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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 11 new isolates *i.e.* six from CoLk 8102 (IR-38, IR-39, IR-40, IR-41, IR-42 and IR-47), four from CoS 8436 (IR-43, IR-44, IR 45 and IR 46), one from CoLk 7203 (IR-37); and an isolate (CoS 8436; non-sporulating) received from Shahjahanpur were evaluated for their virulence pattern 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*).

These isolates were multiplied on oat meal agar (OMA) medium and inoculated on the designated differentials in the month of August using standard plug method. Observations were recorded after two months of inoculation.

It was observed that CoLk 8102 isolates could be grouped into two categories *i.e.* some showing susceptibility to Co 62399 while others to Khakai. However, these isolates failed to infect Co 975, Co 1148, CoS 767, BO 91. The CoLk 8102 isolates mostly behaved as pathotype Cf 02 with gain in virulence for Khakai in some cases. All the CoS 8436 isolates were similar and mostly matched with disease reaction with the isolates of CoLk 8102 with specific virulence to Khakai. Thus, it was concluded that there was no emergence of highly 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

∴ Not evaluated on CoS 8436

Table-2: Reaction of red rot isolates on a set of differentials

S. No.	Isolates	Source	Co 419	Co 975	Co 997	Co 1148	Co 7717	Co 62399	CoC 671	CoJ 64	CoS 767	BO 91	CoS 8436	CoLk 8102	Baragua	Khakai	SES 594
1	IR-37	CoLk 7203	S	R	R	R	I	R	S	S	R	R	R	R	R	S	R
2	IR-38	CoLk 8102	R	R	R	R	R	S	S	S	R	R	R	S	R	R	R
3.	IR-39	CoLk 8102	R	R	R	R	R	S	S	S	R	R	R	S	R	R	R
4.	IR-40	CoLk 8102	S	R	R	R	S	S	S	S	R	R	R	S	R	S	R
5.	IR-41	CoLk 8102	S	R	R	R	I	R	S	S	R	R	S	S	R	S	R
6.	IR-42	CoLk 8102	S	R	R	R	R	R	S	S	R	R	S	S	R	S	R
7.	IR-47	CoLk 8102	R	R	R	R	R	R	S	S	R	R	R	S	R	S	R
8.	IR-43	CoS 8436	S	R	R	R	R	R	S	S	R	R	S	S	R	S	R
9.	IR-44	CoS 8436	S	R	R	R	R	R	S	S	R	R	S	S	R	S	R
10.	IR-45	CoS 8436	S	R	R	R	R	R	S	S	R	R	S	S	R	S	R
11.	IR-46	CoS 8436	S	R	R	R	R	R	S	S	R	R	S	R	R	S	R
12.	SHP*	CoS 8436	S	R	R	R	R	R	S	S	R	R	S	R	R	S	R

*: SHP- Shahjahanpur

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

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

In North West Zone IISR Farm, Lucknow, 43 AICRP(S) entries were screened against red rot, smut and natural incidence of wilt.

Forty three genotypes i.e. 12 entries of Initial Varietal Trial (Early) viz., Co 09020, CoH 09261, CoH 09262, CoH 09263, CoLk 09201, CoLk 09202, CoLk 09203, CoPb 09181, CoPb 09211, CoPb 09212, CoPb 09213 and CoS 09246; three of Advance Varietal Trial (Early)-I Plant viz., CoPb 08211, CoPb 08212 and CoS 08233; five of Advance Varietal Trial (Early)-II Plant viz., Co 06032, Co 07023, Co 07025, CoH 07261 and CoLk 07201; eight of Initial Varietal Trial (Mid late) viz., Co 09021, Co 09022, CoH 09264, CoLk 09204, CoPb 09214, CoS 09231, CoS 09232 and CoS 09240; six of Advance Varietal Trial (Mid late)-I Plant viz., CoH 08262, CoH 08263, CoH 08264, CoPb 08217, CoS 08234 and CoS 08235 and nine of Advance Varietal Trial (Mid late)-II Plant viz., Co 07028, CoH 07263, CoH 07264, CoLk 07202, CoLk 07203, CoPb 07212, CoPb 07213, CoS 07232 and CoS 07234 were screened against red rot (Cf 08) and smut. Natural incidences of wilt and other diseases (GSD) were also recorded (Table-3).

(i) Red rot:

Two cane stalks in each of twenty five clumps were inoculated by plug method. The cane stalks were split open longitudinally after 60 days of inoculation and observations on spread of disease was recorded on 0-9 scale.

Nine genotypes viz., CoH 09261, CoH 09263, CoPb 09181, CoPb 09211 (IVT-Early), Co 07023, CoH 07261 (AVT- Early)-II Plant; CoH 08263, CoPb 08217 (AVT- Mid late)-I Plant and CoLk 07203 (AVT-Mid late)-II Plant were moderately to highly susceptible (MS to HS) and remaining 34 were resistant to moderately resistant (R to MR) to red rot.

(i) 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. Out of 43 genotypes tested, 10 genotypes viz., Co 07023, Co 09022, CoPb 07264, CoH 09261, CoH 09263, CoLk 09203, CoPb 09181,

CoPb 09214, CoS 07232 and CoS 08235 were susceptible and rest 33 genotypes were resistant to smut.

(iii) Wilt:

Natural incidence of wilt was noticed in eight genotypes viz., Co 09021, CoH 09263, CoLk 09204, CoPb 08211, CoPb 08212, CoPb 08217, CoPb 09181 and CoPb 09214. Incidence of grassy shoot disease (GSD) was also observed in four genotypes viz., CoH 09263, CoPb 09211, CoS 08234 and CoS 08235.

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

In North Central Zone (IISRRC farm, Motipur), 12 genotypes *i.e.* five entries of Initial Varietal Trial (Early) viz., CoP 09436, CoSe 09451, CoSe 09452, BO 153 and UP 09453; three entries of Initial Varietal Trial (Mid late) viz., CoP 09437, CoSe 09454 and BO 154 and three entries of Advance Varietal Trial (Mid late)-I Plant viz., CoP 08437, CoSe 08451 and CoSe 08452 were screened against red rot (Cf 07 and Cf 08) using plug method.

All the genotypes were moderately resistant to both the pathotypes except CoSe 09452 which showed susceptibility to pathotype Cf 07 and moderately resistant reaction to Cf 08 pathotype (Table-4).

Table-3: Reaction of sugarcane genotypes against red rot, smut and wilt at IISR, Lucknow

Sl. No.	Genotype	Red rot (Cf 08)	Smut	Wilt	Other Diseases
Initial Varietal Trail (Early)					
1.	Co 09020	MR			
2.	CoH 09261	HS	S		
3.	CoH 09262	MR			
4.	CoH 09263	HS	S	S	GSD
5.	CoLk 09201	MR			
6.	CoLk 09202	MR			
7.	CoLk 09203	MR	S		
8.	CoPb 09181	HS	S	S	
9.	CoPb 09211	HS			GSD
10.	CoPb 09212	MR			
11.	CoPb 09213	MR			
12.	CoS 09246	MR			
Advanced Varietal Trial (Early)-I Plant					
1.	CoPb 08211	MR		S	
2.	CoPb 08212	MR		S	
3.	CoS 08233	MR			
Initial Varietal Trial (Early)-II Plant					
1.	Co 06032	MR			
2.	Co 07023	MR	S		
3.	Co 07025	MR			
4.	CoH 07261	MS			
5.	CoLk 07201	MR			
Initial Varietal Trial (Mid late)					
1.	Co 09021	MR		S	
2.	Co 09022	MR	S		
3.	CoH 09264	MS			
4.	CoLk 09204	MR		S	
5.	CoPb 09214	MR	S	S	
6.	CoS 09231	MR			
7.	CoS 09232	MR			
8.	CoS 09240	MR			
Advanced varietal Trial (Mid late)-I Plant					
1.	CoH 08262	R			
2.	CoH 08263	HS			
3.	CoH 08264	MR			
4.	CoPb 08217	S		S	
5.	CoS 08234	MR			GSD
6.	CoS 08235	MR	S		GSD
Advanced varietal Trial (Mid late)-II Plant					
1.	Co 07028	MR			
2.	CoH 07263	MR			
3.	CoH 07264	MR	S		
4.	CoLk 7202	MR			
5.	CoLk 7203	S			
6.	CoPb 07212	MR			
7.	CoPb 07213	R			
8.	CoS 07232	R	S		
9.	CoS 07234	MR			
Check	CoJ 64*	HS	S	-	-
Check	CoS 767*	MR	S	-	-
Check	CoLk 9617**	-	-	S	-

*: Check for red rot

**: Check for smut

Table-4: Reaction of sugarcane genotypes against red rot at IISR Regional Station, Motipur

Sl. No.	Genotype	Red Rot	
		Cf 07	Cf 08
Initial Varietal Trial (Early)			
1.	CoP 07436	NT	NT
2.	CoSe 09451	MR	MR
3.	CoSe 09452	S	MR
4.	BO 153	MR	MR
5.	UP 09453	MR	MR
Initial varietal Trial (Mid Late)			
1.	CoP 09437	MR	MR
2.	CoSe 09454	MR	MR
3.	BO 154	MR	MR
Advance Varietal Trial (Mid late)-I Plant			
1.	CoP 08437	NT	NT
2.	CoSe 08451	NT	NT
3.	CoSe 08452	NT	NT
Check	BO 91	MR	MR
Check	CoSe 92423	MR	MR
Check	CoP 9301	MR	MR
Check	CoJ 64*	S	HS

Nt:- Not tested

*: Check for red rot

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

Command area of DSCL Sugar Mills units (Haryawan, Ajbapur, Loni and Rupapur); Mawana Sugar Mills Units (Naglamal, Titawi and Mawana) and Balrampur Chini Mill Units (Maizapur, Balrampur, Tulsipur and Mankapur) were surveyed for the prevalence of diseases. In the command area of DSCL units, smut incidence (1-5%) was noticed in the varieties Co 0238, Co 0239, CoS 88230, CoSe 92423, CoS 97264 and CoSe 01235. However, in some fields (ratoon crop) the incidence of smut was 35-40% in CoSe 98231. Incidence of leaf scald and red rot was also observed in variety CoLk 8102.

In the command area of Mawana Sugar Mills Meerut, an increasing incidence of GSD (2-5%) was observed in CoS 767. In some fields, the incidence of GSD was up to 40% (ratoon crop). Incidence of RSD was also noticed in CoS 767.

In the command area of Balrampur Chini Mills, CoLk 8102 is still occupying larger area in some pockets as a mixture with other varieties. Red rot incidence (1-10%) was observed in CoLk 8102 in all the sugar mill units surveyed. Similarly, red rot was also noticed in CoS 91269 and CoSe 92423 and CoSe 95436. Minor incidence of GSD was noticed in Co 0238, CoSe 92423 and CoLk 94184. Incidence of Pokkah boeng was observed in CoSe 92423 and Co 0238. Smut incidence (1-2%) was noticed in Co 0238, CoSe 92423, CoSe 01235, CoSe 01424, CoSe 96275 and CoS 98231. Leaf scald was also noticed in variety Co 0238 and CoLk 8102. Bacterial soft rot was observed in variety CoSe 92423 in some water logged fields.