



## Survey for the Occurrence of Cassava Mosaic Disease in Tamil Nadu

Cassava (*Manihot esculenta* Crantz) is grown in extensive areas in Tamil Nadu for both industrial and consumption purposes. Cassava mosaic disease (CMD) is one of the constraints in cassava production and this was first recorded in India by Abraham (1956). This disease is caused by *Cassava mosaic virus*. So far there are eight distinct *Cassava mosaic virus* species viz., *African Cassava Mosaic Virus* (ACMV), *East African Cassava Mosaic Virus* (EACMV), *East African Cassava Mosaic Cameroon Virus* (EACMCV), *East African Cassava Mosaic Malawi Virus* (EACMMV), *East African Cassava Mosaic Zanzibar Virus* (EACMZV), *South African Cassava Mosaic Virus* (SACMV), *Indian Cassava Mosaic Virus* (ICMV) and *Sri Lankan Cassava Mosaic Virus* (SLCMV) approved by *Geminiviridae* study group. A survey conducted in Tamil Nadu revealed that cassava mosaic disease incidence was more than 90% and the disease severity ranged from 2.35 to 4 with an overall mean of 3 (Manivasagam et al., 2006). Dasgupta et al. (2003) recorded yield loss of 18-25% due to ICMV in India.

The first whitefly transmission of *Cassava mosaic virus* was reported in Congo. In India, *Bemisia tabaci* is reported to be the vector of ICMV (Alagianagalingam and Ramakrishnan, 1966; Binu Antony et al., 2006). The nature of infection of *Cassava mosaic virus* was reported to be via cuttings and whitefly transmission (Malathi et al., 1985; Thankappan et al., 1997). There was high infection due to the use of infected planting material (stem cuttings), while the whitefly borne infection was found to be very low (Dasgupta et al., 2003).

A survey was conducted in the major cassava growing districts of Tamil Nadu during 2005-2006. The samples and places to be surveyed were selected based on the area under this crop. The major cassava growing districts viz., Salem, Trichy, Coimbatore, Erode, Dharamapuri, Namakkal, Tirunelveli and Kanyakumari were selected and surveyed. Disease

incidence was assessed by the number of visibly diseased plants, usually in relation to the total number of plants assessed and expressed as the proportion or percentage of plants infected with CMD (Fargette et al., 1985). In each village one field was selected and four samples were chosen for the observation of disease incidence and disease severity. Plants were selected from two sides and along a diagonal across the field in a “Z” configuration (Otim-Nape et al., 1998). The formula used to calculate disease incidence is:

$$\text{Disease incidence} = \frac{\text{Number of plants with visible symptoms}}{\text{Total number of observed plants}} \times 100$$

Disease severity refers to degree of symptom expression and was assessed based on 1 – 5 scale (Hahn et al., 1980). The number of plants under each grade was counted and multiplied with their representative grade and divided with total number of plants assessed for disease incidence. The plants scored with grade one (healthy) were not included for calculating the disease incidence (Sseruwagi et al., 2004) (Fig. 1).

Five young apical leaves of the uppermost shoot were examined for the presence of whitefly. Each leaf was held by the petiole, gently inverted and the adults present on the lower surface were counted (Fargette et al., 1985). The adult whitefly population was counted at different growth stages viz., 3 months after planting (MAP), 6 MAP and 10 – 12 MAP.



Fig. 1. Different grades of cassava mosaic disease  
1. Unaffected 2. Mild chlorosis 3. Pronounced mosaic  
4. Severe mosaic 5. Distortion

The area surveyed and their locations are presented in Table 1. The survey conducted in major cassava growing

Table 1. Area under cassava surveyed with CMD incidence and disease severity

District	Name of the village	Variety	Disease incidence	Disease severity*	
Salem	Udayarpalayam	MVD1	96	3.03	
	Narashingapuram	MVD1	95	2.60	
	Ilankaliyamman kovil	MVD1	96	3.00	
	Puthupettai	MVD1	96	3.16	
	Thulukkanur	MVD1	95	2.70	
	Valayachetty palayam	MVD1	97	3.80	
	Kanchamputhur	CO2	96	3.60	
	Ayyakadu	MVD1	96	3.40	
	Manchini	MVD1	97	3.10	
	Puthiragoundapalayam	MVD1	95	2.80	
	Konganapuram	MVD1	97	3.89	
	Sankagiri	MVD1	97	3.60	
	Omalar	H-226	99	4.00	
	Eddapadi	H-226	99	3.90	
	Irrupalli	H-226	99	3.85	
	Mecheri	Kunkuma rose	100	4.00	
	Valayadevi	Kunkuma rose	100	3.80	
	Periya				
	Krishnapuram	MVD1	100	3.90	
	Trichy	Musiri	VS1	100	4.00
Coimbatore	Mathampatti	6-6	99	3.85	
	Periyanayakan palayam	CO4	99	3.73	
	Ganeshapuram	Kunkuma rose	99	3.81	
	Kovilpalayam	VS2	100	4.00	
	Devarayapuram	VS2	99	4.00	
	Thondamuthur	Kunkuma rose	100	3.95	
	Vedapatti	MVD1	99	3.73	
	Nambiazha-hanpalayam	MVD1	99	3.85	
	Erode	Pallipalayam	Kunkuma rose	100	3.92
		Bhavani	H-226	100	4.00
Cithodu		Kunkuma rose	99	3.95	
Poonachi		Kunkuma rose	100	4.00	
Gopichetty-palayam		H-226	100	4.00	
Sathiyamangalam		TCH-2	99	3.53	
Unchampalayam		TCH-1	99	3.89	
Perunthurai		H-226	100	4.00	
Thindal		MVD1	99	3.90	
Dharma-puri		Harur	H-226	93	2.96
	Pallipatty	H-226	82	2.50	
	Pappanayakanur	H-226	90	2.90	
Namakkal	Namagripettai	MVD1	98	3.90	
	Tirunelveli	Alwarkuruchi	MVD1	97	3.89

Kanyakumari	Mankulam	MVD1	99	4.00
	Esanthimangalam	MVD1	99	3.90
	Thuvarankadu	MVD1	99	4.00
	Kulasekarapuram	MVD1	100	3.82
	Acchankulam	MVD1	99	3.91
	Pothiyadi	MVD1	98	3.50
	Andithoppu	MVD1	99	3.96
	Mean			97.77

\* Disease severity of 5: Total crop failure; Disease severity of 1: Plants are healthy and disease free (Hahn et al., 1980)

districts of Tamil Nadu revealed that the incidence of cassava mosaic disease was more than 90% throughout Tamil Nadu. This could be attributed to indiscriminate use of infected planting material as a result of which there was high percentage of cutting borne infection than whitefly transmitted infection in the areas surveyed. Similar situation was reported by other workers (Fargette et al., 1985). The disease severity ranged from 2.5 to 4, while the overall mean was 3.66.

The observation on the whitefly population revealed that the whitefly population was more when the cassava plants were at the age of 3 to 6 months. An overall mean of 16 whiteflies per plant were recorded at the age of 3 months. At 6 MAP, there was not much change in the population of whiteflies wherein, an overall mean of 13 whiteflies per plant was observed. Thereafter, whitefly count reduced drastically and it was one to two per plant towards the end of the crop growth. In certain occasions it was not even present in places like Mathampatti of Coimbatore district, Thulukkanur of Salem district and Cithodu of Erode district (Table 2).

Table 2. Population of whiteflies at different growth stages

Name of the village	Population of whitefly (number per plant)		
	3 MAP	6 MAP	10 MAP
Mathampatti	17	15	0
Cithodu	14	13	0
Poonachi	18	12	1
Thulukkanur	15	14	0
Pappanayakanur	15	13	1

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<sup>1</sup>Maize Research Station, Tamil Nadu Agricultural University, Vagarai 624 613, Tamil Nadu, India

<sup>2</sup>Department of Plant Pathology, Tamil Nadu Agricultural University, Coimbatore 641 003, Tamil Nadu, India

<sup>3</sup>Department of Plant Pathology, Agricultural College and Research Institute, Madurai 625 104, Tamil Nadu, India

Corresponding author: Nataraj Rajinimala  
e-mail: rajinimala@rediffmail.com

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Nataraj Rajinimala<sup>1</sup>  
Ramalingam Rabindran<sup>2</sup>  
S. Mohan<sup>3</sup>  
K. Sethuraman<sup>1</sup>