

STUDIES ON THE IDENTIFICATION OF MOSAIC DISEASES OF BRINJAL (*SOLANUM MELONGENA* L.) IN KARNATAKA

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BRINJAL is grown throughout Karnataka State and mosaic and little leaf diseases are one of the major constraints for successful cultivation. During our routine surveys of brinjal fields in 1976-77 various types of mosaics and ring spot symptoms were noticed. This communication deals with the results of the studies pertained to the identification of these diseases, conducted at the Experimental Farm of Indian Institute of Horticultural Research, Hessa-raghatta, Bangalore.

The cultures of these diseases were maintained on the brinjal var. Pusa Purple long under glass house conditions. Based on the symptom picture, they were

grouped into three categories and labelled as virus 1, 2 and 3. The infected leaves with virus 1 showed severe mosaic mottling symptoms, while that of virus-2 exhibited only chlorotic rings and oak leaf pattern. Virus 3-infected leaves exhibited mild mosaic symptoms with necrotic spots on the stem and the leaves. The mechanical sap transmission studies of these three viruses were conducted by macerating the infected leaf material in phosphate buffer pH 7 (0.05 M) and inoculated to the test plants. The results of the host range and physical properties of the three viruses are presented in the table 1.

Aphid transmission studies were conducted by using *Aphis gossypii* Glov and *Myzus persicae* Sulz. During the transmission studies the aphids were given one hour fasting followed by 30 min each acquisition and inoculation periods; and brinjal was used as a test plant. Only virus 1 was transmitted by both these aphids and the transmission was 70%. Seed transmission tests were conducted by collecting the seeds from the infected plants and raised in the glass house. The results indicated that only viruses 2 and 3 were seed

TABLE I

Host range and physical properties of viruses infecting brinjal.

Hosts	Reactions		
	Virus-1	Virus-2	Virus-3
HOST RANGE			
<i>Solanum melongena</i> L.	SMM	Ch.R	MM, NLL
<i>Capsicum annum</i> L.	MM	Ch.R	MM
<i>Nicotiana tabacum</i> var. W.B(L)	MM, VN	NLL	MM
<i>N. glutinosa</i> L.	MM	NLL, Ch.R	NLL
<i>Datura stramonium</i> L.	—	NLL	NLL
<i>D. metel</i> L.	MM	—	MM
<i>Physalis floridana</i> Rydb.	NLL	—	—
<i>Cucumis sativus</i> L.	—	NLL, Ch.R	—
<i>Phaseolus vulgaris</i> var. Pinto	—	NLL	NLL
<i>Lablab niger</i> L.	—	NLL	NLL
<i>Vigna unguiculata</i> (Linn) Walp sub sp. <i>Cylindrica</i> van-Eseltine	—	NLL	—
<i>Chenopodium amaranticolor</i> Coste & Reyn.	NLL	NLL	NLL
PHYSICAL PROPERTIES			
Thermal inactivation point	55-60° C	60-65° C	90-95° C
Dilution end point	1/1000- 10,000	1/1000- 1/10,000	1/10,000- 1/10,00,000
Ageing <i>in vitro</i>	24-48 hrs	8 days	90 days
SMM- Severe mosaic mottle	Ch.R—Chlorotic rings		
MM Mosaic mottle	VN—Veinal necrosis		
NLL. Necrotic local lesions	—No reaction		

transmitted and the percentage of transmission was 12 and 41 respectively.

Based on host range, physical properties, aphid and seed transmission, viruses 1, 2 and 3 were identified as potato Y (PVY), tobacco ring spot (TRSV) and tobacco mosaic viruses (TMV). For quick identification 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* (L.) Walp Sub sp. *Cylindrica* van-Eseltine) was developed and their reactions are given in table 1.

From India, Sastry *et al.*¹ reported a strain of PVY which had thermal inactivation point between 55–60°C, dilution end point between 1/1000 to 1/10,000 and ageing *in vitro* for 24 hr. The present PVY isolate has close resemblance with this isolate. Tobacco ring spot virus under study differs with the earlier report of Sastry and Nayudu² both in host range and physical properties. Hence it is a new strain of TRSV occurring on brinjal, which is not reported from India³. The third virus, TMV differs with the report of Sharma⁴ in having higher thermal inactivation point and also in host range; and is a first report from Karnataka State.

In the present studies, *P. floridana*, *C. sativus*, *P. vulgaris* var. Pinto and *V. unguiculata* were found to be good differential hosts for PVY, TRSV and TMV strains infecting brinjal. *P. floridana* produced necrotic local lesions only with PVY. *C. sativus* and *V. unguiculata* reacted to TRSV and produced necrotic local lesions followed by chlorotic rings; and reddish brown necrotic local lesions respectively. Pinto beans produced necrotic local lesions 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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CELL ORNAMENTATION IN *COSMARIUM BIOCULATUM* BREB. UNDER SEM.

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SURFACE ornamentation is useful to study the taxonomic identification of Desmids. The present study was undertaken to study the surface ornamentation in *Cosmarium bioculatum* Breb.

Cosmarium bioculatum culture was kindly supplied from the Cambridge culture collection. The alga was growing in Chu's inorganic medium, (18–22°C) receiving an illumination of 16/8 hr light and dark, respectively. The cells were isolated and unialgal cultures were raised. The populations thus raised from single cells were fixed for scanning electron microscopy. The cultures immediately after their subculturing were selected for fixation. It was observed that old cultures showed a lot of mucilage accumulation, which would obscure the cell surface. Previous reports on the scanning of Desmids were mostly by Pickett-Heaps^{1–4}, who successfully removed the mucilage covering in most of the species by repeated washing. But incubation of specimens in a solution of the polysaccharidase preparation Glusulase was better. Pickett-Heaps used 1:50 v/v dilution in distilled water for 90 min at room temperature. However, during the present study, repeated subculturing was found useful to eliminate excess mucilage from the cell surface.

Cells were fixed by standard glutaraldehyde/osmium procedures and then dehydrated by various grades of acetone. Finally, they were dried and shadowed with gold and carbon, before being examined at 15 kV in a Jeol-JSM-25S scanning microscope.

Cells of *C. bioculatum* Breb. were minute, as long as broad, deeply constricted, sinus narrow towards the apex and widening outwards, semi-cells transversely oblong-elliptic both base and apex flattened, sides rounded West & West⁵. Side-view of semicell subcircular. Vertical-view oblong-elliptic.

C. bioculatum is one of the most well distributed of the small smooth species of the genus. The cell surface shows thick mucilage strands, arranged hexagonally (figure 2). Frequently, it was observed that these strands were arranged circularly (figures 3 and 4). For the taxonomic identification of Desmid species, it is necessary to study cell in surface, top and lateral-views (figure 1). The mucilage strands are quite thick and robust in the older cultures compared to the young. Such observations will help in the taxonomic identification of the species.

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