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Survey for the incidence of *Chilli veinal mottle virus* (ChiVMV) in selected districts of Karnataka

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Abstract

The roving survey was conducted during *kharif* 2017 to access the incidence of *Chilli veinal mottle virus* (ChiVMV) in selected districts of Karnataka *i.e.*, Shivamogga, Chickmagalur, Davanagere and Haveri district. The disease was widespread in major chilli growing areas of Karnataka and highest per cent disease incidence was observed in Haveri district (41.82%), followed by Chickmagalur, Shivamogga and lowest incidence was observed in Davanagere districts (18.48%).

Keywords: Survey, per cent disease incidence (PDI), *Chilli veinal mottle virus*, *Capsicum annuum* L.

Introduction

Chilli (*Capsicum annuum* L.) is one of the important vegetable and spice crop is grown in India. It belongs to the family Solanaceae, commercially grown in tropical and subtropical regions of the world. It requires long and warm climate for its growth and development. Chilli suffers from a large number of viral, bacterial, nematode and phytoplasma diseases. Chilli is highly susceptible to a large number of viruses through natural infection and in addition to artificial infection. Chilli is known to be affected by 42 viruses. Among, 22 are found to occur naturally, while the rest are known to infect on artificial infection (Raju, 2010) [4]. Aphid-transmitted *Chilli veinal mottle virus* (ChiVMV) and *Cucumber Mosaic Virus* (CMV) are the most common viruses affecting the chilli crop during a prolonged rain-free period. ChiVMV is important virus belonging to the largest and one of the most economically devastating families of plant viruses, the Potyviridae. It causes varied symptoms *viz.*, dark green vein banding, leaf mottling and shoe string resulting in heavy loss of yield (Moury *et al.*, 2005) [2]. ChiVMV was first reported by Ong *et al.* (1979) [3] on *Capsicum annuum* which caused yield loss up to 50 per cent. Systematic survey on the incidence of *Chilli veinal mottle virus* (ChiVMV) in Karnataka is lacking. Considering the above fact, the present investigation was undertaken to know the incidence and locating the hotspots of ChiVMV disease in major chilli growing areas of these selected districts of Karnataka, India.

Material and Methods

An intensive roving survey was conducted during *kharif* 2017, to assess the incidence of *Chilli veinal mottle virus* disease in major chilli growing districts of Karnataka, which includes Chickmagaluru, Davanagere, Haveri and Shivamogga districts. In each districts two taluks were selected and in each taluk three villages and in each village three fields were selected randomly. The per cent disease incidence and symptoms were recorded. The samples showing virus infected symptoms were collected brought to the laboratory and virus identification was done by mechanically inoculated to the indicator host plants (*Datura metel*) and cultures were maintained in the glass house. The per cent incidence in the surveyed fields was calculated using the following formula,

$$\text{Per cent disease incidence} = \frac{\text{No. of infected plants}}{\text{Total no. of observed plants}} \times 100$$

Results and Discussion

Roving survey was conducted to know the occurrence of *Chilli veinal mottle virus* (ChiVMV) in selected districts of Karnataka *viz.*, Chickmagalur, Davanagere, Haveri and Shivamogga districts during 2017-18. At the time of survey, collected the *Chilli veinal mottle virus* (ChiVMV) infected sample and brought to the laboratory and later inoculated to the highly susceptible weed host *Datura metel*. A total of 24 villages in four districts were surveyed.

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Chilli plants in the selected area of the fields were counted and the numbers of plants showing ChiVMV symptoms were recorded. Data recorded during the survey are presented in Table 1.

The survey data revealed that, the *Chilli vein mottle virus* (ChiVMV) was present in severe form and incidence ranges from 12.77 to 48.43 per cent. The highest per cent disease incidence (PDI) was recorded in Hosalli village (48.43%) of Hirekerur taluk followed by Channapura village (45.70%) of Kadur taluk and the lowest incidence of 12.77 per cent was observed at Mathodu village of Shivamogga taluk respectively. The disease incidence was found moderate at Ajjampura, Bannihatti, Bisalahalli, Gundagatti and Ingalagondi villages.

Taluk-wise average disease incidence of *Chilli vein mottle virus* (ChiVMV) indicates that the highest incidence was observed in Hirekerur taluk (44.95%) followed by Byadagi (38.69%) and Kadur (38.37%). Lowest incidence of 16.37 and 16.58 per cent were recorded in Harihara taluk and Shivamogga taluk respectively.

Among the four districts surveyed, the highest disease incidence of 41.82 per cent was observed in Haveri followed by Chickmagalur (30.21%) whereas the lowest disease incidence of 18.48 per cent and 18.60 per cent was documented in Davanagere and Shivamogga districts respectively.

Apart from that, in all the fields observed the symptoms like dark green vein banding, leaf mottling, leaf distortion, stunted growth and shoe string symptoms. ChiVMV infection was confirmed by inoculating on to the *Datura metel* plant.

Similar observations with regard to ChiVMV incidence varied from 50 to 75 per cent in Uttar Pradesh (Sathyaprakash *et al.*, 2002) and in Karnataka during 2006 varied from 5.3 to 81.5 per cent (Lakshminarayana Reddy, 2006)^[1]. All these results conclude that (ChiVMV) was predominantly occurring in major chilli growing areas. The disease symptoms observed on chilli plants were similar to the findings of Ong *et al.*, (1979)^[3] who reported that vein mottling and leaf distortions of ChiVMV infected plants. Also, Sulaiman and Gim (1981)^[6] reported that leaves of ChiVMV infected plants exhibited varying degrees of vein clearing, mottling and chlorosis

Table 1: Survey for the incidence of *Chilli vein mottle virus* (ChiVMV) disease in selected districts of Karnataka

Sl. No.	District	Taluk	Village	PDI	Mean PDI of Taluk	Mean PDI of District
1	Chickmagalur	Kadur	Ajjampura	38.96	38.37	30.21
			Channapur	45.70		
			Yarehalli	30.45		
		Tarikere	Bavikere	22.22	22.06	
			Lingadhalli	24.99		
			Rangenhalli	18.99		
2	Davanagere	Harihara	Chikkabidre	17.77	16.37	18.48
			Hanagawadi	15.87		
			Jigali	15.47		
		Honnalli	Jeenahalli	20.51	20.60	
			Kattige	19.14		
			Nyamathi	22.16		
3	Haveri	Byadagi	Bannihatti	42.82	38.69	41.82
			Beesalahalli	36.70		
			Ramagondanahalli	36.56		
		Hirekerur	Gundakatti	43.38	44.95	
			Hosahalli	48.43		
			Ingalgondi	43.04		
4	Shivamogga	Shikaripura	Bannuru	20.55	20.62	18.60
			Devikoppa	19.39		
			Kolagi	21.92		
		Shivamogga	Abbalagere	22.53	16.58	
			Hunasodu	14.44		
			Mathodu	12.77		

The present study showed that maximum incidence of *Chilli vein mottle virus* disease of chilli was observed in Haveri district and minimum incidence was observed in Davanagere district. This study concluded that Haveri is the hotspot for *Chilli vein mottle virus*.

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