

**Annual report for the year 2016-17**  
**All India Coordinated Research Project on Sugarcane**  
**Plant Pathology**

Centre– Coimbatore

**Project: PP14 - Identification of pathotypes / races in red rot pathogen**

**Results obtained during this year**

Two new isolates (Cfv09356-Keerangudi and CfPI1110-Nathakadu) along with six old isolates (Cf0323-Pettavaithalai, Cf92012-Kanjanur, Cf91017-Nellikuppam, CfPI1110-Kothangudi, CfPI1401- Kadaganur and Cf94012- Old TN [CF12]) and 1 standard isolate (Cf671) were inoculated by plug method on 19 sugarcane differentials and disease intensity was assessed. The red rot development on differential hosts indicated that all the isolates except Cf94012- Old TN exhibited more or less similar reactions of standard isolate Cf671 and among the tested isolates, Cf94012- Old TN (CF12) exhibited more virulence followed by CfPI1401- Kadaganur and Cfv09356-Keerangudi (Table 1).

**PP17: Evaluation of Zonal varieties for resistance to red rot**

**a. Red rot**

Thirty three entries of IVT were evaluated for red rot resistance by plug and nodal methods against CF06 and CF12 pathotypes. About 22 IVT entries were identified as resistant to CF06 as against four for CF12 in plug method to red rot (Table 2). In nodal method, 30 and 15 were resistant to the two pathotypes, respectively.

**b. Smut**

During the season totally 28 IVT entries were evaluated for smut resistance. About 10 entries were identified as R/MR to smut and eight behaved as MS and the rest were S/HS to the disease (Table 2).

**d. Yellow leaf disease**

During the season, about 28 IVT entries and 31 AVT entries were monitored for the YLD severity based on the 0-5 scale. Among the IVT and AVT entries, 10 each were apparently free from the disease symptoms and had shown R reaction. The disease severity in rest of the entries were in the category of MS to MR. Three IVT mid late entries viz., Co 13016, CoT 13366 and PI 13131 and one AVT mid late II plant entry Co 10031 were found to be susceptible to YLD. Similarly, the ratoon fields of AVT early I plant and AVT mid late I plant were monitored throughout the season where two entries such as, Co 10006 and Co 10027 in AVT Early I plant ratoon were found apparently free from the disease symptoms. In AVT mid late I plant ratoon,

the entry Co 10031 had shown YLD score more than 3 with severe stunting symptoms and none of the entries in that were found to be free from the disease.

### **PP 23: Assessment of elite ISH clones for resistance to red rot**

Twenty seven ISH clones were evaluated for red rot by plug and nodal methods for CF06 and CF12 pathotypes. About 14 clones were identified as resistant to CF06 as against eight for CF12 in plug method. In nodal method 18 and 19 were resistant to the two pathotypes, respectively (Table 3).

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

Detailed surveys for smut, wilt and YLD were conducted in Karnataka and Tamil Nadu. Occurrence of red rot in Co 86027 and TNAU Si8 was found in Namakkal and TiruvannamalaiDt, respectively. Trace incidence of red rot was found in a ratoon crop of Co 06022 in Nagapattinam Dt. Sudden outbreak of smut in Co 86032 was found in Villupuram and Tiruvannamalai districts. Continuation of thr old varieties such as Co 97009 and PI-96-843 with severe smut was found to be the reason for the sudden outbreak of the disease. Further severe wilt outbreak was found in both the states. The varieties Co 62175, Co 86032 and Co 0323 were affected in the Karnataka state and in many varieties in Tamil Nadu. Severe rust occurrence of brown rust was found in Co 0323 in Karnataka. Degeneration in the cvs Co 86032, CoA 92081 and CoV 94101 was found due to YLD and mosaic. Occurrence of GSD was found in many districts where healthy seed nursery programme is not followed. Degeneration due to YLD was addressed through YLD-free nurseries. Disease-free crops raised from such nurseries recorded ~250 tonnes/ha in the variety in Erode and Namakkal Districts in Tamil Nadu.

### **PP33: Management of yellow leaf disease through meristem culture**

Detailed field experiments were conducted to assess impact of YLD on cane growth and yield by comparing the crops planted with virus-infected and virus-free planting materials of the popular variety Co 86032. It was found that the disease has significantly affected germination, plant growth/yield parameters such as number of stalks, cane diameter, cane length, number of internodes, cane weight, juice yield etc in the popular variety Co 86032. It was found that due to virus infection, cane and juice yield are reduced by ~20 and 10 per cent, respectively in the variety in the plant crop.

Table 1 Reaction of host differentials to *C. falcatum* isolates

Sl. No	Pathotype	Reaction on host differentials																		
		Co 419	Co 975	Co 997	Co 1148	Co 7717	Co 62399	Co C 671	Co J 64	Co S 767	Co S 8436	BO 91	Baragua	Khakai	SESS94	CoSe 95422	Co 7805	Co 86002	Co V 92102	Co 86032
1	CF06	S	I	S	I	I	I	S	I	I	R	I	R	I	R	R	R	I	I	I
2	Cf94012 Old TN (CF12)	S	I	I	S	S	S	S	S	I	R	I	R	S	R	R	I	I	I	I
3	Cf0323 Pettavaithalai	S	I	I	I	R	I	S	I	I	R	R	R	I	R	R	S	I	I	I
4	Cf92012 Kanjapur	S	I	I	R	S	R	S	I	I	R	I	R	I	R	R	I	S	I	I
5	Cf91017 Nellikuppam	S	I	I	I	S	I	S	I	R	R	R	R	I	R	R	I	S	R	I
6	CfPI1110 Kothangudi	S	I	R	R	S	I	S	I	I	R	I	R	I	R	R	R	I	I	I
7	CfPI1401 Kadaganur	S	I	I	I	S	I	S	I	S	R	I	R	I	R	R	S	S	I	I
8	Cfv09356 Keerangudi	S	I	I	I	I	I	S	I	I	R	I	R	I	R	R	I	I	I	S
9	Cf86027 Nathakadu	S	I	I	I	I	S	S	I	R	R	I	R	I	R	R	I	R	I	I

Table 2 Screening for IVT entries for red rot and smut resistance

Sl No	Entry	Pathotype - CF06						Pathotype - CF12		Smut
		Plug method		Nodal method	Plug method		Nodal method			
		Score	Reaction		Score	Reaction				
1	Co 13002	1.6	R	R	4.2	MS	R	MS		
2	Co 13003	1.6	R	R	5.0	MS	R	MS		
3	Co 13004	1.5	R	R	8.0	S	S	MR		
4	Co 13005	2.0	R	R	7.0	S	S	HS		
5	Co 13006	4.2	MS	R	6.0	MS	R	MS		
6	Co 13008	2.0	MR	R	-	RT	RT	S		
7	Co 13009	2.6	MR	R	9.0	HS	S	HS		
8	Co 13011	2.5	MR	R	6.8	S	S	MS		
9	Co 13013	0.0	R	R	6.1	S	S	HS		
10	Co 13014	2.4	MR	R	6.2	S	S	MS		
11	Co 13016	3.0	MR	R	9.0	HS	S	S		
12	Co 13018	2.0	R	R	5.4	MS	R	MR		
13	Co 13020	3.4	MR	R	7.0	S	S	R		
14	CoM 13082	3.4	MR	R	3.8	MR	R	R		
15	CoN 13071	8.0	S	RT	8.1	HS	RT	MR		
16	CoN 13072	8.0	S	R	8.0	S	S	HS		
17	CoN 13073	3.4	MR	R	7.0	S	R	MR		
18	CoN 13074	2.0	R	R	7.4	S	S	S		
19	CoSnk 13101	2.4	MR	R	6.2	S	S	MS		
20	CoSnk 13102	4.6	MS	R	5.0	MS	S	S		
21	CoSnk 13103	8.0	S	R	5.6	MS	R	MS		
22	CoSnk 13104	3.0	MR	R	4.2	MS	R	MR		
23	CoSnk 13105	2.6	MR	R	3.6	MR	R	HS		
24	CoSnk 13106	5.0	MS	R	5.2	MS	R	R		
25	CoT 13366	8.1	HS	S	9.0	HS	S	MS		
26	MS 13081	2.0	R	R	2.8	MR	R	R		
27	PI 13131	9.0	HS	S	9.0	HS	S	MR		
28	PI 13132	1.8	R	R	9.0	HS	S	HS		
29	Co 12001	4.4	MS	R	7.0	S	R	-		
30	Co 12017	5.0	MS	R	6.0	MS	R	-		
31	Co 12021	3.0	MR	R	3.6	MR	S	-		
32	Co 12024	5.0	MS	R	4.4	MS	R	-		
33	CoN 12071	2.0	R	R	7.0	S	R	-		
	Standard – red rot									
34	CoC 671	9.0	HS	S	9.0	HS	S	-		
35	Co 94012	9.0	HS	S	9.0	HS	S	-		
	Standard – smut									
	Co 96007						-	HS		

	Co 97009						-	HS
--	----------	--	--	--	--	--	---	----

RT- Retest

Table 3 Screening ISH clones for red rot resistance

Sl No	Entries	Pathotype - CF06			Pathotype - CF12		
		Plug method	Nodal method	Plug method	Nodal method	Plug method	Nodal method
1	AS 04-245	9.0	HS	S	9.0	HS	S
2	AS 04-635	1.4	R	R	6.0	MS	R
3	AS 04-1687	2.6	MR	R	5.0	MS	R
4	AS 04-1689	3.2	MR	R	2.6	MR	R
5	AS 04-2097	4.0	MR	R	4.4	MS	R
6	BM 1003143	6.2	S	S	9.0	HS	S
7	BM 1005149	4.2	MS	S	8.0	S	S
8	BM 1009163	5.6	S	S	8.0	S	S
9	BM 1010168	1.0	R	R	3.0	MR	R
10	BM 1022173	5.2	MS	R	5.0	MS	R
11	CYM 07-986	5.2	MS	R	5.0	MS	R
12	GU 07-2276	1.0	R	R	2.8	MR	R
13	GU 07-3774	9.0	HS	S	9.0	HS	S
14	GU 07-3849	2.4	MR	R	6.0	MS	R
15	MA 5/5	6.6	S	S	8.0	S	S
16	MA 5/22	1.0	R	R	8.0	S	S
17	MA 5/37	2.1	MR	R	3.0	MR	R
18	MA 5/51	9.0	HS	RT	9.0	HS	R
19	MA 5/99	1.0	R	R	2.2	MR	R
20	PG 9869137	4.1	MS	R	9.0	HS	S
21	SA 98-13	2.6	MR	R	2.0	R	R
22	SA 04-390	3.2	MR	R	5.0	MS	R
23	SA 04-409	3.0	MR	R	3.0	MR	R
24	SA 04-454	3.8	MR	R	4.0	MR	R
25	SA 04-458	9.0	HS	S	6.0	S	S
26	SA 04-472	6.1	S	R	8.0	S	R
27	SA 04-496	6.2	S	R	8.0	S	R
28	CoC 671 Std	9.0	HS	S	9.0	HS	S
29	Co 94012 Std	9.0	HS	S	9.0	HS	S