Host factors required for plant susceptibility to viruses: targets to improve plant resistance to viruses

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Genomic approaches to interactions between plant viruses, their hosts and their vectors

"Sacra di San Michele" abbey (XI century), symbol of Piedmont, in the Susa Valley

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Host factors required for plant susceptibility to viruses: targets to improve plant resistance to viruses

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Because of their small genome encoding generally less than a dozen proteins the viral infectious cycle completely relies on the use of cellular factors. The completion of the viral cycle is therefore the result of a complex interplay between virus-encoded and host-encoded factors. In this scheme, absence or mis-adequacy of a single host factor (also called susceptibility factors) led to plants fully or partially resistant to viruses. In the plant natural diversity, these non-functional versions of host factors required for the viral cycle were demonstrated to correspond to recessive resistance genes. In recent year, one of the results that has enabled plant virology to make a step forward is the identification of components of the translation initiation complex as essential host factors required for RNA virus infection. Although translation initiation factors were demonstrated to be highly conserved determinants of plant resistance to viruses, several data indicate that the molecular basis underlying translation initiation factors-mediated resistance are highly variable. In parallel, several recessive resistance genes against viruses were identified and demonstrated to be distinct from translation initiation factors. These genes are therefore very good candidates for the discovery of new susceptibility factors. Recent results on (*i*) the specificity in the use of translation initiation factors by RNA viruses and on (*ii*) the identification of new host susceptibility factors, will illustrate this topic.