Ultimately, resistance is measured as reduced influence of disease on crop yield and quality. Factors that may contribute to reduced disease loss include percentage of plants that develop disease, severity of symptoms among diseased plants, length of time required following inoculation for symptoms to develop, concentration of virus in infected tissue, degree of systemic distribution of the virus, capacity of an infected plant to serve as a source of virus for vectors, susceptibility to the spread of virus from plant to plant, numbers of vectors found colonizing plants, frequency of visitation by vectors, and attraction of vectors to virus source plants.

2. Determine the kind of resistances that would be effective: The specific strategies used for field testing must depend on the kind of resistance desired or required. One type of resistance may be effective for one virus, but it might not be effective for another, depending on epidemiological factors involved in dissemination of the different viruses (**Note 3**).

   Tolerance generally is not the preferred means of reducing disease loss, but it could be acceptable when the virus is not a threat to other crops (i.e., potato virus X and potato virus S of potato), or when infected plants within the crop itself do not serve as a source of virus for infection of other plants (i.e., beet curly top virus-infected tomato).

3.3.3.2. Resistance to the Homologous Virus

This test involves intentional inoculation of each plant with the virus isolate that served as the source of the transgene. It is used to rank the resistance of lines that survive the initial screen test described above. When incidence of systemic infection is the criterion for resistance selection, at least four replications with 20 plants/rep, arranged in a randomized complete-block design, is recommended.

The chief advantage of this approach is that it insures that all plants receive a uniform exposure. The exposure is easily limited to the homologous virus for mechanically transmissible viruses, but not for vectored viruses, since it does not exclude natural exposure to other isolates and strains carried to the plots by vectors. Natural exposure to vectors might be limited by conducting the inoculation during a period when the vectors are not present in the area, and then controlling the vector using pesticides or other methods at later stages.

This test provides an opportunity to obtain resistance data on the incidence of systemic infection, time required for disease development after inoculation, virus concentration in infected plants, and severity of symptoms on infected plants. It provides no direct information on resistance to spread of virus from plant to plant. This test also provides an opportunity for more stringent selection of agronomic characteristics among the most resistant lines.

The inoculum pressure should be sufficient to assure high infection rate in wild-type control plants, but should not exceed that required to infect 100% of