

ALL INDIA COORDINATED RESEARCH PROJECT ON SUGARCANE

2012-13

Technical Report

Plant Pathology, Shahjahanpur

Period	: 2012-13
Staff position	: Senior Scientific Assistant (Plant pathology)
Financial allocation sanctioned expenditure-	: Yes
Whether data with past background and correlation with past fluctuation to data obtained	
Project No.	: PP 14
Project title	: Identification of pathotypes/ races in red rot pathogen.
Objective	: To gather information on the major pathotypes of red rot from the different areas/zones.
Year of start	: 1983-84
Location	: Shahjahanpur

Report

Three red rot isolates viz. R 1101, R 1102, R 1103, were tested for their pathogenic variability along with designated pathotypes viz. Cf 01, Cf 02, Cf 03, Cf 07, Cf 08, Cf 09 and Cf 011 on prescribed sugarcane host differentials during the year under report. The observations on disease development were recorded after 60 days of inoculation. The evaluations were done on the basis of symptomatology viz., lesion width laterally restricted, nodal transgression, white spots, and rind infection, sporulation over the rind and yellowing/ drying of the tops. Host reactions were categorized into three groups i.e. Resistant (R), Susceptible (S) and Intermediate (X) reactions (Table-2). Isolated R 1101 (CoSe 92423) and R 1103 (CoJ 64) exhibited reactions to that of Cf 08 and Cf 09 pathotypes respectively where as the isolates R 1102 from CoS 8436 variety displayed variable pathogenic reactions on CoS 8436 differentials different from the existing pathotypes. On the basis of pathogenic behaviour of above tested three isolates, it is clear that there is emergence of a new pathotype on CoS 8436 variety along with the existence of Cf 08 and Cf 09 pathotypes in Uttar Pradesh.

Project No.	: PP17
Project title	: Evaluation of pre-zonal/ zonal varieties/ genotypes for resistance to red rot and smut.
Objective	: To gather information on the relative resistance of the varieties to red rot and smut in pre-zonal/ zonal trials of respective zones.
Year of start	: 1986-87
Location	: Shahjahanpur

Report

A- Red rot

Under this project 08 varieties of IVT (M), 11 varieties of IVT (E), 03 varieties of AVT (E-1), 05 varieties of AVT (E-II), 06 varieties of AVT (M-1), 09 varieties of AVT (M-II) along with susceptible check were evaluated against red rot by plug and nodal cotton swab method by using two types of inoculum Cf 08 and Cf 09 in each method of inoculation. The inoculum was prepared from 07 days old cultures of Cf 08 and Cf 09 pathotypes individually. Conidial suspension at concentration of one million spores/ml was prepared for inoculation. The inoculation was done in 2nd week of August by Plug and Nodal cotton swab method. The observations were recorded after 60 days of inoculations. The varieties were evaluated on the basis of 0-9 scale and rated as Resistant (R), Moderately resistant (MR), Moderately susceptible (MS), Susceptible (S) and Highly susceptible (HS) (Table-3).

(a) Varieties graded as resistant/ moderately resistant by plug method of inoculation with Cf 08

AVT (E-1): CoPb 08211, CoPb 08212 and CoS 08233.

AVT (E-II): Co. 06032, Co. 07023 and Co. 07025.

AVT (M-1): CoH 08263, CoH 08264, CoH 08234 and CoH 08235 and Cos 767.

AVT (M-II): Co. 07028, CoH 07263, Co.07264, CoLk 07202, CoLk 07203, CoPb 07212, CoPb 07213, CoH 07232, CoH 07234, CoS 767 CoS8436 and CoPant 97222.

IVT (Early): CoS 09020, CoH 09262, CoH 09263, CoLk 09201, CoLk 09202, CoLk 09203, CoPb 09211, CoPb 09212, CoPb 09213, Cos 09246

IVT (Mid-Late): Co.09021, Co. 09022, CoH 09264, CoPb 09214, CoS 09232, Cos 09240, CoLk 09204, CoS 09231.

(b) Varieties graded as resistant/ moderately resistant by plug method of inoculation with Cf 09

AVT (E-1): CoPb 08211, CoS 08233

AVT (E-II): Co. 06032, Co.07025

AVT (M-1): CoH 08234, CoH 08235, and CoH. 08262

AVT (M-II): Co. 07028, CoH 07263, Co.07264, CoLk 07202, , CoPb 07212, CoPb 07213, CoH 07232, CoH 07234, CoS8436 and CoPant 97222.

IVT (Early): CoS 09020, CoH 09262, CoH 09263, CoLk 09201, CoLk 09202, CoLk 09203, CoPb 09212, Cos 09246

IVT (Mid-Late): Co.09021, Co. 09022, CoH 09264, CoPb 09214, CoS 09232, Cos 09240.

(c) Varieties graded as resistant/ moderately resistant by Nodal cotton method of inoculation with Cf 08.

AVT (E-1):) : CoPb 08211, CoPb 08213 and CoS 08233.

AVT (E-II): Co. 06232, Co. 07023 and Co. 07025, CoH 07261, CoLk 07201

AVT (M-1): CoH 08234, CoH 08235, CoH. 08262, CoH 08263, CoH 08264, CoPb 08217 and Cos 767.

AVT (M-II): Co. 07028, CoH 07263, Co.07264, CoLk 07202, CoLk 07203, CoPb 07212, CoPb 07213, CoH 07232, CoH 07234, CoS 767, CoS8436 and CoPant 97222.

IVT (Early): CoS 09020, CoH 09262, CoH 09263, CoLk 09201, CoLk 09202, CoLk 09203, CoPb 09211, CoPb 09212, CoPb 09213, Cos 09246.

IVT (Mid-Late): Co.09021, Co. 09022, CoH 09264, CoH 09204, CoPb 09214, CoS 09232, Cos 09240, Cos 09231

d) Varieties graded as resistant/ moderately resistant by Nodal cotton method of inoculation with Cf 09.

AVT (E-1) : CoPb 08211, CoPb 08213 and CoS 08233.

AVT (E-II): Co. 06232, Co. 07023 and Co. 07025, CoH 07261, CoLk 07201.

AVT (M-1): CoH 08234, CoH 08235, CoH. 08262.

AVT (M-II): Co. 07028, CoH 07263, Co.07264, CoLk 07202, CoLk 07203, CoPb 07212, CoPb 07213, CoH 07232, CoH 07234, CoS 767, CoS8436 and CoPant 97222.

IVT (Early): CoS 09020, CoH 09261, CoH 09262, CoH 09263, CoLk 09201, CoLk 09202, CoLk 09203, CoPb 09211, CoPb 09212, CoPb 09213, CoS 09246.

IVT (Mid-Late): Co.09021, Co. 09022, CoH 09264, CoH 09204, CoPb 09214, CoS 09232, Cos 09240, CoS 09231.

B- SMUT

All the entries of IVT (M), IVT (E), AVT (E) I, AVT(E-II), AVT (M) I, AVT (M) II, were tested against smut also, teliospores from commercially cultivated sugarcane varieties were collected and filled in blotting paper bags and stored in dessicator under calcium chloride. Three budded setts were dipped in spore suspension of over 90 per cent viability with a spore load of one million per ml for half an hour before panting. The incidence of the smut was recorded fortnightly on the clump basis of each row on different varieties (Table-3).

Varieties found R/MR to smut

AVT (E-1) : CoPb 08211, CoPb 08213 and CoS 08233.

AVT (E-II): Co.06232, Co.07023, Co.07025, CoH 07261.

AVT (M-1): CoH 08263, CoH. 08264.

AVT (M-II): Co. 07028, CoH 07263, Co.07264, CoLk 07202, CoPb 07212, CoPb 07213, CoH 07232, CoH 07234, CoS 767, CoS8436 and CoPant 97222.

IVT (Early): CoS 09020, CoH 09262, CoH 09263, CoLk 09201, CoLk 09202, CoLk 09203, CoPb 09212, CoPb 09213, Cos 09246.

IVT (Mid-Late): Co.09021, Co.09022, CoH 09264, CoH 09204, CoPb 09214, CoS 09232, Cos 09240, Cos 09231.

Check (smut susceptible): Co 1158 was used as smut susceptible check & found highly susceptible to smut.

Project No.	:	PP 22
Project title	:	Survey of sugarcane diseases naturally occurring in the area on important sugarcane varieties.
Objective	:	To gather information on the diseases naturally occurring in the area on varieties to compile an All India disease status report yearly.
Year of start	:	1989-90
Location	:	Shahjahanpur

Report

Red rot was reported on variety CoS 95422 from Balrampur and Its incidence varied from 10-20 percent. Stray incidence of smut has been reported from few pockets, Shahjahanpur and Gola gokaranath in variety CoSe 01424.

GSD have been reported in almost all the sugarcane cultivars and its incidence varied from 0.5 to 30 percent in central and western part of Uttar Pradesh. 60% incidence of GSD was observed in variety CoS 97261 from Shahjahanpur.

Stray cases of Pokkah Boeng were reported on variety, CoS 07250, Co.0238, CoS 97261, CoS 98231, CoS8436, CoS97264, CoS 88230, CoS98259, CoS05125, CoS91269, Co. 0239, CoS 97264, CoS 08272, CoS 08279, CoS 07240 and CoSe 92423 from Golagokarannath, Shahjahanpur, Sitapur, Baheri, Azabapur and Gonda districts (Table-1). 25% incidence of PBD was recorded in variety CoSe 01434 at Shahjahanpur.

Project No. : PP 23
Project title : Assessment of elite and ISH genotypes for resistance to red rot.
Objective : To gather information on *Saccharum* sp. and elite genotypes for resistance to red rot so that the resistant genotypes could be used in breeding programme as possible donor for resistance.
Year of start : 1996-97
Location : Shahjahanpur

Report

Of twelve ISH genotypes four ISH genotypes namely ISH 338, ISH 280, ISH 208 and ISH 291 were found moderately resistant by plug method of inoculation with Cf 08 and Cf 09 pathotypes separately (Table-4).

Project No. : PP 31
Project title : Screening, epidemiology and management of Pokkah boeng in sugarcane.
Objective : To study the development of Pokkah boeng disease in relation to weather parameters and its management in sugarcane crop.
Year of start : 2011-12
Location : Shahjahanpur

Report

A total of number of 11 varieties was screened out during the crop season 2012-13 with mild infection (Table-5). All the infected varieties have chlorotic streaks, curling and twisting on leaves at various intensities. No symptoms of top rot and wilting of stalks have been observed in planted sett.

It has been observed that the incidence of *pokkah boeng* disease appears after the starting of rain fall with high humidity and low temperature. The maximum intensity of symptoms was observed at temperature 32.4 (Max.), 26.0 (Min.), relative humidity 85.5% and 479.2 mm rainfall in the month of August (Table-6). Rainfall and high humid condition plays a major role in incidence of disease however; symptoms were also noticed in different locations after monsoon period with stray condition.

Table-4: Pathogenic behaviour of *C. falcatum* pathotypes/isolates on host differentials (2012-13)

S N	Isolates	Source	Reaction on host differentials														
			C 0419	C 0975	C 0997	C 01148	C 07717	C 062399	CoC 671	CoJ 64	CoS 767	CoS 8436	B 091	Baragua	Khakai	SES 594	Tallied with pathotype
1	Cf 01	Co 01148	R	S	S	S	R	S	S	S	R	R	R	R	S	R	
2	Cf 02	C 07717	X	R	S	R	S	X	S	X	R	R	R	R	S	R	
3	Cf 03	CoJ 64	R	R	S	R	R	R	X	S	R	R	R	R	S	R	
4	Cf 07	CoJ 64	X	R	S	S	R	R	X	S	R	R	R	R	S	R	
5	Cf 08	CoJ 64	X	S	S	S	S	S	S	S	X	R	R	R	S	R	
6	Cf 09	CoS 767	X	X	S	S	R	R	X	S	S	R	R	R	S	R	
7	Cf 11	CoJ 64	S	X	S	X	X	X	X	S	X	R	X	X	X	R	
8	R 1101	CoSe 92423	X	X	S	S	R	R	X	S	S	R	R	R	S	R	Cf 09
9	R 1102	CoS 8436	S	S	S	X	R	S	S	S	R	S	R	R	S	R	New
10	R 1103	CoJ 64	X	S	S	S	S	S	S	S	X	R	R	R	S	R	Cf 08
R-Resistant, I- Intermediate, S- Susceptible																	

Table-5: Evaluation of Pre-zonal/ Zonal genotypes/varieties to red rot and smut (2012-13)

S N	Genotypes/ Varieties	Reaction against Red rot				Reaction to smut
		Plug method		Nodal Cotton swab		
		Cf 08	Cf 09	Cf 08	Cf 09	
1	2	3	4	9	10	12
AVT (E-I)						
1	CoPb 08211	MR	MR	R	R	R
2	CoPb 08212	MR	MS	R	R	R
3	CoS 08233	MR	MR	R	R	R
4	CoJ 64	HS	HS	S	MS	R
5	Co. 453	HS	HS	MS	S	R
AVT(E-II)						
1	Co 06032	MR	MR	R	R	R
2	Co 07023	MR	MS	R	MR	R
3	Co 07025	MR	MR	R	R	MR
4	CoH 07261	NG	MS	R	R	R
5	Colk 07201	NG	NG	R	R	S
6	CoJ 64	HS	HS	S	MS	R
7	CoPant 84211	HS	HS	S	S	R
AVT(M-I)						
1	CoH 08262	NG	MR	R	R	S
2	CoH 08263	MR	S	R	MS	R
3	CoH 08264	MR	S	R	MS	R
4	CoPb 08217	MS	S	R	MS	S
5	CoH 08234	MR	MR	R	R	MS
6	CoH 08235	MR	MR	R	R	MS
7	CoS 767	MR	MS	R	MS	MS

Table-5: Evaluation of Pre-zonal/ Zonal genotypes/varieties to red rot and smut (2010-11)

S N	Genotypes/ varieties	Reaction against Red rot				Reaction to smut
		Plug method		Nodal Cotton swab		
		Cf 08	Cf 09	Cf 08	Cf 09	
1	2	3	4	5	6	7
AVT (M-II)						
1	Co 07028	MR	MR	R	R	R
2	Co H 07263	MR	MR	R	R	R
3	CoH 07264	MR	MR	R	R	R
4	CoLk 07202	MR	MR	R	R	R
5	CoLk 07203	MR	MS	R	MR	MS
6	CoPb 07212	MR	MR	R	R	R
7	CoPb 07013	MR	MR	R	R	R
8	CoH 07232	MR	MR	R	R	R
9	CoH 07234	MR	MR	R	R	R
10	CoS. 767	MR	MS	R	MS	R
11	CoS 8436	MR	MR	R	R	R
12	CoPant 97222	MR	MR	R	R	R
IVT (M)						
1	Co.09021	MR	MR	R	R	R
2	Co 09022	MR	MR	R	R	R
3	CoH 09264	MR	MR	R	R	R
4	CoLK 09204	MR	MS	R	MR	R
5	CoPb 09214	MR	MR	R	R	R
6	CoS 09231	MR	MS	R	MR	R
7	CoS09232	MR	MR	R	R	R
8	CoS 09240	MR	MR	R	R	R
IVT(E)						
1	CoS 09020	MR	MR	R	R	R
2	CoH 09261	S	HS	MS	S	R
3	CoH 09262	MR	MR	R	R	R
4	Coh 09263	MR	MR	R	R	R
5	CoLk 09201	MR	MR	R	R	R
6	CoLk09202	MR	MR	R	R	R
7	CoLk 09203	MR	MR	R	R	R
8	CoPb 09211	MR	S	R	MS	R
9	CoPb 09212	MR	MR	R	R	R
10	CoPb 09213	MR	MS	R	MR	R
11	CoS 09246	MR	MR	R	R	R

Table-6: Screening of ISH genotypes against Red rot during 2012-2013(Shahjahanpur).

S. N.	Genotypes	Plug method	
		Cf 08	Cf 09
1	ISH 338	MR	MR
2	ISH 280	MR	MR
3	ISH 208	MR	MR
4	ISH 291	MR	MR
5	ISH305	HS	S
6	ISH 287	S	S
7	ISH 263	MS	MS
8	ISH 266	HS	S
9	ISH 174	MS	MS
10	ISH301	HS	S
11	ISH 975	S	S
12	ISH 298	MS	MS

Table-7: Reaction of different sugarcane varieties against Pokkah boeng disease under natural condition

S. N.	Varieties	Percent infected plants				Disease reaction
		Mild	Moderate	Severe	Total incidence	
01	CoPb 08217	1	-	-	1	Resistant
02	CoS 8436	3	-	-	3	R
03	CoLk 08201	1	-	-	1	R
04	CoH 08263	1	-	-	1	R
05	CoH 06266	2	-	-	2	R
06	CoH 08234	1	-	-	1	R
07	CoH 08264	1	-	-	1	R
08	CoH 08262	2	-	-	2	R
09	CoH 08261	1	-	-	1	R
10	CoH 08235	1	-	-	1	R
11	CoPant 03220	1	-	-	1	R

Table-8: Meteorological data at Sugarcane Research Institute, Shahjahanpur during April, 2012 to March, 2013

S.N.	Month	Rain fall (mm)	Temperature °C		Relative humidity
			Maximum	Minimum	
01	April, 2012	6.2	36.6	19.9	43.7
02	May, 2012	-	40.0	24.4	32.0
03	June, 2012	3.4	41.0	28.1	39.0
04	July, 2012	332.3	33.7	26.5	79.0
05	August, 2012	479.2	32.4	26.0	85.5
06	September, 2012	249.6	33.4	25.2	80.0
07	October, 2012	1.8	32.0	17.0	66.0
08	November, 2012	-	27.5	11.9	71.9
09	December, 2012	2.6	23.1	8.6	78.0
10	January, 2013	28.4	17.4	5.9	80.0
11	February, 2013	77.1	23.6	10.9	68.8
12	March, 2013	4.4	30.6	15.4	61.55

