

Viburnum Calico Caused by a Strain of Alfalfa Mosaic Virus

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ABSTRACT

A strain of alfalfa mosaic virus was isolated from *Viburnum tinus* 'Robusta' leaves exhibiting a bright calico pattern. The virus was serologically related to a strain of alfalfa mosaic virus isolated from *Viburnum opulus* showing mosaic symptoms on the spring leaves. Plants of *V. tinus* and *V. opulus* free of virus were developed through heat treatment. Calico symptoms developed in heat-treated plants of *V. tinus* when subsequently inoculated with the alfalfa mosaic strains isolated from the two *Viburnum* species. The name "Viburnum Calico" is proposed for this disease. *Phytopathology* 61:1305.

A mosaic of *Viburnum opulus* L. in Germany and Hungary was described as snowball mosaic (2). Although no electron micrographs or serological data were presented, snowball mosaic was shown on the bases of physical properties and host reaction to be caused by a strain of alfalfa mosaic virus (AMV) (1).

Plantings of *Viburnum tinus* L. 'Robusta' in California were found which displayed a bright calico on the foliage (Fig. 1). These symptoms were easily distinguishable from those found on plantings of *V. opulus* in California. The symptoms on this latter host corresponded to those described as snowball mosaic (2). This investigation was undertaken to determine if the calico symptoms were caused by a strain of AMV.

Leaves of infected *V. tinus* were homogenized in a solution of 0.3% K_2HPO_4 , 0.3% $Mg_2Si_3O_8 \cdot 5H_2O$, and 0.2% Na_2SO_3 . The resulting homogenate was used to inoculate a series of Carborundum-dusted herbaceous hosts, including *Nicotiana tabacum* L. 'Xanthi-nc' which developed local lesions and necrotic rings. Subsequent inoculations from *V. tinus* were made with a solution of 2.5% nicotine sulfate and 1% K_2HPO_4 which made it possible to go directly to a number of the described hosts of AMV (3). The AMV from *V. opulus* showing symptoms of snowball mosaic was isolated using this second buffer.

The viruses isolated from *V. tinus* and *V. opulus* were purified from infected *N. tabacum*, and their physical properties were determined as previously de-

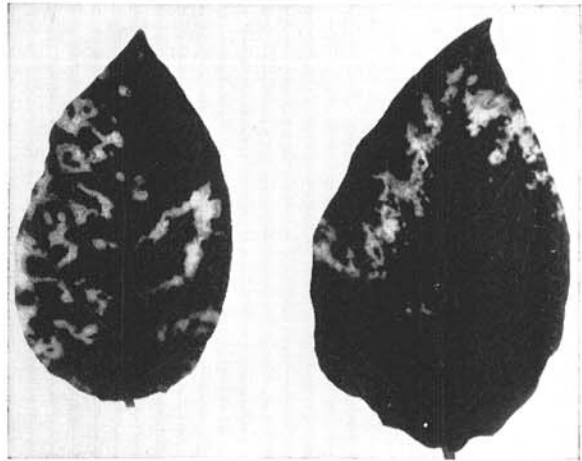


Fig. 1. *Viburnum tinus* L. 'Robusta' leaves exhibiting a bright calico pattern caused by a strain of alfalfa mosaic.

scribed (3). Although there were differences between their reactions on herbaceous hosts and their component ratios, the two isolates were serologically identical, and are considered strains of AMV (4).

Plants of *V. tinus* and *V. opulus* showing calico symptoms which were 6-12 months old were placed in a heat chamber at 37.7 C, and cuttings were removed at 4 to 9 weeks after the start of heat treatment. These cuttings were rooted, and the developing plants showed no calico symptoms over the next 4 years. The original source plants consistently developed symptoms over the same period of time.

The AMV originally isolated from plants showing symptoms of Viburnum calico was used for mechanical inoculation of the plants derived from the heat-treated *V. tinus*. Infected *N. tabacum* was homogenized in 1% K_2HPO_4 and rubbed on the Carborundum-dusted, heat-treated *V. tinus*. Symptoms of Viburnum Calico appeared within 12 weeks on the inoculated plants. Heat-treated *V. tinus* plants were graft-inoculated with budwood from the original *V. tinus* and *V. opulus* plants. Symptoms that developed in the inoculated, heat-treated plants were similar, but different enough to be separable.

This report establishes that a calico symptom can be induced on *V. tinus* by a strain of AMV which is serologically related to that causing snowball mosaic. Also, plants showing symptoms of Viburnum Calico can be freed of the virus by heat treatment.

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