

Original Research Article

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## Roving Survey for the Incidence of Leaf Crinkle Disease of Urdbean in Major Urdbean Growing Districts of Tamil Nadu, India

T. Priyanga<sup>1\*</sup>, T. K. S. Latha<sup>1</sup>, T. Ramya Teja<sup>1</sup>, K. Prabakar<sup>1</sup>,  
V. Balasubramani<sup>2</sup>, M. Raveendran<sup>2</sup> and G. Karthikeyan<sup>1</sup>

<sup>1</sup>Department of Plant Pathology, <sup>2</sup>Department of Plant Biotechnology, Tamil Nadu Agricultural University, Coimbatore, India

\*Corresponding author

### ABSTRACT

#### Keywords

Urdbean, Leaf crinkle, Roving survey, Tamil Nadu, Percent disease incidence (PDI), Insect diversity

#### Article Info

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Urdbean (*Vigna mungo* (L.) Hepper) is an important pulse crop grown in all pulse growing districts of Tamil Nadu. The productivity of urdbean is very low mainly due to yield losses caused by various viral diseases. Urdbean Leaf Crinkle Disease (ULCD) is one of the important viral diseases that affect both the quality and quantity of the seed. An intensive roving survey was conducted during cropping seasons of 2018-2019 in major blackgram growing districts of Tamil Nadu viz., Coimbatore, Villupuram, Cuddalore, Tenkasi, Tirunelveli and Pudukottai to determine disease incidence and insect diversity. The farmers were cultivating blackgram varieties were CO-6, VBN-4, VBN-5, VBN-6, VBN-8, KKM-1, MDU-5 and T-9. All the cultivars were found to be susceptible to ULCD ranging from 11.80 to 33.50%. Higher level of disease incidence (33.50%) was observed in T-9 variety in Pudukottai district followed by VBN-8 variety (30.66%) in Coimbatore district. The lowest level of disease incidence was recorded in VBN-5 (11.80%) and CO-6 (12.8%) in Tenkasi and Coimbatore district respectively. The most prevalence insects visiting the urdbean field were Whitefly, Aphid, Hoppers and Coccinellid beetles.

### Introduction

Urdbean (*Vigna Mungo* (L) Hepper) is an important food legume used for its rich source of protein in human diet. The crop is highly prone to attack by fungal, bacterial and viral pathogens which greatly affect its yield drastically. Among the various viral diseases, urdbean leaf crinkle disease (ULCD) is considered as serious one since it affects both the quality and quantity of the seed grain. Urdbean leaf crinkle virus (ULCV) was first

reported from Delhi by Nariani (1960) and Williams *et al.*, (1968) and still the etiology is unknown. The infected plants showed crinkling, puckering, curling, malformation of leaves and flowers (Bindra, 1971).

The transmission of ULCD is mainly through infected seed (Narayanasamy and Jaganathan, 1975; Kanimozhi *et al.*, 2009), infected sap (Biswas *et al.*, 2012), insect vectors (Srivika *et al.*, 2018) but not transmitted through soil (Beniwal *et al.*, 1983). The yield losses were

reported by several authors (Beniwal and Chaubey, 1979; Kadian, 1982; Bashir *et al.*, 1991; Kadian, 1994; Sharma *et al.*, 2007; Kanimozhi *et al.*, 2009). In the present study, leaf crinkle disease incidence was recorded in major urdbean growing districts of Tamil Nadu state.

### Materials and Methods

In Tamil Nadu, Urdbean is cultivated in three seasons *viz.*, summer, *Kharif* and *Rabi* besides rice fallow in certain districts. An intensive roving survey was conducted in major urdbean growing districts of Tamil Nadu *viz.*, Coimbatore, Villupuram, Cuddalore, Tirunelveli, Tenkasi and Pudukottai to understand the prevalence of leaf crinkle disease incidence and insects as vectors during cropping seasons of 2018-2019. Two fields in each village were selected and in each field 10 quadrats (each 25sq.m area) were randomly selected and disease incidence was recorded at 45 days after sowing (Bhavani and Manoj Kumar, 2017). The percent disease incidence (PDI) was assessed by recording the number of plants having

symptoms and total number of plants examined by using the following formula:

$$PDI (\%) = \frac{\text{Number of infected plants}}{\text{Total number of plants}} \times 100$$

During the survey information on cultivation under rainfed or irrigation conditions, cropping season, variety and presence of insects were recorded.

### Results and Discussion

Results obtained from roving survey conducted on leaf crinkle disease incidence in major urdbean growing districts of Tamil Nadu during cropping seasons of 2018-2019 are presented in Table 1. The ULCD infected plants showed severe leaf crinkling, malformation of auxiliary buds and stunted growth of the stem (Fig. 1). The farmers were cultivating blackgram varieties *viz.*, CO-6, VBN-4, VBN-5, VBN-6, VBN-8, KKM-1, MDU-5 and T-9 (Table 1). All the cultivars were found to be susceptible to ULCD ranging from 11.80 to 33.50%.

**Table.1** Incidence of urdbean leaf crinkle disease (ULCD) during cropping season of 2018-2019

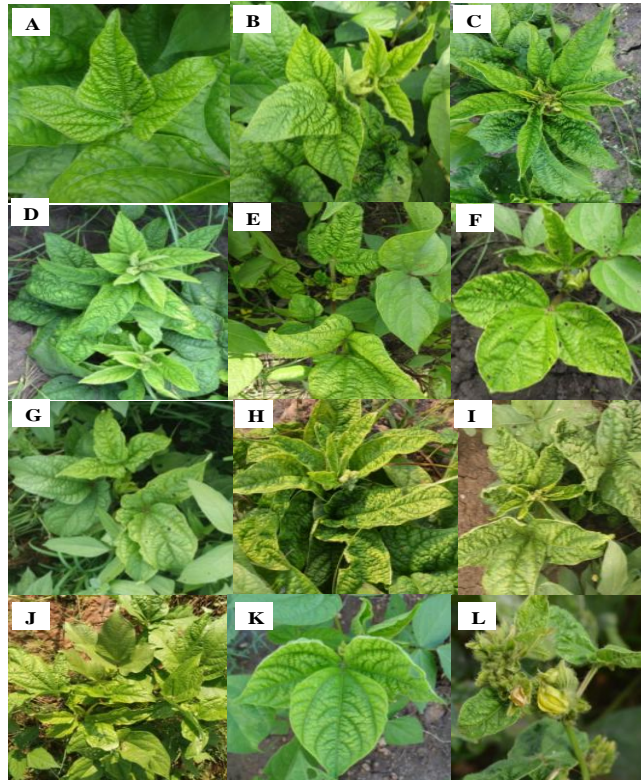
S. No	District (season/year)	Villages	GPS coordinate	*Type of farming	Cultivar	% Disease Incidence	**Insect diversity
1.	Villupuram (Rabi/2018-19)	Tindivanam	N12°12.547; E79°40.143	IR	VBN-6	13.3	W and B
		Iraiyanur	N12°21.317; E79°67.021	IR	VBN-8	17.5	A
		Iraiyanur	N12°19.574; E79°66.546	IR	VBN-4	31.4	B
		Pangalathur	N12°17.649; E79°45.416	IR	VBN-5	21.9	A
		Pangalathur	N12°17.326; E79°45.330	IR	VBN-5	19.8	W

		Pangalathur	N12°16.915; E79°46.177	RF	VCN-5	29.2	W
		Siruvadi	N12°12.637; E79°51.052	IR	VCN-5	18.6	W, A
		Siruvadi	N12°14.987; E79°51.082	RF	VCN-6	15.8	W
		Agoor	N12°12.689; E79°51.053	RF	VCN-5	15.7	W
2.	Cuddalore(Rabi/ 2018-19)	Palur	N11°44.772; E79°38.195	IR	MDU-5	13.3	A
3.	Pudukottai(Rabi/ 2018-19)	Vamban	N10°36.755; E78°91.275	IR	VCN-6	15.8	W, A
		Vamban	N10°36.842; E78°93.165	IR	VCN-8	29.8	W, A
		Vadakadu	N10°34.648; E79°05.744	IR	T-9	33.5	W
		Vadakadu	N10°34.648; E79°05.744	IR	VCN-6	20.7	W
4.	Tirunelveli (Summer/ 2019)	Killikulam	N08°70.338; E77°51.347	RFw	KKM-1	13.4	W
5.	Tenkasi (Summer/ 2019)	Panpozhi	N09°01.209; E77°15.161	RFw	VCN-8	26.4	W, LH
		Pavoor	N08°55.633; E77°23.434	IR	VCN-5	11.8	W
6.	Coimbatore (Rabi/ 2018- 19)	Pullagoundanputhur	N10°97.916; E76°83.606	IR	CO-6	14.6	W, A
		Devarayapuram	N10°99.764; E76°81.587	IR	CO-6	12.8	A, B
	Summer/ 2019	Thondamuthur	N10°98.992; E76°84.088	RF	VCN-6	13.5	W
	Kharif/ 2019	TNAU	N11°01.347; E76°93.724	IR	VCN-8	30.66	A,W,LH

\* RF: Rainfed; IR: Irrigated; RFw: Rice fallow

\*\* A: Aphid; B: Coccinellid beetle; LH- Leaf hopper; W: Whitefly

**Fig.1** The leaf crinkle disease symptoms observed in all the districts were similar viz., Crinkling of lamina, stunted growth and floral malformation (A-K. Crinkling of leaves; L. Malformation of auxiliary buds). A. VBN-8 (Iraiyanur); B. VBN-4 (Iraiyanur); C. VBN-5 (Pangalathur); D. VBN-6 (Vadakadu); E. VBN-5 (Siruvadi); F. MDU-5 (Palur); G. VBN-8 (Panpozhi); H. T-9 (Vadakadu); I. VBN-5 (Pavoor); J. KKM-1 (Killikulam); K. CO-5 (TNAU); L. VBN-8 (TNAU)



Among the all varieties, higher level of disease incidence (33.50%) was observed in T-9 variety in Pudukottai district followed by VBN-8 variety (30.66%) in Coimbatore district. The lowest level of disease incidence was recorded in VBN-5 (11.80%) and CO-6 (12.8%) in Tenkasi and Coimbatore district respectively (Table 1).

According to Vijaykumar (1993), the incidence of ULCV disease ranging from 1.15 to 4.52% in Guntur district of Andhra Pradesh (AP) and the incidence was high during *Rabi* (1.25-7.52%) compared to *Kharif*-1993 (1.15-4.52%) and rice fallows (1.10-2.52%). In Uttar Pradesh, the incidence of ULCD varies from 28 to 85% under natural conditions (Srivastava, 2005). The disease incidence of ULCD was 14.4-20.5% and yield losses upto 91% during successive

years from 2006 to 2009 (Biswas *et al.*, 2015). Disease incidence was varying in all surveyed districts of the state (Table 1). This may be due to variation in environmental factors, health of seed material, population and movement of vectors. Similarly, Haller and Byadgi (2019) also reported about the spread of leaf crinkle disease in greengram under field conditions. Since the incidence of ULCD under natural condition is increasingly alarming. Studies on the etiology and transmission have to be strengthened in order to develop as management strategy of this dreadful disease.

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