Physical Properties and Host Ranges of Viruses Latent in and Mechanically Transmitted from Jasmine

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ABSTRACT

Viruses were isolated from introductions of *Jasminum multiflorum* with mild mosaic symptoms and from symptomless *J. odoratissimum* by triturating petal tissue in 0.025 M phosphate buffer and rubbing leaves of *Chenopodium quinoa*. These viruses infected few herbaceous species. Tobacco ringspot and cucumber mosaic viruses were isolated from symptomless *J. nudiflorum* shrubs growing in Maryland by the same procedure. The host ranges and physical properties of the latter two were typical of those for the respective viruses. The cucumber mosaic virus and the virus from *J. multiflorum* were transmitted by aphids. I suggest naming the two undescribed viruses "Jasmine mild mosaic" and "Jasmine latent virus 1." This appears to be the first report of mechanical transmission of virus from jasmine. Phytopathology 61:228-230.

Additional key word: serology.

Viruslike disorders of jasmine have been known for a long time. Orton (5) reviewed an early report of infectious chlorosis in "Jassamine" which was graft-transmitted by an English clergyman prior to 1713 (3). More recently, McLean (4) described a mosaic of *Jasminum simplicifolium* Forst. which was graft-transmissible.

At the U. S. Plant Introduction Station, Glenn Dale, Md., a single jasmine plant (*Jasminum multiflorum* Andr. P.I. 246874) from Brazil was not released for distribution because leaves exhibited a mild, viruslike mosaic symptom. When flower petals were indexed, virus was readily mechanically transmitted to *Chenopodium quinoa* Willd. This prompted us to index petals of other jasmine introductions and established shrubs.

MATERIALS AND METHODS.—One-half to 1-g samples

TABLE 1. Reactions of herbaceous plant species to four viruses from *Jasminum* spp.

Species	Virus and source: Mild mosaic, *J. multiflorum* P.I. 246874	Latent virus 1, *J. odoratissimum* P.I. 238775	Tobacco ringspot virus, *J. nudiflorum*	Cucumber mosaic virus, *J. nudiflorum*
Gomphrena globosa L.	S-H[a]	0	L-C, stunt	S-H
Vinca rosea L.	0	0	0	S-H
Chenopodium quinoa Willd.	CLL + SC	L-CRS + SC	NLL + LN	CLL + NRS
Ageratum houstonianum Mill. 'Blue Mink'	0	0	S-H	NLL
Cucumis sativus L. 'Long Improved Green'	NSS	CLL	CLL + SM	SLL + SM
Vigna sinensis (Torner) Savi. 'Early Ramshorn'	NS	SN-stunt	NRS-death	NLL
Phaseolus vulgaris L. 'Pinto 111'	NS	NS	L-N	NS
Antirrhinum majus L.	0	L-H	S-N	
Torenia fournieri Lind.	0	0	NLL + death	NLL + death
Capsicum annum L. 'California Wonder'	0	0	SC	SC
Datura stramonium L.	0	0	NLL + SM	0
Lycopersicum esculentum Mill. 'Rutgers'	L-H	0	0	SH
Nicotiana glutinosa L.	0	L-C	S-H	S-C
Nicotiana tabacum L. 'Samsun'	0	0	L-NRS	S-C
'KY-35'	NS	LH	L-NRS	LH
Petunia hybrida Vilm. 'Snowball'	0	S-H	SH	SM

[a] L = Local infection (inoculated leaves); S = systemic infection; CLL = chlorotic local lesions; NLL = necrotic local lesions; NRS = necrotic ringspot; N = necrosis; M = mosaic; C = chlorosis; H = latent infection, and 0 = no infection based on back indexing on *C. quinoa;* NS = no symptoms (not back-indexed).

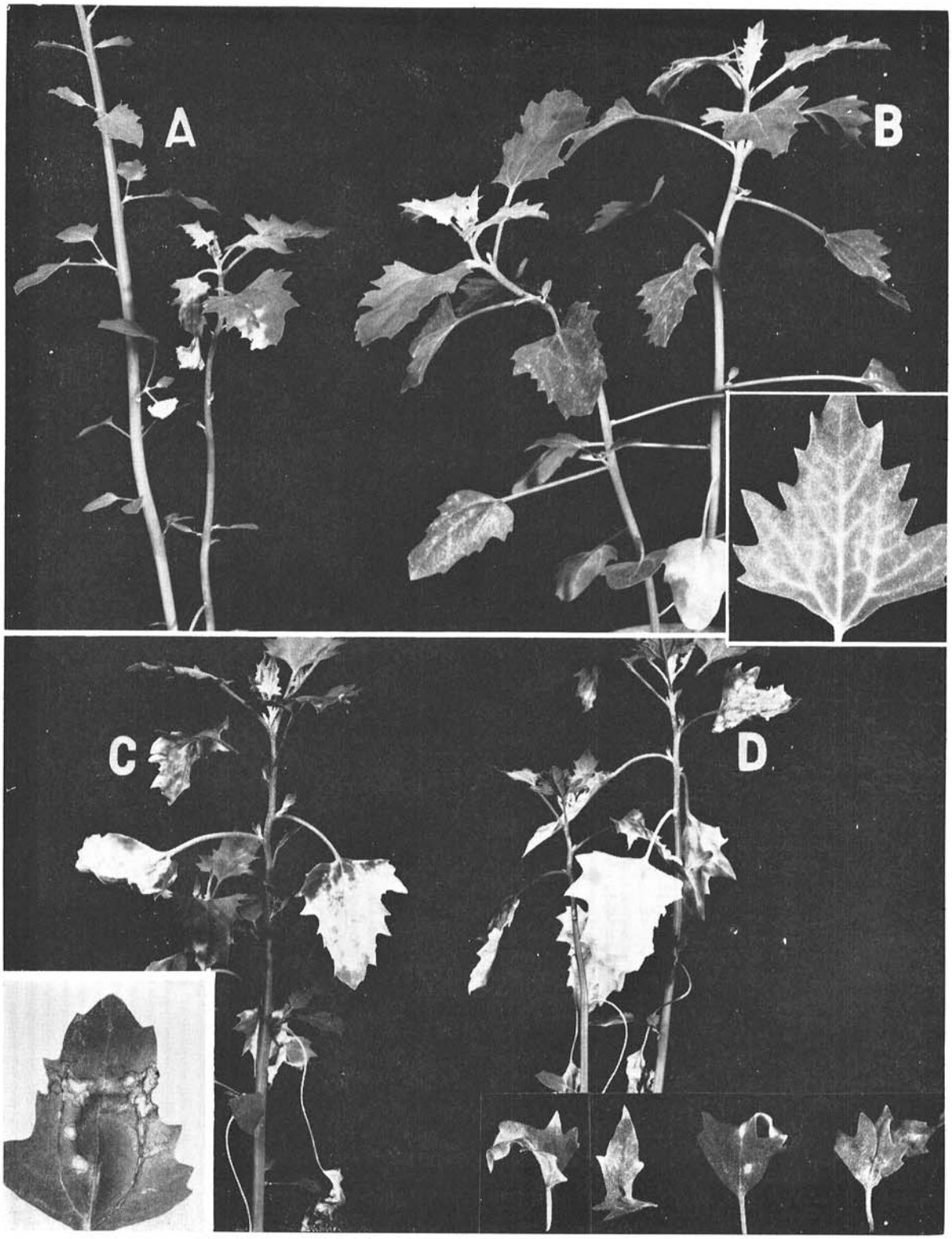

Fig. 1. *Chenopodium quinoa* infected with viruses isolated from *Jasminum* spp. **A)** Cucumber mosaic virus from *J. nudiflorum*. **B)** Mild mosaic from *J. multiflorum* P.I. 246874. **C)** Tobacco ringspot virus from *J. nudiflorum*. **D)** An unidentified virus latent in *J. odoratissimum*. In A, C, and D, some inoculated leaves have dried up and fallen. The insets at B and D show systemically infected leaves.

TABLE 2. Physical properties of four viruses from *Jasminum* spp.

Property	*J. multiflorum* mild mosaic	*J. odoratissimum* JLV-1	*J. nudiflorum* TRSV	*J. nudiflorum* CMV
Thermal inactivation point[a]	70-73 C	57-60 C	60-63 C	50-53 C
Dilution end point ($\times 10^3$)	10-50	10-50	1-2	5-10
Aging in vitro (room temp)	25-35 hr	72-96 hr	20-30 hr	10-20 hr
Aphid-transmissible (*Myzus persicae* Schulz)	Yes		No	Yes

[a] *Chenopodium quinoa* sap diluted 1:10 in 0.025 M phosphate buffer, submerged in water bath for 10 min, and assayed on *C. quinoa*.

of petals were triturated in 1 to 2 ml of 0.025 M, pH 7.2, phosphate buffer, and immediately rubbed onto Corundum-dusted *C. quinoa* leaves.

Host ranges and physical properties were determined according to previously described procedures (6), except that *C. quinoa* was used as the source of viruses and as the assay host in these experiments. In efforts to identify the viruses, we used the routine microprecipitin and agar gel-diffusion techniques.

RESULTS.—In addition to the virus isolated from *Jasminum multiflorum*, we isolated a virus from an introduction of *Jasminum odoratissimum* Linn. (P.I. 238775). Tobacco ringspot (TRSV) and cucumber mosaic (CMV) viruses were isolated from separate *Jasminum nudiflorum* Lindl. plantings. The latter two species did not exhibit any virus symptom; *J. multiflorum* is a white-flowered species; the other two are yellow flowered. *J. nudiflorum* is a commonly-grown ornamental in the mid-Atlantic region.

Each virus incited a distinct disease in *C. quinoa*. The differences were particularly evident 3 weeks or more after inoculation. CMV from *J. nudiflorum* incited tiny necrotic or chlorotic lesions and systemic leaf distortion or cupping (Fig. 1-A), while TRSV incited larger necrotic local lesions and systemic necrotic ringspots or tip necrosis (Fig. 1-C). The virus from *J. multiflorum* with mild mosaic incited 1-mm chlorotic lesions and stunted the plants. On occasion, systemically infected leaves reacted with veinal chlorosis (Fig. 1-B). The virus from *J. odoratissimum* incited many tiny chlorotic lesions or ringspots, and later a systemic mottle in some leaves or an unusual distortion in other leaves (Fig. 1-D). The reaction of other species to these viruses are given in Table 1, and physical properties are summarized in Table 2.

None of the four viruses reacted with antisera to arabis mosaic, tobacco mosaic, bean yellow mosaic, carnation mottle, turnip yellow mosaic, tomato ringspot, tobacco etch, or potato X viruses. Virus from one *J. nudiflorum* source reacted serologically with cucumber mosaic antiserum (provided by H. A. Scott), and that from another *J. nudiflorum* reacted with TRSV antiserum.

DISCUSSION.—None of our four virus source plants exhibited symptoms as severe as those described by Orton (5) or McLean (4). Indeed, only the *J. multiflorum* plant exhibited any symptom, and it was a mild mosaic on only a few leaves. All of the source plants were growing vigorously.

These viruses were readily isolated from the source plants when petals were used for inoculum, but with difficulty or not at all when leaves were used, as has frequently been noted with other virus-host combinations (2). *Chenopodium quinoa* is used extensively in our work with viruses, and is probably the single most sensitive species to a large number of viruses from fruit and ornamental plants. For this reason, one has to be alert for contaminating viruses. In view of the confusion which sowbane mosaic (1) and carnation mottle viruses can cause, each of our cultures was serologically tested with these antisera periodically.

I suggest naming the two undescribed viruses "Jasmine mild mosaic virus" and "Jasmine latent virus 1".

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