

**Sugarcane Research Institute,  
Rajendra Agricultural University, Bihar,  
Pusa (Samastipur)-848125**

***Dr. S. S. Pandey***  
***Director***



**No1008/SRI, Pusa**

**Date 26.5.14**

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To

Dr. O.K. Sinha  
Project Co-Ordinator (Sugarcane)  
A.I.C.R.P. on Sugarcane Research  
P.O. Dilkhusa  
Lucknow-226002 (U.P)

Sub: Annual report of Plant Pathology, Sugarcane Research Institute, Pusa 2013-14.

Sir,

I am enclosing herewith one copy of Annual Report (2013-14) of Plant Pathology experiments for your needful. I have already sent two copies of this report to the Head, Division of Crop Protection, S.B.I, Coimbatore. Kindly acknowledge the receipt of the same.

Encl: As above.

Yours faithfully

Sd/  
(S. S. Pandey)

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**Sugarcane Research Institute,  
Rajendra Agricultural University, Bihar,  
Pusa (Samastipur)-848125**

***Dr. S. S. Pandey***  
***Director***



**No. 1009/SRI, Pusa**

**Date 26.5.14**

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To

Dr. R. Viswanathan  
Head  
Division of Crop Protection & Principal Investigator  
Plant Pathology (AICRP on Sugarcane),  
SBI, Coimbatore-641007 (T. N.)

Sub: Annual report of Plant Pathology, Sugarcane Research Institute, Pusa 2013-14.

Sir,

I am enclosing herewith two copies of annual report (2013-14) of Plant Pathology experiments for your needful. Kindly acknowledge the receipt of the same.

Encl: As above.

Yours faithfully

Sd/-  
(S. S. Pandey)

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 : (2013-14)
7. Technical summary :

14 Sugarcane differentials were inoculated with two pathotypes CF 07 and CF 08 and nine isolates collected from different parts of Bihar. Twenty five canes of each differential were inoculated in the 3<sup>rd</sup> week of August, 2013 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 and Co 975 showed differential reaction against all the test isolates.

It is clear from the data that pathotype CF 07 and isolates RR<sub>2</sub>, RR<sub>3</sub>, RR<sub>4</sub>, and RR<sub>7</sub> produced resistant reaction on differentials Co 419, CoS 767, Co 7717 and Co 975 and intermediate reaction on CoS 8436 and Co 62399. Since pathotype CF 07 and isolates RR<sub>2</sub>, RR<sub>3</sub>, RR<sub>4</sub> and RR<sub>7</sub> produced similar pathological reaction on differentials. Hence, isolates RR<sub>2</sub>, RR<sub>3</sub>, RR<sub>4</sub> and RR<sub>7</sub> are similar to CF 07 in their level of virulence. Similarly Pathotype CF 08 and isolates RR<sub>1</sub>, RR<sub>5</sub>, RR<sub>6</sub> RR<sub>8</sub> and RR<sub>9</sub> produced intermediate reaction on Co 419, CoS 767, Co 7717 and Co 975 and susceptible reaction on CoS 8436 and Co 62399. Hence, isolates RR<sub>1</sub>, RR<sub>5</sub>, RR<sub>6</sub>, RR<sub>8</sub> and RR<sub>9</sub> are similar in exhibiting the pathological reaction on differentials.

(Detailed in Appendix-I)

**APPENDIX- I**  
**P.P.-14 Identification of major Pathotypes of red rot Pathogen 2013-14**

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	Baragua	SES 594	Co 975
1.	CF 07	Co 1148	S	R	R	S	S	R	S	S	R	I	I	R	R	R
2.	CF 08	Co 7717	S	I	I	S	S	R	S	S	I	S	S	R	R	I
3.	RR <sub>1</sub>	BO 145	S	I	I	S	S	R	S	S	I	S	S	R	R	I
4.	RR <sub>2</sub>	BO 138	S	R	R	S	S	R	S	S	R	I	I	R	R	R
5.	RR <sub>3</sub>	CoLK 8102	S	R	R	S	S	R	S	S	R	I	I	R	R	R
6.	RR <sub>4</sub>	CoSe 95422	S	R	R	S	S	R	S	S	R	I	I	R	R	R
7.	RR <sub>5</sub>	BO 128	S	I	I	S	S	R	S	S	I	S	S	R	R	I
8.	RR <sub>6</sub>	CoBlh 7501	S	I	I	S	S	R	S	S	I	S	S	R	R	I
9.	RR <sub>7</sub>	CoS 8436	S	R	R	S	S	R	S	S	R	I	I	R	R	R
10.	RR <sub>8</sub>	CoJ 7430	S	I	I	S	S	R	S	S	I	S	S	R	R	I
11.	RR <sub>9</sub>	CoJ 9070	S	I	I	S	S	R	S	S	I	S	S	R	R	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 : (2013-14)
7. Technical summary :

Thirty 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 inoculation. The inoculation was done in the 3<sup>rd</sup> week of August 2013. In case of plug method, genotypes CoSe 95422, CoSe 92423 and Co 1148 showed susceptible reaction against both the isolates, whereas, genotypes CoSe 10452 was graded as moderately susceptible reaction against CF 07 and CF 08. The remaining genotypes showed resistant to moderately reaction against both the test isolates.

In case cotton swab method, genotype CoSe 95422 showed susceptible reaction against both the isolates, whereas, genotype CoSe 92423 was graded as susceptible against CF 07 isolate and moderately susceptible reaction against isolate CF 08. The rest of the genotypes showed resistant to moderately resistant reaction against both the test isolates.

(Detailed in Appendix-II)

**Appendix -II**  
**Screening of zonal/pre-zonal varieties against red rot disease year-2013-14**

Sl. No	Genotypes	Plug method				Cotton swab			
		CF 07		CF 08		CF 07		CF 08	
		Score	rating	Score	rating	Score	rating	Score	rating
1.	CoSe 95422	6.5	S	7.1	S	6.2	S	6.8	S
2.	CoP 08436	1.4	R	2.3	MR	1.0	R	1.5	R
3.	CoSe 08451	3.5	MR	3.2	MR	1.8	R	2.8	MR
4.	CoSe 08453	2.4	MR	3.1	MR	1.3	R	1.5	R
5.	CoSe 08452	2.4	MR	2.8	MR	1.2	R	1.6	R
6.	CoP 08437	3.2	MR	3.6	MR	1.8	R	2.4	MR
7.	CoSe 09451	2.8	MR	3.0	MR	1.5	R	1.2	R
8.	CoSe 09452	2.5	MR	3.4	MR	2.3	MR	1.6	R
9.	CoSe 09453	2.6	MR	3.0	MR	1.2	R	2.3	MR
10.	CoSe 09454	2.3	MR	2.8	MR	1.4	R	1.8	R
11.	CoP 09436	2.6	MR	3.0	MR	1.6	R	2.4	MR
12.	CoP 09437	1.6	R	2.3	MR	1.2	R	1.6	R
13.	BO 91	2.3	MR	2.5	MR	1.0	R	1.4	R
14.	CoP 9301	1.8	R	2.3	MR	1.2	R	1.6	R
15.	CoSe 10451	2.3	MR	2.8	MR	1.2	R	2.3	MR
16.	CoSe 10452	4.2	MR	4.5	MS	3.2	R	3.8	MR
17.	CoSe 10453	1.6	R	2.6	MR	3.5	R	3.2	MR
18.	CoP 11436	3.1	MR	3.6	MR	2.4	R	2.8	MR
19.	CoP 11437	1.0	R	3.2	MR	1.4	MR	1.8	R
20.	CoP 11438	2.6	MR	3.2	MR	1.6	MR	2.2	MR
21.	CoP 11439	2.5	MR	3.2	MR	3.4	MR	3.0	MR
22.	CoP 11440	1.5	R	2.6	MR	2.4	R	1.6	R
23.	BO 155	1.4	R	2.5	MR	3.0	R	2.5	MR
24.	CoP 12436	2.3	MR	3.6	MR	2.4	MR	1.5	R
25.	CoP 12437	3.5	MR	3.8	MR	2.4	MR	2.8	MR
26.	CoP 12438	2.4	MR	2.8	MR	3.0	MR	3.5	MR
27.	CoP 12439	2.6	MR	3.5	MR	3.2	MR	3.8	MR
28.	BO 130	1.6	R	2.4	MR	1.4	MR	1.6	R
29.	CoSe 92423	6.4	S	7.0	S	6.5	S	5.5	MS
30.	Co 1148 (Check)	8.6	HS	6.4	S	-	-	-	-

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 : (2013-14)
7. Technical summary :

Thirty genotypes including one check of different maturity groups were tested artificially against smut disease. Three budded sets of 30 genotypes were artificially inoculated by soaking the sets in freshly collected spore suspension of the smut pathogen for 30 minutes. The incidence of smut was recorded as percent of disease. The data showed that nineteen genotypes (CoP 08436, CoSe 08451, Cose 08453, CoSe 08452, CoP 08437, Cose 09451, CoSe 09452, CoSe 09454, CoP 09436, BO 91, CoP 9301 CoSe 10453, CoP 11438 ,CoP 11440, BO 155, CoP 12436, CoP 12438, CoP 12439 and BO 130) remained free from smut disease and thus, were graded as resistant. While ten entries (CoSe 09453, CoSe 18451, CoSe 10452, CoP 09437, CoSe 95422, CoP 11436, CoP 11437, CoP 11439, CoP 12437 and CoSe 92423) got infection ranging from 1.0 to 5.6 per cent and thus, were graded as moderately resistant against smut disease.



(Detailed in Appendix-III)

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 : (2013-14)
7. Technical summary :

Thirty 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 thirty genotypes evaluated, six genotypes (CoP 9301, CoP 11437, CoP 11438, BO 155, CoP 12436 and CoP 12438) free from wilt infection and they were graded as resistant. While twenty two entries (CoP 8436, CoSe 08451, CoSe 08453, CoSe 08452, CoP 08437, CoSe 09451, CoSe 09452, CoSe 09453, CoSe 09454, CoP 09436, CoP 9437, BO 91, CoSe 10451, CoSe 10452, CoSe 10453, CoP 11436, CoP 11439, CoP 11440, CoP 12437, CoP 12439, BO 130 and CoSe 92423) got infection ranging from 0.4 to 1.8 units in 0-4 scale and thus, they were graded as moderately resistant. While single entry CoSe 95422 showed moderately susceptible reaction to wilt disease having infection of 2.5 units.

(Detail in Appendix-III)

**Appendix III**  
**Screening of zonal/pre-zonal varieties against smut and wilt diseases disease year-2013-14.**

<b>Sl. No.</b>	<b>Genotypes</b>	<b>Smut %</b>	<b>Rating</b>	<b>Wilt severity index</b>	<b>Rating</b>
1.	CoSe 95422	3.0	MR	2.5	MS
2.	CoP 08436	0.0	R	0.6	MR
3.	CoSe 08451	0.0	R	1.2	MR
4.	CoSe 08453	0.0	R	1.0	MR
5.	CoSe 08452	0.0	R	1.0	MR
6.	CoP 08437	0.0	R	0.4	MR
7.	CoSe 09451	0.0	R	0.6	MR
8.	CoSe 09452	0.0	R	1.5	MR
9.	CoSe 09453	2.4	MR	1.2	MR
10.	CoSe 09454	0.0	R	0.8	MR
11.	CoP 09436	0.0	R	1.5	MR
12.	CoP 09437	4.6	MR	1.2	MR
13.	BO 91	0.0	R	0.6	MR
14.	CoP 9301	0.0	R	0.0	R
15.	CoSe 10451	3.8	MR	1.4	MR
16.	CoSe 10452	5.6	MR	1.8	MR
17.	CoSe 10453	0.0	R	0.8	MR
18.	CoP 11436	2.0	MR	0.8	MR
19.	CoP 11437	1.0	MR	0.0	R
20.	CoP 11438	0.0	R	0.0	R
21.	CoP 11439	1.5	MR	1.2	MR
22.	CoP 11440	0.0	R	0.6	MR
23.	BO 155	0.0	R	0.0	R
24.	CoP 12436	0.0	R	0.0	R
25.	CoP 12437	3.5	MR	1.2	MR
26.	CoP 12438	0.0	R	0.0	R
27.	CoP 12439	0.0	R	0.8	MR
28.	BO 130	0.0	R	1.0	MR
29.	CoSe 92423	4.6	MR	1.6	MR
30.	Co 1148 (Check)	-	-	3.6	S
31.	Co 1158 (Check)	32.5	HS	-	-

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 : (2013-14)
7. Technical summary :

To ascertain the disease position and varietal susceptibilities of sugarcane, an extensive survey was carried out in different cane growing areas of Bihar in the months of June, September and December, 2013. In general, in the months of September and December the severity of the diseases was higher as compare to month of June. Eighteen sugarcane varieties were found affected with red rot, wilt, Smut, Pokkah Boeng and grassy shoot diseases.

Red rot alongwith wilt was observed on varieties CoS 91269, Co 118, CoB 07430, BO 128 and CoS 08436. Whereas, genotypes CoB 07427, CoBIn 07502 & CoBIn 07503 were found affected with red rot disease alone. Varieties BO 146, CoSe 98231 and Co 1158 were found affected with smut disease. While, varieties BO 137 & Co 0238 were found affected with Smut & Pokkah Beong diseases. Variety BO 147 was affected with Smut, GSD and wilt diseases. Variety CoJ 64 was found affected with GSD alone. While, variety CoLk 94184 was affected with Pokkah Beong and red rot diseases. The severity and location of the diseases are depicted in appendix IV.

(Details in Appendix IV)



## APPENDIX- IV

## P.P. 22 Survey of Sugarcane diseases naturally occurring on Sugarcane Varieties (2013-14)

Sl.No	Varieties	June	September	December	Areas
1.	BO 146	Smut (T)	-	-	Harinagar
2.	CoLK 94184	-	Pokkah Boeng (5%) + Red rot (T)	Pokkah Boeng (5%) + Red rot (T)	Hasanpur, Harinagar
3.	CoS 91269	-	Wilt (T) + Red rot (T)	Red rot (T) + Wilt (T)	Manjhawalia
4.	BO 137	Smut (T)	PB (T)	Wilt (5 %)	Hasanpur, Narkatiyaganj, Manjhawalia, Gopalganj, Sidhwalia
5.	BO 147	Smut (10 %)	G. S. D (5%) + Smut (5%)	G. S. D (5 %) + Wilt (5 %)	Kalyanpur Farm, Hasanpur, Gopalganj, Sidhwalia Sasa Musa
6.	CoS 8432	Smut (T)	Smut (T) + Red rot (T)	Red rot (5 %)	Manjhawalia
7.	Co 0238	Smut (5 %)	PB (5%), Smut (5%)	PB (10 %)	Manjhawalia, Sidhwalia
8.	CoJ 64	-	G. S. D (T)	G. S. D. (5 %)	Sidhwalia, Gopalganj
9.	Co 118	-	Wilt (5%) + Red rot (5 %)	Wilt (5 %) + Red rot (T)	Manjhawalia
10.	CoSe 98231	Smut (5 %)	-	-	Sidhwalia
11.	CoB 07427	-	Red rot (5 %)	Red rot (10%)	Pusa
12.	CoB 07430	-	Red rot (5 %) + Wilt (30%)	Red rot (10 %) + Wilt (5%)	Pusa
13.	CoBln 07502	-	Red rot (5 %)	Red rot (5%)	Pusa
14.	CoBln 07503	Smut (10 %)	Red rot (10 %)	Red rot (10%)	Pusa
15.	Co 1148	-	Red rot (10%)	Red rot (15%) + Wilt (10%)	Pusa
16.	BO 128	Smut (15 %)	Red rot (10%) + Wilt (15%)	Red rot (15%) + Wilt (15%)	Pusa, Sidhwalia, Hasanpur, Sasa Musa
17.	Co 1158	Smut (10 %)	Smut (10%)	-	Pusa, Sasa Musa,
18.	CoS 8436	-	Red rot (5%)	Red rot (10%) + Wilt (5%)	Majhauilia, Hasanpur, Pusa

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 : (2013-14)
7. Technical summary :

The experiment could not be conducted due to non receipt of seed materials from Co-ordinated unit.

1. Project No. : PP 30
2. Location : Sugarcane Research Institute, Pusa, Samastipur (Bihar)
3. Title of experiment : Assessment of field resistance in sugarcane to red rot.
4. Objective of experiment : Identification of sugarcane varieties exhibiting field resistance to red rot.
5. Year of start : 2010-11
6. Technical programme on which report based during : (2013-14)
7. Technical summary :

Fourteen varieties including two resistant checks (BO 139 and BO 154) were tested for field resistance to red rot with three replications. The disease development was recorded at fortnightly intervals till maturity of the crop.

Among 14 varieties, tested no red rot symptom were observed in varieties BO 139, CoSe 05452, Co 0419, Co 05020 and BO 154 under field condition. While in nine varieties CoSe 95422, CoSe 06456, CoSe 05451, CoB 099161, CoBIn 05502, CoB 07426, CoB 07427, CoB 07428 and CoBIn 05501 red rot symptom were observed having moderately resistant to susceptible levels of resistant.

**Conclusion-** Since this experiment is being conducted from 2010-11 to 2014-15 with same sets of varieties and similar results are being observed in each year. Hence, this experiment may be conclude/dropped from atleast Pusa centre.

**(Detail in Appendix-V)**





**APPENDIX- V**  
**P.P 30 Assessment of field resistance of Sugarcane varieties to Red rot 2013-14.**

<b>Sl. No</b>	<b>Varieties</b>	<b>Resistance Level (MR/S)</b>	<b>Symptoms observed followed by number of days after Planting</b>	<b>C. falcatum (Yes/No)</b>	<b>Any others informations.</b>
1.	BO 139 (Check)	MR	No Symptoms observed	No	-
2.	Cose 95422 (Check)	S	SY (90), SD (120), SM (150), LY (210), LD (240)	Yes	Red rot in combination with wilt.
3.	Cose 05452	R	No Symptoms observed	No	-
4.	CoSe 06456	S	SY (120), CR (150), LY (210)	Yes	-
5.	Cose 05451	MR	SY (60), SM (90), SD (120), LY (150)	Yes	-
6.	CoB 099161	S	SY (60), SD (90), SM (120), CR (135), LY (210)	Yes	Pokkah Boeng observed.
7.	CoBln 05502	MS	SY (90), SM (120), LY (150), LD (210)	Yes	-
8.	Co 0419	MR	No Symptoms observed	No	-
9.	Co 05020	R	No Symptoms observed	No	Poor germination
10.	CoB 07426	S	SY (60), SD (90), SM (120)	Yes	Wilt, Pokkah Boeng, Sprouting were observed.
11.	CoB 07427	MS	SY (45), SD (60), SM (90), LY (120), LD (150), CD (210)	Yes	-
12.	CoB 07428	S	SY (45), SD(60), SM (90), CR (120), LY (150), LD (210)	Yes	Pokkah Boeng, Wilt were observed.
13.	BO 154 (Check)	MR	No Symptoms observed	No	-
14.	CoBln -05501 (Check)	S	SY (60), SD (90), SM (120), CR (210), LY (240), LD (270)	Yes	Wilt, logging, Sprouting

