

PAPAYA RING SPOT VIRUS - A REVIEW

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The papaya (*Carica papaya* L.) belongs to the family *caricaceae*. It is cultivated all over the tropical and subtropical regions for its edible fruits and for papain production.

Papaya is affected by several diseases such as mosaic, distortion ring spot and ring spot virus (Mandahar, 1987).

PAPAYA RING SPOT VIRUS (PRSV)

In the past many times the term "mosaic" has been used to designate the "ring spot" virus in Sri Lanka (Abeygunawardene, 1969; Rajapakse *et al.*, 1981). Later, it was reported that the virus affecting papaya in Sri Lanka was PRSV (Shivanathan, 1982). PRSV is found in most of the tropical and subtropical areas where papaya is grown and papaya mosaic virus (PMV) was reported to be prevalent in USA and Venezuela (CMI/AAB report No. 84, 1972).

Papaya ring spot virus particles are long flexuous rods of about 800 nm length (Herold and Weibel, 1962). Mandahar (1987) stated that the virus particles are flexuous filaments of about 700-800 nm length.

This virus is inactivated when exposed to 55°C for 10 minutes. CMI/AAB report No. 84 (1972) states that this virus loses infectivity after 10 minutes at 54 - 56°C and after 8 hours at room temperature.

This virus induces cylindrical inclusions and amorphous inclusions in the cytoplasm of the host cells (S.P. Yeh *et al.*, 1988).

VECTORS OF PAPAYA RING SPOT VIRUS

PRSV is transmitted by both vectors and mechanical means. Most of the vectors are aphids. The important aphid vectors are *Myzus persicae* and *Aphis gossypii* (Abeygunawardene, 1969; Mandahar, 1987), and *Aphis*

medicaginis (CMI/AAB report No. 84, 1972). Under experimental conditions, *Myzus persicae* was the important vector transmitting the papaya ring spot virus. The virus is not persistent in the body of this insect. PRSV can be experimentally transmitted by sap inoculation or by grafting (Mandahar, 1987). CMI/AAB report No. 84 (1972) also reports similar findings.

ALTERNATE HOSTS OF PRSV

Cucurbita pepo, *Cucumis sativus* (100% infection), *Nicotiana glauca*, *Chenopodium amaranticolor*, *Gomphrena glubosa* and *Lycopersicon esculentum* are the possible alternate hosts of this virus disease in Sri Lanka (Rajapakse and Herath, 1981).

SYMPTOMS OF PRSV

Disease symptoms appear about two weeks after inoculation or infection. But when artificially infected mild symptoms appeared compared to natural infection (Agrios, 1978). The symptoms initially appear usually in the top leaves. The lower mature leaves may not show symptoms (Agrios, 1978).

Symptoms of PRSV include prominent mottling, malformation of leaves and reduction in leaf

size. The symptoms initially appear on the upper surface of the leaves and later spread downwards. Only dark green streaks and distinct ring spots may be seen on fruits (Mandahar, 1987). Fruits are generally deformed and may remain much smaller than those from healthy trees. In severe infestation, the plants develop small chlorotic and filliform leaves and fail to flower.

Sometimes, the symptoms of the PRSV may gradually disappear. This is due to the production of inhibitors by the plants. Papaya plants may be affected by PRSV at any stage of growth but the plant is seriously affected if infection takes place when plants are one year old (Sing, 1969).

PRSV severely affects papaya growing in wet and intermediate areas specially in Kandy, Matale, Colombo, Kalutara, Galle, Kurunegala and Gampaha districts. PRSV is not yet reported in Jaffna district apparently due to the high temperature, absence of the vectors or soil conditions.

CONTROL MEASURES

Papaya ring spot virus could be controlled only by eradication of infected plants and by maintaining good field sanitation.

Also it would be useful to initiate a programme to breed varieties resistant to PRSV. *Carica cauliflora*, a mild relative of

papaya is immune to this virus (Capoor and Varma, 1961) and hence has the potential of its use in breeding resistant varieties.

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