Molecular detection of raspberry viruses

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Raspberry plants are known to be infected by more than twenty different viruses which, especially when present as mixed infections, can cause severe symptoms and greatly affect fruit yield and plant viability. Accurate diagnosis of these viruses can be important, for example to ensure that planting material is virus-free or to suggest approaches to prevent the spread of the viruses within and between plantations.

Some diagnosis can be achieved by visual inspection of symptoms and graft reactions, however, symptoms do not appear in all varieties and are easily misinterpreted. More specific tests include antibody-based ELISA, which can be effective if virus concentrations in the plant are sufficiently high, and nucleic acid sequence-based technologies such as PCR. We are attempting to obtain sequence information for the most commonly occurring viruses in UK raspberry crops, a procedure which is also identifying other viruses that were previously unknown.

RCVC symptoms

Raspberry leaf mottle virus (RLMV)

Leaf spot symptoms are very commonly seen in raspberry plantations in Scotland and elsewhere. We now know that these symptoms are caused in part by RLMV. Work at SCRI has shown that Raspberry leaf spot virus and Raspberry mottle virus are variants of RLMV, and we have used a PCR test to detect this virus in Scottish and English crops.

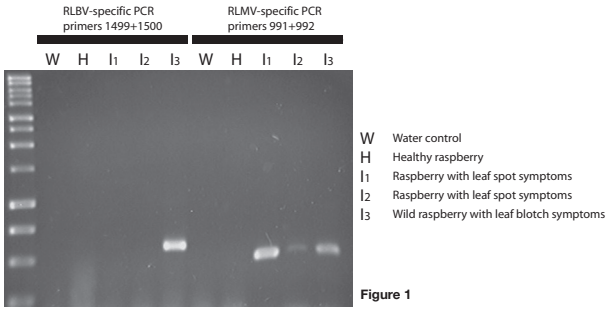

Figure 1

All three raspberry plants (two cultivated and one wild) were found to be infected with RLMV. The wild raspberry also contained RLBV.

Raspberry vein chlorosis virus (RVCV)

This virus is very common locally, and in mainland Europe, and is transmitted by the small raspberry aphid. Work at SCRI has shown it to be a rhabdovirus, suggesting that it probably multiplies in both the insect vector and raspberry plant. We have obtained a significant amount of sequence information for this virus, and used this to design diagnostic PCR tests.

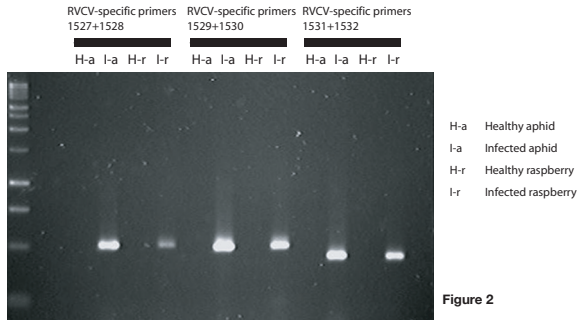

Figure 2

RVCV can be detected by a PCR test in both the vector aphid and infected raspberry plant. Three pairs of PCR primers amplify different regions of the virus sequence.

Raspberry leaf blotch virus (RLBV)

Newly discovered by work at SCRI, this virus is probably spread by raspberry leaf and bud mite *(Phyllocoptes gracilis)* and is associated with very severe symptoms of leaf distortion and patchy necrosis. Sequencing of this virus is nearly complete and has enabled us to develop a diagnostic PCR test (Figure 1).