

From

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To

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Memo. No. RRS/K/2014/

Dated:

Sub: Annual Report for AICRP on sugarcane Plant pathology 2013-14 of Uchani centre.

Sir,

Please find enclosed herewith a copy of Annual Report for AICRP on sugarcane Plant Pathology 2013-14 of CCS HAU RRS, Uchani centre. It is for your submission and necessary action, please.

With regards

Yours sincerely

(Rakesh Mehra)

**ALL INDIA COORDINATED RESEARCH PROJECT ON
SUGARCANE (ICAR)**

ANNUAL REPORT (PLANT PATHOLOGY)

20013-14



**CCS HARYANA AGRICULTURAL UNIVERSITY
REGIONAL RESEARCH STATION, UCHANI,
KARNAL-132001**

PP.14: Identification of pathotypes of red rot pathogen

Objective: To gather information on the major pathotypes of red rot pathogen

Year of Start: 1983-84

Location: RRS, Uchani (Karnal)

Technical programme:

A given set of differentials to be inoculated by plug method with different local isolates of red rot pathogen and observations will be recorded on disease development after sixty days.

Results of the current year:

Pathogenic variability in *Colletotrichum falcatum* was studied at CCS Haryana Agricultural University, Regional Research Station, Uchani (Karnal) on fourteen differentials. (Co 419, Co 975, Co 997, Co 1148, Co 7717, Co 62399, CoC 671, CoJ 64, CoS 767, CoS 8436, Bo 91, Baragua, Khakai and SES 594) .All the six designated pathotypes viz. CF 01, CF 02, CF 03, CF 07, CF 08 and CF 09 alongwith four new isolates RR-X (CoS 8436), RR-XI (CoJ 85),RR-XII (CoS 89003) and RR-XIII (CoJ 64) collected from Haryana were used for pathogenic variability. The inoculations were done during last week of August 2013. Red rot observations were recorded 60 days after inoculation and red rot reactions were categorized into three groups viz. resistant (R), susceptible (S) and intermediate (I) based on the various symptomatic parameters as per the technical programme (Table 1). Observations recorded indicate that all the pathotypes/isolates exhibited susceptible/intermediate reaction on Co 997, CoC 671, CoJ 64 and Khakai, whereas resistant reaction on BO 91, SES 594 ,and Baragua. Observations recorded indicate that clones Co 7717, Co 1148, Co 975, Co 419 and Co 62399 exhibited a clear cut differential reaction (S/R). Isolates RR-X showed susceptible reaction on Co 997, CoC 671, CoJ 64, CoS 8436 and Khakai and resistant reaction on other differentials. Isolate RR-XI shows susceptible reaction on Co 419 ,Co975 ,Co 997, Co 1148,Co7717 ,Co 62399, CoC 671,CoJ 64 and Khakai and resistant reaction on other differentials. Isolate RR-XII shows susceptible reaction on Co 997,Co 62399, CoC 671,CoJ 64, CoS 8436 and Khakai and resistant / intermediate reaction on other differentials. Isolate RR-XIII shows susceptible reaction on Co975, Co 997, Co Co7717,Co 62399, CoC 671,CoJ 64 and Khakai and resistant reaction on rest of the differentials . Isolates RR-10, RR-11, RR-12 and RR-13 showed similarity with CF 03,CF 08 and CF 09.

In order to study zonal variability in *C. falcatum*, six pathotypes viz., CF 01, CF 02, CF 03, CF 07, CF 08 and CF 09 along with one isolate RR 14 (CoS 8436) from Ludhiana were evaluated at Uchani, Karnal . Isolate RR 14 shows susceptible reaction on Co 975 , Co 997, Co 1148, CoC 671,CoJ 64, CoS 8436 and Khakai and resistant reaction on rest of the differentials .Results revealed that CF 288 isolate shows similarity with CF 09.

Table-1: Pathogenic behavior of isolates of *Colletotrichum falcatum* on a set of differentials (Uchani)

Sr. No	Pathotypes/ Isolates	Source	Reaction on host differentials													
			Co 419	Co 975	Co 997	Co 1148	Co 7717	Co 62399	CoC 671	CoJ 64	CoS 767	CoS 8436	Bo 91	Baragua	Khakai	SES 594
1	CF 01	Co 1148	I	S	S	S	I	S	S	S	R	R	R	R	S	R
2	CF 02	CoJ 7717	I	R	S	R	S	I	S	R	R	R	R	R	S	R
3	CF 03	CoJ 64	R	R	S	R	R	R	S	S	R	R	R	R	S	R
4	CF 07	CoJ 64	I	R	S	S	R	R	S	S	R	R	R	R	S	R
5	CF 08	CoJ 84	I	S	S	S	S	S	S	S	R	R	R	R	S	R
6	CF 09	CoS 767	R	R	S	S	R	R	S	I	S	R	R	R	S	R
7	RR X	CoS 8436	R	R	S	R	R	R	S	S	R	S	R	R	S	R
8	RR XI	CoJ 85	S	S	S	S	S	S	S	S	R	R	R	R	S	R
9	RR XII	CoS 89003	I	I	S	I	R	S	S	S	R	S	R	R	S	R
9	RR XIII	CoJ 64	R	S	S	R	S	S	S	S	R	R	R	R	S	R
10	RR XIV	CoS 8436	R	S	S	R	I	R	S	S	R	S	R	R	S	R

R = Resistant;

I = Intermediate;

S = Susceptible

PP.17: Evaluation of pre-zonal/IET/zonal varieties/genotypes for resistance to red rot

Objective: To gather information on relative resistance to red rot of the entries in pre-zonal/zonal varietal trials of the respective zones

Year of Start: 1986-87

Location: RRS, Uchani (Karnal)

Technical programme:

Early and mid-late genotypes/varieties to be evaluated against red rot by the plug and nodal cotton swab method of inoculations.

Results of the current year:

Entries of pre-zonal and zonal varietal trials along with standard checks were evaluated for resistance to red rot by plug and nodal cotton swab methods of inoculations at CCS Haryana Agricultural University, Regional Research Station, Uchani (Karnal). Entries of AVT (early and mid late) and IVT (early and mid late) were inoculated with CF 08 and CF 09 separately. Inoculations were carried out during last week of August 2013. Observations on disease development were recorded after 60 days of inoculations and varieties were categorized on 0-9 scale.

AVT (early) Plant-1: Five entries (CoH 09262, CoH 09263 ,CoLk 09202 , CoS 09246, CoPb 09181 and) along with two checks CoJ 64 and CoPant 84211 were evaluated against CF 08 and CF 09. All the five entries *viz.*,CoH 09262, CoH 09263, CoLk 09202, CoS 09246 and CoPb 09181 showed resistant/moderately resistant reaction by plug and resistant reaction by nodal cotton swab methods against CF 08 and CF 09 (Table 2).

AVT (early) Plant II: Three entries (CoPb 08211, Co Pb 08212 and CoS 08233) along with two checks CoJ 64 and CoPant 84211 were evaluated against CF 08 and CF 09 by plug and nodal cotton swab methods against race CF 08 and CF 09. CoPb 08212 entry showed moderately resistant reaction by plug and resistant reaction by nodal cotton swab methods against CF 08 and CF 09. Entries Co Pb 08211 and CoS 08233 were moderately susceptible against CF 08 and moderately resistant against CF 09 by plug method of inoculation but resistant by nodal cotton swab method of inoculation against CF 08 and CF 09 (Table 3). However, checks CoJ 64 and CoPant 84211 showed highly susceptible reaction by plug and nodal cotton swab methods against race CF 08 and CF 09.

AVT (mid late) Plant-I: Five entries (CoH 09022, CoH 09264, CoLK 09204, CoPb 09214 and CoS 09232) along with three checks CoS 767, CoS 8436 and CoPant 97222 were evaluated against pathotypes CF 08 and CF 09. Check CoS 8436 behaved as moderately resistant/resistant with CF 08 and CF 09 pathotypes. However, CoS 767 and Co Pant 97222 showed moderately susceptible/susceptible reaction by plug method and susceptible reaction by nodal cotton swab method. Entries *viz.*, CoH 09022, CoH 09264 and CoS 09232 showed resistant/ moderately resistant reaction by plug and resistant reaction by nodal cotton swab methods against CF 08 and CF 09 (Table 4). CoPb 09214 and CoLK 09204 entries showed moderately susceptible reaction by CF 08 and moderately resistant by CF 09 with plug method but resistant reaction by nodal cotton swab method of inoculation by CF 08 and CF 09 pathotypes.

AVT (mid late) Plant-II: Six entries of mid late plant-II *viz.*, CoH 08262, CoH 08263, CoH 08264, CoPb 08217, CoS 08234 and CoS 08235 along with three checks (CoS 767, CoS 8436 and CoPant 97222) were evaluated by plug and nodal cotton swab method against CF 08 and CF 09 (Table 5). All the entries *viz.*, Co 07028, CoH 08262 CoH 08263 CoH 08264, CoPb 08217, CoS 08234 and CoS 08235 showed resistant/ moderately resistant reaction by plug and resistant reaction by nodal cotton swab methods against CF 08 and CF 09. Check CoS 8436 showed moderately resistant/ resistant reaction by CF 08 and CF 09 pathotypes. However, CoS 767 and Co Pant 97222 showed moderately susceptible/susceptible reaction by plug method and susceptible reaction by nodal cotton swab method.

IVT (early): Three genotypes (Co 10035, CoH 10261 and CoS 10231) along with two standards *viz.* CoJ 64 and CoPant 84211 were evaluated against CF 08 and CF 09 by plug and nodal cotton swab method of inoculation (Table 6). Genotypes CoH10261 and CoS 10039 were moderately resistant by plug and resistant by nodal cotton swab methods against CF 08 and CF 09 pathotypes . Entry Co 10035 was found moderately susceptible to CF 08 and moderately resistant to CF 09 by plug but resistant to both CF 08 and CF 09 by nodal cotton swab method of inoculations. Two standards CoJ 64 and CoPant 84211 behaved highly susceptible/susceptible by both plug and nodal cotton swab methods of inoculation with CF 08 and CF 09.

IVT (mid late): Ten entries (Co 10036, Co 10037, Co 10039, CoH 10262, CoH 10263, CoPb 10181, CoPb 10182, CoPb 10283, CoPb 10211 and CoPt 10221) including three checks *viz.*, CoS 8436, CoS 767 and Co Pant 97222 were evaluated against CF 08 and CF 09

by plug and nodal cotton swab methods of inoculation. Entries *viz.*, showed resistant/moderately resistant reaction by plug method and resistant reaction by nodal cotton swab methods of inoculations to both CF 08 and CF 09 pathotypes (Table-7). Entries, and behaved moderately susceptible against CF 08 and moderately resistant against CF 09 by plug method and resistant reaction by cotton swab methods against both CF 08 and CF 09 pathotypes. Entry showed susceptible reaction against CF 08 and moderately susceptible by CF 09 by plug method but resistant reaction by nodal cotton swab method against both CF 08 and CF 09 pathotypes. Check CoS 767 shows moderately susceptible/susceptible reaction by plug method and susceptible reaction by nodal cotton swab method. However, CoPant 97222 showed moderately susceptible/ susceptible reaction by plug method and susceptible reaction by nodal cotton swab method to CF 08 and CF 09 pathotypes.

Table-2: Reaction of genotypes of A V T (early) Plant I against red rot

Sr. No.	Genotype/Variety	Plug method		Nodal cotton swab method	
		CF 08	CF 09	CF 08	CF 09
1.	CoH 09262	MR	R	R	R
2.	CoH 09263	R	R	R	R
3.	CoLk 09202	MR	R	R	R
4.	CoS 09246	MR	MR	R	R
5.	CoPb 09181	MR	MR	R	R
6.	CoJ 64	HS	HS	S	S
7	CoPant 84211	S	HS	S	S

Table-3: Reaction of genotypes of A V T (early) Plant II against red rot

Sr. No.	Genotype/Variety	Plug method		Nodal cotton swab method	
		CF 08	CF 09	CF 08	CF 09
1.	CoPb 08211	MS	MR	R	R
2.	CoPb 08212	MR	MR	R	R
3.	CoS 08233	MS	MR	R	R
4.	CoJ 64	HS	HS	S	S
5.	CoPant 84211	S	HS	S	S

Table-4: Reaction of genotypes of AVT (mid late) Plant I against red rot

Sr. No.	Genotype/Variety	Plug method		Nodal cotton swab method	
		CF 08	CF 09	CF 08	CF 09
1.	Co 09022	MR	R	R	R
2.	CoH 09264	R	R	R	R
3.	Colk 09204	MS	MR	R	R
4.	CoPb 09214	MS	MR	R	R
5.	CoS 09232	MR	MR	R	R
6.	CoS 767	MS	S	S	S
7.	CoS 8436	MR	MR	R	R
8.	Co Pant 97222	S	MS	S	S

Table-5: Reaction of genotypes of AVT (mid late) Plant II against red rot

Sr. No.	Genotype/Variety	Plug method		Nodal cotton swab method	
		CF 08	CF 09	CF 08	CF 09
1.	CoH 08262	R	MR	R	R
2.	CoH 08263	R	R	R	R
3.	CoH 08264	R	R	R	R
4.	CoPb 08217	MR	MR	R	R
5.	CoS 08234	MR	MR	R	R
6.	CoS 08235	MR	MR	R	R
7.	CoS 767	MS	S	S	S
8.	CoS 8436	MR	MR	R	R
9.	CoPant 97222	S	MS	S	S

Table-6: Reaction of genotypes of IVT early against red rot

Sr. No.	Genotype/Variety	Plug method		Nodal cotton swab method	
		CF 08	CF 09	CF 08	CF 09
1.	Co 10035	MS	MR	R	R
2.	CoH 10261	MR	MR	R	R
3.	CoS 10231	MR	MR	R	R
5.	CoJ 64	S	S	S	S
6	Co Pant 84211	S	HS	S	S

Table-7: Reaction of genotypes of IVT mid late against red rot

Sr. No.	Genotypes/ Variety	Plug method		Nodal cotton swab method	
		CF 08	CF 09	CF 08	CF 09
1.	Co 10036	MS	MR	R	R
2.	Co 10037	MR	MR	R	R
3.	Co 10039	MR	MR	R	R
4.	CoH 10262	MR	R	R	R
5.	CoH 10263	S	MS	S	S
6.	CoH 10181	MR	MR	R	R
7.	CoPb10282	MR	MR	R	R
8.	CoPb10283	MS	MR	R	R
9	CoPb 10211	MS	MR	R	R
10	CoPt 10221	MR	MR	R	R
11.	CoS 767	MS	S	S	S
12.	CoS 8436	MR	MR	R	R
13.	Co Pant 97222	S	MS	S	S

Date of Inoculation: 28.08.2013

Date of Observation: 28.10.2013

0-2 : R (Resistant)
2.1-4 : MR (Moderately Resistant)
4.1-6 : MS (Moderately Susceptible)
6.1-8 : S (Susceptible)
>8 : HS (Highly Susceptible)

PP-22: Survey of sugarcane diseases naturally occurring in the mill area on important sugarcane varieties

Objective: To gather information on diseases naturally occurring in the mill area on important sugarcane varieties

Year of Start: 1989-90

Location: Different mill zone areas of Haryana.

Results of current year:

Survey was conducted in various mill zones areas of different co- operative and pvt sugar mills of Haryana state during pre and post monsoon seasons for sugarcane diseases (Table 8).

Red rot: Red rot was observed on plant and ratoon crop of varieties like CoS 8436 in sugar mill zone areas of Shahabad, Karnal, Kaithal, Asandh and Badshu during both pre and post monsoon ranging from traces to 45 %. Red rot was also observed in CoS 8436 and CoJ 85 in Yamunanagar sugar mill area. Red rot was noticed on CoH 156 in Karnal and Jind sugar mill zone areas.

Top rot: Top rot was observed on varieties CoJ 85, CoH 152, CoS 8436, CoH 133 and Co 0238 in Shahabad, Kaithal, Jind and Karnal sugar mill zone areas ranging from traces to 20 %. Top rot was also observed on varieties CoJ 85, CoS 8436 and Co 0238 in Yamunanager sugar mill zone areas.

Wilt: Wilt was noticed in varieties namely CoS 8436, Co 7717, Co 767, Co 1148, CoJ 64 ,CoH 156 and CoH 119 in Palwal Sugar mill, Karnal sugar mill and Gohana sugar mill zone areas ranging from traces to 5% The incidence of wilt in association with red rot and root borer was also observed in Karnal and Rohtak sugar mill zone areas.

Smut: Smut incidence ranging from traces to 10 % was observed on varieties Co 89003, Co 0238 and CoH 119 in Shahabad, Karnal, Panipat and Rohtak sugar mill zone areas.

Grassy Shoot Diseases: GSD was observed in traces in most of the sugar mill zone areas of Haryana on varieties which includes CoS 8436, CoH 152, CoS 767 and Co 89003. GSD was also observed on Co 118, Co237, Co238, Co 50011, Co 241, CoS 767, Co H 128, CoH 160, CoS 8436 in Yamunanager sugar mill area and on CoS 8436 and Co 238 in Karnal sugar mill zone area.

Pokkha boeng: Pokkha boeng (traces to 8 %) appeared on most of the varieties in Haryana. Varieties viz.,CoS 8436, CoH 151, CoH 119, Co 238 and CoH 152 in Shahabad, Kaithal, Panipat, Gohana and Karnal sugar mill zone areas were infected by pokkha boeng . Disease

also appeared on varieties CoJ 85, CoS 8436, Co238, CoH 118 and CoS 88230 in Yamunanagar sugar mill zone area.

YLD: Yellow leaf disease was noticed in traces on varieties viz., Co 84212, CoS 8436, Co 89003, CoH 119 and CoJ 64 in Shahabad sugar mill ,Panipat sugar mill and Rohtak sugar mill zone areas.

Table 8: Survey of sugarcane disease naturally occurring in the Haryana State on important sugarcane varieties

Name of disease	Location	Disease incidence	Varieties affected	Crop stage when observed
Red rot	Shahabad, Karnal, Kaithal, Asandh, Bhadsu ,Yamunanagar and Jind	Traces to 45%	CoS 8436, CoJ 85, CoH 156	3-7 months
Top rot	Shahabad, Kaithal, Karnal,Jind andYamunanagar	Traces to 20%	CoH 152, CoS 8436 CoJ 85 and CoH 133 and Co 0238	5-6 months
Wilt	Palwal, Gohana, Karnal Rohtak and Shahabad	Traces to 5%	Co 7717, Co 767, Co 1148, CoJ 64 CoS 8436,CoH 119	7 months
Smut	Shahabad, Karnal, Rohtak and Panipat	Traces to10%	Co 89003, Co 238, CoH 119	3 months
Grassy shoot disease (GSD)	All sugar mills zone area	Traces	CoS 8436, CoH 152, CoS 767 and Co 89003 Co 118, Co237,, Co238,Co 50011, Co 241, CoS 767,CoH 128, CoH 160 and CoS 8436	5-6 months
Pokkha boeng	Shahabad, Kaithal, Gohana,Panipat, Rohtak ,Yamunanagar and Karnal	Traces to 8%	CoS 8436, CoH 151, CoH 119, CoH152, CoJ 85, Co 238, and Co H 118,	4-5 months
YLD	Shahabad , Panipat and Rohtak	Traces	Co 84212, CoS 8436, Co 89003,CoH 119 and CoJ 64	5-7 months

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

Objective: To gather information on the *Saccharum* spp and elite genotypes for resistance to red rot so that the resistant genotypes could be used in breeding programme as possible donors for resistance.

Location: RRS, Uchani (Karnal).

Results of current year:

Clones *viz.* IA 31-32, F1108, IA 30-17, IA 31-35, B 44-167, IA 30-14, Q-65, Q-45 and 57 NG 131 were evaluated for resistance to red rot by plug method of inoculation using CF 08. The clones namely IA 31-32, F1108, IA 30-17, and IA 31-35 were found resistant/moderately resistant whereas, genotypes B 44-167, IA 30-14, Q-65, Q-45 and 57 NG 131 showed susceptible/high susceptible reaction against red rot pathotype CF 08.

PP31: Epidemiology, varietal screening and management of *pokkha boeng* (AICRP)

Objective: To study epidemiology and management of *pokkha boeng* disease

Year of start: 2011-12

Location: Karnal

Result of current year:

Incidence of *pokkha boeng* disease was noticed in second week of June at Uchani, Karnal. Initial symptoms showed curling and twisting of spindles leaves, whitish and chlorotic yellow leaves. Malformed or twisted top symptoms develop during rainy season period. At later stage yellowing of foliage, wilting and reddening of spindles also noticed. *pokkha boeng* incidence starts appearing after rainfall with high humidity. Incidence on important varieties *viz.*, CoS 8436 (13%), CoS 0238(22%),CoH 119(7 %) and CoH 133 (19%) was observed during first to last week of July.

Twenty three varieties of sugarcane were screened against *pokkha boeng* disease under natural conditions. Co 0238 variety showed highly susceptible reaction.Varieties namely CoH 110, CoH 156, CoH 152, CoS 8436, CoH 151, and CoH 133 were found susceptible to *pokkha boeng* disease. Varieties CoH 119,Co H 118,Co 1148 CoH 56, , CoH 128 Co 7717, Co 0237, CoJ 64 and CoJ 85 were found moderately susceptible to *pokkha boeng* disease.Varieties namely CoH 92, CoH 160, CoJ 85 CoH 167, CoH 150, CoH 99 and CoH 56 were found resistant to *pokkha boeng* disease .

Table 8: Reaction of sugarcane clones for resistance to Pokkha boeng

Sr.No.	Genotype	Totat incidence(%)	Disease reaction
1.	CoH 110	18	S
2.	CoH 152,	13	S
3.	CoH 156	13	S
4.	CoH 151	12	S
5.	CoH 119	7	MS
6.	Co H 118	6	MS
7.	CoH 133	19	S
8.	CoH 128	9	MS
9.	CoH 92	0	R
10.	CoH 160	4	R
11.	CoH 56	8	MS
12.	Co 1148	9	MS
13.	CoS 8436	13	S
14.	Co 7717	8	MS
15.	Co 0238	22	HS
16.	Co 0237	8	MS
17.	CoJ 85	7	MS
18.	CoH 167	4	R
19.	CoH 164	3	R
20.	CoS 767	0	R
21.	CoJ 64	6	MS
22.	CoH 150	0	R
23.	CoH 99	0	R