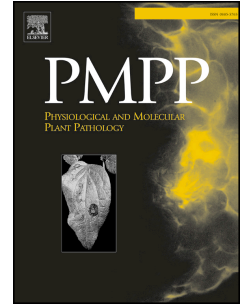


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Host induced gene silencing, an emerging science to engineer crop resistance against harmful plant pathogens

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2 **harmful plant pathogens**

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8 **Abstract**

9 RNA interference (RNAi) has rapidly progressed as one of the most important genetic tools to
10 understand gene function. Moreover, conservation of the RNAi machinery and pathway across
11 kingdoms enabled plant biotechnologists to engineer disease resistance in crop plants. This is
12 achieved by transforming the plant with double stranded RNA constructs targeting vital pathogen
13 genes or host susceptibility genes. The double stranded RNAs (dsRNAs) and small interfering
14 RNAs (siRNAs) generated in the transgenic host plant find their entry into the nematodes and
15 fungal pathogen, during interaction and subsequently cleave the cognate mRNAs. Numerous
16 studies conducted so far have demonstrated successful application of RNAi technology (termed
17 as HIGS) in plants to protect against a wide range of pests and pathogens such viruses, bacteria,
18 fungi, nematode and plant parasites and herbivorous insects that cause significant economic loss.
19 The present review emphasizes the potential of RNAi technology for developing crop plants
20 resistant to pests and pathogens.

21
22 **Keywords:** HIGS, disease resistance, post transcriptional gene silencing, RNAi, dsRNA,
23 transgenic plants, silencing suppressors, CRISPR

24
25 **Introduction**

26 Crop plants are susceptible to a wide array of pathogens including viruses, bacteria, fungi, insect
27 pests and nematode parasites that are responsible for huge economic losses (Oerke, 2006;
28 <http://www.fao.org/docrep/008/y5800e/Y5800E06.htm>). Management of these plant pathogens is
29 of utmost importance to feed the ever-increasing global population. Conventionally, three major
30 strategies are employed to manage plant diseases; crop rotation, application of chemical
31 pesticides and breeding for resistance. Crop rotation requires additional knowledge and skills,

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