

# **AICRP ON SUGARCANE**

**ANNUAL REPORT  
PLANT PATHOLOGY  
2015-2016**

**KERALA AGRICULTURAL UNIVERSITY  
AGRICULTURAL RESEARCH STATION  
THIRUVALLA**



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**ANNUAL REPORT FOR 2015-16**

1. Project No : PP.17.
2. Title : **Evaluation of zonal varieties for resistance to red rot**
3. Objectives : To gather information on the relative resistance to red rot of the entries in zonal varietal trials of the respective zones
4. Technical programme
- a. Varieties/genotypes : All the centers will test all the entries of early and mid late genotypes under IVT and AVT of the respective zone.
- b. Inoculum : Isolates chosen will be only from local red rot collection.
- c. Method of inoculation : Plug and cotton swab methods of inoculation to be done in the fortnight of August to first week of September when 6 to 7 well formed internodes are formed.
- d. Observation : One observation at the 60<sup>th</sup> day of inoculation. The canes are split opened longitudinally along the point of inoculation. This is graded on the international scale of 0-9.
5. Evaluation (Results)

**(a) INITIAL VARIETAL TRIALS**

All the entries in the IVT (Early), IVT (Mid late) were inoculated by plug and cotton swab methods of inoculation with the standard isolate (CF06) and cf94012-0 of red rot pathogen and observations were recorded 60 days after inoculation (Table1).

**(i). Initial Varietal Trial (Early)**

Out of the 15 entries tested in the IVT (Early) trial with the standard isolate CFO6, eight varieties *viz.*, Co12003, Co 12006, Co 12008, CoM 12072, Co 12001, Co 12082, CoT12367 & CoT 12366, showed moderate resistance (MR) reaction, five varieties *viz.*, Co 12083, Co 12007, CoM 12071, Co 12081 & Co 94008 showed moderate susceptibility (MS) reaction, one variety *viz* Co 85004 showed susceptible (S) reaction and one variety *viz.*, CoC 671 showed highly susceptible (HS) reaction to plug method of inoculation.

Out of the 15 entries tested in the IVT (Early) trial with the standard isolate cf94012-0, nine varieties *viz.*, Co12003, Co 12006, Co 12008, CoM 12072, Co 12001, Co 12082, Co 12081, CoT12367 & CoT 12366, showed moderate resistance (MR) reaction, five varieties *viz.*, Co 12083, Co 12007, CoM 12071, Co 85004 & Co 94008 showed moderate susceptibility (MS) reaction, one variety *viz.* CoC 671 showed susceptible (S) reaction to plug method of inoculation.

All the varieties except one variety *viz.*, CoC 671 showed resistant reaction to cotton swab method of inoculation.

#### **(ii). Initial Varietal Trial (Mid late)**

Out of the 17 entries tested in the IVT (midlate) trial with the standard isolate CFO6, eight varieties *viz.*, Co 12009, Co 12012, Co 12014, Co 12016, CO 12017, Co 12019, Co 12086 & Co 12073 showed moderate resistance (MR) reaction, seven varieties *viz.*, Co 12021, Co 12024, CoM 12084, CoM 12085, CoT 12368, VSI 12121 & Co 86032 showed moderate susceptibility (MS) reaction, one variety *viz.*, CoN 12074 showed susceptible (S) reaction and one variety Co 99004 showed highly susceptible reaction to plug method of inoculation.

Out of the 17 entries tested in the IVT (midlate) trial with the standard isolate cf 94012-0, one variety *viz.*, Co 12014 showed resistance (R) reaction, eight varieties *viz.*, Co 12009, Co 12012, Co 12016, CO 12017, Co 12019, Co 12086, VSI 12121 & Co 12073 showed moderate resistance (MR) reaction, seven varieties *viz.*, Co 12021, Co 12024, CoM 12084, CoM 12085, CoT 12368, Co 99004 & Co 86032 showed moderate susceptibility (MS) reaction to plug method of inoculation.

All the varieties showed resistant reaction to cotton swab method of inoculation.

#### **(b) Advanced Varietal Trials**

All the entries in the AVT (Early I Plant, II plant & Midlate I plant) were inoculated with the standard isolate (CF06) and cf 94012-0 by plug and cotton swab methods of inoculation and observations were recorded 60 days after inoculation (Table 2).

##### **i. Advance Varietal Trial (Early) I Plant**

Out of the eleven entries tested in the AVT (Early I Plant) with the standard isolate CFO6, six varieties *viz.*, CoT 10367, Co 10027, Co 10026, Co 10006, Co 10005 and Co 10004 showed moderately resistance (MR) reaction, three varieties *viz.*, CoT 10366, Co10024 & Co 94008 exhibited moderately susceptible (MS) reaction, one variety *viz.*, Co 85004 showed susceptible reaction and one variety *viz.* CoC 671 showed highly susceptible (HS) reaction to plug method of inoculation.

Out of the eleven entries tested in the AVT (Early I Plant) with the standard isolate cf 94012-0, seven varieties *viz.*, CoT 10367, Co 10027, Co 10026, Co 10024, Co 10006, Co 10005 and Co 10004 showed moderately resistance (MR) reaction, three varieties *viz.*, CoT

10366, Co85004 & Co 94008 exhibited moderately susceptible (MS) reaction, one variety viz., CoC 671 showed susceptible reaction to plug method of inoculation.

All the varieties except one variety viz., CoC 671 showed resistant reaction to cotton swab method of inoculation.

**i. Advance Varietal Trial (Early) II Plant**

Out of the six entries tested in the AVT (Early II Plant) with the standard isolate CFO6, one variety viz ., Co 09004 showed resistance (R) reaction, three varieties viz., Co 09007, CoN 09072 & Co 94008 exhibited moderately susceptible (MS) reaction, one variety viz., Co 85004 showed susceptible reaction and one variety viz CoC 671 showed highly susceptible (HS) reaction to plug method of inoculation.

Out of the six entries tested in the AVT (Early II Plant) with the standard isolate of 94012-0, one variety viz ., Co 09004 showed resistance (R) reaction, one variety viz ., CoN 09072 showed moderate resistance (MR) reaction, three varieties viz., Co 09007, Co 85004 & Co 94008 exhibited moderately susceptible (MS) reaction, one variety viz., CoC 671 showed susceptible reaction to plug method of inoculation.

All the varieties except one variety viz., CoC 671 showed resistant reaction to cotton swab method of inoculation.

**Advance Varietal Trial (midlate) I Plant**

Out of the thirteen entries tested in the AVT (midlate I Plant) with the standard isolate CFO6, eight varieties viz., Co 09009, Co 10031, Co 10033, CoT10368, CoT 10369, CoVc 10061, PI 10131, PI 10132 exhibited moderately resistant (MR) reaction, four varieties viz., Co 10015, Co 10017, Co 10083 and Co 86032 showed moderate (MS) susceptible reaction and one variety viz Co 99004 showed highly susceptible (HS) reaction to plug method of inoculation.

Out of the thirteen entries tested in the AVT (midlate I Plant) with the standard isolate of 94012-0, ten varieties viz., Co 09009, Co 10015, Co 10031, Co 10033, Co 10083, CoT 10368, CoT 10369, CoVc 10061, PI 10131, PI 10132 exhibited moderately resistant (MR) reaction, three varieties viz., Co 10017, Co 99004 and Co 86032 showed moderate (MS) susceptible reaction to plug method of inoculation.

All the varieties except showed resistant reaction to cotton swab method of inoculation.

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## Evaluation of Zonal varieties/genotypes for resistance to red rot disease (2015-16)

Location: Agricultural Research Station, Thiruvalla

**Table 1. Initial varietal trial (Early and Mid late)**

Sl. No	Genotypes	Plug Method (CF 06)		Cotton swab Method	Plug Method (cf 94012-0)		Cotton swab Method
		Reaction	Score	Reaction	Reaction	Score	Reaction
<b>A. IVT (EARLY)</b>							
1.	Co 12083	MS	5.3	R	MS	4.3	R
2.	Co 12003	MR	3.0	R	MR	3.6	R
3.	Co 12006	MR	2.6	R	MR	3.0	R
4.	Co 12007	MS	5.0	R	MS	4.8	R
5.	Co 12008	MR	3.3	R	MR	3.6	R
6.	CoM 12072	MR	2.6	R	MR	2.6	R
7.	Co 12001	MR	4.0	R	MR	3.6	R
8.	CoM 12082	MR	3.6	R	MR	3.0	R
9.	CoM 12071	MS	6.0	R	MS	4.3	R
10.	Co 12081	MS	4.6	R	MR	3.6	R
11.	CoT 12366	MR	3.3	R	MR	3.3	R
12.	CoT 12367	MR	3.6	R	MR	4.0	R
13.	Co 85004	S	6.25	R	MS	5.3	R
14.	Co 94008	MS	6.0	R	MS	5	R
15.	CoC 671	HS	9.0	S	S	7	S

Sl. No	Genotypes	Plug Method (CF 06)		Cotton swab Method	Plug Method (cf 94012-0)		Cotton swab Method
		Reaction	Score	Reaction	Reaction	Score	Reaction
<b>B. IVT (MIDLATE)</b>							
1.	Co 12009	MR	3.75	R	MR	3.66	R
2.	Co12012	MR	4.0	R	MR	3.3	R
3.	Co 12014	MR	3.3	R	R	1	R
4.	Co 12016	MR	3.5	R	MR	3	R
5.	Co 12017	MR	4.0	R	MR	2.3	R
6.	Co12019	MR	4.0	R	MR	3.3	R
7.	Co 12021	MS	6.0	R	MS	5.3	R
8.	Co12024	MS	6.0	R	MS	5.3	R
9.	CoM 12084	MS	6.0	R	MS	6.0	R
10.	CoM12085	MS	6.0	R	MS	5.6	R
11.	CoM12086	MR	4.0	R	MR	3.6	R
12.	CoN12073	MR	4.0	R	MR	3.6	R
13.	CoN12074	S	8.0	R	S	6.6	R
14.	CoT 12368	MS	5.0	R	MS	4.3	R
15.	VSI 12121	MS	6.0	R	MR	3.0	R
16.	Co 99004	HS	9	R	MS	5.0	R
17.	Co 86032	MS	4.3	R	MS	4.1	R

**Table 2. Advanced varietal trial**

Sl. No	Genotypes	Plug Method (CF 06)		Cotton swab Method	Plug Method (cf 94012-0)		Cotton swab Method
		Reaction	Score	Reaction	Reaction	Score	Reaction
<b>A. AVT Early(I PLANT)</b>							
1.	CoT 10367	MR	4.0	R	MR	3.6	R
2.	CoT10366	MS	4.25	R	MS	5.0	R
3.	Co10027	MR	3.0	R	MR	3.6	R
4.	Co 10026	MR	3.5	R	MR	4.0	R
5.	Co 10024	MS	5.0	R	MR	4.0	R
6.	Co10006	MR	3.5	R	MR	3.3	R
7.	Co 10005	MR	3.6	R	MR	4.0	R
8.	Co10004	MR	3.75	R	MR	3.6	R
9.	Coc 671	HS	9.0	S	S	7.0	S
10.	Co94008	MS	6.0	R	MS	5.0	R
11.	Co85004	S	6.25	R	MS	5.3	R
<b>AVT EARLY II PLANT</b>							
1.	Co 09004	R	2.0	R	2.0	R	R
2.	Co 09007	MS	5.0	MS	5.0	MS	R
3.	CoN 09072	MS	4.25	MR	4.0	MR	R
4.	Coc 671	HS	9.0	S	S	7.0	S
5.	Co94008	MS	6.0	R	MS	5.0	R
6.	Co85004	S	6.25	R	MS	5.3	R

Sl. No	Genotypes	Plug Method (CF 06)		Cotton swab Method	Plug Method (cf 94012-0)		Cotton swab Method
		Reaction	Score	Reaction	Reaction	Score	Reaction
<b>A. AVT MIDLATE(I PLANT)</b>							
1.	Co 09009	MR	4.0	R	MR	2.3	R
2.	Co10015	MS	6.0	R	MR	4.0	R
3.	Co10017	MS	6.0	R	MS	6.0	R
4.	Co 10031	MR	4.0	R	MR	3.6	R
5.	Co 10033	MR	4.0	R	MR	3.0	R
6.	Co10083	MS	6.0	R	MR	4.0	R
7.	CoT 10368	MR	3.5	R	MR	3.6	R
8.	CoT 10369	MR	3.3	R	MR	2.0	R
9.	CoVc 10061	MR	3.6	R	MR	4.0	S
10.	PI 10131	MR	2.75	R	MR	2.0	R
11.	PI 10132	MR	3.6	R	MR	3.6	R
12.	Co99004	HS	9.0	R	MS	5.0	R
13.	Co86032	MS	4.3	R	MS	5.3	R

**Scoring for natural incidence of various diseases in sugarcane varieties under IVT & AVT**

<b>Si.No</b>	<b>Genotypes</b>	<b>Diseases</b>
1	Co09009	Ring spot disease
2	Co 10015	Rust
3	Co 10017	Sheath blight ( <i>R Solani</i> )
4	Co 10031	Ring spot disease
5	Co10033	Mosaic
6	CoM 10083	Ring spot disease
7	CoT 10368	Ring spot disease
8	CoT 10369	Ring spot disease
9	CoVc 10061	Mosaic
10	PI 10131	
11	PI 10132	Ring spot disease
12	Co 12009	Sheath blight ( <i>R Solani</i> ), Ring spot disease
13	Co 12012	Sheath blight ( <i>R Solani</i> ), Ring spot disease
14	Co 12014	Ring spot disease, Sheath blight ( <i>R Solani</i> ), Rust
15	Co 12016	Ring spot disease
16	Co 12017	Ring spot disease, Rust
17	Co 12019	Ring spot disease, Rust
18	Co 12021	Ring spot disease
19	Co 12024	Ring spot, Sheath blight ( <i>R Solani</i> )
20	CoM 12084	Ring spot disease, Pokkah boeng
21	CoM 12085	Ring spot disease, Sheath blight ( <i>R Solani</i> ), pokkah boeng
22	CoM 12086	Ring spot disease, Sheath blight ( <i>R Solani</i> )
23	CoN 12073	Ring spot disease, Sheath blight ( <i>R Solani</i> )
24	CoN12074	Ring spot disease, Sheath blight ( <i>R Solani</i> )
25	CoT 12368	Ring spot disease, Sheath blight ( <i>R Solani</i> )
26	VSI 12121	Sheath blight ( <i>R Solani</i> ), Pokkah boeng
27	Co 12001	Mosaic
28	Co 12003	Ring spot disease, Sheath blight ( <i>R Solani</i> )
29	Co 12006	Mosaic
30	Co 12007	Ring spot, mosaic, Rust
31	Co 12008	Sheath blight ( <i>R solani</i> )
32	Co 12081	Ring spot disease, Rust
33	CoM 12082	Rust, Ring spot disease, Mosaic
34	CoM 12083	Leaf sheath rot( <i>Sclerotium rolfsi</i> ), Mosaic
35	CoN 12071	Rust (Severe), Ring spot disease
36	CoN 12072	Mosaic, Rust
37	CoT 12366	Ring spot
38	CoT 12367	Ring spot
39.	Co 10004	Ring spot
40.	Co 10005	Ring spot, Rust
41.	Co 10006	Ring spot
42.	Co 10024	Ring spot

<b>43.</b>	Co 10026	Ring spot
<b>44.</b>	Co 10027	Ring spot
<b>45.</b>	Co 10366	Ring spot (severe)
<b>46.</b>	CoT 10367	Ring spot
<b>47.</b>	Co 09004	Ring spot
<b>48.</b>	Co 09007	Ring spot, Pokkah boeng
<b>49.</b>	Co 09072	Ring spot
<b>50.</b>	CoC 671	Ring spot, Pokkah boeng, Sheath blight ( <i>R solani</i> )
<b>51.</b>	Co 94008	Ring spot, Pokkah boeng, rust
<b>52.</b>	Co 85004	Ring spot, Pokkah boeng
<b>53.</b>	Co 99004	Ring spot, rust
<b>54.</b>	Co 86032	Mosaic, Ring spot

Signature of Scientist

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**ANNUAL REPORT FOR 2015-2016**

Project No	: PP.14
Title	: <b>Identification of pathotypes of red rot pathogen</b>
Objective	: To gather information on the major pathotypes of red rot pathogen from the different areas /zones.
Location	: Peninsular zone-Thiruvalla, Agricultural Research Station, Thiruvalla.
Year of start	: 1983-84 (continuing project)
Differential varieties/genotypes	: Baragua ( <i>S. Officinarum</i> ) Khakai SES 594 CoS 767 BO 91 CoC 671 Co 7717 Co 997 Co J 64 Co 1148 Co 419 Co 62399 Co 975 CoS 8436 Co 7805 Co 86002 Co 86032 CoV 92102 CoSe 95422
No. of isolates	: Virulent isolates collected from redrot affected canes of commercially cultivated varieties in the zone.



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1. Project No : P.P.22
2. Title: **Survey of sugarcane diseases naturally occurring in the area on important sugarcane varieties.**
3. Objective To gather information on the diseases naturally occurring in the area on varieties for compiling an all India disease status report yearly
4. Location Peninsular zone-Thiruvalla  
Sugarcane Research Station, Thiruvalla
5. Year of start 1989-90
6. Technical programme Survey will be conducted in the sugarcane growing areas and to take periodic observations in June, September and December in all locations to gather information on the per cent incidence of diseases on all varieties of the area (General survey)
7. Phase to be covered during the Survey of major diseases occurring in the area on important varieties and their identification period

## 8. Result

:

(1). **Pokkah Boeng:** This disease has been observed in most of the varieties cultivated. The disease incidence is observed during the south west monsoon period of May - June. The diseased plants produce twisting and yellowing symptom in young leaves, and also infected young leaves get converted to twine like structure and tied to main shoot. Stunting of plants was also noticed. But, fortunately, all the affected plants are found to get recovered after the monsoon showers.

(2) Sheath blight: Sheath blight due to *Rhizoctonia solani* was observed in the entire experimental field in the station during May – June. The sheath blight symptom was observed in the leaves and leaf sheath also. Sclerotia were also produced in the field. Proper field sanitation and detrashing at regular interval for two to three times reduced the incidence of this disease.

### (3). Foliar diseases

(a). **Ring spot:** This disease is the most common and predominant foliar disease observed even from two months age up to harvest. But proper field sanitation and detrashing at regular interval for two to three times can reduce the incidence of this disease.

(b). **Rust:** Rust disease was observed during August – September months. Uredospores were observed as light orange pustules on leaf lamina during the month of August. The next stage of teliospores was observed as black pustules as raised spots during September, month. The severely affected leaves got dried up. But any how the disease subsided with the onset of North East monsoon showers.

(4) **Mosaic:** Mosaic is seen commonly in most of the crop varieties, but the disease is not in such a stage to cause any severe yield reduction.

(5) Grassy shoot: this disease was not observed commonly. But was seen in some varieties obtained from Mandya for red rot resistance screening.

9. Discussion and summary

: In the current year (2015–16), the most predominant disease was the foliar disease *viz.*, ring spot but was not found in a severe form so as to cause any drastic yield loss. Sheath blight due to *Rhizoctonia solani* was also observed in the field. However, no severe infestation on the plants was observed. Proper field sanitation and detrashing controlled the disease. The other diseases observed as usual were rust, mosaic as well as Pokkah Boeng. But none of the diseases were in a severe stage to cause any drastic yield decline.

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**PP 22: Survey of naturally occurring sugarcane diseases (2014-15)**

<b>Sl. No</b>	<b>Disease</b>	<b>Name of area surveyed</b>	<b>% Disease incidence</b>	<b>Crop stage</b>	<b>Any other information</b>
1.	Smut	Disease not present in any area	-	-	-
2.	Wilt	Disease not present in any area	-	-	-
3.	RSD	Disease not present in any area	-	-	-
4.	YLD	Disease not present in any area	-	-	-
6.	Foliar diseases				
	(a). Ring spot	Iramallikkara, Pandanadu and Prayar of Alleppey district, Kuttor, Vallamkulam, Nariyapuram, Niranam and Pandalam of Pathanamthitta district, Aramanoor of Kottayam district and Marayoor of Idukki district.	Moderate	2 month onwards	Ring spot is associated with almost all varieties till harvest
	(b). Sheath blight (R solani)	Iramallikkara of Alleppey district and Vallamkulam and Pandalam of Pathanamthitta district.	Mild	4months	
	(c). Narrow leaf spot	Marayoor in Idukki dist.	Moderate	2 month	

7.	Other diseases a. Pokkah Boeng	Iramalikkara, and Thiruvanmandoor of Alleppey district, Nedumbram and Venpala, of Pathanamthitta district .	Mild	4-6 month	The disease appears during May month and is found to disappear after shower during July- August
	b. Rust	Iramalikkara, Pandanadu and Prayar of Alleppey district, Kuttor, Vallamkulam, Nariyapuram, Niranam and Pandalam of Pathanamthitta district, Aramanoor of Kottayam district and Marayoor of Idukki district.	Mild	5-6 month	The disease appears during June month. Uredospores and teliospores are found to arise. The disease subsides during August with the onset of monsoon.