

1. Project No. : PP 14
2. Location : Sugarcane Research Institute, Pusa, Samastipur (Bihar)
3. Title of experiment : Identification of pathotypes of red rot pathogen.
4. Objective of experiment : To gather information on the major pathotypes of red rot from different areas/zones.
5. Year of start : 1983-84 (Continuing project)
6. Technical programme on which report based during : (2016-17)
7. Technical summary :

17 Sugarcane differentials were inoculated with two pathotypes CF 07 and CF 08 and eight isolates collected from different cane growing areas of Bihar. Twenty canes of each differential were inoculated in the 3<sup>rd</sup> week of August, 2016 and disease progress was assessed after 60 days of inoculation.

The data (Appendix I) indicate that differentials BO 91, Baragua and SES-594 showed resistant reaction while, Co 1148, Co 997, CoJ 64, CoC 671 and Khakai produced susceptible reaction against all the test isolates. Differentials Co 419, CoS 767, Co 7717, CoS 8436, Co 62399, Co975, CoV, 92102, Co 86032 and CoSe 95422 showed differential reaction against all the test isolates.

It is clear from the data that pathotype CF 07 and isolates RR<sub>1</sub>, RR<sub>3</sub>, RR<sub>4</sub>, RR<sub>5</sub> and RR<sub>7</sub> produced resistant reaction on differentials Co 419, CoS 767, Co 7717, Co 975, CoV 92102 and Co 86032 and intermediate reaction on CoSe 8436 and Co 62399. Pathotype CF 07 and isolates RR<sub>1</sub>, RR<sub>3</sub>, RR<sub>4</sub>, RR<sub>5</sub> and RR<sub>7</sub> showed similar pathological reaction on differentials. Similarly, pathotype CF 08 and isolates RR<sub>2</sub>, RR<sub>6</sub> and RR<sub>8</sub> produced intermediate reaction on Co 419, CoS 767, Co 7717, Co 975, CoV 92102, Co 86032 and CoSe 95422 and susceptible reaction on CoS 8436 and Co 92399. Hence, CF 08 and isolates RR<sub>2</sub>, RR<sub>6</sub> and RR<sub>8</sub> showed the similar pathological reaction on differentials.

**(Detailed in Appendix-I)**

## APPENDIX- I

## P.P.-14 Identification of Pathotypes of red rot Pathogen 2016-17

Sl. No	Isolates	Sources	Reaction on host differentials																
			Co 1148	Co 419	CoS 767	Co 997	CoJ 64	BO 91	CoC 671	Khakai	Co 7717	CoS 8436	Co 62399	Bara-gua	SES 594	Co 975			
1.	CF 07	CoJ 64	S	R	R	S	S	R	S	S	R	I	I	R	R	R	R	R	S
2.	CF 08	CoJ 64	S	I	I	S	S	R	S	S	I	S	S	R	R	I	I	I	I
3.	RR <sub>1</sub>	BO 145	S	R	R	S	S	R	S	S	R	I	I	R	R	R	R	R	S
4.	RR <sub>2</sub>	CoS 98231	S	I	I	S	S	R	S	S	I	S	S	R	R	I	I	I	I
5.	RR <sub>3</sub>	CoLk 8102	S	R	R	S	S	R	S	S	R	I	I	R	R	R	R	R	S
6.	RR <sub>4</sub>	CoS 8436	S	R	R	S	S	R	S	S	R	I	I	R	R	R	R	R	S
7.	RR <sub>5</sub>	CoLk 94184	S	R	R	S	S	R	S	S	R	I	I	R	R	R	R	R	S
8.	RR <sub>6</sub>	BO 141	S	I	I	S	S	R	S	S	I	S	S	R	R	I	I	I	I
9.	RR <sub>7</sub>	CoSe 95422	S	R	R	S	S	R	S	S	R	I	I	R	R	R	R	R	S
10.	RR <sub>8</sub>	BO 128	S	I	I	S	S	R	S	S	I	S	S	R	R	I	I	I	I

1. Project No. : PP 17 a
2. Location : Sugarcane Research Institute, Pusa, Samastipur (Bihar)
3. Title of experiment : Evaluation of Zonal varieties for resistance to red rot disease.
4. Objective of experiment : To gather information on the relative resistance to red rot of the entries in Zonal varietal trial of the respective Zones.
5. Year of start : 1986-87 (Continuing project)
6. Technical programme on which report based during : (2016-17)
7. Technical summary :

Eighteensugarcane genotypes including one check of different maturity groups were tested artificially by using CF 07 and CF 08 isolates of red rot pathogen adopting plug and cotton swab methods of inoculations.

In case of plug method, genotypes CoP 11437, CoP 11438, CoP 11451, CoLK 09204, BO 155, BO 130, CoP 13437, CoSe 13451, CoSe 13452, CoP 13438, CoSe 13453 and CoSe 13454 showed moderately resistant reaction against both the isolates whereas, entries BO 91, CoP 9301 and CoP 13439 showed resistant reaction against CF 08 and moderately resistant against CF 07 while, genotypes CoP 13436 was observed resistant against CF 07 and Moderately resistant against CF 08, while CoSe 92423 and CoSe 95422 showed susceptible reaction against both the tested isolates,

In case of cotton swab method, genotypes CoSe 92423 and CoSe 95422 showed susceptible reaction against both the isolates. The rest of the genotypes showed resistant reaction against both the tested isolates.

**(Detailed in Appendix-II)**

1. Project No. : PP 17 b
2. Location : Sugarcane Research Institute, Pusa, Samastipur (Bihar)
3. Title of experiment : Evaluation of zonal varieties for resistance to smut disease.
4. Objective of experiment : To gather information on the relative resistance to smut of the entries in zonal varietal trial of the respective zones.
5. Year of start : 1994-95 (Continuing project)
6. Technical programme on which report based during : (2016-17)
7. Technical summary :

Eighteen sugarcane genotypes including one check of different maturity groups were tested artificially against smut disease. Three budded setts of 18 genotypes were artificially inoculated by soaking the setts in freshly collected spore suspension of the smut pathogen for 30 minutes. The incidence of smut was recorded as percent of disease. It is observed that seven entries (CoP 11438, CoP 11451, CoLK 09204, BO 155, BO 91, CoP 9301 and CoP 13439) remained free from smut disease and graded as resistant. Whereas, ten entries (CoP 11437, BO 130, CoSe 92423, CoP 13436, CoP 13437, CoSe 13451, CoSe 13452, CoP 13438, CoSe 13453 and CoSe 13454) were graded as moderately resistant against smut disease.

**(Detailed in Appendix – II)**

1. Project No. : PP 17 c
2. Location : Sugarcane Research Institute, Pusa, Samastipur (Bihar)
3. Title of experiment : Evaluation of zonal varieties for resistance to wilt disease.
4. Objective of experiment : To gather information on the relative resistance to wilt of the entries in zonal varietal trial of the respective zones.
5. Year of start : 2000-01 (Continuing project)
6. Technical programme on which report based during : (2016-17)
7. Technical summary :

Eighteen sugarcane genotypes including one check of different maturity groups were planted in two rows of 5 meter long in wilt sick plot to test their relative resistance to wilt disease. Data were recorded on 0-4 scale. Out of eighteen genotypes evaluated, nine entries BO 155, BO 130, CoP 13436, CoP 13437, CoSe 13451, CoSe 13452, CoP 13438, CoSe 13453 and CoSe 13454 were observed free from wilt infection and they were graded as resistant. Whereas, seven entries (CoP 11437, CoP 11438, CoP 11451, CoLK 09204, BO 91, CoP 9301 and CoP 13439) were graded as moderately resistant. While, single entry CoSe 92423 showed moderately susceptible to wilt disease.

**(Detailed in Appendix – II)**



1. Project No. : PP 17 d
2. Location : Sugarcane Research Institute, Pusa, Samastipur (Bihar)
3. Title of experiment : Yellow leaf disease of sugarcane (YLD).
4. Objective of experiment : -
5. Year of start : 2014-2015 (Continuing project)
6. Technical programme on which report based during : (2016-17)
7. Technical summary :

Yellow leaf disease was not observed in any experimental plots, but the symptoms was noticed in ratoon crop of varieties CoSe 95422 and CoS 8436 in two clumps only during survey in the farmers field in 2<sup>nd</sup> week of August, 2016.

1. Project No. : PP 22
2. Location : Sugarcane Research Institute, Pusa, Samastipur (Bihar)
3. Title of experiment : Survey of sugarcane diseases naturally occurring in Bihar on important sugarcane varieties.
4. Objective of experiment : To gather information on the diseases naturally occurring in Bihar on varieties to compile all India disease status report yearly.
5. Year of start : 1988-89 (Continuing project)
6. Technical programme on which report based during : (2016-17)
7. Technical summary :

To know the disease position and varietal susceptibilities of sugarcane, the disease survey was conducted in different cane growing areas of Bihar. Twelve sugarcane varieties were found affected with wilt, red rot, smut, GSD, PokkahBoeng and mosaic diseases.

During survey incidence of wilt was noticed in varieties CoLk 94184, CoSe 98231, Co 118 and Co 0233. Smut was observed in BO 141 and BO 136. Variety Co 5011 was found affected with PokkahBoeng and mosaic diseases. Varieties CoSe 92423, CoS 8436 and CoSe 95422 were found affected with red rot disease. While, red rot and GSD was observed in variety Co 0235. While YLD was noticed in ratoon crop of varieties CoSe 95422 and CoSe 8436 in two clumps only in the farmer field during 2<sup>nd</sup> week of August, 2016. The severity and locations of the diseases are depicted in appendix – III.

**(Detailed in Appendix – III)**



## APPENDIX- III

## P.P. 22 Survey of Sugarcane diseases naturally occurring on Sugarcane Varieties (2016-17)

Sl. No	Varieties	June	September	December	Areas
1.	CoLk 94184, CoS 98231, Co 118, Co 0233	-	Wilt (2%)	Wilt (3-5%)	Sidhwalia, Manjhaulia, Murila (Harinagar)
2.	Co 5011	-	PokkahBoeng (T), Mosaic (T)	Mosaic (2%)	Narayan Pipri (Hasanpur)
3.	BO 141, BO 136	Smut (T) Ratoon	-	-	Riga, Hatwa Farm
4.	CoSe 92423, CoS 8436, CoSe 95422	-	Red rot (2%)	Red rot (3-5%)	NarkatiaganjandPusa
5.	Co 0235	-	Red rot (T) + Grassy Shoot Diseases (T)	Red rot (T) + GSD (T)	Manjhaulia
6	CoSe 95422 and CoS 8436	-	YLD	-	Hasanpur

1. Project No. : PP 23
2. Location : Sugarcane Research Institute, Pusa, Samastipur (Bihar)
3. Title of experiment : Assessment of elite and ISH genotypes for resistance to red rot.
4. Objective of experiment : To gather information for resistance to red rot so that resistant genotypes could be used in breeding programme as donor of resistance.
5. Year of start : 1996-97 (continuing project)
6. Technical programme on which report based during : (2016-17)
7. Technical summary :

Twenty seven clones received on 12.03.2016 from SBI, Coimbatore, out of 27 clones, 06 clones (AS 04-1687, AS 04-1689, BM – 1003143, BM 1009163, SA 98-13 and SA – 409) failed to germinate. Due to poor germination in rest 21 clones (One/Two clumps) inoculation were not carried out. After multiplication of seed materials, 27 clones were planted during planting season 2017 and inoculation will be carried out during August, 2017.

1. Project No. : PP 31
2. Location : Sugarcane Research Institute, Pusa, Samastipur (Bihar)
3. Title of experiment : Screening, epidemiology and management of PokkahBoeng in sugarcane.
4. Objective of experiment : To study the development of Pokkahboeng disease in relation to the weather parameters and its management in sugarcane crop.
5. Year of start : 2015-2016 (continuing project)
6. Technical programme on which report based during : (2016-17)
7. Technical summary :

Eleven genotypes including one check were screened under natural condition, out of eleven genotypes, four genotypes CoX 12278, CoX 12137, CoX 12489 and CoX 12494 were showed mild infection. Whereas, seven genotypes showed susceptible to PokkahBoeng disease. The disease appeared in the 2<sup>nd</sup> week of June and gradually increased till 1<sup>st</sup> week of August. Initial symptoms showed whitish, curling, twisting and bending of the leaves from the top portion. Yellowing of foliage and reading of spindles with small holes were also noticed at later stage. High humidity and rainfall favours the disease development.

Sett treatment with Carbendazim 0.1% and three (03) foliar spray with Carbendazim 0.05% at 15 days interval showed the maximum (46.8) percent germination and also low disease incidence (5.3) of PokkahBoeng. After 3 sprays with Carbendazim at 15 days interval started from 30<sup>th</sup> June, 15<sup>th</sup> July and 30<sup>th</sup> July, gave good reduction in PokkahBoeng incidence. The minimum and maximum temperature 23.0 to 35.2<sup>0</sup>C, relative humidity 53.1 to 93.0 per cent and rainfall 34.6 to 319.2 mm were observed during May to October, 2016.

**(Detailed in Appendix – IV)**

## Appendix – IV

## Reaction of sugarcane genotypes for resistance to PokkahBoeng (2016-17)

Sl. No.	Varieties	Percent infected plants			Total incidence	Disease reaction
		Mild	Moderate	Severe		
1.	CoX 12092	13	07	05	25	S
2.	CoX 12191	16	03	02	21	S
3.	CoX 12264	13	05	02	20	S
4.	CoX 12278	02	-	-	02	R
5.	CoX 12348	13	06	02	21	S
6.	CoX 12070	15	03	02	20	S
7.	CoX 12137	03	-	-	03	R
8.	CoX 12144	15	06	02	23	S
9.	CoX 12489	04	-	-	04	R
10.	CoX 12494	02	-	-	02	R
11.	CoSe95422 (Check)	13	05	02	20	S

Months	Temperature		Relative humidity (%)		Rainfall (mm)
	Maximum (°C)	Minimum (°C)			
			Morning	Evening	
May, 2016	34.6	23.1	83.4	53.1	132.8
June, 2016	35.2	26.3	81.0	61.0	105.1
July, 2016	32.0	26.0	91.0	79.0	304.1
August, 2016	33.7	26.2	86.0	67.0	110.8
September, 2016	31.4	25.0	93.0	79.0	319.2
October, 2016	32.8	23.0	88.0	58.0	34.6
November, 2016	29.0	15.9	68.0	44.0	0.0
December, 2016	22.3	11.3	90.0	65.0	0.0

## Management of PokkahBoeng/Top rot disease in sugarcane

Treatment		Germination (%)	Disease incidence (%)
T <sub>1</sub>	Sett treatment (Overnight soaking with carbendazim 0.1%)	40.4	12.3
T <sub>2</sub>	Foliar spraying (Carbendazim 0.05%, 3 sprays at 15 days interval from 30 <sup>th</sup> June)	34.2	10.7
T <sub>3</sub>	T <sub>1</sub> +T <sub>2</sub>	46.8	5.3
T <sub>4</sub>	Control	22.2	32.7
SEM±		1.48	0.89
CD at 5%		4.73	2.84
CV%		7.17	10.0

