Transgenic Approaches to Combat Plant Viruses Occurring in India

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Abstract

Genetic engineering (GE) approaches have been effectively deployed to incorporate foreign genes of economic and/or agricultural importance in crops. Ever since Powell et al. in 1986 showed virus resistance through GE approach, numerous crop plants have been genetically modified to impart virus resistance. Greater understanding of host-virus interactions in the wake of RNA silencing phenomenon have further opened up small non-coding RNAs based virus management strategies. This chapter discusses research priorities, approaches and accomplishments in the field of virus resistant transgenic plants in India. Various genetic modification strategies namely coat protein mediated resistance through RNA silencing have been successfully deployed to develop virus resistance. Transgenic lines have been licensed to private sector, in crops like tomato, and significant progress has been made in crops like potato, rice etc. However, a major bottleneck in developing successful transgenic crop in legumes, cucurbits and other crops, where viral infection is a serious menace is the lack of suitable regeneration and transformation protocols. Hence, this chapter also deliberates upon potential pitfalls of genetic engineering approaches that require intensive research efforts. Further, as a way forward, it is also proposed to explore recently emerging genome editing tools to combat phytopathogenic viruses.

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B. Mandal et al. (eds.), *A Century of Plant Virology in India*,
https://doi.org/10.1007/978-981-10-5672-7_31