

THREE VIRUSES OF NANDINA DOMESTICA: NANDINA MOSAIC, NANDINA

STEM PITTING, AND CUCUMBER MOSAIC

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Heavenly bamboo, *Nandina domestica* Thunb., is a popular evergreen shrub native to eastern Asia. While the larger types, collectively referred to as "common nandina", are typically seed propagated, the named dwarf cultivars, 'Harbor Dwarf' and 'Nana-purpurea', are vegetatively propagated. 'Harbor Dwarf' closely resembles common nandina in leaf color and form, whereas 'Nana-purpurea' typically have cupped, distorted, and often variegated leaves which is likely due to uniform virus infection.

Three viruses have been reported infecting nandina. Nandina mosaic (NMV), a potexvirus, has been isolated from the 'Harbor Dwarf' and 'Nana-purpurea' (4,5,6), Nandina stem pitting virus (NSPV), a closterovirus, was originally described in 'Nana-purpurea' and in nature appears to be ubiquitous yet restricted to this cultivar (1). Cucumber mosaic (CMV) has been described as occurring naturally in common nandina in South Carolina (2) but appears to be less common in Florida.

Host Range and Transmission. Neither NMV nor NSPV appear to have a known natural vector, and both have been reported only as pathogens of nandina. However, NMV has been transmitted experimentally by rub inoculation to other species including Madagascar periwinkle and celosia (5, 6). Like other potexviruses such as cymbidium mosaic and potato virus X, NMV is readily transmitted mechanically and may be spread to healthy plants by cutting tools used in vegetative propagation. Cucumber mosaic virus is aphid transmitted and has a very wide host range which includes members of the Chenopodiaceae, Compositaceae, Cucurbitaceae, Leguminosae, and Solanaceae.

SYMPTOMS. Mosaic symptoms of NMV are intermittently expressed in the foliage of nandina cultivars. Infected plants are not obviously stunted and are essentially normal in appearance (6) (Fig. 1A). Plants infected with NSPV exhibit reddish discoloration and irregular, inward curling of the leaves (Fig. 1B). Removal of bark tissue of NSPV infected nandinas reveals stem pitting (1) (Fig. 2A) similar to that caused by tristeza virus in citrus. Symptoms of CMV in nandina are described as leaf distortion and discoloration, as well as reduction in number of flowers and berries. Plants which have been infected with CMV for several years show leaf narrowing and distortion with intense red pigmentation in newly developing leaves (2) (Fig. 2B).

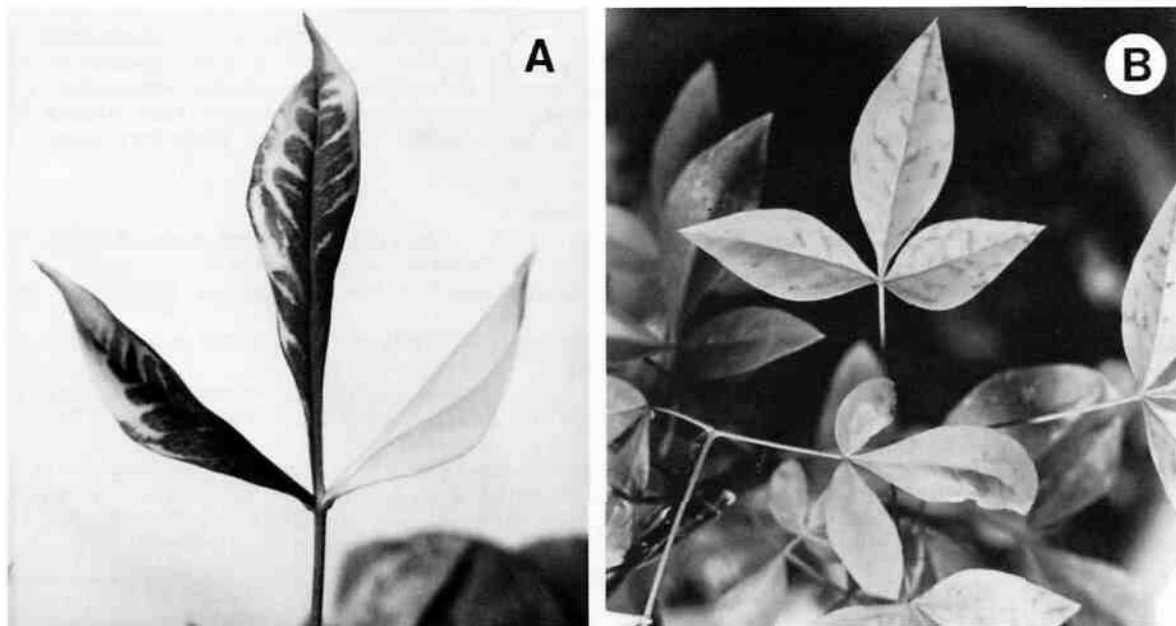


Fig. 1. *Nandina domestica*. A. Intermittent mosaic symptoms of NMV in 'Harbor Dwarf' (DPI Photo #702592-12). B. Mosaic leaf symptoms caused by NSPV (Photo credit: F. W. Zettler).

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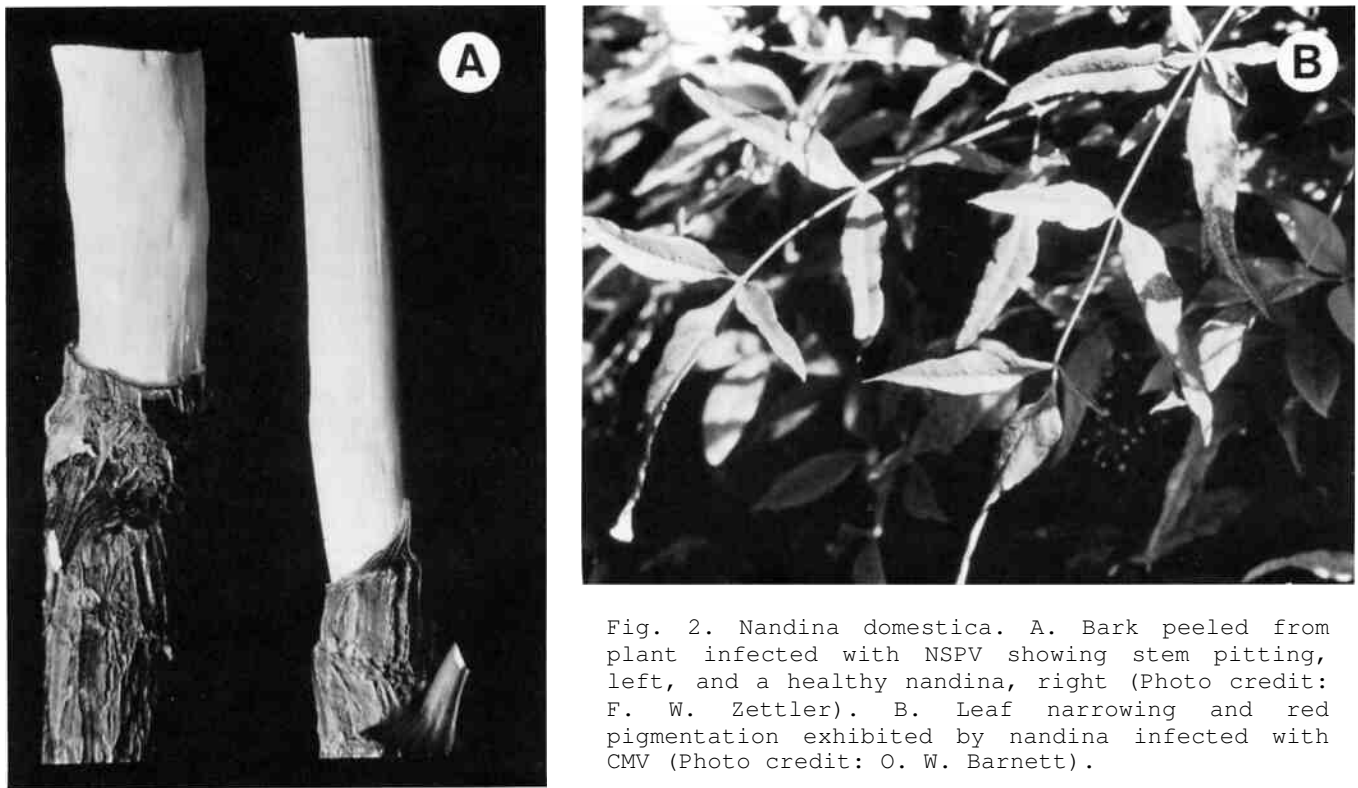


Fig. 2. *Nandina domestica*. A. Bark peeled from plant infected with NSPV showing stem pitting, left, and a healthy nandina, right (Photo credit: F. W. Zettler). B. Leaf narrowing and red pigmentation exhibited by nandina infected with CMV (Photo credit: O. W. Barnett).

DETECTION. Any nandina, regardless of cultivar, with mosaic or leaf distortion symptoms should be considered as virus suspect. One of the best means for diagnosis of infection is by observation of symptoms. In addition, electron microscopy can be used to detect the flexuous rod-shaped virus particles of NMV and NSPV. Light microscopy of tissues stained in azure A is also helpful in making definitive diagnoses for each of these viruses (1,3,6) by observation of virus aggregates or inclusion bodies. Whereas inclusions of NMV and CMV can be found in the epidermis and/or mesophyll, those of NSPV are apparently restricted to the phloem and resemble those induced by citrus tristeza virus.

CONTROL. Because there is no cure for these viruses, care should be taken to avoid symptomatic plants for use in landscaping and propagation. Virus incidence in 'Nana-purpurea' plants appears to be very high, and healthy plants are not likely to be available. In this case, some recent advancements in the in vitro propagation of nandina suggest the future possibility of obtaining virus-free plants of this cultivar. Neither of these three viruses appears to be seed-borne in nandina, therefore plants propagated by this method are likely to be free of virus.

LITERATURE CITED.

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