

# Plant Pathology

**KERALA AGRICULTURAL UNIVERSITY**  
**Agricultural Research Station, Thiruvalla**  
**All India Coordinated Research Project on Sugarcane**

**Annual Report 2014 - 2015**

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 (2013-14) 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) & AVT Early (I Plant) were inoculated by plug and cotton swab methods of inoculation with the standard isolate (CF06) of red rot pathogen and observations were recorded 60 days after inoculation (Table 1).

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

Out of the 16 entries tested in the IVT (Early) trial, seven varieties viz., Co 11001, Co 11004, Co 11016, Co 11018, CoM 11084, CoN 11071 & CoT 11366, showed moderate resistance (MR) reaction, six varieties viz., CoM 11081, CoM 11082, CoN 11072, PI 11131, Co 85004 & Co 94008 showed moderate susceptibility (MS) reaction, one variety viz CoM 11083 showed susceptible (S) reaction and two varieties viz., Co 11017 & CoC 671 showed highly susceptible (HS) 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 16 entries tested in the IVT (Early) trial, thirteen varieties *viz.*, Co 11005, Co 11007, Co 11012, Co 11019, Co 11021, Co 11022, Co 11023, Co 11024, CoM 11086, CoM 11087, CoN 11073, CoN 11074 & Co 99004 showed moderate resistance (MR) reaction, one variety *viz.*, CoM 11085 showed moderate susceptibility (MS) reaction and two varieties *viz.*, Co 110220 & Co 86032 showed highly susceptible (HS) reaction to plug method of inoculation.

All the varieties except one variety *viz.*, Co 11020 showed resistant reaction to cotton swab method of inoculation.

**(b) Advanced Varietal Trials**

All the entries in the AVT (Early & Midlate) were inoculated by plug and cotton swab methods of inoculation with the isolates of red rot pathogen and observations were recorded 60 days after inoculation (Table 2).

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

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

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

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**Evaluation of Zonal varieties/genotypes for resistance to red rot disease  
(2014-15)**

**Location: Sugarcane Research Station, Thiruvalla**

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

Sl. No	Genotypes	Plug Method		Cotton swab Method
		Reaction	Score	Reaction
<b>A. IVT (EARLY)</b>				
1.	Co 11001	MR	3.7	R
2.	Co 11004	MR	3.6	R
3.	Co 11016	MR	4.0	R
4.	Co 11017	HS	8.3	R
5.	Co 11018	MR	4.0	R
6.	CoM 11081	MS	5.3	R
7.	CoM 11082	MS	5.3	R
8.	CoM 11083	S	6.6	R
9.	CoM 11084	MR	4.0	R
10.	CoN 11071	MR	4.0	R
11.	CoN 11072	MS	5.7	R
12.	CoT 11366	MR	3.7	R
13.	PI 11131	MS	5.6	R
14.	Co 85004	MS	5.3	R
15.	Co 94008	MS	5.6	R
16.	CoC 671	HS	8.3	S
<b>B. IVT (Mid late)</b>				
1.	Co 11005	MR	3.7	R
2.	Co 11007	MR	4.0	R
3.	Co 11012	MR	3.7	R
4.	Co 11019	MR	3.3	R
5.	Co 11020	HS	8.3	S
6.	Co 11021	MR	3.7	R
7.	Co 11022	MR	3.3	R
8.	Co 11023	MR	3.3	R
9.	Co 11024	MR	3.7	R
10.	CoM 11085	MS	5.7	R
11.	CoM 11086	MR	3.7	R
12.	CoM 11087	MR	4.0	R
13.	CoN 11073	MR	4.0	R
14.	CoN 11074	MR	3.7	R
15.	Co 86032	HS	8.3	R
16.	Co 99004	MR	3.3	R

**Table 2. Advanced varietal trial**

SL.No	Genotypes	Plug Method		Nodal Method
		Reaction	Score	Reaction
<b>a. AVT (Early) I Plant</b>				
1.	Co 09004	MR	3.6	R
2.	Co 09007	MS	5.7	R
3.	CoN 09072	MR	4	R
4.	Co 85004	MS	5.3	R
5.	Co 94008	MS	5.6	R
6.	CoC 671	HS	8.3	S

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

Si.No	Genotypes	Diseases
1	Co 11001	-
2	Co 11004	Ring spot disease, Pokkah boeng
3	Co 11016	Ring spot disease
4	Co 11017	Ring spot disease
5	Co 11018	Ring spot disease
6	CoM 11081	Ring spot disease
7	CoM 11082	Ring spot disease, Rust
8	CoM 11083	Ring spot disease
9	CoM 11084	-
10	CoN 11071	Yellow leaf disease
11	CoN 11072	Ring spot disease, Pokkah boeng
12	CoT 11366	-
13	PI 11131	Ring spot disease, Pokkah boeng
14	Co 85004	Ring spot disease, Mosaic, Pokkah boeng, Yellow leaf disease
15	Co 94008	Mosaic, Pokkah boeng (Severe), Ring spot disease, Rust
16	CoC 671	Ring spot disease, Pokkah boeng
17	Co 11005	Ring spot disease, Pokkah boeng, Mosaic
18	Co 11007	Ring spot disease, Rust (severe), mosaic
19	Co 11012	Ring spot, Pokkah boeng, Mosaic
20	Co 11019	Ring spot disease, Pokkah boeng, mosaic
21	Co 11020	Ring spot disease, grassy shoot, mosaic, pokkah boeng
22	Co 11021	Ring spot disease, mosaic
23	Co 11022	Ring spot disease
24	Co 11023	Ring spot disease (less severe), yellow leaf disease

<b>25</b>	Co 11024	Mosaic
<b>26</b>	CoM 11085	Ring spot disease, Pokkah boeng
<b>27</b>	CoM 11086	Ring spot disease, Pokkah boeng
<b>28</b>	CoM 11087	Ring spot disease, Mosaic
<b>29</b>	CoN 11073	Ring spot disease, Mosaic
<b>30</b>	CoN 11074	Ring spot, mosaic, Yellow leaf disease
<b>31</b>	Co 86032	Ring spot, Pokkah boeng, Yellow leaf disease
<b>32</b>	Co 99004	Yellow leaf disease, Ring spot disease, Rust
<b>33</b>	Co 09004	Pokkah boeng (severe), Ring spot disease, Mosaic
<b>34</b>	Co 09007	Ring spot disease
<b>35</b>	CoN 09072	Rust (Severe), Ring spot disease

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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, Sugarcane Research Station, Thiruvalla.
Year of start	:	1983-84 (continuing project)
Differential varieties/genotypes	:	Baragua 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
No. of isolates	:	Virulent isolates collected from redroot affected canes of commercially cultivated varieties in the zone.
Method of inoculation	:	Plug method of inoculation to be done. Inoculations with each isolate to be done on all the varieties with freshly prepared spore suspension. All inoculations to be completed in 2 days by last week of August.
Observation	:	One observation at the 60 <sup>th</sup> day of inoculation.

Evaluation : The canes are to be split opened longitudinally along the point of inoculation. This is graded of the international scale of 0-9.

Result :

Eleven new isolates *viz.*, CF91017, CF94012 (G), CFSi6 (Karaikudi), CFSi97021 Pacheri , CF0323 (G), CF09356 Elanganur, CoTl88322 (New isolate - Madhuri), CF0323 (Pettavaithalai), CF09356 Keerangudi & CF92012 Kanjanur along with the designated pathotype for Peninsular zone (CF06) were inoculated and tested for red rot resistance against fourteen differentials by plug method of artificial inoculation. Five differentials (CoSe 95422, CoV 92102, Co 7805, Co 86002 and Co 86032) for inclusion as standard differentials were also multiplied during the year. All the new isolates tested exhibited similar reaction to red rot as that of the standard isolate and hence there is no emergence of new pathotype of red rot pathogen in this zone.

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Pathogenic behavior of isolates of red rot pathogen on a set of 14 differentials by plug method (2013-14)															
S.N	Isolate	Differentials													
		Co 419	Co 975	Co 997	Co 1148	Co 62399	Co 7717	CoC 671	CoJ 64	CoS 767	CoS 8436	BO 91	Baragua	Khakai	SES 594
1.	CF06	S	S	I	I	S	R	S	I	R	R	R	R	R	R
2.	CF91017	S	S	S	R	S	I	S	I	R	R	R	R	I	R
3.	CF94012 (G)	S	I	S	S	S	R	S	S	R	R	R	R	I	R
4.	CFSi6 (Karaikudi)	S	S	S	S	S	I	S	S	R	R	R	R	I	R
5.	CFSi97021 Pacheri	S	S	I	I	S	I	S	I	R	R	R	R	R	R
6.	CF0323 (G)	I	I	I	I	S	R	S	I	R	R	R	R	S	R
7.	CF09356 Elanganur	S	S	S	S	S	S	S	S	I	R	R	R	S	R
8.	CoTl88322 (New isolate)	I	S	I	S	S	I	S	I	R	R	R	R	I	R
9.	CF0323 (Pettavaithalai)	I	S	I	S	S	I	S	S	R	R	R	R	I	R
10	CF09356 Keerangudi	S	I	S	S	S	I	S	I	I	R	R	R	I	R
11	CF92012 Kanjanur	S	I	S	I	S	I	S	S	R	R	R	R	R	R



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1. Project No	:	P.P.22
2. Title:		<b>Survey of sugarcane diseases naturally occurring in the area on important sugarcane varieties.</b>
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	<p>:</p> <p>(1). <b>Red rot:</b> Observed only in few pockets.</p> <p>(2). <b>Pokkah Boeng:</b> Prominently observed with its first appearance during May month. The leaves are found to turn yellow, become twisted, crinkled and the plant appears to be stunted. But the affected plants are found to recover from the infection by the onset of monsoon. The plants are not found turning to top rot infection stage and hence are saved.</p> <p>(3). <b>Foliar diseases</b></p> <p>(a). <b>Ring spot:</b> 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.</p> <p>(b). <b>Rust:</b> Rust disease was observed during August – September months. Uredospores were observed as light orange pustules on leaf lamina during the month of August, 2011. 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.</p> <p>(4) <b>Mosaic:</b> 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.</p> <p>(5) <b>YLD:</b> The disease has been observed in some varieties. Its prominent symptoms started with yellowing of midrib, later resulting in drying up of the leaves from tip downwards. Screening of all varieties for their susceptibility to this disease is being undertaken.</p>
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		Aramanoor and Kidangoor of Kottayam district			
7.	Other diseases a. Pokkah Boeng	Iramalikkara, Pandanadu and Thiruvanmandoor of Alleppey district, Kuttor, Nedumbram, Venpala, Niranam and Thengeli of Pathanamthitta district and Aramanoor and Kidangoor of Kottayam district	Mild	4-6 month	The disease appears during May month and is found to disappear after shower during July- August
	b. Rust	Kuttor, Nedumbram, Venpala, Niranam and Thengeli of Pathanamthitta district, Aramanoor and Kidangoor of Kottayam district and Pandanadu and Thiruvanmandoor of Alleppey 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.
	Red rot	Kuttor, Nedumbram, Venpala, Niranam and Thengeli of Pathanamthitta district, Aramanoor and Kidangoor of Kottayam district and Pandanadu and Thiruvanmandoor of Alleppey district	Mild	-	-