



Fig. Papaya ringspot disease symptoms (on papaya leaf, stem & fruit) and Electron micrograph of PRSV- P virus (sources: Ceri Pearce, DAFF Qld. ; <http://beta-media.padil.gov.au/species/136656/3177-large.jpg>)

Disease: Papaya ringspot disease in papaw; **Causal agent:** *Papaya ringspot virus* – type P

Classification: D: Virus, F: Potyviridae, G: Potyvirus

Papaya ringspot virus (PRSV) causes significant diseases of commercially cultivated papaya and cucurbits in many countries. Based on host, the virus is grouped into PRSV-P (papaya and cucurbit) and PRSV-W (cucurbit only) biotypes. Both biotypes are transmitted in a non-persistent manner by a wide range of aphid species. In Australia, PRSV-P is restricted to south east Queensland, while PRSV-W is widespread in all cucurbit growing areas. Transgenic papaya varieties, resistant to PRSV-P, have been used to manage papaya ringspot disease in Hawaii.

Host range and Distribution: In addition to papaya and cucurbits (cucumber, melons, zucchini and squash), a number of experimental hosts for both biotypes have been reported. PRSV-P and PRSV-W are commonly found in tropical and subtropical regions worldwide. PRSV-P was first reported in south east Queensland in 1991. This area is designated as the Papaya Ringspot Pest Quarantine Area. PRSV-W has been present throughout Australian cucurbit production areas since the 1970's.

Biology: The general characteristics of PRSV are very similar to other members of the *Potyvirus* genus. In nature the virus is transmitted in a non-persistent manner by aphid species. Transmission occurs when aphids pick up the virus by feeding on an infected host plant and then moving to feed on a healthy host plant. Mechanical transmission is possible, but there have been no confirmed reports of seed transmission.

Symptoms: Typical PRSV-P symptoms include prominent yellowing and vein-clearing, as well as a distinctive “ringspot” mosaic pattern on young leaves.

Dark-green streaks and rings also appear on papaya leafstalks and stems. Infected fruit can also show dark green concentric “ringspots” on the skin. Symptomatic fruit are unmarketable. Severely affected plants become stunted, resulting in reduced fruit set.

Impact and Quarantine risk: PRSV-P is the most serious viral pest of papaya worldwide. Infected plants produce little to no fruit and the pathogen can be a significant restraint to commercial papaya cultivation. The presence of PRSV-P in south east Queensland poses a significant risk to commercial papaya production in the rest of Queensland and Australia. To mitigate this risk, the Queensland Government has implemented quarantine movement restrictions for papaya and cucurbit plants leaving the Papaya Ringspot Pest Quarantine Area.

Management: PRSV is very difficult to manage as there are no chemical treatments available. Short term, limited success may be achieved by using cultural practices such as roguing, on-farm hygiene and use of tolerant cultivars. Commercial papaya industries in Hawaii and Taiwan have managed this disease through the use of genetically engineered papaya varieties that are resistant to their local strain of PRSV-P.

Further Reading: A review by D Gonsalves, S Tripathi, JB Carr, and JY Suzuki (2010). Papaya Ringspot virus. The Plant Health Instructor. DOI: 10.1094/PHI-I-2010-1004-01

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