

ALL INDIA CO-ORDINATED RESEARCH PROJECT ON SUGARCANE

ANNUAL REPORT 2016-17

CENTRE: CUDDALORE (EAST COAST ZONE)

DISCIPLINE: PLANT PATHOLOGY

PP14: Identification of pathotypes/races in red rot pathogen

Sugarcane differentials host 19 nos. (Co 419, Co 975, Co 997, Co 1148, Co 7717, Co 62399, CoC 671, CoJ 64, CoS 767, CoS 436, BO 91, Baragua, Kakhai, SES 594, Co Se 95422, Co 7805, Co 86002, CoV 92102 and Co 86032) were inoculated with the *C. falcatum* isolated from varieties *viz.*, CoC 23, CoC 24, Co 91017, CoA 92081 and designated pathotype CF 06. Among the differentials, in BO 91, the isolate from CoC 24 had showed intermediated in reaction while all other isolates registered resistant reaction. Similarly in the Co 1148 differential, the isolate from CoC 24 showed susceptible reaction while it was resistant to CF 06. With regard to reaction in CoS 767 the isolate from CoC 24 showed intermediate in reaction which indicated limited variation in designated pathotypes (Table 1).

Table 1. Pathogenic behaviour of isolates of *C. falcatum* on host differential

Isolates	Source	Reaction of host differentials																		
		Co 419	Co 975	Co 997	Co 1148	Co 7717	Co 62399	CoC 671	CoJ 64	CoS 767	CoS 8436	BO 91	Bara gua	Kak hai	SES 594	CoSe 95422	Co 7805	Co 86002	CoV 92102	Co 86032
CF 06	CoC 671	X	S	S	R	R	X	S	S	R	R	R	R	X	R	R	R	X	R	X
Isolate 1	CoC 24	S	X	X	S	X	X	S	S	X	R	X	R	X	R	R	R	X	R	X
Isolate 2	CoC 23	X	X	S	S	X	S	S	X	R	R	R	R	X	R	R	R	X	X	X
Isolate 3	Co 91017	S	S	X	R	R	S	S	X	R	R	R	R	X	R	R	R	R	X	R
Isolate 4	CoA 92081	S	S	S	S	R	X	S	X	X	R	R	R	X	R	R	R	S	R	X

R =Resistant S = susceptible X = Intermediate

PP17A. Evaluation of Zonal Varieties for resistance to red rot (2016-17)

Plug method

S. No	Clones	CF 06		CF 04	
		Score	Disease reaction	Score	Disease reaction
	IVT Early				
1.	Co 07013	5.2	MS	5.8	MS
2.	Co 13023	3.8	MR	3.2	MR
3.	Co 13024	3.1	MR	3.5	MR
4.	CoA 14321	2.9	MR	2.6	MR
5.	CoA 14322	7.3	S	6.1	S
6.	CoC 14336	3.7	MR	3.4	MR
7.	CoV 14356	6.3	S	7.4	S
	IVT Mid late				
1.	Co 13025	3.4	MR	3.0	MR
2.	Co 13027	2.9	MR	3.4	MR
3.	Co 13028	3.2	MR	3.8	MR
4.	Co 13029	2.1	MR	2.7	MR
5.	Co 13030	3.4	MR	3.2	MR
6.	Co 13031	3.7	MR	3.4	MR
7.	Co 13032	6.1	S	7.4	S
8.	CoA 14323	2.9	MR	3.4	MR
9.	CoA 14324	7.6	S	7.8	S
10.	CoC 14 337	4.0	MR	3.6	MR
11.	PI 14376	7.1	S	6.8	S
12.	PI 14377	4.0	MR	3.8	MR
	AVT Early I Plant				
1.	CoA 13322	2.3	MR	3.1	MR
2.	CoA 13323	4.2	MS	4.8	MS
3.	CoC 13336	3.9	MR	3.7	MR
4.	CoC 13337	3.9	MR	3.1	MR
5.	CoV 13356	4.9	MS	4.6	MS
	AVT Early II Plant				
1.	CoA 12321	3.6	MR	4.2	MS
2.	CoA 12322	3.5	MR	3.1	MR
3.	CoA 12323	8.0	S	7.3	S

4.	CoOr 12346	4.4	MS	5.1	MS
5.	CoV 12356	2.1	MR	2.9	MR
	AVT Mid late I Plant				
1.	CoA 11326	3.8	MR	3.4	MR
2.	CoA 12324	4.2	MS	4.6	MS
3.	CoC 13339	3.2	MR	2.9	MR
4.	CoOr 13346	2.7	MR	3.2	MR
	Checks				
1.	CoC 671	9.0	HS	9.0	HS
2.	Co 86249	2.1	MR	2.2	MR

Among the thirty three clones screened, twenty one clones viz., Co 13023, Co 13024, CoA 14321, CoC 14336, Co 13025, Co 13027, Co 13028, Co 13029, Co 13030, Co 13031, CoA 14323, CoC 14 337, PI 14377, CoA 13322, CoC 13336, CoC 13337, CoA 12322, CoV 12356, CoA 11326, CoC 13339 and CoOr 13346 registered moderately resistant reaction to red rot by plug method of inoculation for both CF 06 and CF 04 pathotypes. Five clones were moderately susceptible and six clones were susceptible to red rot.

Nodal Cotton swab method

S. No.	Clones	Nodal Cotton swab Method	
		CF 06	CF 04
	IVT Early		
1.	Co 07013	R	R
2.	Co 13023	R	R
3.	Co 13024	R	R
4.	CoA 14321	R	R
5.	CoA 14322	S	S
6.	CoC 14336	R	R
7.	CoV 14356	S	S
	IVT Mid late		
1.	Co 13025	R	R
2.	Co 13027	R	R
3.	Co 13028	R	R
4.	Co 13029	R	R
5.	Co 13030	R	R

6.	Co 13031	R	R
7.	Co 13032	S	S
8.	CoA 14323	R	R
9.	CoA 14324	S	S
10.	CoC 14 337	R	R
11.	PI 14376	S	S
12.	PI 14377	R	R
	AVT Early I Plant		
1.	CoA 13322	R	R
2.	CoA 13323	R	R
3.	CoC 13336	R	R
4.	CoC 13337	R	R
5.	CoV 13356	R	R
	AVT- Early II Plant		
1.	CoA 12321	R	R
2.	CoA 12322	R	R
3.	CoA 12323	S	S
4.	CoOr 12346	R	R
5.	CoV 12356	R	R
	AVT-Mid late I Plant		
1.	CoA 11326	R	R
2.	CoA 12324	R	R
3.	CoC 13339	R	R
4.	CoOr 13346	R	R
	Checks		
1.	CoC 671	S	S
2.	Co 86249	R	R

Among the thirty three clones screened for resistant to red rot by nodal cotton swab method, twenty seven clones viz., Co 07013, Co 13023, Co 13024, CoA 14321, CoC 14336, Co 13025, Co 13027, Co 13028, Co 13029, Co 13030, Co 13031, CoA 14323, CoC 14 337, PI 14377, CoA 13322, CoA 13323, CoC 13336, CoC 13337, CoV 13356, CoA 12321, CoA 12322, CoOr 12346, CoV 12356, CoA 11326, CoA 12324, CoC 13339 and CoOr 13346 were found to be resistant for both CF 06 and CF 04 pathotypes by nodal cotton swab method.

PP17B. Evaluation of Zonal Varieties for resistance to smut (2016-17)

Sugarcane clones were screened against smut disease as per technical programme and the results are presented below

S. No	Clones	Smut disease	
		Progressive Smut (%)	Disease reaction
	IVT Early		
1.	Co 07013	2.28	MR
2.	Co 13023	4.87	MR
3.	Co 13024	7.31	MR
4.	CoA 14321	2.58	MR
5.	CoA 14322	39.57	HS
6.	CoC 14336	2.29	MR
7.	CoV 14356	7.50	MR
	IVT Mid late		
1.	Co 13025	8.10	MR
2.	Co 13027	27.50	S
3.	Co 13028	2.38	MR
4.	Co 13029	9.80	MR
5.	Co 13030	4.00	MR
6.	Co 13031	1.51	MR
7.	Co 13032	0	R
8.	CoA 14323	11.30	MS
9.	CoA 14324	14.28	MS
10.	CoC 14 337	0	R
11.	PI 14376	1.35	MR
12.	PI 14377	3.39	MR
	AVT Early I Plant		
1.	CoA 13322	10.87	MS
2.	CoA 13323	10.30	MS
3.	CoC 13336	18.90	MS
4.	CoC 13337	2.88	MR
5.	CoV 13356	0	R
	AVT Early II Plant		
1.	CoA 12321	24.32	S
2.	CoA 12322	0.74	MR

3.	CoA 12323	11.28	MS
4.	CoOr 12346	4.15	MR
5.	CoV 12356	6.72	MR
	AVT Mid late I Plant		
1.	CoA 11326	7.43	MR
2.	CoA 12324	0	R
3.	CoC 13339	8.33	MR
4.	CoOr 13346	6.07	MR
	Checks		
1.	Co 97009	31.99	HS
2.	CoC 22	21.84	S

Among the thirty three clones screened, only four clones viz., Co 13032, CoC 14337, CoV 13356 and CoA 12324 recorded resistant to smut disease and twenty clones viz., Co 07013, Co 13023, Co 13024, CoA 14321, CoC 14336, CoV 14356, Co 13025, Co 13028, Co 13029, Co 13030, Co 13031, PI 14376, PI 14377, CoC 13337, CoA 12322, CoOr 12346, CoV 12356, CoA 11326, CoC 13339 and CoOr 13346 were moderately resistant, six clones were moderately susceptible, Co 13027 and CoA 12321 were susceptible and CoA 14322 was highly susceptible to smut disease.

PP17 D. Evaluation of Zonal Varieties for resistance to Yellow Leaf Disease (2016-17)

S. No	Clones	Mean Severity Grade	Disease reaction
	IVT Early		
1.	Co 07013	1.4	MR
2.	Co 13023	1.5	MR
3.	Co 13024	1.7	MR
4.	CoA 14321	1.6	MR
5.	CoA 14322	2.1	MS
6.	CoC 14336	1.6	MR
7.	CoV 14356	1.8	MR
	IVT Mid late		
1.	Co 13025	1.4	MR

2.	Co 13027	1.8	MR
3.	Co 13028	1.9	MR
4.	Co 13029	0.3	R
5.	Co 13030	2.0	MR
6.	Co 13031	0.8	R
7.	Co 13032	1.6	MR
8.	CoA 14323	1.5	MR
9.	CoA 14324	1.9	MR
10.	CoC 14 337	2.1	MS
11.	PI 14376	1.5	MR
12.	PI 14377	1.3	MR
	AVT- Early I Plant		
1.	CoA 13322	1.8	MR
2.	CoA 13323	0.9	R
3.	CoC 13336	1.3	MR
4.	CoC 13337	1.4	MR
5.	CoV 13356	2.1	MS
	AVT- Early II Plant		
1.	CoA 12321	0.3	R
2.	CoA 12322	0.6	R
3.	CoA 12323	1.8	MR
4.	CoOr 12346	1.7	MR
5.	CoV 12356	1.6	MR
	AVT-Mid late I Plant		
1.	CoA 11326	1.9	MR
2.	CoA 12324	1.8	MR
3.	CoC 13339	1.4	MR
4.	CoOr 13346	1.6	MR

Natural incidence of yellow leaf disease in clones were recorded, the incidence of YLD was generally low. Among the thirty three clones, five clones viz., Co 13029, Co 13031, CoA 13323, CoA 12321 and CoA 12322 were found to be resistant to YLD.

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

Survey has been conducted in the following sugar mill areas for assessing incidence of diseases in sugarcane.

1. M/s. Kallakurichi II Co-operative Sugar Mills Ltd., Kachirapalayam, Villupuram District
2. M/s. Maduranthagam Co-operative Sugar Mills Ltd, Padalam, Kanchipuram District
3. M/s. MRK Co-operative Sugar Mills Ltd., Sethiathope, Cuddalore District
4. M/s. Kallakurichi I Coperative Sugar Mills Ltd., Mungilthuraipattu, Villupuram District
5. M/s. Puducherry Co-operative Sugar Mills Ltd., Lingareddipalayam, Puducherry
6. M/s. EID Parry India Pvt. Ltd., Ariyur, Puducherry
7. M/s. Bannari Amman Sugars Ltd., Kolunthampattu, Thiruvannamalai District
8. Shree Ambika Sugars Limited , Pennadam, Cuddalore District

S. No.	Disease	Name of the Area Surveyed	% Disease incidence (clump basis)	Varieties affected	Crop stage when observed (Month)	No. of farm holding surveyed
1.	Red rot	Sethiathope, Cuddalore District	5 to 54	CoC 24	7-9	13
		Lingareddipalayam, Puducherry	2 to 25	CoC 24	7-8	10
		Padalam, Kanchipuram District.	5 to 38 15 to 25	CoC 24 CoC 23	6-7 7-8	7
		Mungilthuraipattu, Villupuram District.	3 to 18	CoC 24	7-8	6
		Kachirapalayam, Villupuram District	24 to 32	Co 91017	7- 8	2
		Nettapakkam, Puducherry	2 to 22	CoC 24	6-8	10
2.	Smut	Sethiathope, Cuddalore District	3 to 8	CoC 22	8	13
		Pennadam, Cuddalore District	2 to 5	CoSi 6	5	6
3.	Wilt	Kachirapalayam, Villupuram District	3 to 12	Co 86032	5-7	5
		Thandarampattu , Thiruvannamalai District	5 to 10	Co 86032	8	12

		Kallakurichi, Villupuram District	2 to 6	Co 86032	8- 9	12
4.	YLD	Kachirapalayam, Villupuram District	5 to 15	Co 86032	8-9	5
		Lingareddipalayam, Puducherry	2 to 5	Co 86032	8	10
		Padalam, Kanchipuram District	5 to 10	CoV 09356	9	7
		Pennadam, Cuddalore District	3 to 5	CoV 09356	9	6
		Kallakurichi, Villupuram District.	5 to 10	Co 86032	9	6

The survey conducted in Cuddalore, Villupuram, Kanchipuram and Thiruvannamalai Districts of Tamil Nadu and Puducherry state indicated that the incidence of red rot disease in varieties viz., CoC 24, CoC 23 and Co 91017 and the disease severity ranged from 2 to 54 %. Smut disease was recorded in variety CoC 22 and CoSi 6 and the disease severity ranged between 2 and 8 %. Wilt disease was observed in Co 86032 (2 to 12 %) and yellow leaf disease was noticed in Co 86032 (5 to 15 %) and CoV 09356 (5 to 10 %).

PP 23 Assessment of elite and ISH genotypes for resistance to red rot

S. No.	Clones	Red Rot reaction (CF 06)		Red Rot reaction (CF 04)	
		Score	Disease Reaction	Score	Disease Reaction
1.	BM 1003143	5.8	MS	4.8	MS
2.	BM 1005149	3.8	MR	3.2	MR
3.	BM 1009163	9.0	HS	8.6	HS
4.	BM 1010168	2.8	MR	3.4	MR
5.	BM 1022173	6.4	S	7.2	S
6.	PG 9869137	3.6	MR	4.0	MR
7.	SA 98-13	3.2	MR	3.4	MR
8.	SA 04-454	1.8	R	2.0	R
9.	SA 04-472	4.9	MS	5.6	MS
10.	SA 04-458	8.3	HS	8.6	HS
11.	SA 04-390	3.7	MR	3.8	MR

12.	SA 04-496	2.9	MR	3.4	MR
13.	SA 04-409	3.8	MR	3.1	MR
14.	AS 04-1689	3.6	MR	3.9	MR
15.	AS 04-245	5.4	MS	4.9	MS
16.	AS 04-2097	3.4	MR	3.8	MR
17.	AS 04-635	4.3	MS	4.8	MS
18.	AS 04-1687	5.8	MS	4.8	MS
19.	MA 5/51	8.8	HS	9.0	HS
20.	MA 5/5	7.4	S	6.8	S
21.	MA 5/37	2.9	MR	2.6	MR
22.	MA 5/99	3.4	MR	3.0	MR
23.	MA 5/22	2.9	MR	3.6	MR
24.	Gu 07-3849	3.8	MR	3.2	MR
25.	Gu 07-3774	9.0	HS	9.0	HS
26.	Gu 07-2276	1.8	R	1.6	R
27.	CYM 07-986	5.6	MS	5.4	MS
	Check				
1.	CoC 671	9.0	HS	9.0	HS

Among the 27 elite and ISH clones screened for resistance to red rot disease by plug method of inoculation, two clones *viz.*, SA 04-454 and Gu 07-2276 recorded resistant reaction. Thirteen clones *viz.*, BM 1005149, BM 1010168, PG 9869137, SA 98-13, SA 04-390, SA 04-496, SA 04-409, AS 04-1689, AS 04-2097, MA 5/37, MA 5/99, MA 5/22 and GU 07-3849 were moderately resistant to both the pathotypes.

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From
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To
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No.P&H/SRS/CDL/AICRP(S)/Pathology/Annual Report /2017 dt.31.05.2017

Sir,

Sub : Sugarcane Research Station, Cuddalore – AICRP on Sugarcane-Annual report-
Plant Pathology – 2016 - 2017- Submitted – regarding.

I submit to enclose herewith the Annual report of AICRP on Sugarcane pertaining to
Plant Pathology division of this centre for the period of 2016-2017 for your kind perusal.

**-Sd/-
Professor and Head**

Copy to the Head, Division of Crop Protection, & PI, Plant Pathology, AICRP on Sugarcane,
Sugarcane Breeding Institute, Coimbatore-641 007.

Copy submitted to the Director of Research, TNAU, Coimbatore-641 003

Copy submitted to the Director, Tamil Nadu Rice Research Institute, Aduthurai – 612 001.