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## Survey of Cotton Leaf CURL Virus (CLCV) in Sindh

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**Abstract:** Cotton leaf curl virus (CLCV) is a very dangerous disease and is spreading in Sindh after Punjab and it affects whole cotton plant which results in drastically low cotton production. The survey report suggests that the disease was present in Ghotki, Sukkur, Khairpur, Noushehroferoz and Nawabshah districts. However, Dadu, Hyderabad, Sanghar, Tharparkar, Mirpurkhas and Umerkot districts were found disease free. It indicates that the disease has traveled up to central part of Sindh province. However, lower Sindh and the areas adjacent to the central parts are still free from this disease. High intensity was observed in Ghotki and showed decreasing trend in the areas far from Ghotki and thus low intensity was found in Nawabshah district.

**Key words:** Cotton leaf CURL virus, cotton, cotton disease, survey, Sindh

### Introduction

Cotton leaf curl virus is one of the most important diseases of cotton crop (Tarr, 1951). leaf curl virus of cotton was first observed in Pakistan during 1967 in Multan area. However, the disease remained ignored due to its low intensities and did not attract serious attention until 1987 when it appeared as an epidemic cotton disease (Hussain and Ali, 1975; Saif *et al.*, 1997). Hussain and Mahmood (1988) reported the incidence of CLCV was upto 80% in certain fields. The cause of this disease was scientifically established in 1992 as a whitefly-transmitted gemini virus (Hameed *et al.*, 1994).

The disease was thought to be restricted only to Punjab on the basis of departmental reports, the cotton crop in Sindh was considered disease free. Keeping in view the magnitude of the disease in Punjab and whitefly (*Bemisia tabaci*) as its vector, a program of monitoring virus diseases with emphasis on gemini viruses including CLCV was initiated in Sindh during 1996 and this disease was found near Ubavro, the area near to Punjab-Sindh border (Saif *et al.*, 1997; Mansoor *et al.*, 1998). The CLCV incidence is an increasing side. The spread of disease have been started from Ubavro (Ghotki district) and has reached up to Sakrand (Nawabshah district) and the disease has traveled three years up to Sakrand, 450 kilometers away from the place where it first time appeared in Ubavro (Anonymous, 1998). The disease is very dangerous, it affects whole cotton plant through showing its symptoms like upward or downward curling of leaves. The veins of leaves become thick which are more pronounced on the lower surface, beside this, enaction (leaf like outgrowth) on backside of leaf. In young leaves, the thickening first appears on the lower surface of the small veins, being at separate and gradually link together. This process makes the leaves curl. From the under side, affected veins appears abnormally dark green and not shining. New leaves developed after appearing of first symptoms are usually small and much distorted by curling (Watkins, 1981). Keeping in view importance of the disease, survey was done to assess its intensity in Sindh province.

### Materials and Methods

On receiving continuous reports for spreading of CLCV disease in upper Sindh, survey of cotton growing areas of Sindh was conducted by the experts of central cotton

Research Institute, Sakrand during the months of July, August and September in 1998 to assess the severity of the disease. Various grower fields were surveyed in each cotton growing district of Sindh for cotton leaf curl virus (CLCV). For recording the intensity of the disease, 100 cotton plants were randomly selected and disease percentage was recorded.

### Results and Discussion

The survey report (Table 1) has shown that CLCV disease was present in Ghotki, Sukkur, Khairpur, Noushehroferoz and Nawabshah districts. However, Dadu, Hyderabad, Sanghar, Tharparkar, Mirpurkhas and Umerkot districts were found disease free. It indicates that the disease has traveled up to central part of Sindh province. However, lower Sindh and the areas adjacent to the central parts are free from this disease. The disease incidence at individual localities varied from 40 to 100% in Ghotki district, from 35 to 100% in Sukkur district, from 8 to 80% in Khairpur district, from 4 to 57% in Noushehroferoz district, from 2 to 55% in Nawabshah district. This shows that the disease was most severe in Ghotki and Sukkur and degree of severity was decreased in Khairpur, Noushehroferoz and Nawabshah districts. The findings show that the area more near to Punjab border, the more was the intensity of the disease. The observations are in conformity with the reports of Soomro (1997) and Saif *et al.* (1997), they reported the presence of CLCV disease in Sindh. They had collected infected plant samples and confirmed through Triple Antibody Sandwich Enzyme Linked Immuno Sarbent Assay (TAS-ELISA) test.

Yet it is matter of great concern that the disease is spreading from north to south and clean up of primary inoculum reduced disease incidence. There was indication that the disease appeared in Sindh in the direction of wind and governed by activity and population of the vector, stage of plant, abundance of the inoculum and environment factors like temperature, humidity, wind, etc. The period with the highest infection rate seemed to coincide well with the period of highest plant growth activity and perhaps also with that of the highest vector population densities (Ali *et al.*, 1995). The virus is not mechanically transmitted nor carried through soil or seed.

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Table 1: Incidence percentage of cotton leaf curl virus (CLCV) found on farmers fields surveyed in cotton growing districts of Sindh, during 1998

Name of Grower and locality	Variety	Disease incidence (%)
<b>I. Ghotki District</b>		
Ghulam Mustafa Abro (Rakh Farm)	NIAB-78	84
Abdul Sami (Old Qazi Farm)	Karishma	100
Rasool Bux Wasan (Qadirpur)	CIM-240	88
Cotton Research Station (Ghotki)	Shaheen	100
Hafiz Saleh Mohammad (SarhadGhotki)	NIAB-78	100
Sher Ali (Mirpur Mathelo)	CRIS-9	88
Ghulam Rasool (Ubavro)	Mixture	100
Tahir Rasheed (Rasheedabad Ubavro)	NIAB-78	100
Gen. Nasir Akhtar ( Ubavro).	Karishma	100
Mohammad Iftikhar (Qasimabad)	NIAB-78	40
<b>II. Sukkur District</b>		
Dr. Abdul Razak Mangrio (Rohri)	NIAB-78	100
Haji Ghulam Hyder Mangrio (Rohri)	Mixture	100
Ghulam Mohammad Bhand (Rohri)	NIAB-78	100
Moula Bux Panhwar (Rohri)	NIAB-78	100
Haji Khan Mohammad Napurabad	NIAB-78	100
Haji Nisar Pathan (Chak No.1 Saleh Pat	NIAB-78	80
Ghulam Nabi Noonari (Saleh Pat)	NIAB-78	100
Mazhar Ali Shah (Arrore)	Karishma	35
Manthar Hingoro (Bhallar Rohri)	NIAB-78	88
Mohammad Ibrahim Lalo (Mako)	Mixture	48
<b>III. Khairpur District</b>		
Wali Dad Phulpoto	NIAB-78	32
Mohammad Bux Thebo (Tando Masti)	NIAB-78	48
Sher Khan Khuhro (Bachal Khuhro)	NIAB-78	16
Sher Khan Khuhro (Bachal Khuhro)	Shaheen	10
Gul Mohammad (Mehar Shah)	BH-41	50
Gul Mohammad (Mehar Shah)	NIAB-78	80
Niaz Hussain Wasan (Kot D.G.) Shaheen		08
<b>IV. Noushehro Feroz District</b>		
M. Khan Wagan (Phull)	NIAB-78	57
Atta Mohammad Wagan (Phull)	CIM-340	25
M. Bachal Khuhro (Bhiria)	NIAB-78	40
Abdul Rahman Choudhri (Bhiria)	NIAB-78	29
S. Chatal Shah (Bhiria)	CIM-240	15
Ghulam Nabi Rind (Kandiaro)	NIAB-78	20
Pir Bux Ujan (Kandiaro)	NIAB-78	10
Nawab Sahito (Tharushah)	NIAB-78	08
Saindad Abro (Moro)	CRIS-9	05
Afzal Khan Bughio (Moro)	NIAB-78	04
<b>V. Nawabshah District</b>		
Huzoor Bux Brohi (60 Mile)	NIAB-78	55
Riaz Hussain Kamboh (60 Mile)	NIAB-78	50
Dr. Anwar (60 Mile)	CRIS-9	10
Punhal Khan Chandio (Near Sakrand)	NIAB-78	47
Ghulam Sarwar (Hala Branch)	NIAB-78	04
M. Akram Noonari (Gh. Hyder Bhutto)	CRIS-9	02
Cotton Research Institute, Sakrand Farm	CRIS-9	03
Rais Ali Nawaz Magsi (Dalel Dero)	NIAB-78	03
Sher Mohammad Uner (Kazi Ahmed)	NIAB-78	02
Syed Imdad Shah (Majeed Keerio)	CRIS-9	04

It is transmitted by feeding of the whitefly *Bemisia tabaci* (Genn.) that can complete the entire cycle from acquisition of the virus and infection of host plant, within 6.5 hours (Watkins, 1981).

The survey also concludes that cotton leaf curl virus was found in all the sown commercial varieties in Sindh. This suggests that the cotton grower should select only disease tolerant varieties for sowing especially when the crop is sown in the upper areas of Sindh province.

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