

the principal purpose. Thus cauliflower mosaic virus and turnip mosaic virus in vegetable brassicas are controlled to some extent by spraying for their aphid vectors using insecticides. However, the principal need for the chemical treatment would be to control the aphids themselves along with other pests, such as caterpillars. Thus the development of transgenic virus-resistant varieties might not result in a reduction in pesticide usage.

The extent to which the deployment of transgenic virus-resistant varieties would reduce these pesticide figures in the United Kingdom would depend mainly on economic factors and whether breeding companies perceived that a suitable market existed. It can, however, be seen that there is potential for very large-scale reductions in pesticide use, if suitable completely resistant transgenic varieties were made available and were widely adopted. Regulatory authorities should take note of this potential in the light of public and governmental concerns over pesticide usage; **Table 1** can be used to estimate the likely environmental benefits of a given virus-resistant crop being widely grown.

2.3. Public Health

In theory, public health benefits could accrue from a reduction in insecticide usage of those chemicals used to protect the crops listed in **Table 1** from the virus diseases mentioned, if transgenic resistant crops were widely grown.

However, there is no evidence (MAFF monitoring studies) of any detectable residues of these insecticides being present in the foodstuffs originating from these crops. This is principally owing to these insecticides being used as foliar sprays or as seed treatments early in the life of the crop, and either no subsequent movement of the products or residues to the edible parts of the plant or simply the breakdown of the product long before harvest. Processed products, such as beet sugar or rape-seed oil, are even less likely to contain the residues of insecticides applied to control aphid virus vectors. Residues of insecticides used to protect seed potatoes would also not be present in the tubers produced from progeny crops.

The only possible public health benefits might arise from a reduction in operator exposure by farm and allied workers in the manufacture, distribution, and application of insecticides used to control virus vectors. These benefits might be significant considering the very large amounts of insecticides involved and their known or suspected harmful effects (5,6) (both acute and long-term). Any actual benefits would be very difficult to quantify.

It is thus unlikely that any major public health benefits would follow from the widespread adoption of transgenic virus-resistant crops. A large reduction in the use of insecticides might however help to reduce the risks to health as perceived by the public, which is greater than can be supported by known facts (5). It would appear that the principal benefits would be environmental and agronomic.