J. Phytol. Res. 7 (1) : 77-78, 1994

OCCURRENCE OF PAPAYA RING SPOT VIRUS FROM AMRITSAR (PUNJAB) INDIA

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Based on host range, symptomatology, transmission, serology and electron microscopy a virus causing yellow mosaic, stunting, presence of rings on fruit and water soaked areas on stem was characterized. Host range of the present virus was restricted. Virus was sap as well as aphid transmissible *(Myzus persicae)*. The particles of the virus were flexous filaments measuring 780 x 12 nm. On the basis of above information the infecting virus was assigned as papaya ring spot virus.

Keywords: *Carica papaya; Myzus persicae;* Virus

Papaya *(Carica papaya L.)* is one of the most widely grown and economically valuable fruit of tropics and sub tropics, is grown in most part of India for medicinal and economic purposes. This large herbaceous, dicotyledonous plant with a single stem and crown of large palmately lobed leaves grows fast and yields fruit 10 months after being transplanted in the field. The extensive adaptation of the plant and the wide acceptance of the fruit after considerable promise for local and export market.

A destructive disease caused by papaya ringspot virus is a major obstacle in papaya plantation. This virus is responsible for distortion of leaves, curling of leaves (not always) water soaked areas on stem and rings on fruits and bearing of undersize fruits. The virus can be transmitted by aphids and mechanically as well.

Virus Source, Transmission and Physical Properties: The isolates were collected from different areas of Amritsar district and labelled them as P1, P2, P3, P4 etc. Each isolate was maintained separately on healthy seedlings of papaya by sap inoculation in insect-proof condition. Sap extracted from severely infected young leaves in 0.1 M Phosphate buffer (pH 7.0) was used for inoculation of the leaves of different host plants using carborundum (600 mesh) as an abrasive. Virus free colonies of aphid *Myzus persicae* were employed in transmission test.

In seed transmission test hundred seeds each from different cultivars were sown in earthern pots containing steam sterilized sand, compost and soil. The plants were observed for the appearance of disease symptoms for 2 weeks. Physical properties in crude sap such as thermal inactivation point (TIP), dilution end point (DEP) and longevity *in vitro* were determined using standard procedures as described by Noordam[1].

Purification: Purification of collected isolates was done by a procedure given by Gonsalves and Ishii[2]. Second method described by Purciful and Hiebert[3] was also

followed. Particles gave single band in the rate zonal density gradient centrifugation. Absorbance ratio at A 260/A280 was calculated.

Serology: Polyclonal antisera was raised by injecting two intramuscular and one intra venous injections. Test bleeding was done after 15 days of last injection.

Host range and symtomatology : Fifteen plant species distributed among different families were inoculated. Out of these *Chenopodium amaranticolor, C.quinoa* reacted with local lesions. *Cucumis sativus* reacted with systemic reaction. Thermal inactivation point 60°C, longevity *in vitro* 40 days at 20°C and dilution end point 10^{-4} was noted. Virus is transmitted by M*yzus persicae* in non persistent manner. Absorption at 260 and 280 nm ratio was found to be 1.23. Size of the particles was calculated to be 780 x 12 nm. Purified preparation was negatively stained with (6.5 pH) Phosphotungustic acid[4]. Serological preparation is immunogenic. Sodium dodecyl sulphate was added to study gel diffusion test. It showed reactivity (1:256) with the antisera of papaya ring spot virus in double diffusion test.

Host range and symptomatology

Plant Sp.	Reaction
Carica papaya	*S.M.*
Chenopodium amaranticolor	*L.L.*
C quinoa	L.L.
C. sativus	m.m.
Cucurbita maxima	Nil
C. pepo	*Nil*
C. moschata	*Nil*
Luffa acutangula	*Nil*
Nicotiana tabacum cv. NP 37	*Nil*
N. tabacum cv. Harrison's special	*Nil*
N. tabacum cv. Samsun NN	*Nil*
N. tabacum cv. Turkish Xanthii	*Nil*
N. benthamiana	*Nil*
Phaseolus vulgaris	*Nil*
P. mungo	*Nil*

L.L. = local lesion, mM = mild mosaic, SM = severe mosaic

There are two isolates of papaya, viz., papaya ring spot type P and papaya ring spot type W. Papaya ring spot type W does not infect papaya but cucurbits. Both are antigenically indistinguishable present isolate gave mild mosaic on *Cucumis melo* and *C. sativus* and on papaya. Isolate P also gives similar type of reaction on papaya and *C. melo*. Isolate W do not inflect *Luffa acutangula*. Present isolate also did not infect this plant. Serological properties, electron microscopy and UV spectrophotometric studies confirmed the presence of papaya ring spot virus (W type) a causal agent to papaya plant infection. Sequencing of the nucleic acid is must for further confirmation of the strain.

References

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