

Studies on the natural infection of mosaic disease of Brinjal (*Solanum melongena* L.) in tarai region of Eastern U.P.

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Abstract

Brinjal crops were surveyed for the incidence of mosaic disease in Devipatan mandal of Tarai region, U.P. On the basis of symptoms, host range, physical properties, sap transmission, insects transmission different hosts and seed transmissions, three different virus isolates were characterized as PVY, TRSV and TMV.

Key words- Disease incidence, brinjal, mosaic disease.

Introduction

Brinjal or eggplant (*Solanum melongena* L.) is one of the most commonly cultivated vegetable crops in India, especially in eastern Uttar Pradesh and is presently affected by a number of viral diseases. During routine survey of Brinjal growing fields various types of Mosaic and ring spot symptoms were noticed viral disease characterized by chlorotic, vein banding, oak leaf pattern, yellow blotches, slight puckering and stunting were frequently observed in crop (var. Pusa Purple long and Pusa Purple round) around Balrampur district of Devipatan mandal. One isolates among these was transmitted by aphids readily. The identification of various mosaic diseases of brinjal is an objective of the present study. This communication deals with the results of the studies pertaining to the identification of various diseases, conducted at post Graduate Department of Botany, Balrampur, U.P.

Materials and Methods

The cultures of these diseases were maintained on the brinjal var. Pusa Purple long and Pusa Purple round in glass house conditions. Based on the symptoms they were grouped into three categories and labeled as virus A, B and C. The infected leaves with chlorotic rings and oak patterns with yellow patches, virus C infected leaves exhibited mild mosaic symptoms with necrotic spots on stem and leaves. The mechanical sap transmission studies of these three viruses were conducted by macerating the infected leaf material in phosphate buffer pH-7 (0.05M) and inoculated to the test plants *Solanum melongena* L.

Aphid transmission studies were conducted by using *Aphis gossypii* Glov and *Myzus persicae* Sulz. During the transmission studies the aphids were given two hour fasting followed by 30 min. each acquisition and inoculation periods and brinjal was used as a test plant. Seed transmission tests were also conducted by collecting the seeds from the fruits of infected plants and were raised in the glass house.

Results and discussion

Based on the host range and physical properties, aphid and seed transmission viruses A,B and C were identified as potato Y(PVY), tobacco ring spot (TRSV) and tobacco mosaic virus (TMV). For quick identifications of these three viruses, a key having a set of four differential hosts (*Physalis floridana* Rydb., *Cucumis sativus* L., *Phaseolus vulgaris* var. Pinto and *Vigna unguiculata* (Linn.) Walp sub. Sp. *Cylindrica* van-Eseltine) was developed and their reaction are given (Table-I). Only virus A was transmitted by both

the aphids and the transmission was 70%. The results indicated that only viruses B and C were transmitted and the percentage of transmission was 12 and 41 respectively.

From India, Sastry *et al.* (1974) reported a strain of PVY which had thermal inactivation point between 55-60°C, dilution and end point between 1/1000 to 1/10000, and ageing in vitro for 24 hours. The present PVY isolate is different with this isolate in physical properties (Table 2). Tobacco ring spot virus under study differs with the report of Sastry and Nayudu (1976) and also Sastry (1982) both in host range and physical properties. Hence, it is new strain TRSV occurring on brinjal, which is not reported earlier in Eastern U.P. The third virus C, TMV differs with the report of Naqvi & Mahmood (1976, 1978) in having higher thermal inactivation point & also in host range and this being different reported from Tarai region of eastern U.P.

In the present study, *Physalis floridana* Rydb., *Cucumis sativus* L., *Phaseolus vulgaris* var. and *Vigna unguiculata* (Linn) Walp sub. Sp. *Cylindrica* van-Eseltine were found to be good differential hosts for PVY, TRSV and TMV strains infecting brinjal. *Physalis floridana* produced necrotic local lesions only with PVY. *Cucumis sativus* L., and *Vigna unguiculata* (Linn) reacted to TRSV and produced mosaic mottling followed by chlorotic rings and reddish brown necrotic local lesions respectively. *Phaseolus vulgaris* var. Pinto produced mosaic mottling and severe mosaic mottling with TRSV and TMV on inoculation. With the help of these four differential hosts, the three viruses under study can easily be identified during the germplasm screening in the breeding programme.

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Table -1
Host range of viruses infecting Brinjal

Host Range	Reaction		
	Virus-A	Virus-B	Virus-C
<i>Solanum melongena</i> L.	SMM	Ch.R.	MM
<i>Capsicum annuum</i> L.	MM	Ch.R., NLL	MM
<i>Physalis floridana</i> Rydb.	NLL		
<i>Datura stramonium</i> L.	-	NLL, Ch.R.	MM
<i>Datura metel</i> L.	MM	-	MM
<i>Phaseolus vulgaris</i> var. pinto	SMM	MM	MM
<i>Lablab niger</i> L.	-	NLL	NLL
<i>Nicotiana tabacum</i> var WB(L)	MM, VN	NLL	MM
<i>Nicotiana glutinosa</i> L.	MM	NLL, Ch.R.	NLL
<i>Cucumis sativus</i> L.		NLL, Ch.R.	MM
<i>Vigna unguiculata</i> (Linn.) Walp. sub. sp.		NLL	Ch.R.
<i>Cylindrica</i> van - Eseltine			
<i>Chenopodium amaranticolor</i> Coste and Reyn.	NLL	NLL	NLL

Note - SMM = severe mosaic mottling, Ch.R. = chlorotic ring, MM = mosaic mottling, NLL = necrotic local lesions, VN = veinal necrosis, - = no reactions.

Table -2
Physical Properties of infecting Brinjal

Physical properties	Virus-A	Virus-B	Virus-C
Thermal inactivation Point	60-63°C	65-70°C	90-95°C
Dilution end point	1/1000 10000	1/1000 1/10000	1/10,000 1/10,00,000
Ageing in vitro	5days	10days	95days