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Functional analysis of wheat autophagy gene (TaATG8j) in relation to wheat- stripe rust interaction

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Understanding the interaction between wheat and *Puccinia striiformis* f. sp. *tritici* (Pst) is a crucial issue to reduce the losses of wheat production against yellow rust disease infestation. Here, we identified an Autophagy-related 8 (ATG8) gene from bread wheat (*Triticum aestivum*), designated *TaATG8j*, present in three genomic copies located in subgenomes 2AS, 2BS, and 2DS, designated as *TaATG8j*-2AS, *TaATG8j*-2BS, and *TaATG8j*-2DS respectively. All three copies encoded the same number of protein (119 amino acid), though there was some variation in nucleotide position in the open reading frame(ORF) region. Autophagy-related 8 (ATG8) protein is involved in the plant innate immune response, but its roles in plant defense against biotrophic pathogens remain largely obscure. In this study, the transcription level of all copies (*TaATG8j*-2AS, *TaATG8j*-2BS, and *TaATG8j*-2DS) of *TaATG8j* was upregulated in wheat challenged by avirulent (Pst). Transient expression of *TaATG8j* in wheat mesophyll tissue and tobacco leaf showed that *TaATG8j* was mainly localized in the nucleus and plasma membrane but was distributed throughout the cytoplasm. Overexpression of *TaATG8j* in *Nicotiana benthamiana* slightly delayed the cell death. Virus-induced gene silencing of all copies of *TaATG8j* rendered wheat Suwon11 resistant to the avirulent Pst CYR23, accompanied by increased fungal biomass and decreased necrotic area per infection site. These results indicate that *TaATG8j* contributes to wheat resistance against wheat stripe rust fungus by regulating cell death, providing information about wheat resistance to stripe rust.

Biography

Abdullah Al Mamun has completed his Master's degree from Bangladesh Agricultural University in 2001 and after that, he joined as a Scientific Officer in Bangladesh Agricultural Research Institute and got promotion from Scientific Officer to Senior Scientific Officer in 2012. Till now, he is working in the same institute but the meantime he has completed his PhD degree from Northwest A&F University, China in 2018 on molecular plant pathology. He has published around ten agricultural research articles from different national and international journal, and received training from his own country and abroad (Denmark).

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