

**Department of Plant Pathology: College of Agriculture
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Professor & P.I.
Sugarcane Pathology

No. CA/PLP/RK/.....
Dated...01-06-2016

To,
Dr. R. Viswanathan
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Plant Pathology (AICRP on Sugarcane)
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Sub: Annual Report of AICRP on Sugarcane (Plant Pathology) for the year 2015-16

Sir

Please find enclosed herewith the Annual Report of AICRP on Sugarcane (Pathology) for the year 2015-16 for further necessary action at your end.

Yours sincerely,

(R.K.Sahu)

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Annual Report (2015-2016)

AICRP ON SUGARCANE PATHOLOGY



**Department of Plant Pathology: College of Agriculture
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Annual Report-2015-2016

AICRP ON SUGARCANE PATHOLOGY

Pantnagar

During 2014 crop season, 42 genotypes and 7 checks were screened and evaluated for red rot and smut under natural as well as artificial inoculation condition. These genotypes were planted in one replication in two rows of 6 mt. for red-rot and in two replications with 3.0 mts row for smut evaluation. However, row to row distance of 75 cm was maintained for both the experiments. Planting was done on 13-03-2015 in D-6 block of N.E. Borlough Crop Research Centre, Pantnagar. All recommended agronomical practices were followed to raise and maintain a good crop stand.

Inoculation:

Artificial inoculations for both the diseases were carried out as per technical programme for **PP-17**. For red rot, two pathotypes of *Colletotrichum falcatum*, **Cf-08** and **Cf-09** were obtained from IISR Lucknow. Pure cultures were grown on oatmeal agar medium and incubated at $28 \pm 1^{\circ}\text{C}$. Freshly sporulated 7 days old cultures were taken from petridishes and the spore mass was washed with 100 ml sterilized distilled water and collected in flasks. Conidial suspension at a spore concentration of one million spores (approximately) per ml was prepared and used for artificial inoculations. Artificial inoculations by **nodal cotton swab method** were carried out on 20th August, 2015, and by **plug method** on 22-24 August, 2015. First row was inoculated with Cf-08 and second with Cf-09 pathotype. Two canes in each of 20 clumps were inoculated. Inoculations were done in the middle of 3rd exposed internode from the bottom and two drops of the spore suspension was injected with a syringe in each cane and sealed with plastic clay whereas in cotton swab method two canes each in 20 clumps were inoculated by placing the cotton swab, dipped in freshly prepared inoculum around the cane covering the nodal region after removing the lower most green leaf sheath.

Artificial inoculations for smut were done by steeping three bud setts for 30 minutes in a spore suspension of over 90% viability and a spore load of one million spores per ml just before planting. Smut infected whips, for the purpose, were

collected from the field and air dried by keeping under shade and stored in desiccators having anhydrous calcium chloride in the base of desiccators.

Results:

PP17 (A) Red rot

In plug method, observations on disease severity were recorded following 0-9 rating scale after 60 days of inoculations. Ten randomly selected plants of a plot were split open longitudinally along the point of inoculation and rated individually for both pathotypes by observing condition of top, lesion width, presence of white spots and nodal transgression. In cotton swab method, presence / absence of lesions underneath the cotton swab was considered for assigning the disease reactions. Disease reactions have been indicated as R for resistant and S for susceptible genotypes.

Data on disease reaction are being presented in **Table 1**. In nodal cotton swab method, 5 genotypes showed susceptible reaction whereas remaining had resistant reactions for both pathotypes. In plug method, 17 genotypes were found resistant, 12 moderately resistant and 9 moderately susceptible, 3 susceptible and one highly susceptible. Identical reactions were recorded for both the pathotypes.

Table 1: Performance of sugarcane genotypes against Red-rot (2015-16)

S. No.	Genotypes	Plug		Nodal Cotton Swab	
		Cf-08	Cf-09	Cf-08	Cf-09
	IVT (Early)				
1.	CoLk 12202	S	S	S	S
2.	CoLk 12203	MS	MS	R	R
3.	Co 12026	MR	MR	R	R
4.	CoPant 12222	MS	MS	S	S
5.	Co 12207	MR	MR	R	R
6.	CoLk 12201	MS	MS	R	R
7.	CoPant 12221	R	R	R	R
8.	CoLk 12204	R	R	R	R
9.	CoH 12261	MS	MS	R	R
10.	CoS 12231	MR	MR	R	R
	AVT(Early) I				
1.	CoLk 11202	MR	MR	R	R
2.	CoLk 11201	S	S	S	S
3.	CoLk 11203	R	R	R	R
4.	CoH 11262	HS	HS	S	S
	AVT(Early) II				

1.	CoH 10261	R	R	R	R
2.	Co 10035	R	R	R	R
3.	CoS 10231	MR	MR	R	R
	IVT (ML)				
1.	CoPant 12223	MS	MS	S	S
2.	CoPant 12224	MR	MR	R	R
3.	CoPb12212	MR	MR	R	R
4.	CoS 12232	MR	MR	R	R
5.	CoPb 12182	MR	MR	R	R
6.	CoH 12262	MR	MR	R	R
7.	Co 12029	R	R	R	R
8.	CoH 12263	R	R	R	R
9.	Co 12028	R	R	R	R
10.	CoPb 12211	MR	MR	R	R
11.	CoPant 12226	MR	MR	R	R
12.	CoPb 12181	MS	MS	R	R
13.	CoLk 12206	R	R	R	R
14.	CoLk 12205	R	R	R	R
15.	CoPant 12225	R	R	R	R
	AVT(ML) I				
1.	CoPb 11214	R	R	R	R
2.	CoS 11232	R	R	R	R
3.	CoLk 11204	R	R	R	R
4.	CoH 11263	S	S	S	S
5.	CoLk 11206	MS	MS	R	R
	AVT(ML) II				
1.	CoPb 10182	MS	MS	R	R
2.	CoH 10262	R	R	R	R
3.	CoPant 10221	R	R	R	R
4.	CoPb 10181	R	R	R	R
5.	Co 10036	MS	MS	R	R
	Checks				
1.	CoJ-64	S	S	S	S
2.	CoPant-84211	MS	MS	S	S
3.	CoS-767	HS	HS	S	S
4.	CoS-8436	S	S	S	S
5.	Co-1148	MS	MS	S	S
6.	CoSe 95422	MR	MR	R	R
7.	CoPant 97222	MR	MR	R	R

0.0-2.0 R

2.1-4.0 MR

4.1-6.0 MS

6.1-8.0 S

Above 8.0 HS

PP17 (B) Smut

Incidence of smut was recorded by counting infected clumps per row at fortnightly intervals starting from 45 days after planting. Results are given in Table 2. Out of 42 genotypes 13 genotypes were found resistant, 10 moderately resistant. Remaining genotypes showed various degrees of susceptibility with 11 moderately susceptible, 7 susceptible and 1 highly susceptible. Maximum disease incidence (50.0%) was recorded in CoLk 12203 followed by CoS 12232 (28.5%) and CoLk 11203 (26.6%).

Table 2: Performance of sugarcane genotypes against Smut (2015-16)

S. No.	Genotypes	Reaction	Infected clumps %
	IVT (Early)		
1.	CoPant 12221	MR	10.0
2.	CoLk 12202	MR	7.6
3.	CoS 12231	MS	20.0
4.	CoPant 12222	R	0.0
5.	CoLk 12203	HS	50.0
6.	CoLk 12204	R	0.0
7.	Co 12026	MS	13.3
8.	Co 12027	MS	20.0
9.	CoH 12261	MS	11.1
10.	CoLk 12201	R	0.0
	AVT(Early) I		
1.	CoLk 11262	R	0.0
2.	CoLk 11203	S	26.6
3.	CoLk 11202	R	0.0
4.	CoLk 11201	R	0.0
	AVT(Early) II		
1.	CoH 10261	R	0.0
2.	Co 10035	S	26.3
3.	Co 10231	MS	16.6
	IVT (ML)		
1.	CoPb 12211	MR	9.5
2.	CoLk 12206	MS	15.7
3.	CoPb 12182	MR	5.8
4.	CoPant 12225	MS	11.7
5.	CoPant 12223	MS	14.2
6.	CoPant 12224	MS	12.5
7.	CoLk 12205	S	26.0
8.	CoPant 12226	R	0.0
9.	CoPb 12212	MR	5.0
10.	CoH 12262	R	0.0
11.	CoPb 12181	S	25.0
12.	CoH 12263	MR	9.0

13.	CoS 12232	S	28.5
14.	Co 12029	MR	5.5
15.	Co 12028	S	23.0
	AVT(ML) I		
1.	CoS 11232	R	0.0
2.	CoPb 11214	MS	12.5
3.	CoLk 11204	MR	8.6
4.	CoH 11263	MS	11.1
5.	CoLk 11206	MR	7.4
	AVT (ML) II		
1.	CoH 10262	S	22.2
2.	Co 10036	MR	7.1
3.	CoPb 10181	R	0.0
4.	CoPb 10182	R	0.0
5.	CoPant 10221	R	0.0
	Checks		
1.	CoJ 64	MS	14.2
2.	CoPant 84211	MS	11.7
3.	CoS 767	S	26.3
4.	CoS 8436	MS	12.5
5.	Co 1148	MS	12.5
6.	Co 1158 (Pusa)	R	0.0
7.	Co 1158 (LKO)	R	0.0

R= Resistant (0%)

MR= Moderately Resistant > 0-10%

MS= Moderately Susceptible > 10-20%

S= Susceptible > 20-30%

HS= Highly Susceptible above 30%

PP 17(D): YLD

Performance of YLD was assessed under natural conditions. Disease reactions are being presented in **Table 3**. Out of 42 genotypes, 22 were found resistant, 14 moderately resistant 5 moderately susceptible and 1 susceptible.

Table 3: Performance of sugarcane genotypes against YLD (2015-16)

S.No.	Genotypes	YLD
	IVT (Early)	
1.	CoLk 12202	R
2.	CoLk 12203	R
3.	Co 12026	R
4.	CoPant 12222	MS
5.	Co 12207	S
6.	CoLk 12201	MR
7.	CoPant 12221	MR

8.	CoLk 12204	MR
9.	CoH 12261	R
10.	CoS 12231	R
	AVT(Early) I	
1.	CoLk 11202	R
2.	CoLk 11201	R
3.	CoLk 11203	R
4.	CoH 11262	MR
	AVT(Early) II	
1.	CoH 11261	MS
2.	Co 10035	MS
3.	CoS 10231	MR
	IVT (ML)	
1.	CoPant 12223	R
2.	CoPant 12224	MR
3.	CoPb12212	R
4.	CoS 12232	MR
5.	CoPb 12182	MR
6.	CoH 12262	R
7.	Co 12029	R
8.	CoH 12263	R
9.	Co 12028	R
10.	CoPb 12211	R
11.	CoPant 12226	R
12.	CoPb 12181	R
13.	CoLk 12206	R
14.	CoLk 12205	MS
15.	CoPant 12225	R
	AVT(ML) I	
1.	CoPb 11214	MR
2.	CoS 11232	R
3.	CoLk 11204	R
4.	CoH 11263	MR
5.	CoLk 11206	MS
	AVT(ML) II	
1.	CoPb 10182	MR
2.	CoH 10262	MR
3.	CoPant 10221	MR
4.	CoPb 10181	R
5.	Co 10036	MR
	Checks	
1.	CoJ 64	R
2.	CoPant 84211	MR
3.	CoS 767	MS
4.	CoS 8436	R
5.	Co 1148	MR
6.	Co 1158	MR
7.	CoSe 95422	MR

8.	CoPant 97222	MR
9.	CoLk 7701	MR

YLD severity scale

0.0 - 1.0	Resistant
>1.0 – 2.0	moderately resistant
>2.0 – 3.0	moderately susceptible
>3.0 – 4.0	Susceptible
>4.0 - 5.0	highly susceptible

PP 22: Survey of naturally occurring sugarcane diseases

Sl.No.	Disease	Name of area surveyed (Mill zone)	Disease incidence	Varieties surveyed	Crop stage when observed
1.	Redrot	Sitarganj, Kiccha, Gadarpur, Bajpur Distt. U.S.Nagar Laksar, Liberhedi, Iqbalpur Distt. Haridward Doiwala, Dehradun	Plot of 1.0 acre of CoS 767 was found severely infected in Doiwala. Severe incidence in CoS8436 in Gadarpur	CoPant97222, CoS8436, CoS767, CoS88230, CoPant 5224, CoPant 3220, Co 0238, CoH 160, CoH 167, CoPant 99214, Co 89003, CoJ 85, CoJ 88, UP 9530, CoSe 5125, Co 118	August onwards
2.	Smut	do	Low incidence observed in CoPant 5224 in Khatima	do	May-July Octo.-January
3.	Wilt	do	CoS 767 and Co 0238 was found infected in Liberhedi, CoS 88230, CoS 767 in Doiwala	do	September onwards
4.	GSD&Albino	do	Co 0238 in Liberhedi, CoS 8436 in Iqbalpur, CoS 95255, CoPant 92423, CoS 96268, CoS 88230 in Laksar, CoPant 3220, Co 0238, CoH 160 in Doiwala, CoPant 3220, Co 0238, CoS 8436 in Sitarganj	do	August onwards
5.	Foliar disease (ring spots, leaf streak and eye spots)	do	Scanty to mild in almost all the varieties. Most severe on CoPant	do	August onwards

			99214, CoS 88230, Co 118, CoS 767, CoS 96268, CoPant 92423 in Khanpur, Laksar and Iqbalpur area		
6.	Banded Sclortial Disease	do	Mild in CoPant 99214	do	During rainy season
7.	YLD	do	Scanty, seen in some pockets	do	November onwards
8.	Pokkah boeng	do	Mild to severe in most of the varieties except CoPant 3220. However, most severe in Co0238 at all places	do	

Note: Survey on incidence of different diseases is based on our own visits, feed back received from farmers, cane department and mill officials.