

Remarkably, constructs derived from (+)-stranded viruses, capable of conferring virus resistance, contain replicase or RdRp sequences, or sequences corresponding to viral RNAs encoding (subunits of) the RdRp. This is the reason why, in the past, the resistance was often referred to as replicase-mediated virus resistance (13,15,21,26).

At least for some (+)-stranded viruses, it has been shown that cotranslational disassembly is the initial step in the viral infection process. In general, this leads to the production of RdRp, which is necessary for replication and/or subsequent transcription, and hence expression of the other viral genes. Obviously, resistance can be obtained by interference with the production of RdRp, blocking the first and critical process in virus replication. In addition, recently it has been reported that resistance to the Picorna-like viruses and the (–)-stranded viruses can also be obtained by expression of genes involved in cell-to-cell movement (14,29). As mentioned in **Subheading 3.**, the Picorna-like viruses move from cell to cell via desmotubules consisting of viral MP. For tomato spotted wilt tospovirus, it has recently been demonstrated that viral nucleocapsids also move from cell to cell via desmotubules (35). It can therefore be assumed that inhibition of the expression of MP genes of these viruses prevents the formation of desmotubules, thereby inhibiting cell to cell and systemic spread.

For viruses that move from cell to cell via plasmodesmata with altered size-exclusion limits, resistance cannot be obtained by interference with the expression of MP genes. Obviously, the production of very small amounts of MP is sufficient for virus transport, and hence for normal systemic infection.

Among the plant viruses, potyviruses, belonging to the Picorna-like supergroup, are real outsiders in a number of molecular aspects. The same holds for engineered potyvirus resistance, since it has been shown that sequences derived from different parts of the potyviral genome are capable of conferring resistance (21,22,36). This might be related to the fact that potyviruses have an undivided RNA genome, encoding a single polyprotein. Hence, resistance can be obtained by interference with the production of this polyprotein, thereby preventing the synthesis of (–)-strand RNA molecules and other processes, including viral cell-to-cell movement.

Despite numerous attempts, only a single clear report appeared on RMR against a phloem-restricted virus, potato leaf roll luteovirus (17). So far, pathogen-derived resistance has not been obtained to other important luteoviruses, such as beet western yellows and barley yellow dwarf luteovirus. Luteo- and closteroviruses obligatorily replicate in phloem tissue including sieve tubes, companion cells, and so on. Since the sieve tubes lack nuclei, it might be that the inhibiting transgenic RNAs (or CPs) are simply not present in cells where these viruses replicate. This implies that other, more novel, strategies need to