Investigation of SCMV occurrences in GuangXi

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Introduction

Sugarcane mosaic virus (SCMV) is regard as the causal agent of sugarcane mosaic virus disease. It has, at one time or another, occurred in every important sugarcane-planting country.

Sugarcane yield losses caused by SCMV mainly due to the virus vary frequently in different time period and sugarcane-planting regions. In fact, mosaic disease serious occurred in Louisiana, caused a near collapse of the industry in the mid-1920s. Now SCMV has been a serious disease problem in the world .

- Sugarcane mosaic virus has been report by Zhejiang University in china at 1984. Subsequently, Sugarcane Mosaic virus were spread to Fujian, Sichuan, Guangdong, Yunnan, and Guangxi province. But systemic investigation of this disease hasn't reported in China.
- Mosaic virus disease can cause more then 30% of cane yield losses in susceptible varieties. when conditions are favorable for the aphid vectors the losses of yield will be increased.

Symptoms

Mosaic virus disease is characterized by a mottled pattern on the leaves produced by contrasting light green to yellow and dark green patches. The patches are irregular in shape and have diffuse margins. Infected plants appear paler and more yellow than healthy plants. The symptoms are most easily seen in young leaves and the symptoms tend to fade as the leaves grew old. In some varieties, particularly varieties with dark red or purple color stalks, the mosaic pattern can be seen on the stalks.

healthy leaves

Mosaic **virus** leaves

- **Spread of the disease**
- There are three principal modes for SCMV spread:

  (1) by aphid vectors

  (2) by infected seed cane

  (3) by mechanical inoculation

  Only aphid vectors and infected seed cane are important in the field.

- **Prevention and control**
- The use of resistant varieties is the most effective method for mosaic control.
- Planting disease-free seed cane is an essential method to avoid of SCMV damage.

Objectives

- This study was mainly to find out the occurrence of sugarcane mosaic virus (SCMV) disease in sugarcane planting areas of Guangxi, and to provide scientific basis for healthy seed cane application of sugarcane.

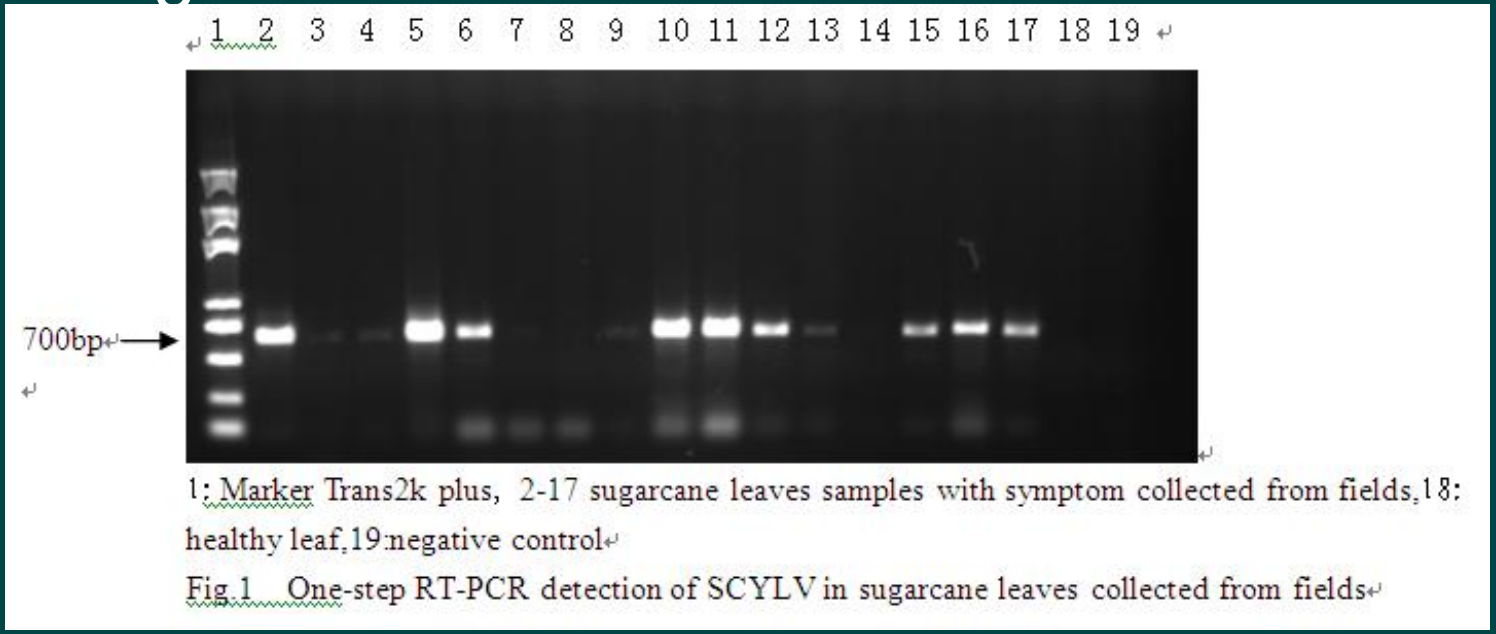
Materials and Methods

- Sugarcane leaf samples with mosaic symptom were collected from sugarcane growing fields in Guangxi. The virus was detected by one-step RT-PCR with SCMV specific primers
- SCMVF4：
- 5′-GTTTTYCACCAAGCTGGAACAGTC-3′;
- Y = C or T，
- SCMVR3 ：
- 5′-AGCTGTGTGTCTCTCTGTATTCTC-3′).

Results

(1) Identification of SCYLV

- The results showed that 69.4% samples were positive. Eight amplified cDNA products were chosen to sequence directly. BLAST analysis revealed that all those cDNA are homologous to reported SCMV CP genes.



1: Marker Trans2k plus, 2-17 sugarcane leaves samples with symptom collected from fields, 18: healthy leaf, 19: negative control

Fig.1 One-step RT-PCR detection of SCYLV in sugarcane leaves collected from fields

TCGAAATTCTTGGCGCTGACGGTCACAATCATAGTTTATGTATA
TGCACAACATTCCAGCTAGAAGAATTGAGAGTGCTA
ACTGGGGACCCAAATTCACAGGGTGGTTTACAAGGTACATTCCA
GGCGAAGTATATATGGATGGAACCCATACCAAGCAT
CCCCAGCAGATATAGAAACCAGCTCTATCATGAGCAATGTCCAT
AGTACACCAATATCCAGATTCCCACCAAAAGAACTT
AGTGATATAGATCAACATAAGTGCAGTATTCACAAGCATAGAAT
CAGCAACTCTGCCATTCATTTCATACTGCTTTATGC
AGTAGGTTACAGCAAGAACAGCCCAGGACATCATACCGAAACG
ACAGTTTGTGAAGACTTTGATATCAAAGTACTTGCCA
ATCCGAGGGTACAGCTCCATACCCCAGTAGAAGTCAATTATCAC
ATTCCCTGAGAATACAGAGACACACCACAGATAGAG
CTACACGACCCTTTATGTAGAGAATACAGAGAGACACACAGCTA
ATAA

Sequence of SCMV

JN021933.1	Sugarcane mosaic virus isolate BD8, complete genome	44.6	44.6	3%	1.0	100%
HQ439440.1	Sugarcane mosaic virus isolate RV polyprotein gene, partial	44.6	44.6	3%	1.0	100%
HQ439439.1	Sugarcane mosaic virus isolate STAP polyprotein gene, part	44.6	44.6	3%	1.0	100%
FM997896.1	Sugarcane mosaic virus partial polyprotein gene, genomic R	44.6	44.6	3%	1.0	100%
FM997895.1	Sugarcane mosaic virus partial polyprotein gene, genomic R	44.6	44.6	3%	1.0	100%
FM997894.1	Sugarcane mosaic virus partial polyprotein gene, genomic R	44.6	44.6	3%	1.0	100%
FM997892.1	Sugarcane mosaic virus partial polyprotein gene, genomic R	44.6	44.6	3%	1.0	100%
FM997891.1	Sugarcane mosaic virus partial polyprotein gene, genomic R	44.6	44.6	3%	1.0	100%
FM997890.1	Sugarcane mosaic virus partial polyprotein gene, genomic R	44.6	44.6	3%	1.0	100%
FM997889.1	Sugarcane mosaic virus partial polyprotein gene, genomic R	44.6	44.6	3%	1.0	100%
FM997888.1	Sugarcane mosaic virus partial polyprotein gene, genomic R	44.6	44.6	3%	1.0	100%
GU474635.1	Sugarcane mosaic virus isolate JAL-1, complete genome	44.6	44.6	3%	1.0	100%
FJ185217.1	Sugarcane mosaic virus isolate CB94270-1 coat protein mRI	44.6	44.6	3%	1.0	100%
GQ386848.1	Sugarcane mosaic virus isolate TN1 polyprotein gene, partia	44.6	44.6	3%	1.0	100%
GQ386847.1	Sugarcane mosaic virus isolate KA1 polyprotein gene, partia	44.6	44.6	3%	1.0	100%
GQ386846.1	Sugarcane mosaic virus isolate AP1 polyprotein gene, partia	44.6	44.6	3%	1.0	100%

Comparison of results

- Investigation results indicated that ROC 22, the main variety in Guangxi was infected by SCMV seriously, and other varieties such as ROC16, ROC28, ROC95-8899, Taiyou, Liucheng03-182, Liucheng03-1137 and so on in Guangxi sugarcane research institute were found positive by detection with RT-PCR.

Table1 Survey of SCMV in Guangxi province

Areas	Varieties	SCMV	Areas	Varieties	SCMV
Nanning	GT98-55	−	Fusui	ROC22	+
	Zhuyuan75-204	−	Pingxiang	Yuetang55	+
	F172	−	Liuzhou	ROC22	+
	Yuetang64-395	−		Liucheng03-182	+
	Gan66-154	−	Liucheng	Taiyou	+
	Chuang64-408	−		Roc 95-8899	+
	Yuetang59-65	−		Roc22	−
	Funong89-209	−	Luzhai	Roc22	+
	LCP78-1628	−	Yizhou	GT21	+
	CP70-1133	+		Roc 16	+
	C676-17	+		Roc22	+
	Yuenong75-15	+	Guigang	Liucheng03-182	+
	F175	+		Roc 28	+
	Mex105	+		Roc22	+
	Yun73-159	+	Baise	Roc22	+
	Co290	+		Liucheng03-1137	+
	F133	+			
	WY55-14	+			
	Co649	+			
	C81-51	+			

Note : “+”is positive， “—”is negtive

Conclusions

- SCMV has been found common occur in sugarcane planting regions in Guangxi.

- **Genetic diversity of** SCMV **in** Guangxi needs to be studied in order to breed resistant varieties in the future.


Thank you
for your attention ! !