STUDIES OF SAP-TRANSMISSIBLE VIRUSES OF FLOWERING CHERRIES

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ABSTRACT

Six sap-transmitted viruses were identified during a study of 434 flowering cherry trees (*Prunus serrulata* Lindl. *sensu lato*) in the North Island of New Zealand. These included *Prunus* necrotic ringspot ilarvirus strain G (PNRSV-G), apple mosaic ilarvirus (ApMV), flowering cherry virus B (FCVB), strawberry latent ringspot virus (SLRV), prune dwarf ilarvirus (PDV) and flowering cherry virus I (FCVI). Of these, ApMV, FCVB, SLRV and FCVI were new records for this host. FCVB and FCVI are newly described viruses. The most common virus was PNRSV-G (30.6%); the other viruses ranged in incidence from 10.2% (FCVB) to 0.5% (PDV). A further nine viruses were also detected by mechanical transmission, but were not characterized in this study. Repeated sampling of 30 flowering cherry trees during late winter and early spring showed that ELISA was more sensitive for detecting PNRSV-G infection of flowering cherries than sap-transmission.

Three methods for purifying PNRSV-G isolates from flowering cherry were assessed and the best method was one that used ether as a clarification agent. Yields of 5.0 mg/100 g of tissue were obtained. An antiserum was produced to PNRSV-G in New Zealand white rabbits which had a titre in microprecipitin tests of 1/8192. A 338 nucleotide cDNA clone was made to PNRSV-G which hybridised to RNA-3 in Northern analysis.

FCVI had a narrow host range, quasi-isometric particles of *c.* 26 nm diam. morphologically similar to the particles of ilarviruses, some bullet shaped particles (also characteristic of ilarviruses), four RNA species of 3550, 2800, 2000 and 1050 nucleotides,

and a coat protein of M_r 30 000. These properties indicate that FCVI has affinities with the ilarvirus group, but it differs in host range and symptoms, physical characteristics and serological properties from other members of this group.

FCVB infected both monocotyledons and dicotyledons, but had a limited host range. FCVB has four RNA species of 3900, 2150, 1800 and 800 nucleotides (estimated from denatured dsRNA). Partially purified preparations contained isometric particles about 24nm in diameter. When purified at pH 7.5 FCVB sedimented in sucrose gradients as three UV absorbing components and virus particles appeared to be swollen. At low pH (5.0 or 6.0) or at pH 7.5 with the addition of magnesium ions, FCVB sedimented as a single predominant UV absorbing component and virus particles were not swollen. One major protein band (M_r 19 300) was extracted from partially purified preparations. Based on these features, it is proposed that FCVB is a new member of the bromovirus group. However, serological interrelationships were not detected with antisera to three bromoviruses, brome mosaic virus, broad bean mottle virus and cowpea chlorotic mottle virus.

SLRV was isolated from flowering cherry trees in close proximity to each other in Auckland, New Zealand. The virus was not isolated from any of 390 flowering cherry trees tested from four other regions in the North Island. The virus was identified by host range, particle morphology, RNA and protein content and by serology. This is the first record of SLRV in flowering cherry.

The nucleotide sequence of the 3'-terminal 2427 nucleotides of SLRV RNA-2 were

determined using cDNA clones. The sequence contains a single reading frame terminating at an ochre stop codon 552 nucleotides from a 3'-terminal poly(A) tract. The N-terminal sequences of the two SLRV coat proteins determined by Edman degradation indicated that the larger 43K protein had a N-terminal Gly and the smaller 27K protein was cleaved at a Ser/Gly bond. No homologies were found in amino acid sequences or nucleotide sequences to four comoviruses or six nepoviruses suggesting that SLRV should be placed in a separate plant virus group.

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