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AICRP ON SUGARCANE PATHOLOGY



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During 2013 crop season, 23 genotypes and five checks, obtained from Sugarcane breeder, Pantnagar were screened and evaluated for red-rot and smut diseases 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 05-04-2013 in D-6 block of N.E. Borlogue 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 **cotton swab method** were carried out on 21st August, 2013, and by **plug method** on 22nd and 23rd August, 2013. First row was inoculated with Cf-08 and second with Cf-09 pathotype. Both rows were divided into two equal halves; the first half was inoculated by cotton swab method whereas the second half by plug method.

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.

Data on disease reaction are being presented in **Table 1**. In cotton swab method identical reactions for both the pathotypes were recorded where 05 genotypes were found resistant, 11 moderately resistant, 5 moderately susceptible and 2 susceptible (CoPb-09181 and CoH-08263). In plug method again similar reactions for both the pathotypes were recorded with 1 resistant, 6 moderately resistant, 9 moderately susceptible 5 susceptible and 2 highly susceptible (CoPb-09181 and CoH-08263).

Table 1: Performance of sugarcane genotypes against Red-rot (2013-14)

Genotypes	Cotton Swab		Plug	
	Cf-08	Cf-09	Cf-08	Cf-09
IVT (Early)				
Co-10035	-	-	-	-
CoH-10261	-	-	-	-
CoS-10231	-	-	-	-
IVT (ML)				
CoH-10262	MR	MR	MS	MS
CoPb-10181	MR	MR	MS	MS
CoPb-10182	MR	MR	MR	MR
CoPb-10211	R	R	R	R
Co-10036	-	-	-	-
Co-10037	-	-	-	-
Co-10039	-	-	-	-
CoH-10263	-	-	-	-
CoPb-10183	-	-	-	-
CoPant-10221	-	-	-	-
AVT (Early) I				
CoH-09262	MR	MR	MS	MS
CoH-09263	MR	MR	MR	MR
CoLk-09202	MR	MR	MS	MS
CoPb-09181	S	S	HS	HS

CoS-09246	MR	MR	MS	MS
AVT (Early) II				
CoPb-08211	MR	MR	MS	MS
CoPb-08212	MS	MS	S	S
CoS-08233	MR	MR	MS	MS
AVT (ML) I				
Co-09022	R	R	MR	MR
CoH-09264	MS	MS	S	S
CoLk-09204	MR	MR	MS	MS
CoPb-09214	MS	MS	S	S
CoS-09232	R	R	MR	MR
AVT (ML) II				
CoH-08262	MR	MR	MS	MS
CoH-08263	S	S	HS	HS
CoH-08264	MS	MS	S	S
CoPb-08217	MS	MS	S	S
CoS-08234	R	R	MR	MR
CoS-08235	R	R	MR	MR
Checks				
CoJ-64	MS	MS	MS	MS
CoPant-84211	MS	MS	MS	MS
CoS-767	MS	MS	MS	MS
CoS-8436	MS	MS	MS	MS
Co-1148	MS	MS	S	S

(-) could not be planted as the seed material was not made available

0.0-2.0	R
2.1-4.0	MR
4.1-6.0	MS
6.1-8.0	S
Above 8.0	HS

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 23 genotypes only CoH-10262 and Co-8235 were found resistant whereas, 4 were found moderately resistant. Remaining 17 genotypes showed various degrees of susceptibility. Among them 8 moderately susceptible, 5 susceptible and 4 genotypes were found highly susceptible. Maximum disease incidence (53.3%) was recorded in CoS-09232 followed by CoH-08264 (37.5%), Co-09022 (36.3%) and CoPb-08217(33.3%).

Table 2: Performance of sugarcane genotypes against Smut (2013-14)

Genotypes	Reaction
IVT (Early)	
Co-10035	-
CoH-10261	-
CoS-10231	-
IVT (ML)	
CoH-10262	R
CoPb-10181	MS
CoPb-10182	MS
CoPb-10211	S
Co-10036	-
Co-10037	-
Co-10039	-
CoH-10263	-
CoPb-10183	-
CoPant-10221	-
AVT (Early)I	
CoH-09262	MS
CoH-09263	MS
CoLk-09202	MR
CoPb-09181	MS
CoS-09246	S
AVT (Early) II	
CoPb-08211	MR
CoPb-08212	MS
CoS-08233	MS
AVT (ML) I	
Co-09022	HS
CoH-09264	S
CoLk-09204	MR
CoPb-09214	S
CoS-09232	HS
AVT (ML) II	
CoH-08262	MR
CoH-08263	S
CoH-08264	HS
CoPb-08217	HS
CoS-08234	MS
CoS-08235	R
Checks	
CoJ-64	S
CoPant-84211	S
CoS-767	S
CoS-8436	S
Co-1148	S

(-) could not be planted as the seed material was not made available

R= Resistant (0%)

MR= Moderately Resistant > 0-10%

MS= Moderately Susceptible > 10-20%

S= Susceptible > 20-30%

HS= Highly Susceptible above 30%

PP 22: Survey of naturally occurring sugarcane diseases

Sl. No.	Disease	Name of area surveyed	Disease incidence	Varieties affected	Crop stage when observed
1.	Redrot	Sitarganj, Kiccha, Gadarpur, Kashipur, Bajpur Sugar Mill, area, Distt. U.S.Nagar Laksar, Liberhedi, Iqbalpur mill area Distt. Haridwar	in traces	CoPant-97222, CoS-8436, CoS-767, CoS-88230, CoPant-99214, Co-0238, Co-0118	August onwards
2.	Smut	do	Observed at some places	CoPant-97222, CoPant-90223, CoS-767 CoS-8436	May-July Octo.-January
3.	Wilt	do	scanty	CoS-8436, Co-0238, CoPant-3220	September onwards
5.	GSD&Albino	do	Scanty to mild	Co-88230, CoPant-3220 CoPant-99214, CoS-767, Co-0238	August onwards
6.	Foliar disease (ring spots and eye spots)	do	Scanty to mild	CoS-88230, CoPant-3220 CoPant-99214, CoS-767, Co-0238	August onwards
7.	Banded Scortial Disease	do	Mild	CoPant-3220, CoS-767, CoS-8436, CoPant-99214	During rainy season
8.	YLD	do	Scanty, seen in some pockets	CoS-767, CoS-8436	November onwards
9.	Pokha boeng	do	Low to Mild	CoS-88230, CoPant-3220 CoPant-99214, CoS-767, Co-0238, CoS-8436, Co-0118	Most severe in Haridwar on CoS-88230 and CoS-8436
10.	Mosaic	do	Low to Mild	CoS-88230,	Observed at some places in Haridwar

Note: survey on incidence of different diseases is based on feed back received from Millers, Cane department officials, farmers, and our own visits.

PP 30: Assessment of field resistance in sugarcane to red rot

As per technical programme 14 genotypes were selected for this trial. The trial was planted in single replication with two rows of 3.0 mts length. One Kg. of partially broken sorghum grain and sand mixture (1:3 ratio) mixed with 100 ml of distilled water. The thoroughly mixed medium was sterilized at 15 lb pressure for 2 hours and after two days the medium was inoculated with pathogen Cf-08) and kept for 15 days in incubation. The inoculum was applied in furrows and on the setts just before planting. Disease development in each row was recorded by death of settlings, yellowing and drying of leaves, mid-rib lesions in the whorl and production of dead hearts. Presence of *Colletotrichum falcatum* was confirmed by isolating the pathogen from the affected plant.

S.No.	Variety/Genotype	Resistance Level	Symptoms observed	<i>C. falcatum</i> recovered Yes/No	Any other information
1.	Co H-7261	S	SY, SM, LY	Yes	
2.	CoS-9231	S	SY, SD, SM	Yes	
3.	CoPb-8217	S	SY, SD, LD	Yes	
4.	CoLk-7203	S	SY, SD, LD, CD	Yes	
5.	CoH-09261	S	SY, SM, LY	Yes	
6.	CoLk-9204	S	SY, SM, LY	Yes	
7.	CoPb-9181	S	SY, SD, SM	Yes	
8.	CoPb-9214	S	SY, SD, LD	Yes	
9.	CoPb-7213	S	SY, SD, LD	Yes	
10.	CoLk-7201	S	SY, SD, SM	Yes	
11.	CoPant-84211	MR	No symptoms	No	
12.	CoS-8436	MR	No symptoms	No	
13.	CoJ-64	S	SY, SD, LD, CD	Yes	
	CoS-767	S	SY, SM, LY	Yes	

* Evaluation based on SY (65), SM (90), CR (150), LY (160), CD (180)