

Table 2
Some Properties of CP- and RNA-Mediated Virus Resistance

Virus resistance	CP-mediated	RNA-mediated
Viral gene involved:	CP gene	RdRp, MP, or other genes
Initial interactions:	Protein–protein or protein–RNA	RNA–RNA
Possible working mechanisms:	Blocking of movement and/or translation	RNA degradation
Capacity:	Dosis-dependent	Dosis-independent
Spectrum:	Broad (against members of a genus)	Narrow (against homologous viruses)
Specificity:	α -like supergroup	All supergroups

CP, coat protein; RdRp, RNA-dependent RNA polymerase; MP, movement protein.

Expression of a truncated RdRp gene of cucumber mosaic cucumovirus conferred immunity to the homologous virus (**13**). Transgenic tobacco plants harboring an untranslatable RdRp gene or an antisense RdRp gene also show resistance to CMV. On the contrary, DNA constructs based on CMV RNA-3 are not capable of conferring resistance (unpublished observations). Concurrently with these reports in which RdRp sequences are used, many more reports appeared dealing with this type of pathogen-derived resistance. Transgenic tobacco plants expressing untranslatable CP cistrons of tobacco etch potyvirus and potato Y potyvirus show immunity to the respective potyviruses (**21,24**). Since untranslatable RNAs are capable of conferring virus resistance, this clearly indicates that the transgenic viral transcripts are involved in the resistance. Therefore, this type of engineered resistance has been denoted RNA-mediated virus resistance (RMR). The number of (+)-strand viruses for which RMR has been obtained is still expanding, and at this moment alfamo-, carmo-, como-, cucumo-, potex-, poty-, tobamo-, tobra-, and tombusviruses are included (*see Table 1*).

Transformation of host plants with (untranslatable) nucleoprotein gene sequences of tomato spotted wilt tospovirus, a (–)-stranded RNA virus belonging to the *Bunyaviridae*, confers high levels of virus resistance (**28**). This is a clear demonstration that RMR is not limited to the (+)-stranded viruses.

Transformation of tomato plants with RdRp sequences of tomato golden mosaic geminivirus, a virus with a circular DNA genome, yielded transgenic plants that show a significant reduction in symptom development following inoculation with the homologous virus (**34**). This at least suggests that RMR might also work for viruses with DNA genomes.