recombination plays an important role in the evolution of RNA viruses (*see* **refs. *20–23***). Evidence is now forthcoming of recombination between superinfecting viral RNA and RNA expressed from a transgene ***(24)*** through the aberrant homologous recombination mechanism. The finding of recognizable host RNA sequences within viral RNAs ***(25,26)*** is suggestive of nonhomologous recombination.

All the experimentation on recombinants between plant virus sequences has been done in controlled laboratory situations. It is difficult to devise detailed protocols for the detection of recombinants produced in the field. However, the basic principles are straightforward. One has to have a system to address the question as to whether the transgene sequence is covalently linked to the superinfecting viral sequence. This can be done by polymerase chain reaction (PCR) with primers to the transgene sequence (easy to devise) and to the superinfecting virus sequence (much more difficult to predict). If a recombinant is found, it has to be characterized to demonstrate that it is infective and viable. Only then can it be considered to be a potential risk.

1.4. Heteroencapsidation

This involves the superinfection of a plant expressing the CP of a virus, say virus A, by an unrelated virus B. Heteroencapsidation is the encapsidation of the genome of virus B by the CP of A, thereby conferring on virus B properties of virus A. There are several examples of heteroencapsidation in transgenic plants, both between viruses of the same group ***(27,28)***, and between unrelated viruses ***(29)***. The main property of CP that is considered is that of vector transmission characteristics. However, there is increasing evidence that CPs are involved in long distance viral movement around infected plants, and heteroencapsidation could enhance the movement of a superinfecting virus that did not normally move systemically (*see* **Subheading 1.2.**).

The discussion of heteroencapsidation has focused on superinfecting viruses. However, there is the possibility that heteroencapsidation of retrotransposons could present a problem. Retrotransposons are a major class of transposable elements whose structure resembles the integrated copies of retroviruses, and which are considered to be important in evolution (*see* **ref. *30***). The *Tyl-copia* group of retrotransposons is widespread in plant genomes ***(31–33)***, and it has been suggested that there might be horizontal transmission between species ***(31)***. Sequencing has shown that most copies of the *Tyl-copia* retrotransposons in plants are mutated, so they would not be active. However, several active ones capable of retrotransposition have been described ***(30,34–37)*** and presumably replicate, as do all retrotransposable elements, via RNA. Among the factors that activate plant retrotransposons is tissue-culture, a process involved in transformation ***(37)***. This raises the possibility that introduction of the CP