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To

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Memo. No. RRS/K/2013/ Dated:

Sub: Annual Report for AICRP on sugarcane Plant pathology 2012-13 of Uchani centre.

Sir,

Please find enclosed herewith a copy of Annual Report for AICRP on sugarcane Plant Pathology 2012-13 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)

20012-13

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 to 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. All the six designated pathotypes viz. Cf 01, Cf 02, Cf 03, Cf 07, Cf 08 and Cf 09 alongwith four new isolates RR-VII (CoS 8436), RR-VII (CoJ 85) and RR-IX (CoJ 64) collected from Haryana were used for pathogenic variability. The inoculations were done during last week of August 2012. 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 CoJ 64, Khakai, Co 997 and CoC 671 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-VII showed susceptible reaction on Co 997,CoC 671,CoJ 64, CoS 8436 and Khakai and resistant reaction on other differentials Isolate RR-VIII shows susceptible reaction on ,Co975 ,Co 997 Co 1148,Co7717 ,Co 62399, CoC 671,CoJ 64 and Khakai and resistant reaction on rest of the differentials. Isolate RR-IX shows susceptible reaction on Co975 ,Co 997,Co7717 ,Co 62399, CoC 671,CoJ 64 and Khakai and resistant reaction on rest of the differentials .Isolates RR-VII , RR-VIII and RR-IX showed similarity with Cf 03 and Cf 08.

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 Cf 288 (CoS 8436) from Ludhiana were evaluated at Uchani, Karnal . Isolate Cf 288 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 behaviour 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	I	S	S	I	S	S	I	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	R	R	R	R	S	R
7	**RR-VII**	**CoS 8436**	R	R	S	R	R	R	S	S	R	S	R	R	S	R
8	**RR-VIII**	**CoJ 85**	S	S	S	S	S	S	S	S	R	R	R	R	S	R
9	**RR-IX**	**CoJ 64**	R	S	S	R	S	S	S	S	R	R	R	R	S	R
10	**CF 288**	**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 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 cotton swab methods of inoculations at CCS Haryana Agricultural University Regional Research Station, Uchani (Karnal). Entries 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 2012. Observations on disease development were recorded after 60 days of inoculations and varieties were categorized on 0-9 scale.

AVT (early) Plant-1: Three entries (CoPb 08211, CoPb 08212, CoS 08233) along with two checks CoJ 64 and CoPant 84211 were evaluated against Cf 08 and Cf 09. Checks CoJ 64 and CoPant 84211 behaved as susceptible/highly susceptible by plug and cotton swab methods against race Cf 08 and Cf 09. Entries viz.,CoPb 08211, CoPb 08212 and CoS 08233 were moderately resistant by plug and resistant by cotton swab methods of inoculation against Cf 08 and Cf 09 (Table 2).

AVT (early) Plant II: Five entries (Co 06032, Co 07023, Co 7025, COH 07261 and CoLk 07201) along with two checks CoJ 64 and CoPant 84211 were evaluated against Cf 08 and Cf 09. Checks CoJ 64 and Co Pant 84211 behaved as susceptible/highly susceptible by plug and cotton swab methods against race Cf 08 and Cf 09. Entries Co 06032, Co 07023, CoH 07261 and CoLk 07201 were moderately resistant / resistant by plug and resistant by cotton swab methods of inoculation against Cf08 and Cf 09 (Table 3). However, entry Co 07025 was moderately susceptible by Cf 08 and moderately resistant by Cf 09 with plug method and resistant by cotton swab method by both the races

AVT (mid late) Plant-1: Six entries along with three checks CoS 767, CoS 8436and 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 cotton swab method. Entries viz. CoH 08262,CoH 08263 CoH 08264, CoPb 08217 CoS 08234 and CoS 08235 showed resistant/moderately resistant reaction by plug and resistant reaction by cotton swab methods against Cf 08 and Cf 09 (Table 4).

AVT (mid late) Plant-II: Nine entries of mid late plant-II viz. Co-07028, CoH 07263, CoH 07264, CoLk 07202, CoLk 07203, CoPb 07212, CoPb 07213, CoS 07232 and CoS 07234 along with three cheeks (CoS 767, CoS 8436 and CoPant 97222) were evaluated by plug and cotton swab method against Cf 08 and Cf 09 (Table 5).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 cotton swab method. Entries viz. Co 07028, CoH 07263, CoPant 07264, CoLk 07202, CoPb 07212, CoS 07232 and CoS 0732 showed resistant/moderately resistant reaction by plug and cotton swab methods against Cf 08 and Cf 09 (Table 5). Entries CoLk 07203 and CoPb 07213 showed moderately susceptible reaction against Cf 08 and moderately resistant reaction against Cf 09 by plug method but entry CoPb 07213 exhibits susceptible reaction against Cf 08 and resistant reaction against Cf 09 by cotton swab method. However, CoPb 07213 showed resistant reaction against both Cf 08 and Cf 09 by cotton swab method

IVT (early): Twelve genotypes along with two standards viz. CoJ 64 and CoPant 84211 were evaluated against Cf 08 and Cf 09 by plug and cotton swab method of inoculation (Table 6). Ten genotypes namely Co 09020, CoH 09262, CoH 09263, CoLk 09201, CoLk 09202, CoLk 09203, CoPb 09181, CoPb 09212, CoPb 09213 and CoS 09246 were found resistant and moderately resistant to both Cf 08 and Cf 09 pathotypes with plug and cotton swab methods of inoculations. Entry CoPb 09211 was found susceptible to Cf 08 by plug and cotton swab methods but moderately susceptible by plug and resistant by cotton swab methods against Cf 09. Similarly genotype CoH 09621 showed moderately susceptible reaction by plug method and resistant by cotton swab methods against Cf 08 and Cf 09. Two standards CoJ 64 and CoPant 84211 behaved highly susceptible/susceptible by both plug and cotton swab methods of inoculation with Cf 08 and Cf 09.

IVT (mid late): Eight entries including three checks viz. CoS 8436, CoS 767 and Co Pant 97222 were evaluated against Cf 08 and Cf 09 by plug and cotton swab methods of inoculation. Entries viz., Co 09022, CoH 09264, CoLk 09204, CoS 09231, Cos 09232, CoS 09240 and check CoS 8436 showed resistant/moderately resistant reaction by plug and cotton swab methods against Cf 08 and Cf 09 (Table-7). Entries Co 09021 and CoPb 09214 behaved moderately susceptible against Cf 08 and resistant/moderately resistant against Cf 09 by plug method and resistant reaction by cotton swab methods against both Cf 08 and Cf 09 pathotypes. Check CoS 767 shows moderately susceptible/susceptible reaction by plug method and susceptible reaction by cotton swab method. However, CoPant 97222 showed moderately susceptible/ susceptible reaction by plug method and susceptible reaction by cotton swab method to Cf 08 and Cf 09.

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

Sr. No.	Genotype/Variety	Plug method		Cotton Swab method	
		Cf 08	Cf 09	Cf 08	Cf 09
1.	CoPb 08211	MR	MR	R	R
2.	CoPb 08212	MR	MR	R	R
3.	CoS 08233	MR	MR	R	R
4.	CoJ 64	HS	HS	S	S
5.	Co Pant 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		Cotton swab method	
		Cf 08	Cf 09	Cf 08	Cf 09
1.	Co 06032	MR	MR	R	R
2.	Co 07023	MR	MR	R	R
3.	Co 07025	MS	MR	R	R
4.	CoH 07261	R	R	R	R
5.	CoLk 07201	R	R	R	R
6.	CoJ 64	HS	HS	S	S
7	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		Cotton swab method	
		Cf 08	Cf 09	Cf 08	Cf 09
1.	CoH 08262	MR	MR	R	R
2.	CoH 08263	MR	MR	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.	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		Cotton swab method	
		Cf 08	Cf 09	Cf 08	Cf 09
1	Co 07028	MR	R	R	R
2	CoH 07263	R	R	R	R
3	CoH 07264	R	R	R	R
4	CoLk 07202	MR	MR	R	R
5	CoLk 07203	MS	MR	S	R
6	CoPb 07212	MR	MR	R	R
7	CoPb 07213	MS	MR	R	R
8	CoS 07232	MR	MR	R	R
9	CoS 07234	MR	MR	R	R
10	CoS 767	MS	S	S	S
11	CoS 8436	MR	MR	R	R
12	CoPant 97222	S	MS	S	S

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

Sr. No.	Genotype/Variety	Plug method		Cotton swab method	
		Cf 08	Cf 09	Cf 08	Cf 09
1.	Co 09020	R	R	R	R
2.	CoH 09261	MS	MR	R	R
3.	CoH 09262	R	R	R	R
4.	CoH 09263	R	R	R	R
5.	CoLK 09201	R	R	R	R
6.	CoLK 09202	R	R	R	R
7.	CoLK 09203	MR	MR	R	R
8.	CoPb 09181	MR	R	R	R
9.	CoPb 09211	S	MS	S	R
10.	CoPb 09212	R	R	R	R
11.	CoPb 09213	MR	MR	R	R
12.	CoS 09246	MR	MR	R	R
13.	CoJ 64	HS	HS	S	S
14.	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		Cotton swab method	
		Cf 08	Cf 09	Cf 08	Cf 09
1.	Co 09021	MS	R	R	R
2.	Co 09022	R	R	R	R
3.	CoH 09264	R	R	R	R
4.	CoLK 09204	MR	MR	R	R
5.	CoPb 09214	MS	MR	R	R
6.	CoS 09231	MR	R	R	R
7.	CoS 09232	R	R	R	R
8.	CoS 09240	MR	MR	R	R
9.	CoS 767	MS	S	S	S
10.	CoS 8436	MR	MR	R	R
11.	Co Pant 97222	S	MS	S	S

Date of Inoculation: 27.08.2012
Date of Observation: 27.10.2012

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 ratoon and plant crop of recommended varieties like CoS 8436 in Sugar Mill zone areas of Shahabad, Karnal, Kaithal, Asandh and Badshu during both pre and post monsoon seasons

Top Rot: Top rot disease was also observed on variety CoH 152, CoS 8436 and Co 0238 in Shahabad,Kaithal ,Jind and Karnal Sugar Mill zone areas.

Wilt: Wilt was also noticed in varieties Co 7717, Co 767, Co 1148, CoJ 64 and CoH 119 in Palwal Sugar Mill and Gohana Sugar Mill zone areas. 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 was observed in 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 most of the sugar mill zone areas of Haryana on varieties which includes CoS 8436, CoH 152, CoS 767 and Co 89003.

Pokka Boeng: Pokka boeng also appeared on varieties CoS 8436, CoH 151, CoH 119 and CoH 152 in Shahabad, Kaithal, Panipat, Gohana, Rohtak and Karnal sugar mill zone areas.

YLD: Yellow leaf disease was noticed on varieties Co 84212, CoS 8436, Co 89003, CoH 119 and CoJ 64 in Shahabad 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	Traces to 20%	CoS 8436, CoJ 64, CoJ 85	4 months
Top rot	Shahabad, Kaithal, Karnal,Jind	Traces to 25%	CoH 152, CoS 8436 and Co 0238	5-6 months
Wilt	Palwal, Gohana, Karnal Rohtak and Shahabad	Traces	Co 7717, Co 767, Co 1148, CoJ 64 and CoS 8436,CoH 119	7-8 months
Smut	Shahabad, Karnal and Rohtak, 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	5-6 months
Pokkah Boeng	Shahabad, Kaithal, Gohana,Panipat, Rohtak and Karnal	Traces to 5%	CoS 8436, CoH 151, CoH 119, CoH 152	5 months
YLD	Shahabad and Rohtak	Traces	Co 84212, CoS 8436, Co 89003,CoH 119 and CoJ 64	5-6 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 doners 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 noticed in first week of June at Uchani ,Karnal. Initial symptoms showed curling and twisting of spindles leaves, whitish and chloratic yellow leaves. At later stage yellowing of foliage, wilting and reddening of spindles also noticed. Incidence was recorded on CoS 8436 (5-15%),CoS 0238(5-25%) and CoH 133 (15-25%) during first to second week of July.

Thirty varieties of sugarcane were screened against *pokkha boeng* disease under natural conditions .Varieties namely CoH 110, CoH 156, CoH 152, CoS 8436, Co 7717, CoS 0238, CoJ 85 and CoH 133 were found susceptible to *pokkha boeng* disease. Varieties Co 0118, Co 1148, CoH 150, CoH 128, CoH 119, CoH 92, CoH 160, CoH 56 were found resistant to *pokkha boeng* disease