Gene Silencing: Developing Viral Resistance in Plants

Ajay Kumar Naik[1] and S.P. Singh[2]

[1]M. Sc (Ag.) Genetics and Plant Breeding, IAS-BHU, Varanasi (U.P.) 221005, India
[2]Dept. of Genetics and Plant Breeding, IAS-BHU, Varanasi (U.P.) 221005, India
E-mail: ajaynaik003@gmail.com

Abstract—*Plant viruses are obligate intracellular parasite that multiplies only in living cells. Over 50% of known plant viruses are rod-shaped, usually 300–500 nm in length and diameter of 15–20 nm. Virus particles consist of Genetic material made from either DNA or RNA, A protein coat that protect these genes and in some cases an envelope of lipids. Plant virus cause considerable yield losses in crops as they are so widely spread and infect field crops, vegetables, cereals, oil seeds, fruit crops and ornamentals. Viruses are transmitted by contaminated tools, vegetative propagation/grafting or through vectors such as insects and nematodes. Viral diseases are recognized by characteristic symptoms such as mosaic patterns, mottles, hyperplasia, ring spots, vein clearing and stunted growth. Viral diseases can be managed effectively using preventive measures and resistant varieties, in this context gene silencing is an important aspect. Gene silencing refers to the ability of a cell to prevent the expression of a specific gene which can occur either during transcription or translation. It is achieved by using Ribozymes, Antisense oligonucleotides, and RNA interference(RNAi) techniques. Out of these RNAi is commonly used which involves blocking of viral gene function by inserting short sequences of double stranded ribonucleic acid (dsRNA) that match part of the target gene's sequence and inhibits the production of viral proteins leads to development of viral resistance. Gene silencing is based on the detection of viral genome for this purpose ELISA, PCR and its variants, microarrays and rDNA technology are playing pivotal role. With gene silencing it would be possible to develop broad-spectrum resistance against pathogens with high degree of variability, like viruses. The complexities of gene silencing pathway and molecular machineries are still to be elucidated.*

Keywords*: Mosaic, Mottles, Hyperplasia, Transcription, Raibozyme, ELISA, PCR, Microarrays.*