

**D-32: Characterisation of papaya ringspot virus infecting *Carica papaya* in Sri Lanka**

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*Carica papaya* L. has been reported to be affected by a number of virus diseases. The most destructive disease is caused by papaya ringspot virus (PRSV), and is reported to limit papaya production in many countries. In Sri Lanka too, a virus has been isolated from diseased papaya plants and identified as PRSV, on the basis of biological and physical properties.

The present work dealt with the characterisation of PRSV isolates from papaya with biological and physical properties and the confirmation of their identity by serology. Isolates collected from different climatic regions of Sri Lanka were compared with each other and with the reported data of PRSV isolates that originate in different regions of the world.

Ten isolates were obtained from the infected leaves of papaya, growing in different climatic zones: wet zone (Nugegoda, Gampola), intermediate zone (Kurunegala) and dry zone (Dambulla). All the 10 isolates were maintained in *Carica papaya* L. by mechanically inoculating young seedlings (3 weeks old) of 5-6 leaf stage.

Papaya leaves with clear "virus" symptoms were ground in 0.05M cold potassium phosphate buffer, pH 7.5 at 1:3 (w/v), and the extracts were rubbed on test plants dusted with 100 mesh carborundum.

A range of test plants of the families, Caricaceae, Cucurbitaceae, Chenopodiaceae and Amarantheceae were mechanically inoculated and maintained in insect-protected cages kept in a greenhouse at  $30 \pm 2^\circ\text{C}$  for symptom production. Those plants which did not produce symptoms, 6 weeks after inoculation were assayed on healthy papaya for latent infection.

Longevity *in vitro* (LIV), Thermal Inactivation point (TIP) and Dilution End point (DEP), of PRSV were determined by standard procedures.

SDS-agar immunodiffusion test was done according to a method described by Yeh *et al* (1984). Both crude and partially purified virus antigens were used. Two antisera, one against PRSV-Hawaiian isolate provided by Gonsalves, Cornell University, USA) and the other against PRSV-Sri Lankan isolate provided by E M Dasanayake, Regional Agriculture Research Centre, Bombuwela) were tested.

Enzyme linked immunosorbent assay (ELISA): An indirect procedure (Clark and Adams, 1977) was used, to confirm the identity of PRSV.

All the isolates expressed symptoms 4-5 weeks after inoculation. Most isolates caused severe foliar symptoms producing severe mottle, leaf distortion and shoestring symptoms. The 2 dry zone isolates and one wet zone isolate produced mild mottling with less distorted leaves after 4 weeks of inoculation, but, later (in about 3 months) they too showed severe foliar symptoms and stunted growth. The rate of infection in the first inoculation was between 60-70%, however, the uninfected plants produced similar symptoms after the second inoculation.

No symptoms were produced by any of the isolates in *Gomphrena globosa*, *Chenopodium quinoa*, *C. amaranticolor* 'Coste & Reyn', *Cucumis melo* var. *agrestis* (Naud.), *C. sativus* L., *Cucurbita maxima* 'Duchesne', *Beninoasa hispida* (Thunb) Cogn. and *Momordica charantia* L. after 6 weeks of inoculation. The results were negative, when each symptomless host was assayed on *Carica papaya* L. for latent infection. *C. papaya* was the only host that could be infected by all 10 PRSV isolates.

No significant differences were found in DEP, TIP and LIV of the 3 contrasting isolates tested.

	DEP	LIV	TIP
PRSV	$10^2 - 10^3$	3 - 5 days	50 - 55°C

No precipitin lines could be detected in SDS-agar immunodiffusion. However, in the ELISA tests all the isolates were strongly positive for both antisera (against Hawaiian and Sri Lankan isolates)

The investigation confirmed that PRSV is responsible for the destruction of papaya plants surveyed. All 10 isolates are identical with respect to their biological and physical properties, despite the variations in severity of symptoms shown in their mother plants. The isolates from different climatic regions also seem to belong to same biological groups. PRSV, isolated from papaya in Sri Lanka can infect only *Carica papaya*. In contrast, PRSV isolates from other regions of the world: Taiwan, Hawaii, Florida, Ecuador and India infect the members of Chenopodiaceae and Cucurbitaceae in addition to papaya. Based on host reaction, therefore, it is suggested that PRSV isolates studied may probably be biologically distinct strains when compared to other PRSV isolates reported elsewhere.

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