

**ICAR- Sugarcane Breeding Institute, Regional Centre, Karnal**  
**AICRP on Sugarcane Pathology**  
**Annual Report (2016-17)**

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

Objective: To gather information on the major pathotypes of red rot from the north western zone

Location: SBI-RC, Karnal

Year of Start: 1983-84

**Results**

Seven established *C. falcatum* pathotypes along with thirteen isolates collected from CoJ 64 (6), CoS 8436, (3) BO 138 (1), CoSe 95422 (1), CoBIn 05221(1) and Co 89903 (1) were inoculated independently on a set of twenty sugarcane differentials by plug method of inoculation. The overall disease reaction indicated that there was a clear pathogenic variation on the host differentials. None of the pathotype /isolate resembled another pathotype /isolate in pathogenic behaviour. Among the seven designated pathotypes, Cf11 found to be more virulent followed by Cf 09, Cf 08, Cf 01, Cf 07, Cf 02 and Cf 03, respectively (Table 1). Differential CoS 8436 succumbed only to isolate Cf8436 (Karnal) for the fourth consecutive years, whereas, resistant differential Baragua showed intermediate reaction to CfSe 95422 and Cf89003 isolates. A new isolate Cf89003 collected from variety Co 89003 exhibited more virulence with intermediate to susceptible reactions on 14 host differentials, suggests the possible emergence of new pathotype in subtropics. Differential SES 594 showed complete resistance to all the test isolates.

**PP 17 A: Evaluation of Zonal varieties for red rot**

Objective: To gather information on the relative resistance to red rot of the entries in zonal varietal trial.

Location: SBI-RC, Karnal

Year of Start: 1986-87

**Results**

Forty two entries along with six standard varieties were evaluated for red rot resistance against CF08 and CF09 pathotypes. Three entries viz. CoPant 13222 IVT(E), CoPb 13183 IVT (ML) and CoH 11262 AVT- E (Ilplant) exhibited susceptible reaction by plug and cotton swab methods, while two entries namely CoLk 13203 (IVT-E) and CoPb 12111 (AVT- ML-I Plant) showed susceptibility to CF08 and CF09 isolates by plug method only. Six entries rated moderately susceptible and remaining were R /MR with both the inocula and methods (Table 2).

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

Objective: To gather information on the diseases naturally occurring in the north western zone on important sugarcane varieties

Location: SBI-RC, Karnal

Year of Start: 1989-90

### **Results**

Survey was carried out under the reserved area of 20 sugar mills of the zone comprising Haryana (14), Uttar Pradesh (3), Bihar (2), Uttarakhand (1) and observed natural incidence of diseases. Severe red rot incidence (> 40%) was recorded in plant crop of variety Co 89003 in village Araipur; upto 20% in variety CoPant 84212 in village Andehara, Karnal and trace to 1% on variety Co 89003 under Panipat, Karnal, Asandh (Haryana) and Shamli (UP) area. Similarly up to 10% incidence was recorded in two fields of mix varieties at Laksar (UK). By and large, smut incidence was prevailing in all the sugar mills of Haryana. Severe incidence (01- 20%) was noted in ratoon of variety Co 89003 at Panipat followed by CoH 150 (1- 8%, Shahabad) and CoH 152 (trace – 3.0%, Palwal). Incidence in other varieties viz. Co 0238, CoH 156, CoH 160 and CoH 119 was ranged trace to 1.0%. None of the field of variety CoH 150 was free from smut in Shahabad. Further, trace incidence observed in variety Co 0238 at Sobitgarh (UP) and under trial in AVT E- 1<sup>st</sup> Plant clone CoLk 12203.GSD was recorded up to 5% in variety Co 89003 (ratoon) at Sonipat, 1- 3.0% in CoH 150 (Shahabad) and trace to 2.0% in other varieties i.e. Co 0238, CoS8436, CoJ 88, CoH 160, CoH 152 and CoH 119 in Haryana. Trace to 3.0% incidence was also found in ratoon and plant crops of varieties Co 0238, Co 98014 and CoS 8436 at Mawana and mild incidence on variety Co 0238 in Laksar and Sobitgarh. Pokkah boeng incidence was ranging from trace to 3% in varieties viz. CoH 150, CoH 119, CoS 8436, Co 0238, Co 89003, CoJ 85 and CoJ 88 in Haryana, whereas, in UP disease was prevailing in most of the surveyed fields of varieties Co 0238, Co 98014 and CoS 8436. However, in one field of variety Co 0238 in village Jaisinghpur, Mawana (UP) incidence was observed 10-12%. Further, very severe incidence of top rot (40%) was recorded in variety CoJ 85 at Meham, 5% in CoH 150 (Shahabad), 1.0- 2.0 % in CoS 8436 (Karnal & Rohtak), up to 2.0% in CoJ 85 (Rohtak) and trace in varieties CoH 119 and CoH 152 at Palwal and Kaithal (Haryana). Disease was recorded by 2.0 – 3.0 % in variety CoJ 88 under Deoband, Laksar and Sobitgarh areas. Mild to severe incidence of wilt (up to 30.0%) was seen in variety Co 89003 at many fields of Haryana and UP. Disease was also noted in tropical Co canes and AVT (ML-II) clone CoH 11236 under trials.

## **PP 23: Assessment of elite ISH clones 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

Location: SBI-RC, Karnal

### **Results**

Twenty three ISH genotypes were inoculated with CF08 and CF09 isolates by plug method of inoculation for red rot resistance. Eleven genotypes exhibited S/HS, seven MS and five R/MR reaction to CF08 isolate. Similarly with CF09 isolate, 13 genotypes showed S/HS, two MS and eight R/MR reactions (Table 3).

**Seed multiplication and supply:** The seed of 27 ISH clones was multiplied and supplied to IISR, Lucknow, PAU RRS, Kapurthala (Punjab) and GSSBRI, Seorhi (UP) for trial.

#### **PP 17 D: Yellow Leaf Disease**

Of the 42 entries evaluated for YLD under trial, 27 exhibited resistant reaction, 13 entries viz., CoLk 13201, CoPant 13222 (IVT-E), CoLk 12203 (AVT-E I Plant), CoH 11262, CoLk 11202, CoLk 11203 (AVT-E II Plant), Co 13036, CoH 13261(IVT-ML), Co12029, CoS 12232 (AVT-ML I Plant), Co 11027, CoH 11263 and CoPb 11214 (AVT-ML II Plant) MR reaction and two entries CoH 13263 (IVT-ML) and CoLk 11206 (AVT-ML II Plant) were moderately susceptible (Table 2). Among the standard varieties, CoS 767 and CoPant 84211 showed susceptible reaction, CoJ 64 and CoS 8436 MS reaction and two varieties (Co 0238 and CoPant 97222) had shown MR/R reaction to YLD.

Table1. Pathogenic behaviour of *C. falcatum* pathotypes on host differentials – SBI-RC, Karnal

#	Pathotype / isolate	Source	Reaction on host differentials																			
			Co419	Co 975	Co 997	Co1148	Co 7717	Co 7805	Co 89003	Co 62399	Co 86002	Co 86032	CoC671	CoJ 64	CoS 767	CoS 8436	CoV 92102	CoSe 95422	Bo91	Baragua	Khakai	SES594
1.	CF01	Co 1148	R	R	S	S	R	S	R	X	R	R	S	R	R	R	R	R	R	R	R	R
2	CF02	Co 7717	R	R	S	R	S	X	R	R	R	R	S	R	R	R	R	R	R	R	R	R
3	CF03	CoJ 64	R	R	R	R	R	R	X	X	R	R	X	X	R	R	R	R	R	R	R	R
4	CF07	CoJ 64	R	R	S	X	R	R	R	R	X	R	S	S	R	R	R	R	R	R	R	R
5	CF08	CoJ 64	S	X	S	R	R	R	R	R	S	R	X	S	X	R	R	R	R	R	R	R
6	CF09	CoS 767	R	R	R	R	X	S	R	X	S	R	X	X	S	R	X	S	R	R	R	R
7	CF11	CoJ 64	S	S	S	X	S	X	X	S	S	S	S	X	R	R	R	R	R	R	X	R
8	cfBO138	BO 138	R	R	R	R	R	R	R	X	X	R	X	R	R	R	X	R	R	R	R	R
9	cfSe 95422	CoSe 95422	R	R	S	R	S	S	X	S	S	S	X	R	R	R	R	X	R	X	R	R
10	cfBLN 05521	CoBlN 05521	R	R	S	X	R	X	R	R	R	X	R	R	R	R	R	R	R	R	R	R
11	Cf 89003	Co 89003	S	S	S	S	S	S	S	S	S	S	S	X	X	R	R	R	R	X	R	R
12	cf8436 (K)	CoS 8436	S	X	S	S	S	S	S	S	X	X	S	X	X	S	S	R	X	R	R	R
13	cf8436 (RI)	CoS 8436	X	R	S	R	R	R	R	X	R	X	X	S	R	R	R	R	R	R	R	R
14	cf8436 (UPCSR)	CoS 8436	S	X	S	R	R	X	X	R	S	X	X	S	R	R	R	R	R	R	R	R
15	cfUP 1	CoJ 64	R	R	R	R	R	R	R	R	X	R	X	X	R	R	R	R	R	R	R	R
16	cfUP 2	CoJ 64	R	R	S	R	R	R	R	R	R	R	S	R	R	R	R	R	R	R	R	R
17	cfUP3	CoJ 64	R	R	R	R	R	R	R	X	X	R	R	X	R	R	R	R	R	R	R	R
18	cfCoJ I	CoJ 64	S	X	S	R	R	R	R	X	R	R	S	S	R	R	R	R	R	R	R	R
19	cfCoJ II	CoJ 64	R	R	R	R	R	R	X	R	R	R	R	R	R	R	R	R	R	R	R	R
20	cfCoJ III	CoJ 64	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R

R- Resistant; X- Intermediate; S- Susceptible

**Table 2: Evaluation of zonal varieties for red rot and YLD resistance- SBI-RC, Karnal**

Sr. No.	Entry	Red Rot Rating				YLD	Other disease
		Plug Method		Cotton Swab Method			
		CF 08	CF 09	CF 08	CF 09		
1	<b>IVT(E)</b> Co 13033	MR	MR	R	R	R	
2	Co 13034	MR	MR	R	R	R	
3	CoLk 13201	S	MS	R	R	MR	
4	CoLk 13202	MR	MR	R	R	R	
5	CoLk 13203	MS	S	R	R	R	
6	CoPant 13221	MR	MR	R	R	R	
7	CoPant 13222	S	HS	S	S	MR	
8	CoPb 13181	MS	MS	R	R	R	
9	CoS 13231	MR	MR	R	R	R	
10	<b>AVT(E-I Plant)</b> Co 12026	MR	MR	R	R	R	
11	Co 12027	MR	R	R	R	R	
12	CoLk 12203	MR	R	R	R	MR	Smut (T)
13	CoPant 12221	MS	MR	R	R	R	
14	<b>AVT(E-II Plant)</b> CoH 11262	HS	HS	S	S	MR	
15	CoLk 11201	MS	MR	R	R	R	
16	CoLk 11202	MR	MR	R	R	MR	
17	CoLk 11203	MS	MS	R	R	MR	
18	<b>IVT(ML)</b> Co 13035	MR	MR	R	R	R	
19	Co 13036	MR	MR	R	R	MR	
20	CoH 13261	MS	MS	R	R	MR	
21	CoH 13262	MR	MR	R	R	R	
22	CoH 13263	MR	MS	R	R	MS	
23	CoLk 13204	MR	MR	R	R	R	
24	CoLk 13205	HS	MS	R	R	R	
25	CoPant 13223	MR	MR	R	R	R	
26	CoPant 13224	MR	MR	R	R	R	
27	CoPb 13182	MR	MR	R	R	R	
28	CoPb 13183	S	HS	S	S	R	
29	CoS 13232	MS	MS	R	R	R	
30	CoS 13233	MS	MS	R	R	R	
31	<b>AVT(ML-I Plant)</b> Co 12029	R	MR	R	R	MR	
32	CoH 12263	MR	MS	R	R	R	
33	CoLk 12205	MS	MS	R	R	R	
34	CoPant 12226	MR	MR	R	R	R	
35	CoPb 12211	S	S	R	R	R	
36	CoS 12232	MR	R	R	R	MR	
37	<b>AVT(ML-II Plant)</b> Co 11027	R	MR	R	R	MR	
38	CoH 11263	R	R	R	R	MR	WILT (T)
39	CoLk 11204	MR	MR	R	R	R	
40	CoLk 11206	MR	MS	R	R	MS	
41	CoPb 11214	MR	MR	R	R	MR	

42	CoS 11232	R	MR	R	R	R	
43	<b>Standard(s)</b> CoS 767	MS	S	R	R	S	
44	CoS 8436	R	MR	R	R	MS	
45	CoPant 97222	MS	MR	R	R	R	
46	CoJ 64	S	MS	S	R	MS	
47	Co 0238	MR	MR	R	R	MR	
48	CoPant 84211	HS	S	R	R	S	

R- Resistant; MR-Moderately Resistant; MS- Moderately Susceptible; S- Susceptible; HS- Highly Susceptible; T= Trace

**Table 3: Assessment of elite andISH genotypes for resistance to red rot- SBI-RC, Karnal**

Sr. no.	Genotype	Red rot reaction	
		CF08	CF09
1	AS 04-245	S	S
2	AS 04- 635	S	S
3	AS 04- 1687	MR	MR
4	AS 04- 1689	MR	MR
5	AS 04- 2097	HS	HS
6	BM 1003143	S	S
7	BM 1005149	MS	HS
8	BM 1010168	MS	MR
9	CYM 07-986	S	MS
10	GU 07-2276	R	MR
11	GU 07-3774	HS	HS
12	GU 07-3849	S	S
13	MA 5/5	S	S
14	MA 5/22	MS	MR
15	MA 5/51	MS	S
16	PG 9869137	S	MS
17	SA 98-13	MR	MR
18	SA 04- 390	MS	MR
19	SA 04-409	MS	S
20	SA 04-454	MR	MR
21	SA 04-458	S	HS
22	SA 04-472	S	S
23	SA 04-496	MS	S