

Short communication

Screening of papaya genotypes against the viral diseases

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ABSTRACT

An experiment was carried out to screen 16 papaya genotypes against the *papaya ringspot* and *leaf curl virus* diseases during 2010-11 under field conditions at IARI, New Delhi. The most of the genotypes showed susceptibility against the *papaya ringspot virus* and some of them had expressed tolerance. However, in case of the leaf curl virus non of the genotypes has shown the tolerance except the Sinta. The different level of of the infection of leaf curl virus was observed during peak of the rainy season. Genotypes P-7-9, Sinta, Pune selection-3, P-7-2 and RCTP-1 could be incorporated in the future breeding programme to develop the tolerant genotypes.

Key words: Papaya, ring spot, leaf curl, virus, tolerance.

Papaya (*Carica papaya* L.), belongs to family Caricaceae, is an important fruit crop of the tropical and subtropical regions of the globe. Both dioecious and gynodioecious varieties are grown in many tropical and subtropical countries for edible fruit and to a lesser extent also for milky latex. The major constraint in production of papaya is its susceptibility to a number of diseases and particularly *Papaya ringspot virus* (PRSV) and *Papaya leaf curl virus* (PaLCV) Wang (7) and Singh *et al.* (6). This disease has posed a major threat to papaya industry by rendering orchards economically unproductive. The viral infection is more severe in the northern parts of the India due to infection of the both Poty and Gemini viruses transmitted by aphids and white fly, respectively (Lokhande, 5). The success of any improvement programme depends on the strength of the germplasm. It is important to screen the available genotypes against the papaya ring spot and leaf curl diseases prior to incorporating genotypes in hybridization programme. Hence, this study was carried out with the objective to identify the genotypes with low incidences of the viral diseases and its future prospective in papaya improvement programme. The present investigation was carried out in the experimental orchard of the Division of Fruits and Horticultural Technology, Indian Agricultural Research Institute, New Delhi during 2010-11. Seeds of the 16 genotypes, viz., Ambasa Local, RCTP-I, Pusa Giant, Pusa Nanha, Pusa Dwarf, P-7-9, P-7-2, Pune Selection-3, Sinta, CO-2, CO-3, CO-5, CO-7, Arka Surya, Arka Prabhat and Red Lady were sown to raise healthy seedlings in greenhouse. The healthy seedlings of the papaya were planted during April 2010 with a spacing of the 1.5 m × 1.5 m. The optimum crop management practices were followed during investigation except the pesticide

application for white fly and aphid in order to allow the the natural infection in the papaya crop. Twenty five plants of the each genotype were selected for the observation on incidence of papaya ringspot and papaya leaf curl diseases. The marketable fruits were harvested and yield was recorded on per plant basis. Data obtained for different parameters of the study were subjected to analysis and differences among the genotypes were compared by calculating critical differences (Gomez and Gomez, 3). It was clear from the data presented in tables 1 that papaya leaf curl disease incidence was observed in all the genotypes with a different levels of the intensity (9.0 to 26.9%). The minimum leaf curl incidence (9.0%) was recorded in P-7-9 followed by P-7-2 (9.5%), in Sinta (12.0%), Tripura Local (12.2%) and in Red Lady (12.5%). Most of the genotypes were found susceptible leaf curl disease during study. Awasthi and Singh (1), Kudada and Prasad (4) also reported the similar trends of the disease incidence. It is evident from the Table 1 that the papaya ringspot incidence varied from 18.5 to 78.6 per cent and minimum disease incidence of 18.5% was recorded in Sinta followed by 20.5% in Pune Selection-3, 21.0% in P-7-2, 21.0% in P-7-2 and 21.5% in Pusa Nanha. The severity of the PRSV was very high in comparison to the PaLCV and it might be due to mode of the transmission of the PRSV which occurred in a non-persistent manner. The trends of the finding are in accordance with Barreto *et al.* (2), and Singh *et al.* (6). Data presented in Table 1 further revealed that there was a significant increase of the fruit yield among the genotypes, least infected with the leaf curl and ringspot disease. The maximum fruit yield was recorded (37.6 kg/plant) in Pune Selection-3 followed by in 36.2 kg/plant in Sinta, P-7-9 (35.9 kg/plant), P-7-2 (34.5 kg/plant) and RCTP-I (29.1 kg/plant) whereas minimum fruit yield was recorded in

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Table 1. Incidence of viral diseases and its effect on fruit yield of papaya.

Papaya Genotypes	Papaya leaf curl virus (%)	Papaya ringspot virus (%)	Fruit yield (kg/plant)
Ambasa Local	14.6	26.5	24.6
RCTP-I	12.2	35.6	29.1
Pusa Giant	25.6	34.6	28.1
Pusa Nanha	26.8	21.5	26.4
Pusa Dwarf	26.9	26.8	24.8
P-7-9	9.0	22.0	35.9
P-7-2	9.5	21.0	34.5
Pune Selection-3	16.9	20.5	37.6
Sinta	12.0	18.5	36.2
CO-2	19.8	38.6	24.6
CO-3	14.6	36.0	21.6
CO-5	25.6	42.5	18.5
CO-7	15.2	58.5	22.3
Arka Surya	12.5	75.5	15.6
Arka Prabhat	10.6	72.6	18.2
Red Lady	12.5	78.6	20.4
CD at 5%	3.84	6.09	3.05

Arka Surya (15.6 kg/plant) followed by Arka Prabhat (18.2 kg/plant) and Red Lady (20.4 kg/plant). The severe incidence of the ring spot virus had adversely affected the fruit yield in dioecious and gynodioecious genotypes. While comparing with yellow flesh the red flesh genotypes were severely infected with the ring spot disease except the Pune Selection-3 and P-7-9. The findings of the present study reveals that the Sinta, Pune Selection-3, P-7-9 and P-7-2 genotypes showed multiple disease tolerance against the viruses. Hence, these genotypes may be considered for the future breeding programme to develop tolerant/resistant papaya varieties.

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Fig. 1. Symptom of the *papaya leaf curl virus* in Pusa Nanha.



Fig. 2. Symptom of the *papaya ringspot virus* in Red Lady.

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