tical sources of resistance is preferred. The general problem, however, with the application of such sources of resistance is often their durability. Since the active resistance mechanisms are triggered upon recognition of the virus by the plant, the resistance can be overcome by new viral strains or pathotypes, which have single, or few, point mutations in their genomes. For example, pepper varieties containing the L1, L2, L3, or L4 tobamovirus resistance genes, are frequently infected with novel pepper mild mottle tobamovirus pathotypes. Resistance-breaking pathotypes already appeared in the breeding phase, during the introgression process of an L resistance gene ***(5)***.

As mentioned, many crops lack resistance genes to viruses. This is well-illustrated in the *Cucurbitaceae*. The cultivation of cucurbit crops in the open field is severely affected by a number of potyviruses, closteroviruses, and cucumber mosaic cucumovirus. Unfortunately, besides the cultivated cucurbits, their wild relatives are often also susceptible to these viruses. Hence, suitable sources of resistance, to be introgressed into cultivated cucurbits, are absent. This illustrates that in some crops, novel strategies to obtain virus resistance are urgently required.

3. Engineered Resistance to Plant Viruses

Over the past decade, our knowledge of plant transformation technology and molecular virology has increased rapidly. This has opened the way to genetically engineer virus resistance. Protection to viruses has been reported by expression of a number of antiviral agents in plants, including ribozymes, 2'–5' oligoadenylate synthetase, double-stranded ribonucleases (dsRNases), ribosomal inhibiting proteins (RIPs), CP-ribonuclease (CP-RNase) fusion proteins, (pl)antibodies, and antibody-enzyme (abzyme) fusion proteins ***(6,7)***. At least some of these approaches look promising, but it is beyond the scope of this chapter to describe these strategies in more detail.

Engineered plant-derived resistance may also be obtained by transgenic expression of durable vertical resistance genes in other crop plants. In this respect, one can imagine that expression of the highly durable Tm-2^2 tobamovirus resistance gene (from tomato) in pepper could serve as an alternative to the nondurable L resistance genes in this crop, provided that this gene operates similarly in pepper ***(2,5)***.

Pathogen-derived resistance comprises expression of viral genes in plants. Transgenic expression of symptom-attenuating satellite RNA molecules in plants, or expression of defective-interfering (DI) RNA molecules, leads to a certain level of tolerance in host plants. The tolerance is conferred by coreplication of these symptom-attenuating RNA molecules with the corresponding helper virus. Since only a few plant viruses support satellite RNAs and DI RNAs, these approaches are generally not applicable.