

## PHYTOPATHOLOGICAL NOTES

### *Datura stramonium*, a Local Lesion Host for Certain Isolates of Cauliflower Mosaic Virus

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Journal Series Paper No. 72-11-89.

#### ABSTRACT

Necrotic local lesions were produced on leaves of *Datura stramonium* inoculated with the Campbell, CM 1841, KK Cabbage or New York 8153 isolates of cauliflower mosaic virus. Lesions developed about 15 days after inoculation and lesion numbers were directly proportional to virus concentration. No lesions or other symptoms were produced on *D. stramonium* inoculated with the Cabbage B isolate.

Phytopathology 62:1473-1474

*Additional key words:* epidemiology, electron microscopy.

Studies on cauliflower mosaic virus (CIMV) have been hampered by lack of a local lesion host suitable for quantitative assay of the infectivity of virus preparations. This paper reports the suitability of *Datura stramonium* L. as a local lesion host for certain CIMV isolates. Some of the data have been published in abstract form (4).

The Campbell, CM 1841, Cabbage B, KK Cabbage, and New York 8153 isolates of CIMV were supplied by R. J. Shepherd, Univ. of California, Davis. Infected mustard plants (*Brassica perviridis* Bailey "Tendergreen") were used as the source of virus in our experiments. Local lesion assays were made on leaves which had been dusted with 600-mesh Carborundum. Inocula were applied to half-leaves with a cheesecloth pad.

Preliminary screening of a number of species commonly used as local lesion hosts for plant viruses indicated that *D. stramonium* was a reliable local lesion host for four of the five CIMV isolates. Distinct necrotic lesions appeared on *D. stramonium* leaves about 15 days after inoculation with the Campbell, CM 1841, KK Cabbage, or New York 8153 isolated (Fig. 1). The top four well-expanded leaves of 8- to 10-week-old *D. stramonium* plants produced the maximum numbers of lesions. No lesions or other symptoms were produced on *D. stramonium* inoculated with the Cabbage-B isolate. Typical CIMV symptoms were produced on mustard inoculated with extracts of *D. stramonium* leaves which had produced lesions in response to inoculation with the CIMV isolates. The infectivity of these extracts was quite low, however.

Further tests were made with the Campbell and New York 8153 isolates. These isolates were purified by the method of Pirone et al. (5). Virus concentrations were determined by spectrophotometry, using an  $A_{260}$  value (1 mg/ml,

1-cm light path) of 7.0 (6). Lesion numbers were directly proportional to virus concentration. (Fig. 2). The specific infectivity of the New York 8153 isolate was about 10 X higher than that of the Campbell isolate when assayed on *D. stramonium*. However, the two isolates had similar dilution end points when a systemic assay on mustard was used.

The methods of Fujisawa et al. (1) were used to prepare tissue for electron microscopy. Examination of cells around the periphery of the necrotic lesions

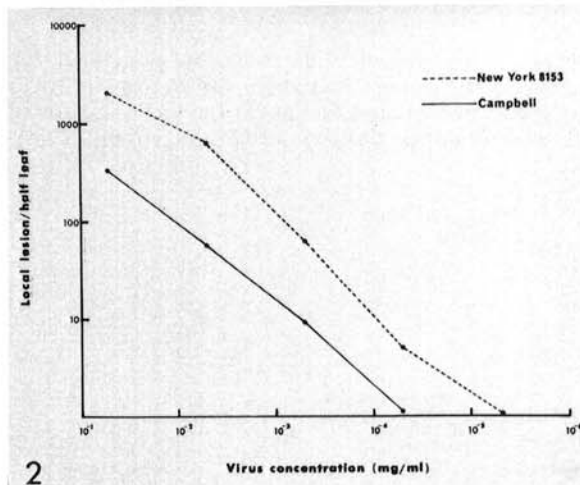


Fig. 1-2. 1) Leaf of *Datura stramonium*; right half-leaf shows local lesions produced 15 days after inoculation with the Campbell isolate of cauliflower mosaic virus. 2) Relationship between virus concentration and number of local lesions produced on *D. stramonium* by two cauliflower mosaic virus isolates.

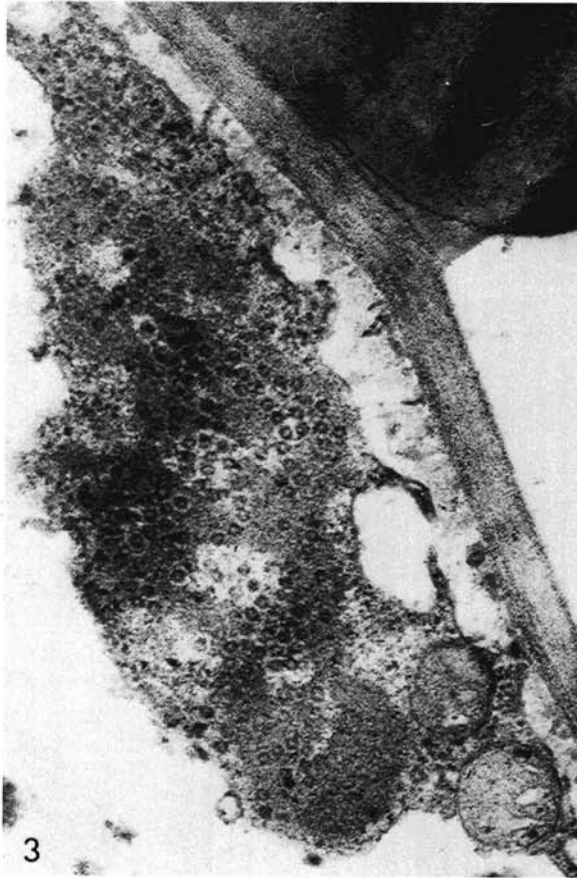


Fig. 3) Electron micrograph of sectioned tissue showing an inclusion body within a cell at the periphery of a local lesion on *Datura stramonium* inoculated with the Campbell isolate of cauliflower mosaic virus. Numerous virus particles can be seen within the inclusion (X 37,500).

revealed the presence of inclusion bodies in the cytoplasm. These contained aggregates of virus particles (Fig. 3), and resembled the inclusions found in cells of mustard systemically infected with CIMV (3).

In addition to indicating that *D. stramonium* is a useful local lesion host for certain CIMV isolates, our data may be of interest from another standpoint. With the exception of *Nicotiana clelandii* (2), the host range of CIMV is considered to be restricted to the Cruciferae (6). The most extensive host range survey reported, however, is that of Walker et al. (8), in which Tompkins' (7) original CIMV isolate and the Cabbage B isolate were used. No hosts outside the Cruciferae were found for either isolate. Our finding that Cabbage B does not induce symptoms on *D. stramonium* agrees with the report of Walker et al. (8). The fact that four other CIMV isolates as well as the unspecified isolate used by Hills & Campbell (2) can infect hosts outside the Cruciferae indicates that the restriction in host range reported in the study of Walker et al. (8) may not apply to all CIMV isolates. This could be of significance in the epidemiology of the aphid-transmitted CIMV.

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