and their various combinations were construed to provide broad spectrum and durable blast resistance in Himachal Pradesh. Pathotype analysis revealed the existence of extremely high pathotypic diversity in the pathogen population. Based on the observed population structure for *M. grisea*, it was not possible to designate a minimum set of pathogen isolates that could be used in blast resistance screens to identify effective sources of blast resistance. The overall results suggested that the pathotype analysis alone is insufficient to describe the existing pathogenic variability, especially when this information has to be used for guiding the breeding programs aimed at developing durable blast resistance. However, population genetics approach of studying pathogenic specialization by monitoring the frequency of individual virulence genes and analyzing virulence gene combinations for their association or dissociation might generate useful information for developing durable blast resistance.

KEY WORDS: *Magnaporthe grisea*; rice; virulence; pathotype.

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