

# ANNUAL REPORT

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## PLANT PATHOLOGY

(All India Coordinated Research Project on Sugarcane)

*Division of Crop Protection*

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## PP 14: Identification of pathotypes in red rot pathogen

This year 13 new isolates *i.e.* six isolates from CoLk 8102 (IR-60, IR-61, IR-62, IR-63, IR-64 and IR-65); three isolates from CoS 767 (IR-66, IR-67 and IR-68), one isolate each from CoSe 92423 (IR 69); CoS 91269 (IR-70); CoSe 95422 (IR-71) and CoS 8436 (IR-72) received from Shahjahanpur were evaluated for their virulence on 14 designated differentials *viz.*, Co 419, Co 975, Co 997, Co 1148, Co 7717, Co 62399, CoC 671, CoJ 64, CoS 767, CoS 8436, BO 91, Khakai (*S. sinense*), Baragua (*S. officinarum*) and SES-594 (*S. spontaneum*) by plug method of inoculation. The virulence pattern of the isolates more or less matched with the existing pathotypes of this zone. Hence, there is no emergence of any new virulent pathotype in this zone.

**Table-1: Reaction of pathotypes on a set of differentials**

S. No.	Pathotype	Source	Co 419	Co 975	Co 997	Co 1148	Co 62399	Co 7717	CoC 671	CoJ 64	CoS 767	BO 91	Baragua	Khakai	SES 594	CoS 8436
1.	Cf 01	Co 1148	R	S	S	S	S	R	S	S	R	R	R	S	R	-
2.	Cf 02	Co 7717	I	R	S	R	I	S	S	I	R	R	R	R	R	-
3.	Cf 03	CoJ 64	R	R	S	R	R	R	R	S	R	R	R	R	R	-
4.	Cf 04	Co 419	S	S	S	S	R	S	S	S	R	R	R	S	R	-
5.	Cf 05	Co 997	R	S	S	S	R	R	S	S	R	R	R	S	R	-
6.	Cf 06	CoC 671	R	S	S	S	R	R	S	S	R	R	S	S	R	-
7.	Cf 07	CoJ 64	I	R	S	S	R	R	I	S	R	R	R	S	R	-
8.	Cf 08	CoJ 64	I	S	S	S	S	S	S	S	I	R	R	S	R	-
9.	Cf 09	CoS 767	I	R	I	S	R	R	I	S	S	R	R	S	R	-
10.	Cf 10	85A261	S	S	S	I	S	S	S	S	R	R	R	R	R	I
11.	Cf 11	CoJ 64	S	I	S	I	I	S	I	S	I	I	I	I	R	I

**Table-2: Reaction of isolates on a set of differentials**

S. No.	Isolates	Source	Co 419	Co 975	Co 997	Co 1148	Co 62399	Co 7717	CoC 671	CoJ 64	CoS 767	BO 91	CoS 8436	CoLk 8102	Baragua	Khakai	SES 594
1	IR-60	CoLk 8102	S	R	R	R	S	R	S	R	R	R	R	S	R	S	R
2	IR-61	CoLk 8102	S	R	R	R	S	R	S	I	R	R	R	S	R	I	R
3.	IR-62	CoLk 8102	S	R	R	R	I	R	S	R	R	R	R	S	R	I	R
4.	IR-63	CoLk 8102	S	R	R	R	S	R	S	I	R	R	R	S	R	S	R
5.	IR-64	CoLk 8102	S	R	R	R	I	R	S	S	R	R	R	S	R	S	R
6	IR-65	CoLk 8102	S	R	R	R	S	R	S	S	R	R	R	S	R	S	R
7.	IR-66	CoS 767	S	R	R	S	R	R	S	S	S	R	R	R	R	S	R
8.	IR-67	CoS 767	S	R	R	S	R	R	S	S	S	R	R	I	R	S	R
9.	IR-68	CoS767	S	R	R	S	R	R	I	S	S	R	R	R	R	S	R
10.	IR-69	CoSe 92423	S	R	R	R	I	R	S	S	R	R	R	S	R	S	R
11.	IR-70	CoS 91269	S	R	R	R	R	R	S	S	R	R	R	S	R	S	R
12.	IR-71	CoSe 95422	S	R	R	R	R	R	S	S	R	R	R	S	S	R	R
13.	IR-72	CoS 8436	S	R	R	R	R	R	S	S	I	R	S	S	R	S	R

## **PP17: Evaluation of Zonal Varieties for red rot, smut and wilt**

### **A. Location: IISR, Lucknow (North West Zone)**

Thirty eight genotypes i.e. 7 Initial Varietal Trial (Early) *viz.*, CoH 11261, CoH 11262, CoLk 11201, CoLk 11202, CoLk 11203, CoPb 11211 and CoPb 11212; 3 Advanced Varietal Trial (Early)-I Plant *viz.*, Co 10035, CoH 10261 and CoS 10231; 5 Advanced Varietal Trial (Early)-II Plant *viz.*, CoH 09262, CoH 09263, CoLk 09202, CoPb 09181 and CoS 09246; 13 Initial Varietal Trial (Mid late) *viz.*, Co 11026, Co 11027, CoH 11263, CoH 11264, CoLk 11204, CoLk 11205, CoLk 11206, CoPb 11181, CoPb 11182, CoPb 11213, CoPb 11214, CoS 11231 and CoS 11232; 5 Advanced Varietal Trial (Mid late)-I Plant *viz.*, Co 10036, CoH 10262, CoPant 10221, CoPb 10181 and CoPb 10182; 5 Advanced Varietal Trial (Mid late)-II Plant *viz.*, Co 09022, CoH 09264, CoLk 09204, CoPb 09214 and CoS 09232 were screened against red rot along with susceptible checks *viz.*, CoJ 64 (Cf07 and 08) and CoS 767(Cf 09) and CoLk 7701 and Co 1158 for smut (Table-1).

#### **(i) Red rot:**

Two cane stalks in each of the twenty five clumps were inoculated by plug and nodal methods of inoculation as per technical programme. The cane stalks were split open longitudinally after 60 days of inoculation and observation on spread of disease was recorded on 0-9 scale.

In Initial Varietal Trial (Early), all the genotypes except CoH 11261 were moderately resistant (MR) by plug method and resistant (R) by nodal method against both the pathotypes (Cf 08 and Cf 09). CoH 11261 was susceptible (S) by plug method whereas moderately susceptible (MS) by nodal method against both the pathotypes.

In Initial Varietal Trial (Early)-I Plant, all the 3 genotypes *viz.*, 10035, CoH 10261, CoS 10231 were moderately resistant (MR) by plug method and resistant (R) by nodal method against both the pathotypes.

In Advanced Varietal Trial (Early)-II Plant, all the genotypes except CoH 09263 were moderately resistant (MR) by plug method and resistant (R) by nodal method against both the pathotypes. CoH 09263 was highly susceptible (HS) by plug method and susceptible (S) by nodal method of inoculation against both the pathotypes.

In Initial Varietal Trial (Mid late), 12 genotypes *viz.*, Co 11026, Co 11027, CoH 11263, CoH 11264, CoLk 11204, CoLk 11205, CoLk 11206, CoPb 11181, CoPb 11213, CoPb 11214, CoS 11231 and CoS 11232 were moderately resistant (MR) by plug method and resistant (R) by nodal method against both the pathotypes. CoPb 11182 was moderately resistant (MR) and resistant (R) by plug method against Cf 08 whereas susceptible (S) by plug method and moderately susceptible (MS) by nodal method against Cf 09 pathotype.

In Advanced Varietal Trial (Mid late)-I Plant, 4 genotypes *viz.*, Co 10036, CoH 10262, CoPant 10221, CoPb 10181 were moderately resistant (MR) by plug method and resistant (R) by nodal method against both the pathotypes. CoPb 10182 was highly susceptible (HS) by plug method and susceptible (S) by nodal method against both the pathotypes.

In Advanced Varietal Trial (Mid late)-II Plant, all the 4 genotypes *viz.*, Co 09022, CoH 09264, CoLk 09204 and CoS 09232 were moderately resistant (MR) by plug method whereas resistant (R) by nodal method against both the test pathotypes. CoPb 9214 was moderately susceptible (MS) to Cf 08 whereas moderately resistant (MR) to Cf 09 by plug method and resistant (R) by nodal method of inoculation against both the pathotypes.

**(ii) Smut:**

Three bud setts were dipped in teliospore suspension ( $10^6$ spores/ml) for 30 minutes and planted as per technical programme. Smut incidence was recorded at fortnight intervals up to the harvest of the crop.

Thirteen genotypes *viz.*, CoLk 11203, CoLk 11204, CoLk 11205, CoH 09263, CoH 10262, Co 11027, CoPb 09214, CoPb 10182, CoPb 11181, CoPb 11213, CoPb 11214, CoS 09232 and CoS 11232 were susceptible and rest 25 genotypes were tolerant to smut.

**(iii) Wilt:**

Natural incidence of wilt was observed in 9 genotypes *viz.*, CoH 09264, CoH 11262, CoLk 11201, CoPb 11182, CoPb 11212, Co 10035, Co 10036, Co 11026 and CoS 09246.

**(iv) Yellow leaf disease (YLD):**

Yellow leaf disease (YLD) incidence was also observed in CoPb 010181, Co 11027 and CoS11231.

**Table-1: Reaction of sugarcane genotypes against red rot, smut and wilt at IISR, Lucknow**

Sl. No.	Genotype	Red Rot				Smut	Wilt	YLD
		Plug Method		Nodal Method				
		Cf 08	Cf09	Cf 08	Cf09			
<b>Initial Varietal Trial (Early)</b>								
1.	CoH 11261	S	S	MS	MS			
2.	CoH 11262	MR	MR	R	R		S	
3.	CoLK 11201	MR	MR	R	R		S	
4.	CoLK 11202	MR	MR	R	R			
5.	CoLK 11203	MR	MR	R	R	S		
6.	CoPb 11211	MR	MR	R	R			
7.	CoPb 11212	MR	MR	R	R		S	
<b>Advanced Varietal Trial (Early)-I Plant</b>								
1.	Co 10035	MR	MR	R	R		S	
2.	CoH 10261	MR	MR	R	R			
3.	CoS 10231	MR	MR	R	R			
<b>Advanced Varietal Trial (Early)-II Plant</b>								
1.	CoH 09262	MR	MR	R	R			
2.	CoH 09263	HS	HS	S	S	S		
3.	CoLK 09202	MR	MR	R	R			
4.	CoPb 09181	MR	MR	R	R			
5.	CoS 09246	MR	MR	R	R		S	
<b>Initial Varietal Trial (Midlate)</b>								
1.	Co 11026	MR	MR	R	R		S	
2.	Co 11027	MR	MR	R	R	S		S
3.	CoH 11263	MR	MR	R	R			
4.	CoH 11264	MR	MR	R	R			
5.	CoLk 11204	MR	MR	R	R	S		
6.	CoLk 11205	MR	MR	R	R	S		
7.	CoLk 11206	MR	MR	R	R			
8.	CoPb 11181	MR	MR	R	R	S		
9.	CoPb 11182	MR	S	R	MS		S	
10.	CoPb 11213	MR	MR	R	R	S		
11.	CoPb 11214	MR	MR	R	R	S		
12.	CoS 11231	MR	MR	R	R			S
13.	CoS 11232	MR	MR	R	R	S		
<b>Advanced Varietal Trial (Mid late)-I Plant</b>								
1.	Co 10036	MR	MR	R	R		S	
2.	CoH 10262	MR	MR	R	R	S		
3.	CoPant 10221	MR	MR	R	R			
4.	CoPb 10181	MR	MR	R	R			S
5.	CoPb 10182	HS	HS	S	S	S		
<b>Advanced Varietal Trial (Mid late)-II Plant</b>								
1.	Co 09022	MR	MR	R	R			
2.	CoH 09264	MR	MR	R	R		S	
3.	CoLk 09204	MR	MR	R	R			
4.	CoPb 09214	MS	MR	R	R	S		
5.	CoS 09232					S		
Check	CoJ 64*	HS	S	S	S			
Check	CoS 767*	MR	S	MR	MS			
Check	Co 1158**	-	-	-	-	S		
Check	CoLk 7701**	-	-	-	-	S		

\*: Check for red rot    \*\*: Check for smut

## **B. Location: IISR Regional Station, Motipur (North Central Zone)**

In North Central Zone, 20 genotypes were screened against red rot at IISRRC, Motipur. Four Initial Varietal Trial (Early) *viz.*, CoP 11436, CoP 11437, CoP 11438 and CoSe 11451; 4 Advanced Varietal Trial (Early)-II Plant *viz.*, BO 153, CoP 08436, CoSe 09452 and UP 09453; 7 Initial Varietal Trial (Mid late) *viz.*, BO 155, CoP 11439, CoP 11440, CoSe 11453, CoSe 11454, CoSe 11455 and CoSe 11456; 3 Advanced Varietal Trial (Mid late)-I Plant *viz.*, CoSe 10451, CoSe 10452 and CoSe 10453; 2 Advanced Varietal Trial (Mid late)-II Plant *viz.*, BO 154 and CoP 09437 along with 4 standard checks *i.e.* BO 91, CoP 9301, CoSe 92423 and CoSe 95422 were evaluated against red rot (Cf 07 and Cf 08) by plug method of inoculation (Table-2).

### **Red rot:**

In Initial Varietal Trial (Early), all the genotypes except CoP 11437 were moderately resistant (MR) to Cf 07 and Cf 08. CoP 11437 was moderately susceptible (MS) to both the pathotypes.

In Advanced Varietal Trial (Early)-II Plant, all the 4 genotypes *viz.*, BO 153, CoP 08436, CoSe 09452 and UP 09453 were moderately resistant (MR) against both the pathotypes.

In Initial varietal Trial (Mid late), six genotypes *viz.*, BO 155, CoP 11439, CoP 11440, CoSe 11453, CoSe 11454 and CoSe 11456 were moderately resistant (MR) against both the pathotypes. CoSe 11455 was found moderately susceptible (MS) to Cf 07 whereas moderately resistant (MR) to Cf 08.

In Advanced Varietal Trial (Mid late)-I Plant, all the 3 genotypes *viz.*, CoSe 10451, CoSe 10452 and CoSe 10453 were moderately resistant (MR) to both the pathotypes.

In Advanced Varietal Trial (Mid late)-II Plant, both the genotypes *viz.*, BO 154 and CoP 09437 were moderately resistant (MR) against both the test pathotypes.

Among the Standard checks *i.e.* BO 91 was moderately susceptible (MS) to both the pathotypes. CoSe 92423 and CoSe 95422 were moderately susceptible (MS) to pathotype Cf 07 whereas susceptible (S) to pathotype Cf 08. CoP 9301 was found moderately resistant (MR) to both the test pathotypes.



**Table-2: Reaction of sugarcane genotypes against red rot at IISR Regional Centre, Motipur**

Sl. No.	Genotype	Red Rot	
		Cf 07	Cf 08
<b>Initial Varietal Trial (Early)</b>			
1.	CoP 11436	MR	MR
2.	CoP 11437	MS	MS
3.	CoP 11438	MR	MR
4.	CoSe 11451	MR	MR
<b>Advanced Varietal Trial (Early)-II Plant</b>			
1.	BO 153	MR	MR
2.	CoP 08436	MR	MR
3.	CoSe 09452	MR	MR
4.	UP 09453	MR	MR
<b>Initial Varietal Trial (Mid late)</b>			
1.	BO 155	MR	MR
2.	CoP 11439	MR	MR
3.	CoP 11440	MR	MR
4.	CoSe 11453	MR	MR
5.	CoSe 11454	MR	MR
6.	CoSe 11455	MS	MR
7.	CoSe 11456	MR	MR
<b>Advanced Varietal Trial (Mid late)-I Plant</b>			
1.	CoSe 10451	MR	MR
2.	CoSe 10452	MR	MR
3.	CoSe 10453	MR	MR
<b>Advanced Varietal Trial (Mid late)-II Plant</b>			
1.	BO 154	MR	MR
2.	CoP 09437	MR	MR
<b>Standard Checks</b>			
1.	BO 91	MS	MS
2.	CoP 9301	MR	MR
3.	CoSe 92423	MS	S
4.	CoSe 95422	MS	S
5.	CoJ 64*	HS	HS

\*: Check for red rot

## **PP 22: Survey of sugarcane diseases naturally occurring in the area on important varieties**

The command area of Balrampur Chini Mill DSCL Sugar Mill in U.P.; Hasanpur Sugar Mill, Hasanpur and Harinagar Sugar Mill, Harinagar (Bihar) were surveyed for the occurrence of diseases on important varieties.

In the command area of Balrampur Chini Mill group (Units: Balrampur and Tulsipur), incidence of red rot was observed in CoLk 8102 and CoS 8436 (>5.0%); CoS 91269, CoSe 95422 and CoS 98230 (1.0-5.0%). Incidence of smut (5-10%) was observed in CoSe 92423, Co 0238, CoSe 1235, CoS 767 and CoS 98230; pokkah boeng in Co 0238 and CoSe 92423 and yellow leaf disease (YLD) in Co 0238 and CoS 767. In the command area of DSCL Sugar Mill group (Unit: Rupapur) incidence of red rot was observed in CoLk 8102; smut in CoSe 92423 and pokkah boeng in Co 0238. Incidence of yellow leaf disease (YLD) was observed in CoJ 64, Co 7717, CoSe 92423, CoLk 94184, Co 0238 and Baragua (*S. officinarum*) at Institute farm.

In Bihar, red rot was observed in BO 130 in the command area of Hasanpur Sugar Mill, Hasanpur. Pokkah Boeng in Co 0232 and yellow leaf disease (YLD) in Co 0238 was noticed in the command area of Harinagar Sugar Mill, Harinagar.